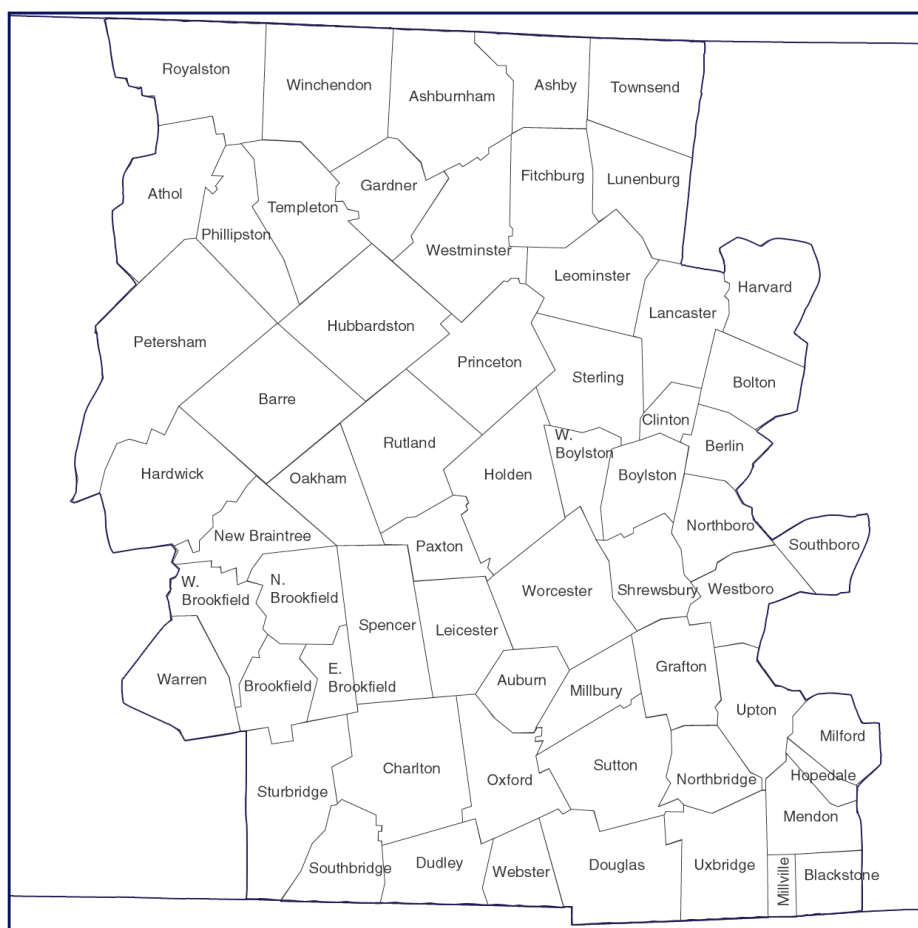


HISTORIC & ARCHAEOLOGICAL RESOURCES OF CENTRAL MASSACHUSETTS

A Framework for
Preservation Decisions



MASSACHUSETTS
HISTORICAL COMMISSION

William Francis Galvin

Secretary of the Commonwealth
Chair, Massachusetts Historical Commission

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A Framework for Preservation Decisions

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**Foreword to the 2007 PDF Reprint Edition of
*Historic and Archaeological Resources of Central Massachusetts:
A Framework for Preservation Decisions***

In the late 1970s, the Massachusetts Historical Commission (MHC), like many state historic preservation offices, recognized the need for a more comprehensive understanding of the historic and archaeological resources of the Commonwealth to inform its decision-making processes. While Massachusetts had been a national leader in historic preservation, overall preservation planning efforts still seemed too biased toward a limited range of historic periods, places, events and people. The staff of the Commission felt that decisions on where to direct efforts to protect and preserve properties and sites had to be grounded in a better and more holistic understanding of the types and locations of cultural resources that characterized communities across the state. These efforts to move toward more comprehensive, resource-based decision-making took the form of a special one-year, National Park Service funded study. The result was a groundbreaking, statewide preservation plan: ***Cultural Resources in Massachusetts: A Model for Management***, published in 1979.

In ***Cultural Resources in Massachusetts: A Model for Management***, the MHC advocated an interdisciplinary approach to the assessment and management of the Commonwealth's cultural resources. This approach measured the significance of properties and sites in terms of the broad, anthropological patterns of historical development of the regions and communities of the state. The ***Model for Management*** called for a cultural landscape approach to preservation planning that considered representative and outstanding cultural resources as expressions of the successive patterns of social, cultural and economic activity that shaped and defined communities. To establish local and regional contexts and a uniform baseline of field-observation and artifact derived information on the types and locations of resources, the Commission undertook a statewide reconnaissance level survey. The state was organized into eight study units, and within each study unit, the survey proceeded town-by-town. A major innovation was the assembly of an interdisciplinary team to undertake each regional study unit survey. Each team included members trained in architectural history, historical geography, industrial history, historical archaeology, and prehistoric archaeology.

Three primary products resulted from the statewide reconnaissance survey: 1) individual reports on each surveyed city and town; 2) an accompanying set of thematic maps for each town, produced on transparent polyester sheets overlaid on a USGS topographic mosaic base map; and 3) a summary regional report on each surveyed study unit. The findings and recommendations of the survey teams provided a key organizational framework for the Commission's preservation planning efforts through the 1980s and 1990s. Intensive communitywide surveys and National Register nominations followed the contextual frameworks established by the reconnaissance program.

Although preservation planning concerns have evolved, and the levels of preservation planning activity have advanced considerably across the state, researchers and planners still find the thematic contexts in these reports useful. Long out of print, the completed reports for five regions and the town reports for seven regions⁵ are now available in electronic format.⁶ Users should keep in mind that these reports are two decades or more old. The information they contain, including assessments of existing knowledge, planning recommendations, understanding of local and regional developments, and bibliographic references all date to the time they were written. No attempt has been made to update this information.

Michael Steinitz
Director, Preservation Planning Division
Massachusetts Historical Commission

⁵ Completed regional reports include those for the **Boston Area** (1982), **Southeast Massachusetts** (1982), **Connecticut Valley** (1984), **Central Massachusetts** (1985), and **Cape Cod and the Islands** (1987). Regional reports for **Eastern Massachusetts** and **Essex** were never completed, and the survey was not initiated for the **Berkshire** study unit.

⁶ Electronic text was not available for digital capture, and as a result all reports have been scanned as pdf files. While all have been processed with optical character recognition, there will inevitably be some character recognition errors.

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INTRODUCTION

The purpose of this introductory section is two-fold: to explain why this report was written and what led up to it, and to describe the kind of information covered in the report.

To answer the first question, why the report was written, it is necessary to review some of the history of the Massachusetts Historical Commission (MHC). The MHC was established in 1963 by Massachusetts General Law Chapter 9 Sections 26-27C. This legislation recognized that state government had a responsibility for the preservation of historic and archaeological resources within the Commonwealth. With the passage of the National Historic Preservation Act in 1966, the Federal government took a similar position toward protecting historical and archaeological resources which might be threatened by Federal actions. This act, and subsequent amendments, also directed each state to appoint a State Historic Preservation Officer (SHPO) who would administer the new regulations on the state level and coordinate local, state, and Federal preservation efforts. In Massachusetts, the office of the SHPO is the Massachusetts Historical Commission.

The MHC has developed a number of preservation programs and has given priority to the following functions: compilation of a statewide inventory of above- and below-ground cultural resources, nomination of eligible sites and properties to the National and State Registers of Historic Places, and protection of prehistoric and historic sites and properties through the use of state and Federal environmental review programs. In each case, the MHC and

its staff are constantly required to make decisions of significance. In other words, what makes a building or site historic? Is it historic enough to be listed on the National Register? Is it historic enough to alter the course of a town sewer project, a state road or construction of a Federal interstate highway? Faced with the need to answer these kinds of questions on a daily basis, it soon became apparent that the MHC required a better base of information from which consistent and informed decisions could be made. Decisions on what should be protected and preserved had to be grounded in a firm understanding of what resources were there.

In an effort to move toward resource-based decision making, the MHC applied for a grant from the Heritage Conservation Recreation Service (now part of the National Park Service, Department of the Interior) in 1979. The purpose of this grant was to outline a program which would provide the kind of information the MHC required. The result was Cultural Resources in Massachusetts, a Model for Management (MHC, 1979).

The Model for Management made several recommendations. First, it recommended that the MHC undertake a statewide reconnaissance survey in order to create a data base which would allow decisions to be made in a consistent and defensible manner. Far from replacing the inventory work of local historical commissions and other groups, this statewide survey would be a supplement, building on existing information and making it more comprehensive. This survey would include both above-ground resources (buildings and other standing structures) and below-ground resources (archaeological sites), and would treat both in an integrated manner.

The second recommendation was that this state survey employ an interdisciplinary, social science approach. Previously, the MHC had evaluated

properties on the basis of their aesthetic merits or historical associations. A social science-based survey would emphasize context, development, and function. From this basis, many groups of resources which had previously received little attention, such as vernacular buildings and historic landscapes, assumed a greater importance.

Finally, the Model for Management set forth a general methodology for carrying out this statewide survey. There would be two related approaches: one focusing on prehistoric resources (Paleo-Indian through Late Woodland periods), the other concentrating on the historic period (1500-1940) and concerned with standing structures and landscapes as well as archaeological sites. In addition, the state was divided into eight study units based on a combination of topographic and political boundaries. A theoretical framework for more detailed surveying was also provided, one which looks at development in terms of core areas, peripheral areas, and corridors. These terms are defined in the introduction to Chapter 3, "Settlement and Social Development."

The state survey project began in the fall of 1979 and has proven an efficient and effective means for providing the information which the MHC requires. During the past five years, survey work has been completed for over two hundred and sixty towns and cities across Massachusetts. This report summarizes the development of the Central Massachusetts study unit, which includes the sixty towns and cities in Worcester County, as well as the Middlesex County towns of Ashby and Townsend. It is the fourth study unit report to be completed.

This leads to the second question: what kind of information is included in this report and how is it presented? As noted above, the state survey is based on the efforts of an interdisciplinary team. The Central Massachusetts

prehistoric team included Eric Johnson and Thomas Mahlstedt. The historic team was composed of four people, each of whom brought a particular skill and knowledge to the project. Claire Dempsey served as the historical archaeologist, Michael Steinitz as the team's geographer, Myron Stachiw as industrial historian, and Charlotte Worsham as the architectural historian. James W. Bradley, the Survey Director, was responsible for organizing and directing the completion of this project.

This report marks the culmination of the survey team's work within the Central Massachusetts study unit. During the previous year, the survey team completed reports and maps for each town and city within the study unit. Each town report summarizes the development of that community from 1500 to 1940. A description of topography and political boundaries, and an historic overview introduce the town. For each period (the four and a half centuries are subdivided into seven periods), information on Transportation, Population, Settlement, Economic Base, and Architecture is summarized. These town reports are based on documentary research (both primary and secondary) and reconnaissance level survey of the town. See MHC's State Survey Scope of Work for additional details (MHC 1980c). The town reports are important for two reasons. First, they are the underpinnings of this report. The process which resulted in this document has been an inductive one, from the sources to the town reports to this summary report. Second, the town reports provide much more detail than does this study. The purpose here is to look at towns in the context of their neighbors to discern what broad developmental trends have taken place. If one wants greater detail on what occurred within a particular city or town, the town report, available at the MHC, should be consulted.

A few additional comments are necessary to introduce the sections of this report. The first two chapters are designed to preface those that follow. The first, which provides an overview of the study unit's topography, was written by Myron Stachiw and Eric Johnson. The second chapter reviews the study unit's prehistory. Written by Eric Johnson and Thomas Mahlstedt, this chapter is drawn primarily from the work done by the prehistoric team of the state survey project.

The third chapter focuses on the processes of settlement and social development. This is the most widely ranging and comprehensive portion of the report. The following topics are discussed: Regional Events, Transportation, Settlement, Population, Core-Periphery Relationships, Survivals, and Research Topics. Claire Dempsey was responsible for Regional Events, Settlement, and Core-Periphery Relationships for the Contact-Plantation and Colonial periods, and for all the Population sections. Michael Steinitz wrote all the Transportation sections and the Settlement sections for the Federal through Early Modern sections. Together, Dempsey and Steinitz wrote the later Regional Events sections and the Research Topics. Steinitz was assisted by Dempsey in the later Core-Periphery sections and in map preparation. Chapter Four, written by Charlotte S. Worsham, concerns architectural development. The emphasis is on the changing form of building types, and secondarily on their ornamentation or stylistic designation. The fifth chapter, written by Myron O. Stachiw, reviews the agricultural and manufacturing basis of the study unit's economy. The economic activities of the study unit are reviewed in terms of their development, relationship to one another, and surviving components. The last chapter, "Management Recommendations," summarizes impacts and development since 1940 and recommends both general and specific priorities for survey and protection.

As noted above, this document is a result of the Massachusetts Historical Commission's need to have an information base from which preservation decisions can be made in a consistent and defensible way. As a result, this study is designed primarily to serve the needs of the MHC and its staff. It is our hope and expectation, however, that other groups--public and private, amateur and professional--will also find this information useful.

Several acknowledgements need to be made, both to organizations and to individuals who have made important contributions. Particular thanks go to three Worcester County foundations: the George F. and Sybil H. Fuller Foundation, the George I. Alden Trust, and the Stoddard Charitable Trust for their generous grants in support of this project. Margaret Donovan provided editorial assistance and, with the help of George, Betty, and Anna Maria, produced the final copy. Thanks also go to Shirley Southworth and David J. Brady for their work in drafting the maps and designing the graphics for the report, as well as to Andre Suarez, who supervised the reproduction of the report. Finally, thanks go to John L. Brooke, History Department, Tufts University, and the members of the Massachusetts Historical Commission subcommittee, whose comments and criticisms helped to shape this report. The subcommittee members include Dena F. Dincauze, Louis Tucker, and John Worrell.

CHAPTER I
TOPOGRAPHIC OVERVIEW
Eric Johnson and Myron Stachiw

The Central Massachusetts study unit includes all of Worcester County with the addition of the towns of Ashby and Townsend from northwestern Middlesex County. This 1,500-square-mile area roughly coincides with the central uplands region of Massachusetts, also known as the Worcester Plateau. The plateau is divided into eastern and western sections by the Blackstone, Quinsigamond and Nashua river valleys. Although the region is characterized by rugged terrain, deeply dissected by numerous watercourses, it is classified as a plateau because of the general uniformity in elevation of the ridge tops and undissected surfaces. Exceptions to this uniformity occur in the form of monadnocks, isolated mountains that rise high above surrounding ridges. The two highest elevations in the study unit, Mt. Wachusett in Princeton (2,006 feet above sea level) and Mt. Watatic in Ashburnham (1,832 feet above sea level) are typical of monadnocks. Elsewhere, elevations generally rise to the north and west, toward the New Hampshire uplands, of which the Worcester Plateau is the southern end.

The location of the central uplands region, separating the coastal lowlands and Merrimack River Basin in the east from the Connecticut River Valley in the west, has made it an impediment, although not an impenetrable barrier, to east-west travel and communication from prehistoric times to the present.

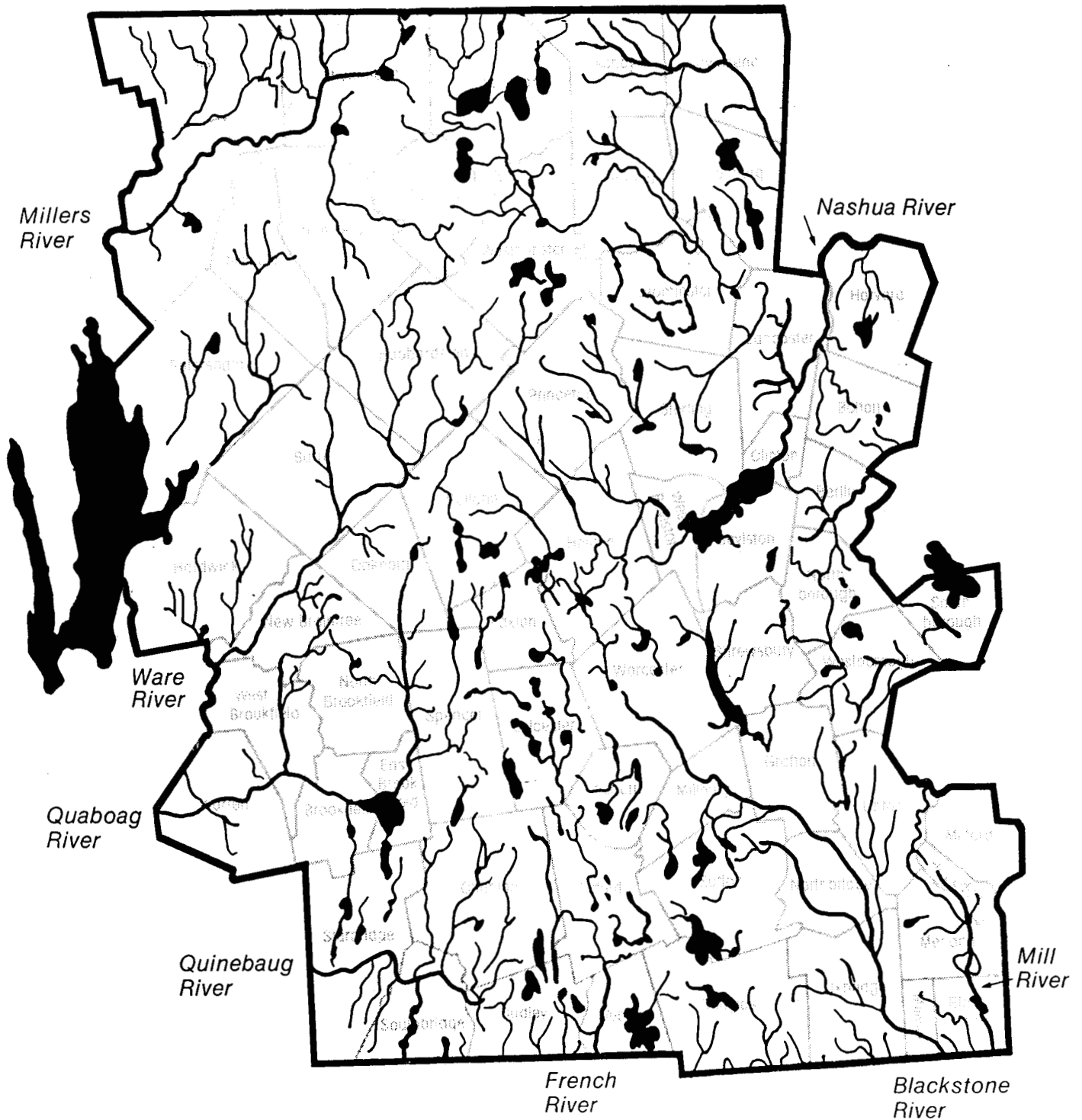
A number of rivers cut in to the uplands, where their headwaters are located. These waterways provide access corridors to and from a wide surrounding area, including the coastal lowlands bordering Long Island Sound and Massachusetts and Narragansett bays, as well as the Connecticut and Merrimack valleys. However, because none of these rivers completely transects the Worcester Plateau, their role in through transportation has been limited. Historically the most important corridors through the region have followed overland routes.

Many of the waterways of Central Massachusetts are swift flowing streams, fed by numerous swamps, ponds, and lakes, particularly in headwater areas, with abundant rapids and falls along their courses. These were well suited for both prehistoric fishing stations and historic waterpower sources. See Map 1.

The eastern part of the Central Massachusetts study unit is drained by the Charles, Assabet, Sudbury, Nashua and Blackstone rivers. The first three are located, for the most part, to the east of Worcester County. Only their headwaters and extreme upper reaches are situated within the study unit. The Assabet and Sudbury are tributaries of the Concord River, which is part of the Merrimack River Drainage.

The Nashua River is also a member of the Merrimack Drainage; however, its course lies mostly within the study unit. The Nashua's major tributaries are the Quinapoxet, North Nashua, and Squannacook, which flow southeast from their respective sources in Princeton, Fitchburg, and Townsend. The Nashua River itself begins at what is now the Wachusett Reservoir in the Boylston area. From the reservoir's outlet at Clinton the river flows northeast, emerging from a narrow gorge into the broad Nashua Valley near its confluence with the North Nashua at South Lancaster. The Nashua exits the study unit at Harvard and empties into the Merrimack at Nashua, New Hampshire.

Major Rivers, Streams, Lakes and Ponds



The Blackstone River drains the southeastern portion of the study unit, as well as much of Rhode Island and portions of eastern Connecticut. Originating in the Worcester area, the Blackstone flows south and east, emptying into Narragansett Bay at Providence, Rhode Island. The Blackstone's three principal tributaries in the study unit are: the Quinsigamond River, which flows south from Lake Quinsigamond to its confluence with the Blackstone at Grafton; the Mumford River, which runs east and south from Sutton, meeting the Blackstone at Uxbridge; and the Mill River, which flows south from Mendon and empties into the Blackstone at Woonsocket, Rhode Island.

The western portion of the study unit is drained by the Millers, Chicopee, and Thames rivers. The first two are tributaries of the Connecticut River, New England's longest river and largest drainage system. The Millers River drains the northwestern portion of Worcester County, running west from the Ashburnham area, exiting the study unit at Athol and entering the Connecticut River near Millers Falls.

The upper part of the Chicopee River Drainage, which includes the central portion of western Worcester County, is divided into three major tributaries: the Swift, Ware and Quaboag rivers. The three tributaries come together at the village of Three Rivers in Palmer, a short distance west of the study unit boundary. From Three Rivers the Chicopee River flows west, entering the Connecticut River at the town of Chicopee, Massachusetts.

The Swift River flows south from New Salem through what is now the Quabbin Reservoir. The river's East Branch drains a small portion of Worcester County, including most of Petersham and portions of surrounding towns. The Ware River Drainage forms the central section of the upper Chicopee Drainage. Arising in the Hubbardston area, the Ware flows southeast to Palmer. Its tributaries are generally small, south-flowing brooks.

The Quaboag River is the southern branch of the upper Chicopee Drainage. The Quaboag arises as two separate streams: the Fivemile and Sevenmile rivers. These flow south from Oakham and Spencer respectively; they unite in East Brookfield and continue south a short distance to Quaboag Pond. This is the largest natural water body in the study unit, covering 541 acres. From the pond's outlet in Brookfield the Quaboag River flows northwest as a wide, slow-moving river, flanked by broad, open wetland meadows. Near Wickaboag Pond in West Brookfield, the Quaboag turns to a more southwesterly direction, loses its wetland borders and flows swiftly through a much narrower valley, exiting the study unit in Warren.

The southwestern portion of the Central Massachusetts study unit is drained by the French and Quinebaug rivers, which are part of the Thames River Drainage. The French River flows south from its headwaters in the Leicester area through Webster, where it drains Lake Chaubunagungamaug. After leaving Worcester County at the Connecticut border it empties into the Quinebaug near Putnam, Connecticut.

From its headwaters west of the study unit, the Quinebaug River follows a looping course through the towns of Sturbridge and Southbridge. In this segment the river's tributaries are generally small streams with a northeast/southwest orientation. From Southbridge the Quinebaug flows southeast to the state border near the village of Quinebaug, Connecticut. Continuing south through eastern Connecticut, the Quinebaug becomes the Thames River at Norwich and empties into Long Island Sound at New London.

The bedrock foundation of Central Massachusetts consists of several north-south oriented bands of igneous and metamorphic rocks. The eastern portion of the study unit is largely comprised of crystalline granitic rocks with

the exception of the Nashua Valley region, which is underlain by fine grained crystalline slate-like rocks. The central part of the study unit is characterized by fine grained metamorphics, mostly phyllites with some quartzites and schists. The western portion consists primarily of granites in the north and schists in the south (Latimer, et al. 1927: 1548-49).

The bedrock structure has influenced the distribution of soils in the study unit because, although soils have been formed from glacial deposits, these deposits are primarily derived from local bedrock. The three principal bedrock formations are reflected in the overlying soils, which appear as three corresponding north-south soil belts. The eastern belt consists largely of Gloucester soils, with an area of Bernardston soils derived from the crystalline, slate-like bedrock in the vicinity of Lancaster. The Gloucester soils are generally sandy, loose, and stony. Where the stones are less abundant, as in parts of the eastern belt and far western portions of the county, Gloucester soils comprise some of the most important agricultural soils in the county. At least 75% of these lands were cleared and used for agriculture, largely mowing. The stonier Gloucester soils, where cleared of forest, were used mostly for permanent pasture, an important component of the widespread late 18th and early 19th century practice of raising cattle for market.

The central belt, ranging from five to fifteen miles in width, is dominated by soils of the Charlton and Paxton series. Because these soils are derived from finer grained rocks than are the Gloucester soils, their composition is less sandy, less loose, and less stony. The Charlton and Paxton soils are also more drought resistant than the Gloucester soils; they therefore support excellent grasslands. Because of the central soil belt's suitability to hay and

grasses and its lack of stones, machinery such as mowers and rakers could be used with little difficulty, making the area an important and progressive hay and dairying district by the mid 19th century.

The western soil belt consists largely of Brookfield soils and is characterized by a high percentage of iron-bearing minerals. The fine grained Brookfield loams are very important, productive agricultural soils, primarily used for mowing, pasture and cultivated crops. High hay yields have made this area a strong dairy producer from the 18th century to the present.

The prehistoric inhabitants of Central Massachusetts procured important mineral resources from bedrock outcrops, including quartz and quartzite for chipped stone implements, steatite or soapstone for carved vessels, and graphite for pigments. Soapstone was also quarried during the mid 19th century at Soapstone Hill in Dana; it was made into sinks, slabs, and talcum powder. A prehistoric graphite quarry in Sturbridge was also mined historically, beginning in the 17th century. The bedrock has also supplied granite for building stone; nearly every town in the eastern belt of granitic-gneissic bedrock operated small quarries from the 18th to the 20th century. The two principal granite-producing regions were the Fitchburg granite area, which extended from the Worcester area north into New Hampshire, and the Milford granite area, which extended from Westborough south to Cranston, Rhode Island. The widespread construction of granite mills and housing in the Blackstone and French river valleys attests to the importance of this material for construction during the first half of the 19th century. During the second half of the 19th century, the popularity of the Romanesque Revival architectural style of building in stone raised granite quarrying in the Fitchburg, Milford, Uxbridge and Townsend quarries to commercial involvement in national markets.

Other commercially important mineral resources extracted from Worcester County include slate, lime, coal, and bog iron. Slate was quarried in Lancaster as early as 1750 for use as slate roof tiles and gravestones. Lime was discovered in Bolton in the 1730s and was mined and fired in local kilns until the 1830s. Anthracite coal was mined in Worcester during the 1820s. Although used locally for several years, it was found to contain considerable impurities. Bog iron was found in relatively large quantities across the western part of Worcester County, particularly in West Brookfield, New Braintree and Hardwick, and contributed to the 18th and early 19th century development of blast furnaces in the area. The high iron content of the region's bedrock and soils was conducive to the process of bog iron ore formation. Although many of these various mining and quarrying operations saw temporary success, with the exception of building stone the economic importance of Worcester County's mineral resources has been limited.

The topography of Central Massachusetts has been strongly influenced by the structure and composition of the bedrock foundation. The orientation of hills and valleys often follows structural patterns in the bedrock and several stream channels coincide with faults. However, glacial erosion and deposition have also played an important role in determining aspects of topography and drainage.

Small-scale landforms in the Worcester uplands are primarily products of glacial, proglacial and postglacial erosion and deposition. The enormous volume of glacial ice, estimated to have been more than 1,800 feet thick over the present city of Worcester (Alden 1927: 37), contained tons of rock particles of all sizes incorporated into the ice mass as it scoured the land surface, smoothing the contours of hills and ridges as it advanced. Today,

upland areas are generally mantled with a veneer of ice-deposited till, a heterogeneous mix of clay, silt, sand, gravel, and boulders, through which bedrock occasionally outcrops. Till is the most widely distributed surficial deposit in the study unit (Motts and O'Brien 1981: 30). The thickness of this mantle averages less than fifteen feet (Alden 1927: 39); thus hills and ridges usually reflect the contours of underlying bedrock. However, many hills are actually mounds of till known as drumlins. These are typically low, rounded hills, tapered in the direction of the movement of the ice mass under which they were deposited and molded, sometimes over a bedrock core. Drumlins often display a clustered distribution; although they are found in all parts of the study unit, they are particularly dense in the areas around Lunenburg, Hubbardston, North Brookfield, Spencer and Charlton. The deep soils, gentle contours, and moisture retaining qualities of drumlins render them well suited to agricultural use.

The melting of the ice sheet, which commenced as early as 17,500 years ago, was a complex process which resulted in the deposition of a variety of small scale landforms in the central uplands, as in much of northeastern North America. As the ice melted, streams of meltwater carried away and redeposited much of the ice-bound rock particles. These sediments, known as stratified drift because the running water sorts or stratifies the sediments according to particle size, are typically associated with valleys and lowland areas and vary in form and composition according to the terrain at the time of deposition and the speed of meltwater flow. Flat-topped terraces of sand and gravel, known as kame terraces, are often found along valley walls where they were deposited by streams running along the sides of ice-choked valleys. Valley floors are often filled with stratified drift washed out from melting

ice. Sinuous, low ridges of sand and gravel, known as eskers, were deposited by streams running through channels in the ice.

Many stratified drift deposits are flat-topped, well drained, and relatively free of boulders. Clustered in valleys, they are also often close to water; because of these attributes they were often selected as sites for prehistoric habitation. Today the value of these landforms as sources of sand and gravel has resulted in the destruction of numerous prehistoric sites by quarrying, and many more are threatened.

Perhaps the most significant proglacial landforms in the Central Massachusetts study unit are deposits associated with glacial lakes. Glacial lakes formed when meltwater or other drainage was blocked or impeded by unmelted ice or deposits of glacial sediments. Typically these were temporary, dynamic water bodies, the shapes and levels of which changed as new outlets were cut through melting ice or unconsolidated sediments. The largest glacial lakes in the study unit existed in the Nashua and Quaboag valleys during the early postglacial period. In each case, unmelted ice blocked drainage and impounded meltwater into large lakes. The margins of these water bodies are often marked by kame deltas where meltwater streams entered the lake waters and dropped their loads of sediment. Kame deltas are characteristically flat-topped deposits of sand and gravel, which now lie stranded high above present water levels.

In the still waters of glacial lakes, fine particles of silt and clay settled. As a result, lake bottom deposits are typified by fine-grained sediments, often including beds of clay, and a flat or gently undulating terrain. The Nashua and Quaboag valleys both contain extensive lake bottom sediments; these have provided valuable stoneless agricultural land. In addition, clay deposits have

been used for prehistoric ceramics and for historic brickmaking. Brickyards and potteries have been operated in nearly every major river valley in the study area. The clay deposits used ranged from small isolated pockets of clay in the river valleys to extensive clay beds of the large glacial lake deposits. The largest historic brickyard in Worcester County was located in Leominster and used clay deposited at the bottom of Glacial Lake Nashua. Large brickworks were also located in the Brookfields in the area of Glacial Lake Quaboag.

In many places, subsurface layers of clay have impeded drainage, producing wetlands in former lake bottoms. Wetlands are also common in deposits of stratified drift, particularly in narrow valleys (Motts and O'Brien 1981: 30, 31). Wetlands have been important both prehistorically as sources of migratory fowl and other animal and plant resources, and historically as sources of livestock fodder, certain wood products, and bog iron.

As soon as the valleys of the central uplands were free of ice, the rivers began to alter the landscape, cutting their channels through the various landforms and sediments and in many places creating alluvial deposits or floodplains along their courses. Although alluvial areas provide flat, fertile land well suited to agriculture, the floodplains of Central Massachusetts are not as extensive as those of the Connecticut River Valley to the west.

Wind has also played a role in altering the postglacial landscape. Areas unaffected by riverine erosion and deposition were gradually mantled with a layer of eolian, or wind deposited, sand and silt. This layer varies greatly in thickness (for example, between 0-1.5 meters in parts of the Ware River Drainage) (Mulholland 1974: 111). These eolian sediments are significant in

that they probably contain a large proportion of the prehistoric cultural deposits not associated with alluvial areas of Central Massachusetts.

In summary, the Central Massachusetts study unit is an upland region which, in its topographic diversity, contradicts the stereotype of an uniform plateau. The radial pattern of drainage has made the uplands easily accessible from a wide surrounding region, but has rendered through travel somewhat more difficult. The numerous lakes, ponds, and swift flowing rivers have provided biotic and later, hydraulic, resources to the area's inhabitants. The diversity of landforms, sediments, and soils attributable to the structure and composition of the bedrock foundation and the complexities of glacial and postglacial erosion and deposition have made possible a variety of land use practices throughout the history of human occupation in the region.

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CHAPTER 2
PREHISTORIC OVERVIEW
Eric Johnson and Thomas Mahlstedt

Past Research

With few exceptions, amateur artifact collecting has dominated archaeological activity in Worcester County for more than 100 years. In comparison with eastern Massachusetts, the number of published reports on archaeological surveys, excavations, and problem-oriented studies from Central Massachusetts is extremely small. Most of the current information on the archaeology of the study unit comes from a few excavation reports of widely varying quality and the accounts of a few amateurs who have shared the results of their collecting over the years.

Interest in the prehistory of the region was often stimulated by historical writings, and late 19th century town and county histories often included references to original Native American inhabitants. Works such as Josiah Temple's 1887 History of North Brookfield described historic period Native settlements, lifeways and history, identified site locations, and occasionally included illustrations of local artifact collections (cf. Emerson 1879:22). Although they sometimes contained detailed information, these accounts were essentially descriptive and narrative in approach and were written with no knowledge of the true antiquity of Native American occupation in the region, something we have only recently begun to appreciate.

It was also during the late 19th century that professional archaeology began in Massachusetts. Most of this early work was sponsored by Harvard University and the Peabody Academy of Science under the direction of some of the leading "natural historians" of the day such as Jeffries Wyman, John H. Sears, and Frederick Ward Putnam. The goals of the first professional archaeologists were limited: to describe archaeological sites and artifacts and to obtain specimens for museum display. Consequently, early excavations concentrated on burials in eastern Massachusetts and the Connecticut River Valley and on coastal shell middens, leaving the central uplands virtually untouched. The only professional archaeologist known to have been active in Worcester County during this time was Putnam, who in 1895 excavated at a prehistoric soapstone quarry in Sutton, but published nothing beyond a brief description of his finds (Bullen 1940:14).

Amateur collecting continued to be the predominant form of archaeology in Central Massachusetts well into the 20th century, with several individuals amassing large collections of prehistoric artifacts. It was not until 1939, however, with the founding of the Massachusetts Archaeological Society, that collectors organized themselves and developed means of recording and exchanging information on site locations and prehistoric artifacts. The Society's Worcester County chapter, originally called the Nipmuck Chapter, was first organized in 1940 and brought together several prominent amateur archaeologists and collectors of the time, including C.C. Ferguson, W. Elmer Ekblaw, Lawrence Gahan and Karl Dodge. The chapter was formally recognized in 1946 (Ekblaw 1949:54-56) and was later renamed the Ekblaw Chapter. Although the chapter recorded dozens of site locations, these represented only a fraction of the sites that were actually collected, and descriptions of

recovered artifacts and features were often vague and uninformative. Unfortunately, some of the largest collections from this time (e.g. those of Ferguson, Dodge, Gahan, and Ekblaw) have been lost, sold or separated from their original provenience records. The Nipmuck-Ekblaw Chapter sponsored several excavations in the Brookfields (Ekblaw 1949:54-56) in addition to collecting forays in many parts of Central Massachusetts during the 1930s and 1940s. However, during the chapter's formative years, excavation reports were rarely written and, when published, were often no more than brief "preliminary reports" (cf. Ferguson 1947; Ekblaw 1949; Dodge 1965).

During the 1930s and 1940s the quantity and quality of archaeological research in Massachusetts increased. Worcester County was no exception to this general trend as both professional and amateur archaeologists were active and detailed excavation reports were published for the first time. Ripley Bullen was the first professional archaeologist to publish his results in any detail, reporting on the House Rock rockshelter (Bullen 1947) and the Dolly Bond steatite quarry and workshop in Millbury (Bullen 1940). The goals of the Dolly Bond study were modest but successfully achieved; Bullen described the quarry site in detail, discussed manufacturing technology for steatite ("soapstone") vessels and compared his findings with those from other steatite quarries in Worcester County and the northeastern United States.

Steatite quarries continued to be a focus of interest in Central Massachusetts during the late 1950s and early 1960s. From 1957 to 1962 William S. Fowler directed the Ekblaw Chapter's excavations at the Horne Hill soapstone quarry in Millbury, where Putnam had dug in the 1890s (Fowler 1966). Fowler's study focused on quarry tools and techniques of vessel manufacture,

which he compared among a number of Northeastern steatite quarries. This was also the first site in Worcester County for which radiocarbon dating techniques were employed.

Evidence of Paleo-Indian and Early Archaic occupation in Worcester County was first reported in 1963 from the Mill River site, which was excavated by Stanley M. Roop (Roop 1963). Other amateur excavations were conducted in Brookfield during the 1960s at the Oakholm site, which proved to be a large multicomponent habitation site on the shore of Quaboag Pond (Dodge 1965) and at a nearby burial site which yielded artifacts similar to those associated with the Early Woodland Adena mortuary complex of the Ohio Valley (Keith 1965). More recently, investigations have been reported from a rockshelter and a quartzite quarry in the eastern part of the study unit (Lemire 1975a; 1975b). Recent excavations sponsored by the Ekblaw Chapter have tended to be problem-oriented, focusing on a number of small sites in the Westborough area, where questions concerning lithic resource utilization, prehistoric chronology, and settlement patterns have been addressed (Hoffman 1984).

Amateur artifact collecting continued throughout the 1960s and 1970s and persists to this day. In the 1960s many large artifact collections were made from the Quabbin Reservoir when severe droughts had greatly lowered the water level, exposing many previously submerged sites.

The 1960s also saw the beginnings of cultural resource management and contract archaeology in Massachusetts. Burt Salwen's 1969 review of the known site inventory for the Connecticut River Drainage was the first cultural resource management study in New England. Salwen's study area included the western portion of Worcester County, where he noted areas with documented or expected archaeological sensitivity (Salwen 1969).

Contract archaeology greatly expanded during the decades following Salwen's survey. Over forty-five management studies have been carried out in Worcester County during the 1970s and 1980s. Many of these have been small-scale projects involving no more than single sites and adding little new information on the prehistory of Central Massachusetts. An important exception was the Route 146 survey, which identified a number of small, special purpose sites in the uplands of the Blackstone Drainage and documented the archaeological sensitivity of interior upland areas in Massachusetts (Public Archaeology Laboratory 1978). In 1978 a preliminary review of the archaeology of Worcester County assembled much of the currently available archaeological information for the county, pointed out biases in the data base, and suggested topics for future research in the area (Anthony 1978).

The most extensive cultural resource management study in Worcester County has recently involved both professional and amateur archaeologists in analyses of artifact collections from the Brookfield area, the Quabbin Reservoir region, and the Nashua Valley. Collections research conducted by the Massachusetts Historical Commission's Prehistoric Survey Team has identified nearly 100 previously unrecorded site locations and has supplied information on dates of occupation, activities, and research potential for many of these. Because of the extent of amateur collecting in the study area, collections research can yield a great deal more information in the future.

At present, our knowledge of the prehistory of Central Massachusetts is based on the few excavated sites mentioned above and the activities of those collectors who have been generous enough to share their information. The following discussion summarizes the distribution of known prehistoric sites in

the Central Massachusetts study unit for each of the generally recognized prehistoric cultural periods, arranged according to the drainage system in which they occur.

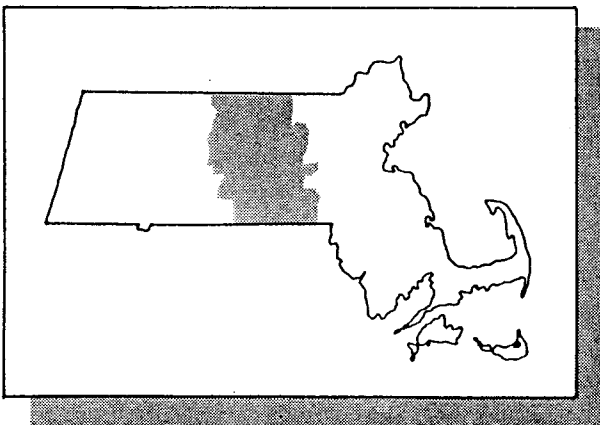
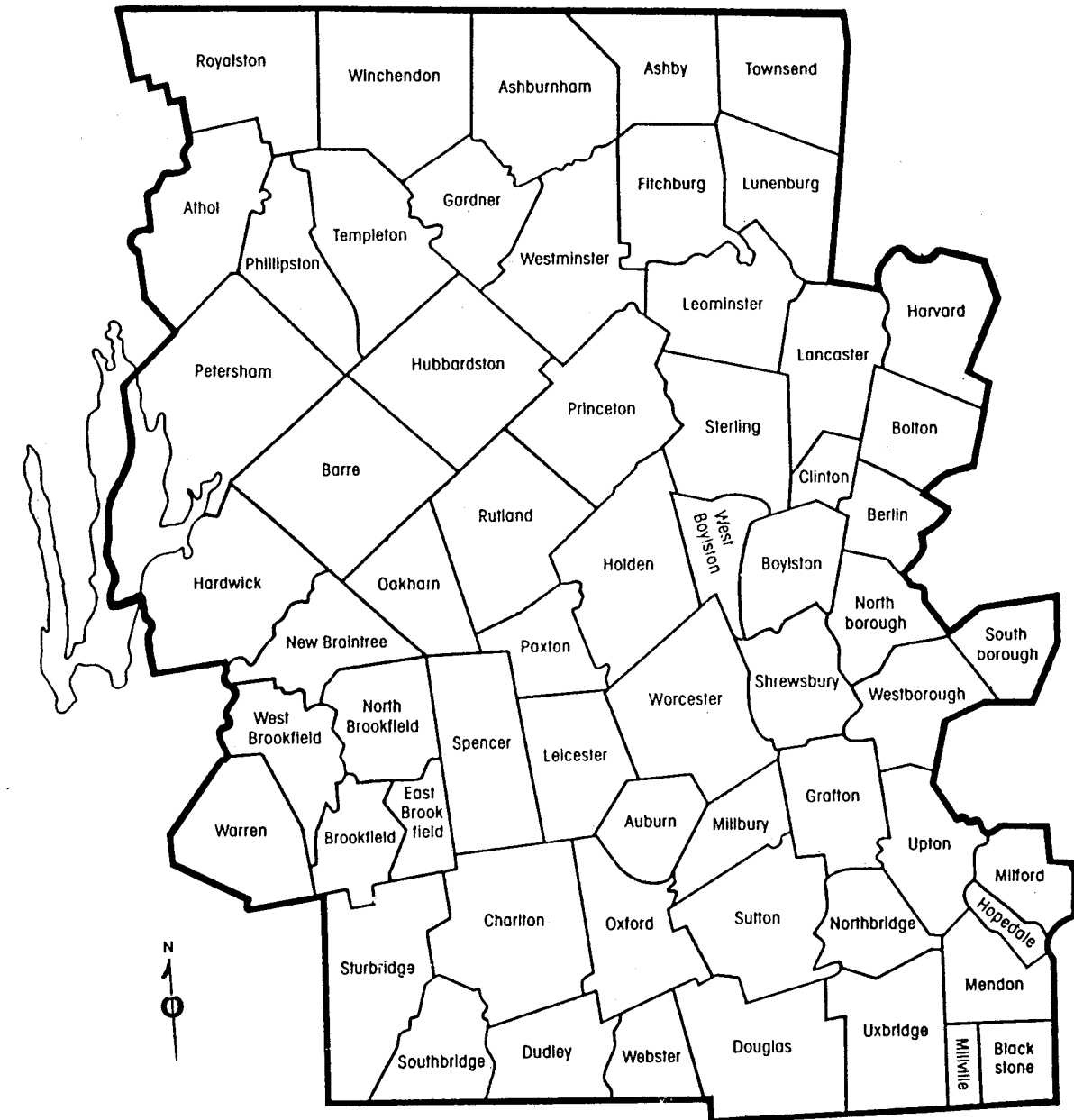
Paleo-Indian Period (12,000 to 9,000 B.P.)

Evidence for the presence of Paleo-Indian hunter-gatherers in the Central Massachusetts study unit is sparse. Only two sites with confirmed Paleo-Indian associations are presently known, although there are three additional reputed occurrences. Only one of these sites has been excavated, and no contextual data accompany the finds of fluted points, which are considered diagnostic artifacts of the Paleo-Indian period.

Drawing from evidence from other parts of the Northeast it is likely that Paleo-Indians entered Central Massachusetts shortly after the retreat of the Wisconsin glacier, which occurred between 17,000 and 15,000 years ago (Sirkin 1967). Land exposed by the retreating ice mass was initially characterized by a tundra-like environment. This was succeeded by a spruce parkland-spruce woodland community, which dominated southern New England between ca. 12,000 and 9,500 B.P., when it was slowly replaced by a pine-oak forest (Davis 1969).

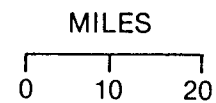
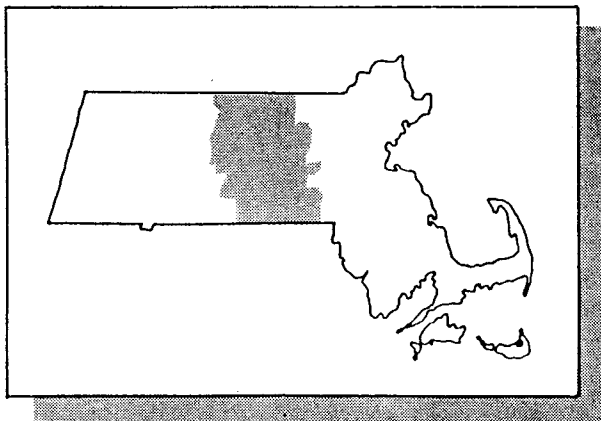
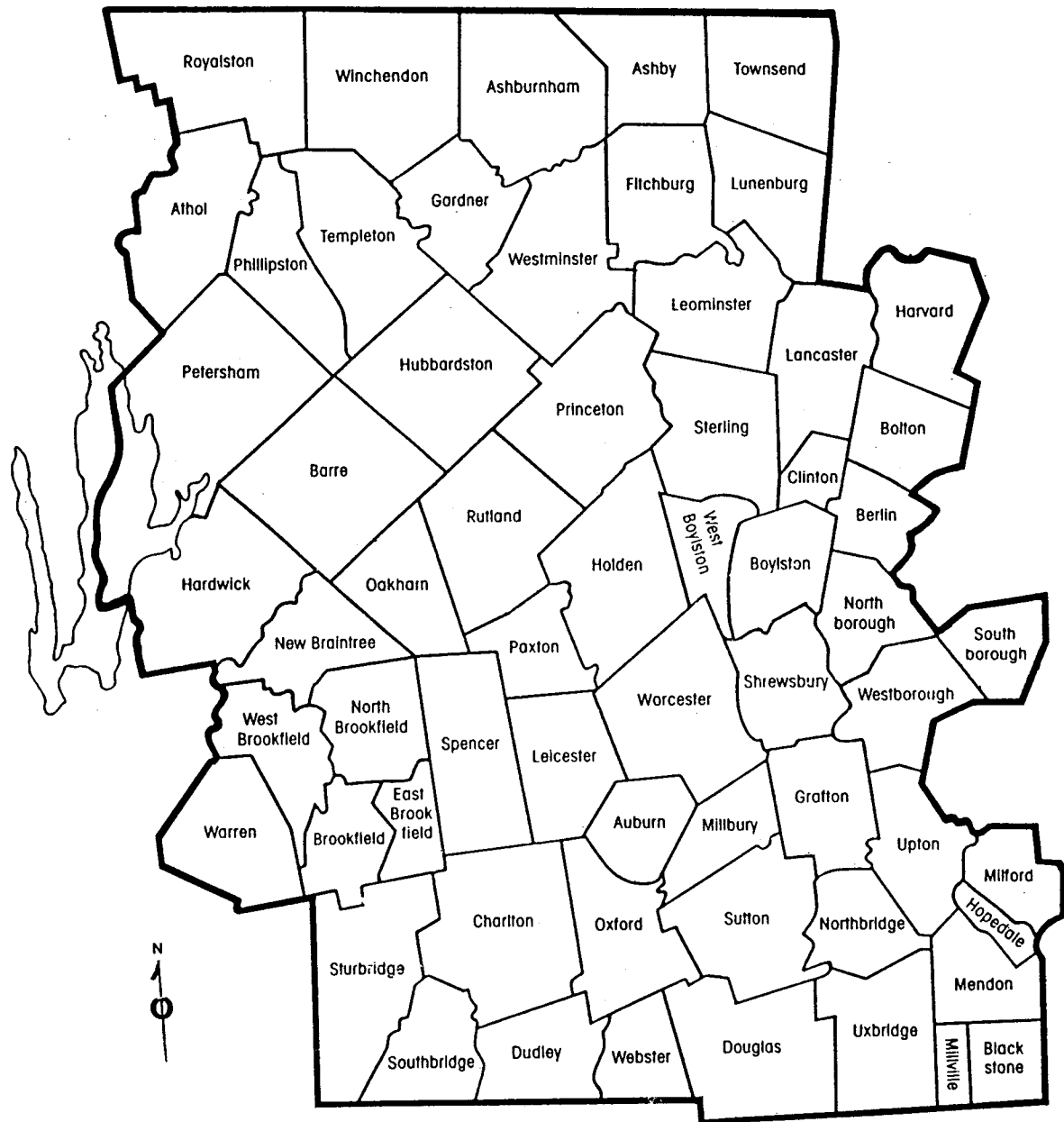
In Central Massachusetts sites with Paleo-Indian associations are reported from the Chicopee, Blackstone and Nashua river drainages. In the Chicopee Drainage fluted points have been surface collected by a number of individuals from several loci within a large, well known collecting area that borders the Ware River, a tributary brook and extensive wetlands (Johnson and Mahlstedt 1984a, 1984b). An unconfirmed recovery of a fluted point was made during the early 1960s at a site on the former East Branch of the Swift River (Quabbin Reservoir). Additional evidence of Paleo-Indian activity in the Chicopee

Cities and Towns

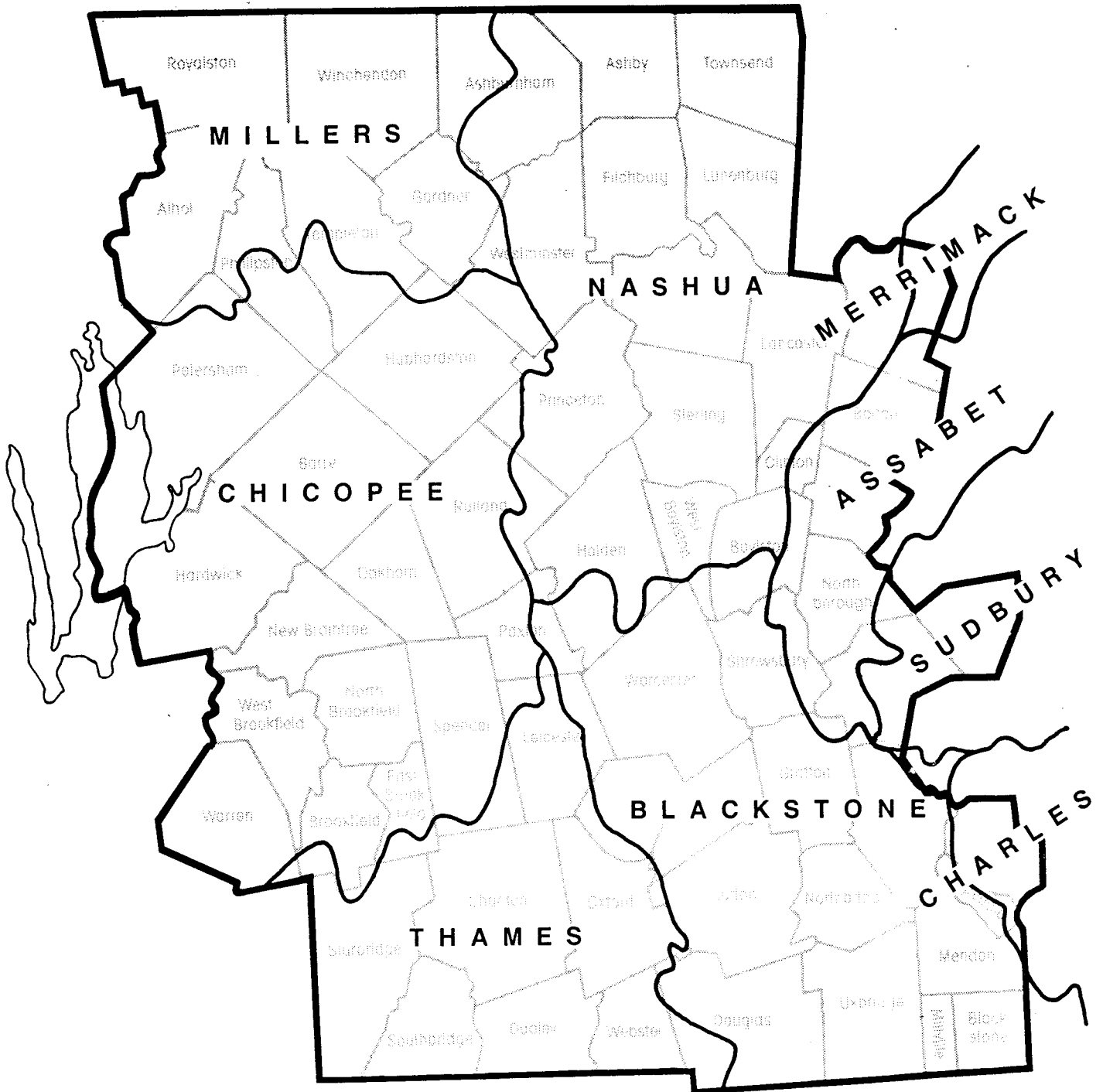


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Cities and Towns



Principal Drainage Systems



Drainage comes from a site on the former Middle Branch of the Swift River, in the town of New Salem, just outside the Central Massachusetts study unit. Partially submerged under the Quabbin Reservoir, the site was exposed by wave erosion and a fluted point was collected in apparent association with a stone hearth feature, suggesting a habitation site (Johnson and Mahlstedt 1984b). Two additional unconfirmed surface finds of fluted points have been reported from the Quaboag Pond area in the Chicopee Drainage.

The only other confirmed Paleo-Indian find in the study unit comes from the Mill River site, a multicomponent site located in Hopedale near the headwaters of the Mill River, a tributary of the Blackstone. Excavations in 1959 recovered a single fluted point (Roop 1963); however, no other Paleo-Indian materials or features were reported, suggesting that this may be an isolated find, not directly associated with a Paleo-Indian habitation area.

In the Nashua River Drainage, an unconfirmed find of a fluted point was made adjacent to a small pond in Lancaster (Anthony 1978).

It has been argued that Paleo-Indians were essentially big-game hunters, focusing their subsistence activities on the early postglacial megafauna such as mastodon and herd animals such as caribou (Funk 1976), and that they possibly contributed to the extinction of some of those species (Martin 1973). However, there is no conclusive evidence that Paleo-Indian adaptations in the Northeast focused on big-game hunting. Instead, arguments based on ecological principles contend that the high species diversity and instability of early postglacial ecosystems favored a flexible generalist subsistence strategy, one exploiting a wide range of food resources but focusing on no single species (Dincauze and Curran 1984; Eisenberg 1978). Regardless of their subsistence strategies, it is likely that Paleo-Indian population densities were low in the Northeast, with people organized in small, mobile groups.

Archaic Period (ca. 9,000 to ca. 3,000 B.P.)

The Early Archaic period (ca. 9,000-8,000 B.P.) is nearly as poorly represented in the archaeological record as the preceding Paleo-Indian period. Based solely on the presence of diagnostic Bifurcate Base points, ten sites in the study unit can be tentatively associated with Early Archaic activity. Of these, all but two are from surface collections and thus lack contextual data.

The incomplete and biased data on Early Archaic site distributions in Central Massachusetts and much of New England render reconstruction of settlement patterns difficult. A number of factors contribute to this problem, some of which also apply to our limited understanding of the preceding Paleo-Indian period. Early Archaic sites lacking diagnostic materials (e.g. Bifurcate Base, Kirk and Dalton points) may be unrecognized; diagnostic points have been described and dated only recently and, with the exception of the Bifurcate Base, are not widely known or easily recognized by Massachusetts collectors even today. Therefore, Early Archaic components may be underrepresented in the reports of early collectors that form a large portion of the current prehistoric data base for Central Massachusetts. In addition, many early sites have undoubtedly been deeply buried or destroyed by erosion during the thousands of years since they were occupied, and early site locations may have been chosen according to environmental features that are no longer evident.

The environment of southern New England during this time was characterized by a mixed pine-hardwood forest which succeeded the spruce woodland by about 9,500 B.P. (Davis 1969). This description of the forest is, of course, highly generalized; at a smaller scale, biotic communities vary

according to such factors as elevation, slope, aspect, drainage and soils. Central Massachusetts' complex topography and diverse soils probably supported an heterogeneous or "patchy" environment throughout prehistory.

Seven Early Archaic sites are known from the Chicopee Drainage. Bifurcate Base points have been collected from two sites around Quaboag Pond in Brookfield, from a site on a small tributary of the Quaboag River in Warren, from three sites located in close proximity to one another on the Ware River in New Braintree, and from a site on the former Middle Branch of the Swift River. Another Bifurcate Base find spot in the Swift River Drainage lies just west of the boundaries of the study unit in the town of New Salem.

Other evidence of Early Archaic activity in the study unit comes from the Blackstone Drainage, where the Mill River site produced a Bifurcate Base point from an uncertain context and with no directly associated features or other artifacts (Roop 1963). An unprovenienced Bifurcate found in the town of Sutton is currently the only other evidence of Early Archaic occupation in this drainage.

In the upper Concord (Sudbury) Drainage, a single Bifurcate Base point was excavated from a site at Hocomonco Pond in Westborough (Hoffman 1984). In addition, a number of Early Archaic sites and find spots are known to the east of the study unit in the lower portions of the drainage.

The wide variety of habitats in which Early Archaic materials have been found suggests that a multisite settlement system had been established by this time, with different site locations focused on the exploitation of different resources (Johnson 1984; D. Ritchie 1984). Settlement and subsistence systems of the Early Archaic were probably focused on seasonally abundant resources. This pattern appears to have persisted throughout later prehistory

and was an adaptation to New England's strongly seasonal ecosystems, which are characterized by extreme fluctuations in the availability of most wild foods.

During the Middle Archaic period (ca. 8000-ca. 6500 B.P.) climatic and biotic changes continued, and by 8,000 B.P. the mixed deciduous forests of southern New England were becoming established, although changes in forest composition would continue throughout prehistory. By this time the present seasonal migratory patterns of many bird and fish species had become established (Dincauze 1974), and important coastal estuaries were developing (Barber 1979).

Data from Central Massachusetts also indicate a preference for regionally and locally available lithic raw materials over exotic stone such as chert and jasper during the Middle Archaic. A high percentage of Middle Archaic projectile points inventoried from the Chicopee and Concord drainages were manufactured on felsites and argillites from sources in eastern Massachusetts, and on quartzites similar to those from known sources in Westborough and West Boylston. Quartzites were also probably available as riverine and glacial cobbles in many parts of Central Massachusetts.

Middle Archaic sites exhibit a somewhat higher density than those of earlier periods. In Central Massachusetts, Neville-like, Neville variant and Stark-like points, considered diagnostic of the Middle Archaic, have been recognized at twenty-two sites. Fifteen of these are clustered at five areas in the Chicopee drainage, reflecting the intensity of collecting in those areas. Six Middle Archaic sites are currently known around the margins of Quaboag and Quacumquasit ponds, and five sites occur in relative proximity to one another along a tributary of the Ware River. Other Middle Archaic components in the Chicopee Drainage occur at a site on the Quaboag River

(West Brookfield) and at the same submerged site in Hardwick where Paleo-Indian and Early Archaic period activity may also have occurred. Collection analysis has recently identified three additional Middle Archaic sites in the Swift River Valley in the town of New Salem, just west of the study unit.

Middle Archaic activity is poorly documented in the rest of the study unit. A site on a small pond in Warren currently provides the sole evidence for Middle Archaic activity in the Thames Drainage. Evidence for occupation in the Blackstone Drainage between 8,000 and 6,500 years ago comes from only four sites: the Mill River site in Hopedale, a site on a small pond near the floodplain of the Blackstone River in Uxbridge, Cracked Rock rockshelter in Millbury (which illustrates the relatively early utilization of this type of location), and some unprovenienced material from Sutton.

The only known Middle Archaic sites in the upper Concord River Drainage are Charlestown Meadows in Westborough, which is known to have been a focus of prehistoric activity for several thousand years, and a site recently identified on Muddy Brook in West Boylston. This stands in marked contrast to the high visibility of Middle Archaic activity characterizing the Concord and lower Sudbury rivers to the east of the study unit. However, this contrast may be a result of collector/sample bias and not an accurate reflection of prehistoric settlement patterns.

A single Middle Archaic projectile point from a site near a small upland pond in Leominster is presently the sole representative of this period in the upper Nashua Drainage.

Middle Archaic site density throughout southern New England is considerably higher than that of preceding periods, an observation that has been interpreted as evidence of increased population density (Dincauze 1974:45),

while the pattern of site distribution implies the utilization of virtually every available habitat (Barber 1979). The variety of site locations, variations in tool assemblages (McManamon 1979; Dincauze and Mulholland 1977), and recovered faunal remains (Thomas 1979) indicate that the multisite seasonal settlement system which may have developed in the preceding Early Archaic was undoubtedly established by this time. The distribution of Middle Archaic sites and the pattern of lithic resource use in southern New England have been interpreted as reflecting intensive use of locally available resources within established territories which were defined by river basins (Dincauze and Mulholland 1977:441; D. Ritchie 1979).

As many as eighty-seven sites have yielded evidence of Late Archaic (ca. 6,500-ca. 3,000 B.P.) occupation in Central Massachusetts. Each of the three commonly recognized Late Archaic cultural traditions--the Laurentian, Susquehanna, and Small Stemmed--are well represented in collections and at the few excavated sites. Orient Phase materials, dating from the end of the Late Archaic period, have also occasionally been found in the study unit.

The nature and significance of these three major Late Archaic traditions of southern New England have been topics of considerable debate and discussion (cf. Ritchie 1971; Dincauze 1975). The Laurentian Tradition, which may be the earliest of the three, is represented by a number of projectile point forms, including Otter Creek-like, Vosburg, Normanskill, Broad Eared, and Archaic Notched (i.e., Brewerton). Laurentian materials have been inventoried in surface collections and excavated from sites in Central Massachusetts (Roop 1963; Hoffman 1984). The predominant Laurentian Tradition point types in the study unit are the several varieties of Brewerton

points. These appear to have been manufactured primarily from locally available materials, particularly quartzites. In general, Laurentian Tradition components appear to have a somewhat higher visibility in Central Massachusetts than in the eastern coastal lowlands, a distribution which lends some support to the contention that the Laurentian Tradition represents an essentially interior, upland adaptation (Ritchie 1971; Dincauze 1974).

The Susquehanna Tradition is best known from a number of mortuary/ceremonial sites in eastern Massachusetts and in other parts of the Atlantic seaboard (cf. Dincauze 1968). In West Brookfield, a cache of more than sixty Wayland Notched-like blades, found in a stone-lined pit with red ochre by local collectors who never reported their results of their digging, is probably related to the Susquehanna Tradition mortuary complex. Artifacts associated with the Susquehanna Tradition (Atlantic, Susquehanna Broad, Wayland Notched points, and several varieties of bifacial blades) have been collected from a number of multicomponent sites in the study unit. In addition, Atlantic-like points were excavated at two Central Massachusetts sites (Roop 1963; Hoffman 1984); however, little contextual information is available for the excavated material.

The Small Stemmed Tradition, identified by a variety of small stemmed and small triangular point forms, was for many years thought to have been a strictly Late Archaic tradition. However, recently procured radiocarbon dates for Small Stemmed points from excavated contexts indicate that they were also being used during the Early Woodland period. Because reliable dates and contextual data are lacking for most Central Massachusetts sites, Small Stemmed points are tentatively considered a Late Archaic point form for the purposes of this review. Therefore, the Late Archaic site frequencies discussed

below are undoubtedly inflated, as an unknown number of sites which have been identified on the basis of Small Stemmed points may represent Early Woodland occurrences.

The Small Stemmed Tradition is highly visible, both in terms of the quantity of artifacts and the number of sites in Worcester County. Artifact collections from the study unit are quantitatively dominated by Small Stemmed and Small Triangular point types. Small Stemmed points were manufactured almost exclusively on quartz, including milky, crystalline and smoky blue varieties, while Small Triangular points were made predominantly on quartz and quartzite with approximately equal frequency. These lithic materials were probably widely available in Central Massachusetts in bedrock veins and outcrops and as riverine or glacial cobbles. The reliance on locally available lithic resources contrasts with the Susquehanna Tradition materials which were manufactured on a variety of lithics, including local quartzites, eastern Massachusetts volcanics, and exotic cherts.

During the Orient Phase the quarrying of steatite or soapstone was an important activity. The soft, easily carved soapstone was made into a variety of vessel forms which were used domestically, ceremonially, and probably for trade as well. Steatite vessel fragments have been identified in collections from numerous sites in the Chicopee Drainage where they have also been found as elements of mortuary features (Ferguson 1947). Prehistoric soapstone quarry/workshops in Central Massachusetts are known from the Swift and Blackstone valleys. In the latter area, two quarry/workshops, the Dolly Bond and Horne Hill sites, have been excavated and reported (Bullen 1940; Fowler 1966). Steatite vessels ceased to be made during the Early Woodland period when they were apparently replaced by ceramics; however, some of the quarries were later reopened for making soapstone pipes.

Presently, thirty-nine sites in the Chicopee Drainage can be identified tentatively as having been occupied or otherwise utilized during the Late Archaic period. Quaboag Pond appears to have remained an important area, as materials from all three Late Archaic traditions as well as Orient Phase artifacts are currently known from at least ten sites. Northeast of Quaboag Pond, in the town of Spencer, two sites located at the confluences of small tributaries with the Sevenmile River have yielded Small Stemmed materials. A third site located on the Cranberry River, reported as a red ochre burial, may also represent a Late Archaic occurrence. Two large collecting areas on the Quaboag River near Wickaboag Pond have yielded artifacts of the Laurentian, Susquehanna, and Small Stemmed traditions, as well as evidence of possible Orient Phase mortuary activity (Ferguson 1947). In neighboring Warren, four sites along a small tributary of the Quaboag River have also yielded Late Archaic materials.

In a small area surrounding a tributary of the Ware River at least ten Late Archaic sites are known from a variety of habitats, including wetlands, river floodplains, high terraces, and headwaters of small upland streams, as well as along the course of the Ware itself. At least two of these sites appear to have been foci of occupation throughout most of prehistory. Other Late Archaic sites have been identified at Hardwick Pond and on the Ware River in Hardwick.

Recent collections analysis has indicated considerable Late Archaic activity in portions of the Swift River Valley which are now submerged under the waters of the Quabbin Reservoir. Small Stemmed points have been collected at three sites along the East and Middle Branches of the Swift River in Petersham, and from one in Hardwick; Laurentian materials were also

inventoried from two of these. Prehistoric steatite quarries are also known in Petersham. On the west side of the Quabbin Reservoir, beyond the limits of the study unit, evidence of Laurentian, Susquehanna, and Small Stemmed Tradition, and Orient Phase activity has been recognized at seventeen additional sites. At least one of these may have been a Susquehanna Tradition burial.

Late Archaic activity within the Thames Drainage is poorly documented. Only three sites are currently known, although materials from unidentified sites provide further evidence for Late Archaic activity. Small Stemmed points have been recovered from sites located on small brooks and ponds in Charlton and Oxford. A site located on a small pond in Warren has yielded Laurentian and Orient materials in addition to Small Stemmed points. Other evidence of Late Archaic activity in the Thames Drainage comes from a number of poorly provenienced artifact collections. Susquehanna Tradition materials have been recorded from unprovenienced locations in Sturbridge where Small Stemmed points and ground stone tools have also been collected. Among other unprovenienced Late Archaic artifacts from Central Massachusetts is an Orient Fishtail point found in Charlton.

In the Blackstone Drainage twenty-five Late Archaic sites have been identified in a wide number of habitats and include materials from the Laurentian, Susquehanna, and Small Stemmed traditions as well as from the Orient Phase. Utilization of the drainage's principal water courses such as the Blackstone, Mumford and Mill rivers is documented at four sites in Uxbridge and at the Mill River site in Hopedale. The larger ponds and lakes, such as Indian Lake in Worcester and Ramshorn Pond in Sutton, were also attractive settlement/exploitation areas at this time. The only known site on Lake

Quinsigamond appears to have been a Late Archaic occurrence. The low visibility of prehistoric activity here undoubtedly reflects historic development and disturbance rather than the frequency of past occupation. Archaeological survey conducted prior to the construction of portions of Route 146 located three sites adjacent to small upland streams and an upland wetland in the town of Sutton. A number of Late Archaic sites are known on small upland ponds in Worcester, Uxbridge, Mendon and Douglas. The Cracked Rock rockshelter in Millbury, first utilized during the Middle Archaic, appears to have been used again during the Late Archaic.

Thirteen Late Archaic sites are currently known from the upper Concord Drainage. Diagnostic materials from each of the three Late Archaic traditions have been reported from sites at several ponds and wetlands in Westborough. The relatively high frequency of sites in this region is the result of several years of survey and excavation by the Ekblaw Chapter of the Massachusetts Archaeological Society (cf. Hoffman 1984).

Currently only seven Late Archaic sites are known in the portion of the Nashua Drainage that lies within the limits of the study unit. The South Bay Quartzite Quarry, located near the Nashua River prior to the creation of the Wachusett Reservoir, has yielded Small Stemmed points (Lemire 1975a) which have also been recovered from sites at two small ponds in Holden.

Recent collections analysis has identified Laurentian and Small Stemmed components at three sites located in close proximity to one another along the upper Nashua River in the town of Bolton. The low visibility of Late Archaic sites as well as those of other periods in this area undoubtedly does not reflect the true nature of prehistoric activity in the Nashua Drainage. Prehistoric sites from a major portion of the Nashua River Valley have been disturbed or destroyed by various military activities at Fort Devens.

A single steatite vessel fragment from an unknown site in Templeton is the only hint of Late Archaic activity in the upper Millers River Drainage, which is otherwise unknown archaeologically. Of the five recorded sites in the Millers River Drainage none have yielded diagnostic materials to date; these sites are located in the towns of Royalston, Athol and Gardner.

The large number of sites and artifacts attributed to the Late Archaic period, especially to the Small Stemmed Tradition, coupled with a high density of sites and their occurrence in a wide range of habitats, has been interpreted as reflecting a dense population intensively exploiting an extremely broad spectrum of resources (Dincauze 1974). However, recent radiocarbon dates of Small Stemmed components have extended the tradition's duration into the Woodland period, at least in some areas (Wamsley 1984; Mahlstedt [in preparation]). This longer length of time may help to explain both the extraordinarily high visibility of the Small Stemmed Tradition and the extremely low visibility or apparent absence of other Early Woodland components from portions of Massachusetts.

The relationship between the Small Stemmed and Susquehanna traditions in southern New England is presently not well understood. It has been suggested that the two traditions represent separate populations, the former indigenous and the latter intrusive, which peacefully coexisted for over 1,000 years (Dincauze 1974, 1975). An alternative interpretation is that these do not represent distinct populations at all but are specialized tool forms which were utilized by many peoples over much of the Eastern Seaboard.

Woodland Period (ca. 3,000 to ca. 500 B.P.)

The Early and Middle Woodland periods, which ranged from ca. 3,000 to ca. 1,300 years ago, are poorly represented in Central Massachusetts. This situation is characteristic of much of southern New England and is responsible for our basic lack of understanding of these two periods. Based solely on the presence of Rossville and/or Meadowood points, Early Woodland activity can be attributed to only thirteen sites in the study unit. All of the currently known Early Woodland sites are located in the western portion of the study unit, and all are multicomponent, having been occupied before and/or after the period. Twelve sites are located in the Chicopee Drainage, where seven sites around Quaboag Pond attest to the continued occupation/exploitation of this area. One of these sites is an Adena-related cemetery, one of only three such sites known in Massachusetts and the most thoroughly reported of the three (Keith 1965; Johnson 1983). Early Woodland activity is evidenced at two sites near the Ware River in New Braintree as well as at Hardwick Pond in Hardwick. Recent collections analysis has identified Early Woodland components at two sites located on tributaries of the Swift River in Petersham where another site may also have had Early Woodland associations based on ceramics tentatively identified as Vinette I. Three other Early Woodland sites have been identified in the Swift River Valley in the town of New Salem, just west of the study unit.

A site at a small upland pond in the nearby Thames Drainage is the only other site in the study unit at which diagnostic Early Woodland artifacts have been recognized. A recent radiocarbon date of $2,990 \pm 155$ B.P. for a Small Stemmed component from the Orcutt Field site in Oxford (Wamsley 1984) further suggests Early Woodland activity in the Thames Drainage.

Ground stone tubes found in the town of Harvard and a steatite elbow pipe from the South Bay Quartzite Quarry hint at possible Early Woodland associations in the Nashua Drainage. Although no sites of this period have yet been identified from the portion of the Nashua Drainage within the study unit, at a site on the Nashua River in Pepperell, Small Stemmed points recovered from controlled excavations and carbon dated to $2,190 \pm 165$ B.P. indicate Early Woodland occupation in the Nashua Drainage (Mahlstedt: In preparation). This site also illustrates the difficulty in using Small Stemmed points as Late Archaic diagnostics.

Mortuary features excavated in Brookfield (Keith 1965) contained artifacts suggestive of a connection with the Adena burial cult which flourished in the Ohio Valley during the Early Woodland period. Additional manifestations of an eastern Adena connection are scattered throughout the Northeast. The Early Woodland appears to have been a time of widespread long-distance exchange involving raw materials, finished products, and information. Similar burial techniques were widely practiced during this time, as mortuary sites sharing Adena-related characteristics have been reported as far east as New Brunswick (Turnbull 1976) and Chesapeake Bay (Ford 1976). However, although the Central Massachusetts Adena-connected burials contained some Adena artifacts and other traits, they are in many respects not typical of Adena burials, which feature elaborate earthworks and mortuary ceremonialism. The Brookfield burials have much more in common with mortuary features excavated at Holyoke, South Hadley and Windsor, Connecticut, all of which are located in the Connecticut River Drainage.

Only ten sites in the study unit can be attributed to the Middle Woodland period. Three sites are located around Quaboag Pond in Brookfield, another is

located on the Quaboag River in West Brookfield, two occur near the Ware River in New Braintree, and another is situated at Hardwick Pond. To the north, in the former Swift River Valley, Middle Woodland artifacts have been recognized at the same site in Petersham where possible Vinette I ceramics were inventoried. Four other Middle Woodland sites have been identified in the Swift Valley; these are within the town of New Salem, just outside the study unit.

A Woodland Corner Notched point, inventoried from the town of Sutton, is the only suggestion of Middle Woodland activity in the Blackstone Drainage. In the upper Concord Drainage, excavations at Charlestown Meadows and around Hocomonco Pond in Westborough have yielded Middle Woodland materials.

No Middle Woodland components have thus far been identified from recorded sites in the upper Nashua Drainage; however, a sizeable Middle Woodland component was excavated from a site on the Nashua River in Pepperell, to the east of the study unit.

The Late Woodland period, while not highly visible, is represented at sites in all of the drainages in the study unit except the Millers River Drainage, for which there is no available cultural/temporal information. Based on the presence of triangular points similar to Levanna and Madison varieties, a total of twenty-four Late Woodland sites are known in the study unit. In the Chicopee Drainage, Late Woodland components have been recognized at seven sites around Quaboag Pond, as well as at a large multicomponent site on the Quaboag River near Wickaboag Pond. A site near Naultaug Brook in Warren, one at Hardwick Pond, and four sites near the Ware River in New Braintree have also yielded evidence of Late Woodland activity. Among the many sites discovered when the level of the Quabbin Reservoir was low, at least three in

the town of Petersham contain Late Woodland materials. Two other sites in New Salem further attest to Late Woodland activity in the former Swift River Valley.

A site on a former small brook in the town of Charlton provides the only evidence of Late Woodland activity in the Thames Drainage. Late Woodland site locations in the Blackstone Drainage include the shores of a small pond and an upland swamp. Chauncey Lake and Charlestown Meadows near the headwaters of the Sudbury River were also occupied during the Late Woodland, completing the occupational sequence in the upper Concord Drainage. Two lakeside sites in the central portion of the study unit illustrate prehistoric activity in the Nashua Drainage.

It was during the Middle to Late Woodland periods that horticulture was introduced to the Northeast. By about 1000 A.D., gardens of corn, beans, and squash were being cultivated by the Natives of southern New England. The importance of horticulture in stimulating changes in subsistence and settlement, population growth, organization of labor, and social stratification has been discussed and/or documented for other parts of the Northeast. For example, horticulture has been postulated as an important impetus for the development of a nucleated village settlement pattern in the Great Lakes area (Noble 1975). The degree of dependence on horticulture and its significance as a stimulus of social and economic change in late prehistoric Central Massachusetts and other parts of southern New England remains a topic for further archaeological research.

Over fifteen sites in Central Massachusetts have yielded aboriginal ceramics in the absence of diagnostic Woodland period projectile points, indicating higher Woodland activity in the study unit than is suggested by

diagnostic projectile points alone. Ceramics are considered by many archaeologists to be one of the diagnostic traits of the Woodland period; the introduction of ceramic technology in southern New England is widely accepted as a somewhat arbitrary beginning for the Woodland period. During the 2,500 years of Woodland period prehistory ceramic technology, decorative styles, vessel forms, and techniques of manufacture all underwent changes. The small ceramic sample and lack of contextual data for Central Massachusetts ceramics has thus far precluded any contribution from the study unit toward explanations of ceramic technological and stylistic variability.

Research Topics

Many of the questions and problems that can be addressed by collections research, archaeological survey, or site examination in the Central Massachusetts study unit apply as well to the prehistory of southern New England or the Northeast in general. The following list is intended to highlight a number of broadly defined areas of research rather than to catalogue all potential research topics.

1. Research into interior/upland activities and adaptations would add much to our understanding of the prehistory of the study unit. The Central Massachusetts study unit includes the upper reaches and headwaters of many of southern New England's principal drainages. These interior and upland areas contained important animal, plant, and mineral resources which were utilized throughout prehistory. The study unit offers opportunities to investigate such topics as the significance of upland resources, the nature of prehistoric land use in uplands and interior lowlands, the relationship between interior and coastal adaptations, and how these changed through time.
2. The lithics used in manufacturing chipped stone tools found at Central Massachusetts sites include varieties of stone from different sources,

including local quartzes and quartzites, eastern Massachusetts volcanics, Hudson Valley cherts, and exotics such as obsidian, Pennsylvania Jasper, and Ohio Flint. Analysis of changes in the importance of local, regional, and exotic lithics may be useful in addressing questions of changing exchange networks, territoriality, and social boundaries.

3. Steatite quarried within the study unit was used for domestic, ceremonial and possibly exchange purposes. Presently, samples of steatite cannot be traced to specific sources based on macroscopic criteria such as color and texture alone. However, more sophisticated techniques of chemical analysis, such as neutron activation, hold considerable promise in identifying source-specific varieties of steatite (Turnbaugh and Kiefer 1979:45), which would enable archaeologists to assess the importance of steatite vessels in trade and the distances over which these products were exchanged.

4. The significance of the three Late Archaic traditions (Laurentian, Small Stemmed, and Susquehanna) and the relationships among them continue to be topics of debate and discussion (cf. Ritchie 1971; Dincauze 1975). Archaeology in Central Massachusetts can contribute to understanding of Late Archaic occupational sequences, differences in adaptation among the three traditions, and related but more general topics such as social boundaries, culture contact, and adaptation to changing social environments.

5. The nature of the eastern Adena connection and the relationship of Early Woodland burial practices to both Adena mortuary behavior and Late Archaic ceremonialism could be investigated by archaeological research in Central Massachusetts. Existing collections from known Early Woodland burials or habitation sites in the Connecticut River Valley and Central Massachusetts hold considerable potential for research on material and information exchange during this period.

6. The addition of horticulture to the hunting-gathering economies of prehistoric New England appears to have had different effects in different areas. The degree of prehistoric dependence on horticulture in Central Massachusetts, as in other parts of southern New England, remains uncertain. The effects of subsistence changes on settlement patterns, material and information exchange, territoriality, and social organization are related topics which could be addressed by archaeological research in the Central Massachusetts study unit.

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CHAPTER 3

PATTERNS OF SETTLEMENT AND SOCIAL DEVELOPMENT

Claire Dempsey and Michael Steinitz

Introduction

This chapter provides an overview of the significant events and processes that have shaped the regional landscape of the Central Massachusetts study unit over the historic period. It describes the specific sequence and pattern of human activity as it has unfolded in the region, and analyzes the historic processes that have resulted in the range and distribution of the cultural resources that survive in Central Massachusetts today. For the purposes of this report, the historic era in the study unit (1500-1940) has been subdivided into six periods. These periods are familiar from earlier regional reports and from town reports. The two earliest, Contact (1500-1620) and Plantation (1620-1675), have been combined into a single unit due to the region's isolation from exploration and colonial contact. The remaining periods follow the traditional designations: Colonial (1675-1775), Federal (1775-1830), Early Industrial (1830-1870), Late Industrial (1870-1915), and Early Modern (1915-1940). Each of these has been organized into five topical sections: Regional Events, Transportation, Settlement, Population, and Core-Periphery Relationships.

Regional Events provides a summary of the major socioeconomic and political trends that affected the study unit during the period. Transportation delineates the significant networks and corridors of movement of people, materials, and ideas through the region. Settlement outlines the changing patterns of human occupancy of the region, and the distribution and internal organization of population clusters of varying sizes. These include dispersed, rural settlement, hamlets, villages, and cities as they occur in the study unit. Population describes patterns of growth and ethnicity, social organization in families and institutions, and social movements which reflect changing values.

Core-Periphery Relationships constitutes an analysis of the dynamic interactions of a range of human activities within the study unit. The analysis is based on a geographic model of the human spatial organization, and requires some explication.¹ A core is defined as a focal point of an integrated set of activities within a region. Cores develop as the result of demographic, social, economic, and political processes operating over time. They represent concentrations of people and institutions which may find expressions in a relatively dense pattern of dwellings, workplaces, and culturally symbolic locations set within the humanized landscape. Cores may have their origins in the perception and use of a significant local resource, or they may develop as points of convergence in the movement of people through a region. Within an area, cores may be ranked according to the extent of their spheres of influence and the level of specialization, intensity, and complexity of their functions. A local core is defined by activities that have influence on and significance to the population of its neighborhood, district, or town area. This area is, however, not necessarily limited to the boundaries of the incorporated

town unit. A regional core contains more specialized activities that serve or affect a wider area, including local cores and their surroundings. A regional core may have significance for a large segment of the study unit area, or for the entire region. Above this level, the importance of a core may extend beyond the study unit to a rank of state, national, or international influence.

Peripheries are the larger, surrounding areas of lower density and intensity activities that occupy the areas between the cores of a region. Composed of more dispersed, extensive patterns of human occupance, peripheries may be highly specialized, but the range of activities is usually more limited than those in the cores. Accordingly, peripheral areas are characterized by settlement forms and landscape features distinctive from those of cores. The model posits an unequal distribution of power between cores and peripheries, but suggests that they are mutually interdependent. The interrelationship of cores and peripheries is complex, with the flow of people, ideas, and economic development moving in a variety of directions in any given period.

The Core-Periphery Relationship section is followed by Research Topics, which lists a range of questions related to settlement and population in the study unit, based on both the literature and the investigations of the team. The Bibliography provides a partial listing of major works relevant to the understanding of the processes described in the study unit. The sources consulted in this chapter fall into three categories: the first consists of the files of the Massachusetts Historical Commission, including the computerized inventory of archaeological sites, the town inventories of cultural resources, and National Register nomination files. These are supplemented by primary sources on the town and region, including maps and aggregate censuses of

population, which report irregularly on a limited number of topics. Town and county histories make up the last source of information. These were written primarily late in the 19th century, and are characterized by a variety of biases. All of these underreport data for the 20th century. Field visits were used to evaluate and supplement information gathered from these sources.

¹ Expanded definitions and suggested readings on the core-periphery model may be found in:

Johnston, R. J., ed. Dictionary of Human Geography. New York: The Free Press, 1981.

Larkin, Robert P. and Gary L. Peters. Dictionary of Concepts in Human Geography. Westport, Conn.: Greenwood Press, 1983.

Contact and Plantation Periods (1500-1675)

Regional Events

During the Contact period the Native Americans of the Central Massachusetts region were culturally transformed through exposure to European goods and trade, reduced in numbers through disease and warfare, and finally dispersed outside the region. Even before permanent colonial settlement was established here, a major epidemic in 1616-17 may have wiped out a large part of the population. The success of Plymouth after 1620 and the Great Migration of the 1630s brought significant European population to the New England coast, and a second major epidemic as well, in 1633-34. Involvement by colonials in intertribal warfare accentuated long-standing rivalries and contributed to the establishment of the New England Confederacy in 1643. The lure of the fur trade brought colonial settlement to the Connecticut River Valley, but its decline, beginning in the 1650s, turned Massachusetts colonials to extractive industries and commercial agriculture in the fertile lands for West Indian trade.

Direct contact between the new settlers and the Native Americans began when travel through the region increased. Missionary activities resulted in the establishment of a praying town in 1654, with others following after 1671. With the great population growth in the coastal communities, inland towns were established. At the beginning of King Philip's War the region included four praying towns and four colonial plantations. When Metacom and his followers withdrew inland to Nipmuck country in July of 1675, much of the

remaining native population joined him. One group attacked Mendon while the main participants engaged in battle at Quaboag (Brookfield). The town was abandoned almost immediately. The war continued, with an attack on Lancaster in February of 1676 and the abduction of a group of hostages, including Mary Rowlandson. By the end of March, Lancaster was abandoned, and by the first week in April the last settlement, Mendon, was vacated.

Transportation

Travel through the interior highland region of Central Massachusetts during the Contact and Plantation periods followed a network of overland trails. These functioned both as interregional connectors between the coastal lowlands and the Connecticut River Valley, and as local routes which allowed access to hunting, fishing, planting, and quarry sites within the area. Although its radial drainage system made the region accessible from the east, west, and south, the complex and diversified upland landscape provided few easily discernable corridors for long-distance movement. Routes both followed the topographic grain and cut across it. Trails often extended across drainage systems, following tributary passages from one river network to the next. Where wetlands or rough terrain presented no major obstacles, trails passed along ridge lines or across highlands plateaus. As in the regions to the east and west, the trail network was braided, with alternate branches around topographic barriers.

In general, the lower elevations and more gently rolling terrain of the southern and eastern regions of the Central Massachusetts study unit allowed a greater range of movement than the Central Uplands zone of the northwest, with its steep highlands, sharply dissected river courses, and extensive

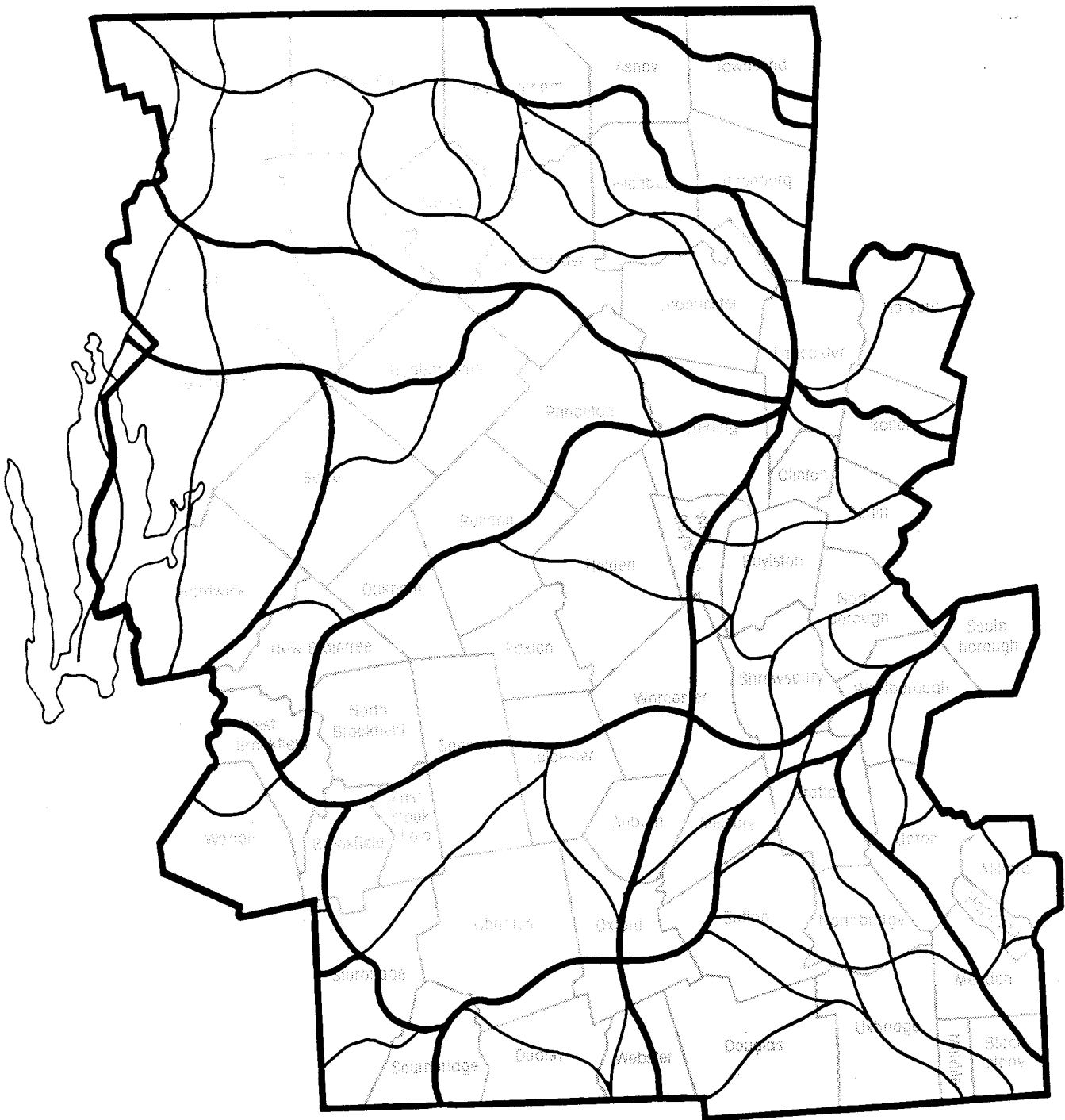
wetlands. Native trails connected available resource exploitation sites, particularly the major pond and river locations that made up the native regional core areas. Across the southeastern half of the region, the general trend of major routes appears to have followed a northeast to southwest direction. In addition, a north-south flow developed through the eastern part of the region. Fewer trails passed through the northwest highlands, and clear patterns of movement are more difficult to trace. See Map 3.

With the colonial settlement of the Connecticut River Valley in 1636 and the subsequent occupation of Lancaster and Brookfield, the Central Massachusetts study unit became a region of increased overland movement between Massachusetts Bay and the Connecticut River Valley. Travel followed the established native trails, but colonial knowledge of the complex terrain lagged behind that of the native occupants, and passage through the region remained problematic and often difficult. In 1636, William Pynchon established a route across the southern part of the region connecting Boston and Springfield. An alternative route through Lancaster came into use in 1648, and followed a relatively level course across the Central Highlands to the Quaboag region. These routes, with an earlier known, southeastern path to the Connecticut River Valley, were the primary colonial roadways of the Plantation period. Scholarship on early transportation in the Central Massachusetts study unit has concentrated on the reconstruction of the location of these Bay Path and Connecticut Path routes (Chase 1895, 1901, 1919; Marlow 1942).

Native Settlement and Population

The low level of reporting of archaeological sites that characterizes prehistoric occupations in the region persists through the period of contact

Contact and Plantation Period Trails



— Primary trails
— Secondary trails

with European settlers. No sites documented to this period are known, although isolated objects have been found. Furthermore, location far from the coast precludes the availability of firsthand descriptions by colonials during the critical period prior to their permanent settlement. An extended period of secondary contact provides a contrasting model of change to the better known coastal regions. By the time of direct contact in the 17th century, the combined effects of disease, trade, and accelerated intertribal warfare significantly changed the population of this region.

The Central Massachusetts region was occupied primarily by the subgroup of Southern New England Algonquins known as the Nipmuck. Sources uniformly distinguish the group's internal organization from that of their neighbors, consisting of loosely connected territorial groups rather than a centrally organized tribe. Indeed, the link between these groups may have consisted solely of the linguistic bond of speakers of Loup, as this language was known by the French. Within the region, population continued to focus in the south and east of the region. Here the river drainages provided foci for the subgroups of the Nipmuck, the Nashaway on the Nashua in the northeast, the Quaboag in the southwest on the edge of the Thames drainage, Quinsigamond in the center, the Pegans in the south, and Nipnet in the Blackstone Valley of the southeast. The southern boundary extended into northeastern Connecticut. Late and indirect contact with European traders may have meant a postponed development of more complex group interactions that characterized the response to the fur trade. These included an increased awareness of territoriality and the merging of small groups into tribes and tribes into larger regional alliances. The Nipmuck have been traditionally linked to the more powerful coastal tribes of the Massachusetts,

Narragansett, and Pequot through tribute payments. Linguistically they are related to the Pocumtuck of the Connecticut River Valley.

The remainder of the region falls within the cultural boundaries of the Western Abenaki, whose territory extended far north into New Hampshire and Vermont. The subgroup Squakeag was the focus for this section of the study unit and was oriented north and west toward the Connecticut River Valley. In contrast to the Nipmuck, this group became heavily involved in the fur trade and tended to cluster together in large fortified villages, later aligning themselves with the Abenaki and French in exploitation of the northern fur territories.

These native place names presumably represent the territories controlled by these subgroups, within which the seasonal round of resource exploitation took place. The groups appear to have dwelled in villages or base camps on alluvial plains of rivers or adjacent to ponds. Here the smaller nuclear families came together from the surrounding territories, primarily during the winter. These groups usually remained together through the spring fish runs and then dispersed to smaller farmsteads, where individual structures were surrounded by fields of corn, beans, squash, and tobacco. During the winter months these family groups or other small task groups left the camps for periodic upland hunting. In the spring they might leave for fishing, fowling, plant and other resource gathering. Large numbers gathered for fish runs. The effect of European contact on this pattern is conjectural, but probably emphasized a tendency toward larger, fortified sites as competition increased, and a drop in horticultural activities as the highly profitable fur trade became more influential.

Second only to the fur trade in its effects on Native American culture were the efforts by colonials to convert the population to Christianity. As early as the 1650s, John Eliot was making periodic visits to the Central Massachusetts region in search of converts, and encouraged the adoption of English ways. In 1654, the third praying town in Massachusetts was formed in present Grafton, known as Hassanamisco. Here the Native American converts formed the colony's second full church within a praying town. Efforts at cultural transformation are clear in the references to construction of English style buildings, including a church, school, and houses.

In 1674 missionary Daniel Gookin catalogued four additional praying towns in the region. The largest of these was Pakachoag, located in Auburn, where approximately 20 families of 100 individuals gathered for preaching. Manchoag held 12 families, and Chaubunagungamaug nine families. No figures survive for the village of Waentug in Uxbridge, nor for the towns formed among the Connecticut Nipmuck at Maanexit (Thompson), Quantisset (Pomfret), and Qabquisset (Woodstock). Two other communities in the region were then "coming on to receive the gospel," Waushacum in Sterling, and Quabaug in the Brookfields (Gookin 1806: 194). Grants of land for these towns from the General Court were delayed because of claims by Uncas, chief of the southerly Mohegans, to control over the area. King Philip's War dispersed these settlements as residents moved either east to other praying towns or withdrew inland with the insurgents.

Colonial Settlement and Population

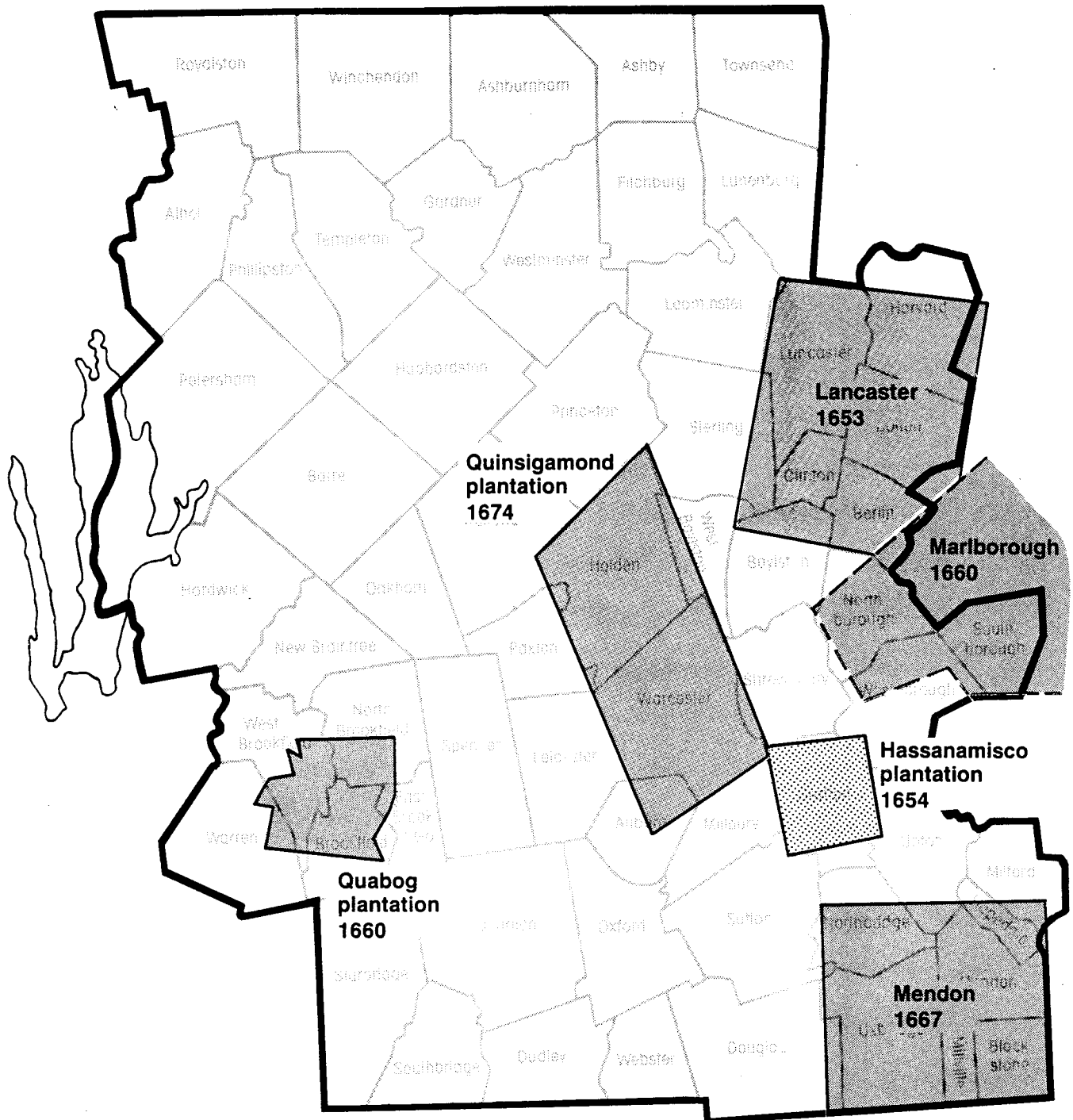
The successful settlement at Plymouth in 1620 and the Great Migration to the Bay Colony in the 1630s brought permanent and sustained contact between



Native Americans and colonial settlers. Within the healthful environment the colonial population grew rapidly and expansion inland from the coast in search of more land occurred quickly. First to the Connecticut River Valley, and into interior areas from the coast, the colonials expanded their control of the area at the expense of the native population. Colonials traversed the Central Massachusetts region, following native trails to interior settlements. After mid-century, permanent settlement was attempted in the region. By 1675 there were four colonial town grants entirely within the area--Lancaster, Mendon, Quaboag (Brookfield) and Quinsigammond (Worcester). A fifth town, Marlborough, had its western boundary within the region. See Map 4.

On the eastern border of the region, the General Court first granted lands within the region for towns. The earliest grant began with the purchase of a large area, ten miles in length and eight miles in width, from the Nashaway sachem Sholan in 1643. The purchaser, Thomas King of Watertown, intended to profit from fur trading and rapidly established a truck house. But as a later writer noted, it was "first begun for love of the Indians trade, but since the fertility of the soil and pleasantness of the river hath invited many more" (Maverick 1884). The first houselots were grouped into two ranges. Between them were located the meetinghouse, burying ground, and minister's house, centrally located in the grant near the confluence of the Nashua branches on an alluvial plain. In 1653, Nashaway was incorporated as the town of Lancaster. Shortly after, an area eight miles on a side was granted to petitioners from Braintree and Weymouth. Located in the southeast of the region, the Quinshepaug grant became the town of Mendon in 1667. Their first land division in the north of the grant extended along a single north-south

Plantation Period Political Boundaries

(ca. 1675)



 *Native plantation*
 *Colonial plantation*
 --- *Conjectured boundary*

road. Between these two large grants, the eastern border area was outlying land of the adjacent town of Marlborough (1660). Primarily unsettled at this time, the area was cultivated upland and meadow worked from farmsteads located in the east.

While these towns can be seen as an extension of slowly westward-moving settlement, other more remote areas of the region were granted by the General Court during this early period. At least ten individuals are known to have received land here, in parcels ranging from 150 to 3,200 acres. None were settled at this time, and few heirs took advantage of these grants in the later, Colonial period. Of particular importance was the grant to John Winthrop in 1644 surrounding the lead mine at Tantiusque, now in Sturbridge. Although the large grant did not remain in Winthrop hands, it was worked sporadically from 1658 on. The most significant town grant was for the remote Quaboag plantation of 1660. At the instigation of Ipswich petitioners, and with the cooperation of John Pynchon of the Agawam plantation in the Connecticut River Valley, the town was located on the primary east-west artery between the older settlements. Its isolation meant smaller houselots located near the center of the grant on Foster's Hill. In 1668, the General Court made an additional large grant, Quinsigamond plantation, not adjacent to earlier settlements. This grant, in the center of the study unit, had little formalized settlement during the period. The plan included four groups or squadrons of lots along Lincoln Street.

In the years prior to King Philip's War, these towns attracted only small numbers of settlers. The largest town, Lancaster, held only 50 families, Mendon 38, Quaboag (Brookfield) 20, and Quinsigamond (Worcester) six or seven by 1675. All were struggling to bring land under tillage, build homes,

and form institutions in new communities. Houselots ranged in size from 20 to 50 acres. In early Lancaster and frontier Quaboag (Brookfield) they were small and clustered together. Beyond them were located open fields for grain cultivation by the community. Mendon's lots were somewhat larger, 30 acres, while those in Quinsigamond (Worcester) were to range between 25 and 50 acres. In addition to houselots, settlers received land grants of upland, meadow, pasture, and woodlot. These completed farmsteads to provide necessary land for food cultivation, animals for food and draught, wood for fuel. Mendon and Quinsigamond (Worcester) seem to have adopted the system of proportional allocation of land according to "estate," a measure of wealth and influence. Each community had established grist and sawmills to serve agricultural processing needs, often recruiting skilled millers with offers of grants of land and monopolies. Lancaster, Mendon, and Quaboag (Brookfield) constructed meetinghouses for the communities' religious and secular activities. Garrisons, occasionally separate forts, more often fortified houses, were also constructed in an area identified as a frontier. In spite of these precautions, the towns were vulnerable to native attack during King Philip's War. Three were attacked and by mid 1676 all had been abandoned.

Core-Periphery Relationships

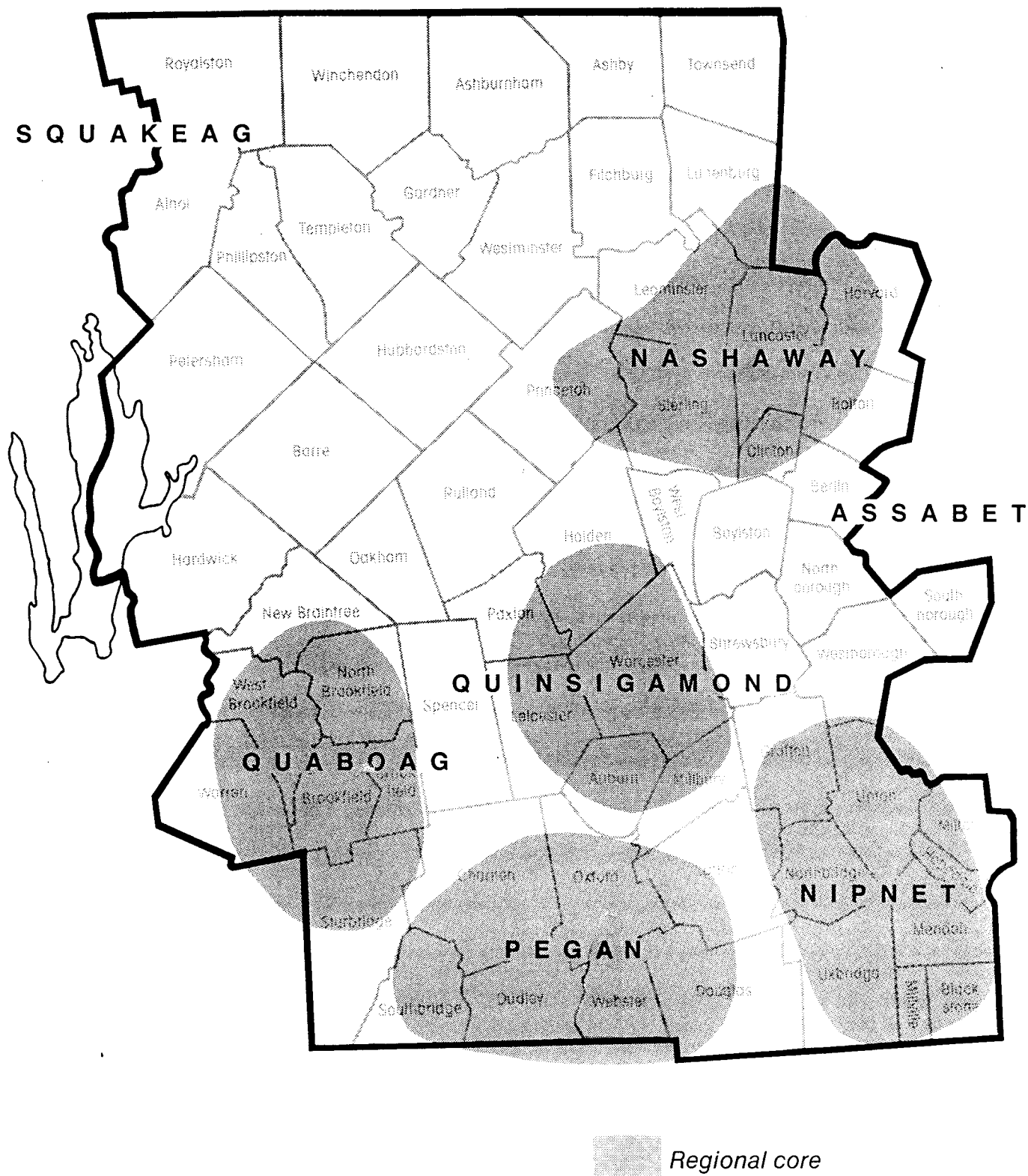
Identification of regional cores has been influenced by the low level of reporting on the area in the historical record as well as the scarcity of archaeological examination. An interaction of several factors has determined the choice of cores, including an examination of the topography, a consideration of archaeological sites, evaluation of historic references to Native American presence, and the presence of praying towns and colonial

outposts in the later years of the period. The general low density of occupation is partially responsible for the comparatively low number of regional cores, five. As for the prehistoric periods, settlement is known from all of the region's drainages, but with particular concentration in the south and east. See Map 5.

The area of the Nashua River Valley in the region's eastern portion is identified as the first regional core, known historically as Nashaway. The confluence of the river's branches, known as "the wading place" (now in Lancaster), was the location of the base camp of this subgroup of Nipmuck. It was well suited both for fishing and for horticulture. The areas east and west formed the territorial base of this group, under the sachem Sholan, the best known Nipmuck leader. Other important gathering places within the territory were Waushacum (in Sterling), located between the two ponds of the same name, and Mt. Wachusett (in Princeton), an important ceremonial location. Waushacum was the home of a group of Christian Native Americans late in the period. This core area was also the site of the first colonial settlement in the region, Nashaway (later Lancaster).

The Quaboag core area falls in the large Thames River drainage, along Quaboag River and Pond, at the Brookfields. The region's best archaeological documentation is available here and, although Contact period artifacts are rare, historical sources of the period consistently refer to a native population in the area. The alluvial plain, river, and pond provided the necessary resources for horticulture and location of fish weirs. By 1675, the area was known to have a number of Christians, and was an emerging praying town. Its location on primary transportation routes was significant in its choice for a colonial settlement, Quaboag (Brookfield), between the older towns to the east and the Connecticut River Valley.

Contact and Plantation Period Core Areas



The third regional core, Quinsigamond, consists of the present town of Worcester and its neighbors. A number of Contact village sites are reported in this vicinity, including Quinsigamond itself, Tatnuck (both in Worcester), Towtaid in Leicester, and Packachoag in Auburn. Several quarries are known from the area now Millbury. Packachoag later became the basis for the region's largest praying town, and in 1675, the twenty Native American families here included about 100 individuals. An embryonic colonial settlement of the same name (now Worcester) was also located here.

The fourth regional core developed in the Blackstone drainage, the Nipnet area within the region. This was the basis for the colonial designation of the region as "Nipmuck" country, an alternative spelling of the native name for the river. It is located adjacent to the cultural boundary of the Rhode Island-based Narragansett. The early praying town Hassanamisco, in Grafton, was well developed by period's end. The twelve families in residence built English structures, including a church, school, and dwelling houses. The area was well suited to colonial grain agricultural and animal husbandry, but the native population reportedly made few changes in their subsistence pattern. In spite of this the town counted 60 individuals, including a colonial schoolteacher, in the four-mile grant. It provided a base for later missionary activities in the area, resulting in a proliferation of praying towns in the early 1670s. Nearby in Uxbridge a village was established later, known as Waentug, but its precise location is unknown. To the east was the early colonial settlement Quinshepaug, incorporated as Mendon in 1667.

The territory of the Pegan subgroup forms the basis of the fifth regional core in the area now the towns of Dudley, Webster, Douglas, and Oxford, as well as the Connecticut settlements. The large pond Chaubunagungamaug was

the focus of the territory. Praying towns were located here and to the north in Oxford, and called Manchoag. The former included about 45 individuals while the latter included about 60. Some Native Americans remained in the village at Chaubunagungamaug during King Philip's War, and 52 were killed or captured there by Major Talcott in 1676. This is the only area village that remained after the war and formed the basis for continued claims to the area and a small reservation that remained intact through the end of the 19th century.

Research Topics

1. Define the relationships among the region's native groups. To what extent can territorial boundaries be located? Was there sociocultural interaction? Trade? Competition?
2. Clarify the role of this upland area in the regional system of southern New England. What was the relationship of the Nipmuck to their coastal and riverine neighbors? Can cultural boundaries be better defined?
3. What was the effect of prolonged secondary contact with Europeans? Were trade contacts with other native groups important? Did these contacts spread disease? How did the fur trade effect this interior area?
4. What was the relationship between the native trail network to regional topography, drainage systems, and known sites? Can the earliest colonial routes through the region be identified more accurately?
5. Elaborate the process of praying town formation. What distinguished the communities that were converted? How did the location of these towns compare with earlier locations?
6. Compare Native American and English colonial resource exploitation systems. How important was an area's ecological setting in its selection for plantation location? What was the role of prior native use in site selection?
7. Outline more specifically the initial colonial route out of Boston into the interior.
8. Describe the early colonial settlements. To what extent did the threat of native attacks influence the physical and social organization of these communities?

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Colonial Period (1675-1775)

Regional Events

During this period permanent colonial settlement was established in the Central Massachusetts study unit. King Philip's War (1675-77) resulted in the dispersal of most praying towns as well as the unconverted Native American population. The existing colonial settlements--Lancaster, Mendon, Worcester, and Brookfield--were abandoned and essentially destroyed by the attacks. Reestablishment was slow, and settlement characteristic of frontier outposts took place through the Peace of Utrecht (1713) which ended Queen Anne's War. Subsequent population growth and continued incorporation of new towns led to the establishment of Worcester County in 1731. Nevertheless, intermittent frontier warfare slowed the settlement of the northwest part of the region.

Town formation was the primary activity in the study unit during this period. Earlier large grants of land were subdivided and new ones taken up in the familiar process of locating the meetinghouse, dividing town lands, calling a minister, and forming a government. Agriculture was the earliest and most important employment of the inhabitants. Older towns in the east and south of the region became more populous and prosperous in their second and third generations of settlement. With this development came improved transportation networks, an elaboration of the manufacturing activities associated with an agricultural region, and the emergence of commercial and trading centers in Lancaster and Worcester. These towns attracted wealthy individuals as well as artisans as their economies matured.

The area shared with the province the financial burden of repeated wars, in addition to the local expense of establishing new communities. The decade of the 1740s brought the Great Awakening and the rise of dissenting groups which challenged the standing religious order and the support of their ministry. After mid-century the towns participated more in provincial politics, in both the Court Party, which supported the royal governor, and the oppositional Country Party. The presence of both groups slowed response from the area to calls for resistance after the Stamp Act in 1765. With the 1774 Coercive Acts, however, a strong patriot leadership emerged.

Transportation

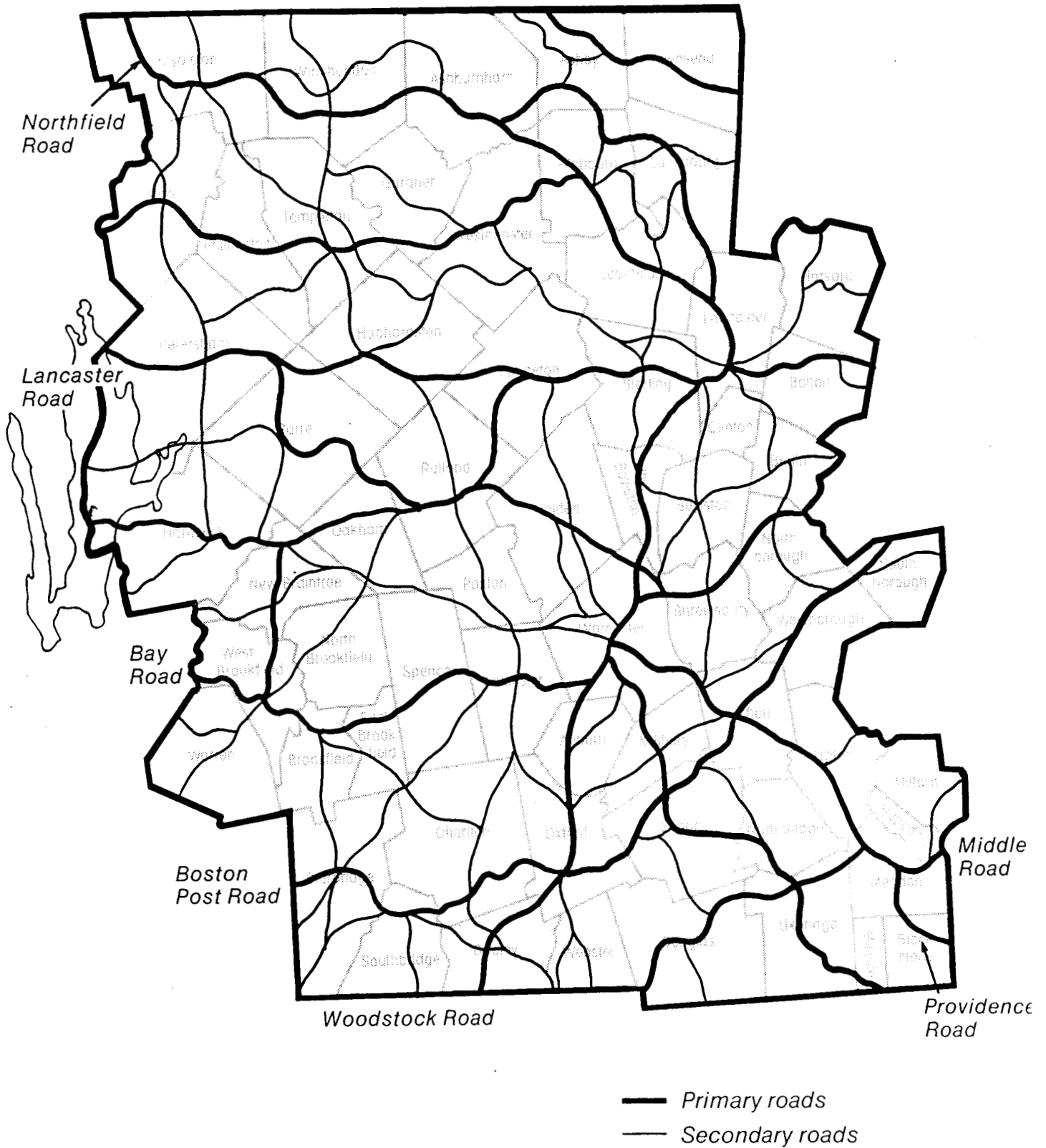
As permanent settlement was established in the study unit during the Colonial period, a network of roads and highways developed. See Map 6. In part, these were an expansion of the existing native trails and Plantation period routes. By period's end, a set of primary corridors was established through the region's southern half, connecting Massachusetts Bay with the Connecticut River Valley. Other major routes led south to the Rhode Island and Connecticut coasts. Three alternate east-west routes crossed the area. The northernmost, the Bay Road, extended from Marlborough through Northborough, Shrewsbury, Worcester, Leicester, Spencer, and Brookfield to Hadley/Northampton in the Connecticut River Valley. South of this, the Boston Post Road (parts of which were formerly the Bay Path) also passed through Marlborough, but then followed a route through Southborough, Westborough, and Grafton south of Lake Quinsigamond continuing through Sutton, Oxford, Charlton, and Sturbridge to Springfield in the west. A third corridor, the Middle Road, passed through Mendon, Uxbridge and Douglas to

Woodstock, Connecticut. The north-south Connecticut Road extended from Worcester through Oxford and Dudley, and the Worcester-Providence Post Road passed through Grafton, Upton and Mendon.

Primary highways were slower to develop in the northern part of the region, away from the main overland corridors from Boston to Springfield, Hartford and New York. Delayed settlement and rougher terrain in the northwest were also contributing factors. Nevertheless, the Lancaster Road through the north-central part of the region to Brookfield continued to be an important route in the early 18th century. The Northfield Road, a military highway, was laid out from Lunenburg west to the Connecticut River Valley in 1733. A northern east-west branch split from the Bay Road in Shrewsbury and passed through Holden, Rutland, Oakham, and Hardwick, with several secondary feeder roads to the northwest. In the northeast corner of the region, an important route from New Hampshire passed through Ashby and Townsend and on to Groton in the east.

In addition to the major highways, other intraregional roads were built during the period. After 1731, a radial regional network was gradually established from outlying communities to the shire town of Worcester. Considerable local road construction also took place during the period. Radial local roadways focused on each town's meetinghouse site, and in some initial settlement surveys straight, central roadway axes were laid out (as in Oxford, Charlton, Westminster, and Worcester). In general, conditions of road improvement in this upland region remained fair to poor during much of the period, and overland travel was often slow and arduous, even on the more frequently used routes.

Colonial Period Road Network



Settlement

Resettlement of Central Massachusetts by colonials following King Philip's War was slow. The pattern throughout the province of withdrawal to older settlements to the east and in the Connecticut River Valley resulted in a continuing inland frontier with areas adjacent to established settlements serving as garrisoned outposts. Lancaster began resettlement in the Nashua Valley in 1679, but with repeated attacks many settlers moved to their second division lands in the highlands to the east. The Brookfield plantation, located on a key east-west route, was particularly isolated and vulnerable. For this reason it was administered by a committee in Boston which required compact settlement and furnished soldiers for defense. Worcester settlers returned in 1684, but renewed attack brought a second abandonment in 1702. Attempts were also made by French Huguenots to settle the new town of Oxford, but fear of attack led to its abandonment on two separate occasions. After the Peace of Utrecht in 1713, a measure of safety came to the southern and eastern sections of the region. Population increased rapidly in these early towns as well as in the towns purchased and granted earlier but barely settled. In the northwest portion of the study unit settlement was slowed by continued warfare caused by dislocation of Native American groups and intracolony rivalries, and local garrisons were maintained through the 1760s.

Two generations of experience in town formation, planning, and government determined the pattern of permanent colonial settlement in the Central Massachusetts region. The demise of the nucleated village and open field farming, the trend toward consolidated holdings, the importance of proximity to the meetinghouse, the stress of "hiving" villages--these factors of 17th century town life structured subsequent settlement plans. The

result in the 18th century was a new form of New England town plan: units measuring 36 square miles (six miles on each side) with a meetinghouse located at the geographic center surrounded by dispersed farmsteads. The process of town formation in Worcester County during the Colonial period clearly illustrated the development of this settlement pattern.

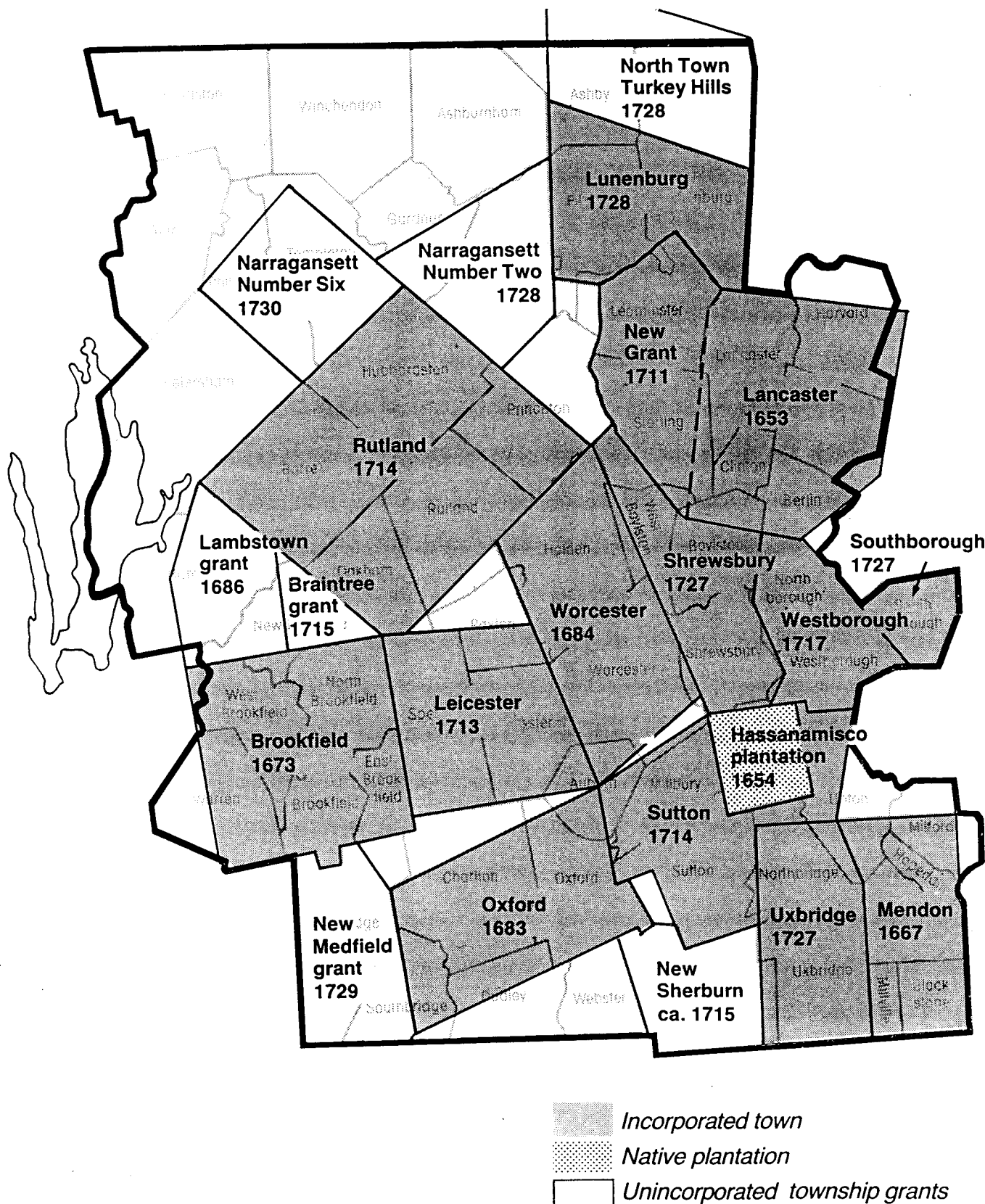
The first act of town formation remained the granting of a petition for a specific area to a group of individuals by the General Court. The process provided a solution to the desires of citizens to acquire land and of the provincial government to control "wilderness" territory. Eighteen new towns in the region were formed in this way. In the early cases (Oxford, Sutton, Rutland, Leicester, and Hardwick) these groups had made prior purchases from Native Americans, as had the grantees of Brookfield, Lancaster, and Worcester earlier. Later town formations of this type, the Turkey Hill towns (later Townsend and Lunenburg), Pequig (Athol), and finally Royalshire (Royalston) disposed of unincorporated Province lands. Petitions from eastern towns for more land formed the basis for New Sherbourne (Douglas), New Medfield (Sturbridge), and New Braintree, as had Mendon, and Brookfield. Finally, some townships were laid out to honor bounties for service in colonial wars, including the Narragansett towns Number Two (Westminster) and Number Six (Templeton), the Canada expedition towns to residents of Ipswich (Winchendon) and Dorchester (Ashburnham), and Voluntown (Petersham) to the Lovell and White expedition veterans. One town, Dudley, began with a large purchase and grant to powerful politicians, but smaller individual grants were scattered throughout the region and were subsumed by or annexed to granted towns. The towns granted early in the period were quite large: Worcester (1684), Leicester (1713), and Sutton (1714) were eight miles on a side; Oxford

(1682) was twelve by nine miles; and Rutland (1722) was the largest with twelve miles square. At the same time, the older towns had territory added to them: Mendon in 1692, Lancaster in 1701/11, and Brookfield in 1719. The majority of the towns were considerably smaller. Most granted later in the 18th century (ten in number) and all of those in which the provincial government selected the territory, followed a similar pattern. Theoretically at least, they were to be square territories, six miles on a side. Variations resulted from earlier individual grants and the later annexations of "gores" of previously unclaimed land. See Map 7.

Once a town's area was located and surveyed, attention was turned to the process of land division among the town's proprietors. In most cases, the proprietors distinguished between the land they retained themselves and that they used to attract the required 30 to 60 settlers. In others, the proprietors sold portions of their individual holdings to settlers. In the large grants, explicit distinctions were made between portions to be divided immediately and those to be held in common. In Worcester, settlement was to take place in the southern half; in Oxford, the English settlers initially divided only the eastern "village" portion; in Rutland, only the southern six-mile quarter was divided; and in Leicester, the eastern section was divided for settlers, while the west (later Spencer) was divided into large sections for the proprietors; in Sutton a four-mile-square section was reserved for Native American use at Hassanamisco (Grafton). In the later, smaller, six-mile towns no such formal distinctions were made.

Within these subsections and the smaller towns, the initial division of land into individual lots involved a still smaller portion of the available land. Houselots were the first priority, with corresponding lots of upland and

Colonial Period Political Boundaries (ca. 1731)



meadow completing the farmstead. These lots were often clustered together: in "a square or long square" in Holden, an oblong in Rutland, and in two groups of 33 in Athol. In some towns, the ordering of the lots relied on tiers and linear arrangements disregarding topography: in Douglas, four parallel ranges were laid out equally in the north-south dimension but varying by estate in the east-west; in Winchendon two groups of 33 equal lots were arranged in three tiers of eleven, and in four tiers of unequal length; in Westminster the lots were also of equal size arranged in unequal tiers on either side of a street four rods wide. The size of these houselots convincingly dispels any notion of attempts at nuclear village formation: the smallest were 30 acres, most were 50 acres, and several were 100 acres.

Therefore, it is not surprising that the towns chose overwhelmingly to locate their meetinghouse as near as possible to the geographic center of the area to be settled. When possible a rise was chosen, and several acres were granted for other public purposes, including most frequently land for burying and training grounds. Later additions might include a pound, stocks, and occasionally a schoolhouse or tavern. It was rare for any dwellings to cluster in this area; rather, the town was dotted by dispersed farmsteads whose dwellings were located adjacent to the roadways. Over time, more of the common land was subdivided, and the more fertile areas as well as the water power sites attracted more homesteads. Unsuitable areas, such as the Douglas Woods, too rocky and uneven, were left unimproved, and population began to focus in one portion of the town, while the remainder was unoccupied.

In spite of efforts to make the public areas convenient to all settlers, citizens soon wanted easier access. Some towns relocated their meetinghouses

in response to shifts in the location of population; most notable are examples of Lancaster, Upton, Brookfield, and Athol. In others, long and protracted debates occurred in town meetings over this issue. Eventually, an area would begin lobbying for independence, "hiving off" from its parent town. This was the second and most frequent type of town formation. The result of this process was already visible at county formation in 1731, when sections of the Middlesex County town of Marlborough had been established as the towns Westborough (1717) and Southborough (1727), and the western part of Mendon had been incorporated as Uxbridge (1727). Six other towns were formed from similar divisions of the old towns, which in the second quarter of the century were willing to grant autonomy: Lancaster set off Harvard (1732), Bolton (1738), and Leominster (1740); Holden broke off from Worcester, and Warren from Brookfield in 1741; somewhat later (1764) Fitchburg broke off from Lunenburg. In some instances towns were formed from individual holdings and portions of adjacent towns, including Shrewsbury (1727) and Upton (1735). After colonials purchased land at Hassanamisco it was reorganized as a colonial town and incorporated as Grafton (1735).

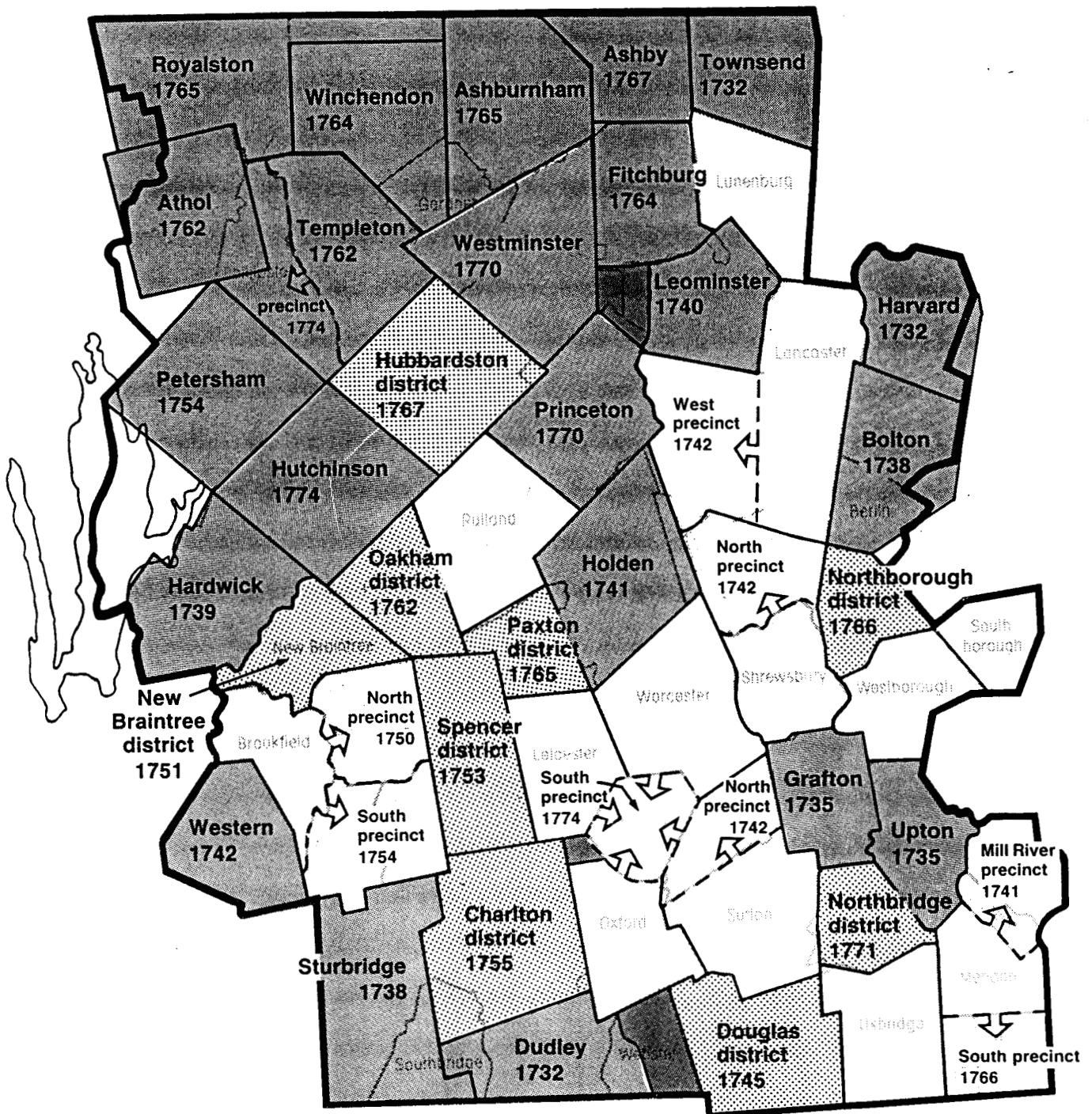
Later in the century the parent towns were more reluctant to grant complete independence. They turned first to parish or precinct formation, which created an independent church and religious society within the town. Twelve towns in the region had their origin through this process: Milford (Mill River, 1741), Boylston (North Shrewsbury, 1742), Millbury (Second Sutton, 1742), Sterling (Second Lancaster, 1742), Spencer (Second Leicester, 1744), Northborough (Second Westborough, 1744), North Brookfield (Second, 1750) and Brookfield (Third, 1753), Ashby (several towns, 1764), Blackstone/Millville (South Mendon, 1766), Ward (Auburn, 1774), and Gerry (Second Templeton,

1774; now Philipston). Although Ashby and Auburn rapidly achieved independence, the majority remained in this dependent state into the Federal period, an average of 55 years.

A second status, that of district, gave more autonomy through the local control of some municipal responsibilities beyond church formation. This pattern was adopted for ten subsequent towns, primarily at period's end. The older towns divided first, Charlton from Oxford (1754). The large Rutland twelve-mile grant contributed the largest number of districts: Rutland District, now Barre (1749), Princeton (1759), Oakham (1762), Paxton (1765), and Hubbardston (1767). In 1751 a portion of Hardwick and the Braintree Farms became the district of New Braintree. Later, Northbridge (1772) was formed from Uxbridge. Two parishes were upgraded to districts--Spencer (1753) and Northborough (1766). This status was held for a far shorter period than parish status, averaging only sixteen years, primarily due to the legislation of 1775 which gave town status to nine districts. See Map 8.

Stimulated to separate in part by a desire for proximity to their own meetinghouse, these towns also located them near the center of their territory. Since most of these areas held no common land, this involved the purchase of property. The acreage of this open area varied from town to town, as small as an acre in Charlton where the cemetery was located elsewhere, and as large as 30 acres in Harvard. The average size of these commons was just under seven acres. These new municipal centers resembled those in the original towns in their symbolic role and attracted few other structures. At the same time that they reoriented activity within the area, they also contributed to the maintenance of the dispersed settlement pattern.

Colonial Period Political Boundaries (ca. 1774)



- Towns incorporated between 1732 and 1774
- Towns incorporated before 1732
- Districts
- Unincorporated territory

As population increased and economic growth took place at different rates, a greater diversity of settlement patterns developed in the region. Lancaster, the oldest town, was the most commercially developed in the region, and the range of nonfarm employments meant more clusters of artisans' and shopkeepers' dwellings, as well as those of wealthy lawyers and justices of the peace. These dwellings were located along the town's primary north-south artery between the center and South Lancaster. The most developed village plan in the region, in the shiretown Worcester, was also linear in form, with double foci provided by the First Parish Meetinghouse and the County Courthouse. Other old towns, Mendon and Brookfield for example, had subdivided into parishes and thus developed multiple municipal points but no strong center. In Sutton the primary east-west artery attracted a series of residences of the wealthy. However, most Central Massachusetts towns consisted of dispersed farmsteads with few clusters of buildings either around their meetinghouses or their mills. At the end of the Colonial period, the landscape clearly reflected the regional economy of extensive mixed grain cultivation and animal husbandry.

Population

Migration into the area was dominated by New England-born residents of Eastern Massachusetts towns. The most frequently documented area of origin was Middlesex County, particularly the towns of Marlborough, Sudbury, Lexington, Concord, Woburn, and Watertown. Interior migration from one portion of the county to another took place, particularly from the eastern towns of Lancaster and Shrewsbury. The Blackstone Valley was a corridor for movement from Rhode Island, and in the north, Franklin County contributed to the new towns in the west of the region. There were isolated examples of

migration from Rehoboth, Massachusetts and Thompson, Connecticut. Although in most cases proprietors did not actually migrate to the towns, the descendants of the recipients of the Dorchester and Ipswich Canada grants did come to those towns. Three groups settled in the region immediately following migration from Europe. French Huguenots arrived in Oxford early in the period but withdrew due to frontier warfare. Scots-Irish settlers purchased land in Rutland, forming the basis of the town of Oakham, and established a Presbyterian church (1763-71) until outnumbered by New England Congregationalists. In addition, a group of German settlers came to Ashburnham.

In most cases, immigrants moved as nuclear families to the region and throughout the period these families formed the basic unit for the social functioning of their communities. They were patriarchal in structure: the male head was responsible for all in his household in matters of legal and religious discipline, and ideally all citizens lived under family government. In addition, the family acted as both a production and consumption unit within the local economy. Although families could not supply all their needs from their own land, many produced surpluses for exchange. All mature household members contributed to either the gathering of raw materials, primarily the males, or to their processing, primarily females. Although most families lived independently, 19.7% shared a dwelling in 1765. Family size averaged 5.96 in that year, but this doubling up meant houses averaged 6.61 individuals in residence. Although occasional outbreaks of epidemic diseases are reported, the lack of crowding in the region meant a healthful environment conducive to natural population increase. This, combined with continued migration, produced a high rate of growth. By period's end the region's population equalled nearly 47,000.

The towns in the south and east grew more rapidly with their "head start" and riverine ecologies than the upland towns to the north and west. In 1765, the first year for which uniform population figures are available, the number of families per town reflects this progression. The county average was 148 families per town, and the vast majority of towns that exceeded this total were located to the south and east of Worcester, while those with fewer families clustered in the north and northwest. In relative population densities this pattern was confirmed: all of the towns with a density greater than 30 people per square mile were located east of Worcester; towns in the west located south of Hardwick averaged 22 per square mile; towns to the north averaged eleven per square mile. In the period's last decade population growth continued in similar patterns: all towns with densities above 40 people per square mile were located in the east. The most densely populated town was also the most eastern town, Southborough, followed by Harvard, also on the eastern border. These were followed by Sutton, the most populous town in 1765 and ranked third in 1776; Lancaster, which grew from second to first position; and Mendon, which fell from third to fourth position in total population.

Above the family unit came the church in the social organization of Massachusetts communities. Throughout the period, Province towns were required to settle an orthodox minister and support him, his ministry, and meetinghouse through compulsory taxation. Attendance at services was mandatory, the minister was settled for life, and the meetinghouse was used for secular as well as religious community meetings. In this area prior to the Great Awakening, most of the towns were free from religious conflict. Communities selected ministers that shared their beliefs, agreed to their arrangements for payment, and shared a common set of values.

The use of the Halfway Covenant meant broad participation in religious activities. Ideally, at least, the town's families gathered together regularly in the meetinghouse and submitted themselves to the church's wide-ranging discipline.

In some communities, dissenting groups existed even at this early date. Small numbers of the Society of Friends as well as Baptists lived in some of the southern area towns of the Blackstone Valley. By 1729 a group of Quakers established a meeting in Mendon under the Smithfield, Rhode Island Monthly Meeting, and three years later a group was organized in Leicester. As their affiliation indicates, many had migrated from nearby Rhode Island. In Bolton a Quaker meeting was established in 1742, affiliated with the Salem Monthly Meeting. Later in the century when Quakers became more generally accepted, meetings were established in Northbridge (1766) and Uxbridge (1770). Early Baptist societies were founded in Sutton (1735) and Leicester (1737) as well as in the neighboring communities of Bellingham to the east and South Brimfield to the west. Although some resistance existed, in these towns dissenters were able to support their own form of worship through certification that freed them from ministerial taxation.

The revival known as the Great Awakening, as well as the response of those who opposed it, contributed to the growth of dissent. Proponents of the revival believed that the tenets of New England Puritanism had been softened and compromised, and that the churches needed to renew their Calvinist faith and purify their membership. Opponents objected primarily to its criticism of the standing order, the activities of itinerant ministers in their midst, and to the excesses of outbursts of enthusiasm. Central Massachusetts held followers of both groups. Some towns held a neutral position but suffered divisions that

caused the formation of new Separate, or New Light, churches, including those in Hardwick, Harvard, Milford, Sturbridge, and Sutton. In Hardwick and Harvard the division was particularly disruptive, resulting in a migration to Vermont from the former, and the attraction to the latter of New Light radical Shadrach Ireland. In the years after the Awakening some Separatist groups, in Sturbridge for example, became Baptist to facilitate the certification process; they shared with the Baptists the Calvinist principles of a gathered church and converted ministry. In others, new Baptist societies were formed, including Upton (1751), Charlton (1762), Grafton (1767), again in the south of the region, as well as in Royalston (1768). Several towns called New Light ministers, including Mendon, Uxbridge, Grafton, Millbury, and Athol, and some who shared their theology formed the Mendon Association in 1751. Several towns in the region felt no influence or were explicitly anti-revival. Often these were led by Arminian ministers, the precursors of Unitarianism, who rejected some Calvinist elements in Congregationalism, and emphasized at this period an individual's ability to choose between good and evil. Several towns in the eastern part of the region, most noticeably Shrewsbury, Lancaster, Leominster, and neighboring Marlborough adopted this position. Their ministers dominated the Marlborough Association.

Later disagreements between towns and their ministers presaged the conflict of the War for Independence. In many instances, towns expressed dissatisfaction with their settled minister through disagreements over salary and temperament; in others, full-blown conflicts, with outside councils and dismissals, addressed the extent of ministerial authority. The best known case occurred in Bolton and was partially responsible for the separation of Berlin; a similar problem arose in Sterling. As the conflicts with the British Empire

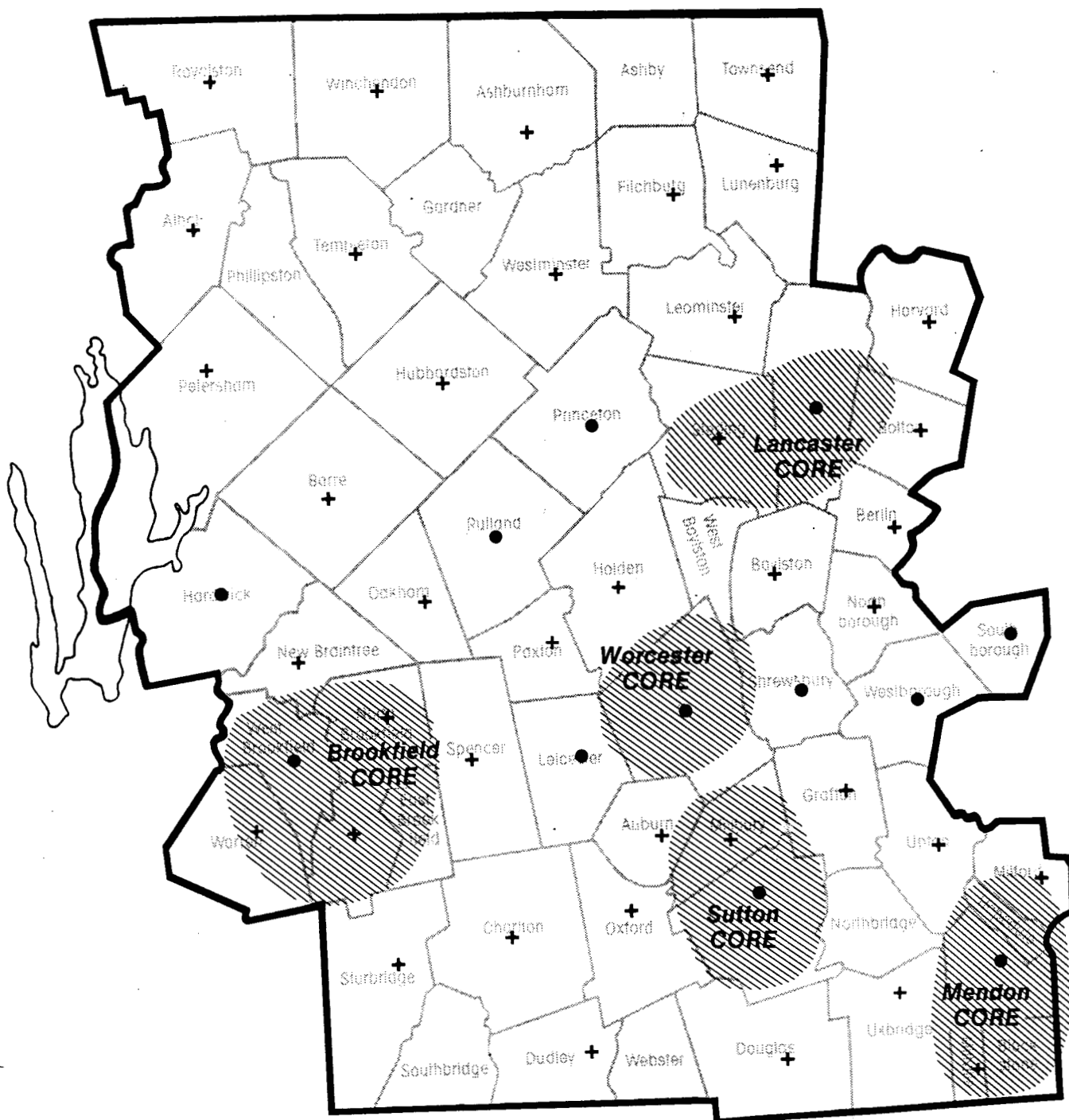
became more pronounced, numerous towns accused their ministers of Loyalist sympathies, including Bolton, Templeton, Petersham, Princeton, and North Brookfield. Other individuals held Tory views, and several communities resisted the Patriot movement against increasing pressure from the Empire. Court party towns like Hardwick remained loyal to the King and turned to him for redress. Towns like Leicester and Worcester responded rapidly to the pleas of Boston's Committee of Correspondence and became the focus of patriot activities. In 1775 the county held a convention of its committees of correspondence and took over legislative and militia functions.




Core-Periphery Relationships

By period's end, five cores had developed in the Central Massachusetts study unit. See Map 9. Reflecting the direction of settlement and concentration of population, the towns that became important in the Province and the region were located in the east and south. The old eastern town of Lancaster and the shiretown Worcester were the region's most important centers of activity. Secondary regional cores located along key transportation corridors included Mendon as a link to Rhode Island, Brookfield along the route to Northampton, and the wealthy agricultural town of Sutton on the road to Springfield. The predominance of dispersed farmsteads and isolated, centrally located meetinghouses slowed the development of strong local cores.

Lancaster's primary position was established early and maintained throughout the Colonial period. In the first county tax of 1734 the town's allocation was 50% higher than Mendon, the next highest town. By 1771, it was the county's wealthiest agricultural town, due to its fertile fields in the Nashua intervale and the development of a variety of processing industries,

Colonial Period Core Areas



-  Regional core
-  Local core
-  Meetinghouse location

including a large number of saw and grist mills, potash works, a tannery, a slate quarry, and cast hollow ware shop. Its position at the focus of important transportation arteries added to its wealth and development as a large number of retail shops were established there. Wealth became more concentrated in fewer hands, and the community became more stratified. In 1765 there were 65 slaves held in the town. By 1771 one-third of the taxpayers were landless, employed by others or renting from them, therefore dependent on others for their livelihood. With the more diverse population came additional institutions, so that common schools were supplemented by a higher level grammar school, and concerns over the poor resulted in the establishment of a workhouse in 1763. Wealthy citizens were also influential ones, and many in Lancaster held seats as justices of the peace, linking the town to the provincial government. Proximity to eastern towns contributed to the early emergence of an Arminian theological position, with the minister and his children forming a network of like-minded leaders in the region.

When Worcester was selected as shiretown in 1731, its role as a gathering place was defined, and its dual function as town and regional center brought rapid population growth. The presence of the court was of particular importance, providing a second, secular institutional focus and bringing outsiders into the community. Citizens from surrounding towns with court business, as well as the powerful judges and lawyers, met together in a fair-like atmosphere during quarterly sessions. The court generated employment for clerks, innkeepers, and shops, and a range of support services for artisans as well. With these alternative occupational opportunities, the economy diversified from one that had been exclusively agricultural, and the village acted as a magnet, drawing people from the dispersed farmsteads. The

larger and more varied population led to the formation here of a grammar school and later a workhouse for the poor in 1772. Of particular significance was the formation in 1773 of the American Political Society, whose members pursued patriot ideals during the pre-Revolutionary period.

Sutton served as a third core in the Central Massachusetts study unit. It was the most populous town in 1765, and remained one of the most densely populated in 1776. The town combined agricultural prosperity with the development of mill privileges along Singletary Brook (later Millbury). The town was also an important focus of religious activity: it was the location of an early Baptist church in 1735 and the parish of a strong pro-revival minister (1729-89). A workhouse was established for the poor in 1770. Its position on the east-west southern transport corridor as well as on the north-south Blackstone River Valley was a significant factor in this development.

Mendon was the fourth core in the study unit, located on the eastern border of the region along important transportation routes. As the focus of migration from Rhode Island, the town was significant, and the first Quaker meetinghouse in Central Massachusetts was built here in 1729. Its 1734 tax assessment was second highest in the region. In both the north (later Milford/Hopedale) and the south (later Millville/Blackstone) mill privileges were developed. In population the town ranked third in size in 1765 and fourth in 1776, and fifth in density for both years. As early as 1749 a grammar school was established and in 1763 a workhouse for the poor was built. The town's minister was instrumental in the formation of the Mendon Association of ministers, the focus for New Light theologians.

Brookfield was the region's fifth core area. Although the town had subdivided into three parishes at mid-century, its position on the east-west artery gave it importance as a focus between the eastern county towns and the commercial agricultural region of the Connecticut River Valley to the west. The town paid the third highest county tax in 1734. It was the fourth most populous town in 1765 and grew to second position in 1776. The primacy of agriculture is reflected in its lower comparative density.

This same low density and the regional pattern of dispersed farmsteads surrounding a meetinghouse make primary local cores more difficult to identify. Although physically similar to their neighbors, several towns can be identified as socially distinctive and influential. In towns like Hardwick, Rutland, and Princeton, wealthy families in residence provided close contact with the provincial government through power in the General Court, the appointment of justices of the peace, and alignment with the Court Party. Leicester acted as a regional focus for the opposing Country Party, as well as for dissenting Quakers and Baptists, and attracted a group of Newport Jews during the Revolution. In contrast to these were the comparatively dense towns on the corridor between Worcester and Marlborough--Shrewsbury, Westborough, and Southborough. Their position made them more populous and commercially developed than most towns in the region. In all other communities the meetinghouse center served, by definition, some of the functions of a local core.

Research Topics

1. Was land speculation an important factor in town formation and initial land division? Can the mechanism of land division be further described? Were divisions made equally or based on "estate"? How did newcomers acquire land? Did allotments change hands frequently? What role did inheritance play?

2. Define the components of the dispersed agricultural landscape. What was the form and pattern of regional farmstead layouts. Can the settlers' region of origin in lowland New England be discerned in that landscape? Did the nonEnglish settlers (Scots-Irish, Huguenots, Germans) develop distinctive landscapes?
3. Describe the effects of this dispersed settlement on the development of social structures above the level of the farmstead. Were interactions between families based on kin, town, neighborhood, religious society, or occupation?
4. Describe useful subdivisions of the region: north vs. south, east vs. west, northwest vs. southeast, new vs. old communities. What was the nature of orientation outside the region, to Boston and the east, the Connecticut River Valley, and Rhode Island? How were these factors effective in period social movements, court vs. country party affiliation, participation in the Great Awakening, presence of dissenting religious societies, other?
5. What factors influenced a town's participation in the Great Awakening? How do these factors differ from those influencing participating individuals in nonparticipating communities and vice-versa?
6. How did the presence of numerous dissenting individuals and competing religious societies affect a town's unity and collective action?
7. Determine the influence of the following factors to the emergence of a prosperous community economy: date of settlement, proximity to transportation routes, quantity of land, waterpower sources, etc. Can the relative power and influence of the region's towns be more clearly differentiated?
8. Can the growing social and economic differentiation be identified in surviving landscapes? Can these distinctions be made between towns' landscapes? Within them? To what extent were towns' internal conflicts (minister and parish, parish and town) due to this increased differentiation?

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Federal Period (1775-1830)

Regional Events

While the American Revolution had little direct physical impact on Central Massachusetts, Worcester did serve as an inland supply depot and communications center and Rutland was briefly (1778) the site of a prisoner-of-war barracks for Burgoyne's troops. The war proved expensive, bringing requirements for furnishing men and materials, inflation, and economic dislocation. In this atmosphere of unrest the number of dissenting religious groups increased, with added impetus provided by periodic revivals. A continuing movement for more democratic government, as well as resistance to an established church, brought rejection of the Massachusetts Constitution of 1780. The increase in debt prosecution and the apparent breakdown of the monetary system led to an armed insurrection, Shays' Rebellion. With considerable regional support, the regulators prevented the courts from holding sessions in Worcester for several months in 1785, until a large force of government militia reestablished order. Suspicion of centralized power led to opposition in the region to the United States Constitution in 1787.

Neutral trade of the 1790s brought the return of relative economic prosperity to New England. Central Massachusetts was increasingly integrated into the expanding national market economy as an agricultural, processing, and manufacturing hinterland oriented toward both the demands of export trade and the needs of the coastal cities. Investment in turnpike construction rose

dramatically after 1800. Agricultural lands were used more intensively, and marginal areas were brought under cultivation. Of particular significance was the increase in home manufactures—shoes and boots, straw braids and hats, butter and cheese—for trade outside the domestic economy. The Embargo Act (1807) helped stimulate many local attempts at small-scale textile manufacturing, which continued through the War of 1812. Regional growth was curtailed during the postwar depression, and the agricultural economy suffered a setback as a result of the unusually cold summer of 1816. The slow economic recovery of the 1820s brought a second, stronger efflorescence of textile manufacturing ventures, some of them highly capitalized. A resurgence of investment in transportation improvements followed, which included new turnpikes and culminated in the completion of the Blackstone Canal in 1828.

With economic development came a restructuring of social relationships. The increased wealth that came with a growing commercial orientation and new opportunities for employment in manufacturing resulted in greater economic differentiation in an expanding population. Successful farmers, mechanics, and professionals formed a regional elite that defined its status through a variety of exclusive voluntary associations and new educational institutions. Continued revivals and the proliferation of religious denominations helped to establish a range of competing value systems. At the same time, the restructuring of the regional settlement patterns paralleled the new diversity of population. Meetinghouse centers were rebuilt and grew into market and service villages. Secondary turnpike and mill villages also developed and added to the variety of population clusters within a landscape still dominated by dispersed farmsteads.

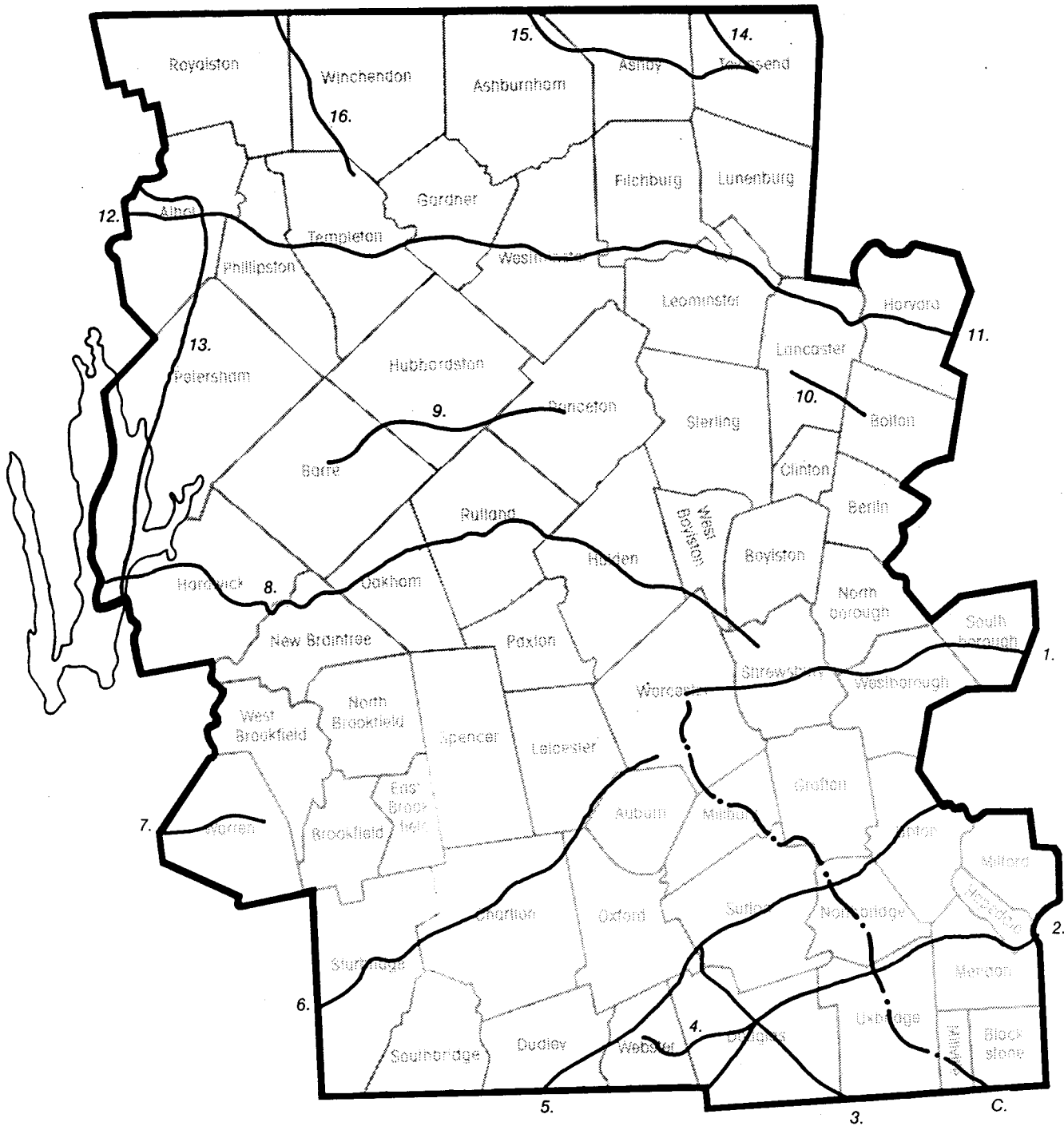
Transportation

Some efforts were made to improve the region's existing post road network in the late 18th century, but major capital investment in the transportation system did not occur until the first decade of the 19th century, when a number of direct, interregional turnpike routes were established. A second flurry of investment in transport improvement took place in the mid 1820s, which resulted in several additional turnpike routes, and more importantly, in the opening of the Blackstone Canal in 1828.

In all, at least seventeen turnpikes chartered by the state were constructed in Central Massachusetts by private companies between 1799 and 1830. See Map 10. Most of these new turnpikes were part of a larger, east-west interregional network radiating out from Boston through the interior hinterland. In the southern part of the region the Ninth Massachusetts Turnpike (1800), and later the Central Turnpike (1824), became important alternate links in the established southwest overland corridor between Boston and New York. The First Massachusetts Turnpike (1796), the Sixth Massachusetts Turnpike (1799), the Boston and Worcester Turnpike (1806), and the Holland, Worcester, and Stafford Turnpike (1810) represented efforts to improve the flow of traffic through the central part of the region. These routes provided direct access between the east coast and the Connecticut River Valley. Across the northern part of the region the Fifth Massachusetts Turnpike (1800) formed an important new east-west corridor.

Besides these major routes, a number of smaller turnpikes were built to provide direct links in the existing road network. Several feeder routes in the north improved northwest connections to New Hampshire and the northern Connecticut River Valley. A few north-south routes were also cut against

Federal Period Turnpikes and Canals



1. Boston and Worcester Turnpike (1806)
2. Ninth Massachusetts Turnpike (1800)
3. Douglas, Sutton and Oxford Turnpike (1808)
4. Gore Turnpike (1825)
5. Central Turnpike (1824)
6. Holland, Worcester and Stafford Turnpike (1810)
7. First Massachusetts Turnpike (1796)
8. Sixth Massachusetts Turnpike (1799)
9. Barre Turnpike (1823)
10. Lancaster-Bolton Turnpike (1806)
11. Union Turnpike (1808)

12. Fifth Massachusetts Turnpike (1800)
13. Petersham, Greenwich and Monson Turnpike (1809)
14. Third New Hampshire Turnpike (1801)
15. Ashby Turnpike (1811)
16. Worcester-Fitzwilliam Turnpike (1815)
- C. Blackstone Canal

— Turnpike
 - - - Canal

the regional transport grain, including the Douglas, Sutton, and Oxford Turnpike, which linked to Providence in the southeast, and the Petersham, Greenwich, and Monson Turnpike in the northwest, which was capitalized by Norwich, Connecticut investors.

A more significant attempt to reorient regional transport flow to the south was the Blackstone Canal, which provided a direct connection between Worcester and Providence along the Blackstone Valley corridor. Initially promoted in the 1790s by Providence investors, but delayed for over twenty years--in part by the denial of a Massachusetts charter--the canal dramatically reduced freight rates along its route, and stimulated economic development along the Blackstone Valley and at its inland terminus at Worcester.

While none of these ventures ultimately proved profitable, they did represent significant investments that had an important effect on regional development. The turnpikes and the canal increased the quantity and efficiency of the flow of goods and people through the area, and they also helped impel the reorientation and centralization of settlement that took place during the period.

Settlement

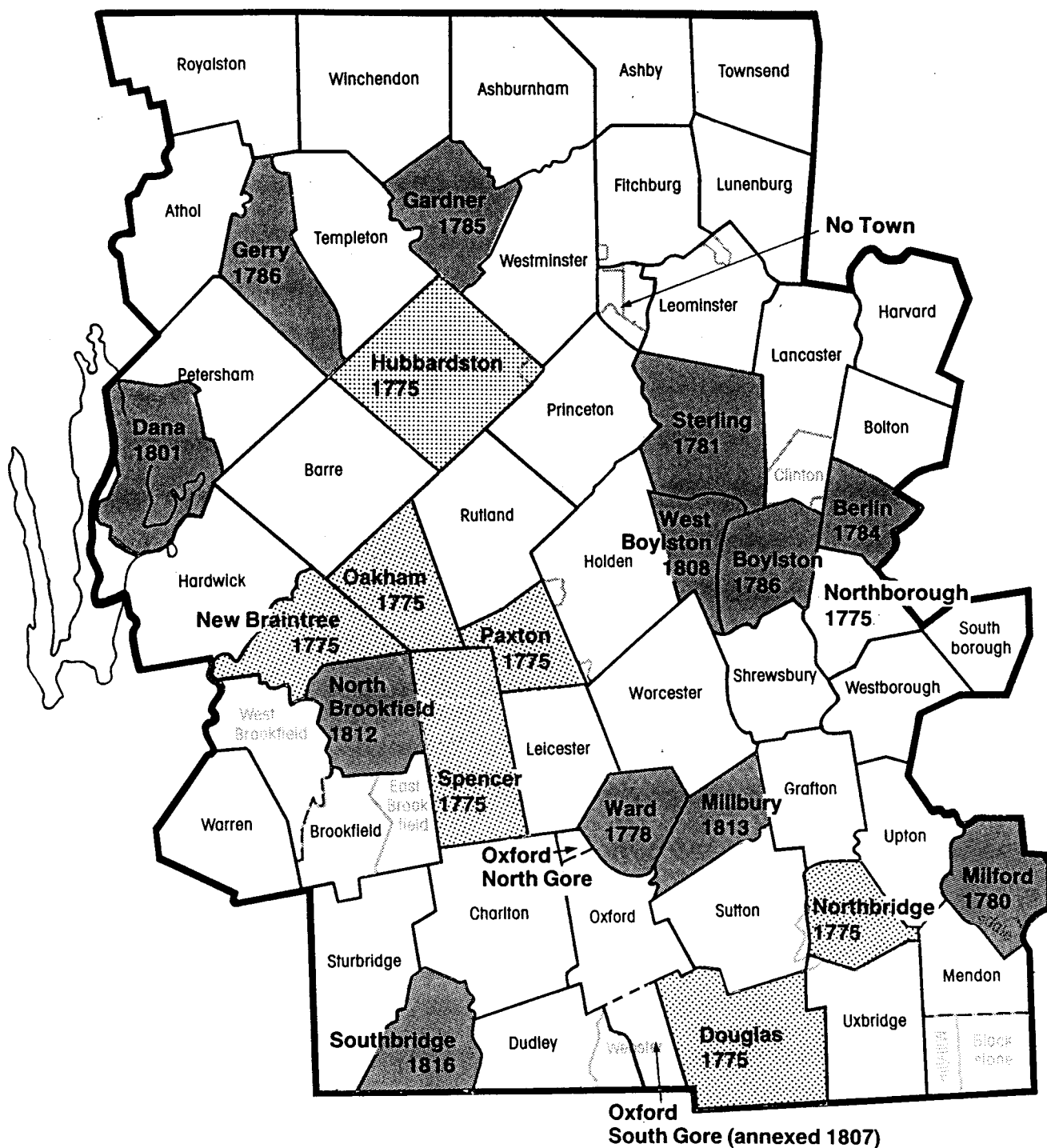
Agricultural settlement during the Federal period continued to spread into the northwest part of the region, and intensified in the south and east. Population increases, greater wealth, and a growing commercial and industrial orientation all led to the restructuring of a dispersed agricultural region into a more hierarchical landscape. The density of residential and nonresidential structures increased dramatically at many local meetinghouse centers, as new business and civic activities converged at the established local focus. New

villages and hamlets located both on the main transport corridors and at the available water-power sites. Within this settlement hierarchy, the shire town of Worcester clearly emerged as the dominant central place.

The process of town formation continued as twelve new towns were incorporated during the period. See Map 11. In addition to the nine towns that were created from districts in 1775, three additional districts were granted independent town status in the late 18th century: Ward (later Auburn) in 1778, and Boylston and Gerry (later Phillipston) in 1786. Four parishes became towns during the period, incorporated as Milford (1780), Sterling (1781), North Brookfield (1812), and Millbury (1813). Hiving off continued in the more densely settled areas, resulting in the formation of Berlin (district 1784, town 1812) and West Boylston (town 1808). In several cases, peripheral areas of two or more towns combined to form a new unit. This process led to the formation of Gardner in 1785, Dana in 1801, and Southbridge in 1816. In the cases of Millbury, Southbridge, and possibly West Boylston, separation resulted from these local places' new identity as manufacturing centers.

The prosperous years of 1790-1810 and the 1820s saw the transformation of many local meetinghouse centers. With the increase of town populations, many meetinghouses were replaced by larger and more ostentatious structures, and civic, commercial, and residential buildings began to concentrate in the vicinity for the first time. Where the center was located on one or more important transport corridors, growth was usually significant. Typically, these Federal period villages took on an extended, linear form along the main transport axis. Although they occurred throughout Central Massachusetts, the most highly developed concentration of these linear settlement forms took

Federal Period Political Boundaries



- Towns incorporated by General Act of 1775
- Towns incorporated between 1776 and 1830
- Towns incorporated before 1775

place in the east around Worcester at Holden, Shrewsbury, Northborough, Westborough, and Grafton. Multiple local centers also developed along the primary highways, as in Brookfield, where a pair of villages developed at Brookfield Center (now West Brookfield) and South Parish (now Brookfield), and at Lancaster, where three distinct village clusters developed east of the Nashua River. Where existing or new regional transport routes bypassed the meetinghouse center, a smaller, more compact center village often developed.

The growth of secondary or alternative centers resulted from a variety of processes. Frequently, local settlement was reoriented toward a new transportation focus. In Townsend, the hilltop meetinghouse was relocated downslope to a newly established turnpike junction, but this type of movement was not typical in the region during the Federal period. More usual was the development of secondary highway or turnpike-oriented hamlets, often including a dissenting group's meetinghouse, away from the primary center, such as at West Sutton, Northside in Charlton, Still River in Harvard, and Wessonville in Westborough. In some cases, these hamlets grew to challenge the established centers for local dominance.

Exploitation of water-power sites intensified during the second half of the Federal period. Throughout the study unit dispersed local privileges were developed for saw and grist mills and a variety of small-scale manufactories. In addition, the factory hamlet, with industrial facilities and a small cluster of worker housing, became an important component of the regional landscape. Various small-scale industrial centers developed after 1800, with perhaps the most notable example on the Blackstone River at Armory Village in Sutton (later Millbury). Textile manufacturing soon emerged as the dominant form of regional industrial development. Textile mills sprang up on the

Blackstone, French, and Quinebaug rivers in the southern part of the region, on the Nashua, North Nashua, Millers and Ware rivers in the north, and on many tributary streams.

Several distinct regional concentrations developed. Notable clusters of factories occurred on the Blackstone River with several hamlets in Uxbridge and Mendon (later Blackstone), on the Nashua River and its tributaries, with multiple factory villages in Holden, West Boylston, and Lancaster (later Clinton), and on the North Nashua at Fitchburg. Smaller clusters developed on the French River in Oxford and Leicester, the Quinebaug River in Sturbridge and Southbridge, the Quaboag River in Warren, the Ware River in Barre, and the Millers River in Athol, Royalston, and Winchendon. While the small hamlet was the typical industrial settlement form, two notable planned textile manufacturing complexes were developed during the period. Rogerson's Village, built in Uxbridge in the 1820s, included the massive, stone Crown and Eagle Mills, and a large cluster of brick worker housing. Samuel Slater's textile manufacturing villages in Dudley and Oxford (later Webster) included several mills and stone worker housing.

Amid the dispersed agricultural and industrial development of the Federal period and the widespread growth of local villages and hamlets, the shire town of Worcester emerged as the region's central social, institutional, and commercial focus. Activities continued to locate in the town's central village along the bipolar Main Street axis, with the county courthouse focus at the northern end of Main Street at the hub of a radiating regional road network, and a town hall/meetinghouse focus to the south. The concentration of commercial and residential structures along the interconnecting Main Street corridor represented the highest density of settlement in the study

unit. In the early 19th century, growth in the central village began to extend east on side streets toward industrial activities along Mill Brook and beyond to Summer Street. The location of the northern terminus of the Blackstone Canal in this area between Thomas and Central Streets in 1828 further stimulated growth in this direction. By period's end, Worcester had clearly developed beyond the linear village form and had begun to show more clearly defined institutional, commercial, residential, and manufacturing zones characteristic of a more urban place.

Population

The pattern of population expansion established late in the Colonial period continued in the region during the Federal period, but a variety of factors brought different rates of growth to the towns. Most areas were adversely affected by the dislocation resulting from the war and the inflation that followed, and their slow increase in population reflected this. Later, with the economic prosperity of the 1790s and 1820s, the growth rate in the region accelerated. Communities where agriculture predominated experienced steady growth, while those that developed new employment opportunities in commerce and manufacturing grew more rapidly. For the most part, however, the Federal period represented a time of maturation and maintenance of the social structure that developed in New England during the 18th century. The growth of population, wealth, and the developing commercial and manufacturing orientation, continued to sustain a system based on the patriarchal family and its domestic economy.

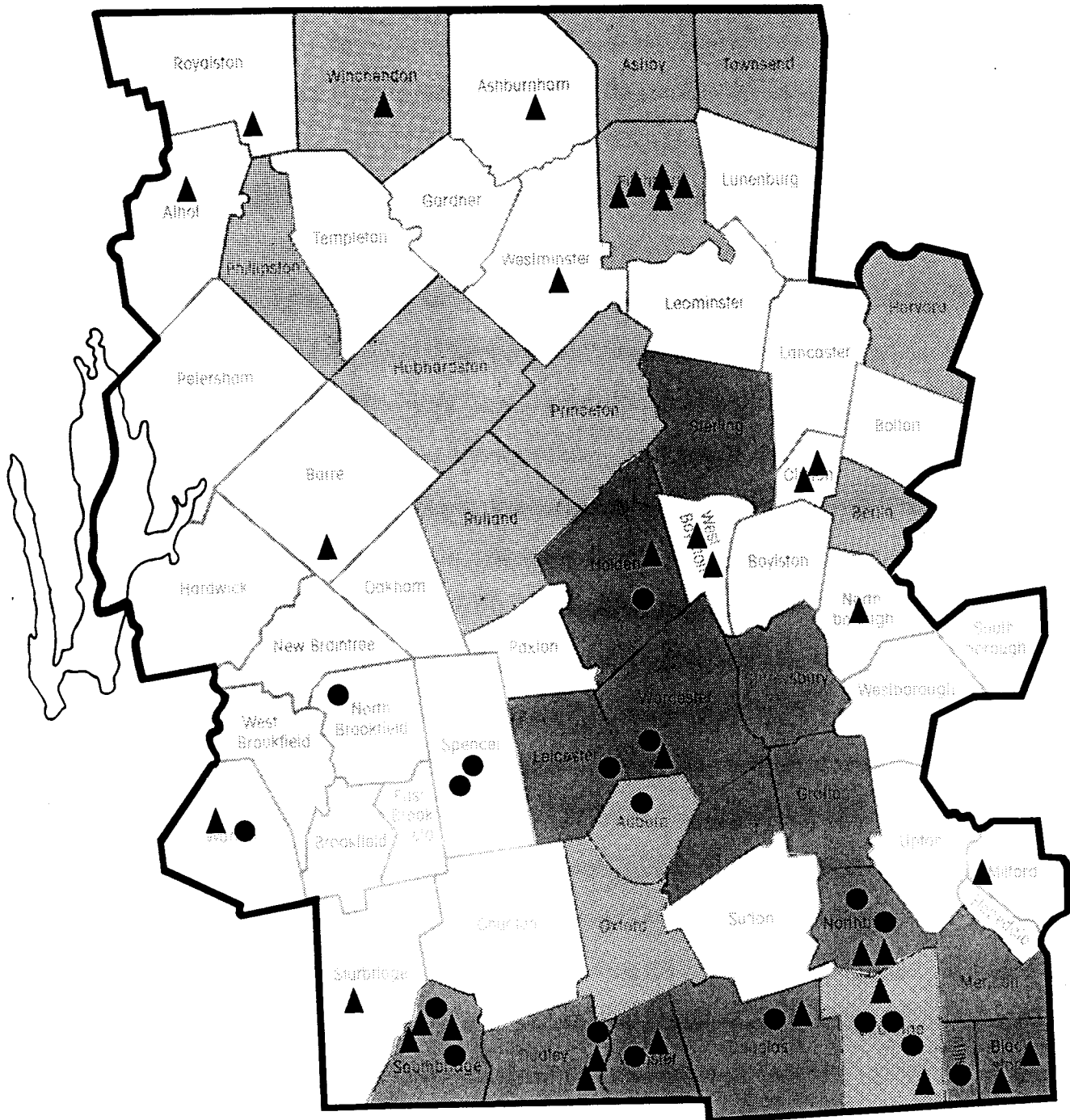
The date of initial settlement was the significant factor in determining growth in agricultural communities. Older communities grew by less than 50%

over the 55 years of the Federal period. These included the eastern towns Harvard and Lunenburg, the small central towns Paxton, New Braintree, Rutland, Hardwick, Petersham, Western (Warren), as well as Phillipston and Westminster. Those towns settled late, in the north and west of the region, continued to grow moderately as the still unsettled lands were taken up by new settlers and the second generation reached family formation years. Several of these towns more than doubled their total populations, including Ashburnham, Ashby, Hubbardston, Royalston, and Winchendon.

Growth was particularly strong in towns that developed their water power sites for manufacturing. The river drainage areas in the southeast grew rapidly in both raw population totals and in increased density per square mile. Mendon and Dudley increased in population by 150% in the period, followed by Milford, Northbridge, and Grafton, which doubled. Increases in density were equally impressive in this area, with these towns, as well as Oxford and Uxbridge, adding between 30 and 40 persons per square mile during the period. Other towns that increased due to manufacturing included the northern towns of Leominster, which added over 30 persons per square mile, and Gardner, which added over 40. Particularly dramatic was the growth of Fitchburg, which combined late formation and early manufacturing to triple its total population and add 55 persons per square mile. Worcester held a unique position in terms of density, adding over 60 persons per square mile to maintain its primary position in the region. Its neighbors Shrewsbury and Leicester grew in its wake in both total population and density.

The distribution of manufacturing and agricultural employment also varied across the region. See Map 12. As late as 1820 agriculture remained

Federal Period Textile Manufactories and Employment Characteristics (ca. 1820)



High agricultural employment
 High manufacturing employment
 Textile Manufactories:
 ▲ Cotton ● Wool

the primary employment in the region, but the relative importance of manufacturing ranged widely from town to town. In the north, farming remained dominant in most areas; over four times the number of men were so employed in Ashby, Berlin, Fitchburg, Harvard, Hubbardston, Phillipston, Princeton, Rutland, Townsend, and Winchendon. In the south and around Worcester the number engaged in manufacturing was much greater. In Southbridge agriculture and manufacturing employed equal numbers. In several towns there were fewer than twice the number of farmers as mechanics and operatives. These included Dudley, Douglas, Grafton, Holden, Leicester, Mendon, Millbury, Northbridge, Shrewsbury, Sterling, and Worcester. Similarly predictive of developments in the Early Industrial period was the construction of the Blackstone Canal and its impact on the region's population makeup. Many canal workers were Irishmen bringing experience on the Erie Canal and British navigation projects. They later settled in the region, primarily in Worcester, and represented the first wave of non-Protestant immigrants to come in large numbers to Massachusetts.

Waves of revival and denominational proliferation characterized the religious history of the period. Beginning with the New Light Stir in the 1770s and culminating with the Great Revival of the 1820s, these periods of increased interest in the spirit added to the theological choices for the inhabitants. Congregational churches contributed an atmosphere of openness, as many pulpits stood empty early in the period. Disputes between ministers and their congregations left little chance of settlement for life. Expansion into the northern and western frontiers meant that many towns had difficulties settling a pastor. Not surprisingly, this left many open to the influence of new and expanding denominations. The Baptists built on the base established

after the Great Awakening, with revivals in the old churches during the 1790s and the establishment of new societies in later years. By the end of the period, over twenty societies and churches had been formed in the region and maintained meetinghouses outside town centers to serve their members from neighboring communities. The Quakers also solidified their position in the Blackstone Valley. With the elevation of Smithfield, Rhode Island to the status of Quarterly Meeting in 1783, Mendon and Uxbridge shared the role of Monthly Meetings over particular meetings in Leicester, Northbridge, and Douglas. Both groups continued to protest against the established church during this period.

At the same time, a number of new denominations became influential in the region. At first established by newcomers from England and from colonies outside the New England area, they soon established a native leadership. The most unusual new group, the Shakers, followers of Mother Ann Lee, visited many northern towns during the 1780s. They found both followers and violent resistance to their alternative vision and built one of their earliest and longest-lasting communities among the followers of Shadrach Ireland in Harvard. More accepted and widespread in their growth were the Universalists. Early societies were formed in Milford (1781), Oxford (1785), and Dana (1797); the leaders of these groups were influential in defining the theology and organization of an emergent denomination. Societies were established in neighboring communities, primarily during the 1820s, adding ten to the total by period's end. In this period of change, the Methodists were able to gain a foothold in New England for the first time, using a well developed system of itinerant preachers who traveled widely over circuits to visit weekly class meetings. Itinerant Lorenzo Dow was particularly effective in the

northern tier of towns in the 1790s and 1800s, and later in the period Methodists were practicing in the southern tier of towns. English immigrants were also responsible for the founding of the region's first Episcopal churches, Christ Church in Leicester in 1823 and St. John's in Sutton in 1828.

Ironically, these dissenting groups faced increased discrimination in the period following the Revolution. A more cumbersome system of ministerial taxation was put in place, as exemption was replaced by redistribution of these funds among religious societies. Individuals continued to resist this penetration by the established church through non-payment, and in several towns dissenters were imprisoned and their goods impounded. In some cases, religious societies organized resistance to this practice, through the formation of Presbyterian societies (Princeton 1818, Millbury 1827), a Free Donation Society (Royalston), the voluntary contribution practice (in Sutton and Charlton) and the growth of poll parishes (as in Worcester and Southbridge). As the number of denominations increased, this resistance became more effective, bringing separation of church and state to a prominent position in Massachusetts period politics. At the same time, the division within Congregationalism divided the supporters of established religion into Trinitarian and Unitarian factions. Soon the Trinitarians joined the dissenters for disestablishment, leaving only Unitarian support, and the Eleventh Amendment to the Constitution ended established religion in Massachusetts in 1833.

In addition to their theological quarrels, the Congregationalists fought for control of parish politics and property during the second half of the period. As a result, in twenty communities in Central Massachusetts the Congregational First Parish was split into two churches. The Unitarians were the majority in

the overwhelming number of these divisions, retaining control of the parish and its meetinghouse. The minority withdrew to form a new church, taking the name Evangelical, Orthodox, or Calvinist, and promptly building a new meetinghouse nearby.

Even as their domination through the primacy of Congregationalism declined, the wealthier citizens employed exclusive associations to supplement their economic positions. Primary among these groups were the Masons, who formed a lodge in Lancaster as early as 1778. Soon after, lodges were formed in Worcester (1793), Charlton (1796), Milford (1797), Oxford (1797), Barre (1800), Hardwick (1800), Athol (1803), and Uxbridge (1819). Less well known were the Thief Detecting Societies formed in several towns, nominally to provide protection from horse thieves, but like their urban counterparts the Fire Societies, primarily social in character. Augmenting the local militias were the elite Light Infantries, who sponsored a variety of social events including banquets and balls, and took part in the May ritual of mustering. Similarly dual-purposed were the subscription libraries that emerged during this period, typically called "social libraries." Early organizations are known in Boylston (1792), Douglas (1799), Harvard (1793), Leicester (1793), Oxford (1792), Royalston (1778), and Rutland (1796), and by period's end at least fifteen are known from throughout the region. The elite also made efforts to augment the common school system. Except for Lancaster and Worcester, few communities were large or wealthy enough to fund a secondary or grammar school, but for those who could afford it, tuition schools were available. Select schools organized by ministers or educated women were usually short-lived. More formally organized academies were formed in Leicester (1783), Uxbridge (1813), Lancaster (1815), Dudley (1815), Worcester (1784-1801), Barre (1825), and Athol (1828).

For most of the region's citizenry, their church with its attendant services and rituals remained the primary social institution outside the family. Entertainment came from get-togethers of kin groups and neighbors, events often combined with seasonal work in the agricultural cycle (haymaking, harvesting, corn husking), as well as events in the individual's life cycle (marriage, childbirth, house-raising). Prayer meetings and Sunday schools provided additional opportunities to meet friends and potential mates. Meetings in local schools and meetinghouses assisted local neighborhood definition as the towns became denser and new villages developed, while bringing together individuals from several towns in new transterritorial groupings. Dissenting groups were particularly attractive to the less privileged groups as both alternative systems of values and a structured opposition to those in power. As the number of denominations increased, the choice of church provided an opportunity for additional self-definition in increasingly diverse communities. During the 1820s the region began to experience the effects of increasing industrial production, but the full impact of these profound changes came later in the Early Industrial period.

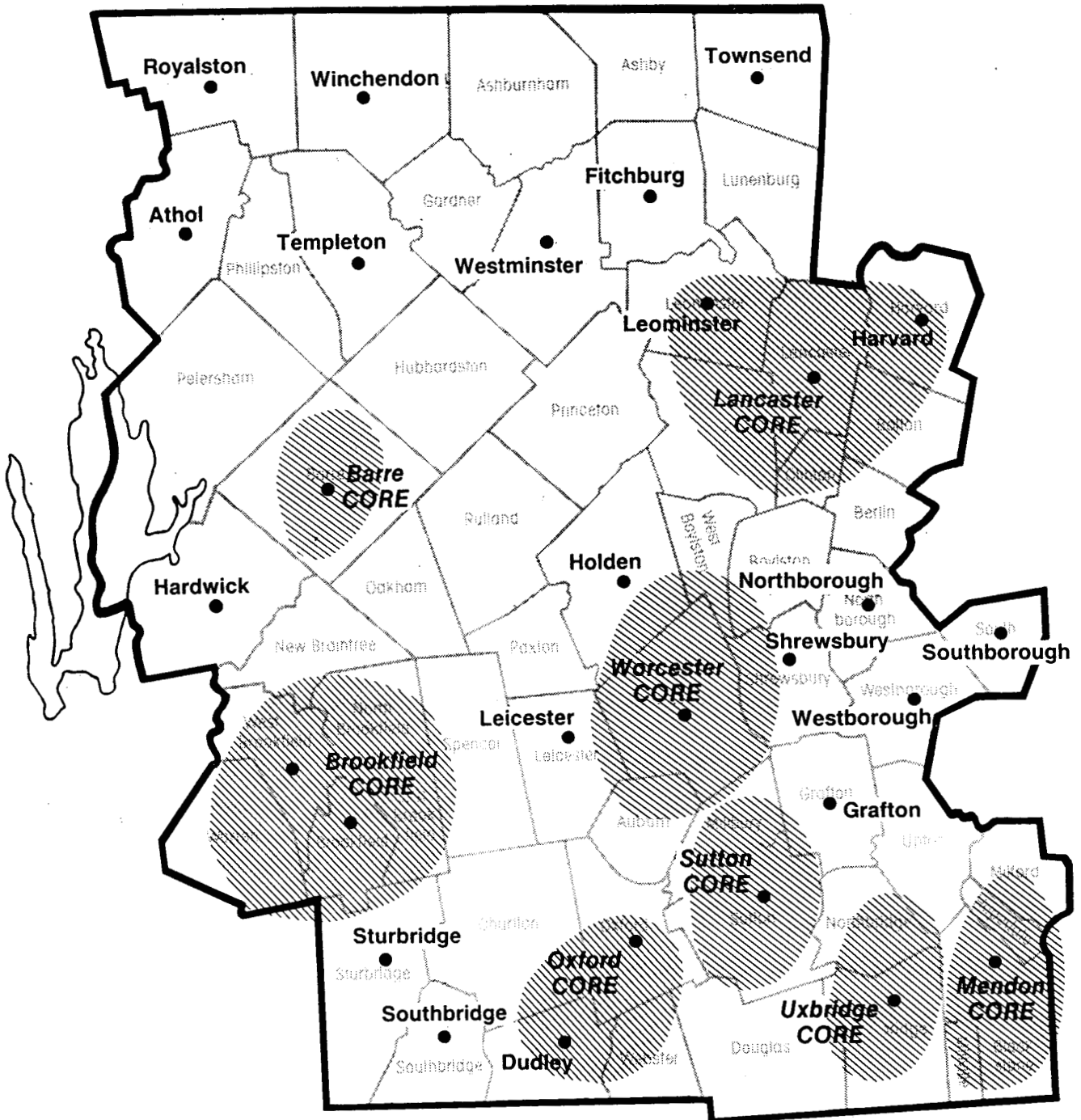
Core-Periphery Relationships



Regional functional and social organization was altered and elaborated during the Federal period as settlement intensified and spread into the northwest, improved transportation corridors developed, and commerce and manufacturing came to play a more significant role in the regional economy. By the turn of the century, agricultural prosperity and an increasing commercial orientation began to exert a strong centralizing tendency. Widespread village formation took place along the regional transport corridors,

particularly in the more densely settled eastern towns, but also in the larger and aspiring towns of the northwest. By the 1790s, several small-scale manufacturing districts began to emerge where the processing of regional agricultural goods and the production of agricultural implements took place. In the early 19th century these were joined, and soon surpassed by, textile manufacturing concentrations which were widely distributed in the region, but were more prevalent in the south, particularly along the Blackstone River and Canal corridor. Through the period, Worcester's influence and importance as the shire town continued to grow, and by period's end it had surpassed the region's large and prosperous agricultural towns (Brookfield, Sutton, Lancaster) to dominate the social, economic, and political realm. See Map 13.

By the end of the Federal period, Worcester had clearly risen to a position as the dominant regional core. The importance of its institutional functions as the shire town where county court and jail were located, and into which large numbers of people were drawn for the periodic court sessions, stimulated the town's economy. Given an expanding market, local capital was invested in a variety of industries, including a brewery and gin distillery. The highest and most specialized level of commercial and financial services available in the region located here. Whitney (1793) noted the existence of apothecary and hardware stores, and called Worcester "wealthy and opulent . . . one of the most populous, lively, flourishing, agreeable inland places in the state." Improved transportation facilities, including the county roads, turnpikes, and ultimately the Blackstone Canal, all facilitated the movement of people, goods, and ideas through the town. The location of Isaiah Thomas' printing facilities in Worcester in 1775 made it a center for the dissemination of

Federal Period Core Areas



 Regional core
 Local core

information. By 1830, four weekly papers were published here. As the town grew to preeminence in population and wealth, private social and institutional organizations were formed, including a social library, the Antiquarian Society, and a masonic lodge. At the other end of the socioeconomic spectrum, the region's only school for Blacks was established here in 1828. At the same time, with the Blackstone Canal came permanent Irish worker settlements in the town's east side.

Despite Worcester's rise to importance, several large agricultural towns remained significant regional cores through the late 18th and early 19th centuries. Shifts in rank took place, however, as the older dominant towns in the east were eclipsed by newer towns in the northwest. In 1776, the Colonial period cores at Lancaster, Brookfield, Sutton, and Mendon all had larger total populations than Worcester. During the period these four towns all lost population and territory to the hiving-off process, while Worcester had given up only a relatively small portion of itself to the formation of Ward in the southwest. By 1830 regional cores were located in the established agricultural communities of Lancaster, Sutton, and Brookfield: the emerging manufacturing centers at South Parish Mendon, Uxbridge, and Oxford, and the new northwestern focus at Barre.

Although it was no longer the dominant place in Central Massachusetts, Lancaster remained the focus of a significant regional core in the eastern part of the area in the Federal period. The agricultural wealth generated by the Nashua Valley intervalle persisted, and Lancaster remained an important transportation focus and commercial center for the developing towns to the west and northwest. A conservative rural gentry emerged, possibly joined by a

transplanted exurban elite. The first lodge of Freemasons (1778) in the region was established here, as was the second academy (1815) in Worcester County. The Lancaster regional core also led the region in the establishment of town halls. Lancaster, Sterling, Leominster, and Harvard all built distinct, secular town houses during the Federal period. Creative energies seem to have focused at the local cores at the outer edges of the Lancaster regional core. Leominster became an important transportation focus and a horn comb manufacturing center. Wood-working industries were introduced at Sterling. Harvard saw the establishment of an important colony of the radical nonconformist Shaker sect.

Beyond the Lancaster core area, a local core developed to the north at Townsend along the Squanicook River corridor. A more significant local core developed in the narrow valley of the North Nashua River in Fitchburg, where a concentration of small-scale industry developed south of the meetinghouse center. By 1830, an important commercial focus emerged here, together with a local academy, and textile and paper mills. South of the Lancaster core, strong local cores developed in towns along the main regional transport corridors north and east of Worcester, with linear villages at Holden, Shrewsbury, Northborough, Westborough, and Southborough.

The southeastern part of the region underwent several transformations during the period. The Colonial period focus at Mendon declined to a local core early in the Federal period, particularly after the loss of its eastern territories to Milford. Established local cores continued to develop at Grafton and Upton along the regional road network. By the end of the Federal period, however, the development of textile manufacturing in Mendon South Parish on

the Blackstone River and Mill River tributary propelled Mendon to second in the region in population with a new local core at South Parish.

Similar developments occurred in other towns in the Blackstone Valley, as early Federal period agricultural cores at Uxbridge and Northbridge were reoriented toward textile manufacturing hamlets and villages. The strongest local core developed at Uxbridge, where both an academy and a lodge of Freemasons were established in 1819. Factory centers also developed further north in the valley in Grafton and Sutton. In 1828, the opening of the Blackstone Canal linked the valley from Mendon to Millbury in what later emerged as a multinuclear regional core area.

West of the Blackstone Valley, Sutton remained a dominant regional core through the Federal period. In the late 18th century, this wealthy agricultural town also developed a small-scale manufacturing concentration along Singletary Brook in the north (later Millbury), including a paper mill (1777) and armory (1808). West of Sutton, important local cores developed at Northside in Charlton and at Oxford. Both towns established Masonic lodges during the period.

A regional textile manufacturing core emerged north of Webster Lake in the Oxford South Gore and along the French River in Dudley. The regional core included the three industrial villages built by Samuel Slater, and Dudley Center, where an academy was established in 1815. Further west, a strong local core developed along the Quinebaug River at Southbridge, which in 1820 had the highest proportion of manufacturing employment in the region.

The Brookfield regional core continued to be important in the west. Still the wealthiest town in Central Massachusetts in 1793, Brookfield remained a

largely dispersed agricultural settlement with local cores at the First Parish and South Parish centers, and only minor industrial development at its eastern and western edges, at East Brookfield and Warren. An important local core developed at Leicester, the focus of a wire card manufacturing industry and the site of the first academy in the region, in 1784.

In the northwest quarter of the region, a number of local cores developed as agricultural settlement intensified, population increased, and manufacturing grew in importance. Barre emerged in the Federal period as the wealthiest of these towns. By the early 19th century, it surpassed its neighbors to become the dominant regional core in the northwest. A Masonic lodge was established in 1800, and an academy was formed in 1825. Textile manufacturing was initiated along the Ware River in the southern part of town. Southwest of Barre, Hardwich remained an important local core through the period. A Masonic lodge was also formed here in 1800, and small-scale manufacturing also located along the Ware River. North of Barre, a local core developed at Templeton, where agricultural wealth was supplemented by numerous, dispersed manufacturing pursuits, and a textile focus developed at Otter River. Further north, three local cores developed at towns located along the Millers River. At Athol, a Masonic lodge was formed in 1803, an academy was opened in 1828, and a mixed manufacturing center developed north of the meetinghouse focus. Textile manufacturing also was initiated in Royalston and Winchendon. A local core also developed at Westminster, where the turnpike route stimulated village growth, and textile manufacturing was initiated in the east. An academy was established here in 1829.

Research Topics

1. How did the location of new religious societies influence the interaction within their neighborhoods? What role did these groups play in the more general integration and separation of social and economic functions within local communities? How did participation in religious revivals and formation of new denominations vary over the region? Within communities?
2. What similarities and differences can be discerned in the development of the village as a settlement form in the region during the period? Can the sequence and progression of village development through the region be identified? Can the specific range of functions of these new centers be determined? What specific impact did improved transportation have on the regional settlement landscape?
3. How did increased social and economic differentiation affect the landscape? Describe both the form and location of elite activities, and the growing concentrations of laboring populations by period's end. In particular, how did these changes manifest themselves in Worcester?
4. Was the early development of waterpower sites for factory manufacturing based on the quality of the resource, proximity to similar development, the activity of individual entrepreneurs, or other factors?
5. How can economic cycles of boom and bust be discerned in the landscape? Can the social and economic dislocation of the Revolution and its aftermath be so identified?
6. What antecedents and innovations influenced the location, form, and function of the first industrial communities of the region in their layout, organization, and provisions for the maintenance of a concentrated working population?
7. How did the increase in non-agricultural employment influence the landscape outside the specialized factory villages? Pay particular attention to small shop manufacturers, service activities, professional, clerical, and retail employment.
8. To what extent was scientific agriculture adopted in the region? Was its adoption regionally varied? How did it affect the landscape here?

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Early Industrial Period (1830-1870)

Regional Events

During the Early Industrial period, Central Massachusetts fully exhibited the socioeconomic patterns of urban-industrial growth. Manufacturing became increasingly important, and organizational transformations of the textile, boot and shoe, iron, machine, and machine tool industries all had their impact on, and in some cases their origins in, the region. The establishment of regional and interregional railroad lines stimulated local concentration of commerce and industry along the new transport corridors. The marginal agricultural lands ceased to be profitable as western areas outside New England were connected to the eastern markets, leading to farm consolidation and abandonment. Regional urban growth attracted greater concentrations of population and encouraged market gardening and dairy specialization in adjacent areas. The result was a reorganization of the regional landscape and the rise of complex urban places.

With the improvement of transportation and communication networks, the region became increasingly integrated into the national economy. The prosperity of the late Federal period extended into the 1830s, but ended with the severe depression of 1839-1843. After 1843 the economy recovered, and a surge of growth accelerated through the 1840s and the early 1850s until the recession of 1854 and the panic of 1857. The Civil War had a mixed impact on the region's economy. Manufacturers that supplied the Southern market

exclusively were devastated, but industries that could provide armaments or supplies to the military experienced growth. These economic fluctuations, coupled with industrial expansion, produced a more clearly stratified and economically differentiated population in the region. Wider gaps emerged between classes in urban areas as a larger portion of workers held positions that required fewer skills and brought greater economic dependence. Changes in the system of production resulted in greater variety in social structures between manufacturing and farming communities. The flow of immigration brought large numbers of Irish and Canadians, groups culturally distinct from the region's majority, and swelled the working-class population.

These factors increased class and racial antagonism manifest in a wide range of social movements. Apologists for the new industrial order became proponents of new middle-class values, while working and ethnic communities struggled to maintain traditional and develop alternative success models. Reform activities of both groups focused on temperance and education, often combined with evangelical religion. Republicans and Democrats competed for voters, and their followers split along class and ethnic lines over national political issues, including the extension of slavery and abolition. The variety of views presented by political parties reflected a divided society, most clearly represented by the success of the xenophobic Know Nothing Party in the region. Most groups unified to protect the Union, bringing a brief respite from conflict.

Transportation

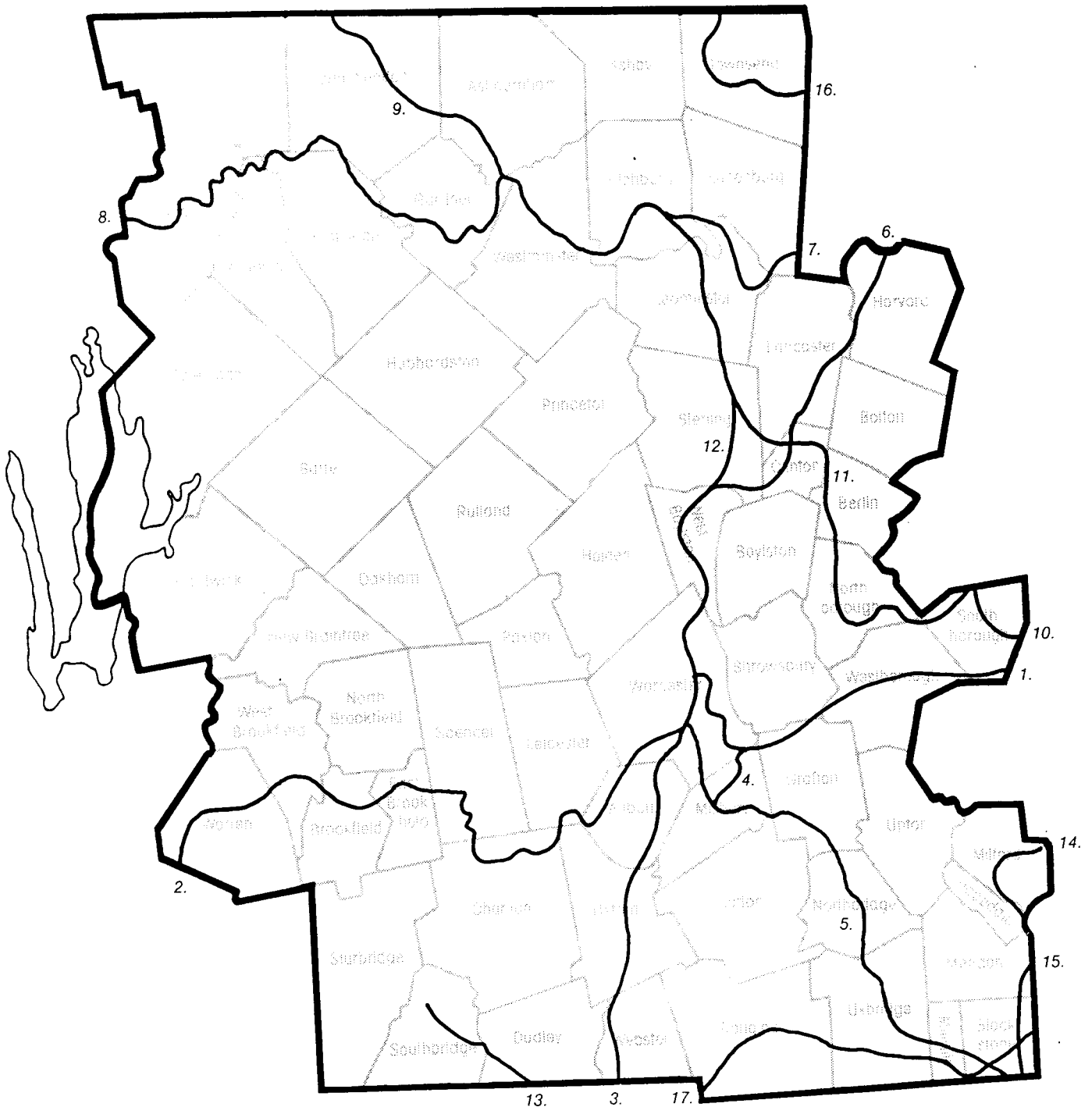
The establishment of railroad connections into Central Massachusetts early in the period marked the beginning of significant improvements in

overland transport. There was as well a fundamental realignment of the flow of people and goods through the region. Railroad construction was carried on extensively and occurred in every decade of the period. Initial interregional corridors were established through the south-central area in the late 1830s. While the Blackstone Canal continued to operate until 1848, traffic decreased dramatically. This was followed by a great efflorescence of railroad building in the period 1845-1848, during which eight new lines were begun and completed in the mid 1850s and the late 1860s. In all, seventeen different rail lines and branches were put into operation in Central Massachusetts during the Early Industrial period. See Map 14.

The first route constructed into the region was the Boston and Worcester Railroad, which opened in 1835, only seven years after the completion of the Blackstone Canal. A branch line south to the Millbury industrial focus opened in 1838. The completion of the Western Railroad to Springfield in 1839, and to Albany in 1842, established this route through the study unit as the primary corridor from Boston to the western interior. The opening of the Norwich and Worcester Railroad in 1840, with boat connections on Long Island Sound to New York, made Worcester an important changeover point in the growing interregional passenger traffic.

New lines were added to the northern and southern parts of the region during the railroad boom of the 1840s. In the north, Fitchburg's Alvah Crocker promoted and built the Fitchburg Railroad (1845) from Boston and the Vermont and Massachusetts Railroad (1848-1850) from Fitchburg across the northern part of the region and up the Connecticut Valley to Brattleboro, Vermont. Two additional northwestern lines to New Hampshire were completed during

Early Industrial Period Railroads



1. Boston and Worcester Railroad (1835)
2. Western Railroad (1839)
3. Norwich and Worcester Railroad (1840)
4. Millbury Branch Railroad (1838)
5. Providence and Worcester Railroad (1847)
6. Worcester and Nashua Railroad (1848)
7. Fitchburg Railroad (1845)
8. Vermont and Massachusetts Railroad (1847-8)
9. Cheshire Railroad (1848)
10. Agricultural Branch Railroad (1855)

11. Boston, Clinton and Fitchburg Railroad (1866)
12. Fitchburg and Worcester Railroad (1848)
13. Southbridge Branch Railroad (1866)
14. Framingham-Milford Branch Railroad (1848)
15. Milford and Woonsocket Branch Railroad (1868)
16. Peterboro and Shirley Railroad (1847)
17. Boston and New York Railroad (1854)

the decade: the Cheshire Railroad (1848) from Ashburnham Junction through Winchendon, and the Peterboro and Shirley Railroad (1847) through Townsend. In the south, the Providence and Worcester Railroad was completed in 1847, largely along the Blackstone Canal right-of-way, and within a year the canal was no longer operating. The Framingham-Milford Branch Railroad (1848) of the Boston and Worcester stimulated the growth of Milford at the end of the line. Connectors were also improved from Worcester to the north, including the Fitchburg and Worcester Railroad (1845) and the Worcester and Nashua Railroad (1848).

Railroad growth was less spectacular in the 1850s, with the extension of the Agricultural Branch (1855) to Northborough, which remained the terminus of the line for ten years, and the opening of the ill-fated Boston and New York Railroad (1854; later the Boston, Hartford and Erie) from Blackstone across the southeast part of the region. With the Civil War, railroad expansion came to a halt, but in the late 1860s it revived. The most significant development in this last decade of the period was the consolidation of the Boston and Worcester and the Western Railroad into the Boston and Albany Railroad in 1867, and the subsequent modernization of the line, including double tracking and the use of steel rails. Elsewhere, development included the extension of a branch line to Southbridge (1865), the extension of the Agricultural Branch (renamed the Boston, Clinton and Fitchburg) through Clinton to the Fitchburg and Worcester line in Sterling (1866), and the running of the Airline Railroad (1868) from Bellingham south along the southeast border of the region into Rhode Island.

By the end of the period then, Central Massachusetts was well integrated into the northeastern interregional rail system, with the main east-west

corridor across the south-central part of the area. Worcester had become the focus of lines radiating in five directions. Several railroads connected to the northwest through the northern part of the region, and Fitchburg had emerged as an important rail center. In general, however, the rail network was concentrated in the south and east, and while several lines were proposed or under construction, the west-central highland area remained unserved in 1870.

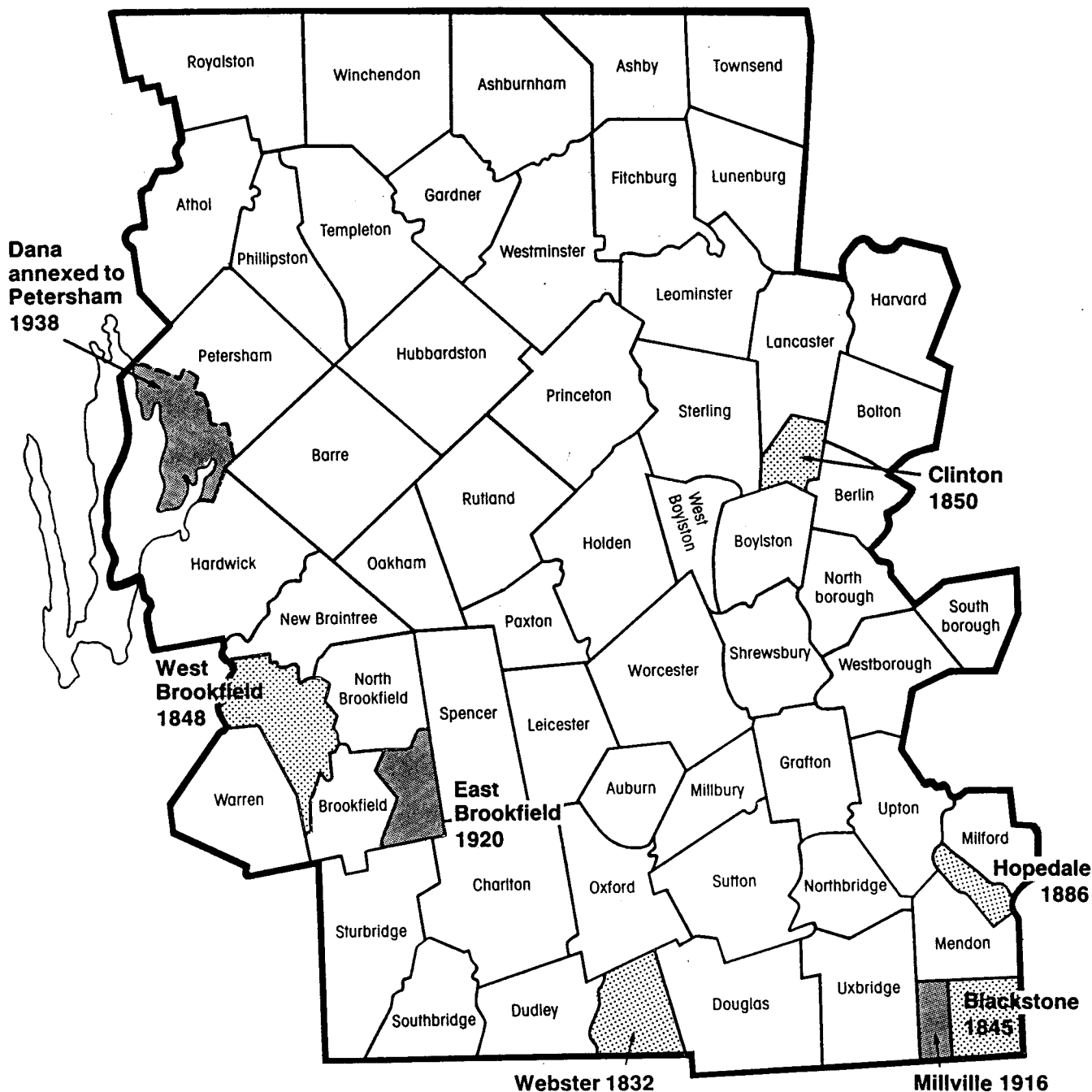
Settlement




Settlement growth continued to concentrate in fewer places as the expansion of dispersed agricultural settlement in the region ended by ca. 1850. The railroad acted as the most pervasive agent of settlement change, both as a general stimulus to growth and as a generator of specific settlement forms. Industrial development accelerated, primarily at locations along the regional rail corridors. The most spectacular transformation during the Early Industrial period was the rise of urban places and the more complex settlement forms associated with concentrated, large-scale industrial development. At the same time, however, changes in settlement took place in most of the towns in the region.

Four new towns were formed during the period. Of these only one, West Brookfield (1848), represented a continuation of agrarian-based parish separation. The three others were formed around the newer, valley industrial settlements of older agricultural towns. Webster was created from Oxford and Dudley in 1832, South Parish Mendon became Blackstone in 1845, and Clinton separated from Lancaster in 1850. See Map 15.

By 1870, Central Massachusetts towns were stratified in a hierarchy of five levels according to population size and settlement pattern. Ranked at the

Industrial and Early Modern Period Political Boundaries



-  Towns incorporated between 1831 and 1915
-  Towns incorporated between 1916 and 1940
-  Towns incorporated before 1831

top was the primary regional urban center, Worcester, which was incorporated as a city in 1848. Below Worcester, two secondary regional urban centers had emerged at Fitchburg in the northeast and Milford in the southeast. The third level consisted of growing industrial towns, the largest of which--Clinton, Blackstone, Southbridge, and Webster--were approaching an urban density and form. A fourth group of towns had developed various combinations of dispersed agriculture and industrial specializations in factory villages during the period. Some towns remained largely agricultural, in some cases with a secondary manufacturing base, but in most instances with a declining rural population.

Worcester's growth from a substantial village to an industrial city followed the pattern of settlement dynamics established in the late Federal period with the construction of the Blackstone Canal. Vertical business block expansion took place in the Main Street commercial district, at first with two- to three-story blocks, and later with three- to six-story brick buildings. Stylish middle- and high-income residential neighborhoods extended primarily into the highlands to the west of the central district. Fringe activities (including the County Jail and the State Lunatic Asylum) located to the east of Main Street and industrial growth also concentrated here along the Blackstone Canal/Mill Brook corridor. Working-class and Irish immigrant residential districts were also established in this East Side area. Once railroad service was established, new, large-scale industrial complexes were developed at the outer edge of the central district along the rail corridors radiating to the north, south, and east. By period's end, an extensive industrial fringe zone developed in the southeast in the lowland sector crossed by three regional rail lines, with several factory and worker housing clusters, and an outer cemetery belt. Local educational institutions were located on prominent hilltop sites.

Similar urban growth occurred in Fitchburg and Milford, although on a reduced scale. Both towns developed linear commercial districts with multistory brick blocks, and new town hall and railroad depot foci. In both places, the main sector of middle- and high-income residential growth extended to the northwest away from the railroad/river industrial corridor, while worker and Irish immigrant neighborhoods clustered at the eastern edge of the central district. Peripheral industrial concentrations were built in both communities, and fringe institutional activities developed.

Many of the mid-level industrial communities exhibited similar settlement characteristics. These included the towns of Athol, Gardner, Leominster, Millbury, North Brookfield, Spencer, and Westborough. Small commercial districts emerged, and rail and water-oriented industrial zones developed. By period's end, clearly segregated high-income residential sections and Irish immigrant neighborhoods were in place in virtually every industrial center in which individual ownership characterized the housing market. In some larger industrial towns like Southbridge and Webster, several distinct manufacturing villages had begun to expand and coalesce to form a larger, loosely connected urban area by 1870. Other industrial towns, like Blackstone, Grafton, Northbridge, Uxbridge, and Winchendon, continued to grow as a collection of dispersed manufacturing villages.

Indeed, the company-controlled factory village continued to develop as an important settlement form in Central Massachusetts during the Early Industrial period. In its larger and more complex forms, as in Clinton, planned industrial settlement included a grid street plan with civic and commercial areas. More generally, the distinguishing feature of the factory village continued to be its regularly arranged cluster of multifamily worker housing

located near the manufacturing complex. Major examples of this settlement type developed during the period at Whitinsville (Northbridge), Hopedale (then part of Milford), and Gilbertville (Hardwick). Smaller factory villages and hamlets appeared throughout the region.

In rural towns, residential commercial, and small-scale industrial growth continued in many meetinghouse centers into the mid 19th century. New civic structures were added as town halls, schools, and libraries and academies were built. New religious denominations also located churches in these centers. Shops and small factories were added, and in many farming towns, agricultural processing plants, such as cheese factories, were built. Small depot villages developed where the rail lines bypassed the established centers, as in Charlton, Spencer, and Ashburnham.

At the same time that these areas were losing residents, outsiders who perceived the rural landscape as a salubrious environment sought to develop them in new ways. A few rural areas were transformed as recreational sites. Most notable were the hotels and summer estates built south of Wachusett Mountain in Princeton, and the Coldbrook Mineral Springs resort in Oakham. The Sterling Camp Meeting Grounds were established in 1852 near Waushacum Pond. Two state schools were built in rural areas in the eastern part of the region: the State Reform School in Westborough, and the State Industrial School for Girls in Lancaster.

Population

Many of the patterns of population growth and reorganization in Central Massachusetts during the period can be attributed to the expansion of industrial production. Opportunities became more numerous in urban places

while rural communities declined in population, and the areas became increasingly different in both social structure and activities. Successful manufacturers joined prosperous merchants in a class that controlled an increasing portion of the region's capital resources. Opportunities for the traditional livelihood of small producer and artisan shrank while growth in commerce and industry provided employment for a new middle class of professionals, service workers, and clerks. The increase in factory employment and changes in agricultural production removed workers and processes from the household. Home production activities decreased while consumption increased, and the role of women in the economic functioning of the family was transformed. Labor outside the home created a new group of wage-earners. This working class expanded and was diversified by the influx of Irish and Canadian immigrants. In the face of such growth and change the fragmented population of the region responded with solutions expressed in a variety of religious and reform movements.

The region's urban places and manufacturing towns grew most quickly. Worcester's position in the region remained unique as an administrative and marketing center to which manufacturing and transportation projects brought unprecedented growth. During this period the town experienced a tenfold population increase, reaching 41,105 by period's end. Milford also grew rapidly during this period (627%) due to the dominance of boot and shoe manufacturing. Fitchburg's population increased by 337% during the period with the expansion of a diversified industrial economy of paper, comb, iron- and wood-working production. Textile manufacturing continued to bring growth to towns in the river valleys of the south and east, where several towns more than doubled their populations, including Blackstone, Millbury, Southbridge,

Dudley, Clinton, Grafton, and Webster. Boot and shoe production brought similar growth to North Brookfield, Westborough, and Spencer, as did machinery in Northbridge, wooden goods in Gardner and Winchendon, horn combs in Leominster, and mixed manufacturing in West Boylston, Warren, and Athol.

The towns that added to their populations slowly fall into two categories. The majority grew because of the development of isolated and small-scale industry and the numbers employed in agriculture and manufacturing were nearly equivalent. None increased their population by more than 100%. Notable examples of this pattern emerged in Templeton, Sutton, Oxford, Barre, Hardwick, and Sturbridge. The growth of the second group of towns can be linked to their proximity to rapidly expanding Worcester, and to the corridor of higher intensity activity extending from that city to the east. These towns included Shrewsbury, Berlin, Northborough, Southborough, Holden, and Auburn.

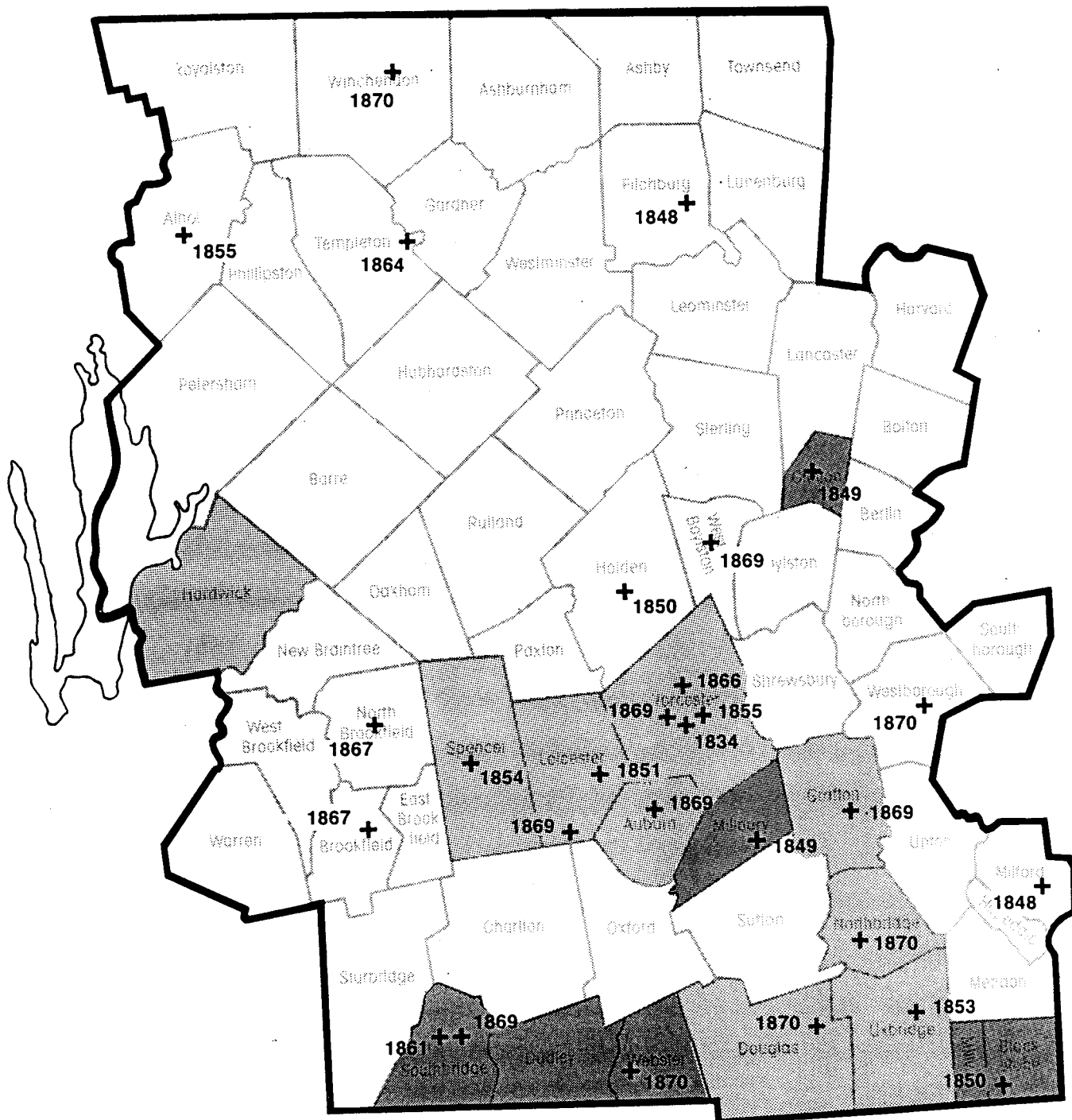
The largest number of towns, however, experienced no growth at all, and their low densities reflect the maintenance of agricultural economies. Agricultural employment outnumbered manufacturing opportunities, but farm abandonment was a significant factor in the population loss that reached as high as 26% in Phillipston. This loss reflects the interior migration from farm communities to the new opportunities of the commercial and manufacturing towns. These nineteen towns were located in the region's uplands, and included Charlton, Sutton, and Mendon in the south, as well as most of the towns north of Worcester.

The new "unskilled" jobs in the area's factories provided work for the immigrants who came to the region in large numbers for the first time since settlement. The Irish came after the famine of 1846 and 1847, and crop

failure and farm abandonment brought large numbers of French and English Canadians. Together with smaller numbers of English and German immigrants, these newcomers settled primarily in the rapidly expanding manufacturing towns. The effects of this movement can be seen in the proportion of foreign-born reported in the state population census of 1855. The county as a whole reported nearly 20% of its population as foreign-born. Six towns in the region had foreign populations over 30%: Blackstone (45.3%), Clinton (38.6%), Milford (37.2%), Southbridge (34%), Webster (32.5%), and Millbury (30.7%). An additional six towns had foreign-born populations above the county average: Leicester (28.4%), Worcester (25.3%), Uxbridge (25.2%), Grafton (24.8%), Dudley (22.4%), West Boylston (21.4%), and Auburn (20.2%). Within this group the Irish were by far the most numerous, accounting for 87.2% of the total in 1855. The next most numerous group, the British Americans, accounted for only 13.2% of the foreign population. Ten years later, fifteen towns had foreign-born populations above the county average. See Map 16. The Irish dominance had been diminished by increased Canadian migration as their proportion increased to 21.4%. In direct contrast, the Irish proportion of the foreign-born population shrank from 87.2% to 65.8%.

Although as a group the foreign-born chose industrial communities, the British Americans and Irish rarely appeared in large numbers in the same town. As early as 1855 there were more Canadians than Irish in West Boylston and Douglas, and ten years later Dudley, Shrewsbury, Spencer, Sutton, Southbridge, and Webster also had more Canadians. Although not nearly as numerous as the Irish and Canadians, other immigrant groups also tended to cluster together in certain towns, in part because of the available jobs in more

Early Industrial Period Foreign-born Population (ca. 1865)



Note:

County average of foreign-born population is 19.8%

- Over 30% foreign-born
- Between 19.8% and 30%
- Under 19.8%

+ Roman Catholic church and founding date

highly skilled trades. Machinery production attracted English workers to Northbridge (11% of the foreign-born population) and Leicester (21%), while more protected jobs in the textile industry, such as mule spinner, attracted the English to Blackstone (14.7%), Millbury (12%), Uxbridge (9.8%), and Webster (8.9%), Germans to Clinton (7%) and Webster (10%), and Scots to Clinton (12.5%).

The majority of these immigrants were Catholics, and with them came the Roman church. Reflecting the early arrival of foreign-born workers with the construction of the Blackstone Canal, and later the railroads, the area's first church was formed in 1834 in Worcester. From this central location, priests made periodic visits to towns to celebrate masses and later established missions. By 1848, missions had been established in Milford, Millbury, Clinton, Uxbridge, Southbridge, Webster, West Boylston, Fitchburg, Winchendon, and Templeton. Early in the period a range of institutions were formed, particularly in Worcester, aimed at providing health care, welfare, and education to the Catholic community. With the great increase in immigration, however, efforts were soon limited to church formation. By the end of the period, 1870, a total of 28 missions and parishes had been formed, four in Worcester alone. Their location closely parallels the concentrations of the foreign-born. See Map 16. Most were oriented to the Irish, conducting services in Latin and English. In a small number of cases, the predominance of French-speaking Canadians led to a choice of that vernacular for parish activities, including St. Louis (1853) in Webster, St. Denis (1870) in East Douglas, Notre Dame (1864) in Southbridge, and Notre Dame des Canadiens (1869) in Worcester.

The most significant social movement of the mid 19th century was the effort of the middle class to transform working-class cultures to the emerging

system of industrial capitalism. The continuing expansion of evangelical religion provided one vehicle for the new values in both urban and rural areas. In Worcester, industrialists built and funded the Mission Chapel among east side immigrants, and in Webster manufacturers provided a convenient Congregational Church. Throughout the region, the number of evangelical Congregational churches increased with the cycle of revivals, adding seventeen new societies concurrently with the continuing pattern of parish divisions between Trinitarians and Unitarians. While Baptists and Universalists also added to their societies during the period, the most significant growth came to the Methodists. Particularly from the mid 1830s to the mid 1850s, societies were formed throughout the region, adding nearly 40 groups by the end of the period. From a loose confederation of classes and societies joined by an itinerant ministry, the denomination became an important rival to Congregationalism.

The range of adjunct activities undertaken by these evangelicals was impressive, augmenting divine services and prayer meetings with social welfare functions. Of particular importance was the temperance movement, aimed at reforming work habits to serve the new system of production. Many societies were organized in the urban and manufacturing areas, including Washingtonians and Good Templars in Worcester, Fitchburg, Blackstone, Douglas, Gardner, and Winchendon. This movement was also felt in rural areas, and organizations were active in Boylston, Lancaster, Paxton, New Braintree, and Westminster. Although many in the ethnic and working communities resented such intrusions, others agreed on its importance to economic independence and formed parallel organizations. Best known was the Father Mathew Temperance Society, formed in Worcester in 1849 among the Irish.

A second group of reform activities focused on the extension and control of education. During the early years of the period, tuition-funded select schools and academies continued to provide secondary education in most towns. Education reformers advocated publicly-funded high schools and increased spending on the school system. Worcester formed Classical and English High School in 1845, followed by Fitchburg in 1849 and Milford in 1850. At least fifteen other towns established high schools by period's end. Reformers also attempted to exert more centralized control through the replacement of the district system by the town system. Debates over the abolition of the district system continued for several years in Blackstone, Fitchburg, Mendon, Oxford, Paxton, Phillipston, Royalston, and Winchendon. A significant portion of the population wanted to retain local control of the education of their children and over the buildings that served as foci for neighborhood activities and housed district libraries. Douglas and Sutton retained the district system into the Late Industrial period. Disagreements over these issues reflected the resistance of portions of communities to the efforts of the few middle-class reformers to tamper with their small areas of control. Again, as in the temperance movement, many saw education as a vehicle to economic independence and took advantage of the opportunities that arose in this period. Worcester led with the formation of public and private programs aimed at mechanics, covering drawing and engineering. There too the Catholics extended their system of parochial education with the establishment of St. James Seminary and Holy Cross College. Educational opportunities expanded for women with schools in Worcester, and for the growing teaching profession with normal schools.

Harsher measures for dealing with the period's change and diversity came as well. In Worcester the first police department in the region was formed in 1848, and the town acknowledged its shift in scale when it adopted city government to replace town meetings in 1848. Blackstone initiated a lockup during the period. Most common, however, was the institution of poor farms or almshouses for the increasing number of citizens who could not support themselves, and for whom the family and church no longer served as primary welfare institutions. Beginning in the Federal period, towns established this method of supporting the destitute, and by 1870 at least eighteen towns throughout the region had them functioning.

Perhaps the most emblematic expression of the reform spirit can be seen in the utopian communities that flourished during the period. The Shaker community at Harvard expanded and supported three large families. Nearby the Transcendentalist community, Fruitlands, was founded by Bronson Alcott in 1843; residents attempted briefly to live in a "consocial" system. At about the same time Universalist Adin Ballou organized Fraternal Communions in a section of Milford that would become the town of Hopedale (1842-1856). During the 1840s the region felt the influence of the most sensational of the many religious enthusiasms of the period, the Adventism of William Miller. Followers awaited the Second Coming of Christ in 1844 in a number of the northern county towns, including Ashburnham, Athol, Fitchburg, Holden, Lunenburg, Templeton, Westminster, and Worcester. A small number of these persisted in their belief in an imminent millenium and formed Second Advent societies in Charlton, Westborough, Templeton, and Athol. The group in the latter town formed a communal society, Adoni Shimo, which removed to Royalston, where it continued until the death of its membership in the 1880s.

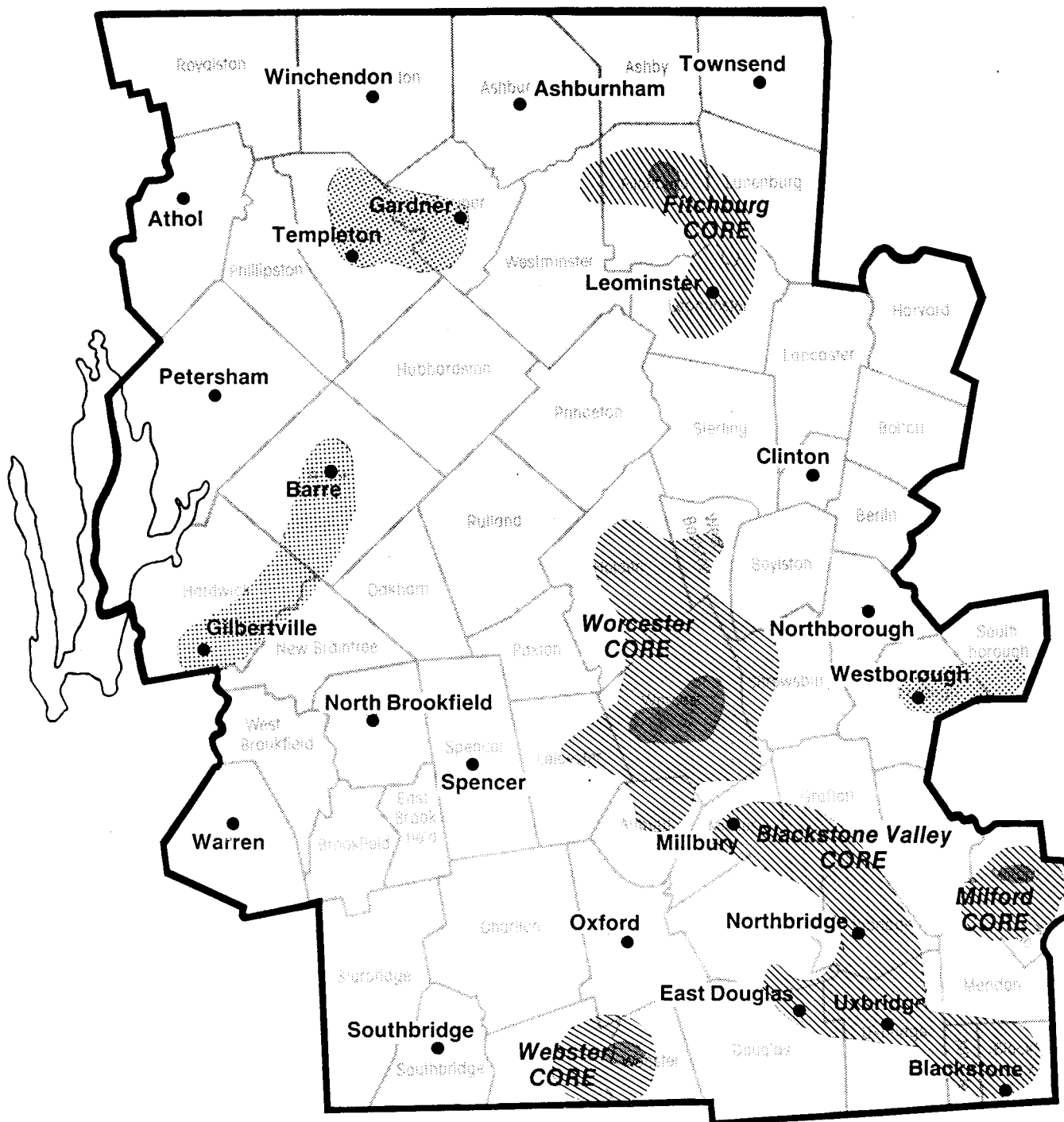
For these groups withdrawal and redefinition were the only solutions to the period's failings.

Core-Periphery Relationships

A fundamental change in the dynamics of the core-periphery relationships in Central Massachusetts took place during the Early Industrial period as the focus of regional economic production shifted from an agrarian to a manufacturing base. The dominance of the large, upland farming towns diminished greatly as the valley manufacturing centers rose to importance. The trends of the period were initiated in the early 19th century with the widespread development of the textile industry and the completion of the Blackstone Canal, but the accelerated pace and scale change in development of this period were distinctly different. The location of the new regional rail corridors, the siting of new industries in relation to the transport system and available water power, and the new concentrations of native and foreign-born populations all led to the rise of a significant number of new cores in the region. See Map 17.

Despite these transformations, Worcester's position as the dominant regional core remained unchallenged during the period. As the county seat, it continued to attract important administrative functions, such as the first State Lunatic Asylum (1831). Political parties had their fullest expression here, as Democrats and Republicans, Garrisonians and Anti-abolitionists, Free Soilers and Know Nothings found followers. Worcester's importance as the preeminent commercial center in the region, boosted by its location at the inland terminus of the Blackstone Canal, was assured by the establishment of the Boston and Worcester Railroad. The extension of the line as the main

Early Industrial Period Core Areas



- Local core
- ▨ Urban core
- ▩ Regional core
- ▤ Emerging core area

east-west route through the state, and the construction of multiple lines to the north and south, placed Worcester at the focus of a wide-ranging rail network and made it an important transshipment point.

While the railroads provided access to wider markets, a local efflorescence of invention and innovation stimulated the growth of major manufacturing activities. Local capitalists provided inexpensive rental space to small-scale industrial entrepreneurs. By the mid 19th century, Worcester had one of the highest per-capita patent rates in the country. By period's end, it was a major center for the production of wire products, textile machinery, agricultural implements, paper machinery and products, boots and shoes, and a variety of iron, machine, and machine-tool items.

Worcester also grew in importance as the primary regional center for education and the dissemination of knowledge. Industrial development was promoted by the Mechanics Association and the Institute for Industrial Sciences (later Worcester Polytechnic Institute). Private schools established during the period included the Worcester Academy and the Highland Military Academy. The public school system included a high school (1845), Manual Labor High School (1832), and a Truant School. Women could acquire a higher education at the Oread Institution (1848) or at the Female College (1856). Religious organizations flourished, and most Protestant denominations were represented by one or more churches. The region's only large Black community formed Zion Methodist Church in 1846. With the largest concentration of Irish immigrants in the region, the city became an important center for Roman Catholicism as well. The first Catholic Church west of Boston was established here in 1834, followed in 1847 by the founding of a seminary (later Holy Cross College). By period's end four additional churches had been formed.

As Worcester's urban population grew, the core area exerted an increasing influence on surrounding towns. The urban core filled the central valley, and residential development began to extend into the flanking hillslopes. In general, urban fringe activities remained within the town bounds, but industrial development to the west extended along Cherry Valley into Leicester. Other towns increasingly provided foodstuffs and wood products for the expanding core market.

Secondary regional cores developed during the period at Fitchburg and Milford, both important railroad centers with high levels of manufacturing activity in the eastern part of the region. At Fitchburg, development of paper, textile, and machine manufacturing along the Nashua River Valley stimulated growth. Local capital financed the Fitchburg Railroad, and as an important conduit for traffic from the northwest to Boston, the town became the most important rail center in northern Central Massachusetts. By the end of the period, Fitchburg was taking on regional administrative functions. A county jail was located here in 1859, and in 1870 a county courthouse was under construction. The town adopted centralized school control and high school education in the 1840s. A large number of voluntary associations were formed, particularly related to temperance. All major Protestant denominations had societies in the town, as did the Roman Catholics. Fringe industrial development extended west into Westminster. To the southeast, a strong local core developed within the Fitchburg regional core at Leominster, an important center of horncomb and piano case manufacturing.

In the southeastern part of the region, the Milford regional core developed as an important rail terminus after 1845. Here too reformers were active,

establishing a high school and temperance societies. All Protestant denominations were present, as well as the experimental Hopedale community and Roman Catholic St. Mary's (1847). Subsequent manufacturing growth concentrated in boot and shoe production, while a textile machinery industry developed at Hopedale and quarrying developed as an important activity at Braggville.

To the southeast of Worcester, an important concentration of five local manufacturing cores developed along the Blackstone River Valley corridor, linked initially by the Blackstone Canal, and subsequently by the Providence and Worcester Railroad. This Blackstone Valley regional core consisted of the towns of Millbury, Grafton, Northbridge, Uxbridge, and Blackstone, all primarily textile manufacturing centers. In addition, the village of Whitinsville in Northbridge developed as an important focus of textile machinery production. All of these towns had foreign-born populations above the county average and established Catholic churches during the period. Smaller manufacturing villages in Sutton and Douglas were also linked to the regional core.

Other important local textile manufacturing cores developed in the region. In the east, Clinton developed under the management of the Bigelow family and prospered as a result of various innovations and inventions in loom construction. In the southwest, local textile cores continued to expand at Southbridge on the Quinebaug River and at Webster-Dudley on the French River. Each of these towns had large foreign-born populations and early Catholic churches. Numerous smaller local industrial cores also appeared during the period. In the east, Westborough became an important boot and shoe center and the location of a State Reform School. In the west, Spencer and North Brookfield grew as boot and shoe towns. In the northwest,

Winchendon and Gardner developed as wood manufacturing towns, and Athol grew with a mixed industrial economy. Although the foreign-born population in these towns was, with the exception of Spencer, less than the county average, the communities were all served by convenient Catholic churches.

In the upland, rural peripheries, some centers continued to prosper into the mid 19th century. In Barre, although manufacturing was not dominant, the importance of the palm-leaf hat trade made it a regional center. Each Protestant denomination, as well as the Roman Catholic Church, had a church here. As early as 1852, a high school was established, and a normal school and school for the feeble-minded were located here. An early public library was established in 1857. However, in the absence of rail connections and large-scale manufacturing, and with the abandonment of agricultural settlement, these areas experienced relatively little new development. Their influence declined, and for the most part they ceased to attract newcomers into their midst.

Research Topics

1. Describe the dynamics of foreign immigration into the region. To what extent did employers recruit from outside the region? How segregated were the foreign-born? To what extent did the Irish and Canadians settle in different communities? How did their distribution over the region relate to the labor needs of canal and railroad construction and the expansion of different industries?
2. What specific forms did the initial Irish and Canadian immigrant neighborhoods take? To what extent can the forms be attributed to class versus ethnicity? Did the immigrant groups that arrived during the period develop distinctive enclave settlements within the industrial towns?
3. How did factory village organization and structure develop over the period? Can changes in attitude be detected within the system of small-scale industrial paternalism with the expansion of manufacturing and the coming of immigrant labor? Can the form of factory villages be related to economic cycles that affected specific industries?

4. What was the socioeconomic dynamic of the continued efflorescence of rural town centers during the first decades of the period? What was the result in those villages and in the dispersed agricultural landscape of the subsequent decline of extensive agriculture? When and where were the rural highlands first perceived and exploited as a salubrious, recreational environment by urbanites?
5. In what particular ways did the emergence of urban places (Worcester, Fitchburg, and Milford) manifest itself? What were the specific patterns of commercial core, industrial corridor, and residential neighborhood, and how did the organization of the city reflect growth in wealth and increasing social stratification?
6. What were the regional dynamics of religious enthusiasm and social movements during the period? What distinctive manifestations of evangelicalism, utopianism, and reform took shape in the urban cores versus the rural peripheries?
7. Clarify the variation in social structure of urban places, mill villages, and agricultural towns. How did the identity of the working class develop in each of these communities? Can these variations be seen in the landscape and settlement pattern?
8. Was disestablishment of religion in 1833 a significant turning point in the history of dissenting religious communities? How did it affect their longevity and vigor? Did it influence building activity?

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Late Industrial Period (1870-1915)

Regional Events

The post-Civil War period saw the rise to preeminence of the issues and interests of industrial development. National policies encouraged manufacturing through the establishment of a national railway and banking system and addressed the continuing concern for the monetary supply. In response to the rising power of industrialists and their monopolies, farmers organized opposition through the Grange and the Populist movement. Factory workers continued to resist pay cuts and technological changes that reduced their control of production. Union organizing increased notably through the efforts of Knights of Labor and the American Federation of Labor, and strike activity was often violent. Later in the period, as the alarming conditions of the homes and workplaces of the poor became more well known, reformers sought social justice to lessen the impact of industrialism.

Within the region came the concentration, both physically and financially, of manufacturing activities. Companies merged, capitalization increased, and technological innovations focused factory production. Regional development was tempered by the fluctuations in prosperity and depression that characterized the American economy during the period. A larger wage-earning working class developed and dramatic diversification in the ethnic composition of the population occurred. Major influxes of immigrants from Ireland, Canada, Scandinavia, and Eastern and Southern Europe created

a mosaic of distinctive enclaves in most of the regional industrial centers. Trade union formation among the growing labor force increased but it was delayed in local strongholds of industrial paternalism and by the ethnic division of communities. While the region was not a major center of labor unrest, textile strikes did occur, most notably in Clinton in the 1880s, and again at the time of the Lawrence Strike in 1912. Increased population mobility came with the development of regional electric street railway service, and urban residential neighborhoods expanded into surrounding communities.

Rural farm abandonment and population decline continued during this period. Production in these areas was increasingly oriented toward provisioning the growing urban areas. The large-scale waterworks projects of Boston's Metropolitan Water Board had a major impact on rural areas in the eastern part of the region and significantly altered local landscapes and caused social disruption in several communities. At the same time, appreciation of the recreational and health amenities of the upland rural areas grew as urbanites reacted to increased congestion and deteriorating environmental quality in the cities. In Central Massachusetts the result was the development of resort facilities in many of the hill town centers and the location of public and private health care facilities in the salubrious highland environment.

Transportation

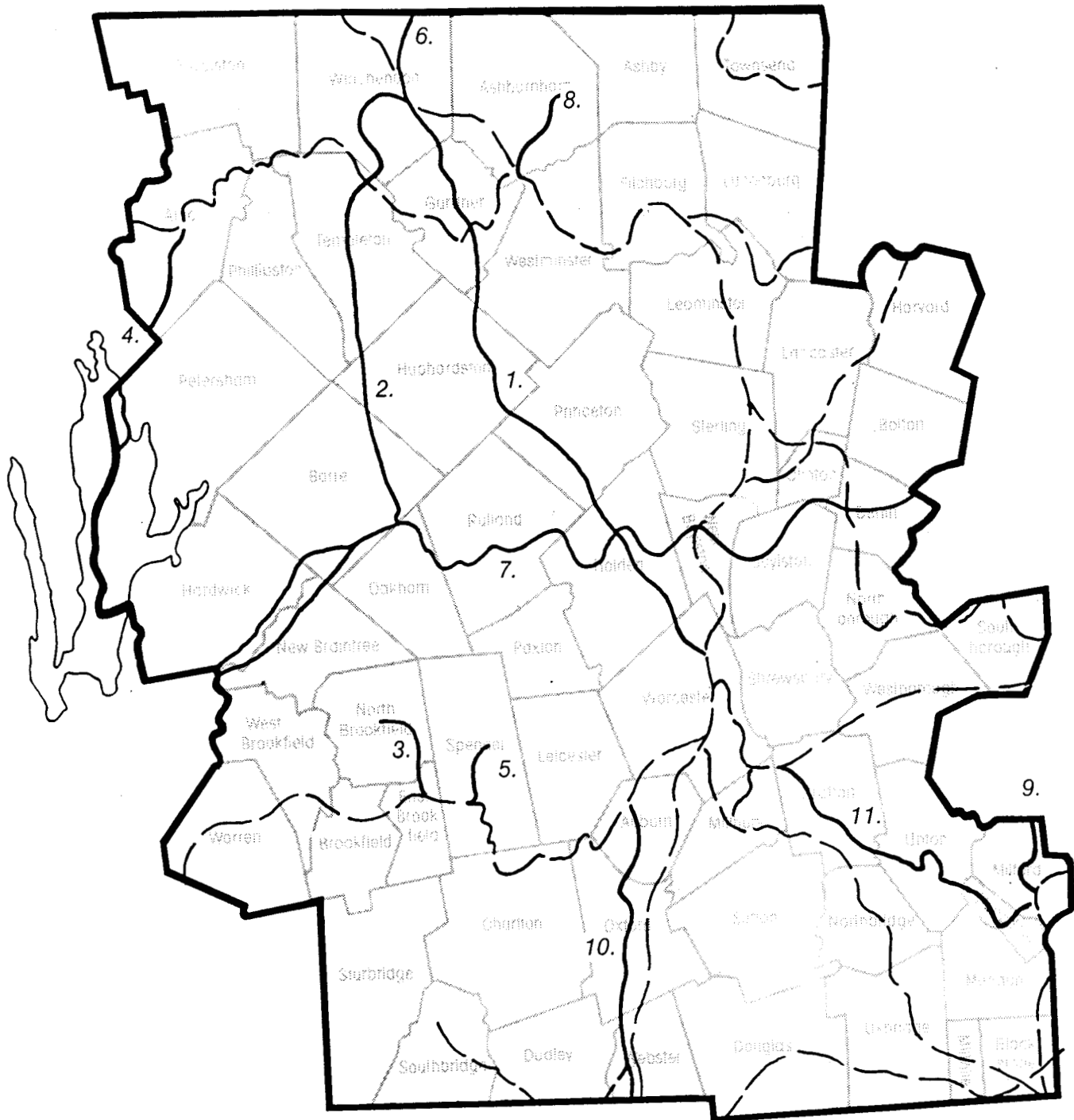
Early in the period the building of rail routes continued as several lines projected or under construction at the close of the Early Industrial period were completed. A dozen towns obtained rail service for the first time, and access was improved significantly in at least ten more. See Map 18. New route

development was most notable in the northwest part of the study unit, where a large cluster of upland communities was finally connected to the regional system. Nine new lines--many of them local--were added in the 1870s. Branch lines were completed to Spencer, North Brookfield, Grafton, and Ashburnham centers, and from Hopkinton to Milford center past the Milford granite quarries. Three new regional lines opened service to the northwest area. The Boston, Barre and Gardner Railroad from Worcester (which does not pass through Barre) and the Ware River Railroad (which does) both had their northern terminus in Winchendon. The addition of the Monadnock Railroad (1872) north from Winchendon, made that town the focus of four regional lines. The Athol and Enfield Railroad (1873) provided a connection from Athol south through Dana to Springfield.

The three routes put into service in the 1880s were the last to be constructed in the region. Two new rail lines were opened in the south. The Boston and Albany completed a branch south from Auburn along the French River corridor to Webster, competing with the Norwich and Worcester Railroad. The Grafton Branch Railroad was extended to Upton and then through Hopedale to Milford in the southeast. The major railroad addition of the 1880s was the completion of the last new route in the study unit. The long projected, financially plagued Central Massachusetts Railroad extended across the central part of the region from Berlin in the east to Gilbertville in the west. In 1890, at the end of the era of rail construction, only four towns in the region--Petersham, Sturbridge, Shrewsbury, and Ashby--remained untouched by the wheels of progress.

The end of railroad expansion was soon followed by a major transformation in the mode of intraurban transport. Despite the rise of the

Late Industrial Period Railroads



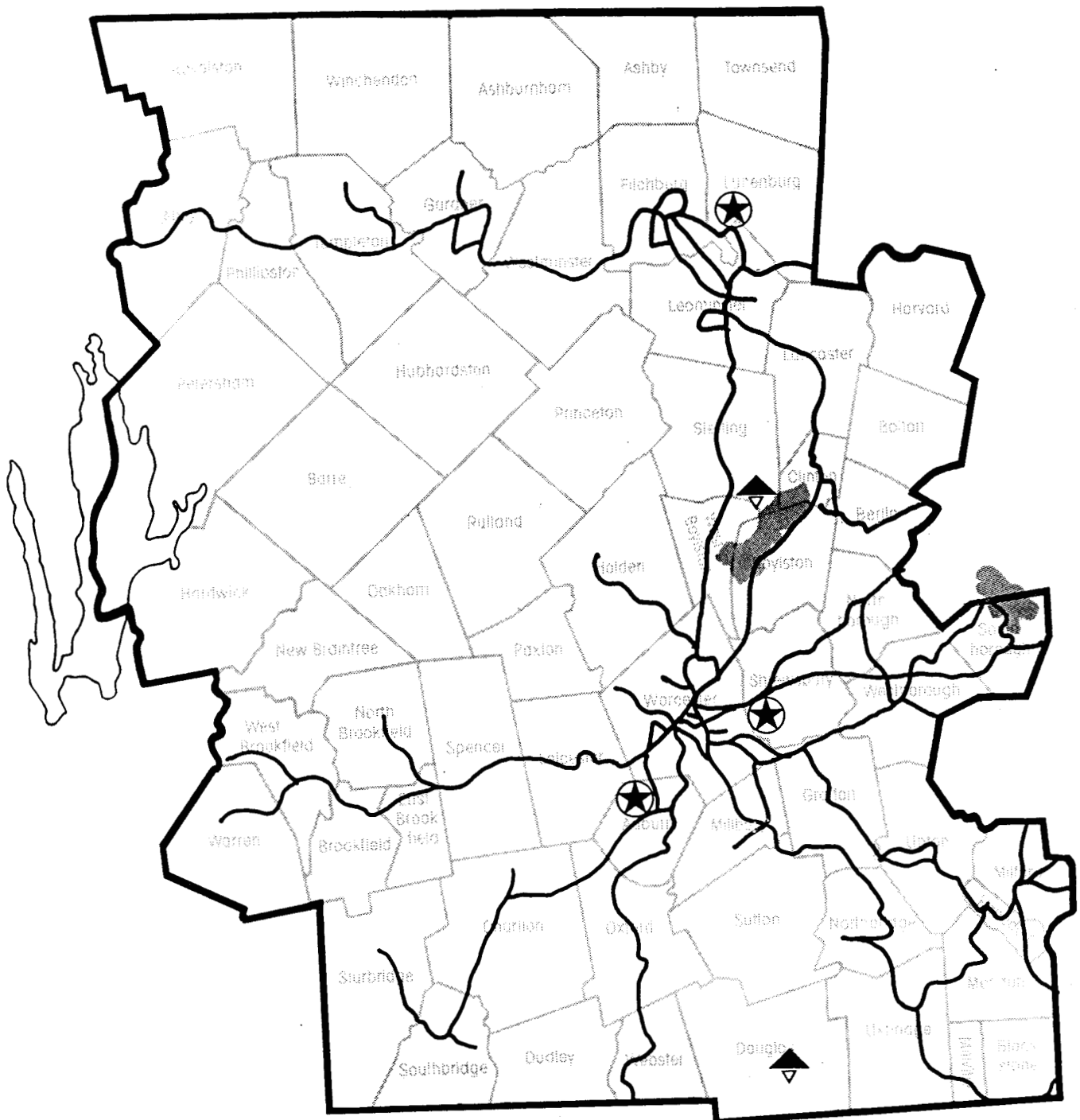
1. Boston, Barre and Gardner Railroad (1872)
2. Ware River Railroad (1873)
3. North Brookfield Branch Railroad (1876)
4. Athol and Enfield Railroad (1873)
5. Spencer Branch Railroad (1878)
6. Monadnock Railroad (1872)
7. Central Massachusetts Railroad (1881-86)

8. Ashburnham Railroad (1874)
9. Hopkington Railroad (1872)
10. Webster Branch Railroad (1885)
11. Grafton and Upton Railroad (1874 to Grafton, 1889 to Upton Center and 1890 to Milford)

railroads during the first decades of the period, most people in the region continued to rely on walking to complete their daily movements to work or to market. Local horse trolley service continued in Worcester, and was expanded with the opening of the Citizen Street Railway Company. Horse trolley service was also initiated in Fitchburg in 1886, extending from West Fitchburg to Fitchburg Park near the Lunenburg line. Movement on these lines, however, was relatively slow, and the range of the possible journey to work remained limited. The regional urban cores, therefore, remained essentially pedestrian cities.

This situation changed dramatically with the electrification of street railway service in the 1890s. See Map 19. Electric service more than doubled the speed of the system and drastically extended the distance people could commute to work. A dense cross-town network was established in the city of Worcester, and interurban lines were extended to Spencer, Millbury, Marlborough, Southbridge, Webster, Clinton, and Fitchburg. By the mid 1900s all these lines had been merged into the Worcester Consolidated Street Railway Company. An independent, high-speed line was opened between Boston and Worcester in 1903. In the northeast, Fitchburg and Leominster developed a local street railway network, with interurban connections east to Ayer, southeast to Clinton, and west to Gardner and Athol. Westborough in the east and Milford in the southeast were focal points for a number of regional lines. The result of the widespread extension of the electric street railways was a major expansion of the region's urban areas, as middle-class streetcar suburbs extended outward from the city cores.

Late Industrial Period Street Railways and Recreation Areas



- Street railways
- ★ Amusement parks
- ▲ Camp meeting grounds
- MDC reservoir

Settlement

Concentration of new development in the region's manufacturing centers continued during the Late Industrial period, as did the abandonment of dispersed, rural settlement. The extension of the railroad system into the northwest part of the region in the early decades of the period helped to stimulate growth of manufacturing centers such as Gardner, Athol, and Winchendon. Local expansion usually followed the addition of new rail lines in towns throughout the study unit. Until 1890, the urban centers remained relatively compact, high-density settlements, and residential neighborhoods concentrated in areas within walking distance of workplaces and the growing downtowns. Subsequent introduction of electric street railway service allowed outward expansion of new, suburban residential zones of both single-family and multifamily housing. At the same time, the continued development of distinctive ethnic immigrant districts gave new character to the inner-city landscape. The period saw the incorporation of two new cities in the region. Fitchburg attained city status early, in 1872, while the incorporation of Leominster in 1915 was the culmination of growth through the period. The only new town incorporated during the period was the planned industrial community at Hopedale, which separated from Milford in 1886.

Worcester continued to dominate the regional settlement hierarchy as its urban area intensified and expanded. By period's end, it was the only center in the region with a high-rise downtown, and its extensive suburbs reached into surrounding communities. Fitchburg continued as the main urban focus in the northern part of the region. By the end of the period, continuous settlement connected Fitchburg and Leominster along the North Nashua Valley, and the two cities formed an extended urban zone. Below Leominster in the

regional hierarchy, Gardner's settlement expanded dramatically during the period. Secondary urban development continued at Southbridge, Milford, Clinton, and Webster, and on a smaller scale at Athol and Northbridge. Many of the smaller industrial towns of the region also continued to develop, sometimes predominantly in the town center (as at Spencer and Westborough) and sometimes with multiple dispersed villages (as in Grafton). In rural areas, dispersed agricultural settlement continued to decline, although in more prosperous towns, small-scale commercial and civic development continued in local centers. Specialized recreational and institutional activities located in the rural highlands, while several lowland areas in the east were inundated by reservoir construction.

Dramatic transformations in the urban landscape continued in the city of Worcester, as a new, larger scale of settlement was achieved. Intensification and vertical expansion continued in the central district, with the growth and multiplication of banks, office buildings, department stores, and manufacturing establishments. The three- to six-story commercial blocks of downtown were overshadowed after the late 1890s by a number of ten- to eleven-story, steel-frame structures. A monumental Union Station was built east of Main Street in the 1870s, and replaced in 1910. Central civic landmarks were rebuilt on a larger scale, including both the city hall and the courthouse. Central high schools were added, and massive brick and masonry churches were built west of downtown and southwest along Main Street. Institutional development focused at both ends of the Main Street commercial corridor and extended into the highland to the west. The primary focus remained the Lincoln Square area at the north end of Main Street. Hospitals,

colleges, universities, and academies located on prominent hilltop sites around the edge of the central district, and a green belt of parks also circled the central area after the 1890s. Industrial development continued to expand outward along the radiating valley rail corridors, and major new complexes were built to the north, east, and southwest.

Established central residential districts were more densely developed, and a number of multistory, brick apartment neighborhoods emerged. Wood-frame construction continued to dominate, however, and with the local development of electric streetcar lines, major expansion of the city's residential zones took place. Throughout the city, neighborhood schools, firehouses, churches, and synagogues were built. New, stylish, middle- and upper-class, single-family residential subdivisions extended along the highlands north and west of downtown. Areas to the south, east, and north of the city center developed as ethnic, middle- and working-class neighborhoods of multifamily housing. After 1890, entire hillslopes were developed with three-deckers, the dominant housing form.

While the period saw the dispersal of second- and third-generation Irish out of the inner-city East Side districts, new ethnic neighborhoods proliferated, with distinctive religious edifices, social clubs, and business areas. By period's end, the larger communities included the French Canadians on Grafton Hill, the Swedes at Belmont Hill, Greendale, and Quinsigamond Village, the Italians on Shrewsbury Street, the Lithuanians and Poles in the Island and on Vernon Hill, and the Jews on Winter Street, Water Street, and Vernon Hill. Many other concentrations developed as well.

Similar development took place in the region's secondary urban centers, although on a greatly reduced scale. In Fitchburg, industrial expansion

extended along the North Nashua corridor, and multistory business blocks concentrated along Main Street, with a civic focus at the County Courthouse (1871), and a monumental train station (1878) to the east. Stylish, single-family residential development pushed into the highlands north of the river, while multifamily, ethnic, middle- and working-class neighborhoods extended south from the river. In Leominster, high-income, residential subdivisions were built west of the growing downtown, while multifamily housing extended to the east, and industrial development continued along the Monoosnoc Brook-railroad corridor. In Gardner, multifamily housing extended up and over the hillsides adjacent to the expanding West Gardner industrial corridor, and high-income and institutional growth continued around the Old Common area. Here, as in Southbridge, Webster, and Athol, discrete 19th century villages continued to expand and coalesce around new multistory downtown districts. Central districts in Clinton and Milford continued to develop, and industrial, commercial, and residential expansion on a smaller scale took place in town centers like Spencer, Westborough, and Winchendon. The industrial village continued as a significant regional settlement form, with major plant and housing expansion at Fisherville (Grafton), Gilbertville (Hardwick), Whitinsville (Northbridge), Hopedale, and South Barre.

Agricultural settlement in the region continued to decline, but the rural countryside was transformed as the setting for a variety of urban-oriented land uses. Streetcar suburbs extended into rural areas surrounding the region's major cities, particularly into the towns around Worcester. Reservoir development also occurred as municipal water systems were built. In the eastern part of the region, large-scale reservoirs were built to serve the Boston area. Sudbury Reservoir flooded peripheral parts of Southborough, but

the construction of Wachusett Reservoir involved the destruction of the main industrial and agricultural settlements in Boylston and West Boylston, and the removal of secondary settlements in Clinton and Holden.

State institutions continued to be built in the wholesome central upland environment, including the Gardner State Colony for the Insane, the Westborough Insane Hospital, the Worcester Insane Asylum, and the Grafton Colony for the Insane. With the establishment of the first state hospital for the treatment of tuberculosis in the country at Rutland, that town became a focus of numerous private sanatoria, and a State Prison Farm and Hospital was established in West Rutland. Health and reform were followed by recreation as an important rural activity. Princeton continued to be a popular summer resort, and hotels and summer estates were built in numerous other hill towns, most notably Petersham and Barre. Recreational lakeside cottage development began to be popular along the region's many ponds and lakes, which also attracted a number of streetcar amusement parks. Camp meeting ground facilities were developed at Sterling and Douglas. Private educational institutions were also located in rural settings, including Atlantic Union College (Lancaster), Cushing Academy (Ashburnham) and Nichols College (formerly Dudley Academy).

Population

The key factors influencing population patterns in the Central Massachusetts study unit during the period remained industrialization, urbanization, and immigration. The opportunities for employment in manufacturing continued to grow, so that by the end of the period, 60% of the towns employed more people in manufacturing than agriculture, and some did

so in overwhelming numbers. These manufacturing towns became denser and more diverse in their populations. Here the foreign-born were able to find employment in the factories and so were present in the greatest numbers. The decline of agriculture in the region resulted in interior migration from country to city in the region, as well as to new communities in the west. The population also became more varied economically as the numbers and poverty of workers grew and, in contrast, the wealth of the few industrialists became more apparent. The variety of social movements of the period reflect a fragmented society in which individuals sought group identification and action. Labor opposed capital, farmers disagreed with factory workers, Yankees with immigrants, and associations and political parties attempted to reform the industrialized society in myriad ways.

Eleven towns and cities in the region, 20% of the total, more than doubled their total populations during the 45-year period. This growth occurred in the region's most industrialized towns, where manufacturing employment opportunities for males outnumbered those in agriculture in a ratio of 16.5 to 1. While Worcester's growth rate of nearly 300% fell to second in the region, its proportion of manufacturing remained very high, 32.3. The greatest growth occurred in Gardner, nearly 400%, where the wood products industry contributed to the ratio of 28.9 employment in manufacturing. Neighboring Leominster (350%) and Fitchburg (250%) ranked second and fourth with similarly high (19) ratios of manufacturing employment. The remaining towns in this group were also highly industrialized and included Athol, Clinton, Hopedale/Milford, Northbridge, Southbridge, and Webster. These towns and cities were unusual in terms of gross population size. Worcester, at over 160,000 in 1915, was three times larger than the next largest town and

operated at a unique scale within the region. Fitchburg numbered nearly 50,000, and all the remaining towns were larger than 9,000.

A second group of towns, 23 in number and 40% of the total, grew at a slower pace. In these towns the industrial component was more contained, outnumbering agriculture in a ratio of 2.8. Their size totalled between 2,000 and 6,000. This large group included the northern towns Templeton and Winchendon, eastern towns Lunenburg, Lancaster, Northborough, and Westborough, and central towns Hardwick, Barre, and Rutland. Most were located in the south of the region, including Blackstone, Charlton, Dudley, Grafton, Leicester, Millbury, Spencer, Sutton, Upton, Uxbridge, and Warren. Some of these towns grew primarily due to their proximity to Worcester, in particular Auburn, Holden, and Shrewsbury.

In all these towns the impact of industrialism was clear. Led by the example of Worcester businessmen, industrialists of these towns formed associations like the Board of Trade (Athol, Fitchburg, and Gardner) to forward their interests, lived together in exclusive neighborhoods, and spent their leisure time in private clubs. The growing middle class of service, managerial, and commercial employees continued to be active in temperance and educational activities, as well as the Odd Fellows in Athol, Clinton, and Gardner. United Workmen organized many local branches in Athol, Clinton, Fitchburg, Leominster, Uxbridge, Webster, and Westminster. The wage-earning working class grew enormously, but occupational and ethnic segmentation inhibited joint action in the face of deteriorating working conditions. Some union activity is noted in the large towns of Worcester and Fitchburg, but by period's end less than 15% of the workforce was unionized.

The final group of 24 towns lost population during the period. Located in the region's uplands, these small, rural communities had fewer manufacturing

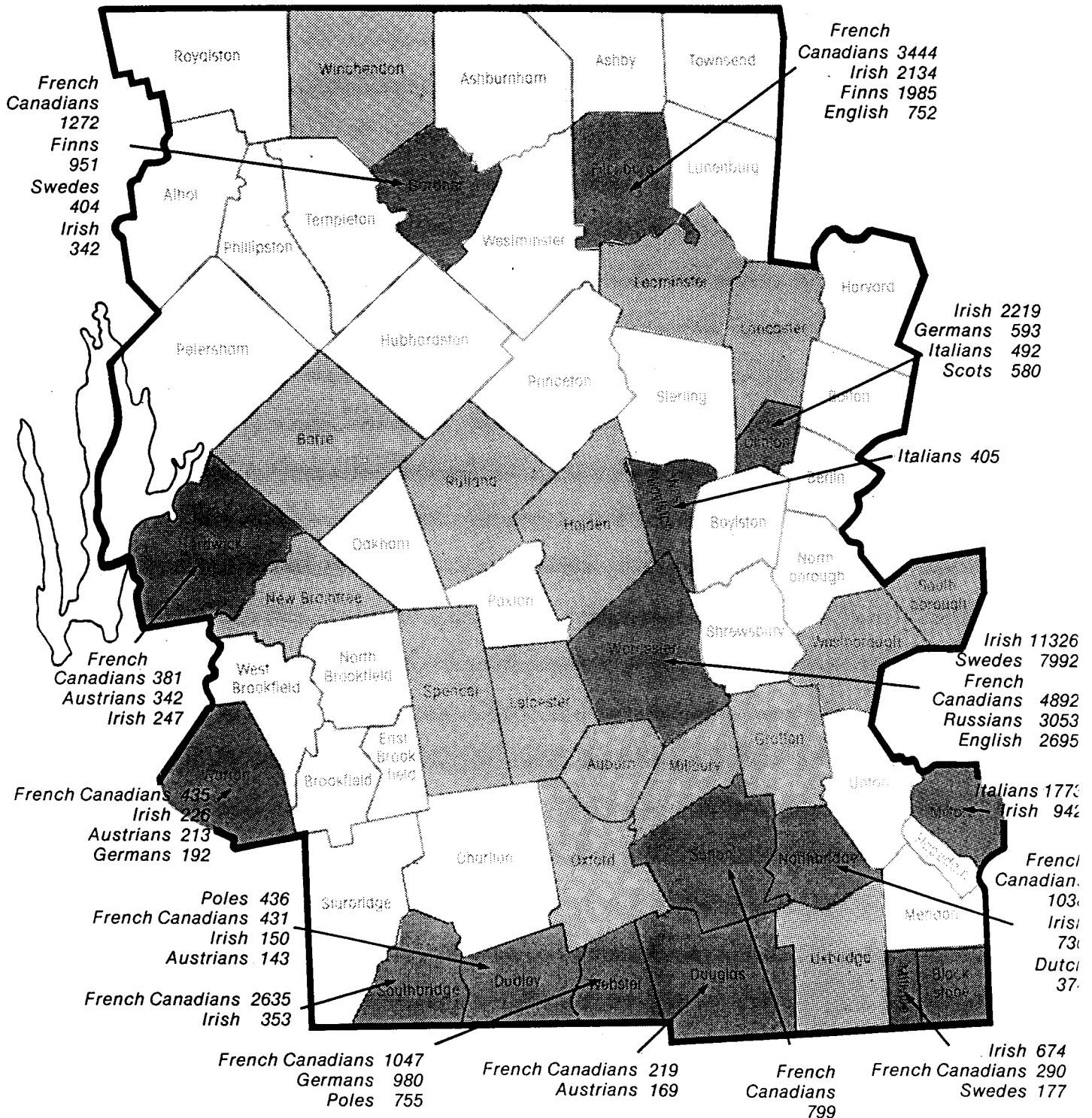
and commercial opportunities. Here, agricultural employment opportunities outnumbered those in manufacturing at 2.9. Although four of these towns had populations of over 2,000, thirteen numbered under 1,000. The towns' farmers turned from butter and cheese production to fresh milk and market garden sales to the industrial communities nearby. They joined together to improve their production capabilities and to protect their interests. Some communities formed Farmers and Mechanics clubs, but the Patrons of Husbandry were the most successful in providing an organizational framework. During the 1870s and 1880s, nineteen Granges were established in the region, primarily in rural communities (Berlin, Bolton, Harvard, Mendon, Paxton, Petersham, Phillipston, Princeton, Royalston, and Sterling), but also in some towns with an industrial component (Athol, Oxford, Rutland, Sutton, Templeton, Upton, Uxbridge, Westborough, and Winchendon).

The immigration of the foreign-born continued to be a significant factor in transforming social relations in the region. For the county as a whole, the proportion of this group within the population increased from 19.8% in 1865 to 23.8% in 1875, 28.7% in 1895, and 30% in 1905. The distribution within the county changed, however. Early in the period, the foreign-born were highly localized in the industrial areas to the south. In 1875, nineteen towns in this area had foreign-born populations above the county average, and ten of these were well over that figure, counting over 30% of their population as foreign-born. By contrast, eighteen towns in the region held less than 10% foreign-born, located particularly in rural areas. Twenty years later, sixteen towns had immigrant populations above the county average. An additional seventeen towns had foreign-born populations over 20%, and only two under

10%, indicating more even distribution over the region. In spite of the increase in total at the end of the period, this pattern remained constant through 1905. See Map 20. In addition to these large numbers of foreign-born must be added the second, and by period's end, third generation born to them. Clearly, many of the towns by this date included a larger portion of their population with an Irish or Canadian ethnic identification than of native, Yankee, extraction.

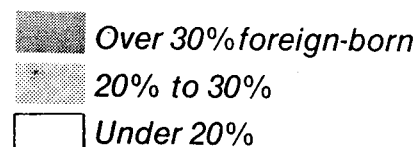
Of equal importance was the shift in the country of origin of the newcomers. The Irish dominance diminished, and the number of towns in which they were most numerous fell to fourteen by 1905. The numbers of French Canadians in the area grew rapidly, and the number of towns in which this group predominated expanded from eight in 1865 to eighteen in 1875, 24 in 1895, and 25 in 1905. By period's end, seventeen towns had ethnic groups other than these in larger numbers. Nova Scotians were most numerous in Townsend, Petersham, Hubbardston, Princeton, and Berlin where the Irish had been most numerous previously. English Canadians were most numerous in Athol and Lunenburg, the English in Hopedale and Mendon, Swedes in Boylston, Finns in Royalston and Ashby, Germans in Bolton, Italians in Milford, West Boylston, and Barre, and Poles in Dudley. As in the Early Industrial period, some of this concentration was due to occupational segregation, and the specialization by industry of some towns. Stoneworking attracted the Italians to Milford and machine production drew the English to Hopedale, while the textile industry in Blackstone continued to hire the Irish--to describe but one varied cluster. Nova Scotians, Finns, and Swedes by contrast preferred farming in rural areas in the northwest.

Late Industrial Period Foreign-born Population (ca. 1905)



Note:

Numbers indicate major local immigrant group populations
County average of foreign-born populations is 30%



Although these concentrations are significant, consideration of only the town's most numerous group overshadows the far greater diversity within most towns. In the county as a whole in 1905, the 108,804 foreign-born came from twelve groups of 1% or more. The Irish remained most numerous with 22.7% of the total, but were nearly equalled by the French Canadians at 22.6%. The other groups were Swedes (9.7%), English (6%), Italians (5.2%), Finns (4.5%), Poles (4.2%), Russians (3.8%), Germans (3.3%), Nova Scotians (2.8%), Scots (2.4%), and New Brunswickers (1.7%). Few towns in the region had a single ethnic group dominating (40% or greater) the foreign-born. In the city of Worcester, for example, the foreign-born population of 41,484 (32%) included Irish (27%), Swedes (19%), French Canadians (12%), Russians (7%), and English (6%). In Gardner, a rapidly growing industrial community, the foreign-born (34%) were divided between French Canadians (32%), Finns (24%), Swedes (10%), Irish (8%), and Russians (6%). The town of Hardwick, with the expanding manufacturing village of Gilbertville, included French Canadians (28%), Austrians (25%), and Irish (18%) among the migrants (42%). Even tiny Oakham included equal numbers (17) of Irish, French Canadians, and Nova Scotians. In some exceptional towns, a single ethnic group remained dominant, as did the French Canadians in Sutton (76% of the foreign-born), Southbridge (68%), Oxford (63%), Sturbridge (61%), and Spencer (60%), and the Irish in North Brookfield (52%), Leicester (46%), Clinton and Millbury (42% each). Others acted as magnets to newcomers, including Dudley for Poles (31%), and West Boylston and Milford for Italians (69% and 45% respectively). For all its ethnic diversity, the region was racially homogeneous. Only the city of Worcester held a large black population, but it equalled only .7% of the total.

The number of Roman Catholic parishes and missions increased with the foreign-born population. By the end of the period, 49 were added to the 28 that had been established during the Early Industrial period. Twenty-one towns required only one church, but eighteen towns had two or more churches, including both territorial and national parishes in 1915. In Worcester, for example, the city was divided into four territorial and one French national parish in 1874; by the end of the period eleven new churches were formed with national parishes established for Italians, Lithuanians, and Poles, as well as additional subdivisions of territorial parishes. In Fitchburg, the next largest city, five new churches were formed. In many of the remaining towns, too, ethnic diversity brought additional national parishes, most frequently for the French, but also for Poles and Italians.

All the newcomers were not Roman Catholics, and new denominations of Protestantism, as well as Orthodox churches and Jewish congregations were formed. The majority of these were located in the large industrial cities and towns that were growing so quickly at the time. The Germans and Scandinavians formed a number of Lutheran churches, organized along national lines, in Worcester beginning in the 1880s, as well as in Clinton, Gardner, Webster, Fitchburg, and Holden. As early as 1877, a Congregation Sons of Israel was established in Worcester, followed by Southbridge, Gardner, and Athol. Eastern Orthodox groups were rarer, organized late in the period in Worcester and Southbridge.

Voluntary associations organized along ethnic lines complemented religious institutions. The earliest group, formed by the Irish, was the Hibernians, in the Early Industrial period. After 1870 this organization appeared in Clinton, Gardner, Leominster, Milford, Uxbridge, Webster,

Westborough, and Winchendon. The French formed Societies St. Jean Baptiste in Fitchburg, Gardner, Millbury, Webster, Winchendon, and Worcester. The Germans formed Turn Verein Vorwaertz societies in Clinton and Webster. These most popular organizations acted in conjunction with ad hoc associations with more specific functions, mutual benefit, and temperance the most common. These organizations built on the pattern of chain migration, which brought many of the foreign-born to areas previously settled by their fellow countrymen and in many instances by kin and neighbors. Together they helped members of the specific ethnic groups adjust to their new homes and often new types of employment. At the same time they helped the community to maintain some of their distinctive traditions. These factors served to isolate the working-class ethnic communities from one another in Central Massachusetts.

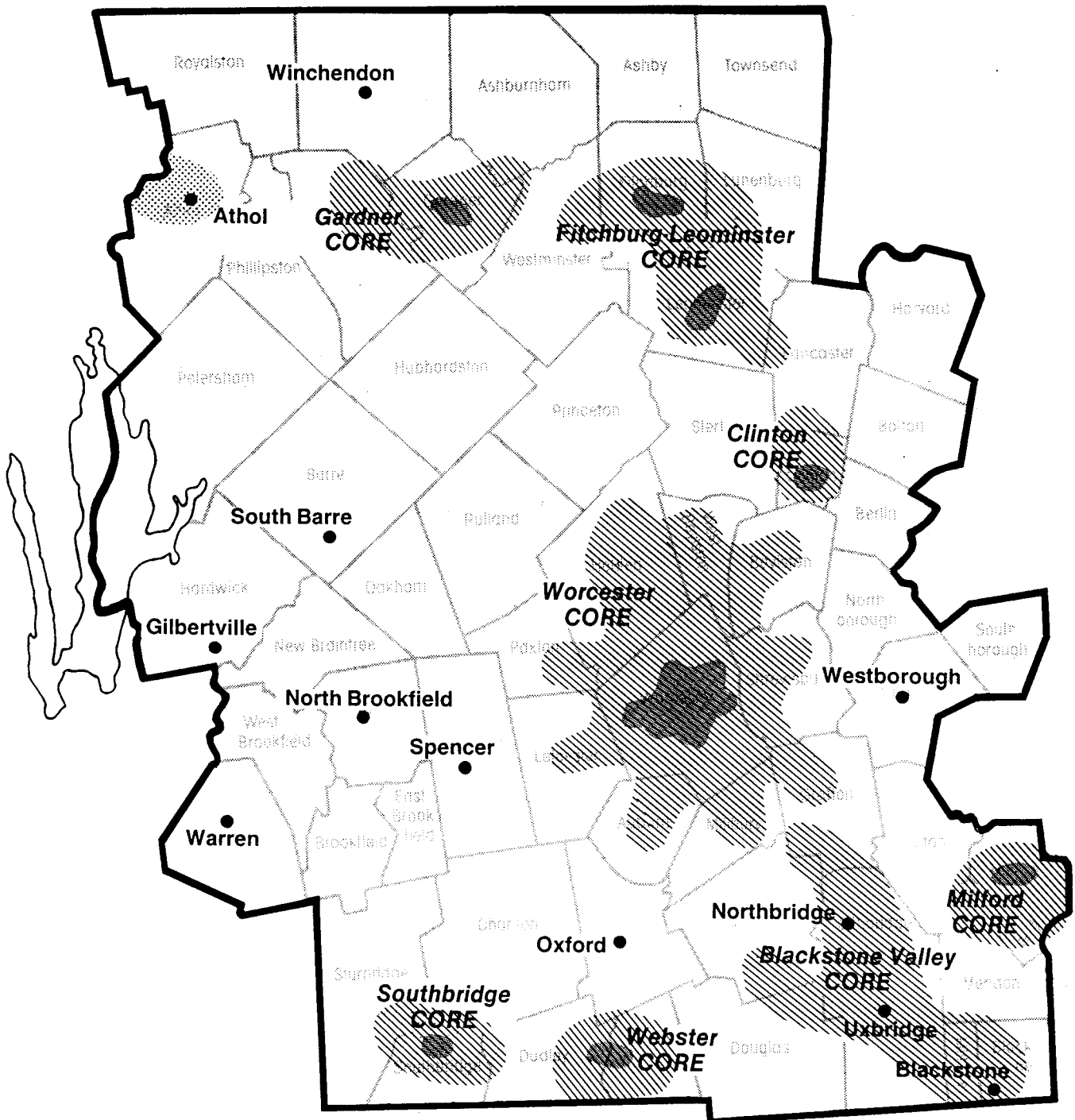
Core-Periphery Relationships

During the Late Industrial period, core-periphery relationships in Central Massachusetts accelerated the development of patterns established in the mid 19th century. Urban growth and the concentration of industry continued in fewer places. Many manufacturing firms expanded to larger scale facilities, and employed an increasingly large labor force. Downtown activities intensified, and with the introduction of electric streetcar service in the 1890s, the outer residential limits of the regional core areas expanded. With a nearly four-fold population increase, the city of Worcester remained the dominant regional core. In the northeast, the cities of Fitchburg and Leominster coalesced into an extended secondary regional core. A dramatic change was the rise of Gardner, with a nearly five-fold population increase, as a secondary regional core in the northwest. Growth was less dramatic

in the area's other secondary regional cores, but changes in rank took place among the towns of the Blackstone Valley regional core, as Northbridge emerged as the dominant local center. As cities grew, the contrast between cores and peripheral towns grew more marked. At the same time, new recreational and institutional activities linked many peripheral areas more closely to urban centers. See Map 21.

The Worcester regional core became firmly established as a diversified industrial center of national rank during the period. Significant expansion took place in the production of iron and steel, wire, machine tools, textile machinery, abrasives, foundry products, forgings, leather goods, envelopes, and machine screws, to mention only a few of the major industries. Hundreds of smaller firms served local, regional, national, and international markets. The range of employment opportunities provided in these factories as well as the service industries that grew with them, meant continued growth in the city. Its rate of expansion was largest in the region, and its gross size, 162,697, was unique. Within this large population were the region's most dramatic divergence between rich and poor, as well as the largest aggregate foreign-born population. In addition to commercial and manufacturing districts, residential neighborhoods became segregated along class and ethnic lines. With the establishment of the electric streetcar system in the 1890s, residential development expanded outward, and by the end of the period, it extended into surrounding towns. Downtown grew both vertically and horizontally, as banks and insurance companies built new and larger corporate headquarters, and new office blocks, department stores, and hotels were added.

Late Industrial Period Core Areas



● Local core

■ Urban core

▨ Regional core

▤ Emerging core area

Worcester's large and diverse population also made it a center of social movements for the region. The wealthy here were among the first in the region to form a Board of Trade, as well as an Art Museum and country club (both in 1898). Owners and skilled manufacturers worked together in associations like the Builder's Exchange, Machine Tool Builders, and National Metal Trades. The rank and file too attempted organization, but with limited success. To the occupational segmentation of a diversified industrial city were added ethnic divisions within the working-class community. Each group developed religious and secular institutions, and patronized their own businesses within ethnic communities, most notably the French Canadians, Swedes, Italians, Lithuanians, Poles, and Jews. Worcester's significance as a center for education and the dissemination of knowledge continued to grow. The local population was served by several new high schools, many neighborhood schools, and three Carnegie branch libraries. Expansion of facilities occurred at Worcester Academy, Worcester Polytechnic Institute and Holy Cross College; Clark University, Assumption College, and the State Normal School were created. In addition, new buildings were constructed for the American Antiquarian Society, Worcester Historical Museum, and the Worcester Art Museum.

Outside the Worcester regional core, the second center of urban growth during the period was concentrated along the Nashua River corridor, where Fitchburg and Leominster continued to expand during the period. By period's end, Fitchburg was the second most important paper manufacturing town in the state, after the 1880s it developed as an important textile center, and it continued as a major machine industry center. It was the region's third most populous town in 1915, numbering 39,656, and became a city in 1872. Downtown Fitchburg continued as an important commercial and financial

center, and as a county administrative focus as well. Diverse ethnic communities developed, dominated by French Canadians, but also included Irish, Finns, Swedes, and Italians. To accommodate these groups, one Italian and two French national parishes were formed for the increasing number of Catholics, as well as Scandinavian and Finnish Congregational and Lutheran churches, a Greek Orthodox church, and Synagogue, and parallel secular organizations. Among the many railway workers were several mutual benefit organizations, while businessmen organized a Board of Trade and charitable organizations. The city's cultural institutions included the State Normal School, the Historical Society, and an Art Museum. Private social, golf, and country clubs were also formed. Leominster remained a center for the comb industry and was the location of significant technological innovations in plastic technology. Piano case, baby carriage, and shirt manufacturing were other major local industries. The town included large numbers of Irish and French Canadians among the foreign-born. The latter had a national Catholic parish, and each formed voluntary associations. Its 1915 population of 17,646 was third in the region. By the early 20th century, Fitchburg and Leominster were linked by several streetcar lines, and the regional core extended along the Nashua corridor from Westminster to Lancaster, with suburban development to the northeast in Lunenburg.

The greatest rate of growth during the period took place in the Gardner regional core in the northwest with the expansion of the local chair and furniture industry. Manufacturing development extended west along the Otter River into Templeton, and northeast to South Ashburnham. A new commercial center developed and ethnic worker neighborhoods grew. French Canadians were the most numerous of the foreign-born, and here formed an exceptional

number of organizations to meet the ethnic goal of survivance, and at the same time encouraged naturalization through these and public evening classes. The innovative Gardner State Colony for the Insane was built in the eastern part of town.

In the southeast part of the region, Milford-Hopedale remained an important focus, and together their population total equalled Gardner at over 13,000. In Milford, continued expansion of the shoe industry and new development of the pink granite quarries attracted a large Italian population, dominating the foreign-born. The downtown became an important regional commercial center. At Hopedale, continued innovations in the textile machinery industry led to major expansion by the Draper Manufacturing Company, which built an internationally recognized model company town for its employees.

Smaller regional cores grew in the region's next most populous towns. The Webster core in the southwest remained an important textile center, and shoe manufacturing was added during the period. An exceptionally high number of foreign-born settled here, 39% in Webster and 37% in Dudley. A commercial center developed at Webster depot, and at Dudley Center the academy was expanded as Nichols College. At the Southbridge regional core, textiles remained important, and major expansion took place at American Optical at Lensdale. Here the large foreign-born population was dominated (68%) by French Canadians. In the east, growth continued at the textile center at Clinton. The Irish remained numerous here, accounting for 42% of the foreign-born. Within the regional core, Atlantic Union College was established at South Lancaster. In the northwest, a small regional core emerged at Athol, which by the end of the period had become an important machine tool center. Its foreign-born population was below the county

average, with the English and French Canadians, Irish, Italians, Russians, and Poles in the diverse community.

The Blackstone Valley regional core continued as a strong manufacturing focus in the Late Industrial period. The former local core at Millbury in the north became more closely integrated with the Worcester regional core, and the Blackstone local core in the south developed closer links to Woonsocket, Rhode Island. Northbridge, in the central part of the valley, grew to become the dominant local core. Expansion at Whitinsville in Northbridge followed growth in textile machinery production at the Whitin Machine Works, which built significant new worker housing districts. Grafton, with industrial expansion at Fisherville and the location of state asylum facilities in the northeast, remained an important local core. Growth in textile manufacturing continued at East Douglas and Uxbridge. These towns included exceptionally high percentages of foreign-born: Northbridge at 41%, Sutton, 32.9%, Blackstone 31.4%, Grafton 29.1%, and Uxbridge 25.6%.

Westborough to the east of Worcester and Spencer to the west continued to be strong local cores during the Late Industrial period, primarily as boot and shoe manufacturing centers. In the northwest, Winchendon developed as an important local core with wood products, wood machinery, and textiles. Warren, in the west, remained a smaller, isolated local core with textile and pump factories. Small local textile manufacturing cores developed along the Ware River at South Barre and at Gilbertville in Hardwick, which had the region's highest percentage of foreign-born population, 42.1%, in 1905.

A number of urban-oriented developments occurred in the region's peripheral areas during the period. Small estate districts developed at

Southborough and Lancaster in the east, and at hill town resorts at Princeton and Petersham. In the eastern part of the region, development of the Sudbury and the Wachusett reservoirs as Boston water supply inundated large tracts of land. State hospitals and institutions were established in the rural upland area, and Rutland became an important focus with the State Tuberculosis Hospital and the Rutland State Prison Camp and Hospital. Some seasonal recreational development took place on the many ponds of the region, and Wachusett Mountain was established as a State Reservation.

Research Questions

1. How did the region's large urban areas differ from the next level of urban place in settlement pattern and social structure? How did the greater diversity in population and population result in different landscapes?
2. What regional variation occurred in the development of late-19th century downtowns? What combinations of retailing, manufacturing, and financial services came together to form distinctive, larger-scale central districts?
3. Within these regional cores, how can class differences be identified through their impact on the landscape? To what extent did the dominant class control the shape and changes of the built environment? How did the working class shape their physical world as they built separate enclaves in neighborhoods and through institutions?
4. What specific forms did ethnic communities take within the region? Where were they located and how did they function? What cross-cultural differences and similarities can be elucidated? What was the relative importance of livelihood, migration patterns, religion, and social organization?
5. What forms of streetcar suburbs developed with the efflorescence of the electric street railways? What was the sequence and pattern of dwelling form and type? The distinction between high and middle income development? How did rail location, land speculation, and the economic cycle combine to produce distinctive suburban residential zones?
6. How can the emergence of middle-class neighborhoods be described? To what extent were these various neighborhoods formed by choice versus exclusivity? Did the variations in class structure, in particular the small middle class in most communities, influence the landscape?

7. What distinctive impacts did the late arrival of railroads have on the socioeconomic development of the upland towns of the northwestern periphery? Is the delay evident in settlement patterns or population composition? In the emergence of industrial cores at Athol and Gardner? To what extent was sub-regional agricultural decline contingent upon the poor accessibility to market?

8. How did the landscape of rural and peripheral areas change with farm abandonment and new recreational uses? Which elements of the landscape were abandoned, which put to new uses? How can the effects of new versus continued similar use be identified? To what extent do landscape features retain the appearance of their first period of use?

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Early Modern Period (1915-1940)

Regional Events

American involvement in the First World War stimulated a regional economic boom as industries retooled to fill defense contracts. Camp Devens, located in part on lands in Harvard, was established as a War Department cantonment, where over 100,000 soldiers were trained during the war. The general economic prosperity of the 1920s saw renewed growth in the region's major urban centers. The maturation of the industrial system of production continued, and with it came changes in the social structure. Manufacturing remained dominant, but during this period the expansion of support services and the salaried middle class was visible for the first time. The restriction of immigration drastically cut the flow of new foreign-born people into the area after 1924.

Technological changes and relocation south of the cotton textile industry during the 1920s led to a severe decline in production in many of the study unit's towns. This marked the beginning of a deterioration in the regional industrial base from which many localities never recovered. Most of the region suffered from the Great Depression of the 1930s. Specialized textile centers like Clinton were particularly hard-hit, although larger, diversified cities and communities such as Hopedale and Whitinsville, with local paternalism, fared better. To add to the economic hardships of the period, many communities were further devastated by the hurricane of 1938.

Widespread destruction resulted from the flooding that engulfed valley industrial settlements, and from the winds that toppled church steeples, damaged buildings, and uprooted 19th century tree plantings.

Widespread adoption of the automobile after the 1920s had a pervasive effect on regional settlement. Improvements in the regional highway system provided easier access to urban places and to the amenities and employment they provided. With this greater mobility the location of population growth shifted from the cities to neighboring communities, and by period's end the first automobile suburbs appeared. The 1930s saw the implementation of major state and federal public works projects, including highway construction and improvements. Along the region's northwest border, Quabbin Reservoir was completed in 1939 as the major source of Boston's water supply. This project that involved the removal of all the settlement of settlement of the town of Dana as well as three towns to the west.

Transportation

Significant changes occurred in the regional transportation system in the Early Modern period, following the general acceptance of the automobile as the dominant form of transport and the development of an improved regional road network. The rise of the automobile led directly to a decline in the existing regional rail system. While railroads remained the primary long-distance carriers of freight, the interurban street railway lines were abandoned rapidly after 1920. By period's end only local trolley systems in the Worcester and Fitchburg area remained in operation, as gasoline buses and private vehicles came into general use. See Map 22.

[illegible]

Quabbin
Reservoir
1939

- | | | | |
|---|-----------------|---|-----------------------------|
|  | Federal highway |  | Airfield |
|  | State highway |  | State forest or reservation |
|  | Express highway |  | Military base |
|  | projected route | | |

The evolution of the interregional automobile highway system during the period included both the improvement of existing roads and the construction of new interregional corridors. By the mid 1920s, two primary east-west corridors extended from Boston through the region. Across the northern part of the region, the Mohawk Trail (later Route 2) passed through Fitchburg, Gardner, and Athol. In the central part of the region, the Yellowstone Trail followed the Colonial period Bay Road route through Northborough and Shrewsbury, crossed Lake Quinsigamond into Worcester, and continued west through the Brookfields and Warren. With the creation of the federal highway system, this southern route from Boston to Springfield and New York was established as U. S. Route 20. Two important regional north-south state highways were also established. Route 12 extended from Winchendon to Fitchburg in the north, then through Worcester and Webster to New London, Connecticut in the south. Route 122 connected Athol and Barre in the northwest part of the region to Worcester. It then continued south through Grafton and Northbridge to Woonsocket and Providence, Rhode Island.

Public works projects during the Depression included two new highway construction programs that significantly realigned interregional traffic flow. In 1931, the old Boston and Worcester Turnpike was rebuilt to provide direct, multilane, express highway service between the two cities as Route 9. At the same time, U. S. Route 20 west of Northborough was rerouted along a new corridor, the Southwest Cut-Off, which passed south of Lake Quinsigamond and bypassed Worcester and the Brookfields by extending across the southern part of the region to Sturbridge. By period's end, a second federal highway, U.S. Route 202, connected the Connecticut River Valley to southern New Hampshire across the northwest part of the region through Athol,

Baldwinville, and Winchendon. Construction was also begun on a direct highway connector between Worcester and Providence, Route 146, which by 1940 had been completed as far south as Sutton. Many of the region's other existing roads were improved as state highways during the period, and by 1940 most of the small industrial centers were linked to the regional system. Traffic through the Worcester regional transport focus had become heavy enough that local segments of regional highways were rerouted away from the congested downtown area.

By the early 1930s, air transport was also growing in significance. A number of small landing fields were established throughout the region, mainly at the peripheries of the larger urban areas. By 1937, eight of the twelve airports that had opened in the study unit during the past decade were still in operation. Worcester was served by the Grafton Airport and by the Turnpike Airport in Westborough. The Fitchburg-Leominster Airport off Route 12 served the northern metropolitan area. To the west, the Gardner Airport was located across the border in Templeton. In the east, the Clinton Airport was situated in Bolton. The Mendon Airport served the Milford area, and Southbridge had its own field. Edson Field was located in West Brookfield. These early fields often consisted of little more than hangar and fueling facilities and a cleared grass landing area.

Settlement

In many respects, the development of settlement patterns in Central Massachusetts during the 25 years of the Early Modern period represented an extension and elaboration of trends established by the early 20th century. The top of the urban hierarchy remained stable, with moderate to low levels of

centralized growth in the downtown districts. While growth persisted in a number of the smaller industrial centers, the precipitous decline of the region's cotton textile industry halted growth in several localities. Nevertheless, confidence remained high enough early in the period for two of the region's small industrial communities to incorporate as separate entities. Millville split from Blackstone in 1916, and East Brookfield gained independence from Brookfield in 1920. The most dramatic development in the region during the period was the rise of the suburban towns surrounding the urban cores. The process of residential decentralization, initiated with electric streetcar service in the late 19th century, accelerated after 1920 with the greatly increased use of the automobile. The private auto proved to be a remarkable generator of new settlement features, as suburbs, exurbs, and auto-oriented commercial strips all appeared in the regional landscape. The extent of this transformation by 1940 is notable, since development was generally tempered by the pervasive effects of the Great Depression during the last decade of the period.

The relative ranking of the ten most populous urban places remained essentially unchanged during the period. Worcester remained the largest city in the study unit, followed by the Fitchburg-Leominster urban area in the north. Gardner was incorporated as the fourth city in the region in 1921. Below Gardner came the three major industrial towns in the southern part of the region: Southbridge, Milford, and Webster. Clinton in the east, Athol in the northwest, and Northbridge in the Blackstone Valley followed in size.

In the city of Worcester, expansion and rebuilding in the central district slowed, but new movie theatres, office buildings, and department stores

appeared. Major civic additions were built, notably the Worcester Auditorium (1933) at Lincoln Square and the Federal Building (1932) at Franklin Square. The expansion of downtown into the highlands west of Main Street continued, and included the landmark New England Telephone Building and the Commerce High School Annex (both 1928). The industrial boom during World War I stimulated the growth of some existing manufacturing facilities, and wartime housing shortages led the Norton Company to construct a new worker housing development in the northern part of the city at Indian Hill. Residential decentralization continued, stimulated by expanded electric streetcar service, and later by widespread use of automobiles. New high income development concentrated in outlying single-family subdivisions and estates on the west side, and concentrations of middle income, single-family residences developed in the western and northeastern sections of the city. Single- and multifamily, ethnic, middle and working class residential areas continued to expand to the east, south, and southwest, with three-deckers continuing to fill inner areas, and modest cottages and two-family housing in the outer fringe. With residential decentralization, new commercial development extended out of the central business district along the well-traveled automobile corridors radiating from the city center, including the Automobile Row of car dealerships that concentrated along Park Avenue. New schools were located in the outer residential districts, and the city's maturing ethnic congregations continued to build churches and synagogues.

Similar developments occurred in the secondary urban centers of the region during the period. Downtown commercial expansion occurred on a reduced scale through the 1920s, followed by some extension of auto-oriented commercial corridors. Civic additions in Fitchburg included new junior (1922)

and senior (1938) high schools on Academy Street. In Leominster they consisted of a new Municipal Building (1915), junior high school, and post office (both 1928), all in the central area. New municipal centers were established at Gardner on Pleasant Street, at Athol north of the Millers River on Main Street, and at Webster at the Main Street-Lake Street intersection. The expansion of decentralized, stylish single-family districts continued, usually to the north or west, as did the growth of distinctive ethnic multifamily and cottage districts. The pattern of central school, library, or post office additions was repeated in a number of the region's middle range town centers during the period. Industrial expansion continued through the 1920s in several of these towns, and many, including Winchendon, Westborough, and Uxbridge, saw some residential and commercial expansion during the period. The company-owned mill village persisted in several locations. The Whitin Company added over 150 housing units in Northbridge, and the Draper Company also built additions to its residential holdings in Hopedale. Both modest and monumental churches and synagogues continued to appear in town and city landscapes.

Significant period suburban development took place in towns around Worcester, and to a lesser extent, in towns adjacent to the other cities in the region. For the most part, suburban growth took the form of single-family neighborhoods located along the main auto corridors. Of the region's Early Modern suburbs, the rise of Shrewsbury was most remarkable. By 1940, this former agricultural community with no significant industrial base had risen to become the eleventh most populous town in the study unit, with intensive residential development east of Lake Quinsigamond and along Route 9. Only slightly less spectacular was the rise of Auburn, which by 1940 was

ranked fifteenth in the region. By period's end all the other communities surrounding Worcester--including Grafton, Millbury, Spencer, Leicester, Oxford, Holden, Northborough, Boylston, and Paxton--had experienced high levels of suburbanization, with its associated needs for schools, churches, and commercial development. In the north, Lunenburg and Westminster saw suburban growth from the Fitchburg-Leominster core. In the south, residential development spread into Sturbridge from Southbridge, Mendon from Milford, Dudley from Webster, and Blackstone from Woonsocket, Rhode Island.

Beyond the suburban rings, rural agricultural settlement continued to decline. By period's end, widespread exurban recreational cottage construction had occurred in the countryside along the shores of the area's many lakes and ponds. State institutional development also continued in the rural periphery, with the expansion of existing school and hospital facilities, and the addition of the new Worcester County Tuberculosis Hospital in Boylston and West Boylston. Rutland continued to be a rural institutional center, with the establishment of a Veterans Administration Hospital complex. The establishment of military training facilities at Fort Devens transformed rural landscapes in Harvard and Lancaster. However, the most destructive period change in rural settlement resulted from the construction of Quabbin Reservoir in the northwest by the Metropolitan District Water Supply Commission to meet the growing water needs of the Boston area. Creation of the 39-square-mile reservoir in the Swift River drainage involved the total elimination of four towns, including Dana in Worcester County. All artifacts of settlement were destroyed or removed, and local cemeteries were disinterred. What remained of Dana's territory was annexed to Petersham in 1938, and the filling of the reservoir began the next year. At the same time,

creation of surrounding watershed management areas resulted in the removal of industrial and residential development in Barre, Hubbardston, Oakham, Petersham, and Rutland.

Population

During the Early Modern period, patterns of population growth that characterized the region during the 19th century were significantly altered. Urban centers that had previously attracted large numbers of newcomers slowed their expansion following immigration restrictions. Manufacturing communities were hurt by the movement south of the cotton textile industry and the Depression, and in many instances lost population. Suburbanization brought a dispersal of population out of these cities and into newly expanding adjacent towns. Rural areas that had previously suffered loss of residents became part of this larger suburban pattern. Overall, the region's population expanded by only 17% during this complex 25-year period.

Twenty-six towns and cities experienced moderate growth during the period. Most of the towns that gained population were located on the outskirts of the area's large cities. The region's most rapidly growing towns formed a ring around Worcester: Shrewsbury (172%), Auburn (102%), Boylston (77%), Paxton (68%), Holden (56%). Moderate growth came to other Worcester neighbors, including West Boylston, Leicester, Oxford, Millbury, and Grafton. The towns surrounding Fitchburg, Westminster and Lunenburg, experienced similar growth patterns, as did Phillipston and Petersham from Athol, Sturbridge from Southbridge, Mendon from Milford, and Douglas from Uxbridge. Suburban growth continued along the east-west corridor, in particular in Northborough and Southborough, and on the eastern border at

Harvard and Berlin. With this dispersal of population, the rate of growth slowed in the region's cities. The largest, Worcester, added only 19% in population. The area's medium sized urban areas also grew only moderately as Uxbridge added 30%, Leominster 26%, Gardner 23%, and Southbridge 18%.

A nearly equal number of towns (25) grew more slowly than the county average. The factors that slowed their growth become clear when the eleven towns that lost population are considered with them. Towns with highly localized or concentrated manufacturing suffered most, including Hardwick (-40%), Millville (-23%), Blackstone, (-20%), Warren (-17%), Royalston (-7%), and Clinton (-6%). In others growth was slowed, as in Ashburnham, Barre, Dudley, Hopedale, North Brookfield, Northbridge, Spencer, Sutton, Webster, and Winchendon. Similarly, three of the region's largest urban areas experienced little growth: Fitchburg (5%), Milford (12%), and Athol (14%). Smaller communities grew slowly as part of the pattern of dispersal and suburbanization, including the eastern towns Lancaster, Sterling, Bolton, Westborough, and Upton, as well as Ashby, Townsend, Templeton, Rutland, Charlton, and West Brookfield. Far fewer rural communities lost population than during earlier periods: Brookfield (-32%), Oakham (-20%), New Braintree (-3%), Princeton (-11%), and Hubbardston (-3%).

Despite the slowing of growth during the period, the region's social structure continued to change. Employment figures for 1915 show an emergence of new occupational categories indicating the maturing of industrial capitalism. Opportunities in trade increased throughout the region, with most towns counting 5% or more of their males so employed. Twenty-four towns and cities included 9% or more males in trade. Worcester was the highest at 14%, and its neighbors Millbury, Holden, Boylston, West Boylston,

and the eastern corridor of Shrewsbury, Northborough, Westborough, and Southborough fell into this category. Other large cities also employed a significant commercial population, including Fitchburg (12%), Leominster, Clinton, and Milford (all 11%), Athol (10%), Gardner and Southbridge (9%). Other communities with high figures include Winchendon, Townsend, Hubbardston, Brookfield, North Brookfield, Spencer, and Mendon. Clerical work represented a new source of male employment, at this date only present in small numbers: Hopedale led with 8%, Worcester included 7%, and its neighbors were also influenced, including West Boylston (6%), Boylston and Holden (5%), and Athol and Southbridge (5%). These communities experienced growth in population as employment opportunities increased during the period. By 1940, Worcester employed 11.2%, Hopedale 15%, Auburn and Fitchburg 14%, Clinton, Leominster, and Milford 12%, and Athol, Southbridge, and Uxbridge 11%. This indicator reflects the expansion of the middle class in the region as the number of salaried service employees grew.

The distribution of the foreign-born within the region in the first half of the period continued earlier trends. The regional average in 1915 remained at 30% of the total population, but the pattern of greater dispersal over the total area accelerated. All but one town (Phillipston) had a foreign-born population of more than 10%. Fourteen towns had large numbers of immigrants, over 30%. The concentration of the foreign-born continued to be in the region's large cities (Worcester, Fitchburg, Gardner, Clinton, and Milford) and its manufacturing towns (Barre, Hardwick, Warren, Grafton, Northbridge, Hopedale, Southbridge, Dudley, Webster, and Douglas). A larger number of towns, 19, included 20% to 30% of their population as foreign-born. Significantly, this group included some of the most rural communities, New

Braintree, Rutland, and Paxton. The growth of the Canadian population continued, so that this group was most numerous in 35 towns, while the Irish held this position in only six towns (Petersham, Clinton, North and West Brookfield, Leicester, and Worcester). In 19 remaining towns, other groups were most numerous, including Russian Finns in Royalston, Phillipston, Gardner, Ashby, and Paxton; Russian Lithuanians in New Braintree; Poles in Hardwick, Warren, Dudley, and Webster; Italians in Barre, West Boylston, Southborough, and Milford; Swedes in Boylston and Holden, Austrians in Douglas and Hardwick, and English in Hopedale.

During the period, however, the impact of legislation to regulate and later restrict immigration was felt in the region. By 1940 the proportion of foreign-born in the region as a whole fell sharply from 30% to 19%. Towns that had formerly attracted the largest number of immigrants showed the greatest loss (Hardwick, 22.5%; Barre, 17.2%; Dudley, 16.8%; Douglas, 16.6%; Sutton, 15.1%; and Southbridge and Webster, 15%). During this period, many of the newcomers chose the area's rural communities, while others moved out of the factory towns. The only towns in which the percentage of foreign-born increased were Westminster (which held the region's highest proportion, 24.9%), Ashby, Berlin, Hubbardston, Lunenburg, Oakham, Phillipston, and Townsend. The pattern of increased dispersal was more evident as decreased immigration made internal movement more discernable. The range of highest to lowest proportion of foreign-born decreased significantly, from 36.8 in 1915 (Hardwick, 43.7% and Phillipston, 6.9%) to 18.2 in 1940 (Westminster, 24.9% and Templeton, 6.7%). Figures for the county as a whole illustrate the remarkable diversity within the region. The total white foreign-born population equalled 95,801 in 1940. Of these, twelve national and ethnic

groups counted more than 1% of the total, including: French Canadians (17.1%), Italians (11.2%), other Canadians (11.1%), Irish (8.9%), Poles (8.1%), Swedes (8.0%), as well as Lithuanians, Finns, English, Scots, Germans, and Greeks. At the same time, second and third generations of the foreign-born continued to contribute significantly to the diversity of the region's population. The Black population remained small, .4% of the total.

During the early years, the immigrant population continued to organize religious societies and voluntary associations along ethnic lines. Roman Catholics added to the number of national parishes: Athol and Clinton's Poles, Fitchburg and Milford's Italians, Worcester's Maronites and Melchites, among others. The region's Scandinavians continued to organize Lutheran churches, in Auburn, Holden, Webster, and a total of seven in Worcester alone. Synagogues also increased in number, led by Worcester with ten, and with new congregations in Clinton and Webster. Orthodox churches were also organized by nationality in the large cities. Ethnically based clubs and societies continued to flourish. Although information is limited, many of the patterns of assimilation and mobility continued during this period. Members of these ethnic communities moved out of working class neighborhoods, as had the Irish earlier. As owners of small businesses and increasingly employed in white-collar professions, they become more influential in the economic structure of the region. With higher rates of naturalization as well as citizenship for the native-born, political participation as well as leadership increased.

Disruption of the patterns of social development came with the Depression. A gauge of displacement can be derived from 1940 employment figures for the region's large towns and cities. Percentages of men

unemployed and engaged in emergency work in that year illustrate the lingering effects. Textile towns suffered acutely, with 28% of Blackstone's men in this category, 26% in Clinton, and 22% each in Webster and Dudley. Other communities with 15% or more in this category included Fitchburg, Leominster, Milford, Millbury, Uxbridge, Winchendon, and Worcester. Exceptions to these patterns were the communities where continuing paternalism helped employees in company towns, and Hopedale held this category to 3% and Northbridge to 4%. In rural communities, the Depression may have accelerated the consolidation of public institutions. Towns grouped together to support a single poor farm, as did the towns in the west at Holden's Public Welfare Association in 1927. Small towns sent high-school age children to neighboring urban areas, paying tuition rather than supporting an independent school, and several towns might share a common superintendent. Protestant denominations formed union or federated societies to share the cost of a minister's salary and church maintenance, as at Bolton, Dana, and Templeton, for example. The development of new institutions around the emerging suburban communities and the increasing middle class was begun during this period.

Core-Periphery Relationships

While the first years of the Early Modern period saw a small regional industrial boom as a result of World War I, what followed was a slowing and cessation of population growth and industrial expansion in the urban centers of Central Massachusetts. Changes in the cotton textile industry in the 1920s brought hard times to many of the region's textile manufacturing towns, and even those centers with a highly diversified industrial base suffered the effects of the Great Depression of the 1930s. At the same time that

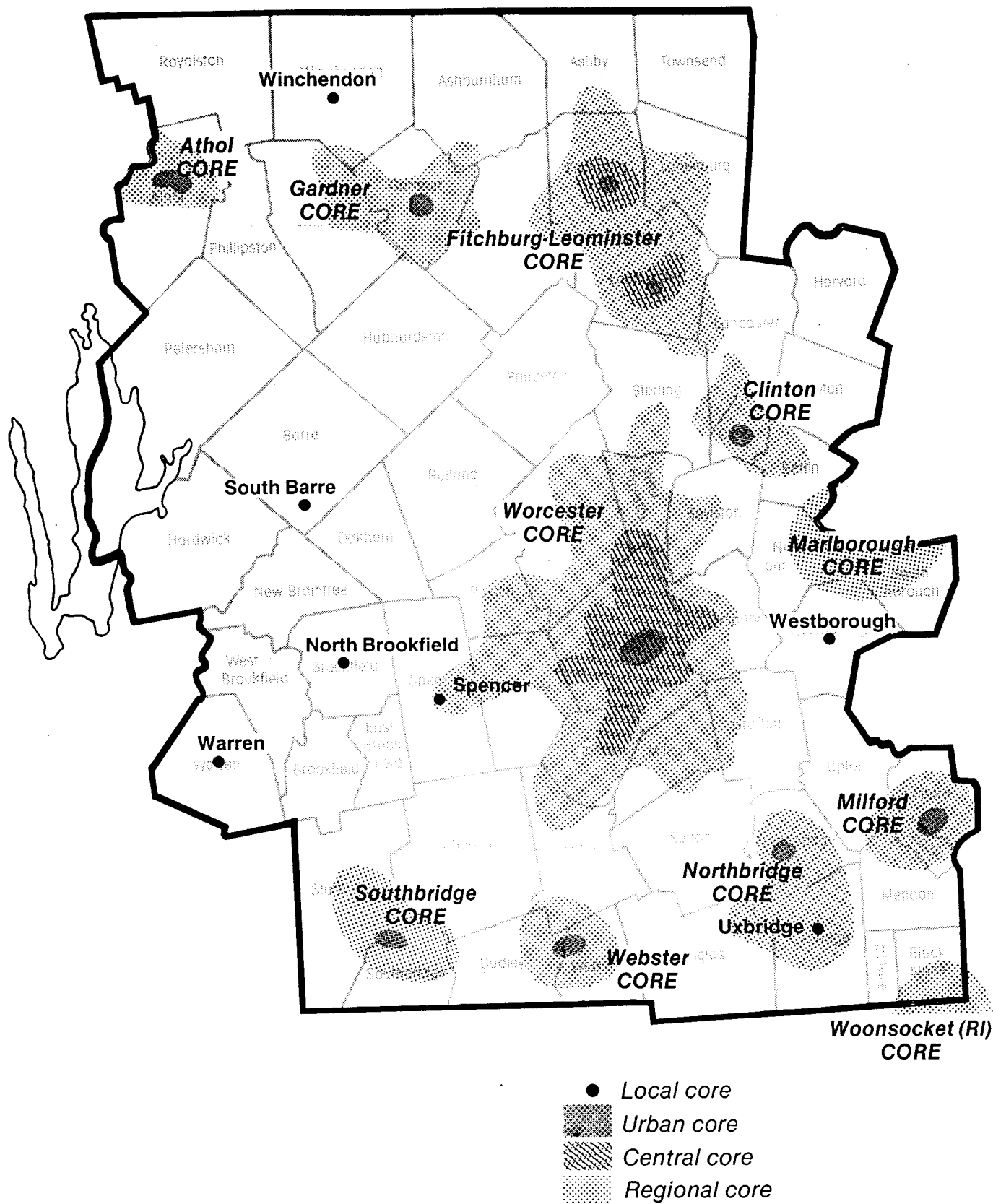
development stagnated in the central urban cores, expansion of regional core areas continued, however, as automobile suburbs grew and the regional population distribution became more decentralized. Beyond the suburbs, improved highways made rural amenities more accessible, and recreational activities increased. See Map 23.

In the Worcester regional core, industrial growth followed the awarding of military contracts to major local manufacturers, and housing shortages led to the creation of company-built housing units. Growth slowed in the 1920s, however. Civic and commercial development took place downtown, but local population growth stopped by 1930. At the same time, suburban growth continued at the edges of the Worcester regional core. Subdivisions were built in the western and northern peripheral areas of Worcester and in surrounding towns along the radiating regional automobile corridors. Suburban growth was most spectacular to the east, where Shrewsbury's population more than tripled during the period, and to the southwest, where Auburn doubled its population. By period's end, suburban development had extended into all communities surrounding Worcester, and the regional core reached beyond into Spencer, Oxford, Sutton, and Sterling.

Similar developments took place within the Fitchburg-Leominster regional core, where growth ended in the mid 1920s. While Leominster continued to be an innovative center of the plastics industry, Fitchburg's paper and textile manufacturing were hard-hit by the Depression. Nevertheless, suburban development continued, primarily into Lunenburg, but also in Westminster, Ashby, and Lancaster.

Growth in the Gardner regional core was sustained somewhat longer than in the region's other urban centers, and the city shifted its civic center to the

Early Modern Period Core Areas



new county courthouse location. The Milford-Hopedale regional core received some growth stimulus during the period from the relocation of shoe manufacturing out of the Boston metropolitan area, and Draper Manufacturing in Hopedale continued to expand into the mid 1920s. Some suburban growth occurred as well to the west in Mendon and Upton.

In the southwest part of the region, the Southbridge regional core remained stable as production continued at American Optical, and suburban development extended into Charlton and Sturbridge. The textile industry in the Webster-Dudley regional core continued to expand into the late 1920s, but development ended soon after. The Clinton regional core was probably the hardest hit center in the region as a result of the changes in cotton textile production in the 1920s, and the mills shut down completely during the Depression. In contrast, the smaller, but more diversified, Athol core in the northwest suffered relatively little. In the Blackstone Valley regional core, Northbridge remained the dominant center and Uxbridge continued to grow. The northern edge of the core blended into the Worcester regional core as suburban development extended into Millbury and Grafton. At the southern end of the core, suburban development from Woonsocket continued into Blackstone. Millville in the south was particularly hard-hit by the Depression, which led to the collapse of the local rubber industry and the placement of the town under the control of a municipal finance commission.

The region's local cores experienced little new development. Growth occurred in Spencer as it became part of the Worcester regional core, and at Winchendon as well in the northwest. However, the boot and shoe industry declined in Westborough in the east, and the small textile cores in the west at Warren, Gilbertville, and South Barre remained stable or declined.

In peripheral areas, widespread lakeside cottage development took place. In the northwest, a large territory was flooded or altered by the creation of Quabbin Reservoir and the establishment of watershed areas by the Metropolitan District Commission.

Research Topics

1. What specific impact did the transition from electric streetcar service to widespread automobile use have on suburban development? Where in the region were the first automobile suburbs built? What distinctive features did the new, pre-1940, suburban communities develop?
2. How did downtown growth in the 1920s differ from that in the late 19th century in the region's urban centers? What commercial and civic functions were most sensitive to the the tendencies toward decentralization brought on by increased automobile use? What changes in urban structure resulted, both in downtowns and along the peripheral highway corridors?
3. What changes took place in ethnic settlement during the period? Which neighborhoods remained stable, and which groups responded first to the opportunities for suburban relocation? Did suburban ethnic concentrations develop? What form of succession took place in vacated central city residential areas?
4. At all levels in the region settlement hierarchy, was there a growing standardization of the landscape, or did distinctive regional characteristics persist? Is there evidence of an increasingly influential national culture? To what extent did radio, national magazines, and government programs during the Great Depression result in more standardized building forms in Central Massachusetts?
5. How did changes to rural areas during this period differ from those of earlier periods? What types of resources were most susceptible to abandonment? What types of reuse were employed? How did reuse types affect the resources differently? What geographic variations in these can be identified?
6. Differentiate the effects of the Depression on working people within the region. How were different classes affected? How did this influence the regional emergence of clerical and service employment?
7. Which elements of the landscape were most susceptible to change due to economic dislocation? How were they changed? Can geographic variations be identified?
8. What improvements to documentation and methodology can provide more information on this period? What additional sources can provide

uniform, consistent, and comparable data? How can significant local activities be related to the increasingly national character of social change?

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CHAPTER 4

ARCHITECTURAL DEVELOPMENT

Charlotte Worsham

Introduction

The architectural development chapter is organized primarily by the three major building classifications: residential, institutional, and economic. Each of these classifications is discussed in the form which best reflects its particular development within the scope of the project. Residential buildings are divided into single and multifamily categories and discussed by form and/or style through five established time periods (Colonial, Federal, Early Industrial, Late Industrial, and Early Modern). Institutional and commercial buildings are discussed developmentally by the types of functions they performed: ecclesiastical, educational, service, and administrative, through each time period. Economic buildings also are categorized as mercantile, transportation, or industrial in orientation, and are discussed by period.

The survey methodology followed that established in previous study units. Historical maps, town inventories, and county and local histories were utilized; field work generally consisted of an average of three hours in each town. The project did not involve studying the interiors of individual structures, but relied on judgments made from exterior observations.

Because this approach was used, some explanation of the treatment of residential buildings is necessary. A scientific, typological survey was not the goal of the project. However, an effort was made to catalogue Colonial, Federal, and Early Industrial period residential buildings by plan based on generalized concepts of traditional regional domestic plans. Thus, a center chimney house implies three rooms (two rooms flanking the chimney and one to the rear). A double chimney house implies two interior, symmetrically placed chimneys that are usually, but not always, located on the ridge (in a gabled house) and with either a lobby entrance or center passage and generally a double-pile plan. An end wall chimney plan implies the placement of the chimneys in the shorter, end walls of a house that may be either single- or double-pile. A rear wall chimney plan suggests the symmetrical placement of two chimneys in the rear wall of a single-pile house with no further indication of plan. A gable-end classification strays from reliance on chimney placement. Instead, the gable-end house refers to a form in which the ridge runs at right angles to the front wall, and the gabled plane becomes the facade.

By the end of the Early Industrial period (1870), popular style buildings generally replaced the traditional forms as they are currently understood. Consequently, Late Industrial and Early Modern period residential buildings must be discussed primarily in terms of the prevailing late 19th and early 20th century architectural styles. This transition from traditional to popular buildings is characteristic of the entire study unit. The earlier period buildings appear to follow a regional pattern of traditional house forms. Later period houses reflect the national trend for popular style architecture which grew with the development of pattern books and the coming of age of the professional architect. The change from traditional, regional building patterns

to popular, national trends is not unique to Central Massachusetts. The evolution is universal and is linked to overall social and economic development patterns.

Residential Architecture

Colonial Period (1676-1776)

Single-Family Dwellings

The earliest surviving houses in Central Massachusetts are timber-framed dwellings. However, the use of other forms of shelter by the first settlers of the region should not be ignored. Mid- to late-19th century historians frequently state that the first houses built during the initial settlement period in the Central Massachusetts study unit were constructed of log. Most of these log structures appear to have vanished from the landscape by the end of the 18th century. Since no physical or documentary evidence is known to survive, further research is necessary before any definite statement can be made concerning the use of log construction in early Central Massachusetts domestic architecture.

Studies in eastern Massachusetts also refer to the use of temporary and impermanent forms of shelter in the early years of settlement. The settlers are known to have employed "wigwams," huts, and even tents until they had the means to construct the traditional timber-framed house. One source (Heywood 1893:81-84) discusses the early years at Narragansett #2 (Westminster), and the attempts to provide housing there. While most of the settlers cleared the needed three acres and constructed houses, seven were still occupying "little houses," some without cellars, suggesting an impermanent phase. Occasionally, town proprietors added housing dimensions to the requirements of early settlers to clear land, construct a meetinghouse,

etc. In both Hardwick and Sturbridge, minimum requirements were for a single story, eighteen feet in length, allowing a lobby/chimney bay and a single room on the main floor. Again, without consulting primary source material for Worcester County and Central Massachusetts, little evidence exists to suggest what forms of initial housing may have been constructed.

The timber-framed, center chimney plan house is the earliest surviving domestic building form in the Central Massachusetts study unit. This plan consists of two rooms, frequently identified as the hall and parlor. These flanked a large chimney that served both rooms, and before which was located the lobby entrance and stair. The two rooms were often augmented by a third in the form of a one-story leanto, either integral or added later, across the rear of the house. The leanto traditionally functioned as the kitchen with smaller rooms at each end and was also served by the central chimney. The majority were constructed with gable roofs over the primary block, extending over the leanto in the rear to form the "salt box." In Central Massachusetts this type of house was sheathed in clapboards.

Five 17th century center chimney houses are recorded in the study unit. They are located in Lancaster, Harvard, and Southborough, all towns situated along the eastern edge of the study unit which were settled early in the Colonial period. In Harvard, the Henry Willard House, said to date from 1687, is two stories with a six-bay asymmetrical facade and a leanto. The sixth bay is somewhat unusual, as most private dwellings in the study unit had a maximum of five bays. The chimney is centrally located as if for a symmetrical five-bay facade, making the sixth bay look like an addition. The second 17th century house in Harvard (now St. Therese House of St. Benedict's Priory) is a two-story, five-bay, center chimney plan thought to date from

1683. Lancaster's John White, Jr. House, believed to date from 1680, is also a two-story, five-bay center chimney house. The remaining two examples, dated 1680 and 1690, are found in Southborough and are also two-story, five-bay, center chimney plans.

At least eleven additional center chimney plan houses have been identified from the first quarter of the 18th century. These are found in Grafton, Holden, Leicester, Milford, Shrewsbury, Sutton, Uxbridge, and West Brookfield, towns in the east and south of the region where early colonial settlement focused. Approximately half of these first-quarter 18th century center chimney plan houses are two stories tall and are generally five bays wide (although a four-bay example does survive in Sutton). The one-story center chimney survivals from this early period display variety in the number of bays in the principal facade. Notable among these are the five-bay Cornet John Farnum House (1710-27) in Uxbridge, the three-bay Rogers House (1722) in Holden, and the "three-quarter" Willard House (1718) in Grafton. The term "three-quarter" implies that this plan provides the occupant only three-fourths of the space found in a full five-bay, two-room, center chimney house, and the two rooms flanking the center chimney are unequal in size, generally reflected on the exterior by a four-bay facade with one window in the smaller room and two windows in the larger.

Both one- and two-story examples of the center chimney plan occur throughout the remainder of the Colonial period. They appear to survive in roughly equal numbers. There is no discernable variation in geographic distribution between these two types. As with the early center chimney plans, throughout the Colonial period there was more variety in the number of principal facade bays on one-story houses. While five-bay facades appear to have been more common, a significant number of three-bay, one-story houses

occur. "Three-quarter" and "half" (one room with a chimney/entrance bay) houses were noted much less frequently. As with the number of stories, there appears to be no discernible geographic distribution based on facade fenestration. Generally, most center chimney houses have gable roofs, but some pyramidal and gambrel roofs were noted as well. Gambrel roofs are most often associated with one-story houses, although a 1724 two-story, gambrel-roofed example is recorded in Sutton. The pyramidal roof occurs most frequently on the two-story, center chimney plan.

It is apparent that the leanto was the universal choice for the expansion of the basic center chimney house. Some were added but many were increasingly planned as part of the house frame from the start. Some builders then incorporated the leanto fully into the house frame and recentered the roof ridge over the entire mass. This created a plan which resembled the old leanto, but with an end elevation symmetrical in form but asymmetrical in the arrangement of its openings. It may best be described as "one-and-a-half-pile" in depth. This form seems to have been most common in two-story houses and was observed throughout the study unit. An architectural feature often associated with these 18th century houses, the so-called "Beverly jog," is connected with this incorporated leanto. The jog can be identified as a lateral extension located behind the ridge line with a roof slope that is generally in the same plane as the rear slope of the main roof. The jog usually has a window, and frequently a door, in the principal facade. Interior inspection of the 1683 St. Therese House in Harvard (which has matching jogs at each end) indicates that the jogs are aligned with this half-pile and are, in effect, extensions of it. One of the jogs at the St. Therese House contains a stair, and each incorporates an entrance door in the front.

The double chimney house occurs much less frequently in the Central Massachusetts study unit but is, nevertheless, a significant period house type, representing the influence of the high-style Georgian ideal in the region. Double chimney houses invariably incorporate a double-pile plan. By adopting this high-style form, the traditional single- or one-and-a-half-pile, center chimney plan could be enlarged to a full, four-room, double chimney, double-pile house. The replacement of the massive central chimney by the double interior chimneys permitted access to each of the four rooms from a center passage, and may also be linked to the disappearance of the lobby entrance.

The double chimney form does not appear to have been built much before the mid 18th century. At least one-third of all the towns in the study unit retain double chimney houses. There are ten towns in which a significant number of the recorded houses are of this type: Templeton, Barre, Rutland, Princeton, Sterling, Harvard, Bolton, Boylston, Shrewsbury, and Westborough. Survivals occur in smaller numbers (often only one per town) in North Brookfield, Gardner, Leominster, Lancaster, Berlin, Northborough, Grafton, Holden, Paxton, Spencer, Charlton, Upton, and Warren. Most surviving double chimney houses appear to be two stories in height; however, single-story examples were noted as well, particularly in Grafton, Holden, Lancaster, Leominster, and Paxton. The overall distribution of double chimney houses makes it difficult to determine a pattern for the distribution of the plan.

Although the gable roof remained the predominant form, the hipped roof occurred for the first time in this period in conjunction with the double-chimney, double-pile house. A two-story, five-bay house in Barre (ca. 1754) has a hipped roof and an unusually elaborate doorway with a full

entablature, including a fanlight. A 1757 two-story, five-bay house in Boylston displays a hip on hip roof. The two-story, five-bay, double chimney, brick Shrewsbury dwelling of Nathaniel Allen of Boston (1756; demolished 1852) also displayed the hip on hip roof form, and in Rutland, the extant Rufus Putnam House (ca. 1760-65) has a steep hip roof. The hip roof appears to be indicative of the status and wealth of the owner.

Rear wall and end wall chimney house plans are also rare for this period in Central Massachusetts, appearing with more frequency later, in the Federal period. The rear wall chimney plan is essentially a single-pile, double chimney form with two symmetrically placed chimneys in the rear wall. One two-story, five-bay rear wall chimney house attributed to the Colonial period is recorded in Southborough. A more thorough investigation of the dwelling is necessary in order to confirm its construction date, as it is the only recorded period example of the type in the entire study unit. While the placement of the chimneys in the end walls appears to have been a modification of the double chimney plan, end chimneys could appear in both single- and double-pile plans. Five examples of the end chimney plan house survive which are recorded as being of the period. In four of the five, the end chimneys are placed in brick walls, and in two of these four, the entire structure is brick (Holden).

The use of brick as a building material in Central Massachusetts is rare in the Colonial period. The four examples just cited, the previously mentioned Nathaniel Allen House (1756) in Shrewsbury, and a four-bay, gambrel-roofed, brick, hall-parlor plan in New Braintree are the only recorded examples of period brick houses in the study unit. Generally, brick was not a popular building material until the early 19th century in Federal period buildings. The

dates of the two brick end wall chimney dwellings in Holden become suspect due to a center-passage plan. The New Braintree structure has been gutted on the interior, making it almost impossible to date. Without further research, one cannot determine whether these are Colonial or Federal period buildings, but if they do predate 1775, they are extremely significant structures in Central Massachusetts.

Exceptional among the survivals of the region is the Salisbury Mansion in Worcester. The west facade is conjectured as the original 1772 appearance, and presents five bays with center entry under a high hip roof. This Boston-born merchant incorporated storerooms for retailing on the first floor of his home. This produced an unusual chimney arrangement of central chimney between the two living areas on the west and a corner chimney for the eastern retail portion. Correspondence with a Boston gentleman-designer directed the builder to English design books, evident in pedimented windows, pilastered door surround, quoins, and modillion block cornice.

Multifamily Dwellings

There are no known examples of a single structure constructed for occupation by more than one household. However, population figures suggest that in many instances more than one family occupied the same dwelling. This pattern continued in later periods as well.

Federal Period (1775-1830)

Single-Family Dwellings

Five Federal period residential building types were identified in the study unit: center chimney, double chimney, rear wall chimney, end wall chimney,

and gable-end. Both the traditional center chimney plan and the Georgian-influenced double chimney plan characteristic of the Colonial period continued to be built between 1775 and 1830. The rear wall and end wall chimney plans became firmly established house types, rather than the exceptional forms they had been in the Colonial period. The new gable-end plan was introduced in the period only in small numbers. As in the Colonial period, no pattern for the geographic distribution of one- and two-story center chimney houses was established. In the central and southeastern towns there is an equal number of center and double chimney types. The center chimney predominates in the remainder of the study unit except in the northern tier towns where rear wall chimneys predominate.

Center and double chimney plans comprise the majority of surviving Federal period houses. The center chimney house, apparently both single and one-and-a-half pile, remained the period's predominant residential form. Both one- and two-story examples are recorded throughout the study unit, but two-story examples occur more frequently. Most center chimney houses of the period are five bays in width with only scattered examples of three- and four-bay facades. Double chimney houses were identified in every town in the study unit, whereas they were found in only half of the towns during the Colonial period. Certainly, the quantity and distribution of surviving double chimney houses increased substantially over that of the Colonial period. Very few examples of one-story, double chimney houses survive. Less than 25 were identified, and they appear to be scattered throughout the study unit.

The General Salem Towne House, built in 1796 in Charlton (moved to Old Sturbridge Village in 1965), is a two-story, five-bay, double chimney plan house

with a unique monitor on the hipped roof. The first floor windows all display wooden flat arches with projecting keystones, and the central door is framed by pilasters which support a pediment with a semicircular fanlight. A secondary facade of five bays on an end wall exhibits a central door with a transom surmounted by a molded entablature. Another noteworthy example of the double chimney plan was the Asa Waters House in Millbury, built between 1826 and 1829. The architect was Gridley Bryant of Boston and the master builder Captain Louis Bigelow of Worcester. As it appeared in a ca. 1860 photograph, the house was a three-story, frame, hipped roof, five-bay, double chimney plan. A two-story wing is evident on one end, while the other end has an entrance with a one-story balustraded portico. A two-story Corinthian portico with a balustrade shelters the front of the house. Beneath it, the facade is flushboarded rather than clapboarded, as were the more exposed surfaces. The cornice of the portico wraps around the corner of the building to the depth of one bay and is supported by Corinthian pilasters. The center entrance of the main facade is set in a rounded arch opening with molded trim. Above the attic story, the cornice is dentilled and a balustrade conceals the hip roof. A second balustrade surrounds the top portion of the roof.

While the traditional center and double chimney houses continued to dominate Federal period residential forms, the number of rear wall and end wall chimney houses increased dramatically over that of the Colonial period. In fact, the two plans were found to be almost exclusively Federal period building types. The double chimney plan was the only double-pile residential form identified in the study unit for the Colonial period. During the Federal period, however, the double-pile form expanded by incorporating combinations of the rear wall and end wall chimney plans, which appear to have the

double chimney plan as their root. Although dates are unavailable for a large number of the rear wall and end wall chimney houses, those with dates indicate that the majority were built after 1800 and before 1830. An early end wall plan is the Asa Kendall House (1790) in Ashby. It is a two-story, Flemish bond brick, double end wall chimney plan with unusual brick wings. The main five-bay block is flanked by one-and-a-half-story, two-bay wings, each with a door and window and a shed roof, the slope of which is in the same plane as that of the side slope of the hipped roof on the main block. The rear wall chimney tends to occur somewhat more often than the end wall chimney plan. Only four one-story rear wall chimney examples are known. From this evidence, it would seem that these two Federal house types were generally perceived as two-story buildings, and that the traditional center chimney plan was the predominant choice for single-story dwellings until the later industrial periods. These plans predominate in the northern tier towns of Royalston and Ashburnham and form a significant portion of the surviving dwellings in the northern town of Fitchburg and the northwestern towns of Rutland and Hubbardston. This reflects the later, Federal period settlement of northern Worcester County, with the influx of progressive ideas. Harvard is the only town with a significant number of end wall chimney plans, implying either a similar influx of progressive ideas or an unusually high survival rate. Ten additional end wall chimney plans were identified which embody a double-pile form: Ashby, Bolton, Holden, Northbridge, Princeton, Sturbridge, and Webster. Six of these examples were brick, and a fifth, frame with brick end walls, was identified.

The George B. Slater House (1827), in Webster, is an exceptional two-story, five-bay, double-pile, end wall chimney plan constructed of coursed

granite blocks. A particularly fine frame example of the double end wall chimney plan was the Moses Gill House in Princeton (demolished ca. 1819), dating from early in the Federal period or possibly of late Colonial period construction. The home of Lieutenant Governor Moses Gill was built sometime after 1766 on a 3,000-acre tract of land in Princeton which Gill acquired from his father-in-law. The plan consists of a square (50x50 feet) two-story, five-bay block with a central pavilion, clapboard facade, and a balustraded hip roof with a cupola. The plan incorporated double end wall chimneys, but whether the end walls were of brick or frame is unknown. Precedent for the form is found in such Eastern Massachusetts houses as those of Peter Faneuil (Boston) and Isaac Royall (Medford), both of which predated 1750. The pedimented central pavillion was distinguished by pilasters, which were also at the corners of the house, and a continuous belt course. These gave the structure a distinctly high-style character, found on such Eastern Massachusetts buildings as the Vassall House (1759) in Cambridge and the Jeremiah Lee House (1768) in Marblehead. The apparent projection of the pavillion exhibited by the Moses Gill House suggest a heavy plastic treatment of the features of that house, more in keeping with the Georgian ideal. Were it not for the end wall chimneys, the combination of these features would tend to place the Moses Gill House in the third quarter of the 18th century.

Compare, for example, the new south facade designed for the Salisbury Mansion in 1790. The redesigning of this facade took place in conjunction with the building of a separate store building and the redesigning of the retail portion of the structure to through passage and paired drawing rooms with end wall chimneys. Here the long and irregular seven-bay original side elevation had a facade pediment added over two bays as well as a one-story porch. The

pilasters and column supports are appropriately attenuated, shielding a flushboard section of the facade and a fan and sidelit new primary entry. These planar features are more in keeping with the Federal style.

Three examples of a double-pile form incorporating both end wall and rear wall chimneys were identified in Berlin, Townsend, and Westborough. The latter is the only one of the three that has been dated (1830). The end wall chimneys are placed in the front rooms. Unique of the three is the Berlin dwelling, which is constructed of coursed ashlar granite. The end chimneys in this house are placed so far forward that the fireplaces must be located in the outside corner of each room. This is the only building with such a chimney arrangement identified in the study unit. The only known example of the unusual combination of double interior and rear wall chimneys in a double-pile plan occurs in Leominster.

Each of the less common double-pile plans (the double end wall chimney, the end wall and rear wall chimney configuration, and the double and rear wall chimney combination) would seem to have its source in the basic double chimney, double-pile, Georgian plan house. The double end wall chimney plan divides the two pairs of back-to-back fireplaces, served by the double chimneys of the Georgian plan, and splits them into four separate fireplaces located in the outer end walls of the house. In the end wall-rear wall chimney combination, two of the four chimneys shift to the rear wall instead of the end wall. The double and rear wall chimney arrangement appears to be simple joining of two single-pile, rear wall plans to form a double-pile mass.

An exceptional single-story house survives in Princeton. The Boylston Villa was built ca. 1819 in Princeton replacing the Moses Gill House. The house, a one-story, five-bay brick dwelling with wings, features a stuccoed

facade, and above the windows are fan-shaped blinds. The original portico is believed to have consisted of four Doric columns. The structure has apparently undergone some interior alteration as well; however, its original plan may have resembled that of Plate 54 in Asher Benjamin's The American Builder's Companion (6th ed., 1827), which illustrates a two-story, four-bay plan with a transverse hall and one-story wings intended as a country house. Evidence exists (files at S.P.N.E.A., Boston) that the design for the Boylston Villa may indeed be linked to the work of Asher Benjamin.

Only eight examples of the gable-end house were identified for this period; all but one of these is two stories high. The one-story example was a five-bay, center-passage plan house in Royalston. The other two-story examples were found in Hardwick (one), Lancaster (two), Sturbridge (three), and Westborough (one). The Hardwick, Sturbridge, and Westborough houses are all three-bay, side-entry plans, while the Lancaster examples are the only ones known with center-entry. None of these appear to predate 1820. These Federal period structures may be considered the prototype of the form that became increasingly popular throughout the 19th century.

While wood continued to be the most common material employed in the construction of Federal period residential buildings, a significant percentage of brick houses were identified. At least two-thirds of the towns contain brick dwellings, or dwellings constructed of brick and frame, indicating the increased availability of that material throughout the study unit by the beginning of the 19th century. The use of brick was confined almost entirely to two-story houses of the double chimney, end wall, and rear wall chimney plans. Center chimney brick houses are practically nonexistent. Based on surviving examples, it would appear that brick was employed more frequently

in the construction of rear wall and end wall chimney plans than in that of the double chimney plan. While brick is not exclusively associated with rear wall and end wall chimney houses (frame examples of those types were identified), brick was found to be a favorite material by builders of those two forms. In some instances only the wall containing the chimney is constructed of brick, especially in end wall chimney plans. In one unique example in Westminster, an 1801 two-story, five-bay double-pile, hipped roof house exhibits frame end walls and brick front and rear walls. The coincidence of the shift in chimney placement to the outer walls in rear and end wall chimney plans and the nearly total lack of brick walling in the study unit's traditional center chimney plans may indicate that the exterior wall chimney is associated with the use of brick as a structural material.

Gable roofs continued to be common during the Federal period, remaining the typical roof form for the traditional center chimney plan. The hipped roof form became a prominent feature on first-quarter 19th century two-story houses. Double chimney, end wall chimney, and rear wall chimney plans were those which frequently employed the hipped roof. At least one center chimney, one double chimney, and one end wall chimney dwelling were identified with pyramidal roofs. Three hip-on-hip roof houses were identified in Charlton, Dudley, and Leicester; and three gable-on-hips were identified in Gardner, Sterling, and Sturbridge. The only two gambrel-roofed houses identified are one-story and thought to be late 18th century houses.

Multifamily Dwellings

Multifamily worker housing appeared in the Central Massachusetts study unit for the first time in the Federal period, but very few dwellings survive.

Those that do are concentrated in the Blackstone Valley towns of Northbridge and Sutton, and in Webster, which supported significant industrial development during the period. Northbridge contains a significant number of multiple family units in Whitinsville and in the center. The earliest date from ca. 1809 and are found in Whitinsville. These consist of one-and-a-half-story blocks. The later period units are one-and-a-half- to two-story, double chimney duplexes located in the center. In Sutton, the two surviving multifamily structures are located in Manchaug and date from 1826. They consist of identical two-story, five-bay, nine-course common bond brick, center chimney duplexes with the chimney set well behind the ridge of the gabled roof. Both have a semicircular fanlight over the center entry.

A two-story, nine-bay double house with a hipped roof remains on the common in the Upper Village of Athol. While this structure may be a survivor of early 19th century industrial development, it is more likely a commercial building, as later industry in Athol concentrated in the Lower Village rather than around the old common. In addition, some surviving examples of two-story, six-bay, double chimney duplexes with double entrances were identified in Bolton. Smaller numbers of one-story examples were also noted.

By far, the most significant examples of multiple family, worker houses are to be found in Webster. These structures, built by the Slater Mills beginning ca. 1820, comprise a large part of the surviving 19th century residential architecture of that town. Both frame and masonry structures remain, and the quantity and quality of the buildings are outstanding. The most popular form appears to be the one-story, six-bay double chimney duplex with entrances in the outer bays of the principal facade. Most are constructed of coursed ashlar granite laid in a distinctive pattern of alternating rows of

narrow and wide blocks. Fewer numbers of frame examples of this type seem to have been built. One-story, granite fourplexes also survive, some with corbelled brick cornices. These may be Federal period buildings with new roofs and cornices, but they are likely later 19th century units. Two-story units appear to have been less popular than the one-story examples. Some six- and seven-bay brick double chimney structures remain, and an even smaller number of center chimney buildings survive. The basic form of the multiple family structure did not vary in Webster throughout the century, making it difficult to date the remaining examples. These same types are known to have been built as late as 1870. Masonry, particularly granite, seems to have been favored in the construction of multiple family units. While the initial cost may have been greater than the use of frame construction, brick and stone buildings were probably viewed as more economical in terms of maintenance and were less prone to damage or destruction by fire.

Early Industrial Period (1830-1870)

Single-Family Dwellings

Building activity increased during the period, coinciding with the growth of manufacturing and population. The shift from an agrarian to an industrial economy was felt throughout the region and is evident in the increased residential building activity which focused in the town centers and mill villages. The increase in manufacturing and subsequent spurt in the rate of residential construction did not produce a great variety of domestic building forms. More houses were erected, but the prevailing form was the gable-end, side-entry plan, which became the "vernacular" form for the remainder of the 19th

century and into the 20th century. The development of the gabled facade house is popularly linked to early 19th century society's absorption with Greece. If the Greek Revival is accepted as the first American "style," then the gable-end house, as a simple representation of the Greek temple form, may be interpreted as a regional response to the first popular or national style.

The gable-end dwelling employed two distinct floor plans, a side-entry or center-entry plan. Based on the surviving buildings, the gable-end, center-entry plan did not achieve great popularity, but as the gable-end form became more common during the 19th century, the side-entry evolved as the plan of choice. As with the traditional center and double chimney forms of the Colonial and Federal periods, the presence or absence of architectural ornament distinguished lower income housing from upper middle-class and wealthy housing in the industrial periods. Post-Civil War middle- and upper-class housing frequently employed popular style architecture, primarily Italianate and Second Empire, derived either from the work of a growing number of architects in the region or from pattern books.

The gable-end, side-entry plan was the predominant single-family form throughout the Early Industrial period and was found in every town in the study unit. The side-entry plan is generally three bays wide with the entrance located in one of the outer bays of the facade. In one plan, the entrance bay consists of the passage which extends the length of one side of the house, and the rooms, two bays wide, are located one behind the other alongside the passage. In another, the entry/stair hall is a single pile in depth with three rooms on the main floor. The form was adapted to all contemporary styles simply by attaching the appropriate ornament of the period. Greek Revival pilasters, corner boards, and cornices characterize the houses from 1830 to

1850. Italianate brackets, canopies, and bay or oriel windows and Second Empire mansard roofs, along with a variety of wall surface textures, became fashionable between 1850 and 1870. These late period gable-end houses were frequently two bays wide on the first floor, particularly when the bay or oriel window was employed on the gabled facade. This gave the structure a more attenuated, vertical appearance than that of the earlier, three-bay Greek Revival house. Both one- and two-story examples of the gable-end form survive, and it can be assumed that the number of stories in this period was linked to the economic status of the owner/occupant. Likewise, the use of brick as a building material was probably connected with the owner's financial means. Although improved transportation systems would have made brick available to builders throughout the study unit, most gable-end houses, as well as other forms employed during the period, were of frame construction. Another consideration in the use of brick as a building material may have been a growing awareness of the danger of fire, especially as housing became denser in the manufacturing centers.

Less common was the gable-end, center entry house. These structures were generally one-and-a-half stories in height. Gable-end center-entry houses were generally either three or five bays wide with the central entrance located beneath the peak of the roof. The concept of the center passage plan, related to the Georgian-influenced double chimney house, was not altered when incorporated in a double-pile gable-end form. However, unlike the 18th century type, both double- and single-pile plans were constructed in the 19th century gable-end, center-entry house. In single-pile examples the chimneys were placed in the rear wall, suggesting the possibility of a similar relationship between the development of this single-pile, center-passage, gable-end form

and that of the rear wall chimney plan from the double-pile, double chimney 18th century house. This form occurs only in the early portion of the period, in those houses exhibiting Greek Revival detail. In addition, the form appears to have been limited almost entirely to the northern tier towns, extending south to include Harvard and Princeton, and was also noted in significant numbers in Upton, Grafton, and Webster. As the northern tier towns, in general, were settled later than the rest of the study unit, this may have some bearing on the concentration of the form in this region.

The Greek Revival temple front house was found primarily in town centers or villages rather than in the rural landscape. This form, built from the mid-1830s until about 1850, appears to have been a stylish version of the standard gable-end form. Both side-entry and center-entry forms were observed. Doric and Ionic porticoes were commonly employed, and frequently the facade sheltered under the portico was sheathed with flushboard rather than weatherboard.

The Gothic Revival experienced only limited popularity here during the mid 19th century. Most examples of the style were restricted to the application of bargeboards and pointed arch windows on gable-end or one-story, symmetrical, gable-roofed houses. A few examples survive in Worcester; others are scattered throughout the study unit.

While the gable-end house was definitely the predominant residential form of the period, traditional center and double chimney houses continued to be built. Center chimney houses tended to be one story in height, and the double chimney houses were more often two stories. Later period houses which did not employ the gable-end, side-entry plan were generally two-story, three- or five-bay structures with symmetrical facades and center entrances. Italianate and Second Empire style residences appear, externally at least, to have

shifted somewhat further from the traditional form, most noticeably with the introduction of the mansard roof and the projecting central pavillion, while retaining the three- or five-bay symmetrical facade. Few high-style examples of Italianate and Second Empire houses were constructed during the period. Those that were built were located in the major manufacturing centers where the first architects to practice in the region had established themselves.

Multisided houses enjoyed a brief period of very limited popularity between 1850 and 1860, concurrent with the national trend. Two octagonal examples are known in Worcester. Another is extant in Dudley, along with a duodecagon, or twelve-sided house, built ca. 1850 by Zephania Baker of Worcester, who published The Cottage Builder's Manual (1856), in which the multisided house is discussed. Gardner also retains an 1854 octagonal house, and two mid-century, brick examples survive in Fitchburg.

Multifamily Dwellings

The sudden increase in multifamily housing in the study unit during the Early Industrial period is directly associated with the development of manufacturing in the region. The greatest number of surviving period multifamily structures are located in the industrial river valley towns of southern and eastern Worcester County. Other towns that retain early examples of worker housing are: Hardwick, Barre, Clinton, Fitchburg, Leominster, and Winchendon.

The standard plan for multifamily worker housing appears to have been the gable-roofed duplex of one-and-a-half or two stories, generally four to six bays in width, with double interior chimneys, although center and end wall chimneys were not unknown. The form was also extended laterally to

incorporate up to four or six units with interior chimneys. Each unit was generally three bays wide and had its own entry. Rowhouse construction was not widespread; examples were observed in Dudley, Fitchburg, Hardwick, and Sutton. A small number of gable-end double houses survive from later in the period, but this form appears to have been associated primarily with the single-family dwelling.

Wood was the common building material; brick was used on a small scale throughout the period. Some handsome duplexes and fourplexes of coursed granite survive in the Blackstone Valley towns. Of particular interest are the units constructed of alternating courses of narrow and wide granite blocks, which create a distinctive visual pattern. This type of construction first appeared in the late Federal period and seems to have disappeared entirely by ca. 1840. Architectural ornament was applied sparingly, if at all, to worker housing. In some instances, structures built in 1870 displayed little or no change in form or appearance from those erected in 1840.

Late Industrial Period (1870-1915)

Single-Family Dwellings

The gable-end, side-entry plan remained the predominant single-family building type throughout the study unit until ca. 1900. The form continued to be built in significant numbers in the early 20th century, but other popular house types increased in number toward the end of the period. While the plan was well suited to a dense urban environment, it continued to find favor in the less heavily populated rural areas of the region. Here, the form occasionally incorporated a gable-roofed lateral wing, set back from the front plane of the gable-end section, and frequently containing a secondary entrance.

The majority of these houses were constructed of wood, and both one- and two-story examples survive. As in the Early Industrial period, current high-style details were adapted to the gable-end house. During the first half of the period, the Queen Anne style enjoyed widespread popularity, appearing most noticeably in the application of patterned shingles to the gabled facades previously sheathed with weatherboards. By the end of the century, classical motifs began to replace the Queen Anne trim. Again, as in the previous period, the degree of ornamentation was an indication of the economic status and aspirations of the owner.

Residential development increased during the period in the manufacturing centers, and it was in these towns and their mill villages that the more ambitious dwellings of the rising middle-class industrialist are located. Center-entry Italianate and Second Empire houses continued to be built in the early years of the period; these gave way to asymmetrical Queen Anne houses, characterized most often by circular or polygonal corner towers and encircling porches of machine-turned posts with Stick Style balustrades and trim. Most of these plans were probably derived from the pattern books and popular magazines of the day. While an increasing number of professional architects are known to have been at work in the region, they appear to have been employed, for the most part, in the major cities--Worcester, Fitchburg, Leominster, Gardner, Athol, and Milford. Consequently, the high-style houses of the period--Queen Anne, Victorian Gothic, Romanesque Revival, and Colonial Revival--are restricted primarily to these towns.

By the late 1890s, a nationally popular house form made its appearance in Worcester County. The Four Square house consisted of a two-story, cubic mass with a pyramidal roof and a central dormer window. Frequently a one-story porch sheltered the facade and the off-center entrance. The basic

plan incorporated four rooms: a corner entry hall with side stairs, a parlor, a dining room, and a kitchen. The retention of the side entry with stairs and a passage to the rear kitchen and back-to-back parlor and dining room relationship would seem to be linked to the side-entry plan of the 19th century gable-end house. However, the Four Square house shed all vestiges of "Victorian" ornament in favor of the classical motifs of the turn of the century. The plan was popular in both urban and rural areas throughout the remainder of the period. In urban areas, the Four Square house occurred in developing suburban sections as infill and on the outskirts of villages and town centers.

Another popular house type dating from the latter portion of the period was the Bungalow. This one-story house with broad gabled roof and gabled front porch was sheathed in wood clapboards or shingles, brick, or stucco. Like the Four Square house, the bungalow form was built throughout the study unit in both urban and rural areas.

Limited examples of the Arts and Crafts movement were identified in the study unit. Likewise, "revival" styles--Federal, Tudor, Mediterranean, etc.--occurred infrequently.

Lakeside cottages in the popular Queen Anne, Stick, and Shingle style designs were built during the latter portion of the period. Rutland and Princeton retain some impressive examples of similar, popular style, summer residences.

Multifamily Dwellings

As in the Early Industrial period, the existence of multifamily structures was associated with the development and expansion of industry in the study unit. Significant concentrations of multifamily worker housing survive in

Blackstone, Clinton, Dudley, Fitchburg, Gardner, Grafton, Hardwick, Hopedale, Leominster, Milford, Northbridge, Warren, Webster, and Worcester. Two forms appear to characterize multifamily worker housing of the period: the more "traditional" gable-roofed structure and the three-decker. The apartment house makes up a third multifamily category; however, this building type does not represent a form of worker housing as the term is commonly used in reference to 19th century industrial development.

During the early portion of the period and continuing into the 20th century in most industrial centers outside Worcester, the one-and-a-half- to two-story, gable-roofed structure containing from two to eight or more units was the typical multifamily dwelling. These were primarily frame buildings, but some brick examples were noted.

Of particular interest is the town of Hopedale, a model planned community incorporated in 1886. Construction of worker housing began in the mid 1850s but did not attain the scale that brought it international fame until the early 20th century. Between 1880 and 1915, construction of worker housing increased, and two well-known landscape architecture firms were hired to execute the planning and design of the later development. William H. Manning, who had been employed formerly with the Olmsted firm, was hired in 1886 and subsequently designed the 1896-1903 Bancroft Park development consisting of thirty duplexes situated on an elliptical knoll. Manning was also responsible for the Prospect Heights development (1903-13) in adjacent Milford. Included in this project, in addition to frame duplexes, were Queen Anne style brick rowhouses with half-timbered gables and porch pediments and segmental-arched windows. Arthur S. Shurcliff was the second major

landscape architect to be involved in the planning of Hopedale. Shurcliff designed the Lake Point development in 1904 and housing projects in 1914.

The basic Hopedale multifamily structure was a two-story, frame duplex containing two three- or four-room apartments, each occupying 20 x 27 feet of space on two floors and sharing a common, central utility wall. The duplexes were six bays wide with double interior chimneys. This form did not vary significantly throughout the successive building booms in Hopedale, although some of the later units were more spacious. The structures displayed little stylistic ornament. Late Industrial period duplexes frequently had hipped or gambrel roofs, bay windows, and were sheathed with shingles rather than weatherboards. Several Boston architectural firms supplied designs for the Hopedale units: Robert Allen Cooke, Peabody and Stearns, Edwin J. Lewis, Jr., J. Williams Beal, Chapman and Frazer, and Walter and Kimball. In addition to the duplexes, three frame boardinghouses were built in Hopedale during the period, one of which is extant.

The second form of worker housing to develop in the late 19th century was the three-decker. The three-decker is found in limited numbers in Athol, Blackstone, Dudley, Gardner, Leicester, and Milford, and in more significant concentrations in Fitchburg, Leominster, and Southbridge. However, the form is most commonly associated with Worcester where there were more three-deckers constructed during the period than any other building type. Indeed, construction of three-deckers in Worcester spanned most of the late Industrial period and continued into the Early Modern period.

Most three-deckers in the study unit were of frame construction, and the survivors display the full range of popular architectural ornament. There appears to have been an attempt to develop inexpensive, multifamily housing

that met the esthetic standards of the middle class. Rather than repeat the traditional forms of worker housing, promoters of the three-decker marketed a multifamily structure that resembled as much as possible the standard gable-end, single-family dwelling. The units within the three-decker were divided horizontally instead of vertically, as in the earlier multifamily structures. Each unit had a separate entrance, yet the overall effect was of a tall, single-family dwelling that, if well maintained, lent an air of middle-class respectability to the streetscape. In Worcester, entire three-decker neighborhoods survive in the southern and eastern sections of town.

Of particular interest is a brick row of Colonial Revival style units that appear to be three-deckers in Gardner. This unusual linking of three-deckers suggests a modification of the traditional multifamily worker housing form and material within the study unit.

A third multifamily building type, the apartment house, was introduced in the late 19th century. These structures were frequently architect-designed and were, therefore, not intended to be inexpensive worker housing in the traditional sense. The apartment houses were generally of brick construction and were located in upper middle-class neighborhoods. Late 19th century eclectic or Colonial Revival motifs were the predominant style of ornamentation. Examples of the apartment house were observed in the major cities: Fitchburg, Leominster, and Worcester.

Early Modern Period (1915-1940)

Single-Family Dwellings

Residential building activity declined overall in the study unit during the early 20th century. The greatest concentrations of period dwellings occurred

in and immediately outside the industrial centers established in the latter part of the 19th century, in particular in Athol, Dudley, Fitchburg, Gardner, Leominster, Milford, Northbridge, Warren, and Worcester. The standard 19th century gable-end house continued to be constructed, but on a smaller scale than previously. Significant numbers were noted in Gardner and Phillipston.

Forms and styles introduced in the study unit during the early years of the 20th century remained popular until ca. 1930. These consisted of the Four Square house and the Bungalow, as well as the popular gambrel-roofed Dutch Colonial style. Generally, Colonial Revival detail was applied to these structures; however, the Arts and Crafts movement had a modest impact on the ornamentation of some period houses.

Beginning about 1930, the one-story, gable-roofed, three-bay "box" with a central entrance appears to have become the most common identifiable house type. These houses tended to be clustered in developments located along major period transportation routes on the outskirts of the town centers and villages. Of framed construction, they were generally clad with weatherboards and displayed little or no architectural ornament.

High-style, architect-designed structures appear to have been restricted to a limited number of "revival style" dwellings usually found in or near the industrial centers. Federal, Tudor, and Spanish/Mediterranean revivals were the most popular, with combinations of brick, stucco, and wood most frequently employed.

Summer cottages reflecting the popular Colonial Revival and Bungalow styles were constructed around the lakes in the region during the first half of the period. These were generally frame buildings, although shingle and fieldstone were also popular building materials.

Multifamily Dwellings

No new forms of multifamily housing were developed during the period. Fitchburg, Leominster, and Worcester remained the major centers for the construction of three-deckers, by now adorned with Colonial Revival detail. In addition, traditional forms of gable-roofed multifamily units were built in significant numbers in Hopedale, Northbridge, and Warren during the early years of the period. Apartment houses continued to be found in the major cities of Central Massachusetts.

Institutional Architecture

Colonial Period (1675-1775)

Ecclesiastical Buildings

The Congregational meetinghouse was the most common type of institutional building constructed during the Colonial period. During the early stages of settlement, it was generally among the first, and certainly the most important, structure erected within a town, parish, or precinct. As the focus of the ecclesiastical, political, and social affairs of the town, the meetinghouse is more carefully documented than any other building type of the period.

A total of 73 meetinghouses were constructed in the study unit from 1668 to 1775, including a few that were under construction before the Revolution and were not completed until after the war. This figure includes those meetinghouses that were the second, third, and occasionally fourth and fifth such structures to be erected by a town during the period. Some of the earliest (17th century) meetinghouses were destroyed by Native American attacks, but the majority of rebuilding was probably called for by the increasing population. Forty-nine (65% of the total constructed for the period) were "first buildings," that is, the original meetinghouse built by the town, parish, or precinct. Twenty (27% of the total constructed) were "second buildings," four (5%) were "third buildings," and two (3%) were "fourth buildings" (in Lancaster and Mendon).

A total of six meetinghouses were built prior to 1700, the earliest of these the first Lancaster meetinghouse constructed between 1657-1658, four years after the town's incorporation. A second structure was built there ca. 1685 and was used until 1704, when it was burned in a native attack. Mendon erected its first meetinghouse in 1668, the year after its incorporation. This structure measured 22 feet square with a twelve-foot stud height, and is described in a 19th century history as having a roof gathered to a seven-foot square with a turret. This building was destroyed shortly after construction and was replaced in 1680 with a meetinghouse measuring 26x24 feet. In 1692, Mendon built its third meetinghouse, a 30-foot square building, which survived into the 18th century. The first Brookfield meetinghouse was built in 1675, two years after the town was incorporated. It too was destroyed by native attack and was not replaced until resettlement in 1715-1716. Of these three towns with pre-1700 meetinghouses, dimensions were available for only the three Mendon buildings. These increased in size with each building, an indication of population growth, but were smaller than the later, 18th century buildings.

Nine meetinghouses were constructed during the first quarter of the 18th century, primarily in the south and west of the region. Seven of these were "first buildings." The third Lancaster meetinghouse was raised in 1705 to replace the loss of the previous year, and the second Brookfield meetinghouse was constructed between 1715-1716. The remaining seven towns which built their first meetinghouses between 1700 and 1725 were: Oxford (1714-ca. 1720), Sutton (1715), Leicester (by 1719), Worcester (1719), Rutland (ca. 1720), Shrewsbury (1721), and Westborough (ca. 1720-1724; floor and pews were completed in 1724).

The first-quarter 18th century meetinghouses increased in size over the 17th century structures. The majority were rectangular in shape and generally 30x40 feet in size, affording 1,200 square feet. The largest was the Brookfield meetinghouse (45x35 feet). Rutland's is recorded as being 30 feet x 41 feet 1/2 inch, Shrewsbury's as 40x32 feet, and Sutton's as 40x36 feet, and Oxford's was 30 feet square. It is also the only building with a recorded stud height, eighteen feet, which contrasts significantly with the twelve-foot height of the 1668 Mendon meetinghouse. Few descriptions are given of these early meetinghouses. However, the buildings were usually of timber frame construction with gable roofs and were sheathed in clapboards. The 1719 Leicester building was unpainted and lacked a porch or belfry. The Sutton meetinghouse of 1715 is described as having "folding doors in front and single ones at each end" and as being "lighted by two small windows of diamond glass set in leaden sashes, at each side and end for the lower floor, and one window of the same fashion and size in each side and end for the gallery."

The greatest number of meetinghouses (33) were constructed during the second quarter of the century, reflecting expanded settlement in frontier areas of the study unit as well as continued population growth in established areas. Twenty-five "first building" meetinghouses were constructed, representing 76% of the total number built between 1725-1750. Aside from those erected for new towns, parishes, or precincts in the southern and eastern portions of the study unit, nine meetinghouses were erected in the northern and western sections: i.e., Lunenburg (1728-31), Townsend (1728-30), Petersham (1733-36), Westminster (1734), Athol (1735-41), Ashburnham (1739), Hardwick (1741-50), Leominster (1741-53), and Barre (1750-53).

This north and west area was regarded as the frontier until the mid 18th century, and exhibited a pattern of rapid replacement of meetinghouses during early years of settlement. The 1734 structure erected in Westminster, described as a house for "general use," was a log building with a stone chimney; it measured 22x16 feet with a seven-foot stud height. This was replaced four years later by a meetinghouse measuring 35x45 feet with a 20-foot stud height. The first Athol meetinghouse (1735-41) was built at the same time as the first Westminster building and is also recorded as having been a log structure. This building burned, apparently soon after it was completed, and a new meetinghouse was finished before 1750. The use of log for the first meetinghouses in Athol and Westminster may be characteristic of the construction methods employed in the first phase of settlement throughout the study unit. Hardwick also built two meetinghouses within a short period of time. The first dates from 1736-37 and the second was begun in 1741 and completed in 1749.

The size of second-quarter 18th century meetinghouses increased over those of the previous 25-year period. The meetinghouses appear to conform to two standard dimensions: 35x45 feet or 40x50 feet, providing 1,575 and 2,000 square feet respectively, a significant increase over those of the first quarter of the century. The stud heights ranged from 20 to 22 feet. With one exception, all meetinghouses built between 1725 and 1750 were rectangular. The second Oxford meetinghouse (1737-52) was square (50x50 feet), as was the first.

Most of the meetinghouses were completed within two to three years of the raising of the frame. Others took longer, but generally it appears that this extra period of time, often from nine to fifteen years, probably consisted of

finishing touches and quite possibly alterations to the original plan. The second Hardwick meetinghouse (1741-50) was apparently used for eight years before the walls were plastered. An exception to this is the Douglas meetinghouse of 1747 which was dedicated the following year, but according to records, not "completed" until 1789, a period of 42 years. Since the building was obviously in use the year after construction began, it is quite possible that, up until 1789, changes were continually being made to the structure which in retrospect were considered a part of "completing" the building.

The period 1750-75 saw slightly less meetinghouse construction. A total of 25 meetinghouses were built, only five less than that of the previous quarter. Fifty-four percent of these were "second," "third," or "fifth buildings." Of the thirteen "first buildings," five were in the developing northern and western frontier towns: Winchendon (1752-62), Templeton (1753-63), Royalston (1764), Fitchburg (1766), and Ashby (1770). Ten "second building" meetinghouses were constructed: Sutton (1751), Rutland (1759), Shrewsbury (1766), Sterling (1766), Upton (1770), Townsend (1771), Spencer (1771-72), Harvard (1773), Uxbridge (1773), and Leominster (1774). Hardwick built its third meetinghouse between 1769-70 and Mendon built its fifth meetinghouse in 1769.

The 1769 South Mendon meetinghouse (now located in Millville) is the most important of the Colonial period meetinghouses because it is the only intact survival. Known as the Chestnut Hill meetinghouse, it is a two-story, rectangular, timber-framed structure with a gable roof. The principal entrance is centered on the southeast five-bay facade. The door is framed by pilasters on rusticated bases which support a full entablature and pediment. The northeast entrance has a similar pedimented door. The northeast and

southwest gable ends are four bays wide. All windows are surmounted by unadorned wooden flat arches. On the interior, the pews and pulpit are cedar grained.

The only other 18th century meetinghouses which are known to survive are the Paxton meetinghouse (1765) and the Hubbardston meetinghouse (1767). The Paxton meetinghouse was moved and enlarged in 1835 and a spire was added. The building appears to have had subsequent significant alterations. The structure does not resemble an 18th century meetinghouse, but displays a projecting three-bay porch on the gable end which shelters a double entrance. The square tower and belfry with octagonal spire are obvious 19th-century additions. A porch and belfry were added to the original Hubbardston meetinghouse in 1806. The present appearance of the building is the result of extensive remodellings in 1842 and 1869.

While the size of third-quarter 18th century meetinghouses varied, all were at least 35x45 feet, and 40x50 feet appears to have been the standard size. Only one square building is known: the Hubbardston meetinghouse (1767) originally measured 45 feet square. The increased size of the meetinghouse as the 18th century progressed obviously reflects the growing population of the study unit throughout the latter portion of the Colonial period. The largest recorded meetinghouse is the Rutland building (1759), which measured 60x50 feet. The second Harvard meetinghouse of 1773 appears to have had the most elongated form, measuring 45x65 feet with a 27-foot stud height. Twenty to 24 feet appears to have been the average stud height for the third-quarter 18th century meetinghouses. Therefore the Harvard structure was an unusually long and tall building.

Most Colonial period meetinghouses appear not to have originally had towers. Although the Hardwick meetinghouse of 1769-70 is a possible

exception, it is not certain whether its tower is original. Towers were frequently added in the early 19th century when the principal entrance shifted to the gable end. The Harvard meetinghouse is described as having three small porches with a principal double entrance in the gable end. If this double gable end entry was original to the 1773 building, it would seem to be the first example among the recorded 18th century meetinghouses where the principal entrance shifted from the long side of the structure to the end. The New Braintree (1752-53), Princeton (1762-64), and Sterling (1766) meetinghouses had three entrances, and the Winchendon meetinghouse (1752-62) is thought to have had a porch entry on the long side. Many early Colonial period meetinghouses may have been unpainted. A 19th-century source describes two later period meetinghouses, Northborough (1745-56) and New Braintree (1752-53), as being a dingy yellow.

Very few dissenting religious denominations erected meetinghouses in the Colonial period. None are recorded before the second quarter of the 18th century, but a total of seven are recorded as having been built in the study unit before 1775. Baptist, Quaker, and New Light societies had substantial enough followings to erect their own structures. This occurred primarily in the southern portion of the study unit in the Blackstone Valley with the impetus from religious societies in Rhode Island. These meetinghouses were always located outside the town center away from the Congregational meetinghouses. In 1729, a Quaker meetinghouse was erected in Mendon which survived until the mid 19th century. The Quaker meetinghouse (ca. 1739-40) in Leicester measured 20x22 feet; the building was replaced with another meetinghouse and sold in 1791. The last meetinghouse of the period built by a dissenting society is the extant 1770 brick, gable-roofed Quaker

meetinghouse (29x34 feet) in Uxbridge. Although this structure originally had two adjacent entries, typical of Friends meetinghouses, it now has a single entry porch. A Baptist society was also organized in Leicester (1738) and by 1747 it had erected a meetinghouse. A Baptist meetinghouse was built in Sutton in 1750. The New Light church formed in Hardwick may have built a meetinghouse between 1740 and 1750. New Light leader Shadrach Ireland established a following in Harvard in the 1750s and built the so-called "Square House" in 1769, which later became the focus of a Shaker community during the Federal period. This building, now a private dwelling, is a two-story, five-bay, double chimney, double-pile plan with transverse summer beams in the two front rooms.

Educational Buildings

After meetinghouses, public schools were the most frequently constructed institutional buildings in the Colonial period. At least 94 are recorded for the Central Massachusetts study unit, but the actual number is probably greater. The establishment of a school was a legal requirement as soon as a town attained a population of 50 families, and some towns did not fulfill this requirement immediately. Early schools were frequently held in private residences, and these schools generally "moved" about the town from house to house during the year to accommodate the entire population more easily. The first school buildings built for that purpose were usually located in the center near the meetinghouse. As the population grew, the town was divided into school squadrons, later known as districts, and buildings were constructed for each district.

Only two schools were built prior to 1725: one in Brookfield (pre-1701) and the second in Mendon (by 1718). The great majority were constructed between 1725 and 1775, with the last 25 years being the most productive. A total of 25 schools were built during the second quarter. Most of these were in the center and were the town's sole school building. More than twice as many schools (67) were constructed between 1750 and 1775, and in addition to the large number of center schools, many of these were district schoolhouses. Only one period schoolhouse is known to survive. This is the 1729 center school in Auburn which has been moved, greatly altered, and is now a residence.

Of the recorded schoolhouses, dimensions are available for twelve, all of which are post-1725 structures. Most are rectangular, measuring on the average 16x20 feet, although three square buildings (16-feet, 18-feet, and 20-feet square) are also recorded. These dimensions generally increase throughout the period. The smallest recorded school (16 feet square), in Bolton, dates from 1760, while the next smallest (14x20 feet) dates from 1736 in Oxford, and the largest measured 20x26 feet (1770) in Hubbardston. Rather than increasing the size of the buildings beyond this, towns constructed additional schoolhouses which were more easily accessible from all sections of the town. Few descriptions of Colonial period school buildings survive. However, it would appear that most of the schools were gable-roofed structures. The early Oakham school buildings (1767) are said to have been log, opening up the possibility that others may have been as well, although clapboarded, timber-framed buildings are thought to have been more common. Several references are made to school buildings having stone chimneys.

Administrative and Service Buildings

During the Colonial period most communal activities were housed in towns' meetinghouses. In the shiretown of Worcester, additional administrative structures were required. The first county courthouse (1732) appears to have been a rectangular frame structure of residential proportions, now rebuilt as a private home. A second courthouse was built (1751). Very nearly as early came a jail (ca. 1732), also rebuilt at mid-century (1753). Near the end of the period several towns voted to construct workhouses for the poor, but it is not known whether they were completed, nor is their appearance known.

Federal Period (1775-1830)

Ecclesiastical Buildings

A total of 93 ecclesiastical structures were identified as having been built during the Federal period in Central Massachusetts. Sixty-eight percent of the towns in the study unit constructed some form of meetinghouse between 1775 and 1830. The only towns in which no Federal period ecclesiastical construction was identified are in the southeast: Northbridge, Shrewsbury, and Uxbridge. Slightly more than half of church buildings were traditional Congregational meetinghouses or houses of worship erected by the Congregational "splinter" societies, Unitarians or Evangelical Congregationalists (Orthodox). The remainder can be attributed to the increasing number of dissident religious denominations that evolved during the 19th century. Of the total ecclesiastical structures erected during the period, approximately 28% survive.

The religious split which in most towns resulted in the establishment of both a Unitarian and an Orthodox society did not occur in most Central Massachusetts towns until ca. 1820. Out of the 60% of the Congregational Church-related structures built in the period, the majority (62.5%) were traditional Congregational meetinghouses. These were for the most part erected during the last twelve years of the 18th century; the remainder were built in the early years of the 19th century, generally before 1810. Four of these were "first building" meetinghouses: Berlin (1779), Phillipston (ca. 1785), Gardner (1787-91), and West Boylston (1793). The majority (70%) were "second buildings" and their construction at this time probably reflected the need to replace the old meetinghouse, either because it was too small or because it required extensive repairs. Only two "third building" meetinghouses were identified, in Rutland and Sutton. Both of these were built in 1830 and replaced 18th-century, Colonial period meetinghouses of 1759 and 1757 respectively, which had burned. Their construction seems to have been unrelated to the Orthodox-Unitarian split. Only two "fourth buildings" were recorded: Brookfield rebuilt in 1794 because it required a larger structure, and Athol replaced its 1772-73 meetinghouse, which was also destroyed by fire in 1827-28. The only two "fifth buildings" occurred in Lancaster (1816) and Mendon (1820). Interestingly, both of these were architect-designed structures. While not erecting a new building, three towns remodelled their Colonial period meetinghouses so extensively during the Federal period that they warrant attention. Oxford (1793), Townsend (1804), and Upton (1820) all made major revisions in the design and/or size of their existing structures.

The Congregational "splinter" churches--i.e., Unitarian and Evangelical Congregational--were erected between 1819 and 1830. Fitchburg, which built

an Orthodox meetinghouse as early as 1805, was an exception. In all, 38% of the towns in the study unit erected meetinghouses as a result of the split in the traditional Congregational societies.

Of the period meetinghouses that may be categorized as dissident, the largest number were Baptist (21), followed by Methodist (9), then Universalist (4), Quaker (3), Episcopal (2), Shaker (1), and Jewish (1) structures comprising the remaining 10%. The number and geographic distribution of Baptist and Methodist meetinghouses increased significantly from the Colonial period. Both tended to cluster in groups of adjoining towns throughout the study unit, but their appearance is unknown. Three Quaker meetinghouses were identified in Mendon (now Blackstone, 1812), Leicester (1791), and Bolton (1799), but they too are unknown in appearance. Two Episcopal churches were built in Leicester (1824) and Sutton (1828), both of which survive, although the Sutton church is now used by another denomination. The Leicester church has a nave plan with a gable-end entry and displays traceried fanlights and Gothic trim. It is the oldest Episcopal church in the Central Massachusetts study unit. The Sutton church also has a gable-end, nave plan with a three-bay facade. A Jewish synagogue is documented as having been built in Leicester in 1777. The building is recorded as standing as late as 1839, although its original congregation apparently used it for only a brief period. The remains of a Shaker settlement in Harvard survive, including the 1769 structure erected by Shadrach Ireland and later taken over by the followers of Mother Ann Lee. Four Shaker buildings are recorded: a two-and-a-half-story, five-bay gable-end dormitory (ca. 1790), a one-story, three-bay center chimney plan (ca. 1800), a 1791 meetinghouse, and a much altered ca. 1795 two-story, five-bay structure.

Significant changes occurred during the Federal period in the orientation and plan of ecclesiastical buildings. These changes generally distinguish meetinghouses from churches. In a meetinghouse, the main entrance is on the long side with the pulpit opposite it, whereas in the church or nave plan, the entrance is found in the gable end of the building. After 1800, many groups built ecclesiastical structures on a church plan. However, most 19th century documents record all religious structures built before the official division of church and state (1830) as meetinghouses. Not until the Early Industrial period is the term "church" used to refer to a Congregational house of worship.

The majority of pre-1800 ecclesiastical structures erected in Central Massachusetts for which some description is available (either from documents or survivals) were built on the meetinghouse plan, while those built after 1800 generally conform to the "new" church plan. An illustration of this transition is recorded in the rebuilding of the 1759 Oxford meetinghouse in 1793. A 12-foot square porch with a tower and bell was added on the south side and the east and west entrances were closed, giving the building a modern plan. While this reorientation occurred slightly before 1800, it clearly illustrates the advent of the church plan.

In Townsend, the 1771 meetinghouse, which reportedly was never completed, was totally rebuilt on a new location in 1804. The evidence suggests that it was rebuilt on the old meetinghouse plan. Two things indicate this. First, the building's dimensions (45x60 feet) are the same as those of both the Gardner (1789-91) and Westminster (1788) meetinghouses, and very close to those of the Winchendon (50x60 feet) meetinghouse built in 1792, all of which employed meetinghouse plans. The records reveal that the Gardner meetinghouse was to be finished like the Westminster meetinghouse, and all

three towns are in close enough proximity that they might have imitated each other. Furthermore, when the Townsend meetinghouse was sold to the Methodists in 1852, it was reported that the west end was turned to the south, possibly indicating a shift to a gable-end entry.

Most of the gable-end church plans incorporated either a Doric or Ionic portico sheltering a symmetrical three-bay facade or a slightly advanced, pilastered vestibule with the three-bay fenestration. The facade could contain either two doors with a window between them or a single entry flanked by two windows. Some form of tower or cupola, frequently with a bell, was typical. Many congregations could not immediately afford a bell, and the documents often record the addition of a tower and bell. A particularly handsome meetinghouse example is that erected by the Orthodox society in Berlin in 1826. The gable-end structure has a three-bay vestibule with rounded-arch openings above which are semicircular blinds. A square tower with a domed cupola completes the building.

Elias Carter's meetinghouse designs are of particular interest. In conjunction with master builder Jonathan Cutting, he designed the Templeton meetinghouse of 1811. This structure subsequently underwent two remodellings in 1859 and 1897, the former executed by the firm of Boyden and Bell of Worcester. The present building displays a slightly advanced, and somewhat ill-proportioned, portico and a square tower with a two-staged spire. This porch and bell tower design is believed to have spawned a "run" of six geographically related and similarly designed meetinghouses erected between 1812 and 1823 in Troy (1812), Fitzwilliam (1816), Dublin (1818), Hancock (1819), Acworth (1821), and Newport and Jaffrey (1823), all in New Hampshire. The Milford meetinghouse of 1819 was also designed by Elias

Carter and was originally a three-bay, gable-end structure with a vestibule containing two entrances with semicircular fanlights above and a central Palladian window. The square tower terminated in a two-staged spire with a belfry. The building was enlarged and remodelled as well as moved back on its lot in 1867-68, and much of the sense of the original design has been lost. In addition, Carter was responsible for the 1820 Mendon meetinghouse which survives in a relatively unaltered form, resembling the original scheme of the Milford meetinghouse. The Mendon structure has a monumental Tuscan portico sheltering a three-bay, gable-end facade with a center entry and rounded-arch windows. This building also has a central Palladian window, a square tower (with quoins), and a two-staged spire with a belfry.

By far, the most famous of the region's Federal period meetinghouses is the Lancaster meetinghouse of 1816 designed by Charles Bullfinch. Cited as an "American masterpiece" by William H. Pierson, the building is noted for its clear lines, geometric forms, and the skillful handling of the vestibule, tower, and porch, the distinguishing elements in 19th century meetinghouse design. The use of brick combined with the lack of any ornament other than a simple Doric cornice tying the parts of the building together emphasizes the simple geometric forms. This is particularly evident in the portico with its rounded arches, which appear to be cut out of a solid plane, and the square tower rising from the rectangular vestibule and topped by the cylindrical cupola (1976: 268-81).

References to color schemes are rare in the Federal period, as they are for the previous period. The Ashburnham meetinghouse of 1791 was painted white, but the society had originally voted to paint it pea green. The Gardner meetinghouse (1787-91) was painted a stone color with green doors and white

trim. Relatively few brick meetinghouses were constructed and many of those seem to have been "splinter" or dissident structures, suggesting the possibility that despite changes in plan, wood was still the material of choice for ecclesiastical buildings.

Educational Buildings

Between 1775 and 1830 at least 71% of the towns in the study unit erected school buildings. Much of this construction consisted of repairs and/or replacements of Colonial period schoolhouses as well as the building of additional structures to serve the growing population. The district system remained in use throughout the period; and as in the Colonial period, rather than build larger schools as the population increased, more districts were created. It was not uncommon for a town during this period to undergo more than one redistricting (which generally necessitated additional buildings), evidenced by the average number of school buildings erected per town. While figures are not available for all of the towns, the average appears to have been seven schools per town, including the center schoolhouse. The numbers range from four to ten, a significant increase from the Colonial period.

Eleven period schoolhouses are known to survive, located in Auburn (1825, with Colonial Revival additions), Dudley (ca. 1825, district #3 building), Lancaster (1825-26, two-story, three-bay, brick gable-end structure with cupola), Oakham (1790, one-story brick gabled building and an 1828 brick structure raised to two stories in 1836; now a three-bay, side-passage plan with a pyramidal roof), Phillipston (1790?, one-story, frame, gable-end structure), Rutland (n.d., but five of the nine recorded schoolhouses survive as residences, a common fate of period structures), Sturbridge (1828, the west

district school, now a residence), Webster (1821, brick), Westborough (1810, four-bay, gabled building, now a residence), and Winchendon (1801, one-story, gable-end building).

As was the case in the Colonial period, the center schoolhouses tended to be somewhat larger than the district buildings. Of the six Federal period center school buildings with recorded dimensions, the smallest (and most common size) was 20 feet square, and the largest was 36 feet square. The 1792 Princeton center school (36 feet square), the post-1796 New Braintree center school (27x43 feet) and the 1828 Athol center school building all served as town halls as well, which likely accounts for the larger dimensions. District schools ranged in size from 14x20 feet to 20x24 feet.

Most of the period schoolhouses appear to have been frame structures with gable-end entry and about four bays deep. Brick was occasionally employed, but it was generally confined to the center schoolhouse, a use less common by the end of the period. An interesting exception is the 1790 brick district schoolhouse which survives in Oakham. The buildings usually had little ornamentation: one reference indicates that the Gardner district schools were improved in 1802 by the application of a coat of Spanish brown paint.

Aside from the public schools, several private schools, usually referred to as "academies" or "seminaries," were constructed during the period. Of the towns which built schools between 1775 and 1830 (71% of all the study unit towns), a quarter of these had private schools as well as public schools. The private schools were located in Athol, Boylston, Dudley, Gardner, Lancaster, Leicester, Milford, Northborough, Uxbridge, West Brookfield, and Westminster. In Athol, the 1828 town hall building also housed the Athol Academy. The original building of the Lancaster Academy survives; ca. 1828

the Academy took over the 1825-26 grammar school building, which is a two-story, three-bay, brick gable-end structure. In 1816, Amasa Nichols constructed the first building of the Nichols College in Dudley. The structure burned and was replaced the same year with a two-story structure displaying a cupola.

Administrative Buildings

Aside from meetinghouses, churches, and schools, the only other significant institutional building type to be erected during the Federal period was the town hall. The official separation of church and state did not take place in Massachusetts until 1830. However, eight towns in the study unit erected or remodelled buildings during the period which were specifically designated as town halls and were separate from the meetinghouse, often serving a dual purpose. With the exception of Princeton (1792), all eight were built between 1816 and 1830.

In 1823, Lancaster converted its 1743 meetinghouse into a town hall (following the construction of its fifth meetinghouse in 1816). Leominster did likewise in 1824 with its 1775 meetinghouse. In 1826, Leicester had a building used both as town hall and a bank. The fourth Athol meetinghouse (1827-28) later served as the town's first town hall. As mentioned elsewhere (see Educational Buildings), Princeton and New Braintree combined their center schoolhouses as town halls; the Princeton building was used exclusively as a town hall after 1810 until 1842.

The only two towns on record as having built a structure solely for use as a town hall are Boylston (1830) and Northborough (1821). The extant Boylston building is a two-story, gable-end granite structure with a definite Greek

Revival appearance. The Northborough town hall was a frame, gable-end building measuring 40x36x13 feet, with a vestibule and a gallery.

The only other administrative building type identified during the period is an 1830 engine house in Spencer, no longer extant.

Early Industrial Period (1830-1870)

Ecclesiastical Buildings

Compared with previous periods, there was a much greater diversity of denominations during in the Early Industrial period. Significant numbers of Baptists and Methodist churches began to appear throughout the study unit. Roman Catholic mission churches were established by 1850 in industrial towns, and frequently an existing building (often an abandoned Baptist or Methodist church) was converted to use as a Catholic chapel or church before the parish could afford construction of a new building. Universalist and Unitarian churches also increased in number during the period.

During the Early Industrial period, the one-story, three-bay, gable-end, center-entry nave plan became the standard form for all ecclesiastical buildings. The Greek Revival style remained popular throughout much of the period. These buildings generally had a Doric portico, either advanced, in antis, or with a pilastered facade. A square tower, usually surmounted by a spire, was common to most churches. Post-1860 structures began to reflect the influence of Romanesque and Italianate architecture, with quoins, rustication, rounded-arch openings, and other influences. Most churches were of frame construction, although brick was used occasionally.

The Gothic Revival was restricted primarily to the few Episcopal and Roman Catholic churches erected during the period. Episcopal churches are recorded as having been built in Millville (1849), Oxford (1864), Fitchburg (1868), and Webster (1870). The Webster and Fitchburg buildings are attributed to Richard Upjohn, the Fitchburg church being of granite construction and the Webster church of frame board and batten.

Educational Buildings

District schools continued to be built in most towns throughout the study unit. These were generally one-story, frame, gable-end entry structures. Brick schoolhouses were not uncommon, particularly in the town center where the school building was often two stories in height. Most of these structures had little stylistic ornament, but simple Greek Revival or Italianate trim was occasionally employed in the form of facade pilasters or brackets at the cornice.

Seminaries or private academies established during the period were generally short-lived. Private institutions which were founded and erected buildings during the period were located in Berlin, Millbury, Townsend, and Winchendon. Like the public district schools, these appear to have been gable-end entry structures.

Only a limited number of towns erected buildings solely for use as public high schools during the period. High school buildings are recorded in Athol (1856), Clinton (1854), Fitchburg (1869), Grafton (1850), and Leominster (1865). With the exception of Grafton, it would appear that the need for a separate high school building occurred primarily in larger cities in the study unit. The gable-end entry remained the standard form whether the building was Greek Revival, Italianate, Second Empire, or Victorian Gothic in feeling.

The survival rate for school buildings of the Early Industrial period is poor, because they were generally replaced, abandoned, or converted to other uses when the district school system was eventually abolished. Some of the early period structures survive as private residences.

Administrative Buildings

Although a few towns built independent town halls in the late Federal period, the majority first erected town halls in the Early Industrial period. Like the churches and schools, these were generally gable-end, three-bay structures with either Greek Revival or, later in the period, Italianate trim. Often the town hall and center school shared the same building. In other cases, the meetinghouse was altered by the addition of a second story and continued to serve both functions, although in separate spaces within the structure. Town halls are recorded for the period in Ashburnham (1838), Barre (1838), Berlin (1870), Blackstone (1845), Fitchburg (1852), Gardner (1860), Hardwick (1838), Lancaster (1848), Leicester (1855), Leominster (1851), Lunenburg (1839), Milford (1853), North Brookfield (1864), Petersham (1850), Princeton (1842), Royalston (1841 and 1867), Southbridge (1838), Sturbridge (1838), Templeton (1843), Webster (1855), West Brookfield (1859), Westminster (1839), and Winchendon (ca. 1850). The majority were of frame construction; however, brick was used in Fitchburg, Lancaster, Milford (first structure), Southbridge, Webster, and Winchendon. The third courthouse in Worcester, designed by Ammi B. Young, was a granite Greek Revival structure.

While library societies were formed in many towns during the period, few buildings were constructed solely for the purpose of housing a public collection of books. Lancaster built a war memorial building in 1868 which served as the

town library. The two-story brick structure is a Renaissance Revival design with a cross-gable roof.

Fire houses, frequently referred to as engine houses, were constructed beginning in the 1830s. They were apparently frame, one-story structures, and many do not survive. Engine houses are recorded in Grafton, Millbury, and Sturbridge.

Late Industrial Period (1870-1915)

Ecclesiastical Buildings

Churches continued to form a large proportion of the institutional buildings erected in the study unit during the late 19th and early 20th centuries. An increasing number of Roman Catholic churches were built during the period, particularly in the urban centers, and "new" denominations such as Second Adventists and Swedenborgians also erected churches. In some towns, the old Federal period meetinghouse was remodelled or replaced, often as the result of a fire. The former meetinghouse was generally replaced by a Congregational, Unitarian, or Federated church.

The gable-end facade remained the popular form for churches of all denominations early in the period. Frequently a side or corner tower containing the entrance to the nave plan structure was added to the traditional form. Both wood and masonry were employed in the construction of churches, although stone, brick, or stucco buildings were generally restricted to the larger cities. Popular styles for period churches were the Victorian Gothic, Queen Anne, Shingle, Stick, and Romanesque Revival. The latter was almost always associated with brick construction. The Gothic Revival remained

popular into the early years of the 20th century, frequently in high-style structures of brick or stone with buttresses, clerestory windows and side aisles, and often associated with Catholic parishes. The Colonial and Classical Revival styles characterized churches of the latter portion of the period, particularly Federated churches and rural Protestant denominations. Episcopal churches tended toward the "English Gothic" or shingled Arts and Crafts movement designs. Synagogues appeared for the first time during the early years of the 20th century and were frequently classically detailed structures.

The Douglas camp meeting ground is a significant complex of small "Victorian" cottages, a frame dining hall, tabernacle, chapel, and office. The campground is still active. A similar campground in Sterling dating from the 1880s survives largely intact, although it is no longer a religious center.

Educational Buildings

With the abolition of the district system and the increase in population in the major industrial centers, the number of schools erected rose significantly during the period. High schools, which had been relatively scarce in the Early Industrial period, became much more common. In larger cities, such as Worcester or Fitchburg, the number of neighborhood public graded schools rose steadily during the last two decades of the 19th century. In less populated areas, consolidated schools were built during the early portion of the 20th century. Several private schools and academies were built during the period as well. The majority of extant school buildings in the study unit date from the Late Industrial period.

While small, gable-end frame rural schools continued to be built during the first part of the period, a significant change occurred in the design of school buildings in the more populated towns and cities of the study unit. The most popular styles appear to have been the Romanesque and Colonial Revival. Schools were often two-story, square, hipped roof blocks with Romanesque or classical detailing and frequently of brick construction.

The Cushing Academy in Ashburnham is a complex containing an 1875 Victorian Gothic brick structure with several later buildings in the Colonial Revival style. The Lyman Academy in Ashby is a ca. 1910 two-story brick Colonial Revival structure. The Observatory and Library and a brick, Queen Anne dormitory of 1885 are the earliest surviving structures on the Nichols Academy campus in Dudley. St. Mark's, a private boys' school in Southborough, is housed in a handsome Tudor Revival complex.

Administrative and Service Buildings

At least one third of the towns in the study unit constructed a town hall during the period. The concept of a town hall that was separate from the old meetinghouse was relatively new at the end of the Early Industrial period. Many towns continued to house their administrative offices in the Congregational church (former meetinghouse) well into the Late Industrial period. In some towns, a memorial hall was constructed following the Civil War which housed not only the town offices, but a public library and high school classrooms as well. Popular styles of the period, ranging from modest frame, gable-end structures with Queen Anne or Stick Style trim to elaborate Victorian Gothic, Romanesque and Colonial Revival designs in brick or stone were built from the 1870s through the end of the period. Many of these structures remain in use today.

At least one half of the towns in the study unit constructed a public library building during the Late Industrial period. Library societies had been established prior to 1870, but it was not until the fourth quarter of the century that public, and frequently private, monies were allocated to the building of libraries. Many were one-story buildings constructed of stone or brick and prominently located in the town center. A significant number of period structures survive. The majority were erected from the mid 1880s through the end of the period. Those few built before 1880 (in Clinton, 1873, and Hubbardston, 1874) tended to reflect Italianate influence. The remaining 19th century libraries display the full range of popular architectural styles: brick Victorian Gothic and Romanesque and fieldstone Arts and Crafts. The early 20th century libraries were generally Colonial Revival or Neoclassical in design. A typical early 20th century library was of brick, one story in height, with a three-bay facade, hipped roof, and classical detailing.

Fire stations, or engine houses, were recorded in the study unit from the first portion of the Early Industrial period. However few of the early structures survive. The need for adequate fire protection increased as the century progressed and the population grew, resulting in denser construction in urban areas. Several handsome period fire stations survive in Clinton, Gardner, Lancaster, Rutland, Southbridge, Southborough, Spencer, Sutton, and Townsend, as well as numerous neighborhood structures in the major cities: i.e., Fitchburg, Leominster, and Worcester. Many were of brick, and most date from the late 1870s, with a significant number having been erected during the 1880s and 1890s in popular Queen Anne, Romanesque, and Colonial Revival designs. A granite structure laid in alternating courses of narrow and wide blocks of stone remains in Sutton and echoes the similar design of Blackstone Valley industrial buildings.

Post office buildings constructed during the period were generally one-story Colonial Revival brick structures. Typical is the 1904 post office in Fitchburg designed by federal architect James Knox Taylor.

Several hospitals were established during the period. The Worcester Hospital for the Insane was built between 1873 and 1876 and is a Victorian Gothic complex situated on a hillside. The Gardner State Colony for the Insane, a Renaissance Revival complex, was also constructed during the period. A complex of Queen Anne and Romanesque buildings were erected in Templeton in 1882 as the Hospital Cottages for Children. The Westborough State Hospital was established in 1884. Four three-story brick buildings with corbelled brickwork survive from the period. Several tuberculosis sanatoria were built during the period in Rutland. One modest Colonial Revival complex remains as a juvenile correction center. A two-story, five-bay frame hipped roof hospital building in Clinton dates from 1892. Berlin retains a two-story, hipped roof, fieldstone, crippled children's home.

Early Modern Period (1915-1940)

Ecclesiastical Buildings

Church construction during the period was limited primarily to the erection of churches by the "immigrant denominations": Finnish/Lutheran churches, Roman Catholic churches and convents, and Second Advent churches. In addition, several Federated churches were built during the early years of the period. In a few instances, a new Congregational, Unitarian, or Federated church was built to replace a 19th century structure destroyed by

fire. They usually embodied the form, materials, and detail of early 19th century, classical meetinghouses, often replicating the original. The Lutheran and Second Adventist churches were generally modest, frame structures reflecting either Gothic or Arts and Crafts influences.

The Roman Catholic churches of the period tended to be built in the industrial centers and were frequently of masonry construction in the NeoGothic, Romanesque, Tuscan, or Byzantine style. Occasionally, the church, a convent, and school formed an impressive complex of buildings serving as the focal point of an Irish or French-Canadian neighborhood.

Educational Buildings

Construction of schools during the Early Modern period was generally confined to the erection of public high schools, although some towns continued to require new graded schools to serve the growing population or to replace outmoded structures. Private schools built during the period were usually associated with a Roman Catholic parish and were frequently part of a parochial complex. Most of the period school buildings were constructed during the 1920s of brick in a modest Colonial Revival or Neoclassical style and were two stories in height. A few later examples of Art Deco- or Art Moderne-influenced schools survive (an Art Deco high school in Athol and a 1938 Art Moderne high school in Fitchburg).

Administrative and Service Buildings

Very little administrative and service construction occurred in this period. The most significant structures erected were town and/or city halls. Town halls were built during the period in Athol (1930), Leicester (1939),

Spencer (1940), Webster (1926-28), and Westborough (1929). Gardner constructed a city hall between 1938 and 1940. All were Classical Revival structures with brick being the common building material.

Public libraries in Berlin, Grafton, Leicester, and Webster were built in the Early Modern period. Most were one-story, symmetrical brick structures, frequently with hipped roofs, and displayed Georgian or Classical Revival detail. The majority date from the 1920s.

Three hospitals were constructed during the period in Grafton, Holden, and Rutland. These structures, or as in the case of Grafton and Rutland, complexes, were utilitarian structures displaying the influence of the 1920s Colonial Revival and Bungalow styles.

Police stations were built in Grafton and Worcester. The Grafton station is a brick Colonial Revival structure, and the Waldo Street Police Station in Worcester is a handsome Renaissance Revival building.

Post offices were built in Southbridge (1928) and Millbury (1930s). The Southbridge structure, designed by James Wetmore, is a one-story, Colonial Revival brick building.

Old Sturbridge Village, a private museum featuring a collection of furnished structures from the late 18th and early 19th centuries arranged to reflect lifestyles of that period, was established in the 1930s.

Economic Architecture

Colonial Period (1675-1775)

Mercantile Buildings

Mercantile buildings in the Colonial period consisted solely of stores and comprised a small percentage of the economic structures which existed at various times between 1675 and 1775. Very little information is available about these establishments, and like the taverns and inns of the period, the Colonial mercantile structures probably embodied the typical center chimney residential form. It is also likely that these stores actually operated from within homes, comprising a single room of the house.

The earliest recorded mercantile building is a "trucking house" in Lancaster (1643). Two stores are recorded during the first quarter of the 18th century and both were located in Harvard, then a part of Lancaster. Five stores are recorded for the second quarter of the century and four for the later period from 1750 to 1775. Two stores were located in both Shrewsbury and Uxbridge around the mid-century and one in Grafton as early as 1733-34, just prior to its separation from Sutton. All of these were situated in eastern and southern towns which were settled early in the period.

The four stores from the third quarter of the 18th century were also located along the eastern edge of the study unit in Harvard (n.d.), Westborough (ca. 1775), and possibly one in Sterling by the end of the period.

Transportation-Related Buildings

The only transportation-related structures recorded for the Colonial period are taverns and inns. A minimum of forty such establishments are recorded. A great many more must have been in operation; however, taverns and inns seem to have passed in and out of existence throughout the period, and the 19th century sources are not specific in most cases concerning the existence of these structures. Generally, the terms "tavern" and "inn" seem to have been used interchangeably, although some sources record both types. It is uncertain whether there actually was a difference between them--i.e., a tavern as primarily an establishment catering more to the local population which provided food and drink with some lodging accommodations, versus an inn which served primarily as a place of lodging for travellers and necessarily provided food and drink. The center chimney form appears to have been standard for all Colonial period taverns and inns.

Six taverns and inns are recorded for the first quarter of the 18th century, eighteen for the second, and twenty for the third. The earliest structures are again found in the established sections along the eastern border of the study unit: Bolton (1718), Harvard (1718-26), Lancaster (1721), Sterling (ca. 1720), and Westborough (ca. 1719). Of these, the Amsden-Gale tavern in Westborough is the only survivor. Originally, the structure probably resembled a typical period center chimney house of two stories and five bays in width. The building now has exterior end chimneys.

By the second quarter of the 18th century, the building of taverns and inns had extended to Ashburnham (1733), Petersham (ref. 1733), Townsend (n.d.), and West Brookfield (mid-century), and had increased in the eastern and southern sections of the county. Some of these structures survived well into

the 19th century; the Townsend tavern existed until 1883. All appear to have been two-story, center chimney structures.

During the third quarter of the century, additional taverns and inns were built in Charlton (1775), Fitchburg (1761), Paxton (1765), Princeton (1765), Royalston (1762), Sturbridge (1772), Templeton (1763), and Westminster (1774), as well as in the previously settled, more densely populated towns. Three of the late period structures are known to survive: the 1763 Abbott Tavern in Holden, the much-altered 1765 Drury Inn in Auburn, and the 1772 Public House in Sturbridge.

Industrial Buildings

Few industrial buildings are known to exist from the Colonial period in Central Massachusetts. The earliest appear to have been small, frame structures which, it is assumed, were not substantial enough to survive into the 20th century. Those sites which were prosperous and subsequently developed on a larger scale in later periods generally do not retain the earlier structures.

Saw and grist mills were the most common industrial form constructed during the period. Pre-1700 saw and grist mills operated in Mendon and Lancaster. Later, 18th century industrial building types included cider mills, clothiers and fulling mills, tanneries, and coopers and blacksmith shops. Slate and lime quarries as well as brick yards are also recorded in several towns by the end of the period. These were all apparently small-scale operations. The Willard family clock manufacturing enterprise in Grafton dates to 1766; this house and shop site has been restored (see **Residential** section).

Federal Period (1775-1830)

Mercantile Buildings

As in the Colonial period, mercantile buildings comprised a small percentage of the total commercial buildings recorded as having been built or operated between 1775 and 1830. Twenty-seven stores, one bank, and a small and indeterminate number of "shops" were identified. Only six such structures are known to survive, all stores. These are located in Auburn (fourth-quarter 18th century, altered in the 20th century), Grafton (1806, Green Store), New Braintree (1816), Princeton (n.d.), Westborough (ca. 1800), and Westminster (1829).

Like the inns and taverns of the period, the mercantile buildings generally assumed the form of a residential structure. Some, like the ca. 1800 house/store at Wessonville in Westborough, were simply a one- or two-bay extension of the house form to accommodate the store. Brick was occasionally employed, as in the 1816 two-story, hipped roof structure in New Braintree. This 60 x 30-foot store is laid in Flemish bond brick on the principal facade.

Transportation Buildings

Taverns and inns continue to be the only transportation-related buildings recorded for the Federal period. By the end of the period, the term "hotel" was frequently used by contemporary historians to describe places offering food and lodging to travellers. Over 50 have been identified as period constructions; however, many more are likely to have existed. Taverns, inns,

or hotels were erected in over half the towns in the study unit, with some towns having more than one by the end of the period.

Nine survivals have been identified. These are located in Bolton (1800-10, now headquarters for the Bolton Historical Society), Boylston (1818), Brookfield (n.d.), Charlton (1797), Dudley (1804), Grafton (1805), Holden (1939 rebuilding of an 1812 structure), Paxton (n.d.), and Westborough (ca. 1800).

As in the Colonial period, the form of these structures resembled that of the traditional dwelling. Most were one-and-a-half to two stories in height with either center or double chimneys. Frequently, the building was larger than the common five-bay house, extending anywhere from six to nine bays in width. A fairly common example was the Wetherbee Tavern in Harvard (ca. 1800), a two-story, seven-bay, hipped roof structure which, from the exterior, appears to have been a standard five-bay, center chimney form with an additional two bays added to one gable end. A second chimney was located between the five-bay block and the "extra" two bays, which might be interpreted as an "end wall" chimney serving both "sections." A similar example was a 1795 tavern in Ashby which exhibited an eight-bay facade which appears to have been a five-bay, double chimney form with three additional bays. Any time the structure was more than five bays wide, it would seem that two interior chimneys were employed.

Among the surviving period taverns, two are especially worthy of note. The 1797 Rider Inn in Charlton is a two-and-a-half-story, nine-bay, gabled structure. At one time, prior to the raising of the roof in 1833, the inn boasted a roof garden. Evidence of such construction is visible in the attic timbers.

The 1805 Grafton Inn is a three-story, five-bay, hipped roof building with monitor cubic block. The building exhibits both double and end wall chimneys,

the latter in brick walls. The center three bays form a projecting pedimented pavillion. The Italianate porch is a late 19th century addition. The details and treatment of the facade bring to mind the work of Charles Bulfinch and Asher Benjamin.

Industrial Buildings

As was true of the Colonial period, few industrial buildings survive from the years between 1775-1830. Those sites that prospered into the late 19th century generally did not retain early structures. Nevertheless, an increasing number of water privileges were developed, and the number and geographic distribution of industrial structures increased significantly during the Federal period.

The textile industry was well developed by the end of the period and shoe and boot manufacturing and its related interests took second place to textiles. Saw and grist mills continued to be common throughout the study unit.

The survivor of a late 18th century comb factory in Clinton (then Lancaster) is a 1790s two-story, six-bay frame structure. The Dudley Shuttle factory, a gable-end, two-story frame structure with late 19th century additions, survives in Sutton. Also in Sutton is a one-story granite mill building laid in courses of alternating narrow and wide blocks.

Early Industrial Period (1830-1870)

Mercantile Buildings

Early period commercial buildings have a relatively poor survival rate as they generally have been replaced by later 19th century development or

converted to other uses if they have survived. The most common commercial structures recorded from the early portion of the period were general stores, usually of frame construction with a gable-end entry. One of the earliest surviving stores in the study unit is the Jencks Store in Douglas, an 1833, two-story, eight-bay, gable-roofed structure with a flushboard facade and a full, two-story portico. Later in the period, multibay Italianate blocks of frame and brick began to be erected in some of the larger town centers. Banks were established during the period and were generally housed in one-story, brick structures, presumably for purposes of security and fire protection.

Transportation Buildings

Hotels replaced taverns and are recorded in most towns throughout the period, although few survive intact. Descriptions of the original buildings are often lacking, but gable-end as well as gable-roofed structures in the Greek Revival and Italianate styles are known. With the advent of the railroad, frame, gabled depots were built. However, few of these early depots survive.

Industrial Buildings

Frame, brick, and granite mill buildings were constructed in many towns in the study unit beginning in 1830. Douglas, Sutton, and Webster retain examples of the unique narrow and wide alternating courses of granite blocks in many of the period mills. Most early mills appear to have been anywhere from two to four stories in height. Some early structures were of frame, but by mid century brick was generally the common building material. Industrial histories reveal the burning and rebuilding of mills throughout the period.

Most structures were gable-roofed with side towers. Several displayed clerestory windows.

Late Industrial Period (1870-1915)

Mercantile Buildings

The Late Industrial period represents an era of significant commercial development in the growing industrial centers in the study unit. In these towns, two- and three-story brick commercial blocks were being erected by the 1870s in the prevailing Italianate and Second Empire styles. By the 1880s Romanesque, Renaissance Revival, and Victorian Gothic detailing was applied to brick and stone commercial blocks ranging anywhere from two to five stories in height. Large plate glass windows provided merchants storefronts in which to display their merchandise. Many of these were mail-order cast iron storefronts which could be applied to the existing masonry facade. Athol, Clinton, Fitchburg, Gardner, Leominster, Milford, and Worcester all had well developed commercial centers by the end of the century. By the 1890s in Worcester, multistory skyscrapers with classical detailing were beginning to replace the traditional commercial rows of the early portion of the period. One-story buildings with little or no architectural detail and large plate glass display windows were typical of the small-scale commercial development or infill in the latter portion of the period.

In the smaller, less developed town centers, such high-style designs were rare. Both frame and brick were employed in constructing mercantile buildings. Some small, rural towns such as Harvard retain only a gable-end, frame general store as evidence of the commercial activity, or lack of it, in the period.

Transportation Buildings

Railroad depots and hotels comprise the majority of transportation-related commercial buildings erected in the period. Depots ranged in style from frame, gabled structures with bracketted eaves and Stick Style trim to elaborate, hipped roof Arts and Crafts and Romanesque buildings of brick, granite, and sandstone construction.

Records of Italianate, Victorian Gothic, and Queen Anne structures reveal that most towns in the study unit either built or remodelled existing hotels during the late 19th century, although few remain intact. Many of the large Shingle Style and Queen Anne hotels in the rural areas are no longer extant. Princeton and Rutland were both popular summer resort areas and boasted several such hotels, none of which survive today. A 1901 shingled hotel in Charlton now serves as a Masonic Home.

Industrial Buildings

The expanding industrial development is reflected in the construction of mill buildings in most of the manufacturing towns in the study unit during the period. Significant construction occurred in Barre, Clinton, Dudley, Fitchburg, Hardwick, Hopedale, Leominster, Millville, Northbridge, Southbridge, Upton, Warren, and Worcester. Period industrial buildings also remain in Berlin, Gardner, Grafton, Royalston, Sutton, and Townsend. Most mill buildings were of brick construction by the late 19th century. Early period structures often reflected Italianate or Second Empire influences, while later 19th century mills and factories were more utilitarian in appearance, with an increase in window space and less masonry in the 20th century structures. Corbelled brickwork, pilaster strips, towers, and clerestories characterize the late 19th century buildings. Construction appears to have slowed by the early 20th

century, and much of the building activity consisted then of small additions to existing mill complexes.

The South Barre mills were rebuilt in 1903 following a fire. In Dudley, the Stevens Mills continued to expand into the 20th century with the addition of brick wings to the existing structures. Gilbertville in Hardwick retains three- and four-story brick mills with segmental arched windows and bracketted cornices. Major construction occurred throughout the period at Hopedale. Italianate and Second Empire detailed brick mills there date from the 1880s. Later mills display clerestories and cupolas. Handsome, pressed brick mills with glazed brick banding also survive. The Whitinsville mills in Northbridge continued to expand. The brick Queen Anne Knowlton Hat Factory in Upton also survives.

Early Modern Period (1915-1940)

Mercantile Buildings

The "traditional" commercial buildings of the period tend to be concentrated in the major urban centers. Worcester retains a significant number of Art Deco commercial structures from the 1920s and 1930s. Also typical of the period are Neoclassical or Colonial Revival style structures (banks, office buildings, department stores) displaying restrained ornamentation. Low, one-story brick structures with large expanses of plate glass were also constructed.

Transportation Buildings

New developments in commercial architecture which characterize the period are related to the advent of the automobile and include gas stations,

diners, and motels. Gas stations range from unadorned cinder block buildings to the Colonial Revival structure still standing in Clinton. Diners, reflecting the streamlined tastes of the Art Moderne era, are found primarily in the urban centers and along major transportation routes. Modestly detailed "colonial" motel courts, generally small-scale, one-story complexes, are likewise found along the major transportation routes of the period.

Industrial Buildings

No significant new construction appears to have occurred during the period. Additions were made to existing mill complexes and a limited amount of small-scale new construction was observed in Auburn, Holden, Warren, and West Brookfield. Brick was the common building material, and if the new structures displayed any architectural ornament, it was generally a restrained interpretation of classical detailing.

Architects of the Region

The first reference to builders occurs in the records of the meetinghouses built in the third quarter of the 18th century. Daniel Hemenway is recorded as the builder of the Shrewsbury meetinghouse (1766), and Daniel Baldwin is cited as the builder of the Spencer meetinghouse (1771-72).

A number of architects began practice in the study unit during the Early Industrial period. In addition to builder/architect Elias Carter, Elbridge Boyden and Edwin T. Lamb, both of Worcester, became popular during the period. The remaining majority of regional architects did not become

established until the Late Industrial period. Most of the known architect-designed buildings are institutional structures, although some residences and mills are known to have been the work of regional architects.

At least 23 regional architects are known to have been working in the study unit by 1890, and this figure jumped to 61 by the end of the period. As in the Early Industrial period, their work, outside Worcester, is mostly associated with public and private institutional buildings, especially churches and schools. Among the best known Worcester architects of the period were: Elbridge Boyden (Boyden & Sons), Stephen C. Earle (a former student of Boyden and of Calvert Vaux), James Fuller (Fuller & Earle, 1867-1896; Fuller & Delano, 1879-1901), Amos P. Cuttin (1867-1896), Albert Barber (Barber & Nourse, 1880-1905), and John B. Woodworth (1877-1893). In addition, some Boston architects were also employed in the study unit: Peabody & Stearns, Robert Allen Cooke, Edwin J. Lewis, Jr., J. Williams Beal, Chapman & Frazer, Walter & Kimball, Thomas W. Silloway, and R. Clipston Sturgis. Henry M. Francis was a popular period architect noted for his churches and schools in Fitchburg. The work of noted church architect Richard Upjohn is recorded in his designs for Episcopal churches in Fitchburg and Webster. Finally, the work of English church architect Henry Vaughan is revealed in the design for St. Paul's Episcopal Church, Gardner.

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CHAPTER 5
ECONOMIC AND INDUSTRIAL DEVELOPMENT

Myron Stachiw

Introduction

The following twelve essays are discussions of several of the more important industries in the Central Massachusetts study unit. They briefly describe the growth, development, and decline of the industries; their geographic distribution throughout the study unit; and where possible, their relationship to other industries. The major focus of the essays is the 19th century, when most of the industries experienced the important transformations from "cottage" to "factory" stages of manufacture, and in many cases, achieved regional, national, or international prominence. The 20th century saw serious decline in many of the region's industries, while others continued to expand through leadership in the development of new technology and production processes. The pre-1800 period is briefly discussed in the essays on extractive industries and agriculture.

Two of the essays deal with subjects rarely integrated into discussions of economic and industrial development: Agriculture and Homework, or "putting out" work. The Central Massachusetts study unit was the leading agricultural region of the Commonwealth in the 19th century, as well as an important industrial area. The two economic activities are closely related, as agricultural prosperity depended on the availability of adequate markets for

the products of the region's farms; the discussion of one without the other is incomplete.

Homework, or putting out industries, such as the sewing and bottoming of boots and shoes, braiding and sewing of straw and palm-leaf hats, sewing of clothing, caning and painting of chairs, etc., were important components of the region's maturing economy. During the first three quarters of the 19th century, thousands of men, women, and children were employed in their home workshops in what was a significant stage in the development of all the region's major industries. Putting out industries furthered the elaboration of extensive market networks and extended commercial activity into rural households during the opening decades of the 19th century. They allowed the large number of home workers to participate in production for a wider market and the new economic relations it brought without the rapid physical or social dislocations which often accompanied manufacturing activity. It is particularly important to identify this extremely widespread process, since, by the fact of its adaptability to available space and time, it has left virtually no physical remains on the landscape other than the occasional "ten footer" or small shoe shop.

This survey of economic and industrial development is certainly incomplete; numerous other industries which contributed to the region's economy have been omitted. The following concepts underlie the choices made:

- a. frequency of encounter;
- b. importance in the development of an individual town or subregion of the study unit;
- c. hitherto undervalued importance;
- d. importance of the Central Massachusetts study unit development to the national industry;
- e. relationship of the activity to particular stages of economic development.

Extractive Industries

Until the development of factory-organized manufacturing and the introduction of the extensive system of home production of sale goods in the late 18th and early 19th centuries, the majority of the region's population was involved in activities that can be loosely classed under the category of extractive industries. These include: agriculture and its many products (see essay on Agriculture); forest products such as timber, potash and pearlash, charcoal, and bark--the major byproducts of land-clearing activity; and mining of clay for bricks and pottery, bog ore for iron-making, and stone for roofing and building materials.

One of the few agricultural products that could be classed as a cash crop during this period was flaxseed. Though encouraged by bounties in many towns throughout the 17th and 18th centuries, it was not until the 1780s that an increased trade with Ireland stimulated a large trade in flaxseed. The Worcester County towns of Barre, Royalston, Millbury, Lancaster, Lunenburg, and New Braintree were particularly active in the trade. Many towns also operated oil mills, where seed was pressed for linseed oil.

Important products of the agricultural towns, especially of the younger towns whose farmers were particularly in need of marketable products while establishing their farms, were potash, pearlash, charcoal, and bark. Potash was produced by burning wood, something a new farm had large quantities of, passing water over the ashes to produce lye, and boiling the lye down until it

evaporated, leaving a residue. Pearlash was produced by further heating the potash until the impurities burned off. Both potash and pearlash were important ingredients in soap and glass making, as well as in many medicines. Small in bulk but highly valued, potash and pearlash were easily transported to ports where they could be sold for export at any time. Nearly every town had several potash and pearlash works during the 18th century. Their disappearance by the early 19th century usually signalled the end of extensive land clearing in the agricultural towns.

Another byproduct of land clearing that was easily marketable was charcoal. Bread and biscuit bakers, blacksmiths, pig iron foundries, forges, gunpowder manufacturers, and blast furnaces needed great quantities of fuel, largely charcoal. Like potash works, there are usually no above-ground survivals from charcoal burning; however, both types of works might be identifiable archaeologically. Occasional survivals are place names, such as Coal Kiln Road in Princeton, the site of a charcoal kiln in 1870.

The tannery was another outlet for forest products. Bark from sumac, chestnut, oak, and hemlock were especially desired by tanners for the processing of hides and skins.

Mining was carried on to a limited extent during the 17th and 18th centuries within the study unit. One of the earliest operations was the graphite mine in Sturbridge, operated periodically from the 17th to the early 20th century. Bog iron ore was found in the western, eastern, and southern portions of the study unit and supplied the iron furnaces erected in those areas during the 18th century (see essay on Primary Iron manufacture). As early as the 1750s, slate was quarried in Lancaster for roof tiles and for gravestones. In neighboring Bolton, limestone was discovered in the 1730s and fired in kilns to produce lime; in Bolton this continued until the early 19th century.

This was the second limestone deposit discovered in New England, the first located in Lincoln, Rhode Island. Copperas was discovered during road building in northern Hubbardston in the 1820s and mined for several decades afterwards. Several attempts to mine coal in the Worcester area occurred in the early 19th century. Coal from the Worcester mine was used locally by several industries during the 1820s, and small quantities were shipped on the Blackstone Canal to Providence. The poor quality and difficulty of removal soon brought an end to its extraction.

Digging of clay for bricks and for pottery occurred in nearly every river valley, supplying primarily local needs through the 18th century. During the 19th century, larger brickyards appeared and supplied wider urban markets. Important brickworks were located in Northborough, Leominster, Uxbridge, Worcester, and East Brookfield. During the late 19th century important potteries were located in West Sterling and East Brookfield.

Quarrying of granite for building materials reached important commercial levels during the second half of the 19th century. Particularly important factors were the widespread erection of granite war monuments following the Civil War, increased construction of civic and public buildings in stone, and the introduction of the Richardsonian Romanesque style of architecture which made heavy use of stone. Important quarries which continued to operate into the early 20th century were located in Milford, Fitchburg, and Townsend. Lesser quarries were located throughout the eastern and southern portions of the study unit. Many of these had been active since the 18th century for local construction, particularly for the textile industry and its mills during the early 19th century. Stone mills were especially common in the Blackstone Valley and in the French and Quinebaug river valleys.

Survivals

Most remains of extractive industries survive only as archaeological features.

Mines

Sturbridge: Graphite mine and site of dwellings and outbuildings. Seventeenth to early 20th centuries. National Register site.

Quarries

Fitchburg: Rollstone Hill Quarries

Milford: The remains of more than a dozen quarries dating from the mid 19th to mid 20th centuries remain throughout the town. These include the quarry pits with evidence of quarrying techniques spanning the entire period of operation, as well as outbuildings, cutting sheds, transportation facilities, which survive in various states ranging from archaeological remains to standing structures.

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Agriculture and Agricultural Machinery

The Central Massachusetts study unit was a leader in most categories of agricultural production and in the manufacture of agricultural machinery from the early 19th to the early 20th century. It consistently contained the largest number of farms and greatest amounts of cultivated land, permanent pasture, and woodland in the state. These figures are partially explained by the size of the study unit: it is the largest unit and county in the state. But, much more importantly, the lands of Worcester County are generally well suited to agriculture. In all but the roughest upland regions in the north and west, some of the best agricultural soils in the state are found. In the hill towns, the valleys contain good tillage land, while the hill slopes have provided much pasture land.

The foundation of Worcester County agriculture from the late 17th century was a system of mixed livestock and grain farming. Little information is available on farm size for the region in the Colonial period, although information from other towns would suggest an average figure significantly under 100 acres. The smallest portion of this area was under tillage for corn and small grains, providing food for the farmstead, supplemented from small garden plots. Additional food came from fowl, swine, sheep, and cattle; horses or oxen were the primary draught animals. Hay, both natural and cultivated, and pasture were the next largest portions of the farmstead, providing feed and space for these animals. Together these improved acres amounted to

a median of 20 acres in the Province at period's end in 1771. Far larger were the areas of woodland and uncleared pasturage of the farmstead, providing fuel as well as land for expansion and newly formed families.

Corn provided the highest yields from these farms, and was the primary grain for consumption in rural areas during the Colonial period. Even at this early date the region was comparatively high in grain productivity. Nearly all the towns in the region ranked among the highest 43% of towns in the Province, and most among the highest 23%. Of particular interest in the productivity of towns in the northeast of the region, which with the adjacent towns in Middlesex County, rivaled the Connecticut Valley. Although less acreage was under tillage here than in the river valley, even higher yields per acre were reported. In these towns in particular, grain surpluses were available for trade and export.

In spite of this productivity, many farms were not self-sufficient units providing all their families' needs. Many lacked elements of the ideal farm, or sufficient amounts of an element to provide these requirements. Insufficiencies were most common among the poorer farmers and it was indeed only large farms that could meet this goal of independence. Others used any available surpluses of agricultural products and household manufactures (see essay on **Homework**) to trade for the elements needed. Most common, however, was the exchange of labor between farms, which involved both the poor and the prosperous, particularly during periods of high labor requirements such as haying and harvesting. Analysis of improved land for the province as a whole shows that while farmers were frequently unbalanced in their holdings, towns were usually individually balanced. Internal trade of produce and labor

tied the members of these communities together in a townwide web of obligation (Pruitt 1984).

At the close of the Revolutionary War, the extent of agricultural improvement was still quite low. Tillage comprised less than 4% of the total land in the towns. Only New Braintree and Sturbridge (5%); Brookfield, Southborough (5%), Warren (5.8%); Worcester (6.3%); and Grafton (6.6%) exceeded this figure. The percentage of unimproved land, including woodland, ranged from 43% in Warren to 90.9% in Winchendon. The greatest amounts of unimproved land were in the central and northern hill towns, among the last to be settled and still undergoing initial clearing and settlement expansion during the last quarter of the 18th century. During the Federal and Early Industrial periods, however, more land was brought under cultivation and proportionally less left unimproved as the area became more densely settled.

Sparked by the surge of economic activity in the late 1780s and 1790s, and by the subsequent improvements to inland transportation with the erection of turnpikes, regional specializations emerged. Orcharding, common to most farms, was particularly well suited to the towns in the northeastern portion of the region. This area, along with the neighboring towns in northwestern Middlesex County, was also an important grower of hops in the 1820s and 1830s. Flax was grown in many towns during the late 18th and early 19th century, and the seed was pressed for oil or sold for export to Ireland. In Worcester County such towns as Barre, Boylston, Lancaster, Lunenburg, Millbury, and New Braintree were big flax growers. The excellent hay and pasture lands throughout the region, but particularly in the central and western portions of Worcester County, led to increased emphasis on cattle-raising and dairying. Cheese and butter were important market

commodities, carried to Boston in large quantities from distant towns in the western portions of the region before 1800. A common practice in many towns as late as 1850 was to purchase cattle from Vermont and New Hampshire in the fall, and fatten them in the spring before driving them to the Brighton Market near Boston.

As the profitability of cheese and butter increased, and more land was cleared and converted to mowing and pasture, dairying gained in importance and gradually replaced the fattening of cattle for market as the principal market activity. By 1845 Worcester County farms produced more than 2.7 million lbs. of cheese and more than 1.7 million lbs. of butter, more than any other single county in the state. Western towns like New Braintree, Hardwick, Barre, and Warren each produced as much as 450,000 lbs. of cheese annually, while Petersham, Brookfield, and Oakham produced more than 100,000 lbs. of cheese annually between the 1810s and 1840s. Butter-making dominated the dairy in most other towns, with up to 40,000 lbs. made each year during the 1820s and 1830s in such towns as Ashby, Charlton, Dudley, Hubbardston, Leominster, Princeton, Shrewsbury, Sterling, Sturbridge, Spencer, Sutton, and Uxbridge. During the 1860s, cheese factories and creameries were organized, removing the process of cheese- and butter-making from the home dairy and locating it in a centralized operation. Frequently these operations were cooperatively organized by local farmers. With increased governmental regulations of dairy products and a demand for high, uniform quality products, these "factories" allowed farmers to shift to whole milk production and sales, continuing to produce the traditional butter and cheese for which their area was known, yet achieve the necessary uniformity.

By the late 1830s, sales of whole milk to Boston began to replace cheese- and butter-making in the towns along the Boston and Worcester Railroad. In 1845 whole milk sales dominated in Southborough, Westborough, Northborough, and Grafton. By 1865, whole milk sales precluded farm production of butter and cheese in the major manufacturing towns and along the expanding railroad network. It was not until the 1870s or early 1880s, however, when rail access was fully extended, that the more remote cheese producing areas in the western portion of the region converted wholly to milk production and sales and the cheese factories and creameries closed. In 1885, the leading milk producing towns were Worcester, Barre, Southborough, Westborough, Sterling, Hardwick, Harvard, Grafton, Fitchburg, and Bolton, all producing in excess of 400,000 gallons of milk annually.

The shift in dairying to whole milk sales was accompanied by a gradual shift in the work patterns and labor force associated with this activity. Until the change, dairying had been primarily the domain of farm women. Most farms in the region contained fewer than five cows as late as the 1830s, and women were able to milk the cows, make butter and cheese in the appropriate seasons, and still manage the household. However, the economic and cultural changes of the next several decades changed this important aspect of the domestic economy. The improvements in transportation, resulting increase in milking herd size, growing commercialization of farming, increasing opportunities for women to work both in the home and outside it, and changing attitudes toward farm work and the role of women in the household and society led to the virtual disappearance of "milkmaids" by mid-century, replaced by hired male workers. This change, however, occurred unevenly across the region, particularly on the smaller farms and in those areas lacking

easy access to rail transportation and urban markets. Paralleling the shift to dairying was leadership in hay and pasture land. Nearly one-fifth of the region's agricultural land (147,000 acres) was devoted to raising hay; slightly more was under crops, while more than twice that amount was in permanent pasture. As a result, the cultivation of nearly all grains declined sharply after 1850, particularly rye, wheat, and barley.

The change in agricultural production to dairying and increased urbanization during the second half of the 19th century introduced new crops and practices. Leadership in agricultural production shifted to the city of Worcester. By 1860 the city led in nearly every category of agricultural production and land use: dairying, orcharding, vegetables, market gardens, corn, potatoes, improved acres, acres under tillage, etc. Fitchburg was not far behind, as intensive, market-oriented farming was practiced there. Greenhouses and nurseries appeared in these cities and in the towns immediately adjacent to the large market gardening centers. Poultry-raising increased greatly during the final quarter of the 19th century and the early decades of the 20th century. By 1895, Worcester County was second only to Bristol County in the value of poultry raised. Many abandoned chicken houses on the region's farms attest to the former importance of this activity. A wide variety of vegetables and fruits such as strawberries, blueberries, and pears were also raised. The introduction of the McIntosh apple in the early 20th century led to the planting of large new orchards throughout the region, but particularly in the towns of Harvard, Lancaster, Bolton, Berlin, and Sterling.

The growth and prosperity of the agricultural economy suffered numerous economic, political, and environmental setbacks. In the mid 1780s, inflation and depression brought threats of legal action and foreclosure against many of

the region's extended farmers. Shays Rebellion made clear their precarious financial position and displeasure with the economic and legal system facing them. In 1815, a volcanic eruption in Mexico caused New England to experience a year without summer, with year-round frosts and crop failures. Many farmers left their hill town farms and emigrated to the new western lands as a result.

The development of more profitable commercial farming in the West and the linking of these areas to the East continued to stimulate western emigration; significant movement into the cities and manufacturing communities also increased through the 19th century. As a result, Worcester County farmland prices grew only 2% during this period, while farmland in Eastern Massachusetts continued to grow in value through the 19th century. Severe depressions and closings of many manufacturing establishments during the late 19th century eliminated many local markets and further advanced emigration from the region's farms. One result was the consolidation of farmland into larger farms, usually dairy farms, and the abandonment of marginal lands to forest. During the early 20th century, a reverse migration occurred from the cities by foreign-born immigrants onto the neglected or abandoned farms in the region. Italians occupied many farms around Milford, Poles moved onto farms in the western portion of the county, and Finns purchased many farms in Rutland. The Depression of the 1930s and hurricane of 1938 again dealt a severe blow to the region's agricultural economy. Many local markets were eliminated by the closing of numerous factories, and the hurricane did severe damage to farm buildings, crops, orchards, and forests.

Agricultural organizations began to appear in the region early in the 19th century, although Sturbridge reported an agricultural society by 1800. In 1811

the Worcester County Agricultural Society was organized on the Berkshire plan of Elkanah Watson, with annual fairs and premiums awarded to the more progressive farmers. Many towns organized Farmers' Clubs through which information on new methods, crops, breeding practices, and tools were disseminated. The county society was divided into regional societies during the mid 19th century. For example, Barre became the seat of the Worcester County West Agricultural Society in 1851, which included the towns of Hardwick, Hubbardston, Oakham, New Braintree, Petersham, Athol, Dana, and Phillipston. Initially, these societies were the domain of gentlemen farmers, but gradually more and more yeomen farmers participated in the organizations and slowly began to accept some of the reforms and the commercial orientation of the societies, particularly as their own participation and dependency on the marketplace increased. During the 1870s and 1880s the Patrons of Husbandry were organized in many towns. Originally established as a political organization during the Panic and Depression of 1873, the Grange became a powerful and effective instrument to protect the interests of the farmers as well as an important social organization. By 1897, Worcester county listed 50 local granges with nearly 5,000 members. The Grange developed cooperative ventures for purchasing and marketing, insurance companies, and community stores.

Worcester County was also important in the manufacture and improvement of agricultural machinery. Numerous triphammer shops in the southern third of the region produced hoes and scythes by the late 18th century. Wooden plows were produced in many towns, but it was not until 1822 that the first cast iron plow was made in Hardwick. By 1830, cast iron plows were being made in Worcester, which quickly became the largest center

for the manufacture of agricultural implements in the United States. In 1830, 1,000 plows per year were made there; in 1845, 61,000. By 1855 its output, from 22 foundries, was 152,686 plows. During the 1850s plows were also manufactured in Sutton, Auburn, Princeton, Petersham, Brookfield, Barre, Hardwick, Oakham, and Sturbridge.

Dominant among the Worcester manufacturers was Nourse, Mason & Co., which maintained a salesroom in Quincy Market, where 300 types of plows alone were displayed. Originally organized by Joel Nourse, who moved his manufactory to Worcester from Shrewsbury by 1833, the company also produced seed sowers, cultivators, and a revolving hay rake. Other Worcester manufacturers produced mowing machines, plows, cultivators, harrows, horse rakes, and hoes. The Buckeye Mowing Machine Co. operated factories in Worcester and Fitchburg during the 1860s; the Union Mowing Machine Co. produced that machine after the 1861 patent of L. G. Kniffen of Worcester. Hay rakes and tedders were manufactured in Barre, Winchendon, and Westminster during the 1870s and 1880s; a Millbury firm made mowing machines during the 1860s. Most manufacturers closed or moved out of the region by the end of the 19th century, most significantly the Ames Plow Co., successor to Nourse, Mason & Co. in Worcester, which removed its works to Framingham in 1912.

Survivals

Perhaps the least systematically studied and recorded structures in the study unit are those related to agriculture: barns, sheds, cribs, enclosures, fences and stone walls, and field arrangements. Although still present throughout the study unit, these structures and their landscapes are in all probability the fastest disappearing resource in the region. Destroyed almost

as rapidly are the archaeological remains of 17th, 18th, and 19th century farms. These are particularly significant as they provide information on farm organization without the subsequent physical alterations brought on by changing agricultural practices when in continual use.

Barns and Outbuildings

Significant survivals of farm buildings dating from the 18th and early 19th centuries remain throughout the Central Massachusetts study unit. An intensive survey which included several of the towns in the study unit was conducted by Old Sturbridge Village researchers from 1975 to 1977 and identified significant structures in the following towns:

English and New England Barns	Brookfield Sutton Bolton Petersham Charlton New Braintree Shrewsbury Sturbridge
Corn or Grain Barns	Sutton Charlton
Animal Sheds	Brookfield

Processing Structures

No known creameries or cheese factories from the mid to late 19th century have been identified. Archaeological remains of cheese factories were identified in New Braintree and Hardwick.

Grist Mill

Southborough: C. B. Sawin & Son steam-powered grain mill, ca. 1870, brick building, no machinery.

Agricultural Machinery Manufactories

While no significant agricultural machinery makers remain in the study unit, the structures which housed several manufacturing establishments remain:

- Millbury: Ohio Mowing Machine Co. building, brick, ca. 1860,
Woolshop Pond
- Barre: S. Heald Machine Shop, frame buildings, ca. 1870, and later,
Valley Road
- Yankee Rake Factory, frame buildings, ca. 1870 and later,
School Street

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Homework (Cottage Industry)

An important, nearly universal component of household economy during the pre-industrial and early industrial periods was the home manufacture of essential items such as cloth and clothing, shoes, hats, various farming and domestic utensils, tubs and pails, and tools. Although artisans often produced these goods in shops, the manufacture of some or all of these goods was also carried on in many households during these periods. Home manufactures were particularly important in rural and outlying settlements where market penetration was limited and the local economy was relatively self-contained.

During the 17th and 18th centuries, production was usually carried on by family members to supply the needs of their own and their neighbors' households. Goods were exchanged with neighbors or with shopkeepers to obtain those items not produced locally. During the late 18th and early 19th century, however, the nature of home manufacturing underwent a gradual, yet radical, transformation: there was a shift to production in the home for a wider market outside the immediate household or community. The employer was a merchant or shopkeeper who provided the materials—straw, palm leaves, shoe parts, yarn, cloth, etc.—and then undertook to dispose of the finished product, paying the workers on a commission basis, often with new raw materials or with credit at a store. Formerly carried out during lulls in agricultural or domestic work activities, homework under this system in many

cases achieved an economic status within the household equal to or greater than agricultural production.

The extension of this economic system into every town in the Central Massachusetts area by the end of the Federal period was a significant factor in the penetration of the market into rural areas and the changing of social and economic customs. The establishment and proliferation of a wide network of rural merchants/shopkeepers with direct access to coastal and urban markets further integrated the region into a national and international economy, and made available a wide assortment of imported and manufactured goods not previously available except in the larger towns.

Homework was particularly important to unmarried women, providing a greater degree of economic independence and new networks of social interaction. A significant change recorded among families involved in homework was the discontinuation of "putting out" girls into homes without daughters to learn domestic management and to earn their own support. With homework, their labors were put to more profitable use in their own homes.

The survival of the homework system depended on three important factors: the presence and continuation of a flexible labor force, the presence and continuation of a market for the goods produced, and the absence of labor-saving mechanized means of production. Ultimately, it was the mechanization of the production process which had the greatest impact on the homework system. The replacement of hand work by machines occurred in stages and unevenly within the various branches of home manufacturing, not reaching completion until the late 19th century.

The earliest and most important shifts in home manufacturing occurred in textile manufacturing. Prior to the development of factory production,

the spinning of yarn and weaving of cloth were primarily the tasks of women and children, particularly young girls. (These tasks remained the domain of women and children in the factory as well, but the work process and setting were radically different.) The removal of these tasks from the household is often credited with being a major factor in the transformation of women's work and role in the household economy. The following remarks appeared in 1829 in The New England Farmer, an agricultural journal:

It is deceptive and dangerous economy, which induces a farmer to buy all his woollens of the manufacturer, merely because he can buy them cheap—cheaper even than he supposes he can make them at home While the farmer is buying at the store what he could make at home . . . the members of his family, whose labor could provide the same articles, are unemployed, or employed to little or no purpose.

This change occurred gradually over a period of several decades during the late 18th and early 19th centuries. Samuel Slater's development of water-powered cotton spinning machinery and establishment of a factory in Pawtucket, Rhode Island in 1790 began the shift. The Embargo and the War of 1812 further stimulated the development of textile mills; by 1820 the Central Massachusetts study unit contained more than 50 cotton and woolen mills. See Map 12.

The presence of these early mills, however, did not signal the end of home cloth manufacturing. Because the power loom was not introduced into this country until 1813 and was not generally in use for nearly a decade afterwards, most of these mills produced yarn only; weaving was still done by hand. The manufacturers either sold the yarn to home weavers, eliminating the time-consuming task of carding and spinning, or they "put out" yarn to home

weavers who then returned the finished cloth to the mills or merchants. Employed by the Poignand and Plant mill in Lancaster and the Slater mills in Webster, this system was common practice throughout the study unit even after the adoption of the power loom. The production of fancy and patterned cloth and carpets was executed on hand looms until the 1840s.

The early textile mills provided other homework: breaking and cleaning of bales of cotton. This task was often carried out by children prior to the improvement of mechanical pickers and carding machines. Urine was also an important product of the home; it was sold to woolen mills for use in wool scouring.

The cutting and sewing of ready-made clothing was another textile-related branch of home manufacturing. A number of mills were involved in the production of cloth for Southern slaves during the 1820s and 1830s, and in times of prosperity the Southern planters requested not only cloth but ready-made clothing as well. Manufacturers put cloth out to women in the community to be cut from patterns and sewn into shirts, jackets, trousers, and dresses. In 1837, 175 women were so employed in Shrewsbury; they produced \$60,000 worth of clothes sent to the South and West. Production for the Southern market was not the total trade, however. In nearly every town in the study unit, women produced clothing in their homes for personal use and for sale. The development of the shirt pattern by Butterick in Sterling about 1850 and the availability of the sewing machine allowed a short but prosperous period of home manufacturing of clothing prior to the establishment of central sewing shops and factories in the 1860s.

Another branch of homework related to textile production was the manufacture of hand cards and card boards. By the late 18th century, Leicester was the center of this industry, dominated by members of the Earle and Sargent families who were responsible for many improvements in the production process. Until the invention of card setting machinery by the 1830s, the wire teeth were put up in bags and distributed to families whose members stuck them into leather and returned the product to the factories where the leather card clothing was fixed to the boards or onto carding machine cylinders. Women and children usually set the teeth while men prepared card boards. Frequently, work was sent beyond the town's limits to neighboring towns. Hand card-making was recorded in Auburn, Sutton, and Rutland during the late 18th and early 19th centuries, while Westminster recorded the manufacture of card boards.

Perhaps the most widespread and longest lasting branch of home manufactures was shoemaking, not fully mechanized until the late 19th century. In Central Massachusetts, production prior to the Civil War was largely devoted to boots and to sale shoes or coarse brogans, shoes made almost exclusively for slave wear. The manufacture of "sale shoes" reached into every town in the study unit during the early 19th century and into nearly every household. Merchants/shopkeepers and entrepreneurial shoemakers who had set up central shops put out leather and shoe parts to be bound or sewn by the women and bottomed by the men. (For further discussion of the home manufacture of boots and shoes, see **Boots and Shoes** below.)

Second to boot- and shoemaking in importance was the home manufacture of straw and palm-leaf hats. Introduced from Rhode Island and Bristol County, Massachusetts about 1800, the braiding and sewing into hats of locally

grown oat and rye straw and split West Indian and South American palm leaves spread rapidly through the region. Introduced by imitation of the fashionable European straw hats, particularly the popular Italian Leghorn hats, early production was for personal use only by young girls and women. However, merchants/shopkeepers soon organized production on a putting out system, supplying the straw and palm leaves and disposing of the finished hats. Thousands of women and girls in the region were employed in this production. Major distribution centers appeared in South Milford, Petersham, and Barre; the latter two towns contained six and five dealers respectively in 1832. Other towns containing dealers in 1832 included: Mendon (four), Sterling, Athol, Fitchburg, Oakham (three), Royalston, Spencer, Brookfield, Gardner, Templeton (two); and Grafton, Phillipston, and Boylston (one). In 1837, the leading town was Barre, where 607,000 palm-leaf hats worth \$167,000 were made. Following Barre was Upton, with 14,000 straw bonnets manufactured, valued at \$35,000.

The industry developed in distinct geographic divisions. Straw hat making was carried on largely in the southeast corner of the Central Massachusetts study unit in Milford, Mendon, Blackstone, Upton, and Westborough, while palm-leaf hat making predominated in the northern and western towns of the study unit. To a large extent, the industry was most widespread in rural areas where textile manufacturing and shoemaking were not the leading industries.

The Civil War had a considerable impact on the palm-leaf hat industry since the market for these coarse hats was the South. Many merchants went bankrupt when outstanding debts could not be met. Following the war, the industry underwent considerable change when sewing machines were introduced to sew the braid into hats. Although braiding was still a hand

operation, sewing and finishing of hats were carried out in central shops and factories. Many women found new employment in the large factories established during the 1880s in Westborough, Worcester, Upton, Milford, and Barre; braiding of straw and palm-leaf had declined considerably as imported braid was increasingly used.

Chair seat caning, begun in the 1830s in the northern chair-making towns, replaced palm-leaf hat making after the Civil War as the major home industry in these towns. It was carried out in much the same manner: chair frames and cane were sent out to homes and were returned to the factories when completed. Thousands of women in the northern chair-making towns were so employed until cane weaving machines capable of producing complex patterns were developed in the 1870s.

Other branches of home manufacturing included chair painting (Winchendon, Petersham, Gardner, Fitchburg, Hubbardston, Phillipston), basket-making (Holden, Ashburnham, Winchendon, Sutton, Fitchburg, Webster, Rutland, Berlin, West Boylston), broom-making (Clinton, Harvard), the cutting of shoe pegs (Milford, Royalston, Charlton, Southborough), the sewing of pocket books and wallets (Lancaster, North Brookfield, Brookfield), and the manufacture of wire sieves, dish covers, and cornpoppers (Fitchburg, Oakham, Rutland, East Brookfield).

Survivals

The advantage of homework was that it could be done in the home without a great investment in tools or space. Because of this, any interpretation of the use of domestic buildings from the early 19th century must include

consideration of their role as workplaces as well as dwelling houses. Occasionally, small shops such as ten-footers for shoemaking or other shop buildings were utilized. However, few examples of these buildings are known or recorded, as their uses frequently changed with economic needs. Because homework was so widespread, such an important component of the household economy, and so underrepresented in current surveys, any survivals are significant.

Shoe Shops

Only one ten-footer was identified in town inventories: Kendall's Boot Shop in Athol. Additional shops, now utilized as sheds and outbuildings, were located in West Brookfield.

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Woodworking and Woodworking Machinery

The abundant forests of Central Massachusetts supported important woodworking industries for nearly two centuries, ranging from extensive lumbering to the manufacture of furniture and toys. Through most of the 19th and early 20th centuries, Central Massachusetts dominated the state's woodworking industries. During the early 20th century, two of the world's leading chair and toy manufacturing centers were in Gardner and Winchendon. Paralleling this leadership in manufacturing was an important role in the development of new motorized machinery and manufacturing methods within the furniture, woodenware, and toy industries.

The forests of Central Massachusetts are composed of two basic types with a transition zone between. In the northern towns is found the southernmost extension of the Northern Forest, composed of northern hardwoods such as yellow birch, white birch, sugar maple, beech, and white ash, along with hemlock, which predominated over the less numerous white pine and spruce. The Oak Forest, covering the southerly portion of the region, is the northern tip of a forest type found as far south as North Carolina. Originally it consisted primarily of oak and hickory on the deeper, better-watered soils; in the swamps were red maple, elm, pin oak, swamp white oak, and black gum. The transitional zone between these two regions contained a mix of both forest types, largely dependent upon local topography and soil type for the dominance of one forest type over the other.

Not surprisingly, the geography of woodworking industries in the region during the 19th century approximated the range of forest types and the changing pattern of settlement expansion. Until the opening of the 19th century, sawmills were distributed relatively evenly over the county, but towns which contained more streams to power mills and better agricultural land had more sawmills. Because clearing of forests proceeded more quickly in the areas most favorable to agriculture and most accessible to the settlers from the south and east, there was a higher number of sawmills in the southern and eastern portions of the region.

During the first three decades of the 19th century, new sawmills were built in or around the developing areas of manufacturing to accommodate the increased demand for lumber. Douglas and Holden contained ten sawmills each, while the agricultural towns of Sturbridge, Barre, and Hubbardston had 13, 13, and 15 mills respectively in 1831. Large quantities of boards, clapboards, shingles, and firewood, numbering several million board feet and thousands of cords of firewood, were annually harvested from these and other towns through the 1850s and 1860s, when land clearing reached a peak and the forest cover was at its lowest point. Another important factor in the clearing of forests in the southern and eastern portions of the region was the concentration of railroads in these areas before the mid 19th century, which required large quantities of wood for fuel and for railroad ties.

By the mid 19th century, new sawmill construction had shifted farther out into the agricultural communities surrounding the textile and other manufacturing centers and into the north, where woodworking had become firmly established by the 1830s. The concentration of woodworking industries in the northern towns was further reinforced by the construction of

rail lines which connected the abundant hardwood forests of northern New England with the major cities of the Northeast. This occurred particularly during the 1870s and 1880s, when the towns in the northern portion of the study unit underwent tremendous and sustained expansion.

Specialized woodworking activities developed within the region by the mid 19th century. Coopering, an activity spread throughout the region in the 18th century, by 1850 was concentrated largely in the northern tier of towns in the study unit and in southern Vermont and New Hampshire. The manufacture of tubs, barrels, and pails were important industries in Ashby, Townsend, Winchendon, Templeton, and Athol. The invention of a machine which turned woodenware on a lathe by Col. William Murdock of Winchendon provided a boost to this industry after 1830. The B. D. Whitney Machine Shop in Winchendon also produced a variety of motorized woodworking machines, including improvements on machines for planing and shaping staves, boring and scraping machines. By the mid 19th century, Winchendon was the state leader in the production of tubs and pails.

Perhaps the most important woodworking industry of the region was chair-making. By the early 19th century, chair-making shops were established in most towns, though the industry soon became concentrated in the northern towns. In 1820 Sterling contained 23 small shops which produced more than 60,000 chairs annually, while Gardner contained 25 shops and factories in 1837. The industry was launched in Gardner in 1805 when James Comee began to produce wood seat chairs. Soon flagg-bottomed chairs, made from split cattails, and cane-seated chairs were introduced. Specialization followed, particularly with the introduction of water- and steam-powered lathes and other machinery. Manufacturers of chair stock, seats, and other parts

developed, and chair frames were put out to women in their homes for caning. Accompanying the shift to mechanization was the introduction and popularity of rattan furniture, which became an important branch of the chair industry. By the mid 19th century, woodworking was the leading industry in the northern part of the region, dominating the economies of Gardner, Ashburnham, Hubbardston, Westminster, Winchendon, Templeton, and Princeton.

A leader in the industry was Levi Heywood, who in 1826 joined his brothers in the manufacture of chairs in Gardner. Heywood was instrumental in mechanizing the production process and by the late 1840s introduced assembly-line methods into many phases of the manufacturing process of chairs and other furniture. In the succeeding decades, machinists associated with his company developed machinery for making wooden seats, bending wood, and for stripping, splitting, splicing, and weaving cane. By the 1880s, the company employed more than 1,300 persons and produced goods worth more than \$2.5 million, including a wide assortment of chairs, reed and rattan chairs and furniture, and children's carriages. Many of Gardner's chair manufacturers got their start working in Heywood's shops. In 1897 the Heywood Brothers merged with their major competitor, Wakefield Co. of South Reading, and continued as the major chair manufacturers in Gardner until its closing in 1970. After World War I destroyed the European chair-making industry, Gardner became the chair-making center of the world. The 1920s were the period of greatest expansion of the workforce and in goods produced, as more than 3,500 men and women were employed in the production of 4,000,000 chairs, furniture, and carriages annually.

Chair- and cabinet-making were also important in Ashburnham and Fitchburg. The former was second only to Gardner in chair-making

through the 19th century, while Fitchburg became an important center for the production of rattan furniture, led by the American Rattan Co., established in 1876. However, several severe depressions in the subsequent decades diminished the industry's importance in that city.

During the late 19th century, Leominster was an important center for the manufacture of baby carriages and piano cases, producing 65% of the piano cases made in the country during this period. The Richardson Piano Case Co., built in 1891, was the largest of its kind in the country. The F. A. Whitney Carriage Co. developed and introduced twisted paper, impregnated with glue sizing, as a substitute to reed and rattan, and produced machines and looms for its preparation and weaving in the early 20th century. Chairmaking was also a leading industry in Princeton and Templeton during the last quarter of the 19th century and first quarter of the 20th century, concentrated in Baldwinville, East Templeton, and East Princeton.

Toymaking became one of the leading industries in Winchendon in the 1870s; by the early 20th century, the Mason and Parker Mfg. Co. produced more than 250 types of toys as well as the machines to make them. After the German toy industry was destroyed in World War I, Winchendon was known as "Toy Town" and had become the largest toy producer in the world. Toymaking was also important in Athol into the early 20th century, together with the making of matches, piano cases, furniture, "Athol sleds," and rattan furniture, as well as woodworking machinery.

Another important woodworking machinery-making center was the city of Worcester. In addition to textile machinery and machine tools, Worcester's many skilled mechanics invented and produced a wide assortment of

woodworking machines. In 1828, William Woodworth invented the automatic wood planing machine, and in 1839 Thomas E. Daniels patented and began production of his widely-used Daniels' Planing Machine. Prominent among the other machine manufacturers were Goddard, Rice & Co. and J. A. Fay & Co., which produced mortising, tenoning and sash molding machines. Woodworking industries in Worcester included a large organ and melodeon manufacture, including the Hammond Organ Co., and the manufacture of railroad cars and carriages, the largest of which was the Osgood, Bradley Car Co.

Survivals

Surviving woodworking sites are most numerous in the northern portion of the study unit where the industry was largely concentrated after the mid 19th century. In addition to the extant factories and mills, a large number of former woodworking facilities--sawmills, chair shops and factories, planing mills--survive as archaeological sites along the region's streams and rivers. Nearly every town in the study unit contains such remains; they are particularly numerous in the towns of Princeton, Charlton, Westminster, Barre, Ashburnham, and Sterling.

Ashby:	Wilder Turning Mill (1879) Loveland Saw Mill (ca. 1800)
Clinton:	William Fuller Saw and Planing Mill (ca. 1890)
Douglas:	Wallis Saw Mill, Crystal Lake (ca. 1870)
Fitchburg:	Walter Heywood Chair Co. factory (ca. 1870)
Gardner:	Heywood Bros. & Co. Chair Factory (1863 and later) L. H. Sawin & Co. Chair Factory (Conant Ball & Co.) (1860s and later)

	Philander Derby Chair Factory (1860s and later)
	S. Bent & Bros. Chair Manufactory (1880s)
	C. H. Hartshorn Furniture Factory (1907)
	Greenwood Bros. & Co. Chair Factory (ca. 1870)
	Levi Warren Chair Factory (ca. 1888)
	S. K. Pierce Chair Factory (ca. 1860 and later)
	Eaton and Dunn Chair Factory (1860s and later)
	C. S. Greenwood's Sons Chair Factory (1886 and later)
Leominster:	F. A. Whitney Carriage Co. Mills (ca. 1865 and later)
	Jewett Piano Co. (1893 and later)
	Wellington Piano Case Co. (1895 and later)
	Richardson Piano Case Co. (1895 and later)
Oxford:	Chafee Bros. Box Factory (1893 and later)
Templeton:	Smith Day & Co. Chair Manufactory (ca. 1880s)
Townsend:	B. & A. D. Fessenden Co. lard barrel shop (1880 and later)
	Copeland Cooper Shop (ca. 1800)
	Spaulding Cooperage (ca. 1760)
Warren:	C. Comins Planing Mill (1857)
West Brookfield:	Foster Sawmill (ca. 1850)
Winchendon:	G. N. Goodspeed Machine Shop (1860s and later)
	E. Murdoch & Co. Woodenware Factory (1895 and later)
	B. D. Whitney Machine Shop (ca. 1850 and later)
	Converse Toy Co. (1883 and later)
Worcester:	Hammond Organ Reed Co. (1868 and later)
	Rice & Griffin Manufacturing Co., Planing Mill and Sash Manufactory (1890)

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Boots and Shoes

The manufacture of boots and shoes was one of the leading industries in Worcester County after the beginning of the 19th century, trailing only textiles and metals in value. The county's production was also important on a statewide level, ranking second behind Essex County until the 1880s, when the production of Middlesex and Plymouth counties also exceeded it. In at least fifteen towns in the county, boot or shoe making was the leading industry during the 19th and early 20th centuries.

The geographic distribution of the industry in Central Massachusetts changed considerably during the period. Though largely concentrated in the towns occupying the southern third of the county, nearly every town was involved in the manufacture of boots and shoes before 1850. By the 1850s the advantages of transportation and financial resources as well as technological and organizational changes within the industry caused a contraction in the distribution of boot and shoe manufacturing. Several distinct core areas developed: in the north, Athol and Fitchburg/Leominster formed two minor core areas; in the southwest, the Brookfields and Spencer formed a core area; and in the south, Webster and Oxford comprised a small core. In addition, the entire southeast corner of the study unit, south of a line from Worcester to Southborough, formed a large core area with Worcester and Milford as foci. This region was part of a larger area that included the Middlesex and Norfolk county towns of Hudson, Marlborough, Hopkinton, and Holliston in the

formation of one of the most important boot and shoe manufacturing areas in the state and nation. These core areas usually coincided with areas where leather tanning and currying were important industries and where turnpikes or early railroads were constructed. By the late 19th century, the industry contracted farther, as production became more concentrated in the core towns. Manufacturing in many of the peripheral towns ceased as mechanization eliminated many of the tasks formerly "put out" to homeworkers or specialty shops. The availability of cheap and rapid transportation and repeated financial panics and depressions between 1870 and 1890 were also important factors in the industry's consolidation.

Through the 18th century, boot and shoe making were carried on by itinerant cordwainers or within individual households only as needed. In the larger towns and compact villages, of which there were few in Worcester county during the 18th century, master shoemakers and their apprentices worked in small shops on "bespoke work"—work done on demand for specific customers. Each man—master, journeyman, apprentice—carried out the full process of shoe manufacture.

By the end of the 18th century, production of "sale shoes"—those made for the market but not for anyone in particular—had begun to occur in the towns of Essex, Plymouth, and Middlesex counties. This practice was introduced into the towns along the eastern side of Worcester County during the 1790s. Colonel Arial Bragg, who moved to Milford from Holliston, Middlesex County, is credited with being the first man in Milford and the county to carry on this trade. Over the next decade the practice spread to other towns in the area; Grafton became a particularly important center during the Federal period.

By 1837 this town led Worcester County in production and employment in the industry, with more than 671,000 pairs of shoes and 18,000 pairs of boots made by 906 men and 486 women. It was also the leading tanning and currying center.

Many shoemakers trained in Grafton left during the early 19th century for other towns in the county. In 1810, Oliver Ward left Grafton for North Brookfield and established a tannery and shoe shop, and became the first to manufacture "sale shoes" west of Worcester. Ward's apprentice, Tyler Batcheller, set up his own shop in 1819; eventually his factory became the largest of its kind in the country and made North Brookfield one of the leading boot and shoe manufacturing centers in the county.

A combination of factors contributed to the rapid expansion of production for the general market during the period, and resulted in many changes in the process of manufacturing and marketing of the finished products. Protective tariffs on boots and shoes, passed by Congress after 1789, added 20% to the price of imported shoes and opened new markets, particularly in the South. Until this period, southern planters supplied their slaves with clothing and shoes produced in Great Britain. With the invention of the cotton gin in 1793 and the unprecedented expansion of cotton cultivation and the plantation system that followed, a tremendous growth in the number of slaves to be clothed and shod occurred. The parallel growth of textile manufacturing villages and large urban centers, westward expansion, and the extension of trade with the West Indies and South America offered what seemed a limitless market.

To meet this immense demand for footwear, entrepreneurial shopkeepers and shoemakers introduced a system of production in which materials, and often tools, were "put out" to be made into boots and shoes. Conducted

in the home or in small shops, or "ten-footers," often during bad weather or slack time in the agricultural work schedule, the work was done by both men and women. The women bound or sewed the uppers together while the men bottomed the shoes or attached the uppers to the soles. The finished shoes were periodically collected or brought to the shopkeeper/merchant who would then market the shoes to jobbers in Boston or Providence, or directly to his customers in the South or West. The network of homeworkers producing for a single shopkeeper/merchant often included hundreds of men and women and extended over several towns. Eventually central shops were organized where the boot and shoe uppers and soles were cut out, then "put out" to be bound and bottomed and returned to be finished and packaged.

The principal product of the Worcester County manufacturers before the Civil War was a coarse, cheap brogan intended for slave wear or a coarse plow shoe for western and domestic use. The manufacture of high boots dominated the production of two town clusters in the mid 19th century: one centered on Spencer and included the towns of Hubbardston, Paxton, Rutland, and Holden; another was centered around Milford and included Upton and Mendon as well as the Norfolk and Middlesex county towns of Hopkinton and Bellingham.

By the 1850s, central factories began to appear where more and more of the steps involved in shoe making were located and the demands of industrial organization--uniformity; economy of time, labor, and stock; supervision; and regularity of work--could be achieved. An important factor in this process was the mechanization of certain phases of production. Although a pegging machine for bottoming coarse shoes had been invented in Hopkinton in 1818, it was not until the sewing machine was adapted to sewing uppers in the early

1850s that this process really occurred. In 1862, the McKay Machine for sewing soles was introduced, but because it was not universally adopted until the later 1860s or 1870s, certain steps in the process, like the men's job of bottoming, continued to be put out to specialized shops or as homework until the 1880s. One result of the introduction of sewing machines was a sharp decline in the number of women employed; individual output increased so greatly with the sewing machine that fewer women were needed to do the work.

By 1875, the Goodyear Welt Machine, an improved system and machine for sewing the uppers to the soles, was introduced, followed by the lasting machine in 1883, mechanizing nearly the entire process. Milford was particularly quick to adopt the factory system of production and organization, and as a result, its production increased rapidly after the 1850s. North Brookfield, on the other hand, exhibited a more conservative approach to mechanization, continuing the putting out system into the late 1860s and early 1870s.

Auxiliary industries developed with the expansion of boot and shoe making: tanning and currying; machine- and tool-making; production of lasts, boot trees, and specialized parts like soles, heels, counters, toe boxes, findings and trimmings; and blacking, varnish, and glue. All or most of these goods were produced in Milford, Worcester, Athol, and Fitchburg, with isolated production of individual items in many of the towns. Shoe boxes were also an important product after the 1830s, with production occurring in most boot- and shoe-making towns.

The expansion and contraction of the industry through the 19th and early 20th century followed a cycle of prosperity and depression periods. The rapid

growth of the 1820s and 1830s, based on loose credit, was stopped by the Panic of 1837 and the seven-year depression that followed. Those firms producing for the South were particularly hard-hit, as falling cotton prices ruined many planters and severed the extended credit relationships that were the norm when trading with the South. The recovery was temporarily halted by the Panic of 1857, but it was the Civil War and the interruption of the important southern trade that had the greatest impact on Worcester County shoe production. At least one-quarter of the shoe manufacturing towns experienced a rapid decline or cessation of production immediately after the war, as many manufacturers went bankrupt. The survivors turned to production of women's and children's shoes as in Athol, or to heavy boots for miners and the western trade, as in Milford. The depressions of the mid 1870s and 1880s further contracted production into the core areas as the surviving companies became more and more mechanized. The depressions of the mid 1890s, 1910s, early 1920s, and 1930s and growing labor militance forced the closing of many factories. By the early 20th century, production was largely concentrated in Worcester, Milford, North Brookfield, Spencer, Fitchburg, Athol, and Webster, where it ranked as the dominant industry or was among the several leading industries in the town.

Survivals

The earliest buildings where shoemaking was carried on, outside of the dwelling house which occasionally doubled as a workshop, were the small ten-footers. These small shops were probably very common in every town where shoemaking was done during the first three quarters of the 19th

century. Very few of these buildings survive; one example, Kendall's shoe shop in Athol, has been identified in a town inventory. Several have been located in West Brookfield during the course of the survey. Others probably survive in backyards as sheds or other outbuildings.

Significant survivals of Early Industrial period boot- and shoemaking structures remain in Milford along Central Street, where at least half a dozen buildings from the 1840s to the 1860s remain. In addition, Milford contains an assortment of shoe factory buildings from the Late Industrial and Early Modern periods as well. Other Late Industrial period survivals occur in Worcester: J. H. Walker Boot Factory (1870, 1879), S. R. Heywood and Co. (1880 and later); in Athol: Charles Lee Shoe Factory (1883-85); in Spencer: Jones and Starr Boot Manufactory (ca. 1870), Josiah Green and Co. Boot Manufactory (ca. 1870), Bacon and Sibley Boot and Shoe Factory (ca. 1870); North Brookfield: Batcheller Shoe Factory (ca. 1870 and later).

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Leather

By the end of the 19th century, nearly every town in the county contained at least one tannery and currying shop for the processing of hides into leather. The nearly universal practice of raising and fattening livestock on the county's farms provided many hides for the tanneries. Leather had a wide variety of uses in the agricultural economy, including footwear, saddles and harnesses, trunks, clothing, caps, gloves, whips, card leather, drinking vessels and buckets, hinges, and straps.

By the end of the Federal period, tanning and currying activities became concentrated in several town clusters, largely the result of the growth and development of manufacturing activities centered in those towns requiring large quantities of leather for boot and shoe making and the manufacture of cards. The largest and most important cluster was located in the southeastern portion of the region and included Shrewsbury, Grafton, and Millbury, which supplied leather to the extensive boot and shoe making industry in the southeastern portion of Worcester County and in the neighboring towns of Middlesex and Norfolk counties. Tanning was centered in Lower Village, Shrewsbury, while currying was carried on in several establishments in Grafton Center.

A second cluster was located in the west, in the towns of North Brookfield and Brookfield, also providing leather for the boot and shoe manufactories of those towns. Leicester formed a third leather processing center in the southern half of the study unit, stimulated by the local development

of card manufacturing. In the northern half of the region, tanning and currying were important in Athol, Templeton, Ashburnham, and Townsend. Only in Athol and Templeton did the tanneries correspond to a significant local boot and shoe industry; the leather processed in Townsend and Ashburnham was probably marketed in these and neighboring towns or sold in Boston.

By the Civil War, tanning and currying had undergone a considerable increase in the value of goods produced as well as changes in the geographical distribution of the industry within the region. The Federal period core areas expanded to neighboring towns and a new core area appeared in Leominster by the 1850s. The Shrewsbury-Grafton-Millbury core expanded to the east into Northborough and Westborough and to the west into Worcester, although Grafton and Shrewsbury--which contained the Nelson and Rice tannery, the largest in the county in the 1860s--continued to dominate. The Nelson and Rice Co. also operated tanyards in Winchendon and Chester, and in Gilsum, New Hampshire. The company's tannery in Winchendon accounted for the rise of that town as a leather processing center. The Brookfield core expanded into Warren, Sturbridge, and Spencer, forming a continuous belt of leather processing towns across the county from Warren to Westborough. This distribution corresponded closely with the major shoe and card manufacturing areas of the county (see essay on **Boots and Shoes**, and **Textiles and Textile Machinery**). The Graton and Knight Company of Worcester, established in 1851, supplied the needs of nearly every steam or water-powered industry, for leather belting was required to transmit power from shafts to machines. This firm, which expanded into the manufacture of shoe counters and soles, made Worcester the leading leather processing and manufacturing center in the county by the 1880s.

Leominster entered into large-scale leather processing during the 1840s, when steam power was introduced into the Babcock & Burrage tannery. Production expanded to include the manufacture of patent and enamelled leather during the 1850s, which was largely used in the production of ladies' and children's shoes, the specialty of Leominster's and Fitchburg's shoemakers during this period.

The manufacture of specialty leather was also responsible for the continued importance of the leather industry in Ashburnham and Townsend. Morocco leather, originally made from goatskins tanned with sumac in Morocco and afterwards the Levant, Turkey, and Europe, was produced in Townsend between the 1830s and 1850s and in Ashburnham during the 1860s and 1870s. It was made chiefly of sheep and lamb skins in this country and was used in bookbinding, upholstery, and for ladies' and children's shoes.

Other important leather processing and manufacturing towns in the northern portion of the county were Athol and Templeton, which supplied their local boot and shoe industries. Clinton was an important tanning center from the 1850s to the 1870s, producing leather for the market and to supply the town's textile mills and textile machinery and loom harness manufactures.

Expansion in these towns was also fueled by the military's demand for leather products during the Civil War and again during World War I. Many of the tanneries expanded during the 1860s, adding steampower and machinery. The growth experienced by the core areas occurred at the expense of smaller tanneries in many of the towns. Leather processing and working (exclusive of boots and shoes) peaked in 23 towns in the study unit between the 1830s and 1860s, and disappeared from 17 towns during the same period.

Nevertheless, at least one small tannery continued to operate in most of the agricultural towns through the 1870s.

The final quarter of the 19th century saw a reordering of the leather industry in the county. Tanning and leather manufacturing ceased in at least 21 more towns by 1900. The core areas, which expanded in area during the 1850s and 1860s, contracted sharply during the 1880s and 1890s. In the Brookfield cluster, leather processing had ceased by the 1880s, with the exception of a small leather novelties manufactory in West Brookfield operating during the 1920s. Tanning had ended in the northern towns by World War I and only small-scale leather manufacturing and the production of artificial leathers were carried out in Fitchburg and Athol. In the south, Worcester dominated the industry. The Grafton and Knight Co. alone employed 1,200 workers by the late 1920s and tanned 300,000 hides per year, principally for belting but also for shoe parts. The company originated the idea of standardized leather belting and virtually controlled the worldwide market, becoming the largest belting manufacturer in the world. The Grafton and Shrewsbury tanners and curriers also ceased operations by the 1920s. In Westborough several tanneries survived the post-World War I depression and continued into the 1940s.

Many tanneries closed during the 1890s and early 1900s because of a major shift in the source of hides. The growth of the meat-packing industry in the Midwest meant an accumulation of cheap hides and large modern tanneries were established there as a result. The repeated depressions of the 1880s, 1890s, and early 1920s, when the price of hides fell quickly, also took their toll on Central Massachusetts tanneries.

Tanning and currying of leather stimulated a number of other industries. Hemlock and oak bark and sumac were required to tan hides and produce Morocco leather until the advent of mineral tanning in the 1890s. The grinding of bark occurred in small water-powered mills throughout the county in the first half of the 19th century when forests were still abundant. Later, bark was imported from northern New England. The manufacture of leather goods during the 19th century included wallets and pocketbooks, saddles and harnesses, luggage, whips, and shoe parts. Leatherboard, a composition of leather scraps, paper, and glue, was manufactured in many towns during the last quarter of the 19th century, and used as a material for shoe counters. Leather-cutting and splitting machinery was manufactured in Worcester during the late 19th century.

Since the larger tanneries were often located near slaughterhouses, the manufacture of other animal products often occurred in the same town as tanning. From the 1860s to 1880s, factories for the manufacture of soap, tallow, grease, and candles were in operation in most towns with large tanneries. In Northborough, mills were also established to grind bone into fertilizer. Horns were commonly sold to area combmakers.

Survivals

Worcester: Graton and Knight Manufacturing Co., 1860s, 1890s, and later.

No other leather processing factories or tanneries are known to survive.

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Textiles and Textile Machinery

The manufacture of textiles and textile machinery was the leading industry in the Central Massachusetts study unit throughout most of the 19th and early 20th century. The region's manufacturers and machinists were often in the forefront of the industry, and many of the revolutionary changes in machine technology, work process, and product occurred in the area's mills and machine shops. Worcester County led the state in the number of both cotton and woolen mills through much of the 19th century, and by 1860 more than one half of all the cotton and woolen machinery manufactured in the state (Massachusetts accounted for nearly half of the nation's textile machinery production) was produced in Worcester County.

Prior to the erection of the first water-powered production of cotton yarn in the study unit (1805 or 1806 in West Boylston), textiles were manufactured in the home or purchased. Home production supplied relatively simple and coarse cloth from flax or wool. Finer cloths of cotton, silk, and wool were purchased as imports from Great Britain, the Continent, the East Indies, or the Orient. During the second half of the 18th century merchants from Providence, Rhode Island and Boston had extended their trading networks up the Blackstone Valley and westward into the Central Massachusetts region, supplying imported cloth as well as other manufactured goods.

The various stages of home production were usually carried on by females, with the exception of the initial processing of the fibers which was most often done by men. Women and girls carried out the intermediate steps of

carding, spinning, dyeing, and weaving, while the final stages of woolen cloth production and dressing were usually carried out by men in clothiers' shops and fulling mills. There the cloth was full'd (washed, shrunk, felted), napped, and sheared. Fulling mills and clothiers' shops were present throughout the study unit from the early 18th century to the mid 19th century, when the virtual cessation of home textile production and the incorporation of these processes into the factory caused the disappearance of the small, independent fulling mill.

At least two attempts at factory-organized production of textiles in the region preceded the introduction of water-powered machinery. In 1768 a group of men in Brookfield, spurred by the non-importation movement which followed the Stamp Act, erected a building "for a manufacturing house" and gathered tradesmen of several sorts to manufacture woolen cloth. Carding and spinning probably occurred in the home, done by women; weaving and cloth dressing were carried out in the factory, the former on hand looms. This level of organization allowed greater control over the production process and over product uniformity and quality than did the collection of entirely home-produced cloth. A second "factory" was erected in Worcester in 1789 for the production of cotton and linen cloth.

During the next two decades several revolutionary changes in textile production occurred. The successful adaptation of the Arkwright water-powered spinning frame in Pawtucket by Samuel Slater in 1790 was felt throughout the region, even though the first cotton spinning mill in the study unit was not erected for another 15 years. The new availability of cotton yarn from the early mills in Rhode Island and Eastern Massachusetts provided warp

and filling yarn, and initially stimulated and increased home production of cotton and mixed cotton warp/wool weft cloth.

The improvement and introduction of carding machines during the last decade of the 18th century and opening decades of the 19th century further improved the production process. The impact of machine carding on the woolen industry has been likened to that of water-powered spinning on the cotton industry. It allowed the process to be incorporated into the factory and improved the quality and uniformity of the carded wool or cotton. Like early cotton spinning, however, the introduction of improved machine cards at first greatly stimulated home production. Machine carding removed from the household the often long and tedious task of hand carding which preceded the spinning of yarn. Combined with the availability of cotton warps, it allowed more time to be devoted to the spinning of woolen yarn and weaving of cloth. Carding machines were added to fulling mills and clothiers' works, and many carding shops were established throughout the region. As early as 1800, carding machines were reported in Leominster and in Worcester by 1803.

Unlike cotton spinning, the mechanization of wool spinning did not occur in American mills until the 1820s, when the spinning jack was introduced from England, and was not universally employed until about 1840. Prior to this time, the spinning of wool yarn was continued in the home or carried out in factories on spinning jennies. These hand-powered machines duplicated the operation of the spinning wheel, only with multiple spindles; a jenny of 150 spindles was reported in Uxbridge during the 1810s.

The greatest stimulus to the early development of textile mills in the United States and in the region was the Jefferson Embargo and War of 1812. Between 1807 and 1815, when little foreign-manufactured cloth was

imported, the establishment of domestic mills proceeded rapidly. At least 96 cotton mills and 57 woolen mills were erected in New England during these years; of these, at least 28 cotton mills and fifteen woolen mills were scattered across 28 Worcester County towns. On the eve of the Panic of 1837, the number of mills in the study unit had increased to at least 74 cotton mills and 66 woolen mills spread across 44 towns.

The largest concentration of mills during this period occurred in the southern half of the county, particularly in the valleys of the Blackstone, French, and Quinebaug rivers and their tributaries. By 1837, the Blackstone Valley contained at least 49 cotton and woolen mills, nearly all erected during the 1810s and 1820s, earning it the distinction as the most harnessed river in America. When the Rhode Island mills were included, 94 cotton mills alone drew power from the river by 1840. The French River and its tributaries through Dudley, Webster, Oxford, and Leicester powered more than twenty textile mills in 1837, while the Quinebaug River through Sturbridge and Southbridge provided power for about fifteen textile mills.

North of Worcester, early concentrations of textile mills were found along the several branches of the Nashua River (about eighteen in 1837), particularly in Clinton, Boylston, West Boylston, Holden (the latter along the Quinapoxet River), and in Fitchburg, where eight mills had been established between 1807 and 1832. The Assabet River in Northborough and Southborough powered three mills in 1837, and in the west at least nine textile mills were located in the Quaboag River Valley. Mills were also scattered along the Ware, Millers, and other rivers in the northwest quadrant of the region.

The Blackstone River and its tributaries, with a large number of early mills, played an important role in the development and spread of the textile

industry. Many mechanics and manufacturers, after receiving initial training in the earliest Rhode Island mills or with Samuel Slater, moved northward into Worcester County during the 1810s and 1820s. Samuel and his brother John Slater were involved in mills in West Boylston, Sutton, Oxford, Fitchburg, and Webster. It was in Webster that the Slaters invested the largest amount of money, time, and energy in the development of several cotton and woolen mills beginning in 1812. Members of the Blackstone Valley families of Taft, Holbrook, Farnum, and Day also established mills throughout the region after initial successes in the Blackstone Valley. Throughout the 19th century, much of the investment capital, management, and leadership for the continued development of textile mills in the southern half of the region were provided by merchants, manufacturers, and mechanics from northern Rhode Island and the Blackstone Valley.

Nearly all of the early mills in the region were organized on the Rhode Island system. The relatively small, low to medium capitalized mills, were owned by families or partnerships, usually managed by owners, and employed entire families, particularly women and children. Single- and multiple-family housing was built and owned by the companies, though the realities of labor availability often required boardinghouses for single men and women as well. The result of this pattern was the relatively stable, paternalistic, rural mill village. This stands in direct contrast to the organization of the Waltham system mills established by a group of wealthy Boston investors: joint stock companies, large capitalization, a shared power canal system, management by agents, sales through commission agents, a labor force of young, unmarried women housed in company-owned boarding houses, emphasis on mass production, and an urban community, typified by Lowell.

Another major distinction between the two systems was the manufacturing process. The Waltham system mills incorporated the entire production process under one roof, from picking to weaving, made possible by the successful introduction of the power loom in 1814. The Rhode Island system mills, at least those built prior to 1814, were built as spinning mills only. The finished yarn was marketed or put out on consignment to home hand weavers. Although most mills built after this date adopted power looms within a few years, many of the mills continued as spinning mills only. Slater's Webster factories did not adopt power looms until the mid 1820s, relying instead on hand weavers for cloth production.

Technological limitations of the early power looms to plain, coarse, and unfigured weaves prevented many manufacturers of finer yarns and cloth from adopting the power loom until important improvements were made. It was not until the early 1820s that power loom weaving was adapted to woolen cloth. By 1821, the first narrow satinets looms in the state were in operation in Uxbridge, and by 1823 Howard and Hovey had commenced the manufacture of broad power looms in Worcester. Power cassimere looms were reported in use in Uxbridge in 1826. By the 1850s, satinets and cassimeres were the leading products of the region's woolen mills.

The introduction of power loom weaving into the factory completed the transformation of the pre-textile factory household economy. Formerly the occupation of women and children, chiefly girls, the home manufacture of textiles was removed in stages from the household, first by the development of machine cards, then by mechanized spinning, and finally by the power loom. Weaving, however, continued in some homes, for it was not until the 1830s or 1840s that figured fabrics could be woven on power looms. Though removed

from the household, textile manufacturing continued to be the domain of women and children, as they made up the majority of early workers in the small Rhode Island system mills throughout the region. Only in the woolen mills, where skilled operators of the spinning jacks and carding machines were required, did men outnumber women.

The early dominance in the region of cotton production over woolens was reversed during the 1860s and 1870s. In 1855, 77 cotton mills and 53 woolen mills were in operation. By 1875, there were 58 cotton mills and 73 woolen mills. This trend continued into the late 19th century; in 1895, 49 cotton mills and 93 woolen mills were in operation in the region. These woolen mills were concentrated largely in the southern half of the region: Worcester and Leicester (ten); Holden and Uxbridge (seven); Millbury (five); Dudley (four); and Brookfield, Auburn, Charlton, Sutton (three). In the northern portion of the region, Athol and Fitchburg each contained three mills, and mills were also located in Royalston, Templeton, Hubbardston, Leominster, and Hardwick.

The major factors in this shift were the disruption of the cotton supply by the Civil War, a large wartime demand for woolen uniform cloth, a series of protective tariffs favorable to woolen and worsted production, and the growth of large competing cotton manufacturing centers in Bristol County and in the southern states. As early as 1845, Worcester County was the state leader in worsted production, although by the 1870s, Middlesex and Essex county mills had achieved dominance. In the Central Massachusetts study unit, the major manufacturers of worsted cloth were the Hamilton Mills in Southbridge and mills in Worcester. Later in the century, worsted mills were also operating in Millbury, Auburn, Blackstone, Clinton, and Fitchburg.

Two other important textile manufacturing branches developed in Worcester County: linen and carpet-making. Factory-organized linen production was first carried out in the region in Grafton in 1826, where twine and bagging were made until the early 1830s. In 1846, the Stevens Linen Works were established in Dudley and quickly became the leading manufacturer of linen crash in the country. Through the late 19th and early 20th century, only the Stevens Linen Works in Dudley and a revived linen twine factory at New England Village in Grafton produced linen goods in the region.

The Central Massachusetts study unit gained importance in carpet manufacturing because of the inventions of Erasmus Bigelow and the incorporation of the Bigelow Carpet Co. in Clinton in 1854. A brilliant mechanic and inventor, Erastus Bigelow was responsible for many important inventions and improvements in textile manufacturing. He was granted 50 patents, 40 of which were for improvements in looms. Bigelow initially developed an ingrain carpet loom in 1842 for the Lowell Mfg. Co., followed by a Brussels carpet loom in 1845, a Wilton carpet loom in 1848, and tapestry carpet loom for weaving figured carpets in 1850. In addition, he obtained six patents for power looms for pile and cut carpeting between 1851 and 1857. Among his other more notable contributions were power looms for weaving coach lace (1837), knotted counterpanes (1838), gingham (1845), and wire cloth (1857). By 1849 he established with his brother Horatio Nelson Bigelow a carpet manufactory and machine shops in Clinton. The Bigelow Carpet Co. grew steadily through the century, merging with the Lowell Mfg. Co. in 1899, with the Hartford Mfg. Co. in 1914, and with S. Sanford & Sons of Amsterdam, New York in 1929. The Clinton mills were closed in 1933. Today they house the Nylon Products Co., which has rehabilitated the core of the former Clinton mills complex (National Register designation).

A second important carpet manufacturing center was located in Worcester. Because the Bigelow carpet looms were protected by patent, George Crompton and Horace Wyman of Worcester invented and patented a Brussels carpet loom of their own design and commenced manufacturing carpets in 1870. By the early 20th century, Whittall Associates operated the large complex of more than fifteen factory buildings in the production of "Wilton and Brussels carpets of the finest grades." The Whittall Co. continued to manufacture carpets in Worcester until the company was sold in 1950.

The invention, improvement, and manufacture of textile machinery, such as the development of carpet looms by Bigelow and Crompton, made Worcester County and its mechanics known worldwide. During the first several decades of textile manufacturing in this country, the manufacture of machinery was mostly carried out in small machine shops, usually attached to the textile mills. The earliest mills frequently had their machinery custom-built on the premises by skilled machinists and mechanics who travelled from new mill to new mill. By the 1810s and 1820s, however, independent machine shops had been established in most textile manufacturing towns in the Blackstone, French, and Nashua river valleys and supplied machinery on order to new mills.

As the industry matured and moved toward centralization, three major centers for the development and manufacture of textile machinery emerged by the Civil War, all in the Blackstone Valley: Worcester and Leicester, Northbridge, and Hopedale. Secondary manufacturing centers were located in Fitchburg, Millbury, Winchendon, Sutton, and Clinton.

The town of Leicester became a center of hand card production during the 1780s and gained importance in the manufacture and improvement of machine cards and card clothing in the next two decades. In 1789, Pliny Earle of Leicester provided the card clothing for Almy & Brown of Providence, Rhode Island, and later to Samuel Slater. Early improvements from Leicester included the invention of a machine for picking twilled cards (1797) and later a machine for automatically setting the wire teeth into the leather. By the 1830s, Leicester was the leading hand and machine card manufacturing center in the country, and it continued in that capacity into the late 19th century when the American Card Clothing Association dominated the town's industry. Other towns in which early hand and machine card making were carried on included Worcester, Sutton, Lancaster, and Holden. After the Civil War, major expansion into Worcester made that city with Leicester the leading manufacturers of carding machines.

Worcester established itself as an important machinery manufacturing center early in the 19th century. By 1811, the first independent textile machine shop was established, and by 1832 at least seven extensive machine-building firms were in operation. Among the significant developments and products of Worcester's shops were: the Goulding condenser, developed in 1826 by John Goulding, enabled carding machines to produce endless rolls, thus eliminating the billy and slubbing process and reducing the child labor force in the woolen industry; an improved shearing machine developed by Albert Curtis in the 1820s; and perhaps most important, a wide range of inventions and improvements on power looms. In 1837, William Crompton, an English mechanic, developed a loom able to weave fancy woolens by the substitution of a timing chain for revolving cams to guide the

selection of harnesses and thus the complexity of the fabric pattern. Crompton looms were initially built in Worcester in the shop of Phelps and Bickford and put into use at the Middlesex Mills in Lowell. In 1851, George Crompton, son of William, established himself in Worcester and continued the manufacture of the Crompton Loom. Within a generation at least three-fourths of all woolen cloth worn came from looms based on Crompton's design. George Crompton continued to improve the loom and in 1857 produced a broad fancy loom, which not only had greater width, but also greater speed and became more automatic with further improvement. In 1860 the Crompton Loom Works were erected in Worcester, and over the next two decades George Crompton and his associates were granted more than 100 patents for improvements on looms.

Lucius J. Knowles, the developer of the drop shuttle box in 1857, moved his loom building firm from Warren to Worcester in 1866. He continued to make improvements on the fancy loom with drop shuttle box mechanism, expanding the range of looms greatly. The Knowles Loom Works developed looms for weaving worsteds, narrow goods, flannels, dress goods, silk goods, fancy cottons, and ingrain carpets, among other materials. An important invention was the open shed principle, upon which all Knowles Looms were built.

In 1897 the Crompton and Knowles Loom Works were formed by a consolidation of the two loom building firms. Among their 20th-century improvements were semiautomatic and automatic looms, as well as many improvements and accessories to these looms. The company expanded greatly with sales in the millions of dollars annually. Both the 1860 Crompton and later Crompton and Knowles Loom Works survive in Worcester, though no longer in use for loom manufacturing.

The manufacture of textile machinery was begun in Northbridge by the Whitin family with the perfection of a machine for spreading and picking cotton in 1832. Ring spinning frames were soon added, and by 1843 production diversified to include cards, railway heads, spinning frames, and looms. The Whitin Machine Works specialized only in cotton machinery and profited greatly from the several boom periods in the industry over the next century: the Connecticut boom of the 1840s and 1850s; the Rhode Island and southeastern New England booms after the Civil War; and the Southern boom of 1880-1900. By the early 20th century, the Whitin Machine Works were one of the three largest makers of cotton preparatory equipment in the country. Important contributions included combing machines for high quality cotton yarn and machinery for silk, rayon, asbestos, twisted paper, worsted, and wool. The success of the Whitin Machine Works is reflected in the growth of the village of Whitinsville, built largely by the company for the several thousand employees. The village, extensive housing for employees built between the early 19th century and the early 20th century, and the factories survive intact, although the latter is no longer in operation.

The third major textile machinery center was located in Hopedale, where the industry was begun by Ebenezer D. Draper. Draper came to that portion of Milford in the 1840s as a member of the utopian Restorationist settlement known as the Hopedale Community, eventually becoming its president. Upon the termination of the industrial affairs of the community in 1856, Ebenezer and George Draper rapidly expanded their cotton and woolen machinery business. Several companies under their control or close affiliation developed in the village, and produced preparing, spinning (particularly high-speed ring spinning machinery) and weaving machinery, temples, stocking knitting

frames, and spindles. By the late 19th century, they controlled more than 400 patents and had sales exceeding one million dollars annually.

Among their greatest contributions was the development of the automatic Northrop Loom in 1894. By World War I the majority of the 400,000 looms operating in United States mills were made by the Drapers. The Northrop Loom included a series of inventions and improvements that revolutionized weaving, increased the number of looms tended by one person from four to 20 or more, yet required a less skilled operator. Further improvements during the early 20th century raised the number of looms that could be tended by a single weaver to 100. The Draper Corp. also developed a Rayon loom, followed by a high-speed loom which ran 20 percent faster than previous looms.

Hopedale was a model company town. It was owned almost entirely by the Drapers, who built a variety of community buildings and high quality housing for their employees. Although textile machine manufacturing has ceased, the village survives relatively intact.

A constant motivation of machine builders and textile manufacturers through the 19th century was the automation and simplification of machinery. This allowed operation by less skilled (and therefore lower paid) workers and improved their productivity. These changes shaped the workforce as much as the workforce shaped the needs of the manufacturers and machine makers. Difficulties with independent jack operators were partially overcome by the introduction of the self-acting mule; the Goulding condenser eliminated the need for many children in the woolen mill; the improvement of spinning operations and the development of semiautomatic and automatic looms reduced the number and skill requirements of spinners, weavers, and loom

attendants. All of these changes occurred during a period of great foreign immigration and economic change, when the Yankee workforce was being replaced by Irish, French-Canadian, and European laborers with little or no manufacturing experience.

The textile industry began its decline within the Central Massachusetts study unit, and throughout New England as well, during the 1890s when a severe depression and concurrent labor conflict hit the industry. Many mills were closed at this time. A revival of production during World War I and the following decade restored some vitality to the industry, but continued labor/management conflicts, the Depression of the 1930s, and the growing strength and importance of the newer, technologically advanced Southern mills signalled the decline of the industry in the region. Many mills were abandoned, burned, reused as chicken houses, destroyed by the 1938 hurricane, or removed to make way for the large public water projects related to the Wachusett and Quabbin reservoir systems created by the Metropolitan District Commission (MDC) between the 1880s and 1940s.

Survivals

Perhaps the most common and most significant categories of surviving structures in the study unit related to an industrial activity are those left by the textile industry: mill buildings, storage buildings, dams, company-built dwelling houses, and many virtually intact villages. The Central Massachusetts study unit contains more textile mill buildings and villages dating from the Federal and Early Industrial periods than does any other region in the state.

Textile manufacturing had a greater impact on the settlement pattern and the formation of the modern landscape since the early 19th century than any other industry. Although many textile manufacturing villages have vanished entirely, remaining only as archaeological sites, many more are represented by a variety of the above-mentioned survivals in both urban and rural contexts. The surviving structures range in date from the late Federal period through the early 20th century, and cover a wide variety of architectural styles and textile manufacturing technologies. The earliest structures and villages are nearly all found in the southern half of the study unit, particularly in the Blackstone, French, and Quinebaug River valleys.

Barre:	Barre Wool Combing Co. (1903 and later) and housing (1830s and later)
Blackstone:	Blackstone Manufacturing Co. Village (ca. 1810 and later)
Charlton:	Akers & Taylor Cady Brook Mill (1885) Akers & Taylor Spring Brook Mill (1877 and later)
Clinton:	Lancaster Mills and housing (1844 and later) Bigelow Carpet Co. spinning mill (1858 and later) Bigelow Carpet Co. weaving mill (1855 and later) Lancaster Quilt Co. mill (1838)
Douglas:	Knapp's Mill (ca. 1841 and later) W. E. Hayward & Co. mill (1863) Archaeological remains of textile mill and housing, Mumford St. (ca. 1820s)
Dudley:	Stevens Linen Works (1811 mill much altered; stone mills from 1846 and later) and housing (1840 and later) Perryville, stone warehouse (1874) Chase Woolen Mill (1860)
Fitchburg:	Duck Mill (ca. 1852) Parkhill Manufacturing Co. mills (1880s) Blackburn & Co. cotton mills (1860)

Grafton:	Saundersville mill and housing (1830s and later) Farnumsville Cotton Mills (1844, 1874) and village (1830s and later) Grafton Mills, North Grafton (New England Village) (1826, 1843, 1893) and housing (1820s and later) Fisher Manufacturing Co. mill (1898) and housing (1830s and later)
Hardwick:	Gilbert Manufacturing Co. mills and village (1860s and later)
Holden:	Jefferson Mill Housing (1820s and later) Lovellville Woolen Mills archaeological site (ca. 1850 and later)
Hopedale:	Draper Co. factories and village (1840s and later)
Leicester:	Rochdale Mills (1850s and later) and housing (1820s and later) Cherry Valley Woolen Mills (1878 and later) Bottomley Mill, Cherry Valley (1847 and later)
Leominster:	Leominster Mills (1865 and later)
Millbury:	Cordis Mills (1914) Bramanville mills: Mayo Woolen Mill #1 (1879, 1897) Nelson Walling Woolen Mill (1854) J. Brierly Cotton Mill (ca. 1886) Wheeler Cotton Mills (ca. 1850) Crane & Waters Woolen Mill (ca. 1820s) and housing (1820s and later)
Millville:	Housing (1820s and later)
Northborough:	Housing (ca. 1814)
Northbridge:	Whitin Machine Works and housing (1847 and later) Whitin Manufacturing Co., brick mill (1826) and housing (1820s and later) Whitin Manufacturing Co. stone mill, Whitinsville (1845 and later) Whitin Brothers Cotton Factory, Linwood (1866 and later) with housing (1860s and later) Paul Whitin Manufacturing Co. Cotton Factory, Riverdale (1852 and later) and housing (1830s and later) Paul Whitin Manufacturing Co. Cotton Factory, Rochdale (ca. 1856 and later) and housing (1810s and later)
Oxford:	Hodges Village Woolen Mill (1912) and housing (1820s and later)

	<p>T. W. Wilmarth cotton mill (ca. 1870) Sigourney Mill (1853 and later) Buffumville mill and housing (1847, 1872, and later) Acworth Mill (1831, 1870, and later) Thayer Woolen Co. Satinet Mill (1886) and housing (1830s)</p>
Southbridge:	<p>Hamilton Woolen Co. Mills, Globe Village mills (1836 and later) and housing (1810s and later)</p>
Sturbridge:	<p>Fiskdale Mills (1860 and later) and housing (ca. 1830 and later)</p>
Sutton:	<p>Manchaug Cotton Factory (1847 and later) and housing (1820s and later)</p>
Uxbridge:	<p>Wheelock Woolen Mills (Waucantuck Mills) (1838 and later) and housing (1820s and later) Rivulet Mill (1872 and later) and housing (ca. 1820 and later) S. W. Scott Woolen Mill (Elmdale Mill) (1879 and later) and housing (ca. 1830s and later) Rogerson's Village/former Crown and Eagle Mills (mills altered and rebuilt 1980-82 after fire) (ca. 1810 and later) Hecla Mill housing (mill demolished) (ca. 1825 and later)</p>
Warren:	<p>Warren Cotton Mills (1864, 1880, and later) and housing (1820s and later)</p>
Webster:	<p>East Village mills and housing (1810s and later) North Village mills and housing (1820s and later) South Village mills and housing (1820s and later)</p>
Winchendon:	<p>Glen Allen Mill (1886) Nelson Mills (1857 and later) B. D. Whitney Cotton Mill (1854)</p>
Worcester:	<p>Adriatic Mill/Lower Junction Shop (1854) Whittall Carpet Mills (1890 and later) Crompton Loom Works (1860 and later) Crompton & Knowles Loom Works (1890 and later) Sargent Card Clothing Co. (1866 and later) Ashworth and Jones Factory (1870 and later) Washburn & Moen Cotton Mill, North Works (1863)</p>

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Primary Iron Manufacture

The discovery of extensive bog ore beds in the southeastern and western portions of the Central Massachusetts study unit led to the development of primary iron manufacturing in the early 18th century. Perhaps the earliest furnace and forge in the study unit were erected in East Blackstone in 1716, as Rhode Island ironworkers expanded their operations into the northern Blackstone Valley. Bog ore was soon discovered elsewhere in the Blackstone Valley, and furnaces were erected at Ironstone in Uxbridge, at Northbridge Center, and Whitinsville (in Northbridge) by the 1730s under the direction of an assortment of local, Boston, and western Massachusetts ironworkers.

A second area of early primary ironworking was along the western portion of the study unit, where the iron-rich Brookfield Series soils predominate. By the 1750s a furnace for the manufacture of hollowware was in operation in Hardwick at Furnace Village, utilizing local bog ores from Hardwick, New Braintree, and West Brookfield. A second furnace was erected in Hardwick during the early 19th century; by the 1820s, both had ceased production. Furnaces and forges were also erected in Clinton (1740s), Oxford (ca. 1800), Warren (1800), and Brookfield (1826).

The exhaustion of local bog ore deposits, the availability of better iron ore, particularly from the Connecticut mines and furnaces in Salisbury, and the difficulty of transporting non-local ores to the interior furnaces had virtually brought an end to the region's primary iron manufacture by the late 1830s.

The development of extensive stove, machinery, and tool industries during the 19th century supported the several furnaces into the 1830s, but by the next decade only foundries operated in the region as pig iron was manufactured in Connecticut furnaces or elsewhere and imported. (See essay on Secondary Iron Manufactures for a discussion of edge tools, firearms, machinery and machine tools, and wire-making industries.)

Survivals

No known blast or air furnaces are known to survive intact in the study unit, although it is likely that some of the furnaces, particularly those in the more rural towns, might survive archaeologically.

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Secondary Iron Manufacture

Secondary iron manufacturing was one of the leading industries in the Central Massachusetts study unit for more than 150 years from the late 18th to the mid 20th centuries. The industry was initially linked to the iron bearing areas where primary iron manufacturing occurred. By the mid 19th century, foundries and forges were located in the major towns and cities of the study unit, supplying castings and tools for the many specialized manufacturers. (See essays on Textiles, Paper, Agriculture, Woodworking, and Shoe Manufacturing for discussions of machine manufacturing for those industries.)

By the late 18th century, a large number of triphammer shops throughout the study unit produced scythes, axes, hoes, and other agricultural tools. The largest concentration of triphammer shops occurred in the southern portion of Worcester County in the towns of Northbridge, Sutton, Oxford, Millbury, and Douglas, where as many as seven triphammer shops and forges were located in each town during the 1790s. In 1834 the Douglas Axe Co. was organized, and for the next 80 years the factories in East Douglas produced high quality axes and other edge tools. Extensive edge tool works also developed in Sturbridge, where Otis Snell commenced the manufacture of augers and bits in 1844, and in Fitchburg, which after Douglas was the second leading manufacturer of edge tools in the region during the 19th century. A major firm in Fitchburg was the Simonds Mfg. Co. (1868), makers of circular, crosscut, band, and hand saws. In Athol the L. S. Starret Co. (1880) and the Union Twist Drill Co.

(1890s) made that town an important manufacturer of mechanics' edge tools and drills through the mid 20th century.

The manufacture of firearms made important contributions to the early development of the machine and machine tools industries. Many machinists received their early training in the Millbury and Springfield armories. At Asa Waters' late 18th-early 19th century Millbury Armory, a number of significant improvements in metalworking technology were developed, among them inventions for welding gunbarrels (1817), turning gun barrels in a lathe (1818), and the idea of Thomas Blanchard's eccentric lathe. Firearms were also produced in Northborough, Dudley, and Fitchburg in the 1840s and 1850s, but it was Worcester that became the leading manufacturer of firearms within the study unit during the second half of the 19th century. Begun on a large scale by the firm of Allen and Wheelock in 1847, and greatly stimulated by the Civil War, the industry included the manufactories of Franklin Wesson (1859), Ball & Williams (1862), F. Copeland (1863), Harrington & Richards Arms Co. (1871), and Iver Johnson & Co. (1871). Among the inventions and products of the Worcester firearms manufacturers were the self-cocking revolver, the double-barrelled breach-loading sporting gun, a machine for making metallic cartridges, a shell-ejecting revolver, a hammerless rifle, the Ballard rifle, the Stevens Platoon gun, and a variety of other firearms from pistols to rifled cannon.

An important factor in the growth of machine industries in Fitchburg and Worcester was the development of those places as important railroad centers. Extensive machine shops and foundries were maintained by the several rail companies in those cities and stimulated the establishment of such auxiliary industries as the Osgood Bradley Car Co. and the Converse & Washburn Car Wheel Co., later the Washburn Iron Co., credited with the first patent for the improved car wheel (1847).

Manufacture of iron castings for machinery, firearms, steam boilers, and stoves was carried on in at least twelve towns and cities in the study unit. By 1860 foundries and forges were located in Brookfield (one: stoves and waterwheels); Northbridge (one: textile machinery parts); Barre (one: agricultural machinery); Millbury (one: firearms, textile, and agricultural machinery); Fitchburg (three: textile, agricultural, woodworking, paper-making, and metalworking machinery, edge tools, firearms, steam boilers); Spencer (seven: wire); Templeton (one: stoves); Worcester (two rolling mills, ten foundries: agricultural and machine tools, textile- , wood- , paper- and metalworking machinery, firearms, wire); Clinton (one: wire, textile machinery); Winchendon (one: woodworking and textile machinery); and Milford (one: textile and shoe machinery).

One of the leading metalworking industries in the study unit was the manufacture of wire and wire products, carried on principally in Worcester, Spencer, Clinton, and Charlton. Wire drawing in Spencer commenced in 1812 to supply the card factories in Leicester during the War with Great Britain, when imported British wire was unavailable. The operations remained small until 1847 when the firm of Sugden and Myrick was formed, and output expanded nearly tenfold. In 1870 the company became the Spencer Wire Co., increased production to 13,000,000 lbs. of wire in 1917, and erected a Worcester facility. Later the firm merged to form the Wickwire Spencer Steel Corporation.

In Worcester, wire drawing was begun prior to 1815, but it was not until Ichabod Washburn and Benjamin Goddard began the manufacture of wire for screws and card wire in 1831 that the industry grew significantly. Washburn and Goddard developed a wire drawing process that could draw an iron rod

fifteen feet through a die in one step, greatly reducing the time then needed to make wire. Over the next century the company became Worcester's largest employer with large plants at Quinsigamond Village, South Worcester, and the North Works above Lincoln Square. The company was responsible for many innovations, including the establishment of the first rolling mill in Worcester (1846); large-scale telegraph wire production after 1847; manufacture of steel wire for pianos after the development of a process for hardening and tempering piano wire in the 1850s; the installation of a Bedson mill in 1868; the control of virtually all of the patents for barbed wire and large-scale production of the wire after 1867, which stimulated the largest expansion of the company; drawing of copper wire as a substitute for iron in long-distance telephone and electric wires (1880s); manufacture of steel street railway cables (1880s-1890s); manufacture of insulated wire (1890). In 1899 the company was purchased by the American Steel and Wire Co. and in 1901 merged with the U. S. Steel Corporation, which operated the works through the mid 20th century.

In Clinton, the development of a power loom for weaving wire cloth by Erastus B. Bigelow in 1856 led to the establishment of the Clinton Wire Cloth Co., eventually the largest wire weaving establishment in the world. The firm was absorbed by the Wickwire Spencer Steel Corp. after World War I and operated until after World War II. Drawing of card wire was established in Charlton in 1868 and continued as the Prout Wire Works into the early 20th century.

The manufacture of machine tools, metalworking machinery, screws, and other metal tools was another significant industry, centered largely in and around the important metalworking centers of Fitchburg and Worcester. In Worcester the machine shops, factories, and foundries of L. W. Pond, Caleb

Calvin, L. & A. G. Coes, Reed & Prince, Standard Screw Co., and many others produced an incredibly wide assortment of machinery, tools, and fasteners throughout the last half of the 19th century and in the early 20th century. Fostered by a large community of skilled mechanics and machinists and a unique system of leasing factory space and power to small companies and shops, Worcester was able to achieve unparalleled prominence in the New England metalworking industries.

Survivals

A large number of buildings related to secondary iron manufacture have survived. Most date to the Late Industrial period and are concentrated in Fitchburg and Worcester, although large machine and tool factories survive in Athol and Winchendon as well.

Wire:

Clinton:	Clinton Wire Cloth Co. (1856 and later)
Worcester:	Washburn and Moen Co. North Works (1863-1930) South Works and Quinsigamond Village (ca. 1865-1930)

Tools

Athol:	L. S. Starret Co. (1880 and later) Union Twist Drill Co. (1890 and later)
Fitchburg:	Simonds Mfg. Co. (1868 and later)
Worcester:	Coes Mfg. Co. (1860s and later) Standard Screw Co. (1880s and later) Reed & Prince (1903)

Machinery

Clinton:	G. M. Palmer Foundry, Clinton (1860s and later)
Fitchburg:	Putnam Machine Co. (1866 and later) Fitchburg Foundry (ca. 1868 and later)

Winchendon: Goodspeed and Wyman Machine Shop (ca. 1860s and later)
 B. D. Whitney Machine Shop (ca. 1860s and later)

Worcester: Rice, Barton and Fales Machine and Iron Co., (1893 and later)
 Junction Shops (1851)
 Lower Junction Shops (1854)

Firearms

Worcester: Harrington and Richards Arms Co. (1893)

Several important iron manufacturing sites remain only as archaeological sites. These include the Asa and Elijah Waters Armory (1808-1845) in Millbury. In Sutton and Douglas several late 18th-early 19th century triphammer sites remain in fairly good states of preservation. In Douglas are also the remains of the extensive Douglas Axe Works (1830s to ca. 1900).

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Combs, Horn, and Plastics

Combmaking was introduced into Worcester County in 1774 when the Hills family moved to Leominster from West Newbury, an early combmaking center. Other West Newbury hornsmiths followed Hills, and by 1793 Leominster had twenty hornsmiths who produced 6,000 dozen horn, ivory, and shell combs. Combmaking spread from the Leominster area toward the southeast, as its hornsmiths moved to other towns. By the end of the 18th century, combmaking was established in South Lancaster (Clinton). By the 1830s, combmakers were working in Berlin, Bolton, Boylston, and Northborough. Horn was obtained from local tanneries, slaughterhouses, or farmers, but ivory and shell had to be purchased from Boston suppliers.

Leominster was the leading horn and comb manufacturing center in the county through the entire 19th and early 20th centuries, containing as many as 24 shops in the 1840s. Leominster's machine shops also introduced and manufactured a wide variety of combmaking tools and machinery. Among its products displayed at the 1876 Philadelphia Centennial Exhibition were men's combs, women's ornamental combs, and horn novelties. Clinton's horn and comb industry experienced growth parallel to that of the Leominster shops through the mid 19th century, entering the factory stage in the 1850s and 1860s. In 1870, the S. Harris & Sons steam-powered comb factory had the distinction of being the largest in the United States, employing up to 100 workers and using 5,000 horns per day, from which were made 1,000 dozen

combs. The factory closed in 1883 after a rapid decline in business, partly the result of the depression, partly due to changing fashion and market demands.

Another secondary horn and combmaking center developed in Northborough. Established in 1839 by hornsmiths from Hudson, the industry continued into the early 20th century, when the final factory closed about 1916. The combmakers in Northborough worked with shell, bone, and tortoise shell, as well as hooves and horn. They also engaged in related industries during the late 19th century, grinding bone and horn wastes into meal and fertilizer. In Berlin, Bolton, and Boylston, combmaking remained on a small scale until its disappearance by the 1860s.

Horn working and combmaking went through at least three major stages of development and organization during the 19th century. In the late 18th and early 19th centuries, the work was organized around the master/apprentice relationship and carried out in small shops or in the home, all done by hand. By the 1810s, cutting machinery was developed by inventive combmakers in Leominster and the other combmaking towns. In 1814, a Leominster man was granted a patent for cutting combs in a single operation; Farnham Plummer of South Lancaster (Clinton) invented another machine in 1826 that sped the cutting of combs and allowed one man to cut 120 dozen side combs per day. These improvements introduced the second stage, which utilized horse or water power in the larger shops. The master/apprentice relationship slowly broke down as task specialization occurred to keep pace with the mechanically speeded-up process. Further mechanization and the introduction of steam power required the organization of the factory system, which met the needs of quality control, employee supervision, and a more efficient and economical production process. Many of the smaller shops in Boylston and Bolton, unable

to compete with the larger Leominster, Clinton, and Northborough manufacturing, closed during this shift to factory organization.

Signs of decline in the industry occurred in the 1870s. The practice of dehorning young cattle made domestic horn difficult to obtain, and the manufacturers often had to import horn from South America. Bone and hooves were used more, particularly the former in button shops. Hard rubber combs, produced by Charles Goodyear's new vulcanizing process, threatened to become competitive with horn. However, the 1870 invention and development of celluloid by an Albany, New York printer revolutionized the industry. Over the next 40 years, Leominster took on a new leadership role in the adaptation of this material to its products, a role continued through the transition to petro-chemically-based plastics, earning it the title of "Pioneer Plastics City."

Celluloid, a substance essentially composed of pyroxylin and camphor, was obtained by treating cellulose with sulphuric and nitric acids. This material, plastic when hot, colorless and transparent or resembling ivory, easily molded and colored to look like coral, tortoise shell, amber, malachite, etc., began to be used on a large scale in the Leominster comb and toiletries industry in the early 1890s. However, it was not until the establishment of the Viscoloid Company in 1901 that this material gained wide use and distribution. This firm was formed specifically to produce sheets of Viscoloid, the trade name of the new pyroxylin plastic. Two other companies were formed by owners of Viscoloid to manufacture the combs and novelties from the Viscoloid sheeting. The growth of these firms was rapid; they merged into the Viscoloid Company in 1912, and by the early 1920s they employed over 2,000 men and women in a plant that covered 40 acres. The company became the largest manufacturer of combs, hair ornaments, and Viscoloid toys in America. In

1925 the company was purchased by DuPont & Co. of Wilmington, Delaware, of which it has remained a part to the present. In 1938 the Leominster plant became the first to make toothbrushes with bristles made from a synthetic material, nylon, which had been developed by the DuPont Company.

Numerous other plastics producers and plastic goods manufacturers were established in Leominster during the first three decades of the 20th century. Among the more prominent was the Foster Grant Co.; established in the 1920s, they initially produced toy sunglasses. Samuel Foster developed the first commercial injection molding machine in America in 1930, an extremely important development in the plastics industry.

Survivals

The majority of survivals from the extensive comb industry in Leominster date from the late 19th and early 20th centuries, when the introduction of plastics transformed the work process and workplace. At least two horn comb factories from the 1860s or 1870s have survived: the A. W. Williams Comb Manufactory and the G. L. Carter Comb Factory. In Clinton, a portion of the Harris Comb Shops, dating to 1860 and later, have survived, though in altered condition.

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Paper and Papermaking Machinery

The first paper mill in the Central Massachusetts study unit was built in 1775 in Millbury by Abijah Burbank. This was followed by the Worcester mill of the Massachusetts Spy printer, Isaiah Thomas, in 1793, and by a mill in North Leominster in 1796. The industry continued to expand in the next few decades into Fitchburg, Athol, Harvard, and Phillipston. By 1837, Worcester County ranked sixth in the state with 17 mills, clustered along the clean and chemical-free Nashua River in Fitchburg and Leominster, in Athol, and in Worcester and Millbury.

Fitchburg, possessing a number of waterpower sites on the Nashua River, emerged as the center of the industry in the region by the mid 19th century, dominated by the firm established by Alvah Crocker, a Fitchburg industrialist. Joining with a son of Abijah Burbank, Crocker, Burbank & Co. was formed in 1850. By 1874 they owned and operated eight mills in Fitchburg and became one of the largest producers of high-grade paper in the country.

An important factor in Fitchburg's ascendancy in the paper industry was the construction of the Fitchburg Railroad in 1845 and subsequent rail connections to the north and west over the next several decades. By 1900, Fitchburg was second only to Holyoke in Massachusetts paper production. Product specialties of the Fitchburg firms included card, lithograph, and book paper at the Fitchburg Paper Co., paperboard at the Fallulah Paper Co., and coated paper at the DeJonge Co.

Papermaking was established in Westminster at Wachusettville about 1850 by Franklin Wyman. Three mills operated at that location until 1892, when the mills were dismantled to protect the City of Fitchburg water supply. During the 1850s, Worcester emerged as an important manufacturing center of paper envelopes. In 1853 the first successful envelope-making machine was patented by Dr. Russell L. Hawes of Worcester, and production of the machines began in the Worcester machine shops of Goddard, Rice & Co. This machine allowed three female operatives to produce 25,000 envelopes in ten hours; by 1889, improvements in the machinery increased production and productivity to 70,000 envelopes in ten hours per female operative. The Bay State Envelope Co. was established in 1864, followed by at least four large firms. In 1898, the U. S. Envelope Co. was organized, composed of the ten leading envelope companies in the U. S., five of which were in Worcester. Also important was the manufacture of greeting cards, begun after the mid 19th century. By the early 20th century, Worcester firms produced more greeting cards than any other city in the United States.

The manufacture of papermaking machinery was largely concentrated in Fitchburg and Worcester. In Fitchburg, it was an important part of that city's machinery industry. The Union Screen Plate Co., established in 1872, produced the first sand-cast, bronze screen plates used in paper and pulp mills, and by 1920 controlled three-fourths of the international market in screen plates. The Brown Bag Filling Machine Co. manufactured machinery for paper bag and envelope-making and filling during the late 19th century. In Worcester, paper machinery was made by 1836 by Goddard & Howe and continued into the 20th century by the Rice, Barton & Fales Machine Co. and others. By the early 20th century, all of the largest envelope makers in the world equipped their plants with machines designed in Worcester.

Survivals

A number of paper mills from the Early and Late Industrial periods survive in Fitchburg, home of the Crocker, Burbank Co., established by Alvah Crocker in 1850.

West

- Fitchburg: Crocker, Burbank & Co. Stone Mill (1854)
Cascade Mill (1847)
Fitchburg Paper Co. Mills (1878, 1880, 1887)
- Fitchburg: Snow Mill (1884 and later)
Whitney Mill (1847 and later)
No. 7 Mill (ca. 1890 and later)
Pulp Mill #6 (1860s and later)
Snow Paper Co. Mill (later Fallulah Paper Co.) (1884 and later)
- Hardwick: G. W. Wheelwright & Son Paper Co. Mill (ca. 1865 and later)
- Leominster: G. W. Wheelwright & Son Paper Co. Mill (ca. 1865 and later)
- Templeton: Adams Paper Co. Mill (1909 and later)
- Worcester: Logan, Swift & Brigham Envelope Manufactory (1889, 1897, 1907)
W. H. Hill Envelope Co. (1890)

Extensive archaeological remains of paper mills are found in Wachusett Village in Westminster. Formerly the mills of Franklin Wyman, built ca. 1850, they were removed during the 1890s when the stream they occupied became part of the City of Fitchburg Water Works.

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CHAPTER 6

MANAGEMENT RECOMMENDATIONS

Changes in the Landscape

Transformations have continued to occur in the cities and towns of the Central Massachusetts study unit in the decades following 1940. Demographic trends set in motion in the region during the Early Modern period intensified, as central city populations declined and decentralized suburban residential development became widespread. The establishment of new, high-speed highway corridors and the relocation of commercial and industrial activities have helped to accelerate changes in the settlement structure of the area. In general, developmental change has been most intensive in the eastern part of the study unit, east of and between the Worcester and Fitchburg-Leominster regional cores, and has increasingly been influenced by the expanding Metropolitan Boston-Eastern Massachusetts region to the east.

Five major processes have contributed to modifications in the regional landscape over the past four decades. These have been: the construction of limited-access, interstate highway corridors and the upgrading and relocation of many state highway routes; suburban and exurban single-family residential development; the location of new industry in urban fringe areas and in suburban industrial parks; the concentration of commercial growth along highway corridors and in new regional shopping malls; and the continued decay

and abandonment of urban core areas, often accompanied by the large-scale removal of historic fabric by urban renewal projects. In addition to these major trends, five secondary (though still significant) factors have affected localities in the region. These include: the abandonment of rural farmsteads and agricultural buildings; watershed management and flood control projects; state forest development; sand and gravel quarrying; and rural recreational facility development.

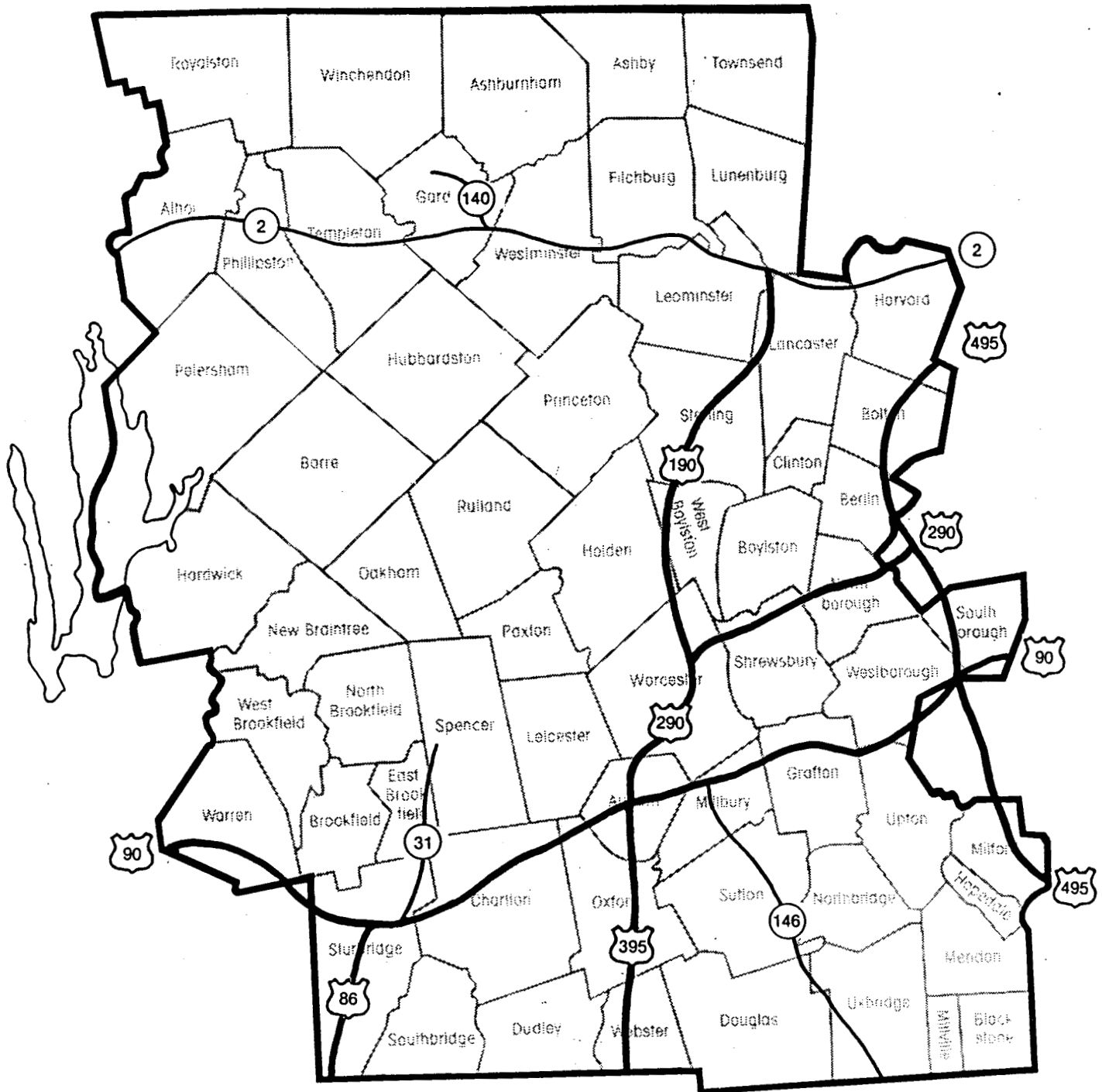
Highway Development

While the construction of high-speed automobile highway corridors was initiated in the Early Modern period, post-1940 expansion of the roadway system in Central Massachusetts has proceeded on a scale and with an intensity unprecedented in the history of transportation in the region. The expanding highway network has had a major impact on the landscape, particularly the multilane, limited-access routes, with their deep cuts through highland terrain, banked roadways across valley bottoms, and extensive interchange and access arteries. Road construction has destroyed resources across the entire range of sites and structures present in the region. The impact has been particularly intensive where these routes have been located through urban areas. The construction of Interstate 290 through Worcester was notable for its destruction of local landmarks and division of historic inner-city neighborhoods. Throughout the region, the roadways themselves have become massive features in the landscape, dividing communities both physically and visually. In towns where several routes converge, such as Auburn or Sturbridge, only a fragmented historic landscape remains. When considered in relation to the general local development that they also

stimulate, highways have been a central force in the attrition of cultural resources in the region since 1940. See Map 24.

Early expressway development included the post-World War II completion of the high-speed Route 146 connector between Worcester and Providence, with sections through Sutton and Uxbridge. By the early 1950s, construction of projected segments of the new, east-west Route 2 corridor across the northern part of the region had also been completed. This was followed by the opening in 1956 of the new Massachusetts Turnpike corridor across the southern part of the region, with interchanges in Millbury, Auburn, and Sturbridge. The new scale of construction involved in the creation of the limited-access Massachusetts Turnpike project marked the beginning of a new era of subsequent interstate highway development that has continued to the present. New routes have included: the I-86 connector south from the Massachusetts Turnpike in Sturbridge; I-290 from Auburn through Worcester and east through Shrewsbury and Northborough; and I-495 along the eastern edge of the study unit. More recent additions have been the I-395 extension south from Auburn through Oxford and Webster, and the I-190 connection between Worcester and Leominster through the central part of the region. Reconstruction of state highway routes has also continued, most notably with the establishment of a new Route 2 through Gardner, Templeton, Phillipston, and Athol, and the ongoing widening and reconstruction of Route 146 in the south. More local impacts have come from the construction of a new Route 49 connector in the southwest through Sturbridge and East Brookfield, and the new Route 140 bypass in Gardner in the north. Widening and reconstruction of other established state highways have been regular occurrences.

Limited Access Highways and Interstates (1955 to present)



— Interstate Highways
 — State Highways

Suburban and Exurban Development

As is the case with highway development, suburban growth has followed trends set in motion during the Early Modern period. Residential development has continued to spread outward from the region's urban cores far beyond the immediately surrounding "bedroom communities." More recent economic development along the I-495 and I-290 corridors has stimulated widespread suburban growth in the towns in the eastern part of the region. Seasonal and second home construction has continued around the area's ponds and in rural, highland areas of the north, northwest, and west. Few communities in Central Massachusetts have not experienced some form of post-1940 suburban development.

An examination of relative population changes over the past 40 years (1940-1980) reveals where the impact of suburban growth has been greatest. In that period, the populations of Lunenburg, Northborough, and Paxton have quadrupled, while those of Bolton, Holden, Princeton, Shrewsbury, and Townsend have more than tripled. The population of Harvard has increased more than 600%, but a large percentage of this is attributable to the military base at Fort Devens. All of these towns are in the east, or within the Worcester suburban zone, or both. An additional nineteen towns have at least doubled their populations. These include: Lancaster, Leicester, Mendon, Oakham, Ashby, Auburn, Berlin, Royalston, Charlton, Oxford, Phillipston, Rutland, Southborough, Sutton, Upton, Westborough, West Boylston, West Brookfield, and Westminster. Again, the majority of these towns are in the east or in the Worcester suburban zone, with notable exceptions at Phillipston and Royalston, which have grown as Athol suburbs in the northwest.

While changes in these communities have been most dramatic, concentrations of suburban development have also continued within the boundaries

of the region's urban areas, where expansion in the outer areas has been masked by depopulation of the central cores. Nevertheless, it is notable that suburban development has had its greatest impact largely in towns that were rural in character before 1940. While agricultural abandonment usually preceded suburban development, the expansion of residential development has primarily affected the cultural resources of the study unit's rural periphery: dispersed archaeological sites, farmstead complexes, agricultural landscapes, and historic transportation corridors. At the same time, the demand for local services and commercial development has adversely altered many local historic village centers.

Industrial Development

A third significant factor in the transformation of the post-1940 landscape has been the dispersal of new industrial development out of the established urban cores. In the first decades following 1940 this relocation continued to concentrate along highway and rail corridor locations at the fringes of the region's major urban areas. In Worcester, expansion took place at the Norton Company complex in the north at Greendale, and industrial development extended north along the Route 12/railroad corridor into West Boylston. In the southern part of the city, new development located along the Route 20 corridor, along Route 12 into Auburn, and along Route 122 into Grafton, where Wyman-Gordon located a major plant complex. Similar expansions took place in the Fitchburg-Leominster area, with growth at West Fitchburg and at Leominster along the Route 12 corridor.

More recent development has, however, been reoriented toward industrial complex and park site locations with access to the interstate highway network. Again, the greatest concentration of this activity has occurred in

the east, particularly with the expansion of high-tech development into the region along the I-495 corridor. The focus of new industrial development in the region has been the town of Westborough. Here, the convergence of I-495, the Massachusetts Turnpike, Route 9, and the Conrail freight corridor has proved a major attraction, and large-scale plant development extends across a central section of town between Route 9 and the railroad. This development has extended west along the Route 9 corridor into Shrewsbury and east along Route 9 into Southborough. To the north, where I-290 access is also available, industrial growth has intensified in Northborough. To the south, I-495 has stimulated new development at Milford. Outside this newly emerging regional core, industrial park growth has occurred at Auburn where I-290, I-395, and the Massachusetts Turnpike converge. Further south, I-395 has led to new industrial development at Webster. In the north, new industrial plants have been located along Route 2 in Westminster and Gardner and south of Fitchburg along the Route 12 corridor in Leominster and Sterling. This is expected to continued with the recent completion of I-190.

Besides access to the regional transport corridors, new industrial development has sought locations on major tracts of well-drained, level land on which extensive plant facilities can be constructed. In many instances, this has resulted in the conversion of agricultural lands to industrial use, with attendant loss of rural landscape, and dispersed, functional agricultural structures and farmstead complexes.

Commercial Development

The spread of industry and residential growth after 1940 resulted in a relocation of the demand for services and retail activities, a process that has

given rise to new forms of commercial development. This relocation has been an extension and intensification of trends established in the Early Modern period, when relocation of commercial activities out of congested downtown areas began. In the subsequent four decades, highway improvements and the nearly universal use of automobiles have generated a new pattern of commercial location within both the cities and the suburbs. Early auto-oriented, commercial development appeared at the fringes of urban areas, where it was oriented toward both the regional traffic flows and daily commuter movement. Linear commercial growth extended along well traveled highway corridors. Smaller commercial clusters developed along the main routes in suburban towns, and local shopping malls were built around the edges of the regional urban cores. The development of high-speed, interstate highways further accelerated the dispersal of commercial activities. Major retail outlets relocated out of the urban cores to new, regional shopping malls at accessible sites in the more densely occupied suburbs. Development continued along the major state highway routes, as extended regional commercial corridors developed and urban fringe corridors were rebuilt.

In Central Massachusetts, then, the impact of commercial relocation has been greatest around the region's urban cores, and in the developing suburban zone to the east. In Worcester, the major urban automobile corridor extends from Webster Square along Route 9 and Route 12 to West Boylston to the north. Several local shopping centers developed at the city's edge, and a regional shopping mall is located to the south at Auburn. East of Worcester, Route 9 is an important regional commercial corridor. Although the Shrewsbury segment remains the main focus, development is continuing east through Westborough and Southborough toward the edge of the study unit.

Local commercial corridors have developed at Grafton (Route 122), Holden (Route 122A), and Northborough (Route 20), with significant impacts on the historic town centers in the latter two locations. To the north, intensive linear commercial growth has occurred along the Route 12 corridor between Fitchburg and Leominster. Local shopping centers were located on the Fitchburg eastern urban fringe toward the Lunenburg suburbs, and the Searstown regional mall was located in Leominster. Suburban linear commercial development has occurred around town centers in Lunenburg, Townsend, and Westminster. Local commercial corridor/shopping mall development has taken place in the region's smaller urban areas, including Gardner, Webster, Southbridge-Sturbridge, and Clinton. Shopping mall development has intensified at Milford in the southeast since the opening of I-495.

Commercial development poses a continuing threat to a wide range of cultural resources. Large-scale mall development often removes entire complexes of historic agricultural or residential features. Urban auto corridor expansion can often have an impact on high-density groupings of residential neighborhoods, or on historic fringe activities. Local suburban corridors often alter the character of historic center village landscapes. The regional Route 9 corridor, located along the route of the Boston and Worcester Turnpike, several early 19th century turnpike hamlets are threatened. Early Modern period commercial complexes have also been overwhelmed and replaced by subsequent corridor development. As is the case with other present developmental processes, the greatest anticipated impacts will continue to be in the communities in the eastern part of the study unit, particularly near the I-495 and I-290 interchanges. Secondary development will persist along I-190 and I-395, north and south of Worcester in the central part of the study unit. In the north, expansion is likely to continue along Route 2.

Decay, Abandonment, and Renewal of Urban Areas

The decentralization of residential, industrial, and commercial development in the region has been accompanied by significant levels of deterioration in the historic urban core areas of Central Massachusetts. Removal of traditional industries from the region and relocation of people and businesses to the suburbs have often left chronically depressed city centers, characterized by vacancies, property abandonment, and arson. The largely wood-frame, late-19th century housing stock has been particularly susceptible to this process. Maintenance of the surviving residential stock has generally involved exterior re-siding with asphalt, asbestos, aluminum, or vinyl materials. The response of many city governments in the 1960s, encouraged by federal programs, was to undertake large-scale urban renewal projects that rebuilt inner city areas. In Central Massachusetts, this process is most evident in Worcester, where most of the historic fabric of the central district east of Main Street was removed and replaced by the I-290 corridor, a shopping mall, public housing, and a civic center. Similar, though smaller-scale, changes took place in Fitchburg, where urban renewal removed much of the riverfront historic development. Varying degrees of deterioration, structural loss, or small-scale renewal are apparent in most of the region's smaller cities, including Clinton, Leominster, Gardner, Athol, and Webster. Downtown centers in Milford and Southbridge appear to have had greater resilience, although they have by no means been free from losses. In general, the loss of components of the historic urban landscape remains a serious problem in the region. Nevertheless, a remarkable increase in local efforts at restoration and adaptive industrial and commercial reuse has taken place in many towns over the past several years.

Decline in Agriculture and Rural Abandonment

Decrease in agricultural production has been a significant fact in many rural Central Massachusetts communities since 1940. While dairying and orcharding remain important economic activities in several communities, competition by produce from the South and West has reduced commercial market gardening to a relatively rare feature in the regional landscape. Particularly in the east, agriculture has come under pressure from commercial, industrial, or residential development, and surviving field and farmstead complexes in these areas face the greatest threats of removal in the immediate future. The threat is particularly significant in that many of the farmsteads represent and preserve components of the development of agriculture in the region over the past 250 years, with surviving 18th century residences and field boundaries, 19th-century outbuildings, and present land use practices. Where developmental pressures have been less intense, particularly in the west and northwest, rural abandonment has continued to occur, as residential and functional structures are allowed to deteriorate. In particular, the attrition of barns, outbuildings, and specialized functional structures has continued even when residential buildings are maintained.

Watershed Management and Flood Control Projects

Widespread regional losses from the hurricane-induced flooding of 1938 and 1955 stimulated the introduction of a number of flood control and watershed management projects in Central Massachusetts. While protecting many downstream cultural resources from future damage, the Army Corps of Engineers projects also involved the removal and/or flooding of significant

numbers of sites and structures, particularly in the rural, peripheral areas. Watershed management projects in the study unit include: the West River Dam in Uxbridge, Hodges Village Dam on the French River in Oxford, Buffinsville Dam in Charlton, Westville Dam in Sturbridge, Barre Falls Dam on the Ware River, Tully River and Birch Hill dams in Royalston, and the Otter River flood control area in Templeton and Winchendon.

State Forest and Park Development

Often located in relation to watershed management projects, state forests and parks have also had a significant impact on cultural resources in the study unit's rural areas. The continued expansion of state forest and park properties has met alterations in land use, removal of historic properties, and the occasional disturbance of both prehistoric and historic archaeological sites. At the same time, passive park and forest areas have played an important preservation role, particularly for relict rural landscape features and archaeological resources. State forests are located in the following towns: Northbridge, Uxbridge, Sutton, Upton, Douglas, Spencer, Oakham, Petersham, Hubbardston, Templeton, Royalston, Winchendon, Ashburnham, Ashby, Townsend, and Leominster. State reservations have been established at Purgatory Chasm in Sutton and Wachusett Mountain in Princeton. Seven additional state parks have been created in these towns: Charlton, Sturbridge, Paxton, Rutland, Winchendon, Townsend, and Worcester. In addition, the recently created Gardner Heritage State Park is the first urban historical park to be located in the region, and is expected to have a positive impact on the cultural resources of that city's core area.

Sand and Gravel Quarries

Sand and gravel quarrying remains one of the few active extractive industries in the study unit. Quarrying continues to threaten archaeological sites, and occasionally destroys historic structures. Although widely dispersed in the area, quarrying is most evident in towns in the eastern and southern halves of Central Massachusetts. The greatest concentration of activity in the region occurs along the Route 146 corridor south of Millbury through Sutton, Douglas, and Uxbridge. Activity is also high in most of the towns east of Route 146 on the Blackstone River and its tributaries. Smaller clusters of quarries occur just to the north in the Shrewsbury, Northborough, Westborough area, and in the Sterling, Lancaster, Berlin, Bolton area. In the southwest, quarrying has concentrated in Sturbridge, East Brookfield, and Spencer. In the northeast, quarries extend along the Route 2 corridor in Lunenburg, Leominster, Fitchburg, and Westminster. They also occur in the northern tier towns of Townsend, Ashburnham, and Winchendon.

Recreational Facility Development

In the Central Massachusetts area, post-1940 rural, recreational development has largely consisted of cottage development around the region's ponds and more recent second-home construction on scenic upland sites in the northwest. This exurban growth has been an extension of the 20th-century trends of regional suburban and exurban expansion. The recent development of ski slope facilities on Wachusett Mountain in Princeton represents a new scale of recreational development in the study unit.

Current Threats to Cultural Resources

The attrition of surviving cultural resources in the Central Massachusetts study unit continues at present as part of an ongoing process of regional maintenance, development, and reorganization. By identifying the general pattern of resource loss, and the major factors contributing to the destruction of structures, sites, and landscapes, a basis for formulating local and regional management schemes can be provided. In general, cultural resources face threats from two basic processes: active development that removes or significantly alters the resource or its context, and abandonment that results in deterioration and eventual loss. In Central Massachusetts, active development includes the various manifestations of industrial, commercial, and residential growth that both intensively and extensively alter the cultural landscape. Abandonment encompasses a variety of forms of disinvestment and demolition in both urban and rural locations.

In Central Massachusetts, development threats are currently greatest in the eastern half of the study unit. This area has continued to experience intensive growth as part of both the Worcester and Fitchburg-Leominster core areas, and the expanding adjacent Eastern Massachusetts region. Development has continued along the east-west Route 2 and Route 9 corridors, and has been spurred on by the location of five of the study unit's six interstate highways in the east. New highway construction has been both a cause and an effect of this growth and poses several issues of concern. One is the direct impact of the highway itself. More important, however, are its secondary effects. As new interchanges are built, large areas of previously inaccessible land become available for development. Easy access to highways make such locations

highly desirable for residential (apartment/condominium complexes or single-family tract housing), commercial (shopping malls or office parks), and light industrial development. The problem is that little of this secondary development falls within existing review processes in terms of its impact on cultural resources. Since these developments may involve hundreds of acres and are seldom planned to be compatible with the existing landscape, they are major factors in the continued erosion of the historical character of Central Massachusetts.

Within the eastern area, a new regional core has emerged in the Westborough area where the convergence of transportation lines and available lands have resulted in significant local industrial plant construction. Recent archaeological investigations at Cedar Swamp have demonstrated that there is also a high potential for significant archaeological sites in the Westborough area, and that new construction frequently occurs in areas of greatest sensitivity. From the Westborough core, industrial growth has spread into the adjacent communities of Northborough, Southborough, and Shrewsbury, and a secondary core appears to be developing to the south at Milford. Growth will likely continue to progress from east to west in the region, from I-495 to I-190 in the north, and from I-495 to I-395 in the south.

Significant future development may occur in the Blackstone Valley region. Proximity to I-495 and reconstruction of Route 146 have improved access to the area, which has for the most part been chronically depressed in the post-1940 period. Residential development has already had an impact on Sutton, Grafton, and Upton in the north, and Milford continues to expand as a commercial and industrial focus to the east. Growth may therefore soon accelerate in Northbridge, Uxbridge, Douglas, Millville, and Blackstone.

Further west, new development is likely to continue along the I-395 corridor through Oxford and Webster.

While threats from development are not as acute in other portions of the study unit, the same problems occur at a lesser scale. These include new construction that is drastically different in size, density, and appearance from its surroundings, insensitive reuse of existing buildings, and inappropriate infill. In rural areas, intensive farming techniques (especially deep plowing) and certain forest management practices, remain serious threats to archaeological sites.

Abandonment and deterioration continue to threaten resources throughout the study unit. While development pressures are greatest in the east, abandonment remains a problem in the region's 19th-century urban and industrial cores and in rural areas, particularly in the west and north. At highest risk is the region's surviving 19th- and early 20th-century, wood-frame housing stock. Deterioration from aging has been compounded by maintenance schemes unsympathetic to historic fabric, and by low levels of recognition of historic significance. High arson and demolition rates continue to deplete historic residential neighborhoods. Similar threats to commercial and industrial structures also remain high.

The continued deterioration of rural structures also presents a major threat. While residential abandonment is less extensive in rural areas, it remains a common problem. Long-term vacancy of historic structures often results in vandalism or scavenging of architectural elements. In a similar manner, digging for bottles and other kinds of "pot hunting" activities threaten, if not destroy, archaeological potential. Even when residential structures are maintained, changing agricultural practices, agricultural abandonment, and residential subdivision all lead to abandonment of barns and other outbuildings. Rural industrial resources face similar threats.

Recommendations for Prehistoric Resources

State of Knowledge

Information on the prehistory of the Central Massachusetts Study Unit is uneven and not based on the results of systematic survey or excavation. At present, information is best from the Chicopee Drainage where several areas have known high site densities; but even here internal site structure and the relationships of sites to one another is not fully known. The Blackstone and upper Concord drainages are reasonably well represented in the archaeological record, although little more than minimal cultural/temporal data is currently available. The Nashua, Thames and Millers drainages are as yet poorly known.

As archaeological research continues, largely in the form of collections analysis and cultural resource management studies, new patterns of prehistoric settlement are slowly emerging. Sites are being identified in previously unknown areas, and the landscape is slowly filling in with recorded prehistoric sites. It is probable that the disparity in site density between the Chicopee Drainage and the Millers or Nashua river drainages is more a function of the intensity of collecting activity than a reflection of prehistoric settlement. Although there probably were differences in natural biota and subsistence resource potential, as well as in the character of the rivers themselves, there is no reason to suspect that the Millers, Nashua or Thames river drainages were significantly less attractive to prehistoric peoples than the more heavily collected Chicopee, Blackstone or Concord drainages, certainly not to the degree that is suggested by the archaeological record.

Generally, survey information is best in lowland areas surrounding the major waterways, ponds, and smaller streams. Sites located at the confluences of streams were, as elsewhere in the state, favored locations. The headwaters of relatively small and insignificant streams were also occupied, and wetlands were utilized throughout the study unit. Upland areas are less well documented. Often such sites were short-term, special-purpose sites which are difficult to detect even under controlled conditions. Most of the towns in the northern tier of the study unit are virtually unknown archaeologically. The topography here is characteristically more rugged and less well watered than other portions of Central Massachusetts, and although site density in the northern areas may not have been as high as in others, the present archaeological record is not a reliable index of prehistoric occupation there.

Preservation Priorities

Survey Priorities

The artifact collection analysis performed as part of the preparation for this report has greatly increased the knowledge about the prehistory of some parts of Central Massachusetts. Over 100 previously unrecorded sites have been added to the MHC files. By employing this newly expanded data base in conjunction with the expected threats, critical informational needs can be identified and suggestions offered as to where research and preservation efforts should be focused. The priorities for survey outlined below serve only as a general framework for addressing preservation issues and were generated from the overall trends and expected changes to the landscape discussed elsewhere in this document.

During the course of any given year, any individual archaeological site or community may be faced with extenuating conditions or circumstances which will require immediate, if not extraordinary, attention. The survey priorities discussed here are but one aspect of a statewide preservation plan which will always have the flexibility to review and respond to individual threatened resources or cases.

Because population growth and its attendant development will be greatest in the eastern half of the study unit, this is where prehistoric sites can be considered at greatest risk. Additional survey work should therefore be given a high-priority status. Included in this area are most of the Nashua and Blackstone river drainages and portions of the upper Assabet and Sudbury drainages. Because the archaeological record for these drainages is so uneven, data gathering performed at the most basic level, the reconnaissance survey, should be conducted as an initial step toward adequate resource protection. Reconnaissance level surveys designed to find and/or verify the existence of prehistoric sites should include analyses of existing artifact collections, documentary research, and when necessary, carefully planned field testing. The towns in the high-risk category for which reconnaissance level surveys should be given high priority are: Auburn, Berlin, Blackstone, Bolton, Boylston, Clinton, Douglas, Fitchburg, Grafton, Harvard, Hopedale, Lancaster, Leominster, Lunenburg, Mendon, Millbury, Millville, Milford, Northborough, Oxford, Shrewsbury, Southborough, Sterling, Sutton, Upton, Uxbridge, Westborough, West Boylston, and Worcester.

A second priority for reconnaissance level surveys includes many northern tier towns and those in the western half of the study unit. These towns are also typically lacking in reliable and substantive data, however, as a group they may not be at as high a risk to developmental threats as the first group.

Reconnaissance level surveys should also be considered when necessary as a second order of priority for Ashburnham, Ashby, Athol, Barre, Dudley, Gardner, Holden, Hubbardston, Leicester, North Brookfield, Oakham, Paxton, Phillipston, Princeton, Royalston, Southbridge, Sturbridge, Templeton, Townsend, Webster, Westminster, and Winchendon.

The overall grouping of first and second order priorities for surveys should not be construed as an attempt to prejudice preservation planning by singling out areas of greater archaeological significance. In general, not enough is known about the nature of the cultural resources of either the eastern or western halves of the study unit to make such judgments. The criteria of ranking as proposed here is based solely on expected development and the immediacy of informational needs. Some of these towns have no known prehistoric sites while others have only a few. Even in towns where many prehistoric sites are known, large areas typically remain unsurveyed although they often exhibit considerable archaeological sensitivity based on environmental and topographic characteristics. In summary, there is no town in the study unit that could not benefit from additional survey work at either the reconnaissance or site examination level; however, some may face more immediate threats than others.

The means by which these reconnaissance surveys could be performed are numerous. The towns identified above should be encouraged to implement surveys on their own if possible or hire professional consultants, and seek financial assistance from the State Planning and Survey Grants Program. A number of planning and preservation groups, academic institutions, and even qualified individuals should be encouraged to become involved in the process and seek grants to conduct reconnaissance surveys.

Surveys of publicly owned land should also be given a high priority. Public agencies such as the MDC, the Department of Environmental Management (DEM), Massachusetts and United States Fish and Wildlife Divisions, as well as private groups such as the Massachusetts Audubon Society which manage a great deal of land, should integrate archaeological preservation priorities into their general land management plans using reliable survey information as a data base. Some of the above groups have already initiated archaeological surveys on properties within the study unit. Smaller land use agencies, those at the town level for instance, should also be encouraged to integrate archaeological preservation policies, beginning with reconnaissance level survey, into their management plans.

Also of concern and of high-priority status are the possible impacts to sites of potential archaeological significance which are presently well known. Potentially significant prehistoric sites are known for the Brookfield, New Braintree, Warren, Hardwick, and Petersham areas, where they have been visited by artifact collectors for many years. However, most of these sites have never experienced controlled field testing, and their present integrity is largely unknown. Site examinations involving limited subsurface testing should be conducted in order to evaluate the integrity, research potential, and archaeological significance of the sites. Only with this type of data can they be successfully protected.

The present survey of the Central Massachusetts study unit has been by no means exhaustive. The constraints on the survey team have, by necessity, been numerous. Although collections analysis has added over 100 previously unrecorded sites to the MHC site inventory, many more are known to local collectors. Collections analysis should be an ongoing process that continuously upgrades the data base.

Protection Priorities

As a general framework for protection priority, initial efforts should focus on the eastern half of the study unit, which has been identified as a high-risk zone and in immediate need of survey work. At present, only a few prehistoric sites have been protected through listing on the National Register of Historic Places, the State Register of Historic Places, as Massachusetts Archaeological Landmarks, or within local historic districts. In part, this has been due to the kinds of information required for listing. Specifically, evaluations of site integrity and justification of site boundaries are needed. Both of these generally require field testing. An additional problem is that many of the sites for which excavation data are available have lost most or all of their integrity (e.g., Horne Hill Quarry).

It could be argued that, except for a few small sites which have been professionally tested during the course of CRM studies (e.g., Route 146) and those sites known to have already been destroyed, virtually every site in the eastern portion could be a candidate for further investigation and possibly formal protection of some kind. In the western half of the study unit, the state of knowledge is better, both on a regional basis as well as at the site-specific level. It is from the Chicopee Drainage that the best archaeological data for Central Massachusetts currently exists. Here there are a number of significant known sites; however, they have not been subjected to the rigorous testing required to evaluate site boundaries and integrity. In fact, the amount of past archaeological excavation has undoubtedly adversely affected the integrity of many sites in this region.

In areas where known site density is high and some information is available (for example, from collections research), the nomination of archaeological districts is recommended. At Cedar Swamp, where excavations at a number of sites are in progress, an archaeological district nomination has been suggested. The successful inclusion of such a district on the National Register would establish a useful precedent for protecting other sites and districts which lie in the high risk/high priority zone in the eastern half of the study unit. In the western portion of the study unit, archaeological district nominations should also be considered for the Winimisset Valley, Quaboag Pond, and the upper Quaboag River Valley because all contain clusters of known prehistoric sites, many of which appear to have escaped severe disturbance. However, additional information would have to be gathered for each of these potential districts.

Another approach to registration of prehistoric sites is to include them, whenever possible, within multiple resource nominations or large districts of historic properties. This approach usually involves a larger segment of the interested local community in the preservation effort. Such involvement serves to educate and alert more of the public about the importance and fragility of prehistoric archaeological resources. An informed and concerned community is the most reliable means of protecting prehistoric sites.

With the current decline in agricultural land use and the subsequent development of former agricultural lands, efforts are currently underway to preserve this valuable land in many parts of Massachusetts. Integration of archaeological preservation concerns with agricultural preservation interests to develop comprehensive land use planning policies should be encouraged.

The development of a program of conservation and preservation easements for the protection of archaeological sites would be one way to do this. Such a program should be associated with other open space and land use planning programs in both the public and private sectors.

Other Recommendations

Because of the amount of land under MDC and DEM stewardship, it is imperative to maintain a close working relationship between these agencies and the Massachusetts Historical Commission. Efforts along these lines have been initiated and should be pursued in order to develop an open dialogue. The possibility of the MDC developing its own in-house archaeological capabilities, which would be sensitive to the needs of the agency as well as to the archaeological resource base, should be explored. Additionally, the MDC should have a Cultural Resources Management Plan, which would specifically address the issues pertaining to the identification, assessment, and preservation of cultural resources under their jurisdictions. The management plan recently prepared for DEM provides a good model for other state agencies to follow.

Cultural resource managers should schedule a field trip to the Quabbin Reservoir at a time of low water in order to witness the process of site erosion and exposure which is occurring seasonally and to assess the effects which the oscillating water levels have had on site integrity.

The lack of curatorial facilities is a critical problem in the Central Massachusetts study unit, as it is in the rest of the state. Recently the Springfield Museum has provided professional curatorial facilities for collections from the Brookfield area. Local libraries and historical societies

throughout the study unit have long provided space for archaeological collections; however, they are often unable to provide adequate space or long-term security for materials and written records. A statewide, regional repository or other alternative is needed, and until such a facility is developed some collections will be housed in Springfield; many others will be less fortunate, and some will be broken up and lost entirely.

Recommendations for Historic Period Resources

Introduction

This section attempts to describe and to locate the cultural resources that survive in the Central Massachusetts study unit. These resource survivals are the physical remains of human activities described in previous chapters. Therefore, they are similarly organized within each of the six periods used throughout the report. A brief summary overview describes significant historical patterns for each period. This is followed by a description of the relative survival of resource types, and an evaluation of our knowledge and understanding of these resources. This provides the basis for the management recommendations presented next in the section. Finally, a chart summarizes the survival of significant clusters of resources.

As in earlier reports, this chart of survivals focuses on associated activities and structures rather than on isolated or single-component sites or individual buildings. A typology of period survivals is presented, first considering the archaeological potential for period activities, followed by successively more complex associations of landscape features. For each period the towns are listed within the core-periphery hierarchy of that period. In contrast to earlier reports, however, all towns find a place in this presentation to allow users to trace individual towns through time. Three symbols are used on the charts: an "X" indicates high potential or that survivals of importance are known; a "?" indicates that important period survivals may be present; a blank indicates little likelihood of significant period survivals.

Contact and Plantation Period (1500-1675)

Summary Overview

The Contact and Plantation period in Central Massachusetts exposed the Native American population to increasing contact with European goods, explorers, and settlers. Primary locations of native groups in the area's river valleys are known from the historic literature. The influence of contact on the patterns of seasonal movement and the size and composition of the groups, as well as interaction of the groups, is less well known. Prolonged secondary contact and an upland ecology distinguish this region and its people from the better known coastal and riverine systems to the east and west. Attempted settlement by colonials did not take place until the mid 17th century. Praying towns were established after 1651 and plantation grants followed shortly thereafter. Most of the region's population left the region due to King Philip's War.

Survivals

King Philip's War and the subsequent dispersal of population precludes the existence of period standing structures. Native archaeological site potential is particularly important in the Central Massachusetts study unit, where reporting of known sites is meager and uneven. Site types include long- and short-term settlements (villages, praying towns, rockshelters), resource-gathering and processing sites (quarries, tool preparation areas, fishweirs), landscape features (trails and fords), and burials. In addition, the

locations of praying towns are important for understanding the effects of contact with colonials. Native American place names reflect surviving designations of places and landscape features from this period, filtered by colonials and later interpretations. Colonial archaeological site potential is important because of the brief duration of these settlements. Consideration of early colonial settlements will elucidate the process of establishing new communities on the frontier in the 17th century. Site types are restricted to farmsteads, garrisons, meetinghouses, and mills. Therefore there are three categories of Contact and Plantation period survivals (see chart):

1. Native archaeological potential is high at sites of repeated and/or long-term use by Nipmuck peoples, as recorded by secondary sources, and where later use limited site destruction.
2. Native place names are handled in two ways: first through a discussion of their recording and modification with selected examples; second, within the chart for the period, indicating current presence in the region's towns.
3. Colonial archaeological potential is high at sites of early settlements where later use limited site destruction.

State of Inventory

Systematic consideration of archaeological sites and potential has seldom been conducted in conjunction with local inventory. While traditional locations of native activity are occasionally noted (wigwams, cornfields, etc.), site locations based on ecological and cultural needs are seldom included. Activities by avocational archaeologists, and those conducted in conjunction with contract archaeology, have been noted with discussion of the prehistoric period and resources in this report. Similarly for colonial materials, sites of specific events or institutions may be noted in local inventories (encounters during King Philip's War, location of the first meetinghouse), but the location

and survival of more commonplace activities (mills, farmsteads) have not been examined. A number of towns with significant potential have little or no information on file.

Specific Recommendations

1. Encourage systematic documentary survey for period archaeological resources.

Local historical commissions are encouraged to include the Contact and Plantation periods in their town surveys of cultural resources. Bibliographies of accessible secondary materials presented in Chapter 3 can assist them in recognizing areas of high potential for period archaeological resources. Local histories and land records, geological surveys, and local and regional site reports should be examined for insight into local conditions. MHC site forms can then be completed and areas of high potential mapped for use in planning.

2. Assist local efforts at identifying resources with expert advice.

Augment local efforts at determining archaeological potential with professional assistance in areas of high potential, or where more in depth examination is indicated due to local interest or lack of disturbance. This might take the form of visits by staff members, or the funding of professionally completed or directed town surveys.

3. High priority should be given to location and evaluation of period sites.

Sites from the Contact and Plantation periods are extremely rare. For the Commonwealth as a whole, and for this region above others, little information is known and the patterns of change remain to be clarified. This

region is particularly important as a point of contrast to the Connecticut Valley and the coast. Any sites from these periods are likely to be eligible for nomination to the National Register.

Native Place Name Survivals in Central Massachusetts

Many native place names were recorded in early boundary and deed records, or were reported in 17th and 18th century narratives, legislative grants, and official documents. Others still remain in common use. Lincoln Kinnicutt (1905) discussed over 140 native place names in the region, compiled from a variety of primary and secondary sources. However, some caution is still required in attributing native terms. John Eliot reputedly named several of the Christian Indian settlements, using native language place designations, and some surviving place names may therefore reflect a peculiar amalgam of colonial intentions and native linguistics. In addition, native place names have more recently been invented or assigned to give historic or romantic associations to a particular location. Artificial bodies of water seem most susceptible to this subterfuge, as with Lake Wampanoag in Ashburnham and Gardner, and Wachusett Reservoir in Boylston, West Boylston, and Clinton. The native appellation assigned to Quabbin Reservoir at least refers to the valley flooded by its waters.

Asnebumskit	A large hill in Paxton and Holden (Kinnicutt 1905: 10)
Chaubunagungamaug	Lands around Dudley and Webster, now the large pond in Webster also known as Webster Lake (Gookin 1792: 189)
Hassanamisco	Grafton, "signifies a place of small stones" (Gookin 1792: 184)
Nashaway	Leominster, "the land between the rivers"; subsequently applied to the Nashua River (Kinnicutt 1905: 29)
Naukeag	Ashburnham area; now two ponds in the town (Whitney 1793: 266)
Nichewaug	Land around Petersham (Whitney 1793: 215)
Packachoag	Hill in southeast Worcester and neighboring Auburn (Gookin 1792: 192)
Payquage	Land around the Millers River, particularly in Athol (Whitney 1793: 246)
Podunk	A meadow adjoining Quaboag Pond in East Brookfield (Temple 1887: 28)
Quaboag	A large pond and river in Brookfield (Temple 1887: 23)
Quinebaug	A river in Sturbridge, Southbridge, and Dudley (Kinnicutt 1905: 41)

Quinsigammond	A large pond between Worcester and Shrewsbury, meaning "the pickerel fishing place" (Lincoln 1837: 2)
Tantiusque	Sturbridge area (Chase 1901: 87)
Uncachewalunk	A large pond in Lunenburg, now Whalom Pond (Whitney 1793: 149)
Wachusett	A mountain in Princeton; originally signified an area near the mountain (Kinnicutt 1905: 50)
Waeuntug	Land around Uxbridge (Gookin 1792: 194)
Watatick	A mountain in northeast Ashburnham (Kinnicutt 1905: 53)
Washakim	Two large ponds in Sterling (Kinnicutt 1905: 54)
Wickaboag	A pond in West Brookfield (Chase 1901: 87)

Contact and Plantation Periods Survivals (1550-1675)

	Native Archaeological Potential	Native Place Names	Colonial Archaeological Potential
<u>Nashaway Core</u>			
Lancaster	X	X	X
Sterling	X	X	
Clinton	?		?
Berlin	?	?	
Bolton	?	X	
Harvard	?	X	
Leominster	?	X	
Lunenburg	?	X	
Princeton	X	X	
<u>Quaboag Core</u>			
West Brookfield	X	X	X
Brookfield	X	X	X
Warren	?	?	
North Brookfield	?		?
East Brookfield	X	X	?
New Braintree	X	X	X
Sturbridge	?	X	X
<u>Quinsigamond Core</u>			
Worcester	X	X	
Holden	?	X	
Paxton	?	X	
Leicester	X	X	
Auburn	X	X	
Millbury	X		
<u>Nipnet Core</u>			
Mendon	?	X	X
Milford		X	
Blackstone	?	?	
Hopedale			?
Grafton	X	X	?
Northbridge	?		
Uxbridge	X	X	
Upton	?	?	
Millville	?		
<u>Pegan Core</u>			
Oxford	X	?	
Webster	X	X	
Dudley	X	X	
Charlton	?	X	
Southbridge	?	X	
Douglas	?	?	
Sutton	X		
<u>Periphery Related to Squakeag</u>			
Athol	?	X	
Royalston	?		
<u>Periphery Related to Assabet</u>			
Northborough	X	X	X
Southborough	?	?	?
Westborough	X	X	
<u>Other Periphery</u>			
Ashburnham	?	X	
Ashby	?	X	

Contact and Plantation Periods Survivals (Continued)

	Native Archaeological Potential	Native Place Names	Colonial Archaeological Potential
<u>Other Periphery (Continued)</u>			
Barre	?		
Boylston	?	X	
Fitchburg	?	X	
Gardner	?	?	
Hardwick	X	X	
Hubbardston	?	X	
Oakham	?		
Petersham	X	X	
Phillipston	?		
Rutland		X	
Shrewsbury	?		
Spencer	?		
Templeton	?		
Townsend	?		
West Boylston	?	X	
Westminster	?		
Winchendon	?	?	

Colonial Period (1675-1775)

Summary Overview

The Colonial period in Central Massachusetts was characterized by the establishment of permanent colonial settlement in the region. This settlement progressed slowly across the study unit, moving generally from the south and east to the northwest. Within each town, the construction of long lasting structures, residential, institutional, as well as economic, proceeded equally slowly. Communities constructed centrally located meetinghouses as their primary public buildings, encouraged millers to provide waterpowered sites for agricultural processing, and occasionally constructed schoolhouses. Households of farm families built their homes and outbuildings on their agricultural holdings, creating a landscape of dispersed farmsteads. As time passed, older communities established more diversified economies and farmers and millers were joined by a range of artisans as well as by an increasing elite strata of justices, lawyers, and doctors. The region's core communities thus displayed a landscape of more clustered buildings at their civic centers, and a wider range of housing types to accommodate their diverse residents.

Survivals

The vast majority of cultural features from this period no longer survive. Residential architecture is overwhelmingly the largest category of standing structures. Institutional structures and workplaces survive in far smaller

examples. Landscape features are known in many communities in the form of roadways, field patterns, burying grounds, and meetinghouse grounds. Changing uses over time, and infill from later periods, have in many cases blurred or destroyed the landscape of dispersed farmsteads. The continuing importance of early core areas, as well as the later emergence of new core areas, have constantly reduced period survivals. Archaeological evidence remains critical to an understanding of the material culture of the period.

Therefore, Colonial period survivals fall into three general categories (see chart):

1. Archaeological potential is high at sites of period residences, meetinghouses, garrisons, schools, and agricultural processing plants. Potential is also high around standing period structures.
2. Landscape features include period field patterns, roads, burial grounds, training fields, fortifications, and meetinghouse sites.
3. Rural landscapes consist of period farm complexes (dwelling house and outbuildings, fields, and walls) or clusters of period houses in a low density setting.

State of Inventory

In most communities, surviving colonial structures, overwhelmingly dwellings, are known, and where inventory exists are included in it. Institutional buildings too are generally well known. The largest gaps in the inventory are structures related to the economic functioning of the communities, an omission that characterizes all towns and all periods. Period structures that are serving new purposes, or have been extensively altered, are often overlooked. The low survival rate of period structures accentuates the absence of the systematic consideration of archaeological sites and potential in local survey. A number of towns with significant period survivals and archaeological potential have little or no inventory information of any kind.

Specific Recommendations

1. Encourage systematic survey for period archaeological resources and provide expert advice where appropriate.

Local historical commissions are encouraged to include archaeological sites, as well as standing structures, in their town surveys of cultural resources. The vast majority of period resources survive only as archaeological sites, and some key elements (milling, farm layout, for example) can only be studied in this way. Examination of secondary sources will allow completion of site forms and maps of areas of high potential. In towns with high potential and little later disturbance, local efforts should be augmented by professional assistance.

2. Complete inventory of period structures and landscape features.

Many towns with significant period roles and resources have not yet completed their inventories. Communities within period cores with little or incomplete inventory include: in the Lancaster core, Bolton and Harvard; in the Brookfield core, Brookfield and East Brookfield; in the Mendon core, Mendon, Blackstone and Millville; as well as Sutton. Local cores not completing survey include: Hardwick, Leicester, Shrewsbury, Southborough, and Westborough. At least fifteen other towns located in period peripheries have little or no survey.

3. Encourage further analysis of period resources identified in completed surveys.

Colonial period resources survive in small numbers, and their rarity demands close consideration of those that remain. Descriptions of the

resources should include accurate construction date, materials, and construction methods, form, ornament, and dimensions. In addition, later changes should be documented. For residences, the most common resource, this description will include size, structure, floor plans, additions and other changes to the original house. This will allow the identification of surviving house types, their enumeration and location, and when combined with other surveys provide an understanding of regional patterns and the sequence of development necessary to management.

4. Assist local efforts at identifying and analyzing resources with expert advice.

The MHC encourages towns to fund both professional surveys and preparation of National Register nominations for significant resources, including: first period residences, later residences with period integrity of structure or setting, clusters of period structures in period settings, surviving period institutional structures (including meetinghouses and schools) and in particular, sites or structures related to the region's agricultural economy (farm buildings, mill sites) as well as commerce and trade (taverns, markets, stores).

Colonial Period Survivals (1675-1775)

	Archaeological Potential	Landscape Features	Rural Landscapes
<u>Lancaster Core</u>			
Berlin	X	X	X
Bolton	X	X	X
Clinton			
Harvard	X	X	X
Lancaster	X	X	?
Sterling	?	?	X
<u>Worcester Core</u>			
	X		?
<u>Sutton Core</u>			
Sutton	X	X	X
Millbury	?	X	?
Auburn	?		?
<u>Mendon Core</u>			
Blackstone	?		
Hopedale			
Mendon	X	X	?
Milford		X	
Millville	?		X
<u>Brookfield Core</u>			
West Brookfield	X	X	X
Brookfield	X	X	X
East Brookfield	?		X
North Brookfield	?	?	X
Warren	?	?	X
<u>Local Cores</u>			
Hardwick	X	X	X
Leicester	?	?	X
Princeton	?		X
Shrewsbury	X	?	X
Southborough	?	?	X
Westborough	?		X
<u>Peripheral Towns</u>			
Ashburnham	X	X	X
Ashby	X	?	
Athol	X	X	X
Barre	?	X	?
Boylston	?	X	X
Charlton	?	?	X
Douglas	?	?	
Dudley	?		?
Fitchburg	?		?
Gardner			
Grafton	X	X	X
Holden	X	X	X
Hubbardston	?		?
Leominster			?
Lunenburg	X	X	X
New Braintree	X	X	X
Northborough	?	X	X
Northbridge	?	?	?
Oakham	X	X	X
Oxford	X	X	X
Paxton	?	X	X
Petersham	?	X	X
Phillipston	?		X
Royalston	X	?	?

Colonial Period Survivals (Continued)

	Archaeological Potential	Landscape Features	Rural Landscapes
<u>Peripheral Towns (Continued)</u>			
Rutland	?	X	X
Southbridge			
Spencer	?		X
Sturbridge	X	?	?
Templeton	?	?	?
Townsend	X	X	X
Upton	?	?	?
Uxbridge	?	?	X
Webster			
West Boylston			
Westminster	X	X	X
Winchendon	?	X	X

Federal Period (1775-1830)

Summary Overview

The Federal period saw an intensification of agricultural activity in Central Massachusetts, as districts and neighborhoods of dispersed farmsteads remained the predominant settlement form. Transportation improvements included turnpike construction and the opening of the Blackstone Canal. Specialized manufacturing, particularly of textile, was initiated, and by period's end had become widespread. Regional economic growth meant greater prosperity, and generated the emergence of local elite populations, as well as a growing class of factory operatives and laborers. Economic development also stimulated the convergence of settlement in a variety of village types. Meetinghouse centers grew into civic and commercial nodes, turnpike-oriented hamlets emerged, and specialized industrial villages were built. Social diversity continued as alternative and nonconformist religious groups formed and flourished in both central and peripheral locations.

Survivals

A wide range of cultural features survive from the Federal period in Central Massachusetts. Compared with the Colonial period, a considerably larger number and variety of building and structure types were generated. A number of distinctive settlement clusters also survive, including meetinghouse centers, turnpike hamlets, and industrial villages, although all have been altered by attrition and subsequent development. Single-family houses are the

most common and widespread surviving component from the Federal period. Institutional buildings such as churches and schools also survive in a number of communities. Workplaces also remain from the period, including fields, barns, stores, shops, and factories. Fragments of period roads and turnpikes survive, as well as segments of the Blackstone Canal. Other landscape features such as field patterns, cemeteries, and town commons are discernable. Archaeological sites are numerous and widespread, and include dozens of saw and grist mill sites, as well as the remains of a variety of early manufacturing facilities.

Five major clusters have been identified for the Federal period in the Central Massachusetts study unit (see chart):

1. Archaeological potential is high at sites of period residences and institutional buildings, abandoned town centers, and sites of waterpowered agricultural processing and manufacturing. Important archaeological potential is also high around standing period structures.
2. Rural landscapes include period farmsteads (a complex of structures with appropriate roads, fences, and fields) clustered in a low density setting, as well as institutional buildings (poor farms, schoolhouses, meetinghouses).
3. Turnpike villages are composed of a cluster of period houses that are set along a turnpike or around a crossroads and often include a tavern, store, shop, school, or meetinghouse.
4. Factory villages are composed of a cluster of period houses and associated institutional buildings set in close proximity to a period mill or factory complex.
5. Town streetscapes include residential and commercial buildings in a medium density setting. These occur in the vicinity of a meetinghouse or town hall, a common or burying ground, and serve as the town's civic focus.

State of Inventory

Relative to other periods, a high proportion of Federal period structures are identified in local inventories. This has occurred largely as a result of a long established interest in period architectural styles as well as historical

associations from the period. Single-family residences are the most widely recorded features of the period, followed by institutional buildings, and sites such as town commons and cemeteries. Inventory of functional structures and industry-related buildings is less complete. While an Old Sturbridge Village regional survey of barns has been compiled, no towns have systematically inventoried their surviving period outbuildings. Similarly, few towns have surveyed their surviving period archaeological sites, although a reconnaissance survey of the Blackstone Canal route has been completed. A number of towns with significant period survivals have little or no inventory information. In general, where local inventories do exist, town centers are better covered than dispersed farmsteads, secondary outlying hamlets, and industry-related features.

Specific Recommendations

1. Complete inventory of town center areas.

Surviving early 19th century central village areas have traditionally received high priority in regional preservation activities. However, a number of towns in the study unit with significant Federal period components have little or no inventory information. Completion of survey of residential and nonresidential structures, sites, and landscape features is a top priority, followed by nomination of National Register eligible districts. The need is particularly high in the eastern half of the study unit, where pressures for residential and commercial development are highest. Survey should be encouraged in: Grafton, Hardwick, Douglas, Sutton, Bolton, Lunenburg, Ashby, Phillipston, Harvard, Hubbardston, Leicester, Upton and Brookfield.

2. Improve National Register districting of secondary centers.

The focus of management of period resources has been restricted to central villages in many towns. Secondary settlement clusters have generally received far less systematic attention. Inventory of local turnpike, meetinghouse, and manufacturing centers is required as part of comprehensive community surveys. Nomination of National Register eligible districts should be a top priority.

3. Improve inventory of rural resources.

Identification of dispersed farmstead areas with significant Federal period structures and components has not occurred in the region. Systematic survey of barns, outbuildings, and other nonresidential features should be included in comprehensive local inventories. Protection of surviving rural districts should be a high priority, particularly in the east. Surveys should include archaeological resources such as cellar holes, shop and craft sites, and dams.

4. Establish complete regional inventory of and evaluation criteria for surviving standing structures.

The survival rate of Federal period structures, while probably higher than that for Colonial structures, is still very low. Inventory information in many communities with surviving concentration is minimal or nonexistent. Identification of all extant period structures should be a high priority. MHC will pursue all available local and regional management strategies to encourage professional survey, and develop formal and functional evaluative criteria.

Federal Period Survivals (1775-1830)

	Archaeological Potential	Rural Landscapes	Turnpike Villages	Factory Villages	Town Streetscapes
<u>Worcester Core</u>					
Worcester	X			?	
<u>Lancaster Core</u>					
Lancaster	X	X	X		X
Sterling	X	X			?
Harvard	X	X	X		X
Bolton	?	X			?
Berlin	?	X			?
Leominster	X	?	?		
Clinton	?				
<u>Brookfield Core</u>					
Brookfield	?	X			
West Brookfield	?	X			?
North Brookfield	?	X			
Warren	?	X			
East Brookfield	X	X			
<u>Sutton Core</u>					
Sutton	X	X	X	X	X
Millbury	X	X		?	
<u>Mendon Core</u>					
Mendon	?	X			X
Blackstone	X	X		X	
Millville	X	?			
Milford	?	?			
Hopedale					
<u>Uxbridge Core</u>					
Uxbridge	X	X		X	?
Northbridge	X	X	?	X	
<u>Oxford Core</u>					
Oxford	X	?		?	?
Dudley	X	X			?
Webster	X			X	
<u>Barre Core</u>					
Barre	X	X			?
<u>Local Cores</u>					
Shrewsbury	?	?			X
Northborough	X	X		?	?
Westborough	?	X	X		?
Southborough		?	?		X
Grafton	X	X		X	X
Leicester	X	?		?	X
Sturbridge	X	X		?	X
Westminster	X	X	X	?	X
Templeton	?	X	?	?	X
Hardwick	X	X	?		X
Royalston	?	X			X
Athol	X	X			
Winchendon	?	X	?	?	X
Fitchburg	?	?		?	
Townsend	?	X			?
Holden	X	X		X	X
Southbridge	X	?		X	

Federal Period Survivals (Continued)

	Archaeological Potential	Rural Landscapes	Turnpike Villages	Factory Villages	Town Streetscapes
<u>Peripheral Towns</u>					
Upton	?	X			?
Douglas	X	X	X	?	X
Charlton	X	X	X	?	
Auburn	?	X			
Spencer	?	X			
Paxton	?	X			
Oakham	?	X			?
New Braintree	?	X			
Princeton	X	X			
Rutland	X	X			
Hubbardston	?	X			?
Petersham	X	?			?
Phillipston	X	X	?		X
Gardner			?		
Lunenburg	?	X			?
Ashby	?	X			?
West Boylston	?	?			
Boylston		?			?
Ashburnham	X	X			?

Early Industrial Period (1830-1870)

Summary Overview

The Early Industrial period saw the growth and spread of diversified manufacturing in Central Massachusetts, and the rise of urban industrial centers and factory villages as the primary settlement forms. While agriculture remained important, rural life was transformed by the abandonment of marginal farmlands and a trend toward greater commercial specialization. Railroad service was established through much of the region, stimulating economic development along its path. Concentrated industrial growth attracted an expanding wage-earning population, increasingly diversified by Irish and Canadian immigrants who brought Roman Catholicism with them. The growing middle class took part in an array of evangelical, utopian, and reform movements. Urban growth included the rise of downtown districts, large-scale industrial complexes, high-income residential areas, and working-class neighborhoods.

Survivals

A large number of new cultural features were generated by the economic development and population growth that took place during the Early Industrial period in Central Massachusetts. Again, compared to earlier periods, a greater diversity of more specialized building types appeared. The period saw the growth of urban centers and industrial villages, where the majority of period structures were concentrated. Components and districts within these

settlement forms have survived subsequent development, although losses have been extremely high in central urban areas. As in other historic periods, residential buildings are the most common Early Industrial survival category. Within this class, a greater proportion of middle- and high-income, single-family residences survive than do multifamily and working-class dwellings. In urban areas and larger town centers, residential streets and districts also survive, as do clusters of company-built dwellings in factory villages. Institutional buildings, such as churches and schools, also survive in a variety of contexts. A larger number of commercial and industrial structures survive than from the Federal period, although the attrition rate for these buildings has been high. Few of the many smaller period workshops survive. A small number of buildings and structures associated with period railroad development also remain. Many established town centers continued to grow in the mid 19th century, and a number of these, with significant period components, survive largely intact. In rural areas, dispersed period farmsteads also remain, with a greater proportion of surviving outbuildings than from earlier periods.

There are six classes of survivals for the Early Industrial period (see chart):

1. Archaeological potential is high at sites of period residences and institutional structures, artisan shops, industrial complexes, as well as the Blackstone Canal. Potential is also high around period standing structures.
2. Rural landscapes include period farmsteads and associated institutional structures in a low density rural setting.
3. Village streetscapes are groups of period houses and associated institutional and commercial structures.
4. Industrial complexes include factories and associated period structures and housing, as isolated villages or within urban places.

5. Town streetscapes are medium density clusters of residential, commercial, and institutional structures serving as the municipal and commercial center.

6. Urban places are relatively large-scale centers of mixed commercial and manufacturing activity. They contain high density central districts, distinct residential neighborhoods, and industrial and institutional fringe zones along the radiating rail corridors.

State of Inventory

Identification of period structures varies considerably among the study unit's towns. In urban areas, existing inventories focus on stylish middle- and high-income residences and residential areas; downtown commercial structures; educational, civic, and religious buildings; and major surviving factories and mills. Relatively little urban survey has been completed on more modest, ethnic, and working-class residences and residential areas. Very little has been completed on surviving engineering structures or industrial archaeology sites. Outside the cities, inventory of period structures focuses primarily on post-1830 components of town centers (civic, institutional, commercial, residential), with a secondary concern for major surviving industrial complexes. Considerably less information has been gathered on mill villages, or company-owned multifamily housing. Several important period industrial centers remain unsurveyed. The study unit's rural towns generally have extremely limited or nonexistent post-1830 survey. No local inventories systematically consider surviving farm complexes with significant mid-19th century nonresidential components. Local surveys rarely include sites of former waterpowered manufacturing sites. Many easily identifiable dams and foundations are not listed.

Specific Recommendations

1. Improve inventory of urban core residential districts.

While period survey information on the study unit's urban centers has continued to expand and improve, coverage of pre-1870 ethnic and working-class residential districts remains inadequate. Significant single- and multifamily residences remain unidentified and little attempt has been made to understand either building form and floor plan or neighborhood and community structure. Local recognition of the historic importance of this category of building type remains low. Identification of survivals of the regions early ethnic concentrations of Irish and French Canadian immigrants is particularly important. High rates of attrition have resulted from subsequent development and urban renewal, and the largely wood-frame housing stock that remains faces continued threats from deterioration, arson, and inappropriate renovations such as siding. Professional survey of these resources is encouraged, particularly in Worcester, Fitchburg, and Milford, as well as Clinton, Blackstone, Southbridge, and Webster. Nomination of National Register eligible properties and districts from this class of resources will be a priority.

2. Improve inventory of factory villages.

The factory village was the prevailing form of industrial organization outside the regional urban cores. While some of these are documented in MHC's inventory files, many more are not. Priority will be given to completion of local surveys that include period industrial complexes, and associated residential, institutional and commercial structures. All these structures continue to face threats from deterioration, abandonment, or

renovation. The need for professional survey is most critical in Millville, Hopedale, Sutton, Hardwick, Grafton, and Douglas. Coverage remains inadequate or nonexistent in a number of other towns. Nomination of National Register eligible districts will be a high priority.

3. Continue survey and registration in surviving town centers.

While a number of the study unit's Early Industrial period town centers are listed on the National Register, several remain undocumented. Survey information on others is incomplete. Establishment of comprehensive survey information is a particularly critical need in the east, where historic central villages face growing pressures for commercial and residential development. Towns requiring survey in the east include Grafton, Bolton, Lunenburg and Mendon. Towns in the west with undocumented centers include Hardwick, Brookfield, and Phillipston. MHC encourages inventory upgrading and establishment of districts as part of a comprehensive local preservation planning process.

4. Improve inventory of rural structures and districts.

Early Industrial period rural residences and areas are far less systematically inventoried than those of earlier periods. Information on nonresidential structures remains minimal to nonexistent. Towns are encouraged to include dispersed, rural resources in comprehensive local surveys. Identification and protection of surviving rural districts should be a priority, particularly in the east, where residential and industrial development pressures are highest.

Early Industrial Period Survivals (1830-1870)

	Archaeological Potential	Rural Landscapes	Village Streetscapes	Industrial Complexes	Town Streetscapes	Urban Places
<u>Worcester Regional Core</u>						
Worcester	X			X		X
Leicester	X	X	X	X	?	
Auburn	X	?	?			
Holden	X	?	?	?		
West Boylston	?	?				
Shrewsbury	X	?	X			
<u>Blackstone Valley Regional Core</u>						
Sutton	X	X	X	X		
Grafton	X	X	X	X	X	
Northbridge	X		X	X	?	
Uxbridge	X	X	X	X	?	
Millville	X	?	X	?		
Blackstone	X	?	X	?	X	
Douglas	X	?		X	X	
Millbury	X	?	X	X	X	
<u>Fitchburg Regional Core</u>						
Fitchburg	X	?	?	X		X
Leominster	X	?	?	X	X	
Westminster	X	X	X	X		
<u>Milford Regional Core</u>						
Milford	X	X		X		X
Hopedale	X		?	X		
<u>Webster Regional Core</u>						
Webster	X		X	?	?	
Dudley	X	X	X	X		
<u>Local Cores</u>						
Clinton	X			X	X	?
Northborough	X	X	?	?	?	
Westborough	X	?		?	X	
Southborough	X	X	X	?		
Southbridge	X	X	?	X	X	
Spencer	X	X	?	X	X	
North Brookfield	X	X		?	X	
Warren	X	X	X	?		
Barre	X	X	X	X	X	
Hardwick	X	X	X	X		
Petersham	X	X	X			
Athol	X	X	?	X	X	
Templeton	X	X	X	?		
Gardner	X		X	X	X	
Winchendon	X	X	X	X	X	
Ashburnham	X	X	X	X		
Townsend	X	X	X	?		
<u>Rural Periphery</u>						
Upton	?	X	X	?		
Mendon	?	X	?			
Charlton	X	X	X	?		
Sturbridge	X	X	X	X		
West Brookfield	?	X	X	?	?	
Brookfield	?	X	X	?		
East Brookfield	?	X	X			
New Braintree	?	X				
Oakham	X	X	X			
Paxton	X	X	X			
Rutland	X	?	?			

Early Industrial Period Survivals (Continued)

	Archaeological Potential	Rural Landscapes	Village Streetscapes	Industrial Complexes	Town Streetscapes	Urban Places
<u>Rural Periphery (Continued)</u>						
Hubbardston	X	X	X	?		
Princeton	X	X	X	?		
Sterling	X	X	X			
Boylston	?	X				
Berlin	?	X	X			
Bolton	?	X	X			
Harvard	X	X	X	?		
Lancaster	X	X	X	?		
Lunenburg	?	X	X			
Ashby	X	X	X	?		
Phillipston	X	X	?			
Royalston	X	X	X	?		

Late Industrial Period (1870-1915)

Summary Overview

The Late Industrial period saw continued urban industrial development in Central Massachusetts, as growth in manufacturing drew an increasingly diverse, ethnic population into the study unit's cities, towns, and factory villages. Rural agricultural abandonment continued; however, recreational and institutional use of the countryside expanded. Central business districts grew horizontally and vertically, while the introduction of electric streetcar service allowed significant extension of urban areas and the creation of new suburbs, as outlying residential neighborhoods were added. Population growth and diversification led to a proliferation of religious and secular institutions that served the established native elite and middle class, as well as the new, concentrated immigrant communities.

Survivals

More structures survive from the Late Industrial period in Central Massachusetts than from any other historic period, and the number of survivals may be greater than the total from all other periods combined. With continued urban industrial growth, the variety of structure types continued to increase, and the scale of building size grew dramatically. The majority of period structures were located in the study unit's urban areas, where districts and many major components have survived. Outside the cities, most period survivals are concentrated in the region's industrial villages, but

significant rural survivals also remain. As in other historic periods, residential buildings are the most common Late Industrial survival category. Within this class, the greatest group of survivals are multifamily residences, with the three-decker probably the most common type. Despite high rates of attrition, a wide range of multifamily dwellings survives, from multistory, urban apartment blocks to company-owned worker duplexes. Large numbers of single-family residences also survive, and a proportion of these are high-style examples. Relatively extensive residential districts also survive, including inner-city neighborhoods, streetcar suburbs, and company-built housing clusters. A wide range of period commercial buildings also remain from the period, from the landmark, ten-story business blocks of downtown Worcester to the many small, neighborhood grocery stores. Significant clusters of multistory blocks remain in several central business districts. Civic and institutional buildings also survive, including schools, religious edifices, police and fire stations, meeting halls, city and town halls, hospitals, and colleges. Parks and cemeteries also remain. The number of industrial survivals from this period is also high, and includes many major building clusters, factory districts, and industrial villages. Many period railroad stations, freight facilities, and engineering features also survive. Rural survivals include upland resort estates, state institutional complexes, reservoir components, camp meeting grounds, and period farmsteads and farm structures.

There are seven categories of Late Industrial period survivals in the Central Massachusetts study unit (see chart):

1. Archaeological potential is high at sites of period residences, institutional structures, and industrial complexes. Potential is also high around period standing structures.

2. Rural landscapes are period farmsteads and associated institutional structures in a low density rural setting.
3. Recreational landscapes are medium to high density clusters, including resort hotels and homes, lakeside cottages, camp meeting grounds, and amusement parks.
4. Industrial villages include factories and associated structures and housing.
5. Town streetscapes are medium density clusters of residential, commercial, and industrial structures serving as the municipal and commercial center.
6. Urban places are large-scale centers of mixed commercial and manufacturing activity. They contain high density central districts with multistory commercial, institutional, and civic buildings. They also include single- and multifamily residential neighborhoods and streetcar suburbs. Industrial and institutional fringe zones extend along radiating rail corridors.
7. Streetcar residential development consists of m medium density, linear housing along a street railway or trolley line.

State of Inventory

Most period inventory focuses on structures in the region's urban cores. Within the cities, relatively high quality information is available on the following building types and areas: high-style residences and districts, commercial blocks in central business districts, civic structures and schools, landmark churches, and major 19th century industrial buildings. A much lower proportion of the less-than-monumental, nonresidential structures has been documented. The mass of the period's building stock--representative, multifamily dwellings of the inner-city residential neighborhoods and streetcar suburbs--has received little systematic survey. Except for recent efforts in Worcester, little or no information has been collected on three-deckers, or on structures and districts significant to period ethnic communities. Little survey has been done of early 20th century industrial structures. Outside the urban areas, inventory information primarily notes central civic, religious, and

commercial buildings in town centers, and high-style residences. Much less information exists on nonurban industrial buildings and on multifamily housing. Significant factory village districts also remain undocumented. Surviving rural building forms have received negligible attention. Inventory on period agricultural, recreational, and institutional features or landscapes is minimal. Information on period archaeological sites or site potential has not been collected.

Specific Recommendations

1. Improve inventory of urban core residential districts.

Significant components of the period residential building fabric of the study units urban cores remain undocumented. These include single- and multifamily, inner city ethnic neighborhoods, as well as urban and suburban streetcar residential areas. While a survey of Worcester's three-deckers has been completed, no similar studies have been conducted for Fitchburg, Southbridge or Gardner to determine local variations. Outside three-deckers and brick apartment blocks, information on period multifamily housing is negligible. Period urban residential structures continue to face threats from abandonment, arson, and redevelopment. Professional survey is encouraged to expand coverage in Worcester, Fitchburg, Leominster, and Gardner, as well as Southbridge, Milford, Clinton, Webster and Athol. Completion of National Register nominations for Worcester three-deckers is a priority.

2. Improve inventory of urban nonresidential structures.

While central commercial and civic districts and major 19th century industrial complexes are generally well identified in the study unit's urban

cores, other period nonresidential structures remain to be systematically inventoried. These include many modest, noncentral, neighborhood-oriented commercial, social and religious structures. Early 20th century industrial structures and complexes have also received less attention than their 19th century counterparts. Continued professional survey is encouraged. Identification and nomination of eligible National Register districts including both residential and nonresidential components is a priority.

3. Improve inventory of factory villages.

As in the Early Industrial period, the factory village remained an important form of industrial organization outside the urban centers. Documentation of period developments of this settlement form is negligible. Major surviving complexes, including associated residential and nonresidential structures should be surveyed in Grafton, South Barre, Gilbertville (Hardwick), Hopedale, Oxford, and Charlton. Numerous smaller concentrations survive and need to be identified in comprehensive local surveys. Nomination of eligible National Register districts is a priority.

4. Improve inventory of rural resources.

Little information on either residential or nonresidential rural structures or areas currently exists in MHC files. Identification of representative period agriculture-related structures and districts is required of comprehensive local surveys. Inventory of surviving camp meeting grounds in Douglas and Sterling is a priority. As for earlier periods, protection of surviving rural districts is a priority, particularly in the eastern part of the study unit.

Late Industrial Period Survivals (1870-1915)

	Archaeological Potential	Rural Landscapes	Recreational Landscapes	Industrial Villages	Town Streetscapes	Urban Places	Streetcar Residential Development
<u>Worcester Regional Core</u>							
Worcester	X		?	?		X	X
Auburn		X		?		?	X
Leicester				X			?
Paxton		?					
Holden	X	?	?	?		?	X
West Boylston		?				?	?
Boylston		?				?	X
Shrewsbury			?				X
Grafton	X	?		X		?	
Millbury	X	?		X	X	?	?
<u>Blackstone Valley Regional Core</u>							
Sutton	?	X	?	X			
Northbridge	X	?		X	X		
Douglas		?	X	X			
Uxbridge	X	?		X	X		
Millville	X			?			
Blackstone	X			X	?	X	X
<u>Fitchburg/Leominster Regional Core</u>							
Fitchburg	X	?		X		X	X
Leominster	X			X		X	X
Lunenburg		X	X				X
Westminster	?		?			?	
<u>Milford Regional Core</u>							
Milford	X			X		X	X
Hopedale	X			X		X	
Mendon		?	?				
<u>Clinton Regional Core</u>							
Clinton	?					X	X
Lancaster		?	X	X			X
<u>Gardner Regional Core</u>							
Gardner	X			X	X	?	?
Templeton	?			?	X		
Asburnham	?	X	?	?	?		

Late Industrial Period Survivals (Continued)

	Archaeological Potential	Rural Landscapes	Recreational Landscapes	Industrial Villages	Town Streetscapes	Urban Places	Streetcar Residential Development
<u>Webster Regional Core</u>							
Webster			X			?	?
Dudley		?		X		?	?
<u>Southbridge Regional Core</u>							
Southbridge	?	?		X		?	?
Sturbridge	?	?	?	X		?	
<u>Local Cores</u>							
Westborough		?	X	X	?	?	
Oxford	?	?		X	?		?
Warren		?		X	?		
North Brookfield	?	X		?	?		?
Spencer	?	?		?	X	?	?
Hardwick	X	?		X			
Barre	X	X	X	X	?		
Athol	X	?	?	X	X	?	X
Winchendon	?	?		X	?	X	
<u>Periphery</u>							
Upton		?		X			
Mendon		?	?				
Charlton		X	?	X			
Brookfield		?	?	?			
East Brookfield			?	?			
West Brookfield		?			?		
New Braintree		X					
Oakham	X	?					
Rutland	X	?	?				
Princeton	X	X	X				
Hubbardston	?	?					
Petersham	X	?	X				
Royalston		?		X			
Ashby		?					
Townsend		?		X			
Sterling	?	X	?				
Harvard		X	?				
Bolton		?					
Berlin		?	?				
Northborough		?					?
Southborough		?		?		X	X

Early Modern Period (1915-1940)

Summary Overview

The Early Modern period saw continued urban industrial growth through the 1920s, ending with the Great Depression of the 1930s. Although the influx of foreign-born population ended with the enactment of restrictive immigration quotas, new ethnic religious and secular organizations continued to be organized. Development of urban central districts continued, with the addition of major civic, commercial and industrial structures. Residential decentralization accelerated, as commuter streetcar lines were replaced by the automobile. New neighborhoods were added in the outer areas of the cities, and surrounding towns grew significantly as bedroom suburbs. The Depression brought an end to industrial growth, as well as hardship to many communities in the region. Public works projects brought some relief, while private industrial paternalism saw a few factory towns through the hard times.

Survivals

The Early Modern period's brief span of twenty-five years, including ten years of economic depression, resulted in relatively fewer structures than had been generated in Central Massachusetts during the previous period. The types of structures continued to diversify, and, in general, the survival rate of Early Modern structures is high. Again, residential buildings are the most numerous type of survival. This category includes high-style, single-family

homes, multifamily dwellings, and more modest single-family residences. All of these are located primarily in neighborhoods outside urban central districts and in suburban towns surrounding the study units cities. A variety of residential districts also survive, including high-income urban and suburban neighborhoods, single- and multifamily streetcar suburbs, early automobile suburbs, and company-built housing clusters. After residences, commercial structures probably represent the next largest group of survivals. These include downtown theatres, department stores, and multistory business blocks, and an array of automobile oriented structures, including gas stations, auto dealerships, and diners. Civic period structures are also numerous. Towns added city or town halls, post offices, and both central and neighborhood schools. Religious denominations built new edifices, and secular organizations continued to erect meeting places. Industrial expansion during the first half of the period continued to generate new structures and complexes in many communities in the study unit, both in the inner city and in outer fringe locations. Surviving period transportation features include the bridges and roadways of automobile highway projects, and early airport facilities. In rural areas, state institutional complexes survive, as do lakeside residences and period agricultural structures and farmsteads.

Archaeological resources for the Early Modern period are not addressed specifically here. Significant potential may exist for activities of undocumented and transient groups. As in earlier periods, potential is high around period standing structures. There are five categories of Early Modern period survivals (see chart):

1. Rural landscapes include period farmsteads, estates, lakeside cottage clusters, recreational areas, and reservoirs. Rural institutional complexes include hospitals, correctional and educational facilities, and military bases.

2. Roadside corridors include period highways and automobile-oriented commercial structures (signs, gas and service stations, diners, motels, and stores).
3. Industrial complexes include industrial buildings as well as associated structures and housing in both urban and rural settings.
4. Urban places are large-scale centers of mixed commercial and manufacturing activity. They contain high-density central districts with multistory commercial, institutional, and civic buildings. They also include distinct single- and multifamily residential neighborhoods, streetcar suburbs, and automobile suburbs. Industrial and institutional fringe zones extend along radiating rail and highway corridors.
5. Residential suburbs consist of small single- or multifamily houses and associated institutional and commercial structures. These are built at medium density and oriented toward primary automobile routes.

State of Inventory

Inventory information on Early Modern period structures in Central Massachusetts is far less systematic than that for earlier historic periods, and most communities in the study unit have little or no inventory on period buildings. In general, documentation of period residential and nonresidential development has been a low priority. Structure types that have been surveyed include central civic and religious buildings, downtown commercial blocks, and high style residences and districts. Worcester has undertaken a survey of auto-oriented commercial buildings outside the downtown area, and period residences are included in Worcester's three-decker survey. However, little other information has been collected on the region's outlying urban residential districts. Major period commercial and industrial structures, schools, and neighborhood churches have received little attention. Twentieth-century suburban development before 1940 has not been inventoried, and rural agricultural changes have been similarly ignored. Archaeological survey is nonexistent for the period.

Specific Recommendations

1. Improve inventory of urban residential districts.

While high-income areas have been documented, much less information has been collected on middle income, ethnic, single- and multifamily residential neighborhoods located in outer urban areas. Identification of surviving districts, including neighborhood schools, stores, churches, and parks, is a priority.

2. Improve inventory of suburban residential areas.

Period streetcar and early automobile suburb development remains virtually undocumented in the study unit. While suburban residential dwellings may be relatively unthreatened, demographic changes are already endangering period schools, churches and community centers. All towns with period suburban development should be encouraged to identify representative areas and structures. Outside the study unit's cities, priority will be given to towns that experienced high levels of suburban growth during the period, such as Shrewsbury, Grafton, Auburn, and Holden.

3. Improve inventory of industrial structures.

Many outstanding industrial structures from the period remain undocumented, as do other representative factory buildings, and complexes. All continue to be threatened by ongoing processes of urban change. Professional survey is a priority.

4. Improve inventory of noncentral commercial structures.

While inventory information generally exists on 20th-century components of downtown areas, coverage is far less systematic of automobile-oriented

structures and districts outside the central district. These include gas stations, diners, car dealerships, stores, and restaurants, as well as airports. Because of continued development along established automobile corridors, the attrition rate has been high. Presently, Worcester has attempted systematic survey in this category of structures. Identification of these resources, in both urban and suburban towns, is a priority.

Early Modern Period Survivals (1915-1940)

	Rural Landscapes	Roadside Corridors	Industrial Complexes	Urban Places	Residential Suburbs
<u>Worcester Regional Core</u>					
Worcester		X	X	X	X
Shrewsbury	X	X	?		X
Grafton	X	?	?		?
Millbury	?	?	?		X
Auburn	X	X	X		X
Oxford	X	?	?		?
Leicester	?	?	X		X
Paxton	?	?			X
Holden	?	?	?		X
West Boylston	X	?		X	
Sterling	X	?	?		
Boylston	X	?		X	
<u>Fitchburg/Leominster Regional Core</u>					
Fitchburg	?	?	X	X	X
Leominster	?	?	X	X	X
Lunenburg	X	?			X
Westminster	X	?	?		
Ashby	?		?		
<u>Gardner Regional Core</u>					
Gardner		X	X	X	X
Templeton	?	?	X		X
Ashburnham	X		?		
<u>Southbridge Core</u>					
Southbridge	?		X	X	X
Sturbridge	X	?		?	
<u>Milford Core</u>					
Milford		?	?	X	X
Hopedale			X		X
Mendon	X				
<u>Clinton Core</u>					
Clinton		?	?	X	X
Lancaster	X	?			X
Berlin	X				
<u>Webster Core</u>					
Webster	X	?	?	X	X
Dudley	?	?	X		?
Athol	?		X		
<u>Northbridge Core</u>					
Northbridge	?		X	?	X
Uxbridge	?	?			
Douglas	X				
<u>Woonsocket, R. I. Core</u>					
Blackstone		?		X	X
Millville					
<u>Marlborough Core</u>					
Northborough	X	X		?	
Southborough	?	?			
<u>Local Cores</u>					
Spencer	X	?	?		
Westborough	?	?		?	
Winchendon	?		X		
Warren	?		X		
Barre	X		?		
North Brookfield	X				

Early Modern Period Survivals (Continued)

	Rural Landscapes	Roadside Corridors	Industrial Complexes	Urban Places	Residential Suburbs
<u>Periphery</u>					
Charlton	X	?			
Brookfield	X	?	?		
East Brookfield	X	?			
West Brookfield	X	?	?		
Oakham	?				
Rutland	X			?	
Petersham	X				
Hubbardston	?				
Harvard	X				
Bolton	?				
Phillipston	?				
Townsend	?		?		
Royalston	?				
Hardwick	X		?		
New Braintree	X				
Sutton	X	?			
Upton	X				
Princeton	X				

General Recommendations

In adopting Cultural Resources in Massachusetts: A Model for Management (1979), the Massachusetts Historical Commission advocated a social science approach to the assessment and management of the Commonwealth's historic resources. The discipline of geography in particular provided a set of theoretical concepts that would inform the gathering and analysis of information. Four approaches that characterize this field provide large areas of inquiry to give focus for future research. In emphasizing sequent occupance (the sequential occupation of an area over time), research would provide historic reconstruction of successive cultures. A focus on local ways of life would emphasize solutions to the functional problems within local environments. At a broader level of analysis, area-wide functional organization would identify concentrated activity (cores), and the interconnections between them (corridors), through surrounding areas (peripheries). Consideration of the patterns of origins and dispersals would identify innovation and the pattern of acceptance, rejection, and modification during dispersal. In recommending a research design, the model identified four elements of study to guarantee that these areas of inquiry would be clarified: process, context, function, and the vernacular. Finally, the model suggested an interpretive framework for the analysis of the resources based on the identification of cores and their peripheries and an examination of their interdependence. In the following general recommendations, these elements provide a framework for the reorganization of survey priorities and resource assessment.

Recommendation 1: Vernacular

The MHC encourages survey that includes a full range of building types, and supports criteria for their evaluation beyond architectural style.

Advocating a consideration of the vernacular in assessing cultural resources requires an emphasis on a broader range of building types than has traditionally been considered through the discipline of architectural history. Architectural historians have always studied residential and institutional buildings in their examination of important design monuments and the development of architectural styles. The majority of local buildings of these types, however, are then compared with these high-style academic examples and found wanting.

Currently, the study of vernacular architecture has emphasized typologies of house form, the most familiar and most studied of building types. Surveys of residential architecture must more clearly address this method of enumerating and analyzing local examples. Thus, the formal aspects of houses (number of stories, floor plan, roof form, etc.) should be enumerated, and types identified that reflect common combinations of these attributes. Equally important is the consideration of the remaining elements of the built environment, which may be generally considered its economic structures. Commercial, agricultural, maritime, extractive, and industrial activities have associated buildings that have too often been neglected by surveys of cultural resources. The study of these more commonplace structures demands the development of new evaluative criteria for buildings whose most significant attributes may be only tangentially related to architectural styles. Alternative attributes must be determined for these building types that consider factors such as size, expense, location, and most important, function, as well as form, ornament, and design sources.

Recommendation 2: Function

The MHC encourages survey that considers the function as well as the appearance of resources.

An emphasis on the vernacular carries an inherent concern for the function of these structures. The concern with form in the development of house types reflects this focus. It acknowledges the importance of the interior division of space into rooms, as well as the size and number of rooms, to an understanding of residential architecture. Similarly, among institutional buildings, plan and function are important. In ecclesiastical architecture, liturgical needs as well as style contribute to building design. Administrative structures such as courthouses, town and city halls have specific and individual space needs that distinguish them from one another, and which change over time. This is of particular importance when considering the relationship of structures to the economic functioning of communities. In many instances, such as farm outbuildings, the survival rate is low. In addition, the specific function is often unclear. For many building types, the activities that these structures enclose is the most important aspect to be considered. A description limited to their formal and ornamental aspects adds little to our understanding of them, or to our ability to evaluate their significance for preservation or management. Cultural resources are valuable, not only for their aesthetic contribution to our environment, but for what they contribute to our understanding of the variety of past life ways.

Recommendation 3: Context

The MHC encourages survey and management that recognizes the position of individual resources within both their specific and general cultural and environmental context.

While careful examination of single structures and sites is important, few of these can be fully understood outside of the landscape in which they function. Often the significance of individual structures can be appreciated only in relation to the full range of surviving and documented local or regional examples. The study of vernacular buildings requires the consideration of large numbers of similar structures in the construction of typologies, and in the elucidation of regional patterns. At the same time, few buildings were constructed to function in isolation from other buildings and landscape features: a meetinghouse coexists with its stables and burying ground, a house with its privy, woodshed, barns, and yard. Residential suburbs need to be understood not just as collections of individual stylistic examples, but as communities made up of families and social groups who used schools, stores, and churches and traveled to urban centers and places of work. Consideration of clusters of buildings as neighborhoods, districts, and areas allows analysis that includes social, cultural, and economic interpretation as well as the determination of period of construction, or an evaluation of their aesthetic merits.

Recommendation 4: Process

The MHC encourages survey and management that recognizes the continual impact of time on cultural resources.

The cultural resources of the Commonwealth represent the material remains, as standing structures, of human activities and historical processes. During each period these activities and processes create new resources to meet the functional and esthetic requirements of that period. At the same time, these activities may destroy resources, and equally significantly, may modify existing resources as needs change over time. Few resources and

landscapes, therefore, can be seen as representing a single historic period but rather the product of many years of changing human activity. Landscapes will therefore be a combination of structures and spaces that have been used in similar ways over time, as well as those that have been used in different ways.

The effects of this accumulated activity can be seen in two general patterns among resources. Within historic landscapes, individual resources will date from different periods of construction. At the same time, these individual resources will have been modified through the passage of time. New functions are brought to old structures as meetinghouses become town halls, or barns, and clearly change our understanding of them as well as their historic significance. At the same time, however, even similar uses are subject to change and modify the resource. A colonial farmstead that survives today is not the same functioning unit. As agricultural practices have changed, mixed grain and animal husbandry gave way to dairying, cheese production to milk, or cleared fields to forest. These changes reorient the use of the house, outbuildings, and its land from its original configuration. Its current appearance must be seen as layered, and those layers closely examined before its resemblance to farms of the past is suggested.

Recommendation 5: Cores and Peripheries

The MHC encourages the use of the core-periphery model into cultural resource management decisions.

This report presents an interpretive framework for the evaluation of surviving cultural resources in Central Massachusetts, based on a core-periphery model. The MHC will continue to develop and extend this model in the process of managing both the more concentrated resources of

core areas and the more dispersed survivals in peripheral regions. By allowing systematic and comparative evaluation of resources at the study unit level, the core-periphery model provides a useful tool for a variety of management decisions, from local survey organization to environmental review. For each historic period this report identifies core and periphery locations within the study unit and indicates period resources characteristic of activities in these places. This provides a context for the evaluation and protection of surviving resources and for comparison with those in both similar and different places within the study unit. Thus analysis beyond the local level is now possible: Colonial period resources from the Sutton, Lancaster, and Brookfield cores can be contrasted, and local inventories of Early Industrial resources in Fitchburg and Milford can be compared. The core-periphery model also outlines the processes of historic change that both created cultural resources in the study unit and affected their subsequent use, alteration, disappearance, or survival. This includes the dynamics of more recent changes that currently threaten resources in the region.

Policy Recommendations

This chapter has reviewed the patterns of surviving cultural resources in the Central Massachusetts study unit as well as the threats to those resources. In addition, both specific and general recommendations have been made outlining priorities for further identification, evaluation, and protection measures. However, the Massachusetts Historical Commission cannot accomplish these goals without public support. Successful preservation must be a cooperative venture, one which involves many interested parties--public and private, amateur and professional. It is the policy of the Massachusetts Historical Commission to work with other preservation constituencies and to encourage broad-scale, integrated planning among them. Specific recommendations follow for five major preservation constituencies.

Local Historical Commissions

Local historical commissions have been active participants in Massachusetts preservation for over twenty years. The Massachusetts Historical Commission encourages local historical commissions to continue to act as the first line of defense in the preservation and protection of cultural resources. Within each community, these commissions serve as the primary means for identifying cultural resources through the completion of a comprehensive community-wide inventory. Completion of the inventory should be the first priority for a local historical commission.

Local historical commissions are encouraged to act as local advocates for the preservation and protection of resources once they have been identified.

Boards of selectmen, mayors, and city councils are encouraged to appoint local historical commission members with appropriate backgrounds and expertise so that commissions can be effective preservation advisors. The Massachusetts Historical Commission supports local historical commissions through periodic training workshops, public information and technical assistance, and survey and planning grant-funded programs.

Specific Recommendations

1. Local historical commissions are encouraged to complete a comprehensive inventory of cultural resources within their city or town. The MHC maintains a list of communities identified for the status of their inventory. Local commissions should contact the MHC to determine the status of their inventory.
2. The following towns without completed inventories have been identified as the highest priority for inventory completion: Douglas, Grafton, Hardwick, Harvard, Hopedale, and Sutton.
3. Local historical commissions are encouraged to become more active in protecting cultural resources by participating in local planning.

Local and Regional Planning Agencies

The Massachusetts Historical Commission encourages local and regional planning agencies to make preservation concerns and cultural resource management strategies an integral part of comprehensive planning. The MHC also encourages a closer working relationship between local historical commissions and local/regional planning agencies, including local planning boards, community development offices, neighborhood development corporations, and regional planning commissions. As the repository for statewide

information on cultural resources--sites and structures, prehistoric and historic--the MHC will work with planning agencies in order to protect cultural resources in a cooperative and comprehensive manner.

Specific Recommendations

1. The integration of preservation concerns into the planning process is especially critical in the eastern portion of the study unit, where the Westborough area continues as the primary focus of development, and a second growth center is emerging at Milford. Threats will continue to be high in the areas east of the historic Worcester and Fitchburg-Leominster regional cores. Most threatened are surviving resources in the Westborough, Southborough, Northborough, Shrewsbury area. To the south, the Milford, Hopedale, Upton, Grafton area will see continued growth. In the north, the Harvard, Bolton, Berlin, Lancaster area will continue to see intensive pressures as will the Lunenburg, Townsend, Ashby region. The Sterling, West Boylston, Boylston subregion will also grow.
2. The need for preservation planning also continues to be high in the high-density regional urban cores. Given the high risk to the region's historic urban cultural resources, continued local preservation activities are encouraged in Worcester, Fitchburg, Leominster, Milford, Webster, Southbridge, Clinton, and Athol.
3. Preservation efforts are also critical to anticipate needs in other subregions in the study unit that are likely to see intensified development in the near future, particularly along major regional highway corridors. Likely areas include: Millbury, Sutton, Northbridge, Uxbridge, Douglas, Millville, and Blackstone in the Blackstone Valley region in the

southeast; Oxford and Webster along the I-395 corridor in the south; and Westminster and Templeton along the Route 2 corridor to the north.

4. Planning agencies are encouraged to explore mechanisms for open space preservation, especially those which incorporate cultural resource management concerns with agricultural, scenic quality and other land use issues.
5. Planning agencies are encouraged to ensure that housing improvement and commercial rehabilitation programs incorporate preservation strategies in the management of urban cultural resources.
6. Planning agencies are encouraged to work with the Massachusetts Historical Commission in implementing the specific recommendations for identification, evaluation, and protection of cultural resources made in this report.

State and Federal Agencies and Authorities

The Massachusetts Historical Commission encourages a close working relationship with other state and federal agencies and authorities so that cultural resources are identified and protected in an efficient and comprehensive manner.

Specific Recommendations

1. Cultural resource management plans should be prepared by: Metropolitan District Commission, Massachusetts Water Resources Authority, Massachusetts Division of Wildlife and Fisheries, and other state agencies and authorities with substantial land holdings or management responsibilities. Comprehensive cultural resource management plans should also be prepared by Federal agencies with land holdings in Central

Massachusetts, including United States Fish and Wildlife Service, Department of Defense, and Farmers Home Administration.

2. The Massachusetts Historical Commission encourages implementation of the cultural resources management plan recently prepared for the Forests and Parks Division, Department of Environmental Management, and adoption of this plan by all divisions of the DEM. The MHC also encourages close cooperation between the DEM and MHC on current DEM projects involving cultural resources, including State Heritage Parks, the City and Town Commons, and Olmsted Parks programs.
3. The Massachusetts Historical Commission encourages continued close cooperation between the Executive Office of Community Development and the MHC on projects such as the Main Street and Cities and Towns Masterplans programs.
4. The Massachusetts Historical Commission encourages that cultural resource concerns be integrated with broad-scale, open space acquisition and protection programs such as the Agriculture Restriction program of the Massachusetts Division of Food and Agriculture, the Massachusetts "Self Help" and the United States Land and Water Conservation Fund programs, both of which are administered by the Executive Office of Environmental Affairs, Division of Conservation Services, and the Massachusetts Division of Wildlife and Fisheries.

Academic Institutions

The Massachusetts Historical Commission invites academic and research institutions to be active participants in the identification, evaluation, and protection of the cultural resources of Massachusetts.

Specific Recommendations

1. The MHC invites members of the academic community to utilize the inventories of cultural resources of the cities and towns of the Commonwealth available at the Commission office.
2. The MHC invites academic institutions to pursue independent research on topics identified in this report as priorities for further study.
3. The MHC invites academic institutions to assist local, regional, and statewide preservation and protection efforts through contribution of expertise and experience.
4. The MHC invites academic institutions to comment on and criticize the Massachusetts Historical Commission's Reconnaissance Survey Reports.

Private Nonprofit Organizations

The Massachusetts Historical Commission encourages private nonprofit organizations to support the preservation and protection of cultural resources through cooperation with other preservation constituencies.

Specific Recommendations

1. The MHC encourages organizations with significant property holdings to complete cultural resource management plans. The Trustees of Reservations and the Massachusetts Audubon Society are particularly encouraged to integrate cultural resource management concerns with their environmental protection programs.
2. The MHC encourages close cooperation between landholding organizations and state planning/management agencies in order to develop broad-scale programs for the protection of both historic and natural landscapes.

3. The MHC encourages private nonprofit groups such as the Society for the Preservation of New England Antiquities, the Massachusetts Archaeological Society, the Society for Historical Archaeology, the Massachusetts Association for Olmsted Parks, the Society for Industrial Archaeology, the Vernacular Architecture Forum, and the Society of Architectural Historians to assist local historical commissions with their expertise and experience.