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Article abstract

Set within the context of varying traditions of Western urbanism, the U.S. city is considered as a partially autonomous creation, and emphasis is placed on the development of its physical forms during the crucial period of the nineteenth century. Nine distinguishing morphological characteristics such as low density, indistinct urban fringes, and short life of buildings are given special stress. Five broad themes, ranging from the nature of the American environment to the cultural value of land and government, are suggested as possible explanations of American physical urban traits. This is followed by a review of concepts and general findings regarding the three basic components of American urban form: land use ecology, history of building fabric, and cadastral patterns. The essay closes with a more detailed analysis of trends in the last category, given the dearth of conceptual clarity concerning this component. General changes in and representative examples of simple and complex urban ground plans of U.S. cities in the nineteenth century include colonial antecedents, new town foundations, and mature town accretions and modifications both on urban fringes and within densely-built urban cores. Finally, a preliminary division of the century into three morphogenetic periods is offered with a view to stimulating further development of the suggested framework.

The Morphology of Nineteenth-Century Cities in the United States

Michael P. Conzen

Résumé/Abstract

Prise dans le contexte de la variété traditionnelle de l'urbanisme occidental, la ville américaine est considérée comme une création partiellement autonome; l'accent est mis dans cet exposé sur le développement des formes physiques au cours de la période cruciale du XIX^e siècle. Neuf caractéristiques morphologiques spécifiques — faible densité, quartiers excentriques aux limites imprécises, brève existence des constructions, etc. — reçoivent une attention particulière. Cinq grands thèmes, qui vont de la nature de l'environnement américain à la valeur culturelle attribuée à la terre et au rôle de l'État, sont proposés comme explications possibles des caractères physiques de la ville américaine. Vient ensuite une revue des conceptions et des constatations de nature générale sur les trois éléments fondamentaux de l'organisation urbaine aux États-Unis: l'écologie de l'utilisation du sol, l'histoire de l'espace construit et les plans cadastraux. L'essai se termine par une étude plus détaillée des tendances existantes dans cette dernière catégorie, compte tenu du manque de conceptions claires à cet égard. Dans les transformations générales qui se sont produites et à l'aide d'exemples typiques de plans urbains, simples ou complexes, de villes américaines au XIX^e siècle, on distingue les phases coloniales, les fondations de nouvelles villes et les concentrations et transformations qui ont porté à la fois sur les quartiers excentriques et les noyaux urbains à forte densité. Enfin, l'auteur présente une division préliminaire du siècle en trois périodes de développement structural afin de susciter la poursuite des études dans le cadre d'analyse envisagé.

Set within the context of varying traditions of Western urbanism, the U.S. city is considered as a partially autonomous creation, and emphasis is placed on the development of its physical forms during the crucial period of the nineteenth century. Nine distinguishing morphological characteristics such as low density, indistinct urban fringes, and short life of buildings are given special stress. Five broad themes, ranging from the nature of the American environment to the cultural value of land and government, are suggested as possible explanations of American physical urban traits. This is followed by a review of concepts and general findings regarding the three basic components of American urban form: land use ecology, history of building fabric, and cadastral patterns. The essay closes with a more detailed analysis of trends in the last category, given the dearth of conceptual clarity concerning this component. General changes in and representative examples of simple and complex urban ground plans of U.S. cities in the nineteenth century include colonial antecedents, new town foundations, and mature town accretions and modifications both on urban fringes and within densely-built urban cores. Finally, a preliminary division of the century into three morphogenetic periods is offered with a view to stimulating further development of the suggested framework.

Urban morphology is the systematic study of the physical form of towns and cities, at all scales of observation. Its purpose is to conceptualize, describe, and explain the character of urban form elements and their interrelationships in a full cultural context. Cities are the most complex type of human settlement, and the elucidation of their built environment provides a powerful lens through which to examine the workings of the society at large. Few social values and actions are so abstract that they fail to be reflected in material forms, since adaptation to local conditions allows an almost infinite variety of physical structures by which human intentions can be expressed. The built form of cities represents the necessary shell within which all action must be confined, but a shell so malleable to the shifting needs of the residents that cumulative action leaves cumulative imprints. Study of urban form, then, explores the nature of man's historical approach to the problems of complex shelter, and casts light both on the possibilities and constraints that various urban forms have offered, and on general cultural character and preferences. By knowing the form of its cities, one learns a great deal about a society.[1]

It is common to regard the modern cities of the Americas as belonging historically to the great tradition of the Western City, nurtured in the Middle East and Mediterranean culture realms and successively developed in and exported from Western Europe.[2] The timing, purposes, and organization of cities brought to the New World, however, varied considerably among colonizing countries. An early divergence was established in urban development between North America and other regions. Notwithstanding the important contributions of Spanish, French, Dutch, and other cultural interests in establishing towns in North America, it is significant that the urban traditions of the present United States have been so early and profoundly affected by English ambitions, planning, and resources.[3] But then the English colonial heritage came under stress in the upheavals of late-eighteenth-century North American economic and political development. A divergent American economic and urban tradition began to form at the same time that English urbanism itself moved in new directions. Following the more autonomous trends of the nineteenth century, urbanization and urban culture then once more came to reflect the unmistakable signs of renewed selective cultural convergence between North America and Europe that has characterized the present century.

The nineteenth century therefore constitutes a critical period in which to examine the evolution of urban morphology in the United States. Major population growth and successful regional development generated conditions for urban fluorescence on a scale unknown in colonial times, and this encouraged a morphological divergence from past traditions.[4] Common experiences in industrialization and the growth of large cities in the United States and northwestern Europe were to reverse some of these divergent trends but too late to erase major characteristics of an emerging U.S. tradition in urban life. This essay, then, aims to provide a broad introduction to the morphological character of cities that developed in the United States in the nineteenth century, suggesting a conceptual framework within which to approach the concrete, physical

nature of these cities, with emphasis on urban forms as artifacts of the culture and economy that produced them. "Urban design" thus is interpreted in a liberal fashion, encompassing unconscious as well as conscious planning, individual as well as social action, and informal as well as formal elements in the physical urban mosaic.

AMERICAN PHYSICAL URBAN TRAITS

Any descriptive model of the general morphology of the nineteenth century U.S. city should include several salient characteristics that have tended to distinguish American cities. A baseline for comparison is most easily established with reference to European cities, given their historical precedence, though general differences can also be noted with cities of other large culture regions within the western hemisphere.

Low density is perhaps pre-eminent among the defining features of the U.S. city in the nineteenth century. The very largest cities developed *central* areas of extremely high densities later in the century, but even in those cases the predominant character over most of their territory was, particularly from a European perspective, low density. Secondly, American urban fringes were, without notable exception, indistinct. They comprised transition zones between rural and built-up urban land use with considerable mixture of land units of both types, and contained much land of neutral status held off the land market in anticipation of development.[5] A third characteristic was a high degree of land use homogeneity at a medium scale and heterogeneity at a micro-scale. Major boundaries such as rivers, railways, and other topographical features served to divide tracts of land at the meso-scale into separate districts with sometimes sharp contrasts between them. Inside such districts, however, a pervading similarity of social, physical, and land use character existed, though the uniformity of neighbouring land uses and structures lot by lot tended to be low. Fourth, nineteenth century cities had simple layouts. The orderliness of street and block systems was high owing to the long-term attachment to grid patterns.[6] Grid discontinuities were common where platting boundaries occurred, and were increased in districts with small plats, but compared again with European patterns U.S. layouts were extremely simple.

A fifth characteristic was the short life of buildings. Often quickly built of cheap materials, houses and non-residential buildings were prone to replacement, depending on deterioration, location and adaptability to the aspirations of the socially mobile and changing standards of living.[7] If certain locations became economically valuable (e.g. through increasing centrality), a whole succession of buildings might follow on the same site as more intensive uses bid for the location. Sixth, there was great "permeability" of forms. Stylistic fashions came and went with increasing rapidity during the century, and while many buildings remained unaltered, great readiness and ingenuity was shown in adapting old forms to new fads. This applied not only to exterior style but also to interior division of space and function. Where the costs of replacement were too high, alterations—again, through cheap materials and increasingly standardized designs—were widely practiced. Thus, seventh, U.S. cities exhibited an enormous variety of building forms and mixture of pure styles, reflecting an eclecticism that fitted closely with easy changeability.[8]

Eighth, the pre-eminent role of transport facilities was striking. Wide streets, in grids that ensured high density; the proliferation of alleys, especially in denser districts; street car lines, elevated tracks, and all the paraphernalia that attached to mass transit (such as stables, car barns, generating stations, and so on); and railways with all their extensive facilities: these devices for moving people and goods took up a higher percentage of urban land and with less concern for their aesthetic effect than their counterparts in Europe.[9] And finally in this brief list of American urban morphological traits, U.S. cities were more susceptible to the economic and social forces of centralization and dispersion. Helped by the transport technology, commercial uses congregated with exceptional frugality of land into taller and taller buildings that came to form a unique nineteenth century urban type—the American downtown. Slow in developing, and not fully apparent until the true skyscrapers began appearing in the 1880s, the "downtown" placed immense importance on maximum centrality, translated through land values into physical form. Conversely, the same forces that encouraged land users to bid for centrality had a solution for those users unable and unwilling to compete. Dispersion gained early favour, and manufacturing joined certain kinds of residential land uses in seeking the periphery.[10]

EXPLANATORY THEMES

If these traits were general to the U.S. city as it developed in the nineteenth century, one may search for equally general causes and explanations. Five themes appear valid as underpinnings of American morphogenesis. A major theme is the extent to which U.S. cities developed as extensions of an Atlantic economy over the last four centuries and the significance this has had for the origins and acquisition not only of population elements but also of sophisticated material goods and cultural ideas. Inevitably, Americans even by the nineteenth century, still drew upon settlement experience and building knowledge derived from Atlantic Europe. New conditions in North America produced modifications severe and subtle, but permanent ties of trade and culture kept Americans keenly interested in innovations in Europe itself. Therefore, few elements of urban morphology in the United States are inherently non-European, though sharp new emphases soon set American cities as a class apart. The transfer of urban characteristics was reciprocal, of course, for the nineteenth century saw much European interest in the urban experiments and problems of U.S. cities.[11] The theme advanced here, however, is the importance of "cultural baggage," and very large English baggage at that, in solving problems of urban layout and construction in an environment markedly different from European conditions, and the importance of developing new traditions when old ideas no longer served well.

The special character of the American environment forms a second explanatory theme. Bountiful land and raw materials appropriate to any technology combined with the demographic sequence of settlement to produce a ratio of land to labour quite different from that in the European countries most involved in North American development. Available natural resources always outstripped the population's capacity for exploitation throughout the nineteenth century. Only distance and shortages of labour and capital had to be overcome in the drive for development. As a result, land as a commodity gained special sanctity and "space" as a geographical element acquired radically new cultural connotations. If the United States was a land of opportunity, cheap land was one root of that opportunity. Consequently Americans learned to spread out and to value finite space in different ways from Europeans. Even so, if physical dimensions for houses, streets, and other spaces tended to be more generous in the New World, still the constraints of location and distance worked to place a special premium on centrality. Thus the paradox of extremely dense built-up business districts in U.S. cities, with steep land value gradients and in modern times, tall buildings, set within a national settlement matrix distinguished for its profligate use of land.[12] This is especially sharp from a European perspective.

The third causal theme emerges naturally from the previous two. Unusual personal opportunities brought about through the application of European ideas of entrepreneurship to the vastness of the North American environment are often held responsible for breeding a distinctive level of individualism, even privatism.[13] Despite the social engineering required to establish communities in new settings from diverse stock, individual energy and resourcefulness have been credited with much of this accomplishment. The implication here of unfettered material pursuit can be translated into two cultural characteristics that help explain the form of U.S. cities, namely, the dominance of economic motives in decision-making and the impressive scale and sheer dynamism of urban growth.

From this follow two final themes, related but distinct. One is the role of land as a commodity in the U.S. culture system. Perhaps nowhere else has land historically been shorn of so much social meaning as in U.S. society. The dominance of economic motives found a perfect vehicle in American land since its abundance and adaptability, particularly its unencumberedness, made it a symbol of material gain accessible to all and a near-currency in a capital-hungry entrepreneurial society.[14] And finally, as a concomitant to this, urban development took place in a political context of coolness towards government intervention. The heady growth of the nineteenth century was due in handsome measure to government largesse (capital development projects), but in the absence of restraint. Social injustices that bred in this era of neglect led to the great reform movements of century's end, but in general the passive role of government, within and beyond the city, was important in explaining the morphology of U.S. cities.

If these broad factors had been uniform in their influence on urban morphology then generic elements would have produced virtually identical cities in all places and at all scales. Since the factors were not uniform in their impact, American cities also developed significant variety and individual identity.

During the nineteenth century the United States more than tripled its claimed territorial extent while quadrupling the average population density within those expanded limits. Actual population grew from 5.3 million to 75.9 million, at the same time that it urbanized from a level of a mere 6 per cent to 40 per cent. This urbanization was spurred not only by the extension of a national system of commercial towns along the major continental trade routes but also by immense growth in indigenous manufacturing that for market reasons and scale economies became increasingly concentrated in cities. By the Civil War, the United States developed a mature mixed economy that depended proportionally far less on European imports than before. The concentration of industry was not only urban but also regional as a manufacturing belt emerged first between Baltimore and New England and later extended through the states bordering the Great Lakes.[15] These variations in the economic role of cities were reflected in their morphology, though few large towns were so specialized as not to exhibit a full range of land parcel characteristics, non-residential building types, and land uses.

The outstanding growth rates of so many cities in the United States during the century put enormous pressure on building capacity to provide the physical environment to contain the increased activity, but the pressure was not uniform across all categories and locations of cities at any one time. By 1880 the exceptional growth of the major Eastern seaports was supplemented with development of medium-sized cities (Table I). Still, it was not until 1910 that the number of cities over 100,000 population was exceeded by that of smaller cities over 50,000 inhabitants, as a gross hierarchical ordering would lead to one expect. Eventually most regions acquired at least one large city, and of course well urbanized regions had many small cities. The thresholds that must have existed for cities to acquire certain morphological characteristics are only dimly perceived by scholars, and the mechanisms by which ideas and capitalization were provided only a little better understood. Both hierarchical diffusion through the urban network and the "neighbourhood effect" (or contagious spread) must have been involved in many urban facilities. It is therefore desirable to deal with a range of city sizes and regional representation in selecting examples to illustrate dominant American morphological trends. Such sampling is not meant to imply that differences did not exist, but rather that space here is inadequate to recognize all the variations.

The variety of physical forms found in the nineteenth century U.S. city is sufficiently great that this overview can do little more than scratch the surface in highlighting some major characteristics. By 1900, there were 1,737 agglomerated settlements large enough to have urban functions (as defined by the U.S. Census, i.e. over 2,500 population), 98 per cent of which had not existed in 1800. For all the individuality that can be ascribed to these places, all cities were composed of three fundamental elements in morphological terms, the urban cadastre, the building fabric, and property use (both of land and buildings). There are inevitable drawbacks in separating these components of the physical design of cities for individual investigation covering long periods of time, but at least the scholarly literature that has accumulated on American urban morphology is usually compartmentalized by these divisions, and only sometimes transcends them. It would be preferable to recognize broad morphogenetic periods, but large gaps in knowledge of processes and their distribution in time and space make any such periodization largely speculative at present. The scale of national urban development and its regional time-lags in the nineteenth century raise difficult questions about proliferation

TABLE 1

NINETEENTH CENTURY INDICATORS OF URBAN GROWTH IN THE UNITED STATES

Census	Total number of places over 2,500 population	Number of cities			Growth rate (%) of all urban places in preceding decade
		2,500-50,000	50,000-100,000	over 100,000	
1800	33	30	3	—	59.9
1850	236	227	3	6	92.1
1880	939	906	14	19	42.7
1910	2,262	2,153	59	50	39.3

and penetration of morphological changes. Periods of economic shift were not always associated with comprehensive changes in form. The mercantile city of the colonial period lingered well into the nineteenth century in terms of plan and lot patterns, building height, and land use, but gradual changes particularly in the east were underway converting some American cities into radically industrialized centres, a phase in which truly tall buildings appear very late. The major epochs in U.S. urban morphology are not as easy to demarcate as their European counterparts, owing in part to the cultural contrasts already suggested.

THE THREE COMPONENTS OF A CITY'S MORPHOLOGY

It is easier to argue the logic of analysing a city's morphology in terms of cadastre, building fabric, and property use than it is to point to a balanced scholarly literature under these headings for the United States. Far more work has been done on land use structure than on the history of building types, and even the latter has been approached with considerably more analytical interest than the urban cadastre. For this reason the latter part of this essay will place most emphasis on this least-understood component as a contribution towards ultimately redressing the balance. In narrowing the focus, however, brief reference should be made to the current state of conceptual models of historical urban ecology and building type history.

Historians, geographers, and sociologists who have looked at the nineteenth century U.S. city have been approaching a broad consensus on the spatial structure of urban land use. The most standard interpretation views the city early in the century as a relatively small, compact, and poorly-differentiated urban area. A general core zone contained the bulk of commerce and major institutions. A weak tendency for the merchant and well-to-do classes to concentrate near this core was outweighed by a broader pattern of mixed residential distribution in which social distinctions were expressed more by dress, manner, activities, and quality of housing than by location. The urban scale was still personal, and certainly pedestrian. By the end of the century, the change in territorial scale, organizational complexity, population growth, increasing mobility, technology, and blurring of material distinctions through rising living standards had precipitated a spatial reorganization of the larger city. In this changed city, adherence to certain ways of life and cultural preferences was registered in socio-spatial separation, the rich and cultivated buying their exclusiveness (in a more impersonal and plural environment) through congregation in single-class residential districts. Geographically, this meant specially created areas of uniformly expensive housing, often suburban or fringe in location, and paid for either through low densities on high value land (reasonably central) or distant low densities brought functionally close through transport links. This segregated city pressed the poor into near central ghettos and relied on housing filtering and neighbourhood change to accommodate social mobility. By then, the central business district (CBD) had become the nerve-centre of the urban economy and cultural activity, and industry conspired with transport corridors to demarcate the residential cells of the metropolis (Fig. 1).[16]

This is, to be sure, a simplified expression of the model and a number of caveats have been offered. Some have questioned the invasion-succession principle implicit in the residential component while others have pointed to varying neighbourhood contexts in which assimilation and mobility took place.[17] The significance of the CBD relative to non-central retailing and social activity is undergoing re-evaluation, as is the dominance of transport arteries in accounting for the spatial land use patterns.[18] Likewise major adjustments are being called for in perceptions of the timing by which various "new" patterns emerged: examples include well-to-do suburban commutation, the emergence of specialized industrial districts and their subsequent decentralization, and the differentiation of the CBD.[19] To these uncertainties can be added several other criticisms. Not enough is yet known about the growth of the physical infrastructure of the city that gave shape to land use patterns, such as prior ownership, and the spatial distribution of urban services.[20] Nor have the pulsations of the urban economy been employed sufficiently to assess the full effect of building cycles on land use structure.[21] And thirdly, the emergence of land use patterns of certain types was undoubtedly a function of city size, growth rate, economic specialization, and regional context. Generalizations about changing urban land use configurations in the nineteenth century U.S. city rest still on too fragmentary a study of too few, mostly eastern, mostly large cities.

Notwithstanding such reservations about the general land use model and its limitations, the conceptual awareness of urban land use zoning and its causes is admirable in comparison with the state of knowledge about American urban building types. Traditionally, this sphere has been the prerogative of architectural history and its dominant interest in formal design, "academic" fashions, and the purely aesthetic dimensions of notable buildings. Only recently have a few architectural historians and others begun to look to the commonplace, "ordinary" buildings—of all functional categories—that comprise most of the city's built form, and to seek in them common threads of building type evolution in response to changing needs, quite apart from the matter of superficial style.[22] Almost totally lacking yet are studies that would then relate such trends to the changing geography of the city so that the locational incidence of particular building types would clarify their role in varying the character of urban districts from one part of the city to another, and from city to city.[23]

Most work on basic house types in the United States, as distinct from house designs, has been done by geographers, and that devoted overwhelmingly to rural houses.[24] Extrapolating from such work, it may be suggested that various building types first developed as an expression of broad regional cultures that then diffused geographically.[25] Migration routes spread successful and preferred building types across the nation in channelled fashion (Fig. 2).[26] New England traditions in building layout and construction moved west along the northern tier of Middle Western states, Pennsylvania culture spread its house types most widely through the central belt of the interior, while Virginia and Tidewater culture spread south and then west. To be sure, some of these movements reflected class, function, climate, and size of land holdings, but that does not detract from the importance of regional culture hearths.

While the published evidence relates to rural trends, there is little reason to doubt that towns and cities shared in these early vernacular developments. Total demand for urban housing designs was far beyond the capacity of a small fraternity of architects that only became professionalized around mid-century. Most buildings were designed, as they were built, by artisans, and while they often resorted to manuals and pattern-books for ideas and methods, the variety of local solutions to building problems is infinite. For the nineteenth century, a broad divergence in forms is generally recognized growing out of the isolated incubation of colonial experiments in the light of available materials, demographic and social requirements, and economic conditions. After the Civil War, however, new technologies combined with nationwide transport and social communications to reduce radically the variety of building. A convergence upon a national norm was in progress.[27]

However limiting this trend may have been, it was never complete and could not overcome the strong residue of individual and regional building character that had accumulated in the building stock of cities over the decades. Hence, to suggest

Changing Land Use Ecology of the 19th Century Large U.S. City

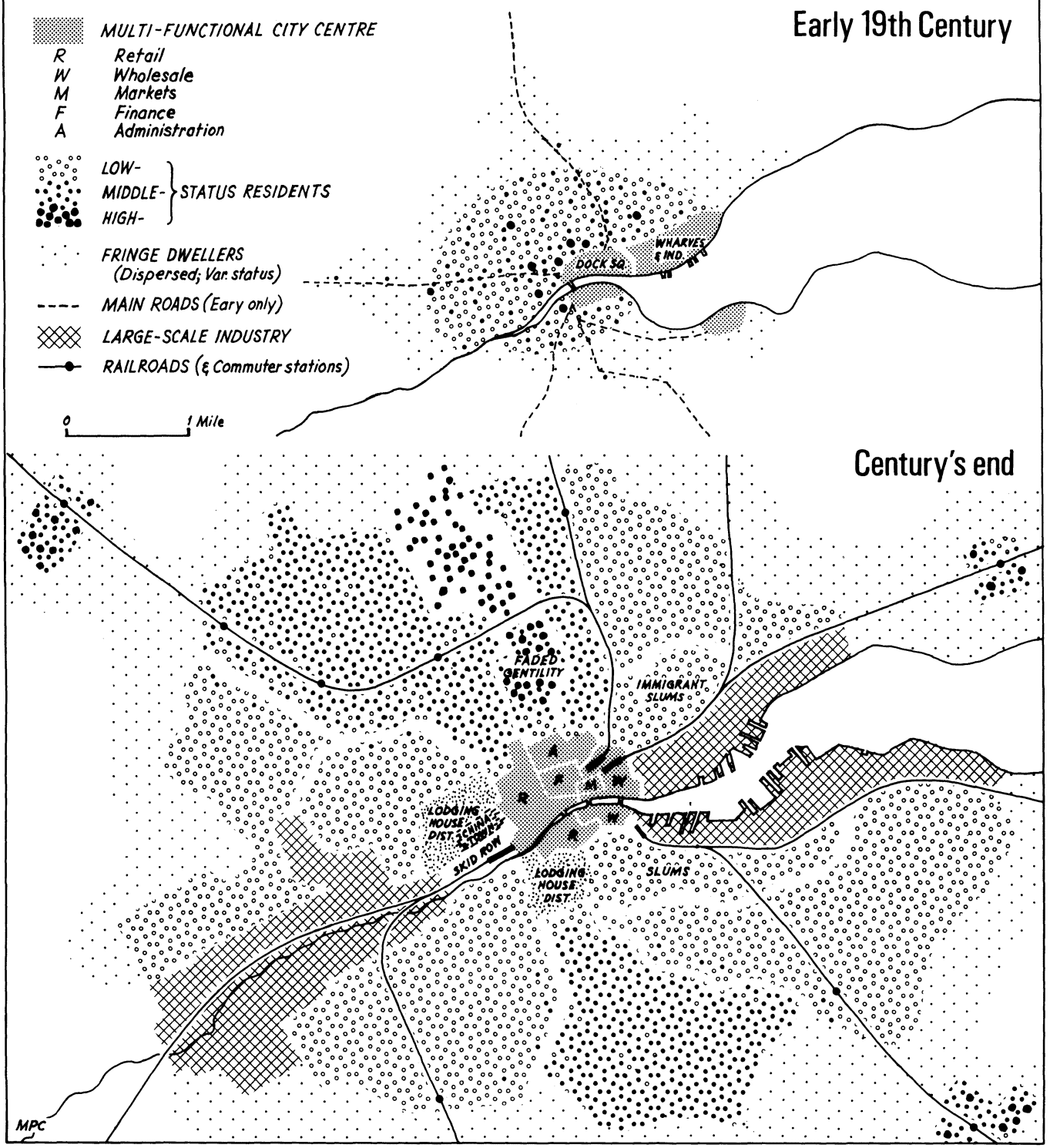

FIGURE 1

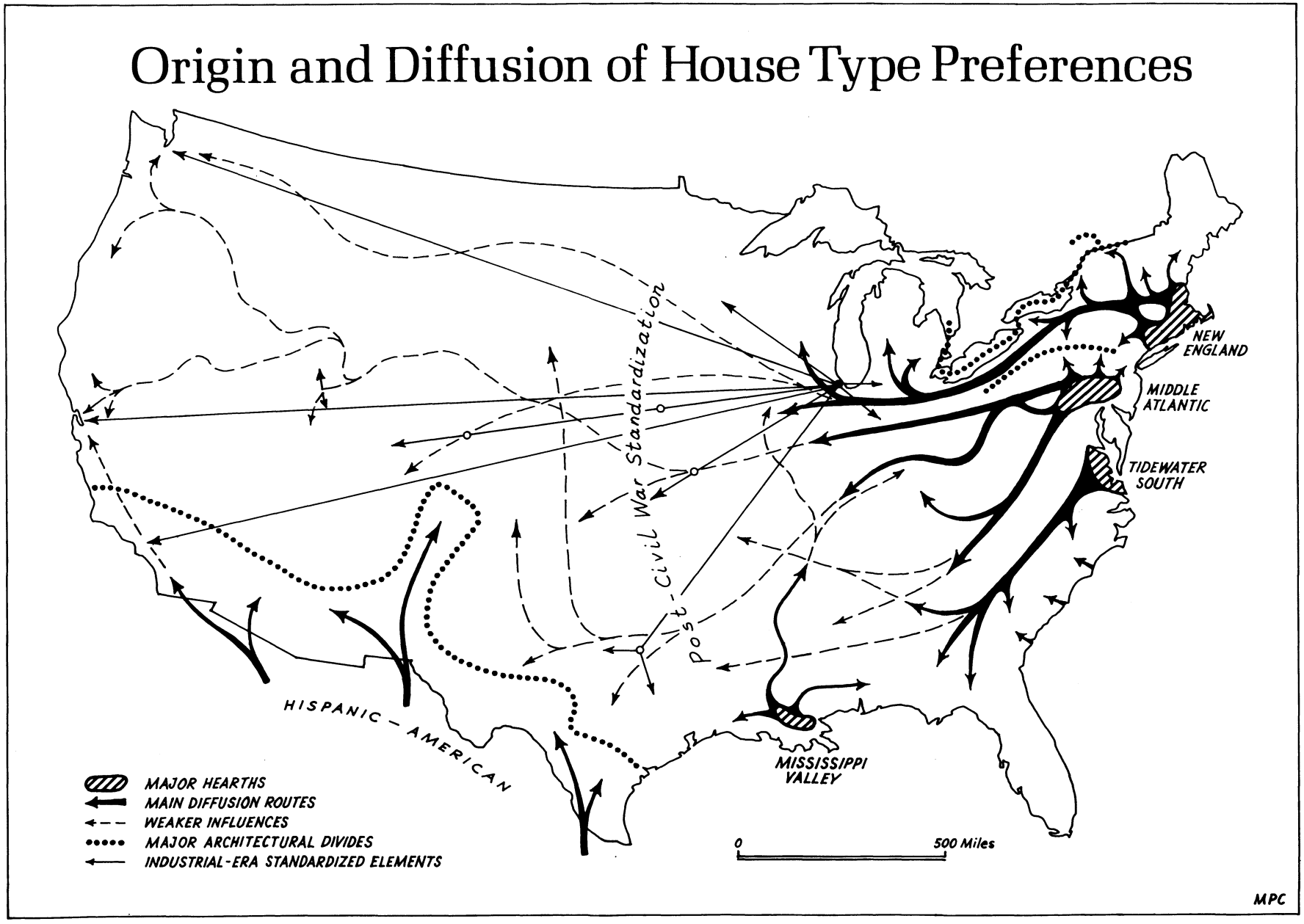
Origin and Diffusion of House Type Preferences
NEW ENGLAND
MIDDLE ATLANTIC
TIDEWATER SOUTH
Post-Civil War Standardization
HISPANIC - AMERICAN
MISSISSIPPI VALLEY
MAJOR HEARTHS
MAIN DIFFUSION ROUTES
WEAKER INFLUENCES
MAJOR ARCHITECTURAL DIVIDES
INDUSTRIAL-ERA STANDARDIZED ELEMENTS
0
500 Miles
MPC

FIGURE 2

only a few examples from residential building types, Philadelphia and other eastern port cities developed strong attachments to the row house, while New Orleans adopted such special types as plantation-inspired townhouses, Creole cottages, and shotgun houses, the latter accepted in other Mississippi tributary cities as far north as Louisville. Chicago became famous for its wooden "balloon-frame" houses, which, when combined with versions sheathed in brick, gave that city in the mid-to-late nineteenth century a singular appearance. New England industrial communities, led by Boston, evolved a special form of inexpensive housing known as the triple-decker which diffused throughout the region at the same time forming important and locally distinct subtypes.[28] Most of these basic housetypes were amenable enough to clothing in a variety of architectural styles such as Greek revival, Italianate, Gothic, and Queen Anne, their fashionableness and degree of ornament reflecting class and income distinctions. Styles such as these swept the nation, and, while the time-lags in regional acceptance and propensity are of great interest in themselves, these styles were generally imported and nationally adopted. Thus, the interaction of imported style with basic building types more indicative of regional character produce the most illuminating scholarship. This brief overview of the potential significance of building types to U.S. urban morphology implies that much yet needs to be studied.[29] A start has been made and some intriguing relationships are beginning to emerge, the larger significance of which in the context of American urban morphogenesis remains to be established.

In turning to the third general component of the physical form of cities, the cadastre or ground plan, we come to the most underdeveloped branch of American urban morphology. A major service has been done by John Reps who has drawn significance from the history of planning ideas in America, as expressed in the initial plats of towns.[30] But a comprehensive approach to urban morphogenesis focuses also upon subsequent changes that can be pervasive and distorting as well as minor and conforming. Whatever they are, their nature and sequence reflect unerringly the complex processes of adjustment as cities, so often fast growing and changing in their economic balance, coped with the physical consequences of that growth and specialization. Therefore, what happened after the initial plan was marked on the ground is replete with significance. In attempting to develop this theme further, the remainder of this essay reviews briefly the establishment of urban ground plans and some of the changes that occurred over time, together with the implications that these had for the general morphology of U.S. cities.

THE GROUND PLAN OF CITIES

Colonial Antecedents

Since at least Greek times ground plans for urban places have contained four basic ingredients common to all situations. Public *circulation spaces* such as streets, lanes, squares, footpaths, and stairways exist to connect locations in different parts of the urban district. They generally form a more or less integrated network of corridors, of greatly varying length and breadth, and their status has usually been that of public rights-of-way in aid of free movement around the city. Second, *blocks* of occupation spaces are created by the margins of the circulation channels, most clearly demarcated in grid-iron ground plans where at their simplest, two series of parallel streets intersect each other at right-angles. However, blocks can be recognized with irregular outward shapes and types of boundaries, though street delineations are the commonest. Third, occupation *lots* are the usual form of block subdivision in which a series of adjacent lots comprise a block. Technically, a lot is recognized by singular ownership in relation to adjacent properties. Hence, while one person may own many adjoining lots (if he chooses to maintain the distinction), there can be no spatial change of ownership as one moves over ground without the establishment of a lot boundary. Finally, ground plans include *building coverage*, that dimension of a built structure that occupies ground space. Building coverage, in the form of ground plan outlines and the percentage of land in a lot actually covered comprise the contribution of buildings, of all kinds, to the urban ground plan. These four elements, present in all urban ground plans, may assume any shape and dimensions, according to the cultural controls leading to their selection.

Almost all ground plan configurations found in U.S. cities in the nineteenth century have their roots in one town-founding tradition or another during the Colonial period.[31] Only the informally-curved romantic subdivision plans following Mt. Auburn (Cambridge, Mass.) and Riverside (Illinois) models claim no such antecedents. Town planning in the colonies from New England to Georgia drew on varied European experience so that there was relatively little spatial logic to the detailed distribution of the myriad variants between grid-iron and irregular principles.[32] In some cases the proprietors of colonies, with strong ideas and broad influence, could stamp a pattern to be widely emulated, as with William Penn's commissioned plan for Philadelphia.

At the other extreme, colonial New England town planning was generally less doctrinaire and more willing to begin frugally and allow *ad hoc* modification as subsequent needs dictated. The resulting informality of early ground plans as in Boston bespeaks pragmatism and small-scale change.[33] Indeed, the piecemeal accumulation of house-lots and streets, often oriented to older field boundaries, implies an innocence of grand urban intentions that later would lead to severe morphological problems in accommodating massive growth in the nineteenth century. Elsewhere in New England, some places were from the outset conscious urban foundations, though equipped as in New Haven and Hartford with decidedly modest grid plans. It is a mistake to view irregular colonial urban ground plans as "unplanned" when compared with those on a grid or other regular system. Planning of the former was merely incremental but not necessarily less thoughtful than for the latter.

It is true nevertheless that all cities which began as colonial towns contained few curved streets. Often, curved routes were actually a series of connected straight segments. There is a surprising degree of angularity in a large number of informal layouts, so that a continuum exists between the informal and the rigidly rectilinear plan types. More significantly, colonial plans bequeathed later periods a tendency for generous street, block, and lot dimensions. Typical of the range of lot sizes in early grid foundations were the 18.3 metres × 27.4 metres (60 feet × 90 feet) lots of Savannah, Mobile lots of 22.9 metres × 45.7 metres (75 feet x 150 feet), and the large, 27.4 metres × 54.9 metres (90 feet × 180 feet) lots of Marietta, Ohio. Streets varied sometimes by intended eminence, but principal streets were rarely less than 22.9 metres wide. Public squares also were a common ingredient, sometimes several to a single town plan that belied the notion that early planners assumed a single strong community focus.[34] Intended as an ample inducement to settlement, the large-lot framework of many colonial plans allowed space for productive gardens and was not meant to anticipate future dense building development. The initial rectilinear grid order was soon to be marred by the individualistic subdivisions of sundry land parcels geared more to emerging business needs than to formal town-plan elegance. The consequences of this early colonial generosity in spatial planning were internal block disorder, irregular fragmentation, and haphazard back alley development in the late colonial and nineteenth century periods, as exemplified dramatically in Philadelphia.

GALVA, Ill., in 1875

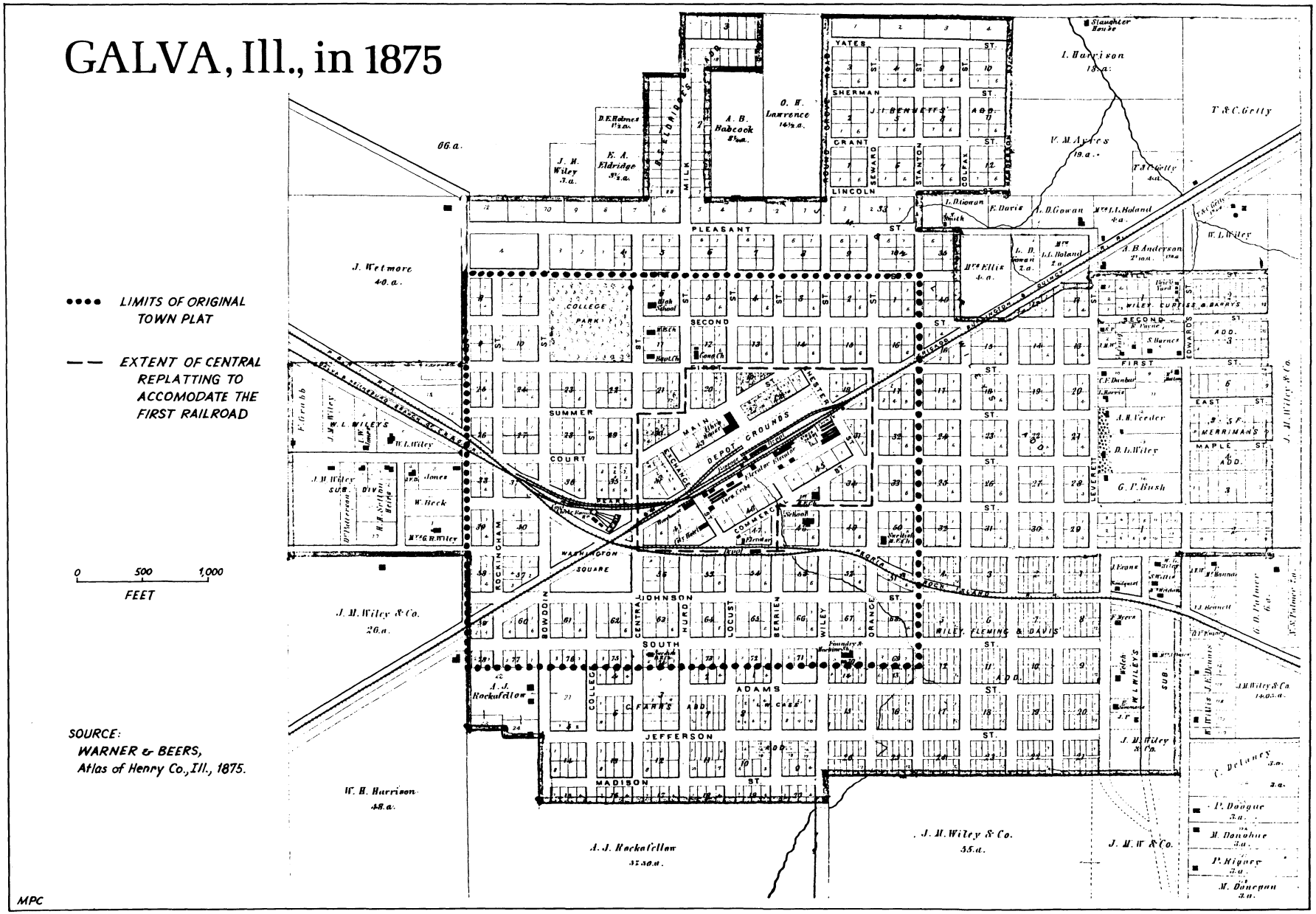

FIGURE 3

Nineteenth Century New Town Foundations

One concomitant of a national land survey system that enshrined the principle of dispersed rural settlement was universal recognition of the need for nucleated settlements as foci for trade and local government. The interior colonization of the United States spawned vigorous efforts by entrepreneurs of all types to provide these centres. Some applied great wisdom to the location and site selection of their urban promotions, while others acted purely on faith. Although no man could predict the future arrangement of the national system of cities in the early nineteenth century, most town founders began with relatively modest visions, when considered in terms of initial plat size and expected rates of property transfer. While many dreamed of starting great metropolises, most were content to establish on the ground the makings of a county town. Often this called for a grid town plan containing from 30 to 60 blocks with between eight and sixteen lots per block. If a town was to grow from nothing, such a plan size would prospectively make the original proprietor a rich person, given sufficiently rapid growth and patience.

Some landowners thought in more grandiose terms. Anglicized Detroit, for example, was conceived on a vast scale in 1807 that has been dubbed "backwoods baroque," with an intricate lattice of squares and diagonal streets. Madison, Wisconsin, sited on a scenically superb isthmus between two lakes by a savvy frontier judge, was laid out in 225 large blocks—a scale that made sense only if the site were designated as a regional political capital, as it immediately was by a suitably lobbied (and bribed) territorial legislature. Here as in so many cases, intense promotion through widespread publicity, based on confident cartographic renderings of such "paper cities," succeeded in stimulating considerable actual settlement.[35] Whatever the initial plat size, its relation to subsequent urban growth was minimal. Towns with large plans that failed to grow simply colonized what land was required and the excess was sold off quickly enough to farmers and market gardeners when the supply of speculative buyers dried up. Towns that quickly outgrew their initial plats developed additional platted subdivisions to keep a plentiful supply of building lots on the market. In contrast to Madison, Chicago began in 1830 with 58 blocks platted, but within four years had added 200 more.

The plan of Galva, Illinois, illustrates typical features of a Midwestern small town platted within the original constraints of the federal land survey system (Fig. 3). An initial plat laid out street blocks in a north-south oriented grid. Before long, the Chicago, Burlington and Quincy Railroad was constructed into town and a central portion of the street plan was realigned to give prominence and convenience to railway business. With railway connections Galva grew steadily and various additions to the town plan were made by later residents, some before and some after the advent of the second railway.

The mentality that had accepted grid street plans for their simplicity in survey and land transfer in Eastern cities in the colonial period was equally prepared to welcome a general grid land division system for the remainder of the country as a whole. So mechanically was it applied that property lines were frequently to conflict with the vagaries of natural topography, with consequences for utility provision, flooding and subsidence, and home construction costs.[36] In many Atlantic coastal and interior prairie locations this was of little concern, but often the best locations for trade and communications purposes dictated river valley confluence sites with steep local terrain. Galena, Illinois, arose where the valleys of the Wisconsin-Illinois Lead District converge to join the Mississippi River. Since the actual confluence area was too marshy, this lead processing and shipping town developed in a deep-cut section of the Galena Valley, requiring that the early street system, though rectilinear in concept, curve with the topography.[37] Beyond the ravine, however, as additions were made to the town plan, human loyalty to the grid battled with the hillslopes. Perhaps the most tortuous examples of such disjunction lie in the valleys surrounding Pittsburgh.[38]

More common by far were town foundations on unencumbered flat ground. Here, rectilinear grids have had ample opportunity to proliferate and expand with urban growth. Two cases can be cited that characterize many city grid patterns in the United States. Although laid out in 1796, Cleveland's first plat was little colonized in the subsequent two decades, as was especially common with frontier towns founded well in advance of intensive agricultural settlement. Its generous lot pattern provided blocks consisting of two rows of twelve lots each measuring 40.2 metres × 201.2 metres (132 feet × 660 feet). This resulted in four street blocks .4 kilometres (.25 miles) in length! Clearly unsuited to a potentially busy lake port, this plan was altered in 1815 by the insertion of five intermediate streets in the two northerly blocks (Fig. 4). Still this was insufficient, and by 1835 many more streets were added to the heart of the town plan, a process that continued throughout the antebellum period. While the rectangular portion of the early street system lay on level ground, the steep river banks necessitated diagonal approach lanes, and the more general wedge shape of the east bank plateau ultimately led to street triangulation that owed much to topography.[39]

Not all changes in the orientation of street grids are due to hill-slopes. While in Cleveland the river and lakefront acted as effective "morphological frames," human action can produce similar effects. The discordance between the land survey system and the railways in Galva has already been mentioned. In Los Angeles, early jurisdictional boundaries had a similar effect. Within the old Mexican boundaries of the pueblo district the orientation of the original settlement was maintained because land holdings were conditioned by them. Once outside those limits, north-south orientation was preferred (Fig. 5).[40]

The nature of the town-founding enterprise had some, but often not much, influence on plan morphology, given prevailing survey ideas. Since most nineteenth century new town foundations in the United States were speculative, most followed design rules aimed at maximizing return on investment. Hence public space was often grudgingly given, increasingly so as the century progressed. Consequently, open squares, cemetery space, and special land for public institutions were haphazardly provided. In the sweepstakes for designation as county seats, courthouse space in towns was often built-in to the original plan (and as easily discarded if designation went elsewhere).[41] Varying width of streets was seemingly also an irregular element. Many plans allowed for a main street to be given an imposing width, but plans with three or four street widths were rare. This implies a form of geographic neutrality. Even though the town centre would be declared in effect by the siting of a courthouse or railway station, other street frontages were given deliberately uniform character, both out of simplicity and desire to let land values and centrality define themselves later — in land use rather than ground plan terms. Nevertheless, many plans did provide for higher lot densities along railway, wharf, and courthouse square peripheries where it was expected that business would congregate, leaving more spacious lots in the remainder of town for residential purposes. But such attempts at predestination have rarely controlled land and building uses in American cities. Whatever the land use pressures were in a given location, so the lot subdivision process strove to achieve.

If the surveyors' concepts for town plans were fairly universal, the details of any given ground plan were generally varied. For the most part, town founding was a deeply individual enterprise. Anyone with sufficient capital could play town-maker,

usually relying upon borrowed ideas for design features. The one major exception is the case of railway companies that simultaneously dealt in new towns along their rights-of-way. The Illinois Central Railroad had a standard town plan which it stamped upon the prairie scores of times. The subsequent cadastral changes as these towns diverged in regional economic role and growth success would make an absorbing study.[42]

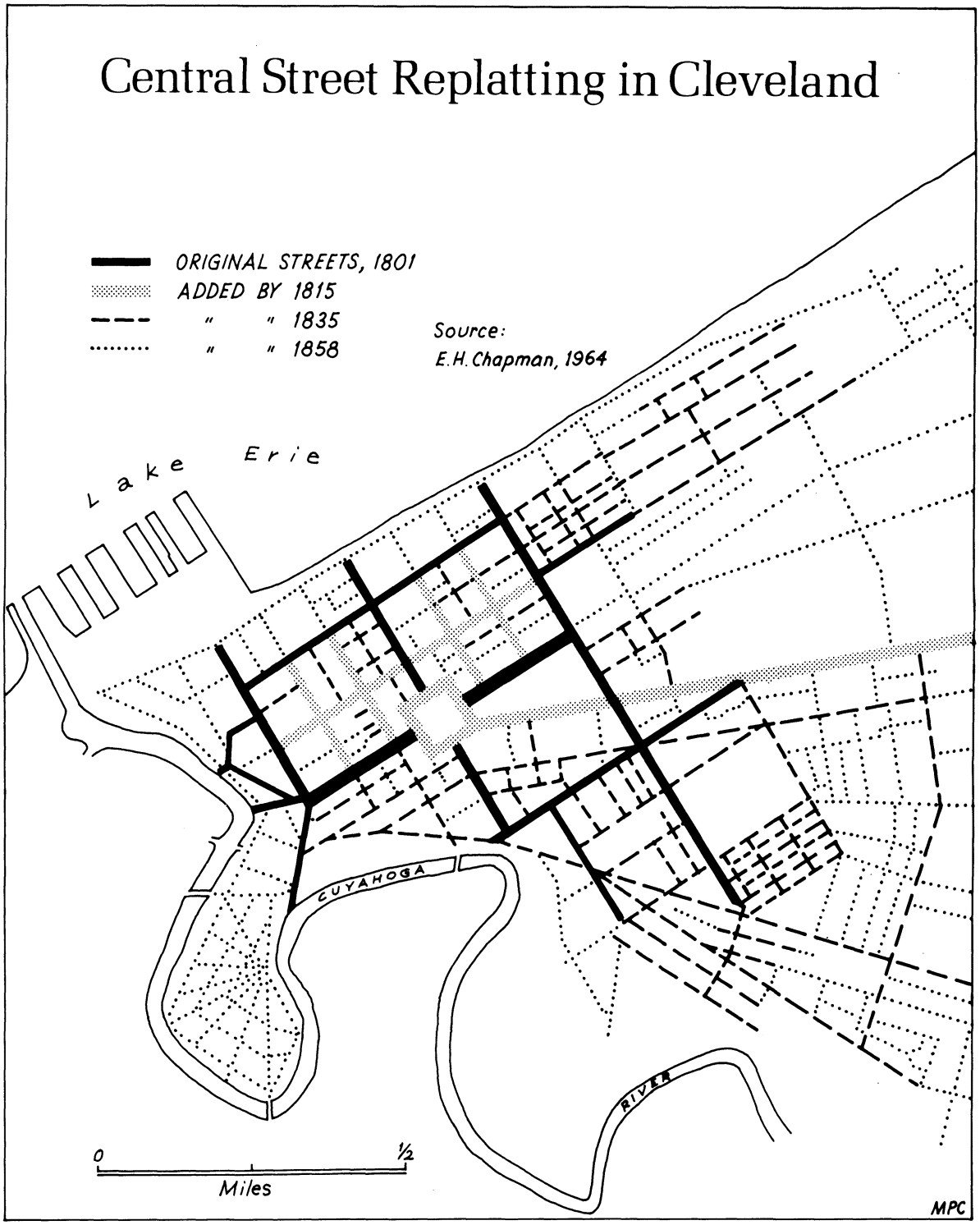

FIGURE 4

Town Plan Accretions and Modifications

The initial character of ground plans is of fundamental significance for its antecedent effects upon later development. In addition, the origins and diffusion of the concepts it embodies are important in tracing cultural growth and exchange.[43] In many ways, however, the later plan developments are of deeper interest because they reflect the ongoing struggle between a cadastral framework laid down at the outset—and steeped in inertia—and the often rapid changes in land use and therefore building needs of the local society as its urban economy develops and old structures become inadequate, both in scale and design.

Changes to the town plan can be considered in the light of urban *accretion*, the addition of new land areas to the "built-up" zone of towns and cities on the one hand and modifications to areas within built-up districts on the other hand. These modifications may have taken the form of *repletion*, filling up of interstitial space, or replacement, the subtraction of old cadastral elements and their substitution with completely new ones.[44]

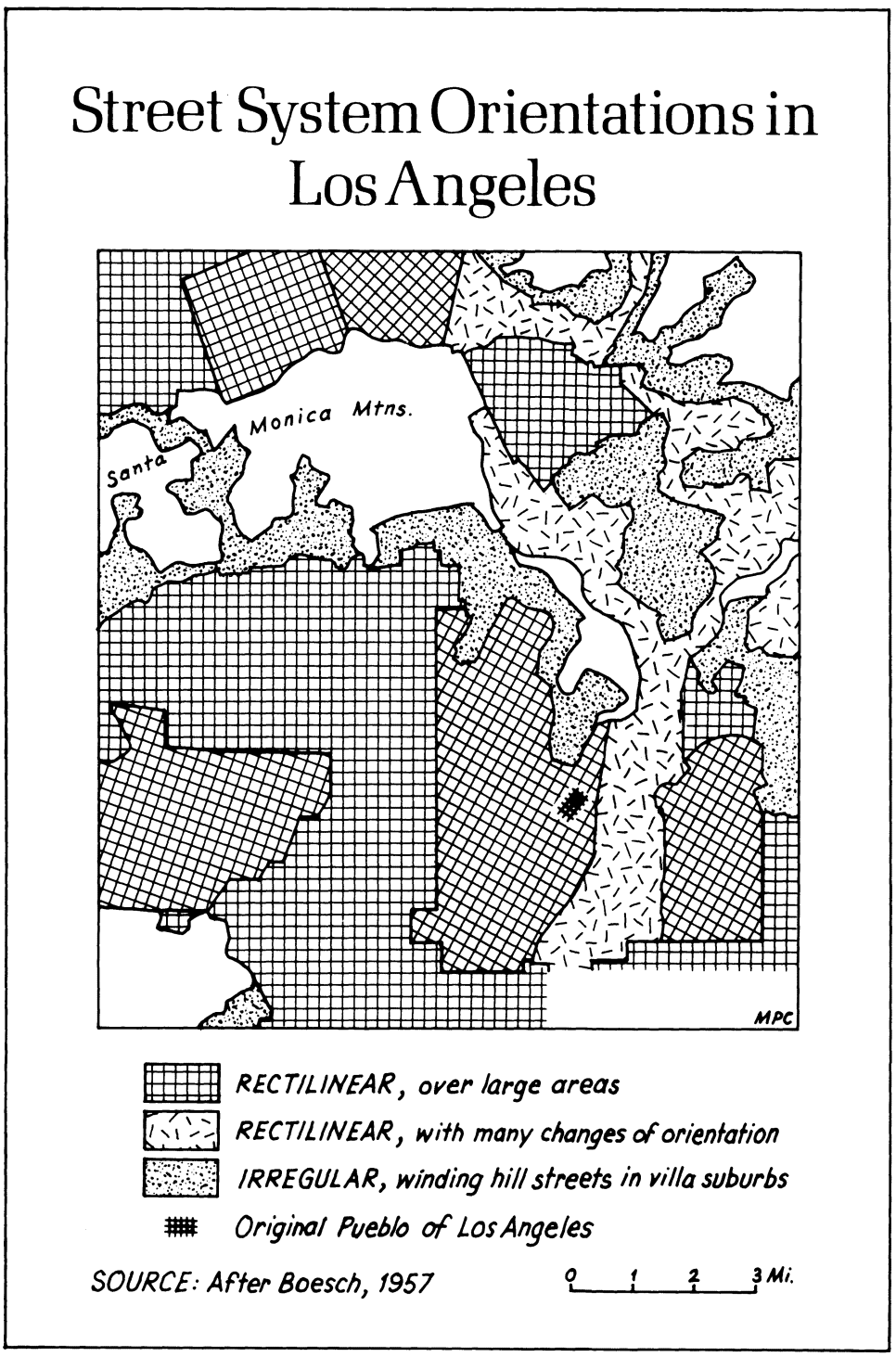

FIGURE 5

Accretions. It is axiomatic that all but the most radical morphological changes take place within outlines or "frames" inherited from earlier periods. Some early boundaries have a nearly permanent effect in constraining change, while the effect of others is ephemeral. In the United States, such antecedent effects have often been devalued in comparison with European conditions, since the comparative youth of American cities has etched patterns on the ground less deeply and their enormous economic vitality has more swiftly transformed them. The general distinction is worthwhile, but within a 400-year span some old American cities have acquired tremendously compound patterns, and even cities less than a century old, through the very rapidity of their growth, have changed on a scale complex enough to leave many relict features.

This general point can be demonstrated with reference to Madison, Wisconsin. The original city plat covering the isthmus referred to earlier was vastly premature in outer extent, needing the remainder of the century to be colonized to a modest density with houses (Fig. 6). Beyond the isthmus, earlier land sales had

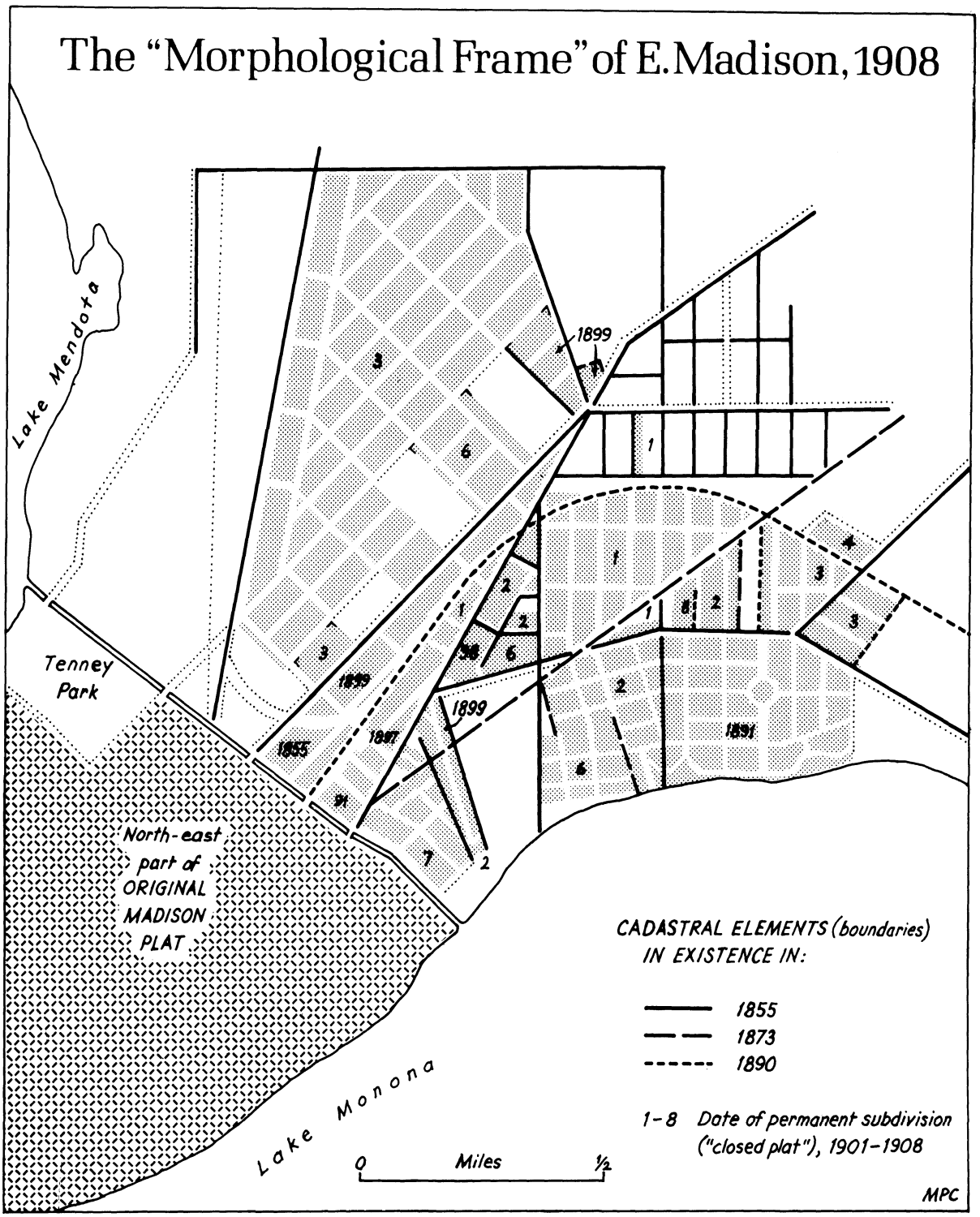

FIGURE 6

created an ownership pattern (heavy lines in Fig. 6) that by 1908 could be seen to "contain" turn-of-the-century plat developments to a remarkable degree.

The disorderly pattern evident in East Madison illustrates the variable character of urban fringe accretions. The process exemplified in Madison can be stated as a simple model of the land preparation process by which fringe land becomes fully urbanized (Fig. 7). Large agricultural parcels break down through exchange to sizes suitable for urban platting. This latter process may sometimes be so premature that lack of demand for house lots may lead to the subdivision design being abandoned. Such *abortive plats* substantially covered East Madison, and a remnant block (1855) is a reminder of a speculative subdivision from the heady pre-1857 land market that covered most of the northwestern map area in Figure 6. Most of the framework survived to shape the large 1903 closed plat that eventually succeeded it, only the lot density having increased in the meantime. When it was clearly recognized that a final plat would be premature, an *open plat* would be laid out in 2.03- and

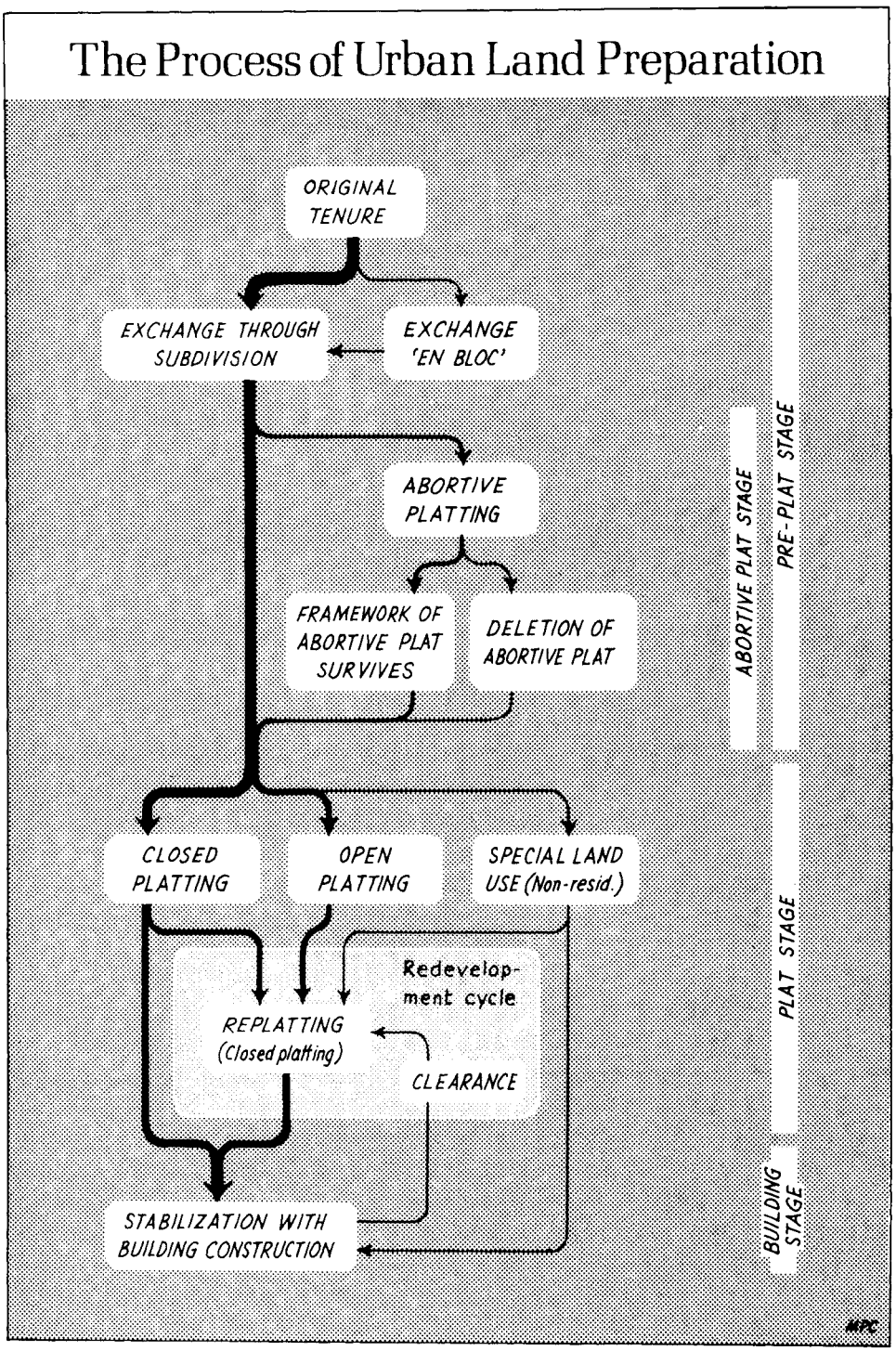

FIGURE 7

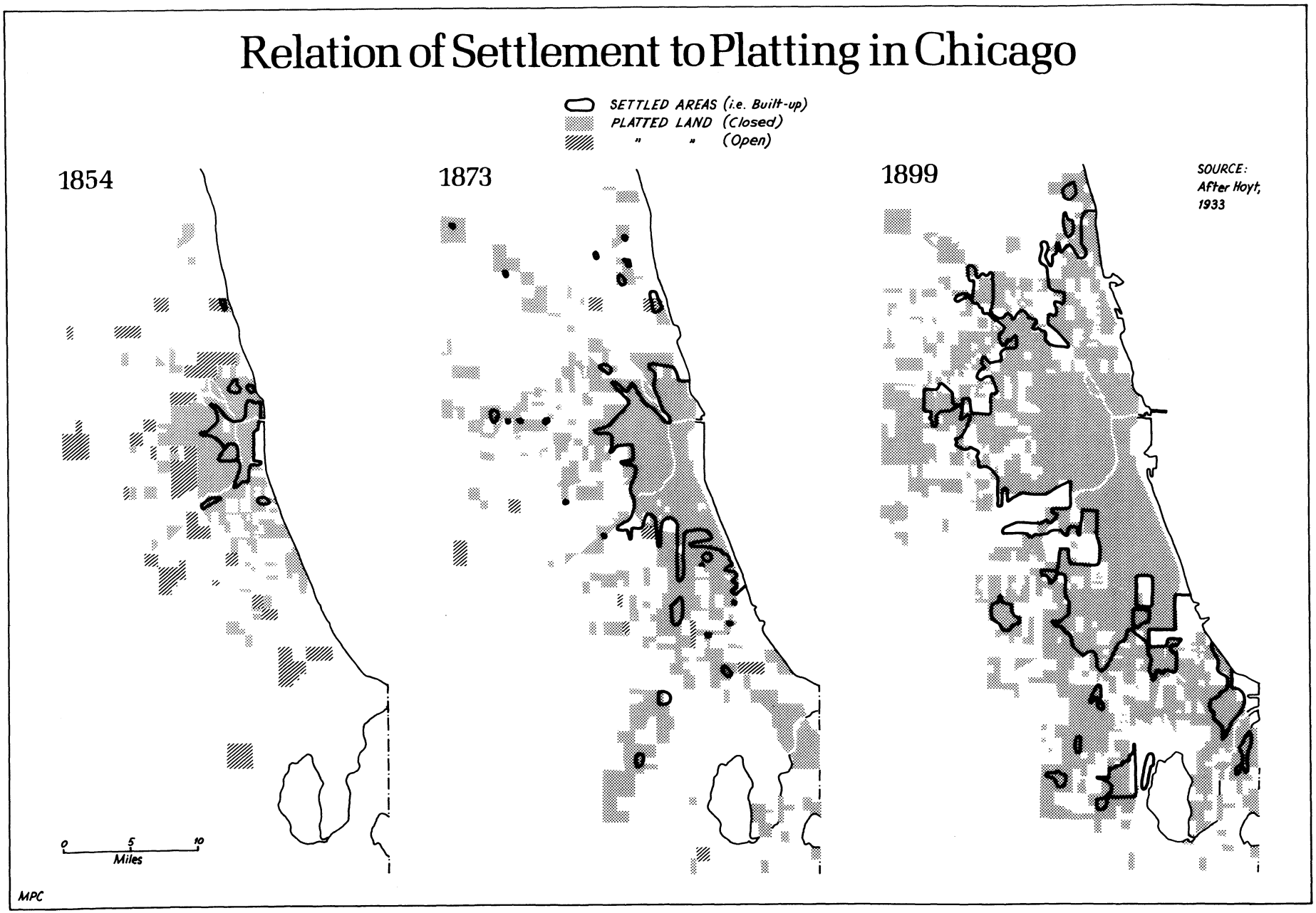
Relation of Settlement to Platting in Chicago
SETTLED AREAS (i.e. Built-up)
PLATTED LAND (Closed)
" " (Open)
1854
1873
1899
SOURCE:
After Hoyt,
1933
0 5 10
Miles
MPC

FIGURE 8

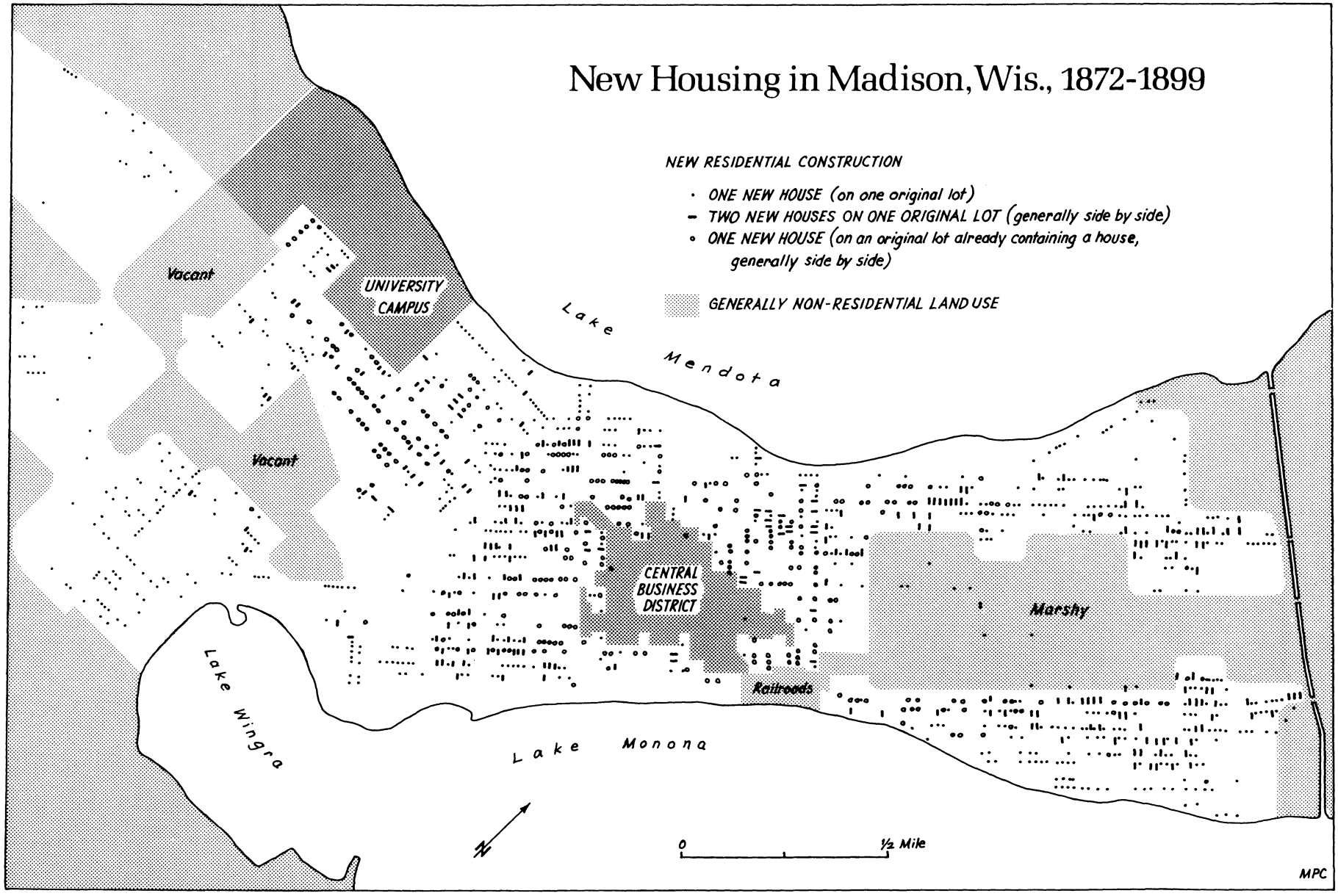
New Housing in Madison, Wis., 1872-1899
NEW RESIDENTIAL CONSTRUCTION
· ONE NEW HOUSE (on one original lot)
– TWO NEW HOUSES ON ONE ORIGINAL LOT (generally side by side)
◦ ONE NEW HOUSE (on an original lot already containing a house, generally side by side)
GENERALLY NON-RESIDENTIAL LAND USE
Vacant
UNIVERSITY CAMPUS
Lake Mendota
Vacant
CENTRAL BUSINESS DISTRICT
Marshy
Railroads
Lake Wingra
Lake Monona
N
0
½ Mile
MPC

FIGURE 9

4.05- hectare (five- and ten-acre) lots, which were usually sold as suburban or country estates. Remnants of such a case are visible in the northeast portion of Figure 6, many of which were ultimately to blossom with individual small *closed plats* when the market prospects for households were better. This process technically produced a *re-plat*. These various channels, by which land would come eventually to support housing at moderate urban densities, were used with widely differing geographical consequences. Depending on timing and the circumstances of exchange, a given edge of a city could be incorporated into the urban tract with considerable integrity, or the result could be most disorderly. The distinction affected future neighbourhood prestige and later redevelopment potential. The East Madison case is one of disorder. The power of early land ownership boundaries and arterials, reinforced by terrain and later railway alignments, succeeded in so fragmenting ownership and thus subsequent development decisions as virtually to ensure a heterogenous and socially déclassé morphological environment which encouraged mixture of unsympathetic land uses. In contrast, Madison's west side developed more unitary subdivi-

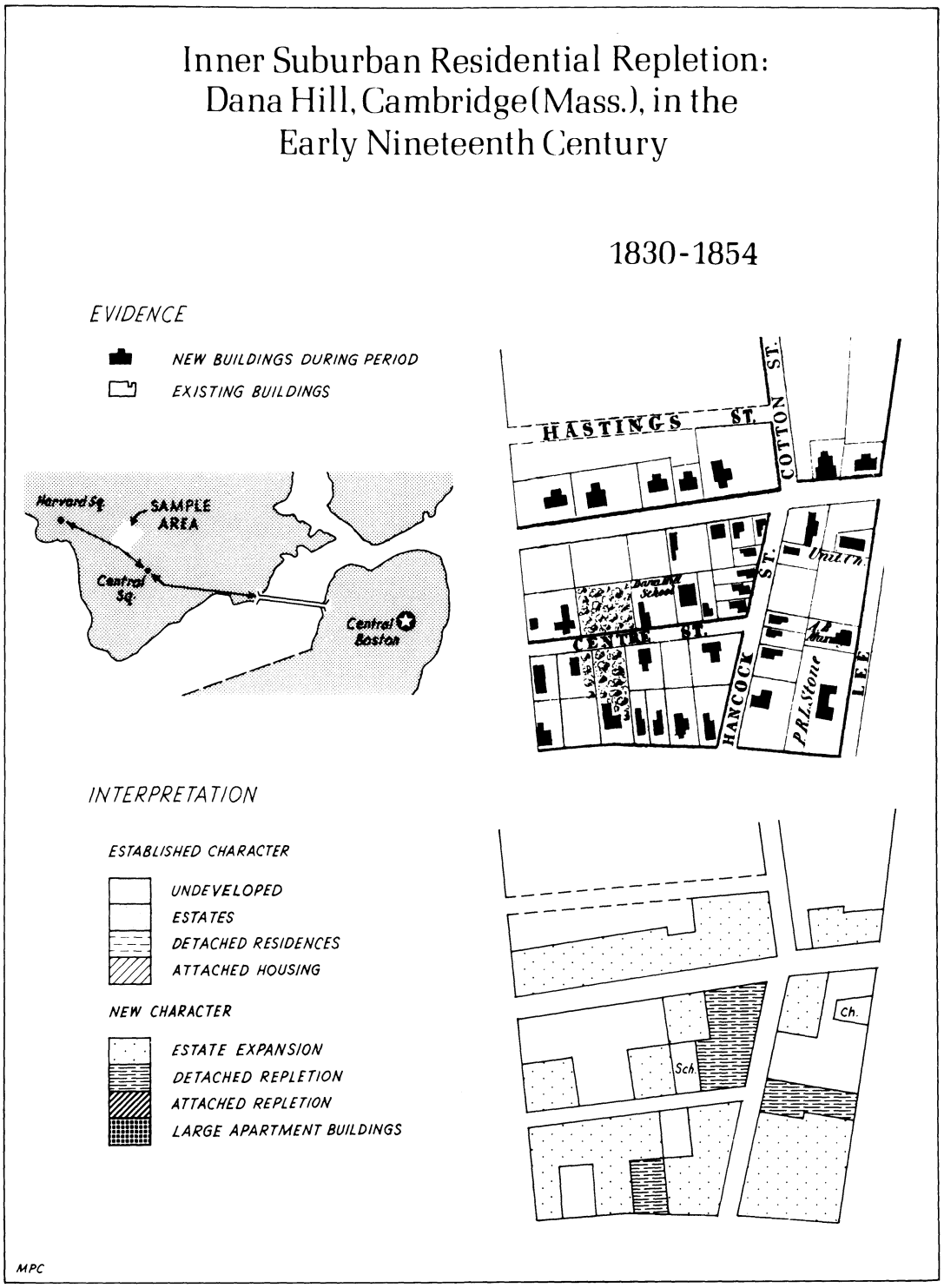

FIGURE 10

sions with comparatively less land use chaos and therefore higher social prestige and stability.

Such cases exemplify land development characteristics of urban accretion processes in the United States during the last century and are explained to a large extent by the free land market system and a municipal environment dedicated to any and all growth as good. Any landowner with property in the broad urban fringe had the privilege to anticipate, institute, and bear the risks of urban growth, regardless of exact location. The logic of orderly, contiguous expansion of subdivisions was largely wasted upon many for whom investments were an urgent commodity and competitive subdivision timing an utterly individual property right. As the speculator calculated, so did the prospective homeowner: with rapid growth as a norm, a given zone would quickly enough become fully built-up. To the extent that the prophecy many times failed, the typical urban fringe has become a monument to the city-building values and style of the society at large.

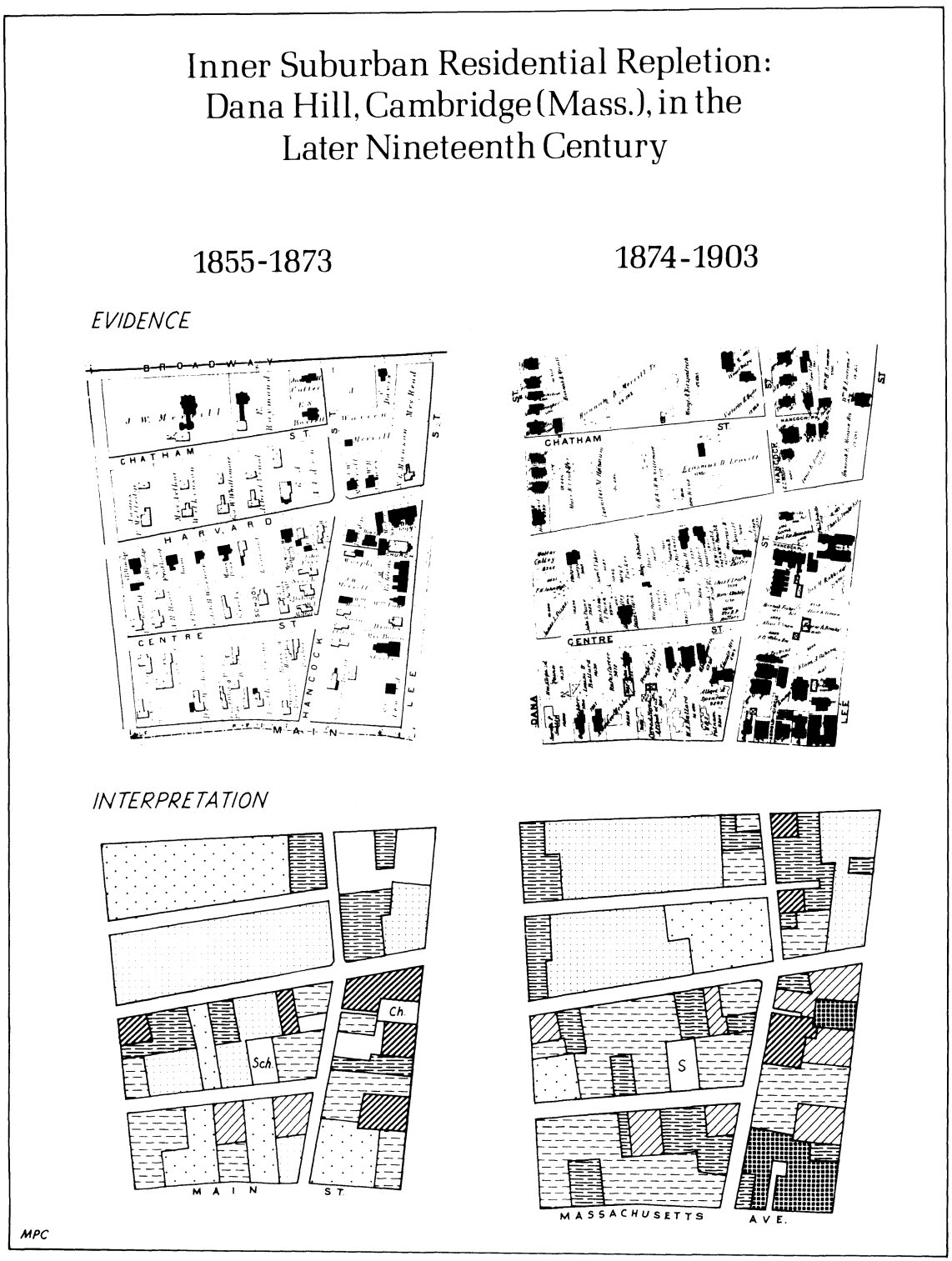

FIGURE 11

On a grand scale, this distended geographical pattern of fringe absorption profoundly influenced vast tracts of land in large cities, as occurred in Chicago. Throughout the nineteenth century the boom mentality in real estate led to thousands of acres being subdivided into urban plats far in advance of solid demand, and therefore of actual building construction (Fig. 8).[45] While ratios of supply to demand varied significantly among cities often for local reasons, the general pattern of extravagant anticipation held up through depressions and wars alike. In young but robust cities of the West and post-bellum South in the later nineteenth century, the phenomenon was especially pronounced. Birmingham, Alabama, translated the fruits of industrialization into a soaring lot surplus at the turn of the century at a time when platting in larger, more sedate cities temporarily slowed. Tacoma, Washington, with 100 households in 1870 had a *surplus* of 1,088 building sites; this city by 1910 with 20,000 households bosted 74,277 surplus house lots.[46] In the Chicago region, suburban Berwyn, with no urban population to speak of in 1870, recorded 4,389 lots awaiting customers in that year.[47]

Trends in the physical character of closed plat design are difficult to assess for lack of systematic investigation.[48] For most of the century relatively standard grid designs held sway, owing no doubt to the numbing simplicity of their implementation, but great variations in plat size, lot density, and orientation could make or break the coherence of a whole district. While different lot densities sought to appeal to different clienteles, there is evidence that overall densities were on the increase towards the end of the century, at least in medium-sized cities.[49] This may reflect changing house types and income distribution, but it also captures the "last-gasp" platting of already encircled smaller parcels for which higher land values, taxes, and perceptions of location and centrality or simple greed suggested denser platting.

One final illustrative characteristic of accretionary urban growth is the piecemeal process by which once-new urban plats actually filled up with housing. Though examples can be found of extraordinary speculative construction in New York and some other large cities, in general, the most widespread form of housing colonization involved individual efforts of small builders and homesite purchasers.[50] In a small city like Madison, this meant that great time-lags could develop between land purchase and house construction, with the effects heightened over whole blocks since lot sales could be individually periodic. In a city dominated by a vast initial plat, but acquiring many new fringe subdivisions around the turn of the century, a mapping of new houses constructed between 1872 and 1899 shows a great deal of new construction at the heart of the city as well as in outlying areas (Fig. 9). Furthermore, extensive home-building occurred that placed second houses on already occupied lots, thus greatly increasing the residential density of quite well-settled districts. It is evident that large areas on the fringe experienced only fragmentary building for quite long periods. One consequence was further to encourage indecision in the perceived character development of neighbourhoods, thus feeding the mobility and casual attachment to place that infused much residential behaviour in the booming young cities of that era. Plan analysis thus provides significant evidence in measuring rapid neighbourhood change.

Built-up Area Modifications. In most European towns and cities the margin of the urban built-up area at any point in time is sufficiently distinct and abrupt, both in platted land and buildings, to recognize clear separation in the incidence of urban accretion and urban repletion. In the United States city margins have been far less abrupt, as the foregoing discussion has attempted to demonstrate. Hence for a given platted land unit the point at which accretion has given way to repletion is hard to determine, and in reality the two processes strongly overlap in time and space, though generally in this sequence.[51] Accretion may have been a process so drawn out that selective repletion set in before basic accretion was complete. In the reason for this there is an analogy with the premature and dispersed subdivision phenomenon. The existence of an extremely fragmented land market and the small-scale structure of construction enterprise placed immense emphasis on disaggregated decision-making about the location and timing of individual residential development.

The complex transition of districts to "inner urban" character is well documented in Cambridge, Mass. (Figs. 10 and 11). In the Dana Hill section of Cambridge lying between central Boston and the colonial satellite centre of Old Cambridge, former landed estates were being progressively subdivided in the 1830s and 1840s with an informal kind of open and closed platting (Fig. 6). By 1854 small estates were appearing in this classic Boston suburban environment (Fig. 10), with scattered detached house-lot development at "closed-plat" densities. Twenty years later, the last estate lots (villas on spacious lots) had been established on streets furthest from the horsecar line on Main Street (Fig. 11). Concurrently the transport opportunities to downtown Boston had stimulated significant changes in estate blocks near Main Street, notably the appearance of attached housing, including some row houses. Between 1874 and 1903 urbanization pressures had forced the breakup of many former villa estates, particularly on north-south streets connecting with the trolley line. In all, 68 new buildings were fitted in among the district's 1874 stock of 69 buildings. Several of the new structures were unprecedentedly large apartment buildings with ground plans that clearly signalled a radical change in character for the district at large. Hence, in this illustration the full sweep from gradual accretion to multi-faceted repletion (institution of narrowed houselots, row houses, apartment buildings, etc.) is represented in a six-block area.

If pressures for yet more intensive land use continued in urban areas, repletion became complete and building replacement became significant. In Boston's North End, the two processes can be seen in approximate sequence during the nineteenth century. By 1814 the North End had developed as a mixed residential district behind the commercial wharves that spread north from the city's trade core, Town Dock (Fig. 12). Streets crisscrossed the peninsula at suitable density and most street frontages of lots in the area were filled with housing, leaving considerable space as yet undeveloped in the rear of most lots. In the next four decades, as Boston's commerce reached a high point and before immigrants arrived in huge numbers, the North End underwent thorough building repletion. Many new houses replaced earlier ones on the same site, but in 1852 substantial numbers of buildings still remained from the colonial and early federal periods, and repletion up till then had been quantitatively the more dominant type of change. The next twenty years, however, were to see the scales tipped. The percentage of interior block space covered by buildings was by 1874 so high that little vacant ground remained (Fig. 13). Yet the pressures on land use in this central Boston district, no doubt made worse by the peninsular limits of the site, caused small buildings to be demolished to make way for much larger structures. While the best index of this trend would be maps of building heights, even the evidence of building outlines on the ground suggests a definite change in this period to large bulk.

Replacement took two forms: one was substitution of buildings substantially within existing lot lines; the second was *redevelopment* which will here be taken to signify land parcel accumulation and resurveying. Replacement in this period normally occurred on street frontages and was probably devoted to tenement construction (complementing at a slightly larger size the two-to-three storey tenements of the 1814-1852 period

Boston's North End Housing Stock in Transition

FIGURE 12

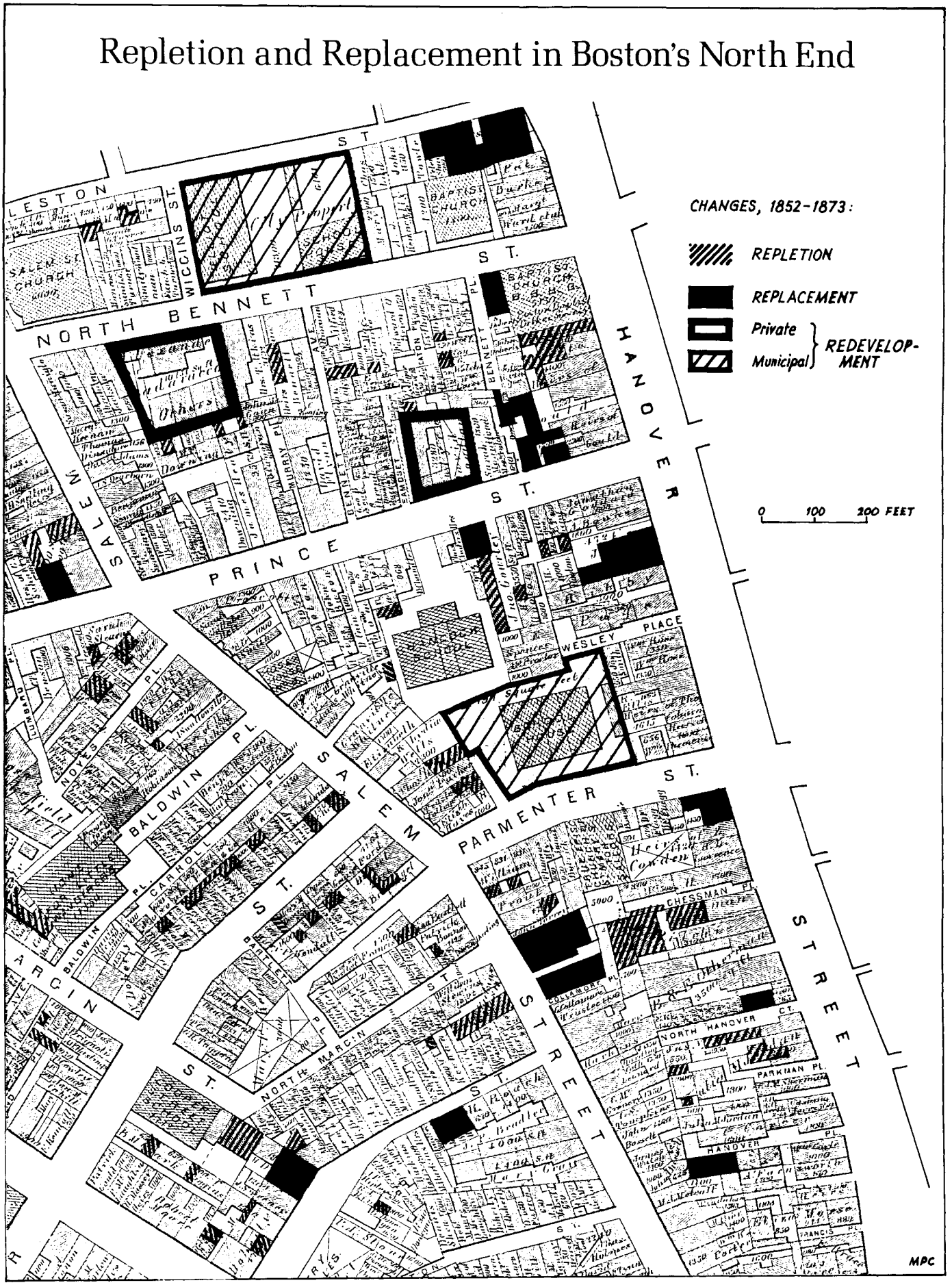
Repletion and Replacement in Boston's North End
CHANGES, 1852-1873:
REPLETION
REPLACEMENT
Private
Municipal
REDEVELOPMENT
0 100 200 FEET
NORTH BENNETT ST.
PRINCE ST.
SALEM ST.
HANOVER STREET
PARMENTER ST.
WESLEY PLACE
BALDWIN PL.
CARROLL PL.
NORTH MARGIN ST.
CHESSMAN PL.
NORTH HANOVER CT.
HANOVER PL.
PARKMAN PL.
MPC

FIGURE 13

found mostly in backyards and newly created side streets running along former yard gardens). Redevelopment included two new schools necessitated by the burgeoning population, but it also took the form of major building complexes—the forerunners of the truly warren-like large tenement buildings that came in the 1880s and 1890s (Fig. 13). Boston's North End gives a clear picture of the substantial changes, by type, of the building stock of an inner city district over a relatively short time. Broad estimates of city-wide morphological change by type await more detailed research, but a summary at a larger scale is provided by the distribution of street system changes in central Boston as a whole (Fig. 14). The most striking aspect is the ubiquity of alterations to the basic ground plan of the city. Of course, the Victorians were faced with massive modernization of a physical legacy of colonial times quite inadequate to later needs. And yet one might argue that the colonial street network, while it was added to and altered (by street widenings), was not really replaced, merely tinkered with. That there were not wholesale changes may well be the telling point.

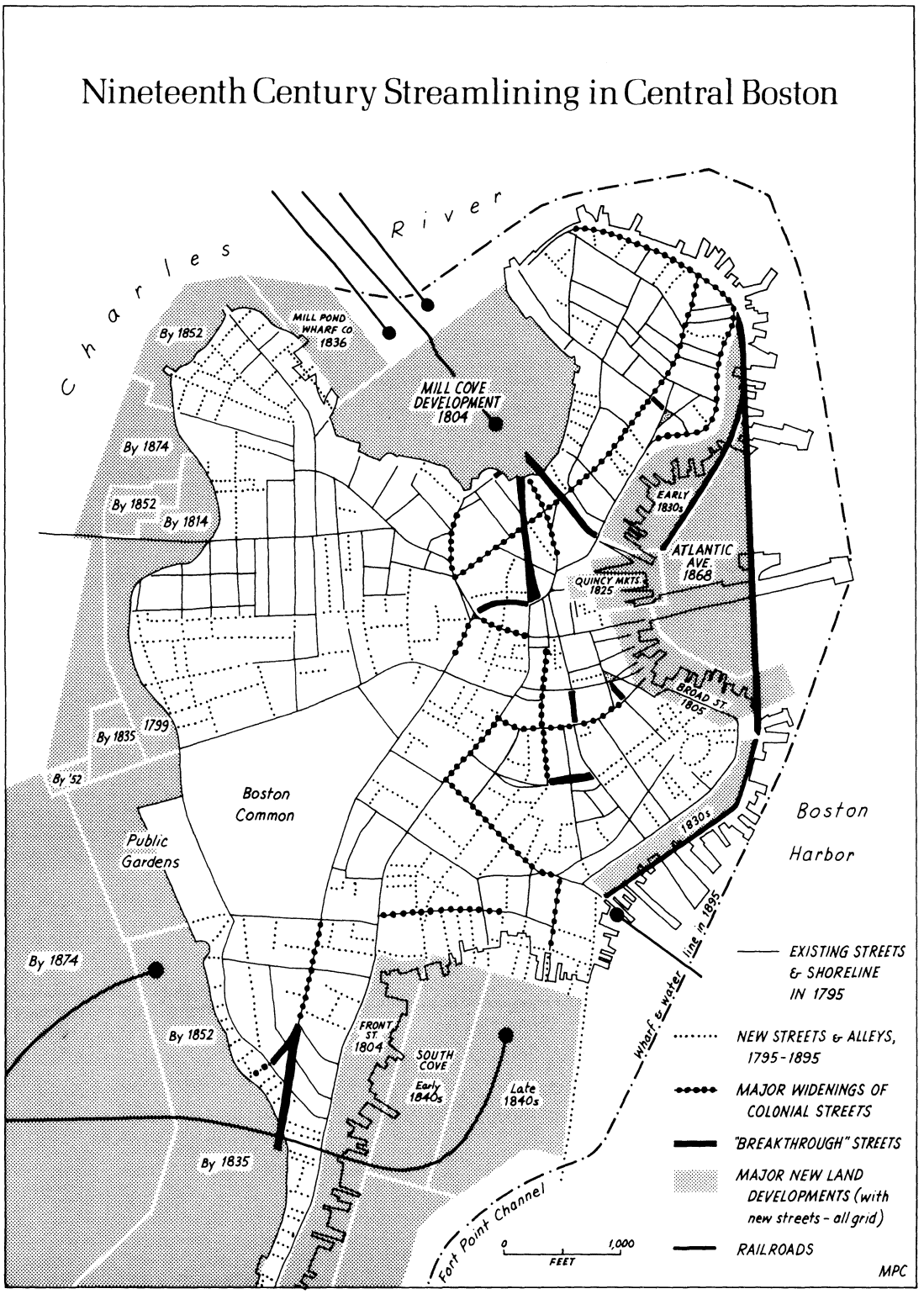

FIGURE 14

Boston was admittedly an extreme case. Most cities in the United States were not faced with the modernization of a large physical inheritance, and even New York and Philadelphia had an easier task with their more regular street patterns. Nevertheless, the Boston evidence is important in suggesting the outer limits of physical regeneration that were encountered by fast-growing American cities in the nineteenth century. There are other kinds of physical change that could be brought under discussion: transport technology and its physical impact (tunnels, elevated lines, railway grade separation efforts), landfill operations, the locating and character of public edifices, park systems, and commercial redevelopment in the central business district.[52] All are relevant, but limited space dictated an emphasis on the more anonymous and yet quantitatively more significant street and building changes that affected the ground plan character of American cities during the last century.

CONCLUSION

If urban morphology is to contribute an added dimension to the broader interpretation of society in the United States, it should offer both a systematic methodology and a set of findings relevant to the issues of American social development. Past morphological work on U.S. cities has been too disparate to have formed an accepted method of approach, and hence, conclusions have been based on too many potentially special cases to appear sound. And yet it is possible to speculate what the outlines of a morphological interpretation of American cities might be. Processes of social differentiation appear in the record of nineteenth century plan development as well as residential building evolution and, of course, land use ecology. Simpler patterns of lot design, building placement, and building types with considerable city-wide uniformity of distribution early in the century gave way gradually to more numerous, complex, and segregated patterns beginning in the middle third of the century and seemingly well established by 1880. As society coped with industrialization and immigration the city grew in scale and impersonality, faithfully reflected in the divergent land choices and locational trade-offs that were made increasingly by rich and poor. The power of capital translated directly into the physical attractiveness of residential and other environments in ways that affected vast urban districts at a single stroke, condemning many areas to low prestige through their land development policies. The countless individual decisions of small builders and homeseekers often produced similar results because they lacked sufficient individual resources to counter the land use disorder inherent in a system of speculative access to land.

But to what extent can such generalizations apply to all American cities? A historical typology of U.S. urban morphology is needed to indicate when and where it is proper to speak of segregated or undifferentiated land use traditions, innovative or restrictive building patterns, and homogeneous or heterogeneous ground plan developments in the nation's cities. The basic themes of cultural heritage, environmental opportunity, individualism, economic motive, land-as-currency, and laissez-faire government intersected in different ways in different urban centres. So the typology would have to distinguish morphological characteristics according to city size (and rate of growth), economic role in the system of cities, and regional affiliation—in recognition of the strength of cultural diffusion in limiting sometimes the spread of morphological elements through the system. Ultimately, the typology needs to define broad morphological periods when the most significant influences converged to create particular form-complexes that in turn defined the physical conditions under which people lived. In the interests of a preliminary formulation, the U.S. city in the nineteenth century seems to have experienced at least three phases of physical evolution. An early phase, which continued colonial traditions of low profile, low-density, and a weakly differentiated land use structure, gave way to a transitional phase sometime in the 1820s and 1830s of major central density increases, centrifugal and centripetal land use sorting, and major experiments in new building forms. This lasted until the late 1870s when the third phase of high-density, CBD-dominated, transport-articulated, residentially segregated urban form became established. Such a scheme is subject to considerable refinement, but if its general validity can be upheld, the way in which cities with different origins, growth curves, and specializations fit the formulation will clarify, it is hoped, the processes by which they have attained their present character.

LIST OF FIGURES

NOTES

1. A discussion of the conceptual structure of urban morphology is included in Michael P. Conzen, "Analytical Approaches to the Urban Landscape," in *Dimensions of Human Geography: Essays on Some Familiar and Neglected Themes*, ed. Karl N. Butzer, University of Chicago Department of Geography Research Paper No. 186 (1978), pp. 128-65. For a general call among historians to consider the physical nature of the urban environment in terms of the city-building process, see Roy Lubove, "The Urbanization Process: An Approach to Historical Research," *Journal of the American Institute of Planners*. Vol. 33 (1967), pp. 33-39.
2. Lewis Mumford, *The City in History: Its Origins, Its Transformations, and Its Prospects* (New York: Harcourt, Brace and World, 1961), p. 330.
3. James E. Vance, Jr., *This Scene of Man: The Role and Structure of the City in the Geography of Western Civilization* (New York: Harper and Row, 1977), pp. 245, 265-69.
4. Eric E. Lampard, "The History of Cities in the Economically Advanced Areas," *Economic Development and Cultural Change*, Vol. 3 (1955), pp. 81-136; Vance, *op. cit.* (footnote 3), pp. 324-29.
5. G.A. Wissink, *American Cities in Perspective; with Special Reference to the Development of their Fringe Areas* (Assen, Holland: Van Gorcum, 1962).
6. John W. Reps, *The Making of Urban America: A History of City Planning in America* (Princeton: Princeton University Press, 1965).
7. James M. Fitch, *American Building: The Historical Forces that Shaped It* (New York: Schocken Books, 2nd Edition, 1966), pp. 121-26.
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9. Harland Bartholomew, *Land Uses in American Cities* (Cambridge: Harvard University Press, 1955), pp. 63-65.
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26. Figure 2 is based on data drawn from the following sources: Lewis, *op. cit.* (footnote 22); Wilbur Zelinsky, *A Cultural Geography of the United States* (Englewood Cliffs, N.J.: Prentice-Hall, 1973), pp. 81, 118-19; and William A. Bowen, "American Ethnic Regions, 1880," *Proceedings of the Association of American Geographers*, Vol. 8 (1976), pp. 44-46.
27. Lewis, *op. cit.* (footnote 22), pp. 17-18.
28. For an introduction to some of these different house types, see Charles Lockwood, *Bricks and Brownstone: The New York Row House, 1783-1929, An Architectural and Social History* (New York: McGraw-Hill Book Co., 1972); William J. Murtagh, "The Philadelphia Row House," *Journal of the Society of Architectural Historians*, Vol. 16 (1957), pp. 8-13; Friends of the Cabildo, *op. cit.* (Footnote 23); *City House* (Chicago: Commission on Chicago Historical and Architectural Landmarks, 1979), pp. 13-22; and Arthur J. Krim, "The Three-Decker as Urban Architecture in New England," *Monadnock*, Vol. 44 (1970), pp. 45-55.
29. Discussion here has focused only on residential building types, but clearly all functional categories (commercial buildings, factories, public institutions, etc.) need study in analogous fashion.
30. Reps, *op. cit.* (footnote 6); John W. Reps, *Tidewater Towns: City Planning in Colonial Virginia and Maryland* (Charlottesville, Va.: University of Virginia Press, 1972), and *Cities of the American West: A History of Frontier Urban Planning* (Princeton: Princeton University Press, 1979).
31. Reps himself has shown interest in subsequent changes to individual plans, and is not surprisingly much interested in urban "redesigners" such as Olmsted and Burnham. For this perspective, see his *Monumental Washington* (Princeton: Princeton University Press, 1967). However, such excursions into morphological changes *in situ* barely rake the surface, and the field is wide open, particularly for studies with a conceptual goal.
32. In the case of Pennsylvania both rectilinear and irregular town plans were instituted simultaneously though in varying proportions from the seventeenth century onward. See Table 1 in Richard Pillsbury, "The Urban Street Pattern as a Culture Indicator: Pennsylvania, 1682-1815," *Annals of The Association of American Geographers*, Vol. 60 (1970), pp. 428-446.
33. Walter M. Whitehill, *Boston: A Topographical History* (Cambridge: Harvard University Press, 2nd ed., 1968), p. 9.
34. Edward T. Price, "The Central Courthouse Square in the American County Seat," *Geographical Review*, Vol. 58 (1968), pp. 29-60.
35. Alice E. Smith, *James Duane Doty: Frontier Promoter* (Madison, Wis: State Historical Society of Wisconsin Press, 1954) pp. 192-208.
36. Hildegard Binder Johnson, *Order Upon the Land: The U.S. Rectangular Land Survey and the Upper Mississippi Country* (New York: Oxford University Press, 1976), pp. 177-88.
37. Glenn T. Trewartha, "A Second Epoch of Destructive occupancy in the Driftless Hill Land," *Annals of the Association of American Geographers*, Vol. 30 (1940), pp. 109-42; Gerald H. Krausse, "Historic Galena: A Study of Urban Change and Development in a Midwestern Mining Town," *Bulletin of the Illinois Geographical Society*, Vol. 13 (1971), pp. 3-19.
38. Bruce J. Buvinger, "The Persistence of Street Patterns in Pittsburgh, Pennsylvania," unpub. M.A. thesis, University of Pittsburgh, 1972.
39. Edmund H. Chapman, *Cleveland: Village to Metropolis* (Cleveland: Western Reserve Historical Society, 1964)
40. Hans Boesch, "Schachbrett-Texturen nordamerikanischer Siedlungen," *Stuttgarter Geographische Studien*, Vol. 69 (1957), pp. 337-44.
41. John W. Reps, "Urban Redevelopment in the Nineteenth Century: The Squaring of Circleville," *Journal of the Society of Architectural Historians*, Vol. 14 (1955) pp. 23-26.
42. Reps, *Making of Urban America*, pp. 389-97.
43. Price, *op.cit.* (footnote 34).
44. These terms were first developed systematically in a British context, but are applicable to various culture regions. For fuller definitions, see M.R.G. Conzen, *Alnwick, Northumberland: A Study in Town Plan Analysis* (London: Institute of British Geographers, Publication No. 27, 2nd Edition, 1968).
45. The classic works on Chicago with this theme are Homer Hoyt, *One Hundred Years of Land Values in Chicago* (Chicago: University of Chicago Press, 1933), and Helen Corbin Monchow, *Seventy Years of Real Estate Subdividing in the Chicago Region* (Chicago: Northwestern University Press, 1939).
46. Data from E.O. Pederson, "Land Subdivision, Land Speculation, and Urban Form," unpub. Ph.D. diss., University of California, Berkeley, 1974, Table iii-2, p. 334.
47. Monschow, *op.cit.* (footnote 44). p. 47.
48. Elizabeth K. Burns, "Subdivision Activity on the San Francisco Penninsula: 1860-1970," *Yearbook of the Association of Pacific Coast Geographers*, Vol. 39 (1977), pp. 17-32.
49. M.P. Conzen, "The Spatial Effects of Antecedent Conditions," (footnote 21), pp. 77-78, 108-18; David Harrison, Jr., "Historical Variations in Residential Lot Sizes in American Urban Areas," Harvard University Department of City and Regional Planning *Discussion Paper* D78-31, 1979.
50. This is one of the themes in Sam Bass Warner, Jr., *Streetcar suburbs: The Process of Growth in Boston, 1870-1900* (New York: Atheneum, 1974). See also Anne Bloomfield, "The Real Estate Associates: A Land and Housing Developer of the 1880's in San Francisco," *Journal of the Society of Architectural Historians*, Vol. 37 (1978), pp. 13-33.
51. The problem exists because accretion of houselots and building occupation has rarely been a simultaneous event in American cities, as it usually has been in European ones.
52. For example, see Carl W. Condit, *The Railroad and the City: A Technological and Urbanistic History of Cincinnati* (Columbus, O.: Ohio State University Press, c. 1977).