THE STRUCTURE AND GROWTH OF RESIDENTIAL NEIGHBORHOODS IN AMERICAN CITIES

FEDERAL HOUSING ADMINISTRATION

WASHINGTON, D. C.

Donald L. Foley

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FEDERAL HOUSING ADMINISTRATION,
Washington, D. C., April 21, 1939.

Honorable STEWART MCDONALD,
Federal Housing Administrator,
Washington, D. C.

DEAR MR. MCDONALD:

In accordance with the provisions of the National Housing Act and so far as its resources will permit, the Economics and Statistics Division prosecutes from time to time studies that are deemed useful to "guide the development of housing and the creation of a sound mortgage market."

I have the honor to transmit to you herewith the results of one such study, entitled "The Structure and Growth of Residential Neighborhoods in American Cities."

Intimate understanding of the character of residential neighborhoods, of their structure, of the conditions and forces that have created them as they are and that are constantly exerting pressures that bring about their change is basic, both to "improvement in housing standards and conditions," and to sound public and private housing and home financing policy.

Only within very recent years has it been possible to secure the materials requisite to an intimate analysis of the structure of residential neighborhoods on a large scale, and materials bearing on the dynamic changes brought by time are still scanty. But enough are now available to make an approach to the problem.

Through the generosity of the Bureau of Foreign and Domestic Commerce and the Works Progress Administration and its antecedent organizations, this Division has been able to collate and analyze these materials. This study, made by Dr. Homer Hoyt with the assistance of other members of this Division, should be considered as both a suggestion in technique and a beginning of the attempt to generalize about a very complex and little-known but vital aspect of urban life.

I recommend that the study be published.

Very respectfully submitted.

ERNEST M. FISHER, *Economic Adviser.*

Author's Preface

As stated in the letter of transmittal, the purpose of this monograph is to suggest techniques through which certain generalizations on city structure and growth may be evolved. It may be of value in serving as a useful guide in the further analysis of urban conglomerates of man-made structures.

The vast storehouse of information relative to the structure of American cities, which was first made available by the Real Property Inventories of the Civil Works Administration supervised by the Bureau of Foreign and Domestic Commerce of the Department of Commerce in 1934, and the subsequent real property surveys of the Works Progress Administration, has been drawn upon freely. This imposing body of statistical data covered detailed housing characteristics more extensive in magnitude and more intensive in coverage than had ever been gathered before. These surveys of real property made possible a scientific analysis of city structure that would heretofore have been impossible.

As the techniques for making real property surveys were refined through the cooperative efforts of the Works Progress Administration, the Central Statistical Board, the Federal Home Loan Bank Board, the Housing Division of the Public Works Administration, and the Division of Economics and Statistics of the Federal Housing Administration, the possibilities of utilizing the voluminous data (available for over 200 American cities) in developing principles of city structure were recognized. Thus, the present study was conceived.

In addition to other members of the Division of Economics and Statistics who at one time or another contributed toward preparation of the final manuscript, the services of a number of individuals should be acknowledged. In its early stages, Mr. Eric Kocher, now with the Social Security Board, was charged with the preparation of certain of the statistical material. Of aid in advice and assistance in analysis were Messrs. Howard G. Brunsman, Carl F. Behrens, and I. Lee Amann, of the Division of Economics and Statistics. Mrs. Jean Williams of the Central Statistical Board was also of aid in preparing the work for publication. Mr. George W. Morris, Supervisor of the Division's Clerical and Mapping Section, and his staff, were invaluable not only in the actual drafting of all the maps and charts that appear in this volume, but also through their suggestions in mapping technique and in gathering the original data for city growth maps. Mr. Frank A. Mucha, Housing Economist, Division of Economics and Statistics, did the final editing and revision of the entire manuscript. His careful work improved the coherence and readability, and clarified the presentation throughout the volume. Among other of his additions might be mentioned the appendices and the sections on the analysis of rent contained in chapters 3 and 4 of part I. I am, of course, greatly indebted to Ernest M. Fisher, Director of the Division, at whose suggestion the study was first undertaken, who supervised its progress at every stage and who made many invaluable suggestions.

To all those who thus so generously aided in the preparation of this study I express my thanks. I wish to emphasize, however, that responsibility for the accuracy and completeness of the manuscript is mine.

HOMER HOYT,
Principal Housing Economist,
Division of Economics and Statistics,
Federal Housing Administration.

MAY 24, 1939.

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Introduction

THE TECHNIQUE OF ANALYSIS

Introduction

The Technique Used in Analyzing the Structure and Growth of Residential Neighborhoods in American Cities

THE American city at first glance may well give the observer an impression of almost utter confusion.[1] Confronted by what may appear to be a chaotic jumble of structures in the urban community, the student who is searching for an orderly arrangement of land uses or residential neighborhoods in the American city may be puzzled as to where or how to begin his analysis.

Is the American city an entity whose different types of land uses and residential neighborhoods are arrayed in definite patterns or is it a disorganized mass of structures scattered about in hit or miss fashion? The answer to this question requires the formulation of principles of city structure and the examination of the fundamental theories of the physical character of the urban community.

Inquiry into the character of the internal organization of cities, however, is not merely an academic matter. There is a whole series of vital urban problems, the solution of which depends upon proper analysis of the apparent riddle of the internal nature of American cities. The selection of areas for slum clearance, the determination of mortgage lending policy by areas, and decisions in regard to zoning or rezoning of sections for given types of land use all depend upon the forces governing the interrelationship of different types of areas and the past and prospective movements of different types of neighborhoods.

[1] See Report of the Urbanism Committee to the National Resources Committee, *Our Cities, Their Role in the National Economy* (Washington, D. C., June 1937), p. 5.

"If the observer views it from an airplane, the typical American city will appear as a sprawling mass of structures of varying size, shape, and construction, crisscrossed by a checkerboard street pattern which here and there assumes irregularities. The cells or blocks into which the city is divided seem to lack any organic grouping into units, even though the variations of the terrain may suggest the articulation of series of blocks with one another. The general impression to be derived from the arrangement is that of unimaginative, stereotyped, mechanical monotony, only rarely will one find even a partially organic pattern throughout."

This monograph has the two principal objectives of furnishing the tools for analysis and developing principles of general application that may be used in the intelligent examination of the internal structure and growth of American cities. In its twofold purpose, this study will first suggest a series of techniques by which the *terra incognita* of a city may be mapped and charted, and the growth of its various parts measured. Secondly, it will seek to develop principles of urban structure and growth that may give an insight into the causes of the present arrangement of land uses and residential neighborhoods in American cities.

The present study is based upon the past performance of the myriad forces governing neighborhood interrelationships and movements in city growth. The series of techniques which form the tools for analysis are designed to bring order out of chaos and to provide an approach to an understanding of the basic forces. The reliability of the principles formulated, however, will depend upon the effect of the impact of new forces and upon their being tested by further study. In years to come, continued eradication of slum areas or a cessation of population growth may foster conditions favoring a doubling back of high grade residential areas rather than a continuation of growth in line with past experience. Or, it is possible that common use of aircraft or other means of rapid transit may result in a greatly accelerated decentralization.

The techniques suggested and employed in this study, and the principles of urban structure and growth suggested are not set forth as the only method of attack upon the difficult question of the nature of the structure and growth of cities. There are innumerable roads by which the subject may be approached. Rather than spend too much time in debating as to the choice of routes, however, the

definite order of procedure outlined below is suggested because it has proved of value when applied to the solution of practical problems.

For the sake of clarity in exposition, this monograph is divided into two major sections. The first part analyzes the city for the purpose of determining its internal structure and the relationships of its various neighborhoods to each other. The second part investigates the movement or growth of the entire city and its component parts. An appendix will acquaint the reader with methods of compilation and provide him with definitions of the basic data used throughout. It will also give the reader a clearer understanding of the method of construction of the several types of maps utilized in the different stages of the technique. A technique developed by the Division of Economics and Statistics of the Federal Housing Administration as an aid in the selection of mortgage risks is also outlined in the appendix. A map supplement contains numerous illustrations for further clarification of the text. This introduction, as its title indicates, outlines the technique followed in the body of the monograph.

The order of treatment of the subject matter of this monograph has a special significance because there is a definite sequence in the successive steps that are used in analyzing city structure and growth. The section of this monograph relating to the structure of the city is placed first because, primarily, it is necessary to ascertain whether there are any definite patterns of land uses and neighborhoods in a city before the movement of these uses and of residential neighborhoods in particular, over a period of time, can be studied.

The first section begins with an inquiry into the structure of a city. It is necessary first to ascertain the extent of the area covered by urban buildings. In other words, the ground plan—the configuration and shape—of the city must be visualized before its component parts can be analyzed. The first step in the technique, therefore, employs the use of urban "topographical," "land coverage," and "settled area" maps. As previously stated, the method of construction of these different types of maps is outlined in the appendix. These maps reveal the shape of the city and the interstices within the urban mass. From these maps, delineating the urban area as a whole, current generalizations as to the shape of cities—whether they are rectangular, circular, or star-shaped—may be thoroughly tested.

Having examined the city as a single unit, the second step in the technique breaks this undifferentiated body into its component parts to establish the pattern of land use. "Land use" maps are utilized to reveal the ground area occupied by each type of use, and the extent to which the different uses are separated or intermingled. Such maps also serve as a guide in formulating a generalization with regard to the pattern of land use. The generalizations thus evolved serve to illuminate the spatial relationships between commercial and industrial functions and to segregate the residential areas from other forms of land use.

Having segregated the home areas from the general urban mass for study, the third major step in the technique differentiates the several types of residential areas on the basis of their essential housing characteristics. The analysis of these home areas and the formulation of generalizations apparently governing the distribution of the several types of residential urban areas are the main subjects of this monograph.

The basic data used in the analysis of city structure are taken from numerous real property surveys. The several types of information gathered in such surveys, together with definitions of each type, are outlined in the appendix. The data in these surveys have been collected in such form that almost any sized area may be selected as a standard unit of measurement. For our purposes, we have taken the city block, which is a relatively homogeneous and unchanging entity. The average characteristics of dwelling units in city blocks are used as the basis for showing differences in neighborhoods in a city.

One form of map which has been used for the purpose of studying variations in the several residential areas of a city is the "block data" map. This type of map indicates for each block in a city the characteristics as represented by averages showing eight of the items for which data have been gathered in real property surveys. For our analysis, however, a single map of that type is not sufficiently revealing.

Accordingly, using the residential areas in the city of Richmond, Va., for illustrative purposes, the technique suggested prescribes the mapping of each of a number of housing characteristics on

separate maps. Each of these maps shows block by block gradations for a single characteristic only as indicated by averages. The characteristics used for this purpose are those which throw the most light on differences in residential areas.

For the purpose of analyzing any urban area, a selection of maps of housing characteristics appropriate to the study may be used. By superimposition of maps of such selected and limited factors, the area in which these characteristics overlap can be delineated. A series of special transparent maps illustrative of Richmond's most adverse housing conditions is shown as an example of such an analysis. The centers of the worst housing conditions are indicated at the points of coincidence of all factors used.

The technique that has just been suggested for tracing patterns of residential areas is suitable for analysis of cities where tabulations on a block basis are available or where there is time for an intensive survey of a city. As an alternative to this third step in the series of techniques outlined above, however, it is desirable to have a quick and fairly accurate method of analyzing cities for which basic data are lacking. If it is found that one factor represents and stands for a whole congeries of other housing factors, then a pattern of a city on the basis of this one factor can be made. Accordingly, the average monthly rent of homes in a block is examined as a possible alternative index of those housing factors used in the third step of the above technique. The reliability of rents serving in this capacity is established on the basis of relationships between rent and other factors.

Thus the subject has been narrowed down until the proposition is set forth that essential differences in the housing characteristics of different areas in a city may be measured by residential rent alone. Having been established as a correct method of analysis for cities in which intensive real property surveys have been made, this method may be applied in urban communities lacking comprehensive data. This alternative step in the technique affords quick analysis of the home areas of a city to those who desire to start at this point.

Having suggested a method for use in the analysis of the structure of residential neighborhoods, a chapter is included which will serve to acquaint the reader with the general composition of the dwellings in 64 American cities with respect to a number of housing characteristics. Because inharmonious racial groups tend to have an influence upon rents in urban residential areas, the composition of American cities with respect to the degree of clustering of racial groups is thoroughly discussed in this chapter.

Finally, having previously established rent as being significantly representative of a congeries of other housing factors, the "rental area" maps of a number of cities are used to arrive at the principles governing the distribution of the high, low, and intermediate residential rental areas in any urban community.

Thus, beginning with the defining of the shape and extent of the undifferentiated mass of urban structures comprising the American city, and proceeding—by means of a series of techniques evolved in the first part of this monograph—through the establishment of patterns of land use, some tentative principles governing the distribution of residential areas, classified according to rent, are finally suggested. For any given moment of time, the city has a certain fixed external form. It has definite areas allocated to certain types of land uses. It has neighborhoods segregated into types according to rents paid. There is some intermingling of uses and also of types of residences making it often impossible to describe hard and fast boundaries. What may be a residential area today may be partially a business or factory section tomorrow. Zones or sections are determined by the predominance of one use, not by its exclusive presence. Nevertheless, in an analysis of structure, the city stands still. The structures existing at the moment the cross section is made fix the boundaries of the settled area. The commercial, industrial, and residential sections at that point of time have immovable locations. The blocks with highest and lowest rents of dwelling units are anchored to definite areas.

Having examined the structure of the American city as a static entity in the first part of this monograph, the second section deals with the growth of the city and the movement of land uses and neighborhoods over a period of time.

The first step in the analysis of the growth of a city involves a consideration of those factors affecting the growth of the entire city. The rate of urban growth varies greatly as between individual

cities. Cities that grow at a rapid rate change their internal structures much more rapidly than cities expanding at a slow pace. Most city growth takes place by spurts as opportunities of employment attract migrants. The sudden growth of city population is made possible by an influx of immigrants from Europe or of adult workers with their families from the farms and villages of America. As the cities grow, they tend to lose population at the center and increase rapidly in numbers on the periphery.

Therefore, the second step in the technique suggested in studying city growth concerns itself with the form of growth of the entire city. A series of "settled area" maps, showing settled areas of a city at successive periods of time, or a single map showing buildings erected at various time intervals shows whether the city is expanding in concentric circles, in long axial lines, or flinging out independent nuclei of settlement beyond the main body of the city. Thus the direction of growth and the influence of topography on the shape of the settled area are clearly brought out. With the data from a number of the largest cities for the entire period of their growth available for analysis, some generalizations as to the form of city growth may be advanced on the basis of a fairly broad experience.

This growth of the city, tending to cause changes in the form of the settled area of the city, also brings about changes in locations of areas devoted to different types of land uses and of the various grades of residential sections. Just as the location of these various areas at one moment of time is traced in the first part of this monograph, so the second section considers the direction of movement of each type of land use or occupancy. Accordingly, the third step in the analysis of the growth of cities segregates the commercial, industrial, and residential areas at different periods of time. This stage in the technique permits the formulation of generalizations according to which business, commercial, and residential uses appear to change their location as the city grows.

Finally, the technique employs the use of "dynamic factor" maps to trace the movement of different types of urban residential rent areas. The successive steps outlined above now bring us to the chief subject of investigation in this monograph. The series of dynamic factor maps showing high, low, and intermediate rental areas at successive 15- or 20-year intervals permits the study and summation of the forces affecting the growth of residential areas in American cities.

Thus techniques are presented for use in the analysis of, first, the structure and, second the growth of residential areas in American cities. As stated previously, the techniques employed and the tentative generalizations derived from their application are not the only avenues of approach to the question of the nature and growth of cities. And, in their application to cities not hitherto studied, modification of techniques and suggested generalizations set forth will doubtless prove necessary, but at least the analytical method here suggested will provide a starting point and may serve as a basis for its own revision by the new evidence it will uncover.

Part I

THE STRUCTURE OF RESIDENTIAL NEIGHBORHOODS IN AMERICAN CITIES

Chapter I

The Ground Plan of Cities

AT the outset of this investigation we are confronted with what may appear to be a chaotic jumble of structures in American cities, and the problem is to discover some clue to a pattern or series of patterns. While the main problem is concerned with the distribution within the city of the different kinds of residential neighborhoods, our technique of approach begins with a generalized picture that shows the configuration of the entire urban mass and thence proceeds by a logical sequence to the ultimate solution.

The initial objective is to ascertain whether the physical structures composing a city are arrayed in any pattern. There is no attempt at first to differentiate between different types of land use or between different kinds of residential neighborhoods. The city is an aggregation of structures whose shape and density are influenced by the nature of the terrain on which it stands. Upon this site, whose water courses, elevations, and valleys were originally determined by nature, there is superimposed by man a pattern of streets and blocks. Within this framework of blocks are the structures that provide homes and working places for the people of the city.

It is possible in one comprehensive view to see the topography, the street plan, and the ground area occupied by buildings in any city. Typical maps based on ground surveys are shown in figure 1 for Washington, D. C., and in figure 2 for the central business district of Los Angeles. These maps present a general view of the urban mass to be studied. They reveal not only the boundaries of the settled areas of the city, but also the interstices within the inner structure. In recent years, the increasing use of aerial photography has made possible rapid mapping of urban areas.

What pattern of city structure is revealed by this comprehensive view? First, the amount of vacant land or yard space within the block increases as one goes from the center of the city to the periphery. At the business center, the blocks are almost solidly occupied by business structures. This area of intensive utilization of the ground space is succeeded by blocks that resemble hollow squares; the street frontages are lined with buildings, but there are vacant backyards or interior courts. As one goes still farther out from the center of the city, rows of detached houses appear, with yard space on the side and in the rear. On the periphery of the settled area the blocks are only partially developed with houses. Finally, there is a penumbra or twilight zone of subdivided land between the city and the country in which there are many blocks with only a few structures and other blocks that are entirely vacant. Beyond these last urban outposts of partly filled subdivisions lies the country, with its large tracts of land and scattered farmhouses.

The decline in the *percentage* of land covered by buildings as one goes from the center to the periphery of a city is also shown by land coverage maps. These maps do not indicate the specific location of buildings within the block, nor do they indicate topographical factors, but they do show the proportion of the land in each block that is occupied by structures. Available maps of this type, however, have the advantage of being of more recent date than the land survey maps. The 1935 land coverage map of Emporia, Kans., (fig. 3), illustrates how the total percentage of land covered by buildings decreases as one leaves the business center—where the ground areas within the blocks are almost entirely covered by structures—and goes towards the city limits where there are only a few scattered houses.

Maps indicating the location of every building in a city and its environs disclose not only the density of land coverage, but they show the shape of the entire urban community. A city as viewed from

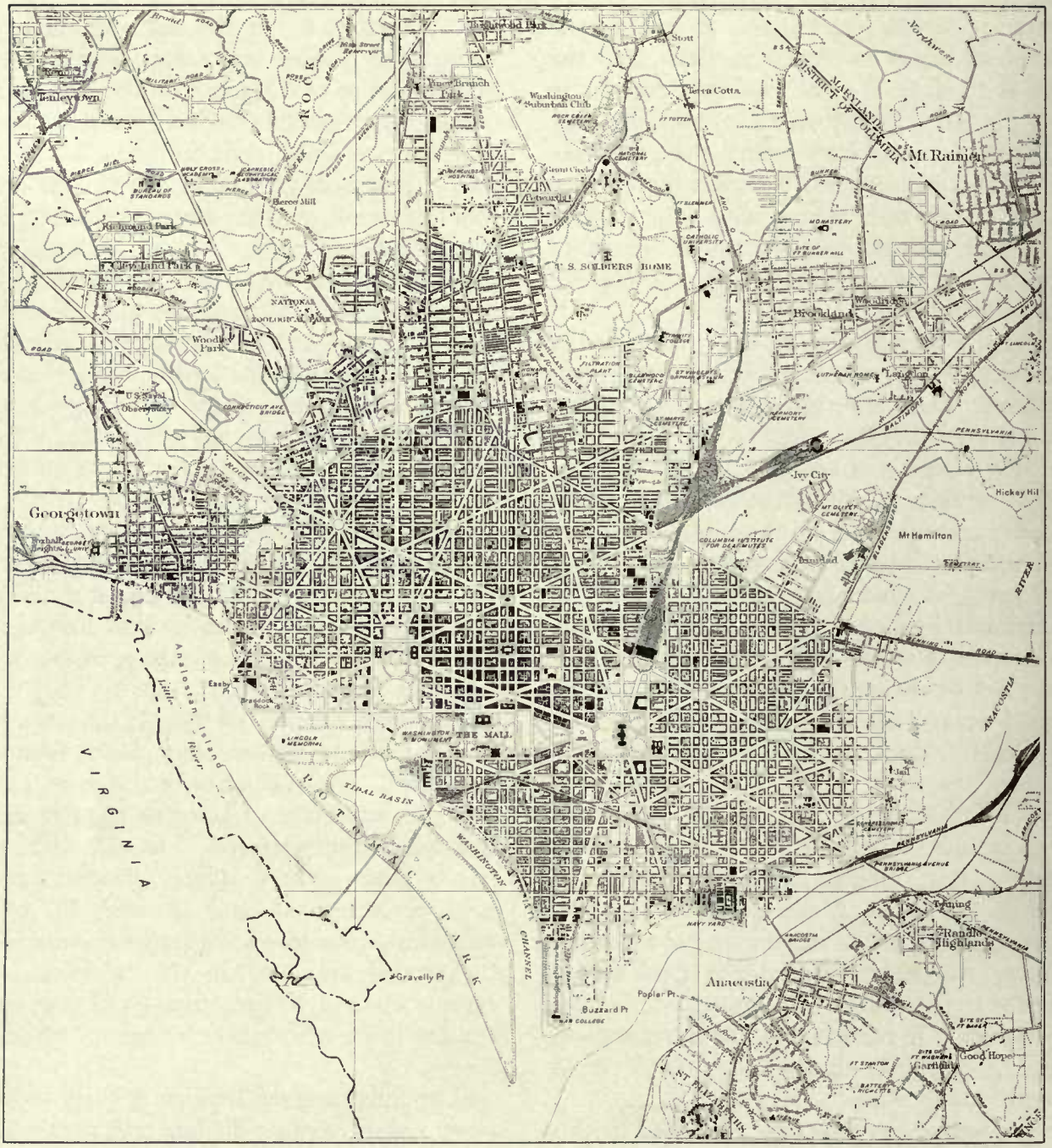
FIGURE 1

LAND SURVEY MAP

WASHINGTON, D. C. 1917

SCALE IN FEET

0 2000 4000 6000 8000 10000



SOURCE: DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS & STATISTICS

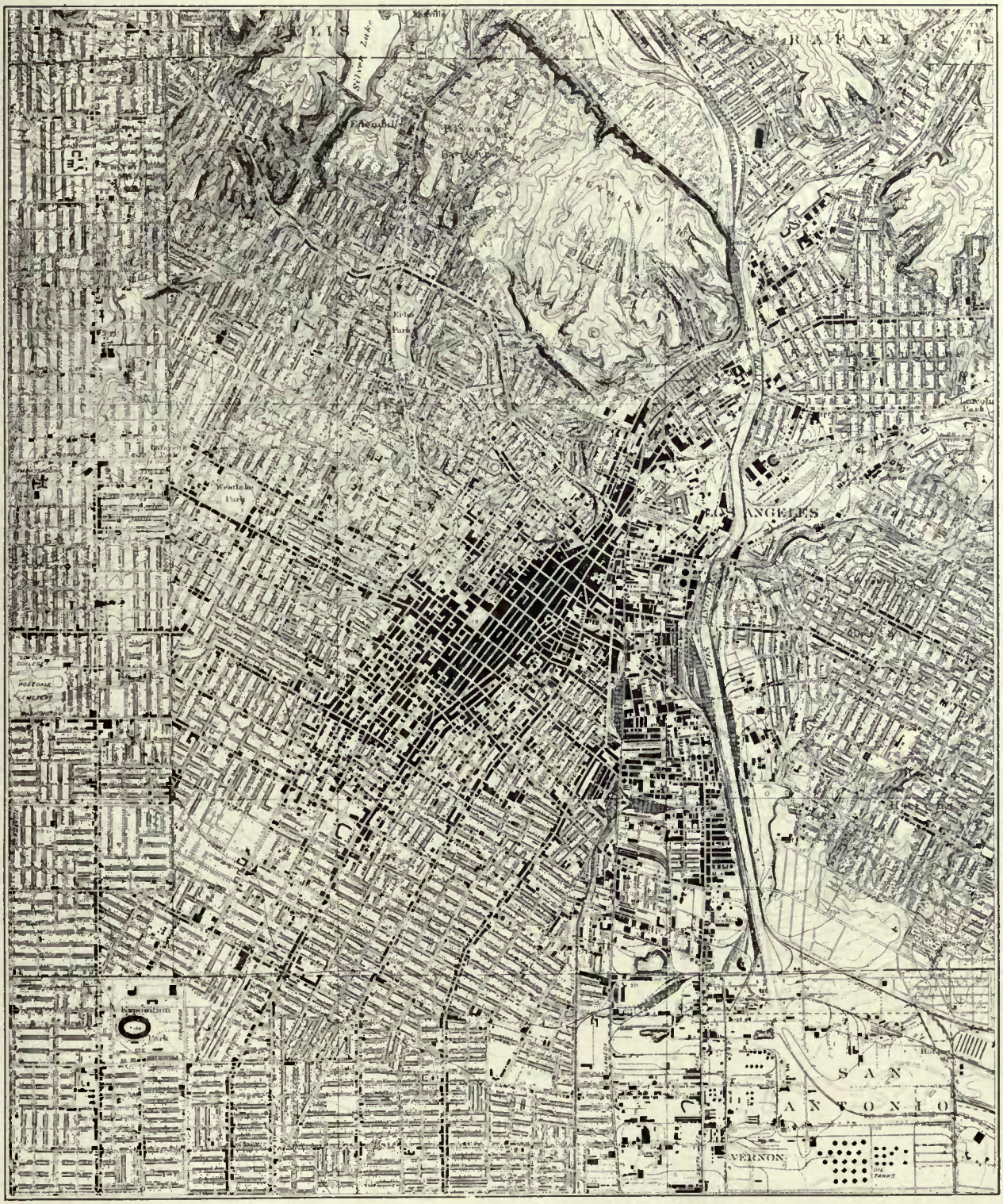
FIGURE 2

LAND SURVEY MAP

LOS ANGELES BUSINESS DISTRICT 1925

SCALE IN FEET

5000 4000 3000 2000 1000 0 5000



SOURCE: DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

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DIVISION OF ECONOMICS & STATISTICS

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this broad perspective frequently has a star-shaped form with bands of houses strung out along principal highways leading to the center of the city. Beyond the main body of the city are often found satellite communities or suburbs, each an independent center that is separated from the central settled area by stretches of vacant land as in Washington, D. C., shown in figure 1.

While the area of a city occupied by structures, other things being equal, tends to form a circle around the central business district, there are a number of factors which tend to distort this circular pattern. First, in cities along a broad, deep river, such as Kansas City, St. Louis, and New Orleans, there are relatively few structures across the river from the main body of settlement. Second, the bands of houses extend further along fast transportation lines and moderate elevations than in areas inadequately served or on low ground. For example, in Washington, D. C., the land occupied by houses extends outward along the ridges of Connecticut Avenue and Sixteenth Street, leaving vacant the valleys now in Rock Creek Park.

The configuration of settled areas of other large cities assumes unique patterns under the influence of topography. The land occupied by buildings in the New York City area does not extend evenly in all directions from the office building and financial centers on Manhattan Island. There are great tracts of vacant land in Staten Island, in the New Jersey marshes, and in low lying areas in Brooklyn and Queens. Prongs of structures extend along fast transportation lines, and numerous suburban communities cluster around railroad stations. The land occupied by buildings in the Boston metropolitan area is broken up by bays, rivers, and hills. From the main body of settlement on Boston Bay and the Charles River, there are a number of independent towns or community centers that have coalesced in the growth of the main body of the city. Chicago, situated on a flat plain, has strings of towns or suburban communities that form almost continuous bands of settlement along a number of radial transportation lines, giving it the appearance of an organism with great tentacles of houses stretching out into the prairie.

Land survey and land coverage maps thus present in minute detail the street pattern of cities, the ground area covered by structures, the water courses, other topographical features such as land elevations. In order to see the general shape of the settled area at a glance, however, a less detailed picture of the area occupied by the buildings of a city is desirable. Generalization is accomplished by solidly blacking in on a map all those areas in which the buildings are close enough together to be classed as urban. As in the settled area map of the Chicago metropolitan region shown in figure 4, all areas having a density of more than one house to the acre are solidly blacked. Such maps are useful in showing the boundaries of urban development in a comprehensive view in which the detail of single structures is subordinated to the picture of the entire urban body.

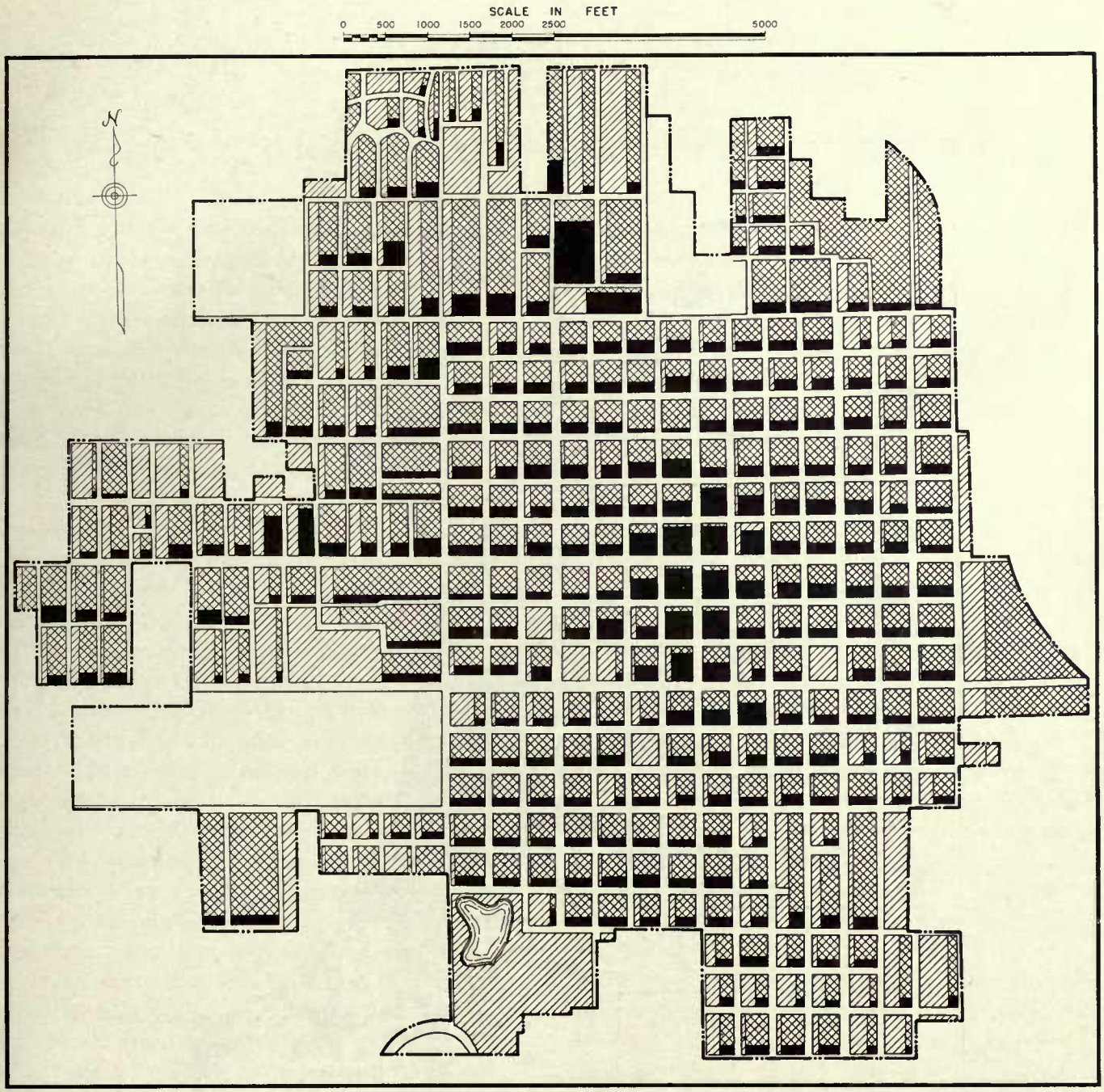
The built-up areas of some metropolitan communities assume a star-shaped form. This pattern, and the penumbra of subdivided but unoccupied land that extends beyond and between the prongs of growth, is sharply portrayed in the map of the Chicago region.

The exact shape of each city is influenced by topography and transportation, and there are no two that have exactly the same form. Every city has its buildings arrayed in a pattern that may be somewhat circular, or oblong, or star-shaped. To obtain a general view of the shape of the settled area of a city is the first step in the analysis of its structure. Having determined the boundaries of the urban body, the next step is to break down what is so far an undifferentiated mass of structures into the component elements and to search for patterns of land use within the urban body as thus defined.

FIGURE 3

LAND COVERAGE MAP

EMPORIA, KANSAS 1935



LEGEND

CITY LIMITS

LAND NOT IN PERMANENT USE

LAND IN PERMANENT USE BUT NOT COVERED BY MAJOR STRUCTURES

AREA COVERED BY MAJOR STRUCTURES

SOURCE: EMPORIA REAL PROPERTY SURVEY, DECEMBER, 1935
W.P.A. PROJECT NUMBER 530

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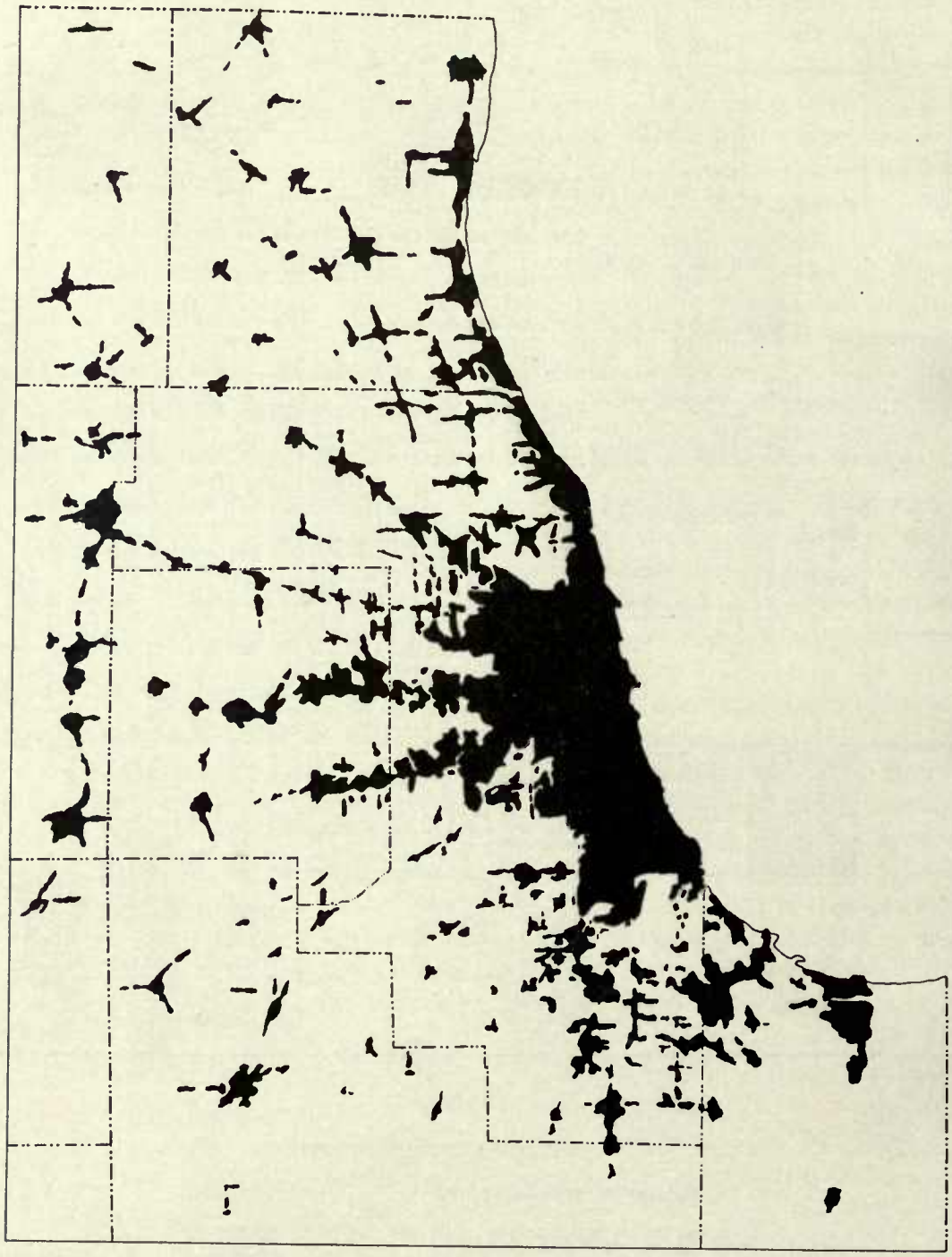
FIGURE 4

SETTLED AREA MAP
CHICAGO METROPOLITAN REGION
1936

0 2 4 6 8 10 12
SCALE IN MILES



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Chapter II

The Segregation of Land Uses in American Cities

IN the first step in the analysis of the structure of the city, the configuration or shape of the urban community was examined. It was seen that the hundreds or thousands of separate buildings form various types of patterns around central business areas like a scattering of iron filings about a magnetic core. The boundaries, the sizes, and the shapes of entire urban communities were clearly defined by the use of settled area maps. They did not, however, reveal the inner compositions of urban areas.

While the primary subject of investigation is the location of different kinds of residential areas within the city, it is necessary first to find out whether dwelling units are segregated into definite sections, or whether they are intermingled with factories, stores, and office buildings in one confused jumble. The next step in our inquiry, therefore, is to ascertain whether there is an orderly arrangement or internal pattern according to which structures devoted to different functions are segregated in definite areas. This involves the examination of evidence presented by maps showing the use made of land within a given city.

The land survey maps used in the preceding chapter to show the actual location of structures frequently give a clue to the nature of land use. Thus the central business district of Los Angeles (fig. 2) with its dense land coverage is clearly outlined, as are also the strings of commercial development extending outward along Seventh Street, Pico Street, and Main Street. The central business districts of Chicago, Washington, D. C., and Detroit are likewise indicated by the high percentage of land area covered by structures at the point of converging highways. Similarly, the location of factories and industrial buildings in South Chicago, indicated by large black rectangles in figure 5, are clearly differentiated from single-family homes by their relative size and also by their proximity to railroad lines. In cities of predominantly single-family homes like Los Angeles, commercial areas tend to form solid lines of development along main thoroughfares or street car lines.

A more precise picture of land use is obtained by land use maps portraying data made available in recent years by real property surveys. The type of use made of each structure in the city, as indicated in those surveys, is shown on such land use maps by two methods. Either each type of land use in the city may be shown on separate maps or all of them may be brought together on a single map.

Thus, the former method would indicate the location of buildings used for factories on one map, stores on a second map, and residential structures on a third map. In land use maps in this form, the exact location of structures within the block may be indicated by solid black squares or rectangles, making it easy to distinguish between the location of residential and commercial areas and to see the extent of land coverage in each case. Maps of this nature are employed by Bartholomew in his study of urban land uses.[1]

The other method, indicating the street frontages occupied by each of the several characters of land use on a single map, is illustrated in figure 6 for Emporia, Kans. Except in reproductions on an unusually large scale, it is not feasible to show exact ground areas covered by each type of use. The reduction of maps to usable size reduces the rectangles representing buildings to proportions so minute as to render different types of crosshatching indistinguishable. In these maps there is no attempt

[1] Bartholomew, Harland, *Urban Land Uses*, Harvard City Planning Studies, Vol. IV (Cambridge, Harvard University Press, 1932). See pls. V, VI, VII, VIII, and IX.

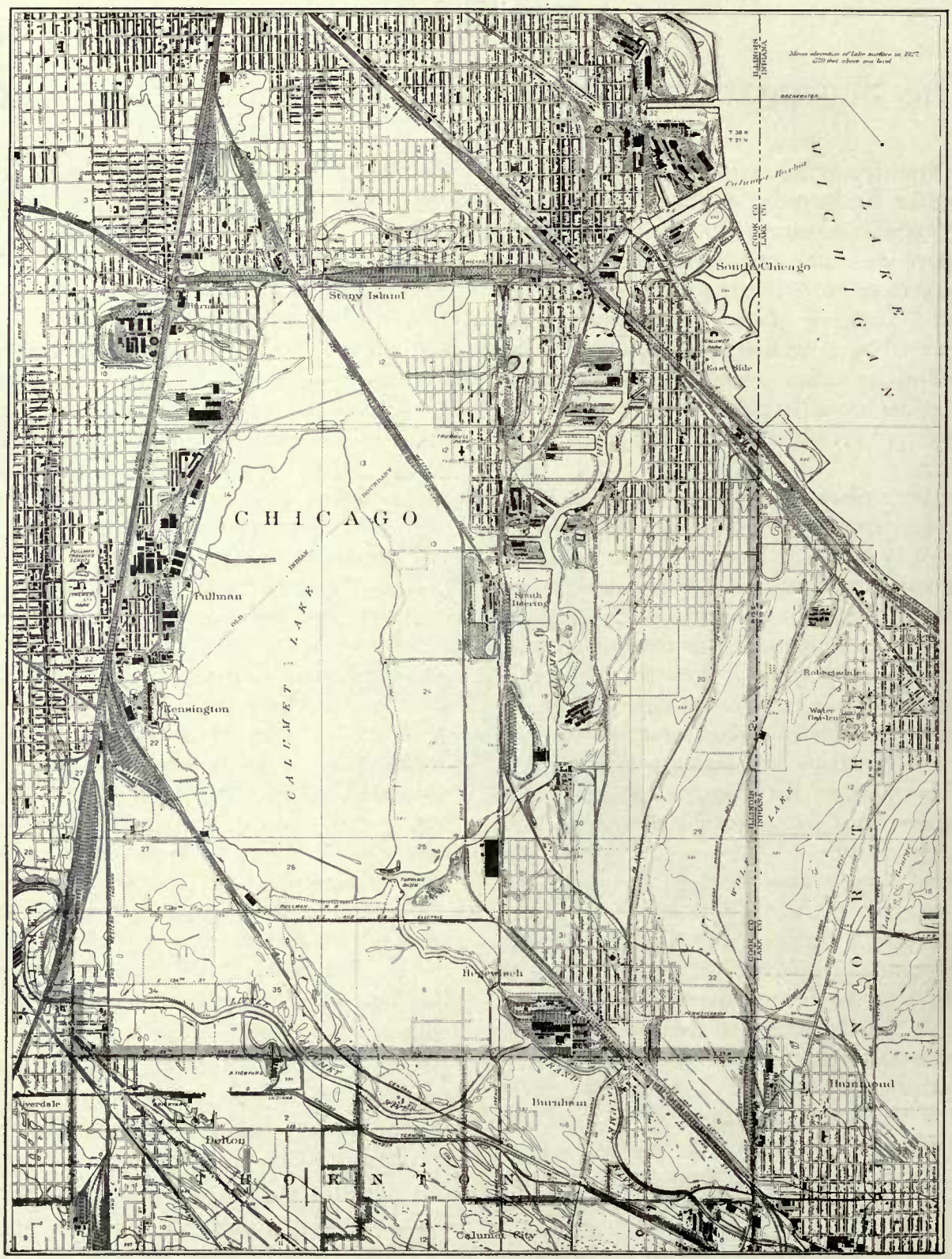
FIGURE 5

LAND SURVEY MAP

SOUTH CHICAGO 1927

SCALE IN FEET

5000 4000 3000 2000 1000 0 5000



SOURCE: DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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to show separate structures where they all are devoted to the same type of use. Where there are several land uses in a block, however, the location of each type of use by street frontage is clearly revealed by different types of crosshatching. From such maps it is possible to determine whether there is a chaotic jumble of land uses or a segregation of uses into definite areas to form a pattern.

According to the concentric circle theory of the distribution of land uses frequently set forth, urban land uses are arrayed in a series of concentric circles in an almost rigid geometric pattern. The theory has been summarized as follows: [2]

> At the center of these zones lies the financial and office district; immediately surrounding this and interpenetrating it is the central retail district where the large department stores and high-grade specialty shops are found. Clinging close to the skirts of the retail district lies the wholesale and light manufacturing zone. Scattered through this zone and surrounding it, old dilapidated dwellings form the homes of the lower working classes, hobos, and disreputable characters. Here the slums are harbored. Cheap second-hand stores are numerous, and low-priced "men-only" moving-picture and burlesque shows flourish.
>
> In the next zone heavy manufacturing may be found, although naturally this use breaks up the uniformity of the pattern to hover along routes of transport. The use characteristic of this district is that of homes of the respectable working classes. Apartment houses and tenements of the better grade are common.
>
> Beyond the workingmen's homes lies the "residential" district, a zone in which the better grade of apartment houses and single-family residences predominate, and beyond this the commuter's zone of finer houses and larger lots.

Thus, the concentric circle theory sets forth that land is most intensively used in the financial and office district at the center of the city. Land so used at the heart of the city has the highest value in the urban area and is dominated by tall structures. Encircling it is the retail shopping district which, in turn, is surrounded by the wholesale and light manufacturing zone. Interspersed with the latter and surrounding it are the homes of the lower working classes. The next zone contains a dotting of heavy manufacturing and the homes of the more respectable workers—successively encircled by belts of better grade residential and commuter zones.

The above concentric circle theory of land uses offers an ideal pattern that helps to bring order out of chaos and is not to be unduly criticized because the pattern is never exactly realized in any actual city. Fisher, in 1930, questioned the concentric circle theory: [3]

> The following observations should be made regarding the variations from this pattern which are commonly found in any community. First, the zones should not be thought of as rigidly determined nor as of uniform width. They interpenetrate each other. Especially is this true of retail uses. They follow population and are to be found in all zones except where restrictions either public or private prevent them. The tendency of heavy manufacturing to spread out along transportation lines is another example of such lack of uniformity. In fact, all the uses tend to hover near transport routes and are extended further in the vicinity of such routes than in districts not served by them. * * * Not uncommonly a type of use will be found only on one side of the use which it is presumed to surround. The wholesale district, for example, seldom entirely surrounds the retail, but lies adjacent to it on only one side. The line of demarcation between two adjacent zones is, furthermore, not definitely drawn. One fades into the other and the exact point at which one ends and the other begins cannot be considered as definitely fixed. * * *
>
> The second variation from the pattern that is particularly noticeable is the tendency seen in cities of considerable size for subcenters to spring up and start another pattern similar to that whose center is the center of the city. These subcenters begin with the familiar neighborhood stores and grow with population growth until the different uses find it desirable to locate near them.
>
> Finally, unfavorable topography may entirely break up the pattern. A city located on a lake, like Chicago, or on a peninsula, like New York, or on a river, like Detroit, finds this physical barrier too great to break through it. The pattern, therefore, becomes distorted. Hills, also, may be equally powerful in breaking up the pattern. * * *

By utilizing the land-use maps and real property surveys made available in recent years, numerous factors may be mentioned that lend support to and amplify the criticism quoted. The limitations and qualifications thus brought out seem to render the theory doubtful even as a statement of an ideal pattern of land uses. Step by step, the land use ascribed to each concentric circle is examined in the following paragraphs and considered in the light of known facts in a number of cities.

1. *The financial and office zone and the retail shopping zone.*—The retail shopping center, and not

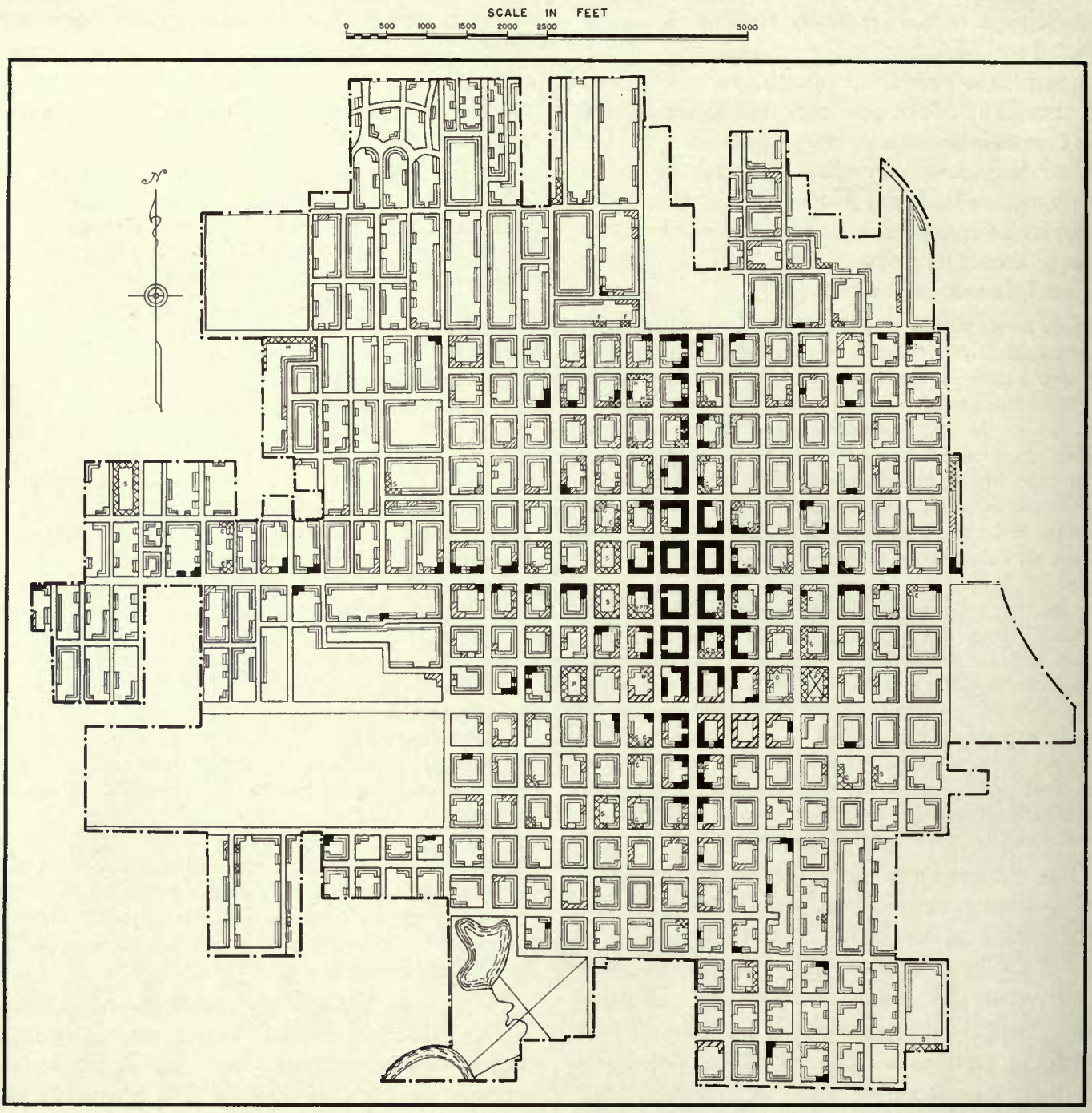
[2] Fisher, Ernest M., *Advanced Principles of Real Estate Practice* (New York The Macmillan Co., 1930), p. 126. See also Park, R. E., and Burgess, E. W. *The City* (Chicago, Univ. of Chicago Press, 1925), ch. II; and Haig, R. M., "Toward an Understanding of the Metropolis—The Assignment of Activities to Areas in Urban Regions," *Quarterly Journal of Economics*, Vol. XL, No. 3 May 1926, p. 402.

[3] Fisher, Ernest M., *op. cit.*, pp. 126, 127.

FIGURE 6

LAND USE MAP

EMPORIA, KANSAS 1935



SOURCE: EMPORIA REAL PROPERTY SURVEY, DECEMBER, 1935
W.P.A. PROJECT NUMBER 530

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the financial center, is the central point in most cities, if the center is determined by converging lines of traffic, density of pedestrian traffic, or by peak land values.[4] In the smaller cities the financial, office building, and retail shopping center may be located within the radius of a few blocks along "Main Street" so that the financial, commercial, and office areas may not be separated distinctly.

Where the financial and retail shopping areas are separated, it is the retail shopping center that lies nearest the converging lines of transportation that bring people from all points on the periphery of the city to the center.

In New York City, lines of transportation from Long Island, New Jersey, and the residential areas of lower Westchester County, upper Manhattan and Bronx, converge near the large department stores centered about Thirty-fourth Street and Sixth Avenue. Grand Central Terminal, at Forty-second Street and Park Avenue, is another converging point for incoming traffic from all residential zones and is the "uptown" office center. The financial center, Wall Street, lies 4 miles to the south on the lower tip of Manhattan Island. It also is easily accessible to commuters, especially from New Jersey, Brooklyn, and Staten Island, but it cannot be considered the only "center."

In Chicago, the retail shopping center is at State and Madison Streets, the point where the main traffic arteries from the west, north, and south converge. It is at the point of maximum pedestrian traffic and peak land values. On the other hand, the financial center at Jackson and La Salle Streets, six blocks from State and Madison, is located at a dead-end street on one corner of the central business district away from mass crowd movements, except those which it generates within itself. Similarly, in London, Paris, and many other cities, the retail shopping center is at the chief converging points of traffic.

There is, of course, a fundamental reason why the retail shopping center should be located at the point most convenient of access to people from all parts of the city. Shoppers tend to go to centers where they can find a large assortment of goods in close compass, so they can make all their purchases with a minimum expenditure of time and effort.[5] On the other hand, the financial center, while it must be conveniently located with respect to transportation lines leading to all points on the periphery of the city, need not be located at the center of the converging transportation lines. The financial district does not depend upon convenience of access to the maximum number of people. It is a separate institution or a group of specialized institutions—financial and produce exchanges, banks, brokers' offices, and insurance companies connected with leading world cities by telegraph, telephone, cable and radio.

The office buildings of a city may be located near either the retail shopping center or the financial center. In New York there are two main office-building centers—one in Wall Street, the other convenient of access to Grand Central Terminal. Office buildings, like the financial center, need not be located at the focal point of all transportation lines, but they should be close to it.

Such are some of the principal functions of the central business district, which includes the retail, financial, and office building centers. The entire area is correctly placed at the point where the main traffic routes leading into the city converge at a central point. It is marked on the sky line of the city by a cluster of skyscrapers. It is indicated on land use and land coverage maps by intense concentration of land use. It is the market place, the seat of direction and control of the municipal and business activities.

However, this central business district is not always a definitely limited and circumscribed commercial area that contains all the stores in a city. Bands of commercial growth or a string-like development of stores may extend out on one or more of the main thoroughfares radiating from the main business center. Thus, lines of stores have grown out along both Connecticut Avenue and Fourteenth Street in Washington, D. C. In Charleston, W. Va., there has been a stringlike development of stores along Washington Street. In Detroit, strings of stores have grown out from the central business district along Fort Street and the main axial avenues:

[4] Except possibly in world or continental financial centers, as in London or New York. One writer has stated that "* * * the point of highest value, which means the most desirable location for a retail shop in all cities, except in the few financial capitals where the banking and office district produces higher values than the retail shops." Hurd. R. M., *Principles of City Land Values* (N. Y., Record and Guide, 1924), p. 85. According to unpublished reports from Federal Housing Administration valuators, the peak point of land values is located at the retail shopping centers in all the Federal Housing Administration regional or district office cities, except New York.

[5] Hurd. R. M., *op. cit.*, p. 82.

Woodward, Jefferson, Gratiot, Grand River, and Michigan.

Again, satellite business centers have developed independently beyond the central business district, or on the city's periphery. These are usually located at or near suburban railway stations, elevated or subway stations, intersecting points between radial and crosstown street-car lines, or intersecting points of main automobile highways.[6]

2. *The wholesale and light manufacturing zone.*—This zone does adjoin the central business district but it usually does not entirely encircle it. This was brought out by Fisher.[7] In Chicago, at one time prior to 1900, the wholesale district did almost entirely enclose the central business district. Now, however, the wholesale area in Chicago lies mainly to the west of the "Loop."

In this wholesale and light manufacturing zone are a scattering of old residential dwellings, the remnants of the residential sections of an earlier and smaller city whose commercial and industrial expansion has intruded into sections that were originally exclusively residential.

3. *The heavy manufacturing zone.*—At one time, there was a tendency for heavy manufacturing industries to be located in areas in close proximity to the retail business center. In the case of towns or cities that had become established as trading centers at crossroads or along river banks before the coming of industry, the early factories tended to locate near the business center and in some cases to encircle it. In the horse and wagon days, industries had to be situated near water or rail transportation and near the labor supply. The same transportation routes that served the city as a commercial emporium were a necessity to the factory. Hence, the early industries of Chicago crowded the banks of the Chicago River and its branches near the central business district, where rail and water commerce met. Heavy industry almost surrounded the first business district. The same spot—the converging point of traffic—was advantageous for both commercial and industrial uses. The commercial uses outbid the industrial uses for the most central point, however, so that the factories were shoved out to the area just beyond the commercial zone, but still very close to it.

The present pattern of industrial land use is frequently so different from this original concentric zone pattern that it is doubtful whether it can be asserted that there is any general tendency for a concentric zone of heavy industry to surround the central business district. As we have seen, Fisher, in 1930,[8] questioned the concentric zone theory. And Davie,[9] criticizing the concentric circle theory in a recent study of land use, found that the heavy manufacturing industries of New Haven, Conn., followed transportation lines instead of forming a concentric circle around the central business district. Similarly, Cleveland[10] has no concentric zone of factories around the central business district. Examination of the land use maps of Lancaster, Pa., (fig. 7), Wellington, Kans. (fig. 8), and Chicago[11] also will reveal no support for the theory.

There are fundamental reasons why heavy industries now follow railroad lines along river valleys or lake or ocean fronts in long bands of growth rather than remain near the central business district.

First, with the coming of the automobile truck, the belt-line railroad, and the specialized industrial districts near freight interchange points on the periphery of cities, factories on the outer edges of cities but with direct rail or water connections, or both, have better transportation facilities than factories in the heart of the city.

Second, industrial sites are cheaper and taxes are lower on the periphery of cities. More land can be used for yard and storage space. One-story buildings permitting continuity of factory operation without an interruption of factory processes on each floor level can be constructed. There being no streets to cross, direct rail connections at the most convenient points can be made.

Third, the distance from the workers' homes is not so important because of the widespread use of the automobile. The automobile truck has likewise minimized the advantage of close proximity to the downtown area for shipments and deliveries of goods.

[6] See Davie, M. R., "The Pattern of Urban Growth," in *Studies in the Science of Society* (New Haven, Yale University Press, 1937), p. 161. See also Fisher, Ernest M., *op. cit.*, p. 127. See also Ratcliff, R. U., "Some Principles of Site Selection in Outlying Retail Subcenters." Fall 1935 issue of *National Marketing Review* (Since merged with *The Journal of Marketing*, N. Y.).

[7] Fisher, Ernest M., *op. cit.*, p. 127.

[8] Fisher, Ernest M., *op. cit.*, pp. 126–127.

[9] Davie, M. R., *op. cit.*, pp. 142–161.

[10] Davie, M. R., *op. cit.*, p. 160, Map of Cleveland.

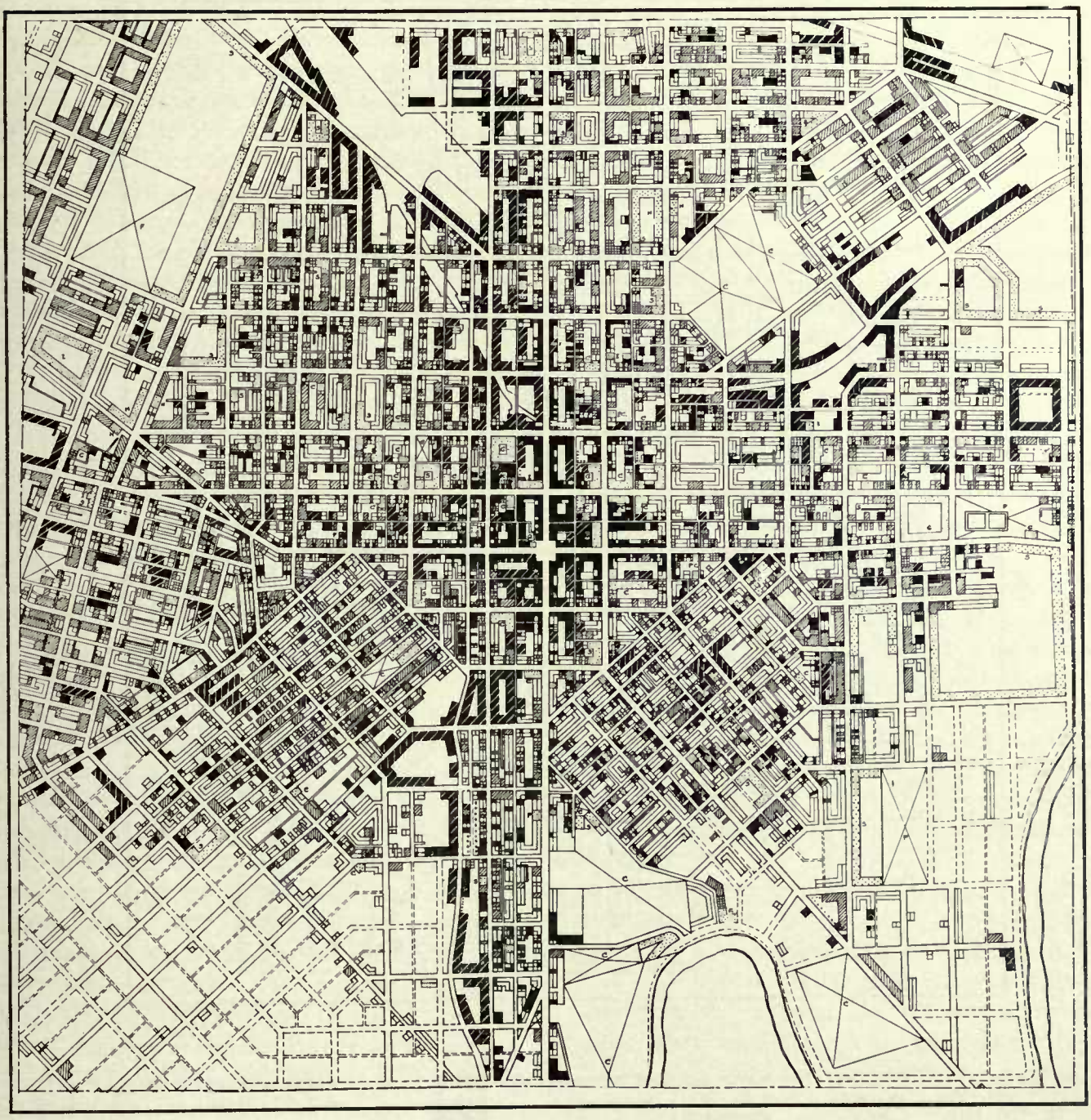
[11] See fig. 38 in pt. II, ch. III.

FIGURE 7

LAND USE MAP
LANCASTER, PENNSYLVANIA 1936

SCALE IN FEET

0 500 1500 2500 5000



CITY LIMITS

SINGLE FAMILY ATTACHED OR DETACHED

TWO TO FOUR FAMILY

APARTMENTS WITHOUT BUSINESS

APARTMENTS WITH BUSINESS UNITS

MIXED BUSINESS AND RESIDENTIAL

COMMERCIAL

INDUSTRIAL

PUBLIC BUILDINGS (INCLUDE LETTER)

PERMANENT OPEN SPACE

TEMPORARY BUSINESS USE

PARKING OR USED CAR LOTS

UNUSED LAND

SOURCE: LANCASTER REAL PROPERTY SURVEY 1936
W.P.A. PROJECT NUMBER 65-23-478D

FEDERAL HOUSING ADMINISTRATION
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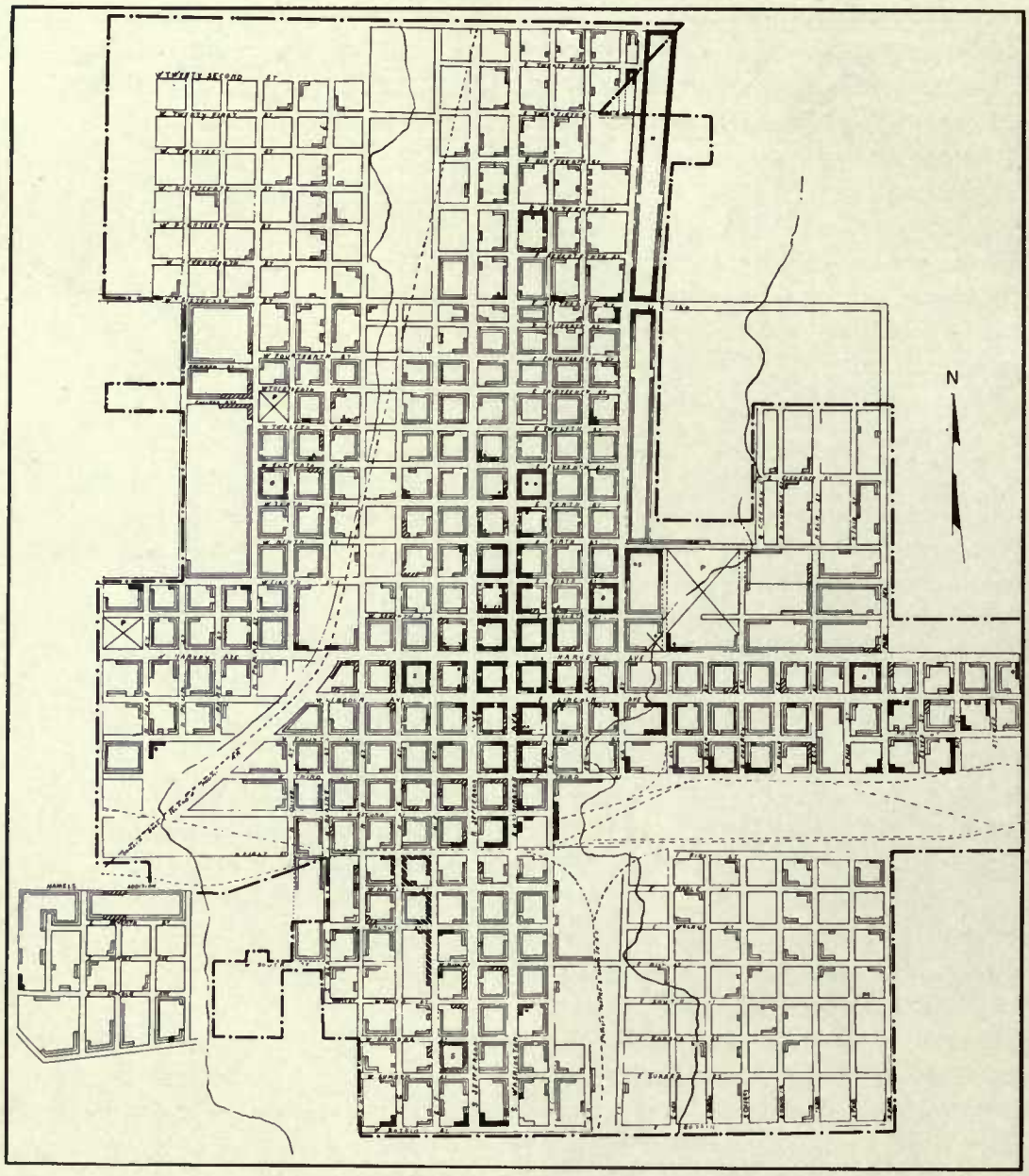
FIGURE 8

LAND USE MAP

WELLINGTON, KANSAS 1935

SCALE IN FEET

0 500 1000 1500 2000 2500 5500



SINGLE FAMILY
ATTACHED OR DETACHED

TWO TO FOUR FAMILY

APARTMENT
WITHOUT BUSINESS UNITS

APARTMENT
WITH BUSINESS UNITS

MIXED BUSINESS & RESIDENTIAL

COMMERCIAL

INDUSTRIAL

PUBLIC BUILDINGS
S - SCHOOLS
F - FIRE STATION
C - CHURCH
H - HOSPITAL
G - GOVERNMENTAL BLDGS., ETC

PERMANENT OPEN SPACE
P - PARKS

PARKING OR USED CAR LOTS

UNUSED LAND

CITY LIMITS

SOURCE: WELLINGTON REAL PROPERTY SURVEY 1935
W.P.A. PROJECT NO. 65 - 82 - 763

FEDERAL HOUSING ADMINISTRATION
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The pattern of heavy industry today, instead of being concentrated near the central business district, tends to follow river valleys as in Youngstown, Ohio, and Pittsburgh; and river fronts, as along the Niagara River at Buffalo and the Detroit River at Detroit; or lake fronts and rivers tributary to lakes, as in South Chicago, the Calumet region, Indiana Harbor, and Gary in the Chicago region; or bays or deep tidal rivers as the Hudson, the East River in New York, and the Delaware River at Philadelphia; or outer belt lines as in Chicago, Detroit, etc. Another pattern of industrial growth is that of a cluster of industries in a specialized industrial section like Bush Terminal in Brooklyn, N. Y., or the Clearing District in Chicago where 100 industries are located in a belt 3 miles long adjacent to the Clearing Freight Yards. These specialized industrial districts furnish services such as daily freight-car door deliveries.

Thus, the pattern of industrial land uses is so shaped by the unique topographical features of cities and by the contours of hills and the curves of rivers that it rarely conforms to the pattern of concentric circles. Moreover, the amount and extent of land used for industrial purposes varies so much as between different cities that no general industrial pattern can be established. Industrial uses of land are almost nonexistent in capital cities like Washington, D. C., or resort cities like Miami, Fla., and Atlantic City, N. J. On the other hand, cities like Gary, Ind., Schenectady, N. Y., and Johnstown, Pa., derive their main support from industry—approximately half of their gainfully employed being directly engaged in industrial pursuits. In Chicago, where one-quarter of the population is industrially employed, 16.8 percent of the privately developed land area was used for industry in 1936.[12]

Differences in extent of industrialization are revealed by the land use maps. Thus, the land use map of Emporia, Kans. (fig. 6), shows only a few small industrial areas, while that of Lancaster, Pa. (fig. 7), reveals extensive sections along the river occupied by factories and mills.

4. *The zone of workingmen's homes.*—In placing the zone of workingmen's homes near or in the same zone as that of heavy industry, the concentric circle theory of land use recognizes the tendency of workingmen's homes to be near the factories. However, as factories do not form a concentric circle around the central business district, so neither do the workingmen's homes encircle the central core of the city. In this respect, the concentric circle theory breaks down, as will be indicated in chapter VI., The Patterns of Residential Rental Areas, in which the subject will be more fully discussed.

5. *The residential zone.*—The concentric circle theory of land use seems to imply that the higher rent areas form a complete circle around the outer edge of the city. That this has not been true in the case of scores of cities studied will be indicated in chapter VI. This theory also indicates that this outer zone on the periphery of the city includes the high grade apartment areas or that there is a progressive rise in rents of apartments as one goes outward from the central business district. This is not true of the Gold Coast of Chicago, nor of Park Avenue in New York City, where the socially elite pay the highest rents in the city for apartments located within a mile of the central business district.

6. *The commuters' zone.*—Beyond the periphery of the city are nuclei of suburban settlements not in the form of zones but in the form of scattered isolated communities. Some of these settlements are occupied by fine homes, but other towns may be middle class in character and others may consist of shacks. It is not true that one progresses from dilapidated dwellings at the center to an encircling belt of mansions on all points of the periphery of the city.

Thus, the concentric circle theory of land use, while convenient as a starting hypothesis for a pattern of land uses, is subject to modification.

In this chapter we have considered mainly the differentiation between business and residential uses. The concentric circle theory is correct in placing the commercial and some of the industrial uses near the center of the city and in putting the residential areas in the encircling belts beyond this central core. In applying the concentric circle theory to different types of residential areas styled "slums," "workingmen's homes," and "commuters' zone of finer houses," there has been introduced a qualitative factor which will be more fully treated in a later chapter.

[12] Young, Hugh A., *Rezoning Urban Areas.* (Chicago Planning Commission), p. 936, drawing 103. Paper presented at the meeting of the City Planning Division, American Society of Civil Engineers, January 21, 1937.

Having examined the over-all pattern of urban land uses, and postponing the analysis of residential areas for later discussion, there still remains to be discussed here the intensity of residential land use. This is determined by the type of structures used for dwelling purposes. Residential land uses occupy the largest proportion of all the privately developed land in American cities. In the 16 cities of between 5,000 and 300,000 population analyzed by Bartholomew,[13] such home uses utilized over 80 percent of the land developed by private owners within the city limits. Because of the predominance of residential land use in the total urban area, it is important to break this large area down into subareas according to the predominating type of structure, such as single-family, two-family or multifamily structures.

Single-family structures predominate in American cities. In the 16 self-contained cities studied by Bartholomew, 74.2 percent of the privately developed land area was occupied by such single-family structures, as compared to only 4.28 percent of the same area occupied by two-family buildings and 2.23 percent occupied by multifamily structures. Similarly, the 1930 census reported that slightly over 84 percent of all United States urban residential structures in that year were single-family homes, and 63 percent of the American urban families lived in such structures.[14]

In many American cities, single-family structures predominate to such an extent that two-family structures and apartments are too few in number to form a distinct area.[15] In many of the smaller cities, two-family structures are scattered through single-family areas, and multiple dwellings likewise seem to be distributed in small isolated groups over a wide area.[16] These multiple dwellings do seem, however, to be clustered around the central business district or in belts along rapid transit lines, while the single-family home areas extend from the center to the periphery of the city. In New York and Chicago there are distinct single-family, two-family, and multiple apartment areas, where one type of structure predominates.

Data gathered in the last decennial census indicate that patterns of types of residential areas in large American cities vary widely.[17] Columbus, Ohio, at one extreme, has 87 percent of its families residing in single-family structures and only 7 percent in multiple units with three or more families. Manhattan Borough, in New York City, at the other extreme, has only 3 percent of its families living in single-unit homes and 95 percent in multiple unit structures.

In New York City, the multiple apartment is the almost exclusive type of residential structure on Manhattan Island and the portions of the Bronx and Brooklyn that are directly adjacent to Manhattan Island.[18] The tallest apartment buildings form a ridge along the routes of subways. Two-family areas are located just beyond the multiple-family areas in Brooklyn and the Bronx. Single-family areas are located still farther from the business center of the city in Queens, Brooklyn, and the Bronx beyond the two-family areas. The suburbs of New York City are composed mainly of single-family homes. While only 25 percent of the residential buildings on Manhattan Island are single-family structures, table I shows that from 80 to 99 percent of the residential structures in satellite communities—New Rochelle, Scarsdale, White Plains, Hempstead, Maplewood (N. J.), Larchmont, Pelham, and Garden City—are of the single home type. In most of these suburban towns, the apartment buildings are located near the local railroad station unless this area is marred by adverse developments.

[13] Bartholomew, H., *op. cit.*, pp. 25, 36, 46.

[14] U. S. Department of Commerce, *Fifteenth Census of the U. S., 1930, Population*, Vol. VI (Washington, 1933), p. 10.

[15] Bartholomew, H., *op. cit.*, pl. VI, showing two-family area in Louisville, Ky., Springfield, Mo., San Antonio, Tex., Sacramento, Calif., and Jefferson City, Mo.

[16] Bartholomew, H., *op. cit.*, pl. VII, showing multiple apartment areas for the same cities.

[17] U. S. Department of Commerce, *Fifteenth Census of the U. S., 1930, Population*, Vol. VI (Washington, D. C., 1933), p. 72.

[18] Mayor's Committee on City Planning of the City of New York, *Progress Report* (N. Y. City, June 1936), pp. 36, 37.

In Chicago, there is a facade of tall apartment buildings along the Lake Shore Drive from Streeterville to Belmont Avenue and on the south side from Fiftieth Street to Seventy-fifth Street.[19] Practically all of the residential structures over seven stories tall are in this lake front fringe. Three story walk-up multiple apartments extend along the elevated railroad lines and in the area near the lake front behind the facade of tall elevator apartment buildings. Two-family areas predominate on the West Side. The single-family areas of Chicago are located in sections on the periphery of the city as shown by the distribution of residential structures by type in table II for Chicago and some of its suburbs. In the suburbs, single-family units again predominate.

[19] Hoyt, Homer, *One Hundred Years of Land Values in Chicago.* (Chicago, University of Chicago Press, 1933), p. 243. Map showing location of buildings over seven stories tall.

TABLE I.—*Distribution of Dwellings*

New York City Compared With Its Suburban Cities and Towns, 1930

City	Distance in miles from Times Square	Total dwellings		1-family dwellings		2-family dwellings		3-or-more family dwellings	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
New York City:									
Manhattan Borough		56, 254	100. 0	14, 295	25. 4	5, 348	9. 5	36, 611	65. 1
Bronx Borough	8	57, 137	100. 0	23, 921	41. 9	14, 856	26. 0	18, 360	32. 1
Brooklyn Borough	4	245, 212	100. 0	112, 086	45. 7	74, 832	30. 5	58, 293	23. 8
Queens Borough	10	169, 254	100. 0	119, 060	70. 3	37, 233	22. 0	12, 961	7. 7
Richmond Borough	13	29, 503	100. 0	24, 675	83. 6	4, 299	14. 6	529	1. 8
Hoboken, N. J	2	4, 547	100. 0	1, 928	42. 4	760	16. 7	1, 859	40. 9
Paterson, N. J	13	20, 648	100. 0	10, 206	49. 4	8, 318	40. 3	2, 124	10. 3
Passaic, N. J	10	7, 001	100. 0	3, 522	50. 3	2, 332	33. 3	1, 147	16. 4
Yonkers, N. Y	13	14, 996	100. 0	9, 169	61. 2	2, 538	16. 9	3, 289	21. 9
East Orange, N. J	7	10, 090	100. 0	6, 835	67. 8	2, 445	24. 2	810	18. 0
Clifton, N. J	11	8, 167	100. 0	5, 752	70. 4	2, 108	25. 8	307	3. 8
Mount Vernon, N. Y	12½	8, 263	100. 0	5, 883	71. 2	1, 469	17. 8	911	11. 0
New Rochelle, N. Y	17	8, 221	100. 0	6, 585	80. 1	998	12. 1	638	7. 8
Montclair, N. J	12½	7, 421	100. 0	6, 116	82. 4	957	12. 9	348	4. 7
Hastings on Hudson, N. Y	18½	1, 125	100. 0	933	82. 9	92	8. 2	100	8. 9
Scarsdale, N. Y	19	1, 517	100. 0	1, 269	83. 7	173	11. 4	75	4. 9
White Plains, N. Y	22½	5, 695	100. 0	4, 783	84. 0	514	9. 0	398	7. 0
Mamaroneck, N. Y	20	2, 071	100. 0	1, 795	86. 7	180	8. 7	96	4. 6
Hempstead, N. Y	19	2, 727	100. 0	2, 455	90. 0	165	6. 1	107	3. 9
Great Neck, N. Y	13	867	100. 0	790	91. 1	61	7. 0	16	2. 0
Maplewood, N. J	18	4, 920	100. 0	4, 589	93. 3	262	5. 3	69	1. 4
Larchmont, N. Y	18	1, 007	100. 0	961	95. 4	22	2. 2	24	2. 4
Pelham, N. Y	17½	935	100. 0	905	96. 8	20	2. 1	10	1. 1
Garden City, N. Y	18	1, 570	100. 0	1, 550	98. 7	11	. 7	9	. 6

Source: U. S. Department of Commerce, *Fifteenth Census of the U. S., 1930, Population*, Vol. VI (Washington, D. C., 1933), tables 18, 21, and 23 for New York and New Jersey.

TABLE II.—*Distribution of Dwellings*

Chicago Compared With Its Suburban Cities and Towns, 1930

City	Distance in miles from State and Madison Streets	Total dwellings		1-family dwellings		2-family dwellings		3-or-more family dwellings	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Chicago, Ill.	.....	403, 229	100. 0	209, 685	52. 0	116, 340	28. 9	77, 204	19. 1
Cicero, Ill.	5½	10, 645	100. 0	6, 572	61. 8	3, 308	31. 0	765	7. 2
East Chicago, Ind.	17¼	7, 272	100. 0	4, 922	67. 7	1, 395	19. 2	955	13. 1
Chicago Heights, Ill.	35	3, 737	100. 0	2, 718	72. 7	828	22. 2	191	5. 1
Evanston, Ill.	11½	9, 957	100. 0	7, 376	74. 1	1, 471	14. 8	1, 110	11. 1
Gary, Ind.	24	16, 090	100. 0	12, 757	79. 3	1, 885	11. 7	1, 448	9. 0
Berwyn, Ill.	8	9, 339	100. 0	7, 622	81. 6	1, 389	14. 9	328	3. 5
Blue Island, Ill.	15	3, 321	100. 0	2, 753	82. 9	518	15. 6	50	1. 5
Maywood, Ill.	10	5, 193	100. 0	4, 431	85. 3	604	11. 6	158	3. 1
Oak Park, Ill.	12½	11, 591	100. 0	10, 039	86. 6	879	7. 6	673	5. 8
Bellwood, Ill.	11½	1, 017	100. 0	886	87. 1	121	11. 9	10	2. 0
Lake Forest, Ill.	27	1, 293	100. 0	1, 154	89. 3	114	8. 8	25	1. 9
La Grange, Ill.	12½	2, 131	100. 0	1, 908	89. 5	164	7. 7	59	2. 2
Wilmette, Ill.	13¾	3, 343	100. 0	3, 166	94. 7	143	4. 3	34	2. 0
Wheaton, Ill.	22⅛	1, 745	100. 0	1, 656	94. 9	82	4. 7	7	. 4
Elmhurst, Ill.	15	3, 399	100. 0	3, 227	94. 9	152	4. 5	20	. 6
Highland Park, Ill.	23¼	2, 678	100. 0	2, 551	95. 3	103	3. 8	24	. 9
Winnetka, Ill.	16½	2, 457	100. 0	2, 346	95. 5	114	8. 8	25	1. 9
Park Ridge, Ill.	13	2, 522	100. 0	2, 461	97. 5	42	1. 7	19	. 8

Source: U. S. Department of Commerce, *Fifteenth Census of the U. S., 1930, Population*, Vol. VI (Washington, D. C., 1933), tables 18, 21, and 23 for Illinois.

Thus, in the cities that have developed intensive multiple apartment areas, these structures tend to be located near the central business district or along fast transportation routes leading to the central area. Because of the more intensive use of the land, such multiple-family structures can occupy sites that are too expensive for single-family homes because of their proximity to the central business district or because of unusual advantages of the terrain, such as frontage on lakes or oceans.

As one goes from the center of the city to the periphery, there is a tendency for the residential use of land to become less intensive. Multiple family units are succeeded by two-family structures and they in turn by single-family dwellings, and the amount of yard space increases. Very intensive land uses may be maintained for considerable distances, however, along lakes, ocean fronts, or fast transportation lines, such as subways, electrified railroads, or elevated lines. There are axial as well as central growths of large apartment units and also the isolated nuclei of apartments in the midst of single-family home areas on the periphery of the city, as in Washington, D. C., and Shaker Heights in Cleveland. Single-family home areas tend to fill in land along axial lines located at a considerable distance from the center of the city or the interstices between axial lines of growth that are reached by crosstown lines.

Chapter III

The Analysis of Residential Areas

IN preceding chapters it has been noted that the separate buildings of different cities do tend to form patterns of various shapes and that within these urban settled areas most of the residences tend to be distributed in a certain definite way with respect to commercial and industrial districts. Having thus narrowed the subject matter to the investigation of the residential neighborhood itself, we are now confronted with the main subject of this monograph—namely, whether there is a segregation of different types of dwelling units in definite areas, or whether the American urban community contains a hodgepodge of all kinds of residences in all parts of the city.

Is there any pattern according to which poor residences are segregated from mansions, so that houses of similar type and rental range are located close together, or is there an indiscriminate mixture of shacks and palaces in the same block, with "rich man, poor man, beggarman, thief" living side by side? The measurement of the characteristics of dwelling units located in a city involves not merely the outlining of the areas occupied by the extremes in the social scale, but also a delineation of the areas occupied by the numerous strata of the social hierarchy from the top to the bottom. If the value of any single home is affected by the condition, type, and value of surrounding homes, then it is of the utmost importance to the mortgage lender that patterns of residential areas be prepared, showing the relationship of sections of different types to each other. If the criminal is partly a product of his neighborhood and of poor housing conditions, then the patterns showing the location and shape of such blighted areas have great significance for the student of social conditions.

As a first step in determining patterns of residential areas, a unit of measurement must be selected that will be satisfactory. The units of measurement available in real property surveys made in recent years are individual dwelling units, individual structures, city blocks, enumeration districts, and—in some cases—"economic areas." Both dwelling units and structures, taken individually, are units too small to throw into relief definite changes in neighborhood characteristics. On the other hand, an enumeration district—usually ranging in size from 10 to 30 blocks—is so large as to obscure variations and gives rise to averages of extremes. And an economic area—an area selected to combine as many as possible of the homogeneous factors influencing the stability of real estate values—is by definition an area shifting in size with the passage of time.

The city block, however, has definite advantages over any of the other four geographic units mentioned above. It is a relatively fixed area bounded on four sides by city streets. It is an area small enough to permit the showing of gradations in characteristics of residential neighborhoods and yet not so small as to obscure the pattern by minutiae of detail. In addition, each individual structure within the confines of a block has a high degree of influence on the determination of the value of the structures in the rest of the block, as will be illustrated in later pages. In the real property surveys, block data in blocks with mixed land uses refer only to the residential uses of land. Such relative advantages indicate that the city block is the most satisfactory primary unit of measurement for the analysis of residential neighborhoods.

The block having been chosen for the unit of measurement, on what basis shall the pattern of residential areas be formulated? A pattern simply shows the grouping within the city of dwelling units on the basis of some single characteristic of the resi-

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dence. Each urban dwelling unit is a physical entity with numerous characteristics. Every residential structure is of a given size, shape, height, volume, age, physical condition, style of architecture, material of construction. It may or may not possess central heating equipment, private baths, indoor toilets, electricity for lighting. With reference to occupancy, it may be vacant or overcrowded; it may be occupied by tenants or owners, or by white or other than white persons. With reference to its financial status, the homes may be mortgaged or free and clear of all encumbrances. Patterns for each one of these factors may be prepared. The real property surveys made in 203 cities[1] in the past 5 years provide data for as many as 30 different elements. The appendix provides definitions of the varied data gathered in real property surveys.

How is it possible from this wealth of material to develop patterns of residential neighborhoods that may be conveniently and quickly used? One method of approach is to take each factor or characteristic of the dwelling unit separately and to place a spot on a map of the city at the address of the dwelling unit in which that factor is found. Thus, a spot may be placed on a map at the location of each house in need of major repairs—as shown in figure 9 for Charleston, S. C. A concentration of spots in certain areas quickly indicates the districts in which the greatest number of houses were in poor condition at the time of the survey. Conversely, the absence of spots in other districts indicates neighborhoods with good housing conditions. While these spot maps have their merits, there are certain disadvantages in their use. First, only one factor can be shown on one map. Second, the number of spots does not show the ratio of dwelling units with the given characteristic to the total number of dwelling units, and frequently this is of vital importance. Third, this method does not lend itself to depicting gradations of a factor such as the degree of disrepair nor to showing factors that may vary for each dwelling, such as rent.

The so-called *block data map* is a device that overcomes some of the disadvantages of the spot map. These maps have been made for 142 of the 177 cities for which block by block data are available. A number of additional surveys are already under way.

[1] Works Progress Administration, *Urban Housing, A Summary of Real Property Inventories* (Washington, D. C., 1938).

Written in the blank space in each block are a number of different figures arranged in a definite order. Each figure represents a given characteristic for that block expressed either as an average of all dwelling units in the block or as a percentage of the total number of the dwelling units in the block. It is thus possible to make comparisons between numerous different factors in every block. Used in this manner, the block data map is a reference manual to be used for detailed analyses of single blocks or for comparisons between adjacent blocks. In addition, the blocks may be colored on the basis of any single factor, such as rent, without obscuring the detailed figures. Such a colored map gives a striking picture of the pattern of the city as a whole with respect to this one factor. A series of colored maps also may be prepared, showing the pattern for each separate factor.

When the data gathered in the first real property surveys, made in 1934, were tabulated, a variety of characteristics of dwelling units were available for the first time which could be used in the measurement of residential neighborhoods. Of the 30 items for which data were collected, 8 were selected for use in block data maps as being the factors most pertinent in revealing housing conditions. The 8 factors chosen were arrayed in each block of the block data maps in the following order from top to bottom:

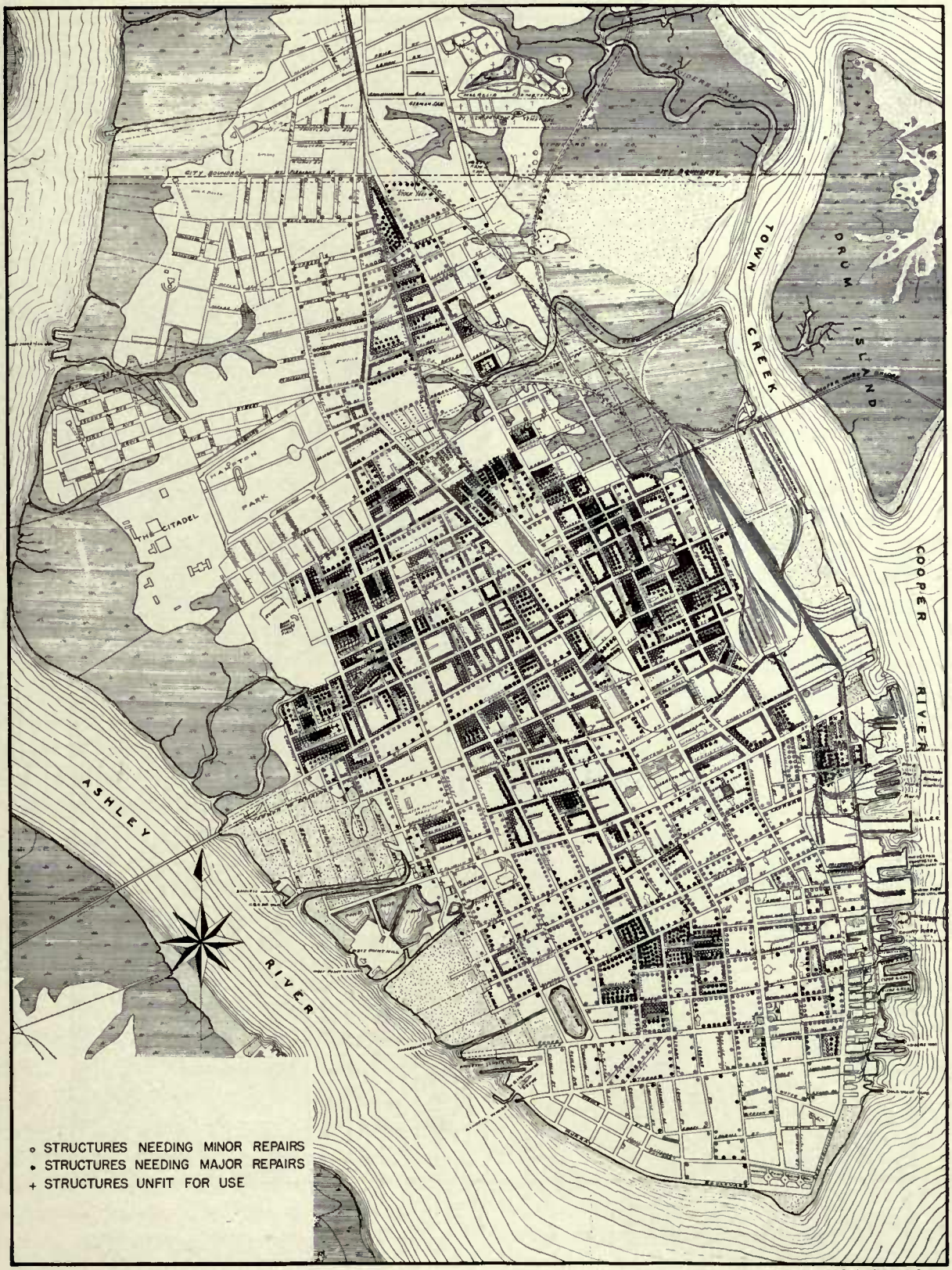
1. Average rental for the block.
2. Total number of residential structures in the block.
3. Percentage of the total number of residential structures in the block less than 15 years old.
4. Percentage of the total number of dwelling units in the block that are owner-occupied.
5. Percentage of the total number of residential structures in the block that need major repairs or that are unfit for occupancy.
6. Percentage of the total number of structures in the block that are used for commercial purposes.
7. Percentage of the total number of dwelling units in the block that have no private bath.
8. Percentage of the total number of persons living in the block that are of a race other than white.

These eight factors are shown in each of over 150,000 blocks in the 142 cities for which block data maps have been made. As an example, a reproduction of a section of the block data map of Richmond, Va., is shown in figure 10.

The use of such block data maps implies that the figures used afford a true picture of the character-

FIGURE 9

CONDITION OF STRUCTURES
CHARLESTON, SOUTH CAROLINA
1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
CHARLESTON REAL PROPERTY INVENTORY, 1934

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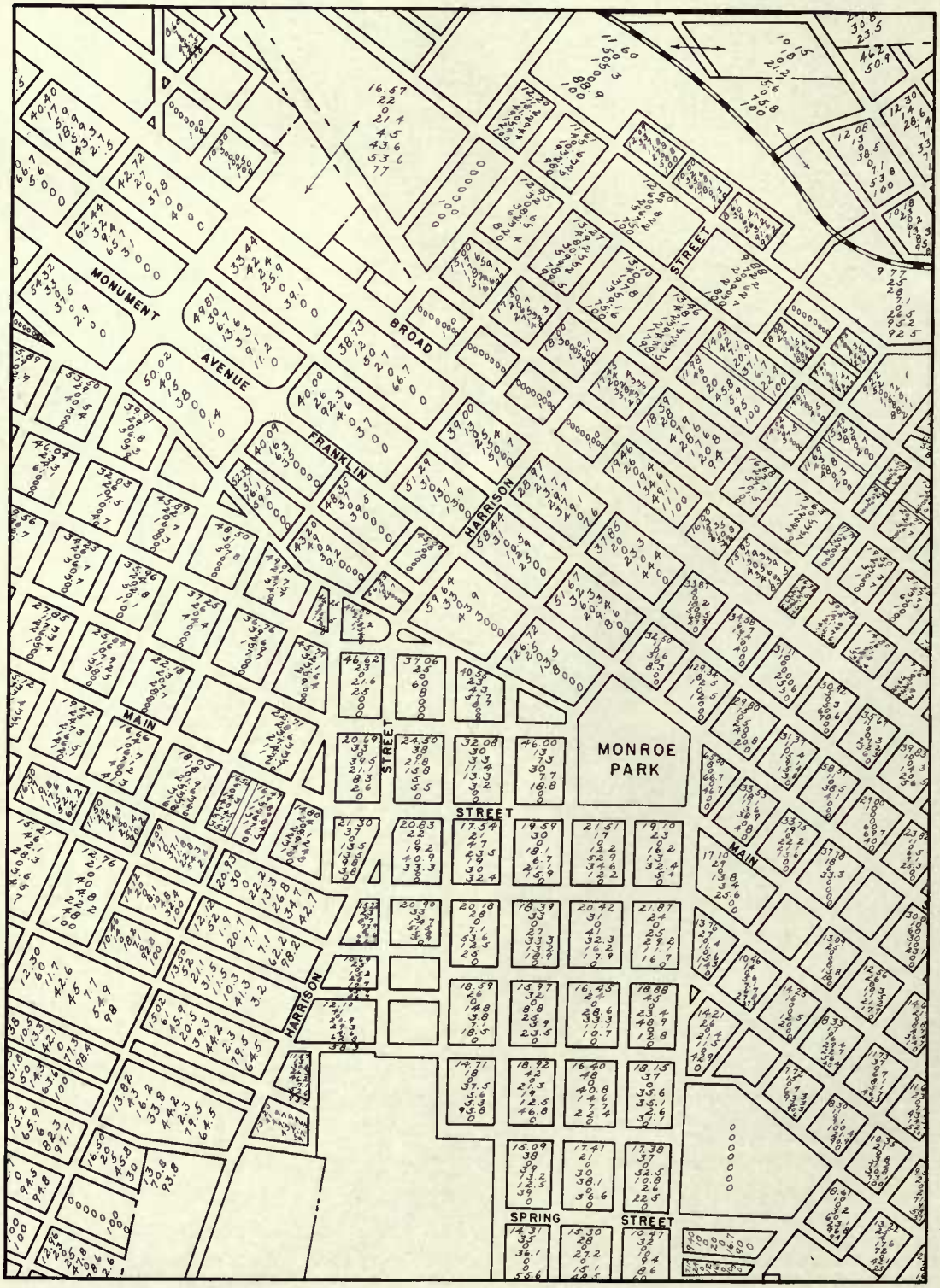
FIGURE 10

BLOCK DATA MAP

SECTION OF RICHMOND, VIRGINIA 1934



SOURCE: U.S. DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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istics represented. Percentage figures, used for the last six items, give greater meaning to the several factors than absolute figures—for they simply denote the relative existence or nonexistence of a characteristic. Certainly, the number of residential structures less than 15 years of age, or the number of owner-occupied dwelling units, or the number of residential structures in need of major repairs, has little significance as an absolute figure. But when expressed as a percentage, the relative condition of the entire block with respect to that factor is clearly brought out. The same is true of the number of dwelling units lacking private baths or the number of persons of a race other than white in a given block. And the number of structures used for commercial purposes is also better stated as a percentage of all structures. The only absolute number shown on the block data map is the number of residential structures in each block—thus giving a direct tie-up with every other figure shown.

It is the predominant condition of the block with respect to these factors that is important in determining its character. The existence of a certain proportion of buildings in a block requiring major repairs influences the value of other structures that are in good condition. The presence of a certain proportion of members of an inharmonious race in a block affects the characteristics of the entire block. As the percentage representation of a factor increases in a given block, more influence is brought to bear by that factor on the whole block.

In the case of rent, the average figure for the block typifies the rentals for the entire block. Although it is known that every unit in some blocks that are wholly occupied by residential buildings of the same type will have rental values within a very narrow range, it is also known that blocks in neighborhoods with mixed types of structures will have rental values more greatly diversified. In only rare and isolated instances will the average rental for a block be merely an average of extremes. But the degree of the range of rents of dwelling units within the block about the average figure typifying the rentals for the entire block—the extent of the homogeneity or heterogeneity of the block with respect to rentals—is important in the use of average rent as a housing characteristic. That it is a measure is self-evident from the lack of complete homogeneity or heterogeneity in any city. That blocks do have different average rents is, in itself, indicative—but the "goodness of the fit" is dependent upon the degree of cluster about the average.

If, to eliminate minor variations, rents are grouped in $5 or $10 classes, extreme homogeneity with respect to rentals in a block may be deemed to exist for the purpose of this monograph if 100 percent of the rental units in the block fall into the same group that contains the average rent. For example, this would be true if the average rent of a block was $35 a month and no dwelling unit in the block rented for less than $30 a month or over $39.99 a month.

Conversely, extreme heterogeneity with respect to rentals in a block may be deemed to exist if an equal number of rental units in the block fall into each one of the rental groups. Thus, with 80 rental units in a block and 10 rental groups, this would be true if 8 rental units fall into each of the rental groups.

Between these two extremes, there are innumerable gradations of homogeneous and heterogeneous blocks. The greater the percentage of rentals falling within the rental group containing the average, the more homogeneous would be the block. And the greater the percentage of rentals falling outside the rental group containing the average, the more heterogeneous would be the block.

As a demonstration of the degree of homogeneity, or cluster about the average rental, 10 percent of the residential blocks in Philadelphia, Pa., Washington, D. C., and Oakland, Calif., have been sampled, together with all of the residential blocks in Gary, Ind., and Spartanburg, S. C. These five cities are representative of different types of American cities, they vary considerably in size, and are scattered geographically. In all, the entire sample includes 67,000 dwelling units in 3,200 blocks. The rental units within each block have been classified into rental groupings as follows:

Less than $10 per month.
$10 to $19.99 per month.
$20 to $29.99 per month.
$30 to $39.99 per month.
$40 to $49.99 per month.
$50 to $74.99 per month.
$75 or more per month.

The distribution of the classified groups within blocks grouped by average rentals of the blocks is

shown in figure 11 for each of the five cities. The rental groupings chosen are small enough, especially in the lower rental classes, to present evidence of the degree to which rents cluster about the average; and large enough to encompass the minutiae of detail encountered in dealing with large numbers of figures. The data available in the cities chosen include tenant-occupied and vacant units in Washington, D. C., and Philadelphia, Pa.; the data for Oakland, Calif., Gary, Ind., and Spartanburg, S. C., include owner-occupied units as well as tenant-occupied and vacant units.

The data for these five cities indicate that, while perfect homogeneity of all dwelling units within the range of any rental group is rare, the rents of dwelling units in blocks with similar average rents generally tend to group closely about the average. The smallest proportion of rents is at an extreme from the average and the largest proportion is within the same grouping of rents as the average block rent. And, the groupings on either side of the grouping containing the average block rent contain most of the other rental units. In other words, homogeneity (rather than heterogeneity) is the rule rather than the exception. Two somewhat more objective tests [2] of the data of these five cities confirm this inference.

Thus, the rents of individual dwelling units in the sample of American cities studied show a definite tendency to cluster around the average rent for the block. Relatively few blocks show extreme heterogeneity; and, although most blocks have a diversity of rentals, the tendency toward homogeneity is the rule rather than the exception. Hence, for purposes of this monograph, it is assumed that the average block rent is not an average of extremes, but in most cases is the modal rent or the one most typical of the units in the block.

Having demonstrated the representativeness of the data used in the construction of block data maps and noted their significance in measuring block by block gradations, we may proceed further with our analysis of residential neighborhoods. The 142 cities for which block data maps have been made have been examined and a technique has been derived whereby the differences in residential areas in American cities may be more closely measured.

The city that was at first a vague and nebulous quantity has been defined as to its external shape by maps of the settled area. Then the areas occupied by different types of land uses within the built-up section were segregated from each other, and the residential sections were separated from the commercial and industrial districts by means of land-use maps. The block was then selected as an appropriate unit of measurement and the data tabulated in real-property surveys were found useful in block-by-block analysis of gradations of certain characteristics of neighborhoods when shown on block data maps. Still we have not found how the characteristics distribute themselves, for example, where the slums and the fashionable areas are located within the city structure.

Although block data maps permit analysis of block by block gradations, they do not clearly portray the differences in residential areas on the basis of any *single* characteristic. They are most useful in detailed analyses of single blocks or for comparison between adjacent blocks. To circumvent this difficulty, therefore, the technique has been refined to permit the analysis of the patterns of residential areas reflected by single characteristics. By this method a series of maps is made, each portraying the block data for one of the factors graded by five or six class intervals. Different cross-hatchings are used to designate the several gradations of each characteristic.

Since two factors—number of residential structures and percentage of structures used for commercial purposes—have less significance in the analysis of residential areas than the percentage of dwelling units having no central heat or that are

[2] A computation of the statistical criterion *eta*, the correlation ratio (see Mills, Frederick C., *Statistical Methods*, revised edition, N. Y., Henry Holt & Co., 1938, pp. 413–423, inclusive), gives values for the five cities as follows:

Spartanburg, S. C	0.74
Gary, Ind	.77
Oakland, Calif	.79
Washington, D. C	.69
Philadelphia, Pa	.70

A second criterion of homogeneity is the coefficient Z derived in the analysis of variance. (See Mills, ch. XV, especially pp. 494 to 500, inclusive, and for a more extensive treatment see Fisher, R. A., *Statistical Methods for Research Workers*, Edinburgh, Oliver & Boyd, 6th ed., 1936.)

The Z's for the five cities are given below:

Spartanburg, S. C	1.674
Gary, Ind	1.531
Oakland, Calif	1.846
Washington, D. C	1.650
Philadelphia, Pa	1.418

Since both the number of blocks and the number of dwelling units included in the analysis are large for each of the cities, these coefficients of the difference between the variation between groups and the variation within groups are considered significant in each instance.

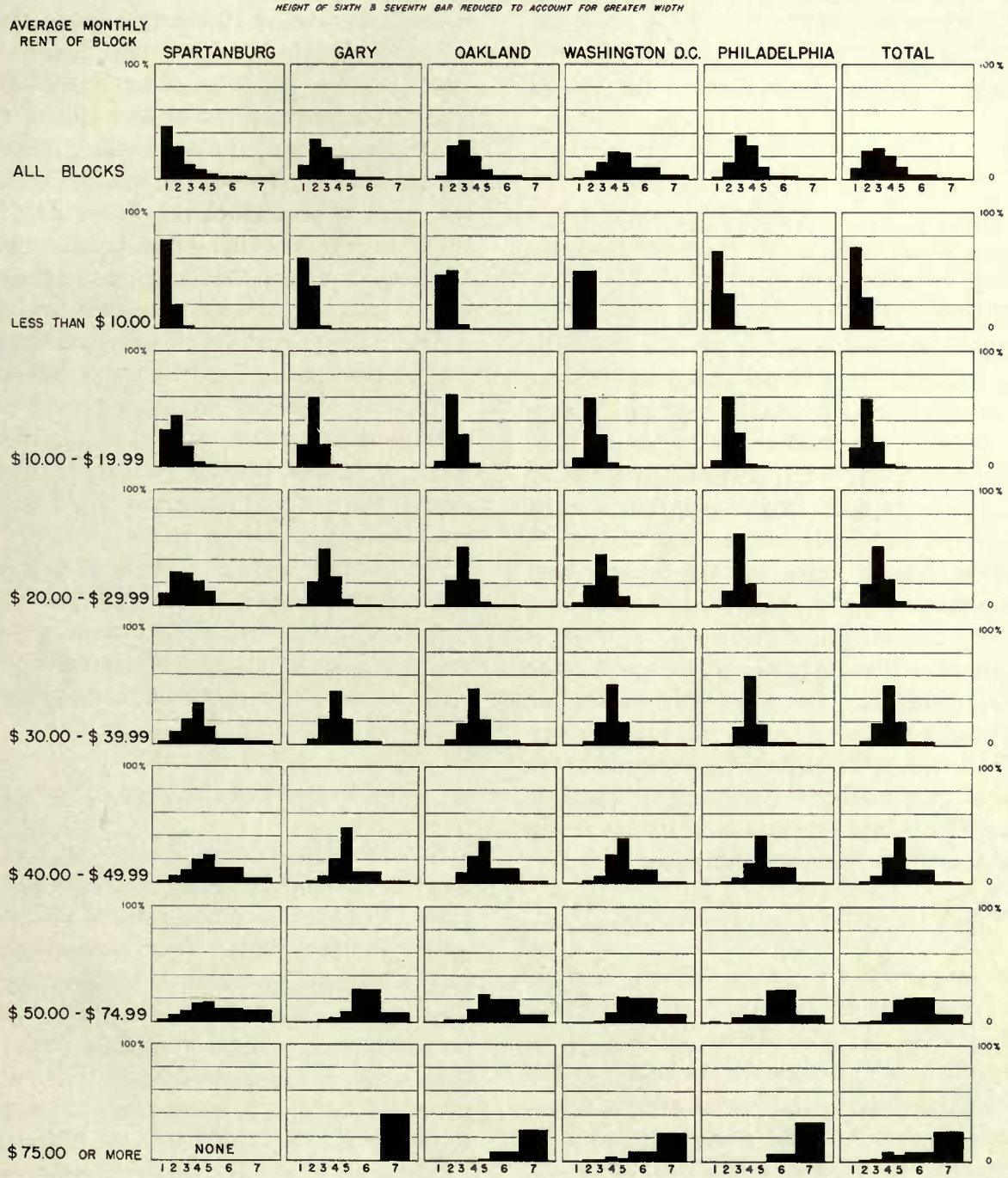
FIGURE 11

RENT* DISTRIBUTION WITHIN BLOCKS GROUPED** BY AVERAGE RENT OF BLOCK

KEY - RENT DISTRIBUTION WITHIN EACH GROUP OF BLOCKS

1ST BAR - LESS THAN $10.00 | 2ND BAR - $10.00 - $19.99 | 3RD BAR $20.00 - $29.99
4TH BAR - $30.00 - $39.99 | 5TH BAR - $40.00 - $49.99 | 6TH BAR $50.00 - $74.99
7TH BAR - $75.00 & OVER

NOTE: WIDTH OF BARS IN EACH GROUP DETERMINED BY SIZE OF CLASS INTERVAL — HEIGHT OF SIXTH & SEVENTH BAR REDUCED TO ACCOUNT FOR GREATER WIDTH



*RENTS (MONTHLY) ARE FOR ALL TENANT-OCCUPIED AND VACANT UNITS (PLUS OWNER-OCCUPIED UNITS IN PHILADELPHIA AND WASHINGTON).

**EACH RENT GROUP CONTAINS ALL RENTS IN THOSE BLOCKS WITH AN AVERAGE RENT FALLING WITHIN THAT GROUP.

SOURCE: CIVIL WORKS ADMINISTRATION, *REAL PROPERTY INVENTORY FOR THE DISTRICT OF COLUMBIA, 1934 AND PHILADELPHIA REAL PROPERTY SURVEY, 1934*
WORKS PROGRESS ADMINISTRATION, *REAL PROPERTY SURVEYS FOR GARY, OAKLAND AND SPARTANBURG, 1935 - 1936*

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overcrowded, the two latter characteristics will be used. Also, the percentage of residential structures 35 years old and over in each block is of more significance for our analysis than those less than 15 years of age. Together with the other factors used on block data maps—the eight block characteristics throwing most light upon residential areas with respect to one another are: [3]

1. Average rental for the block.
2. Percentage of residential structures that are 35 years old and over.
3. Percentage of dwelling units that are owner-occupied.
4. Percentage of residential structures in need of major repairs or unfit for occupancy.
5. Percentage of dwelling units that have no private bath.
6. Percentage of persons that are of a race other than white.
7. Percentage of dwelling units having no central heat.
8. Percentage of dwelling units that are overcrowded.

Taking each of these block factors one at a time and using a different type of cross-hatching for each of the five or six class intervals into which each factor is divided, the relative gradations of residential neighborhoods thus mapped are clearly identified. Since reproduction of eight such maps for each of the 142 cities—or even a number of them—is not feasible here, we will content ourselves with demonstrating the technique of making patterns for residential neighborhoods by using as illustrations on following pages, the maps for the city of Richmond, Va. The pattern for each factor will be discussed separately. Only residential structures are included in the maps to be discussed in the remainder of this chapter; commercial and business buildings are excluded entirely, except where they are partially used for residential purposes.

The Pattern of Average Rents

The first step in sorting out the different kinds of residential areas in a city is to examine the patterns formed by average block rentals of dwelling units. The analyst of city structure should locate on the map the blocks of highest and lowest average rental in the city and then note the gradations, block by block, between these two poles. In figure 12, average block rents in the city of Richmond, Va., have been classified into five groups and the cross-hatching for each block indicates the rental group in which that block falls.

[3] See appendix, pp. 125–128 for definitions.

An examination of the map indicates that the highest rental blocks tend to be concentrated along two main axial lines—Monument Avenue and Chamberlayne Avenue—running respectively northwest and north to the periphery of the city. The lowest rental blocks curve around the valleys and extend through the central, southern, and southeastern portions of the city. From the highest rental blocks, there is gradation downward, with blocks in the rental range of $30 to $49.99 a month tending to form a border on each side of the blocks where the average rent of dwelling units is $50 a month or more. There is no compact or completely concentrated area of blocks whose dwelling units are in the highest rental group, but there is an intermingling of blocks that have as much as $20 difference in average rentals. However, the blocks with highest average rent for dwelling units tend to be located along definite axial lines in certain sections of the city, and they are not scattered at random through all parts of the city. The pattern of average rents by blocks, however, can only be indicated clearly with all its gradations when the data are available for every block.

The pattern of rent areas, while irregular, indicates that the dwelling units for which the highest rent is paid tend to cluster along certain axes or around a certain pole in one or more sections of the city. Rent, however, is only one factor measuring the quality of housing.

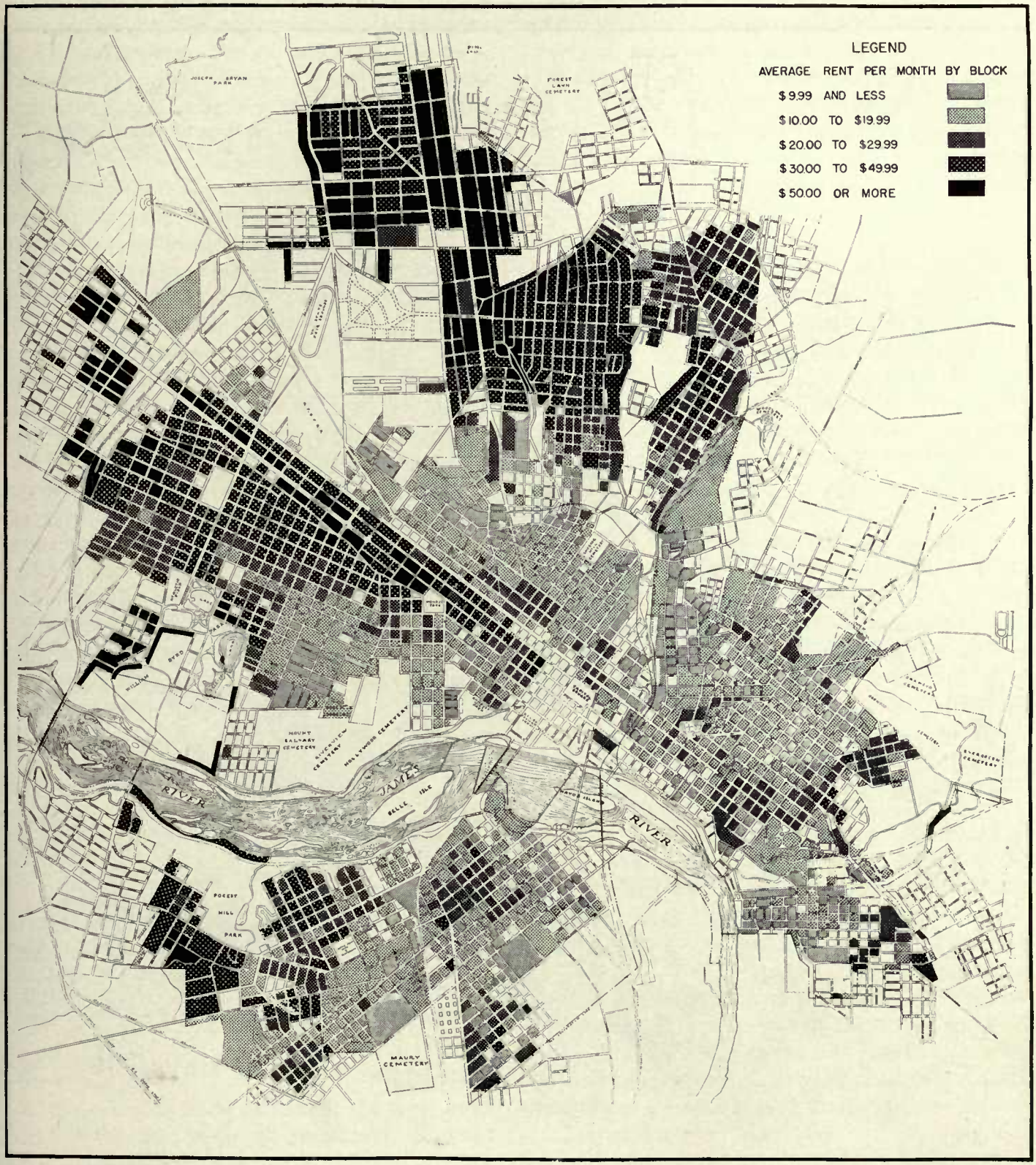
The Pattern of the Age of Structures

Are the oldest and newest buildings in a city mixed together in the same blocks, or are the newest structures segregated in certain parts of the city and the oldest in other parts? There are several types of maps showing the age of structures in a city. On one form of map, data may be used to indicate the location of new structures erected in a recent period. Such a map for Detroit, showing the new buildings for which building permits were granted in the first 4 months of 1937, is shown in the Map Supplement in figure 1. It reveals that all the new construction was on the periphery of the city.

Another type of map, showing the actual age of structures in Washington, D. C., is shown in the Map Supplement in figure 2. The medians indicating age of structures in the different blocks are

FIGURE 12

PATTERN OF RESIDENTIAL RENTS
RICHMOND, VIRGINIA 1934



SOURCE DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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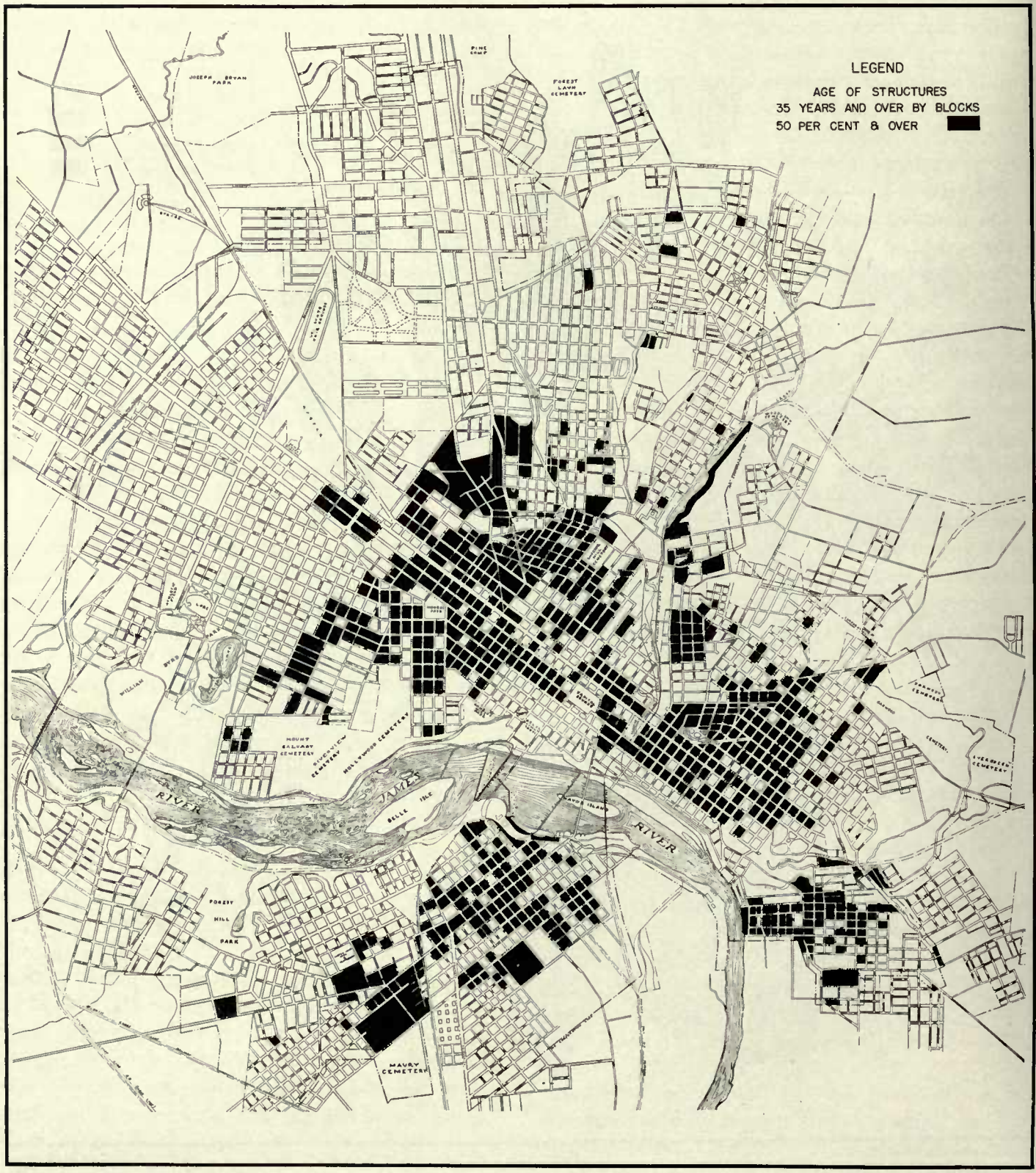
FIGURE 13

PATTERN OF RESIDENTIAL STRUCTURES 35 YEARS OLD & OVER

RICHMOND, VIRGINIA 1934



SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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classified in this map into several age groups and designated by different cross hatchings. Thus, the pattern of the age of structures in Washington, D. C., portrays a central nucleus, in which the buildings are 30 years old or more, in the Georgetown section and the entire adjacent area bounded by Florida Avenue, the Potomac and Anacostia Rivers. The newer sections, containing blocks with a median building age of less than 15 years, fill in the areas in the northwest and northeast quadrants between nuclei of blocks occupied by older structures. The latter, of course, reflect the growth of the older settled area which had expanded in small detached settlements.

The pattern of the age of structures is also shown by another type of map for Richmond in figure 13. Here, the blocks have been classified in groups according to the percentage of structures in the blocks that are 35 years old or more. This map clearly portrays that blocks with 80 percent or more of the structures 35 years old or more at the time of the survey were concentrated in the central, southern, and southeastern sections. These were the very areas where rents were lowest. As one goes toward the periphery of the city along Chamberlayne and Monument Avenues, to the north and northwest, the percentage of aged structures in the blocks rapidly decreases and numerous blocks are found with no structures 35 years old or more. The proportion of such structures in the several rental groups is shown in table III.

TABLE III.—*Proportion of Residential Structures 35 Years Old and Over in Each Rental Group*

Richmond, Va., 1934

In all blocks with average monthly rent of—	*The percentage of residential structures 35 years old and over was—*
Less than $10	60.8
$10 to $19.99	55.0
$20 to $29.99	26.4
$30 to $49.99	7.6
$50 or more	8.3
Entire city	36.3

Source: U. S. Department of Commerce, *Richmond Real Property Inventory*, 1934.

The Pattern of Owner Occupancy

Is the extent of home ownership the same in all parts of the city, or is the proportion of owned homes greater in some areas than in others? The pattern of owner-occupied dwelling units in Richmond, shown in figure 14, clearly portrays a higher percentage of owner-occupied homes on the periphery than in the center of the city. While there are many blocks in areas adjacent to the central business district in which less than 10 percent of the dwelling units were owner-occupied at the time of the survey, there are large sections in the north in which home ownership ranged from 70 percent to 100 percent. Sections on the northwestern, southwestern, and southern fringe of the city also contain a number of blocks in which owner-occupied units predominated.

The percentage of owner-occupied units thus tends to increase as one goes from the center to the city limits. The greater number of two-family structures, dwellings over stores, lodging houses, and apartments near the central part of the city reduces the percentage of owner occupancy. In many such structures, however, the owner may live in one of the dwelling units. It is also true that the older dwelling units near the business center are occupied to a large extent by a tenant class that lacks the means or inclination to buy homes in areas that are either slums or border on blighted areas. Houses in such old areas are frequently regarded as places of temporary abode. When a family accumulates the funds to make a down payment on a house, it usually desires to move into a newer neighborhood farther from the business center. In Richmond, some individuals have made it a business to own and rent the older houses, and one person may own and rent a considerable number of such properties.

As indicated in figure 12, the residences in the central part of Richmond tend to rent for less on the average than those on the periphery. There is likewise a tendency for the percentage of owner occupancy to increase as the average rent of the dwelling units in the block increases. Thus, for the entire city, only 17.4 percent of the dwelling units were owner occupied, at the time of the survey, in blocks where the average rent was less than $10 a month. As average rent increases by class intervals, the proportion of owner-occupied dwelling units also increases as shown in table IV.

FIGURE 14

PATTERN OF OWNER OCCUPANCY

RICHMOND, VIRGINIA 1934

SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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TABLE IV.—*Proportion of Owner-Occupied Dwelling Units in Each Rental Group*

Richmond, Va., 1934

In all blocks with average monthly rent of—	*The percentage of owner-occupied dwelling units was—*
Less than $10	17. 4
$10 to $19.99	25. 3
$20 to $29.99	37. 5
$30 to $49.99	43. 3
$50 or more	58. 7
Entire city	33. 7

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

TABLE V.—*Proportion of Structures in Poor Condition in Each Rental Group*

Richmond, Va., 1934

In all blocks with average monthly rent of—	*The percentage of structures needing major repairs or unfit for use was—*
Less than $10	50. 6
$10 to $19.99	28. 6
$20 to $29.99	8. 6
$30 to $49.99	2. 8
$50 or more	1. 5
Entire city	19. 5

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The Pattern of the Condition of Structures

One of the most important measures of the quality of housing is the percentage of structures in a block that are in need of major repairs or that are unfit for use.[4] Are such buildings in poor condition scattered at random through the city, or are they concentrated in certain areas? The pattern of the condition of residential structures in Richmond, Va., is shown in figure 15.

The map clearly illustrates that the blocks in which 50 percent or more of the structures were in need of major repairs or were unfit for use at the time of the survey were concentrated in a number of clusters in the valleys and on low ground along the James River in the central, southern, and southeastern portions of the city. As we have seen, these are predominantly low-rent areas. Bordering the clusters of blocks in which over half of the structures were in poor condition at that time are blocks in which 25 to 49 percent of the buildings needed major repairs or were unfit for occupancy. There is a decline in the proportion of houses in a poor state of repair as one goes northward or northwestward from the center of the city.

In the highest rental areas, there are only a few scattered blocks that had an appreciable percentage of structures in poor condition. Thus buildings requiring structural repairs tend to be concentrated in low-rental areas. In Richmond in 1934, 43.8 percent of the dwelling units renting for less than $10 a month required major repairs, and 6.8 percent of the dwelling units in that lowest rental category were unfit for use. Table V below indicates the proportion of structures in poor condition in the several rental groups.

[4] See appendix for definition.

The evidence shown in the table clearly indicates that structures in need of major repairs or unfit for habitation are few and far between in blocks having average rents of $20 monthly or more and that the proportion rapidly diminishes as the rental scale ascends. Hence, the pattern of blocks on the basis of the physical condition of houses shows chiefly the gradations within the lower rental areas. The pattern does not show adequately the gradations in the character of areas in which the average rent of dwelling units is over $20 a month.

The Pattern of Dwelling Units Having No Private Bath

Whether or not a dwelling unit has a private bath is another measure of significance relating to the quality of housing. The pattern of dwelling units lacking this modern convenience at the time of the survey is shown for Richmond, Va., in figure 16. As in previous maps of this city, the several types of cross hatching reflect the predominance of the factor being measured.

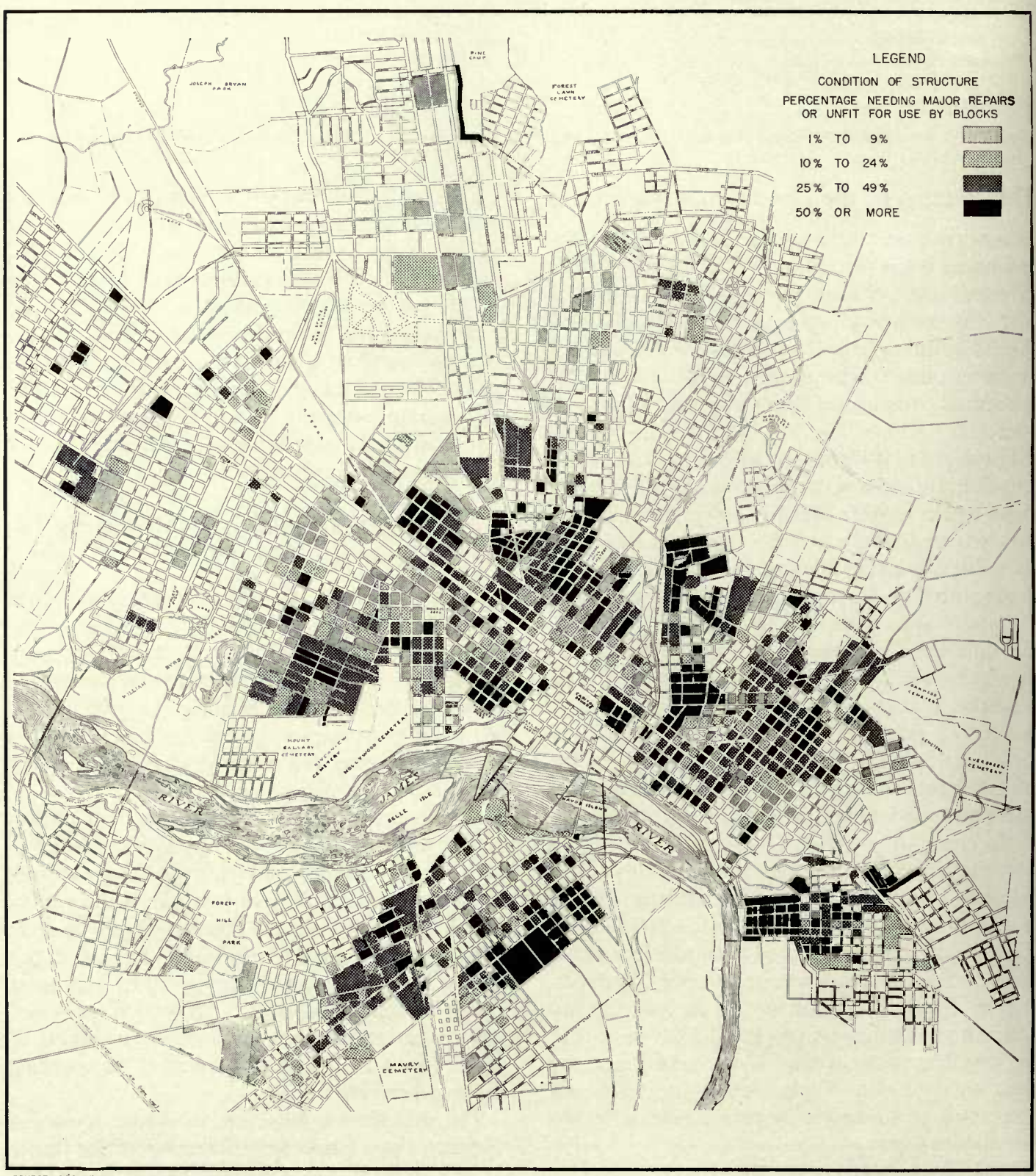
In Richmond, most of the dwelling units which lacked private baths in 1934 were concentrated in those same valleys and low-lying areas in the central, southern, and southeastern portions of the city in which average rents were the lowest. There were a number of clusters of blocks in which none of the houses had private baths, surrounded by a fringe of blocks in which a greater proportion possessed private baths. There were also a large number of blocks in which at least 60 percent of the dwelling units had private baths.

The map shows, however, an abrupt transition between these blocks in which some of the homes lacked a private bath and blocks in which all of the

FIGURE 15

PATTERN OF RESIDENTIAL STRUCTURES IN POOR CONDITION

RICHMOND, VIRGINIA 1934



SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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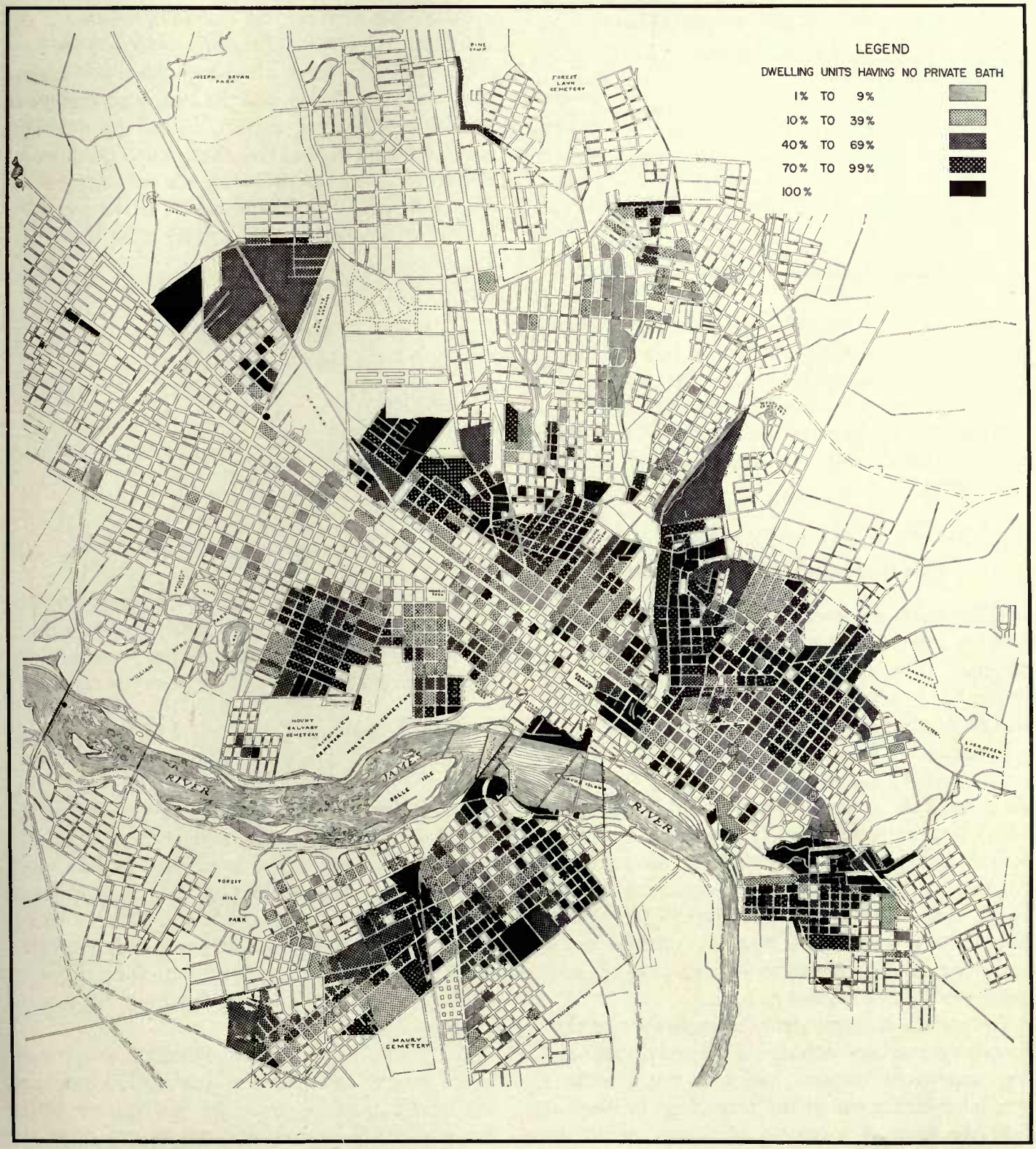
FIGURE 16

PATTERN OF DWELLING UNITS HAVING NO PRIVATE BATHS

RICHMOND, VIRGINIA 1934



SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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dwelling units possessed a bath. That a pattern based on the presence or the lack of a private bath tends to separate the lowest rental areas or the most inferior types of houses from all other residential areas is corroborated by table VI.

TABLE VI.—*Proportion of Dwelling Units Without Private Bath in Each Rental Group*

Richmond, Va., 1934

In all blocks with average monthly rent of—	*The percentage of dwelling units without private bath was—*
Less than $10	89.6
$10 to $19.99	48.4
$20 to $29.99	8.2
$30 to $49.99	1.0
$50 or more	.3
Entire city	30.3

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The table indicates that the percentage of homes lacking this modern convenience is large in blocks with rents averaging below $20 per month, and drops off sharply in blocks with higher average rentals. Patterns based on this feature fail, therefore, to show gradations in housing quality above that rental level.

The Pattern of Areas Occupied by Persons of a Race Other Than White

The pattern of nonwhite residential areas in Richmond is essentially a pattern of areas occupied by Negroes. The extent to which Negroes are concentrated in segregated areas in American cities will be discussed in detail in chapter V.

Instead of a diffusion of Negroes throughout Richmond, figure 17 shows that at the time of the survey there were six or seven concentrated Negro areas. Many large sectors of the city had an entire absence of nonwhite persons, particularly in the high rent neighborhoods. In most of the Negro areas in Richmond, the dwelling units of a majority of the blocks were entirely occupied by Negroes. In most of the remaining blocks, from 40 to 99 percent of the residents were of the colored race.

The pattern of Negro areas shown on the map thus reveals a dense concentration of colored persons in a few segregated sections, and does not portray a gradual thinning out in the percentage of Negroes from the heart of a colored area to a border line fringe of blocks occupied by both white and colored persons. While there are some mixed racial blocks on the edges of the blocks entirely occupied by Negroes, in most of the areas there is an abrupt transition from blocks occupied by Negroes to those in which the entire population is white.

These concentrated Negro areas in Richmond tend to fall in those same central, southern, and southeastern sections of the city where, as we have seen, rents are lowest, buildings are oldest and in the poorest condition, and the largest percentage of dwelling units lack private baths. In following pages we shall also see that the sections occupied by the colored race generally lack central heat and are overcrowded. The relationship of rental groups to colored occupancy is evidenced by table VII.

TABLE VII.—*Proportion of Colored Occupants in Each Rental Group*

Richmond, Va., 1934

In all blocks with average monthly rent of—	*The percentage of colored occupants was—*
Less than $10	72.7
$10 to $19.99	45.8
$20 to $29.99	6.7
$30 to $49.99	.2
$50 or more	0
Entire city	26.6

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The dwelling units in the lower rental brackets thus were predominantly occupied by Negroes in 1934. As the average block rental increases, the proportion of colored occupancy decreases rapidly.

The Pattern of Dwelling Units Lacking Central Heat

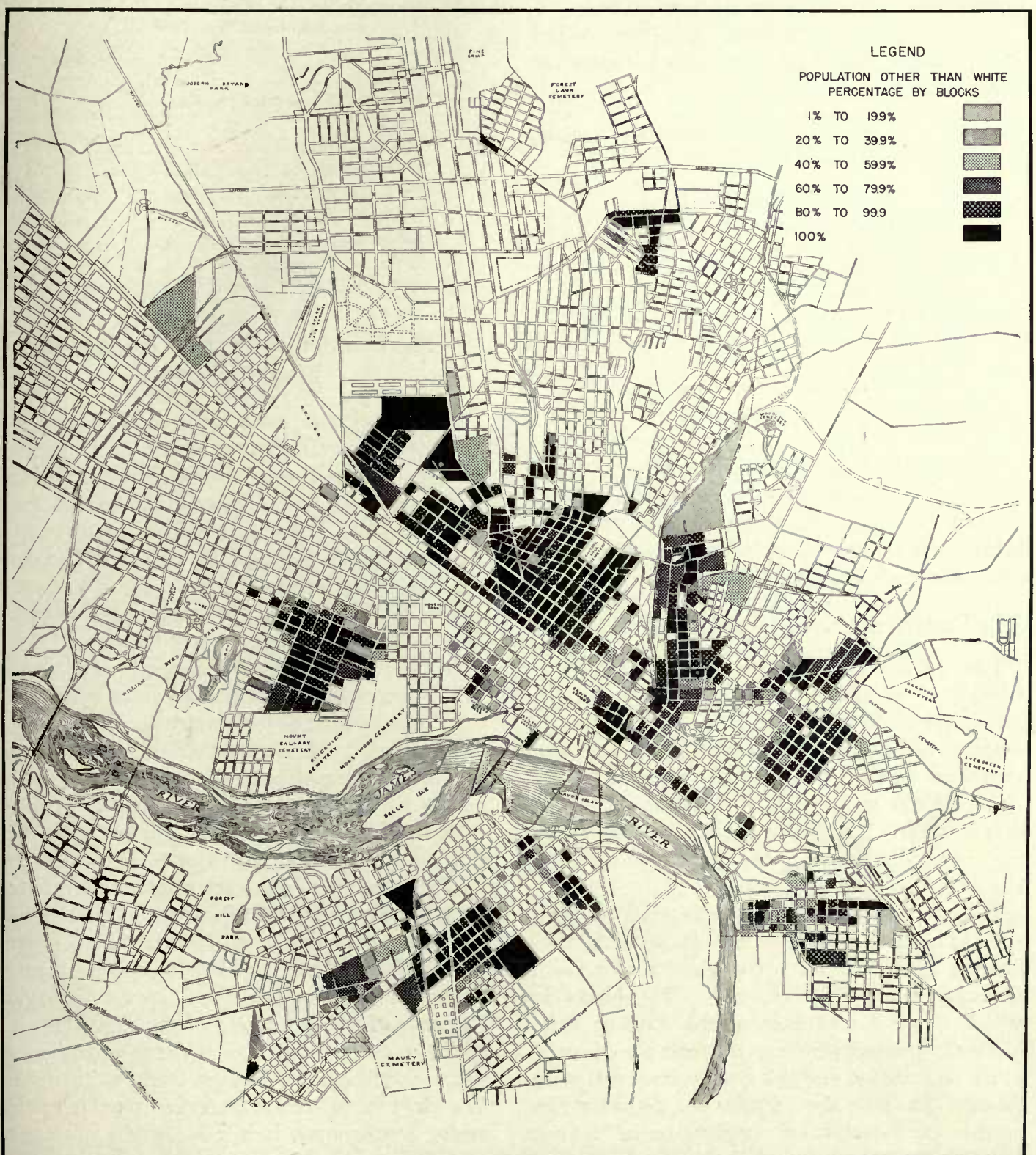
The factor of central heat, as a measure of the quality of housing, is of significance chiefly in northern cities. As one travels southward in the United States, central heating becomes less of a necessity and, in the southern tier of States, becomes a rarity. Richmond, for which the pattern is shown in figure 18, is not too far south to warrant the expense of central heating installations in structures of average quality.

The pattern of blocks in Richmond in which most of the structures lack central heat includes most of the blocks in which there are few private baths, but it extends beyond this area on all sides. In Richmond, Va., the dividing line between homes

FIGURE 17

PATTERN OF NON-WHITE POPULATION

RICHMOND, VIRGINIA 1934



SOURCE DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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possessing central heat and those lacking it in 1934 came at the point where dwelling units rented for $30 a month or more. Thus, of the dwelling units renting from $20 to $29.99 a month, only 8.2 percent lacked private baths but 62.3 percent had no central heat.

The percentage of dwelling units that lacked central heat in the several rental groups is shown in table VIII.

TABLE VIII.—*Proportion of Dwelling Units Lacking Central Heat in Each Rental Group*

Richmond, Va., 1934

In all blocks with average monthly rent of—	*The percentage of dwelling units lacking central heat was—*
Less than $10	97.6
$10 to $19.99	94.5
$20 to $29.99	62.3
$30 to $49.99	8.2
$50 or more	2.3
Entire city	60.9

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The pattern of blocks in which a majority of the dwelling units lack central heat thus serves to delineate the areas in which average rents are below a certain figure, but it fails to measure accurately the gradations above that level.

The Pattern of Overcrowded Dwelling Units

The eighth measure of the quality of housing taken into consideration in this monograph is the percentage of dwelling units in each block that are overcrowded.[5] Are overcrowded homes scattered at random throughout the residential sections of a city? Or do they tend to be concentrated in definite areas? The pattern of overcrowded dwelling units in Richmond at the time of the survey is shown in figure 19.

The map reveals that the same central, southern, and southeastern sections of the city in which other housing characteristics were poor also suffered from the greatest overcrowding. The blocks in which 40 percent or more of the dwelling units had more than one person to the room were located in the same valleys and low lands where rents were lowest. The map also portrays the declining proportion of overcrowded dwelling units as one travels from the center of the cluster of overcrowded blocks toward the blocks with higher rentals.

The relative proportion of dwelling units in the several different rental groups that were overcrowded is shown in table IX.

TABLE IX.—*Proportion of Overcrowded Dwelling Units in Each Rental Group*

Richmond, Va., 1934

In all blocks with average monthly rent of—	*The percentage of overcrowded dwelling units was—*
Less than $10	35.2
$10 to $19.99	27.1
$20 to $29.99	15.9
$30 to $49.99	5.7
$50 or more	2.9
Entire city	18.6

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The Location of Types of Residential Neighborhoods

Throughout this monograph, step by step, we have developed a technique for use in the analysis of the structure of residential neighborhoods in any American city. For purposes of illustration, maps of the city of Richmond, Va., have been used for the more refined steps in this chapter. The same technique may be applied, however, to 177 cities for which data by blocks have been made available in real property surveys.

In brief, according to the technique developed in this chapter, average block data are tabulated for eight or more selected factors significant of the quality of housing. A map is then prepared for each one of the selected factors. Each map shows the gradations, by five or six class intervals, block by block for the factor portrayed. The entire series of maps shows the patterns of residential neighborhoods and enables one to see the structure of residential areas on the basis of any single characteristic.

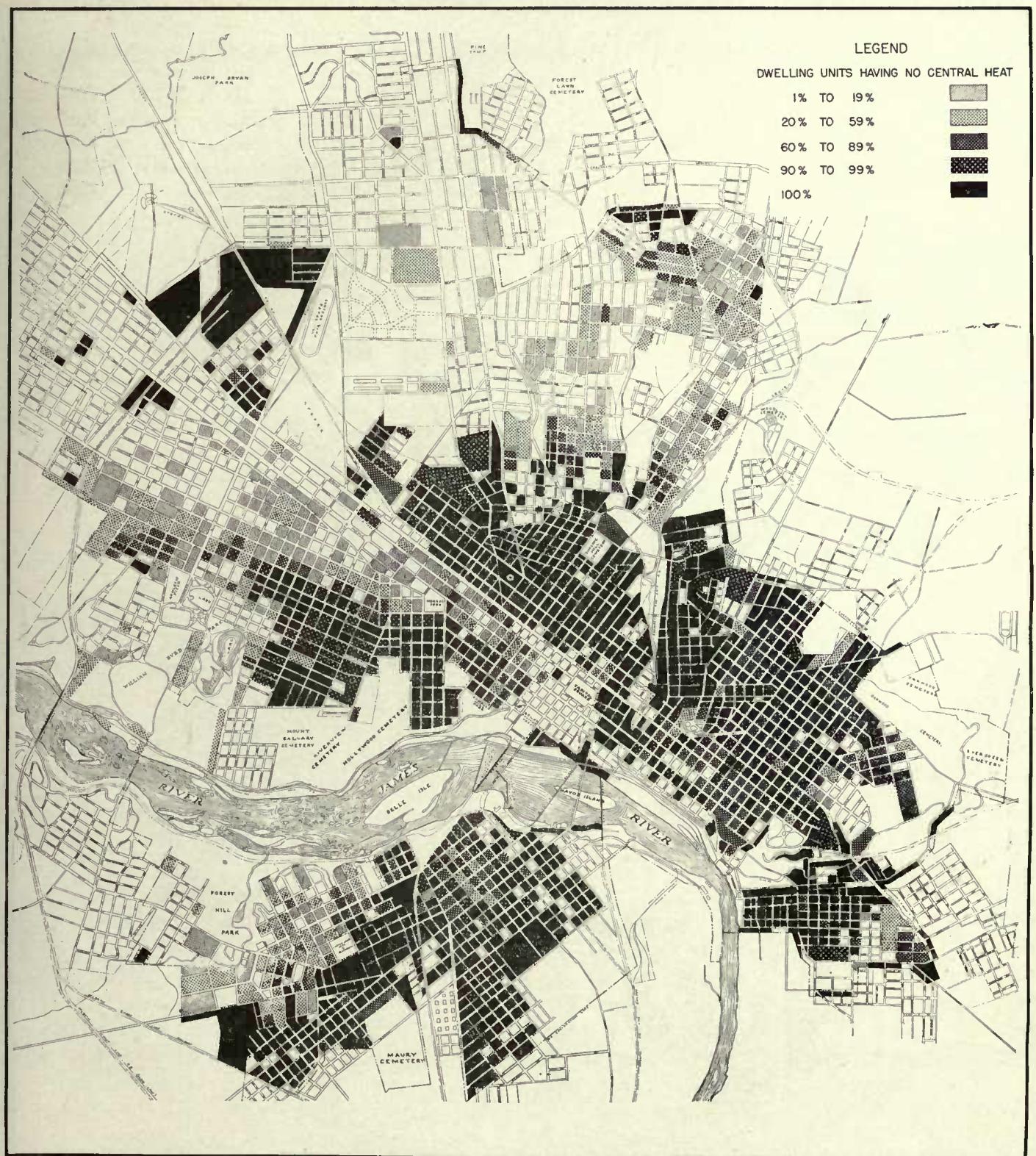
Such maps, presenting the gradations of different housing factors block by block, show that there is not an indiscriminate mixture of homes with varying characteristics in every part of the city. They do reveal a definite series of patterns according to which dwelling units that are similar with respect to a given factor tend to be concentrated in certain areas. Furthermore, it is found that a number of these characteristics are associated together and

[5] See appendix, pp. 125–128, for definition.

FIGURE 18

PATTERN OF DWELLING UNITS HAVING NO CENTRAL HEAT

RICHMOND, VIRGINIA 1934



SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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FIGURE 19

PATTERN OF OVERCROWDED DWELLING UNITS

RICHMOND, VIRGINIA 1934

SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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THE COINCIDENCE OF FACTORS INDICATIVE OF POOR HOUSING
RICHMOND, VIRGINIA
1934

FIGURE 20

FIGURE 21

FIGURE 22

FIGURE 23

FIGURE 24

SOURCE. U.S. DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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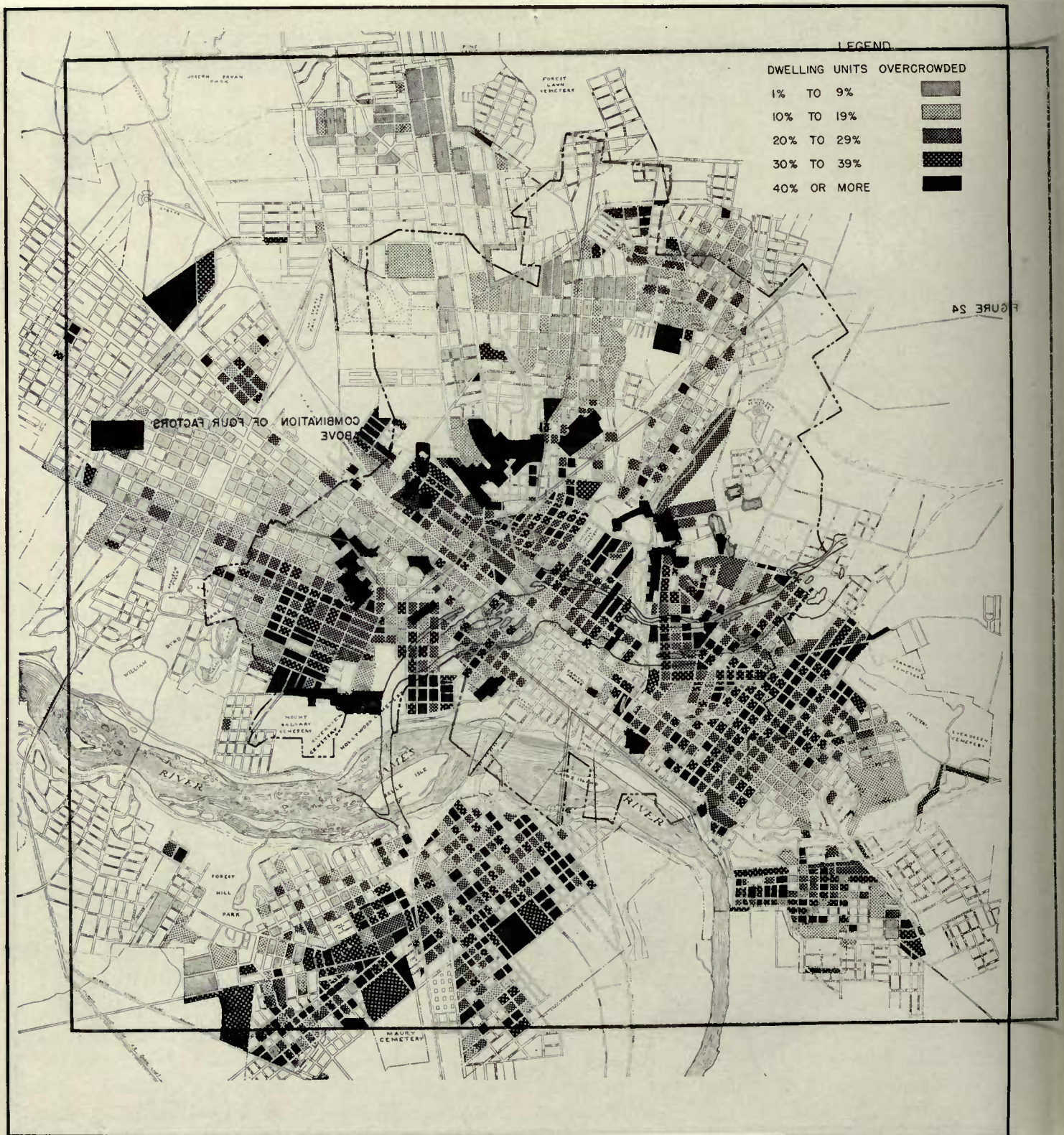
COMBINATION OF ALL 4 FACTORS | RACE | AGE | CONDITION | RENT

FIGURE 19

PATTERN OF OVERCROWDED DWELLING UNITS

RICHMOND, VIRGINIA 1934



SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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THE COINCIDENCE OF FACTORS INDICATIVE OF POOR HOUSING
RICHMOND, VIRGINIA
1934

FIGURE 20

FIGURE 21

FIGURE 22

FIGURE 23

SOURCE. U.S. DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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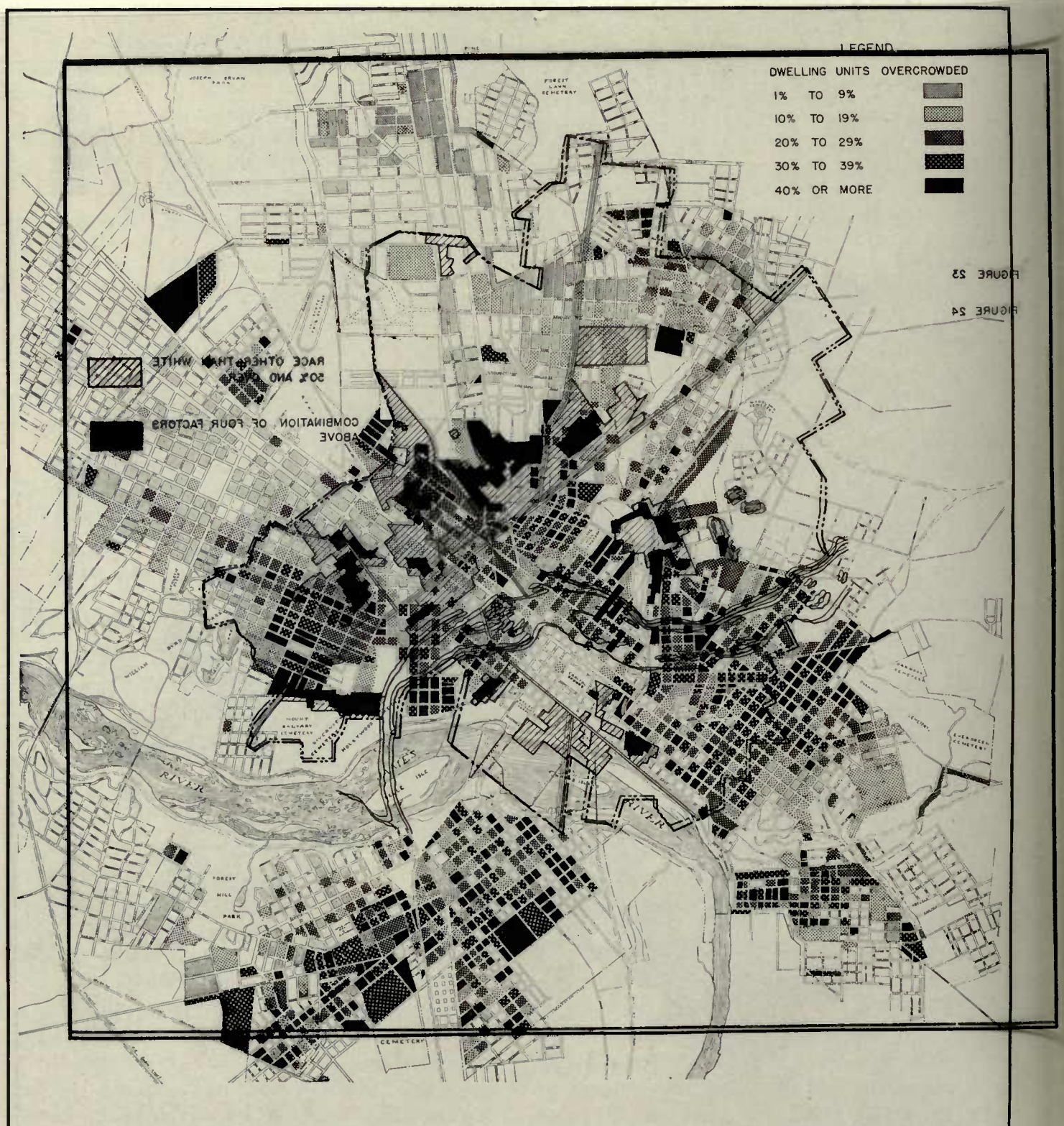
RACE AGE CONDITION RENT

FIGURE 19

PATTERN OF OVERCROWDED DWELLING UNITS

RICHMOND, VIRGINIA 1934



SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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THE COINCIDENCE OF FACTORS INDICATIVE OF POOR HOUSING
RICHMOND, VIRGINIA
1934

FIGURE 20

FIGURE 21

FIGURE 22

SOURCE: U.S. DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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AGE CONDITION RENT

FIGURE 19

PATTERN OF OVERCROWDED DWELLING UNITS

RICHMOND, VIRGINIA 1934

SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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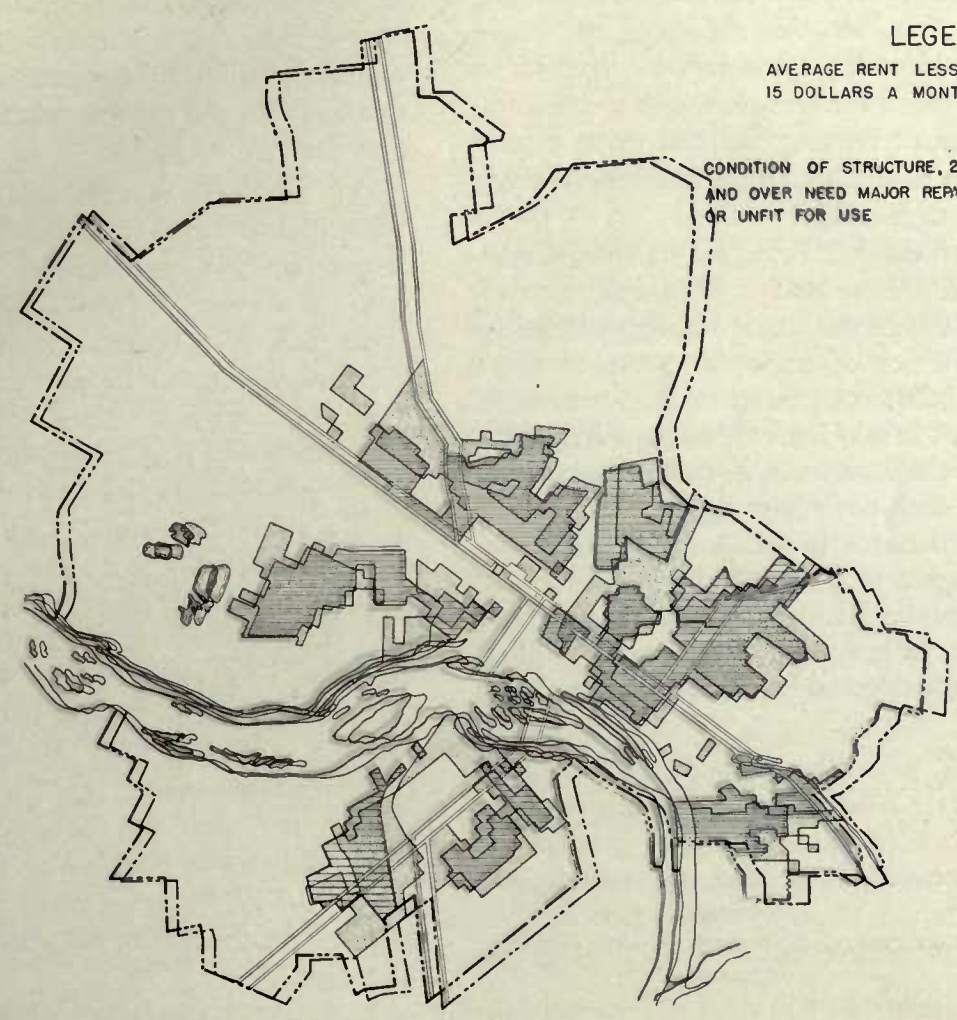
THE COINCIDENCE OF FACTORS INDICATIVE OF POOR HOUSING
RICHMOND, VIRGINIA
1934

FIGURE 20

FIGURE 21



SOURCE: U S. DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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CONDITION

RENT

FIGURE 19

PATTERN OF OVERCROWDED DWELLING UNITS

RICHMOND, VIRGINIA 1934

SOURCE: DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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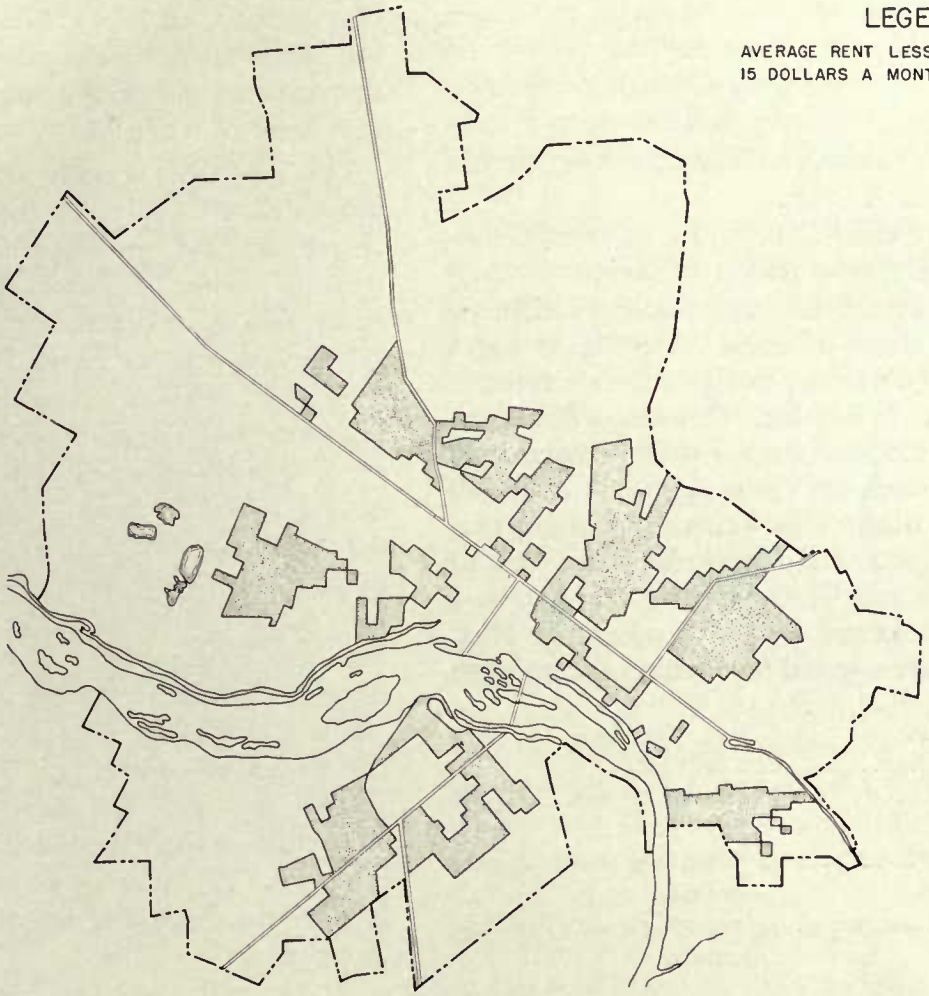
THE COINCIDENCE OF FACTORS INDICATIVE OF POOR HOUSING
RICHMOND, VIRGINIA
1934

FIGURE 20



SOURCE: U.S. DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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RENT

end to fall in the same general areas of the city. This brings us to the next step in our analysis of the structure of residential areas in American cities.

Inquiries into the structure of a city usually have the location of some specific area or areas as their main objective. In some instances it may be desired to locate the worst slum areas; in others the objective may be to locate the best residential neighborhoods. Between these two extremes, there are numerous possibilities of specific analysis according to the combination of the characteristics chosen as the guideposts to the residential pattern desired. In order to bring out at a glance the areas in which a concentration of the desired housing facilities exist, a technique has been devised for superimposing a series of patterns on each other.

Continuing to use Richmond for illustrative purposes, we shall assume that it is desired to ascertain the areas where the worst housing conditions prevail. The series of maps on previous pages showed several different gradations for a number of factors pertinent to housing. Choosing a few of the most pertinent characteristics, a series of *transparent* maps is made—each one portraying (for our present purpose) only the area in which the existing condition with respect to the particular factor mapped is most pronounced. Thus, it is necessary to choose arbitrary limits for the factors chosen. The block factors and limits selected for Richmond are shown below.

Block factors	*Factor limits*
Average monthly rent	Less than $15.
Age of structures	75 percent or more 35 years and over.
Condition of structures	25 percent or more in poor condition.
Other than white occupancy	50 percent or more nonwhite occupancy.

The blocks with these characteristics are solidly blocked in on transparent maps—as portrayed in figures 20, 21, 22, and 23, respectively. The resultant picture of the areas where the worst housing conditions are located is shown in figure 24—areas in which all four of the above factors, as can be seen through the transparencies, coincide in the same blocks. Figure 24 clearly shows that the areas possessing all four of the limited characteristics fall in the central, southern, and southeastern sections of Richmond. It is of interest to note that none of the blocks falling in the categories selected falls in the northern and northwestern districts—the high rent areas of Richmond.

This procedure is easily flexible—the area finally delineated will depend on the factors and the limits chosen by the investigator. In other cities, a different choice of factors might be advisable—other than white occupancy, for example, is a characteristic which may be used with justification only in southern cities as a measure of the poorest housing conditions. In northern cities, the worst slums are frequently occupied by whites, and some cities have a relatively small Negro population. Also, different limits may be desired by the investigator—in some cases both an upper and a lower limit for each factor will better fit the purpose of the study. Less than four, or more than four, factors may be desired—but an increasing number of transparencies will eventually make the ultimate pattern difficult to ascertain correctly. Thus, the choice of the pattern lies with the investigator, and types of residential neighborhoods may be clearly defined for each of the 177 cities for which block data are available by the method of coincidence of indices here discussed.

Chapter IV

An Alternative Technique in the Analysis of Residential Areas

THE technique thus far developed for use in the analysis of residential areas in American cities is, of course, applicable only in those cities in which real property surveys have been conducted. The data compiled in those surveys are invaluable to analysts of urban residential areas. In the 5 years, 1934–38, surveys of real property have been made in 203 cities, others are under way, and additional surveys are contemplated. To those desiring to analyze cities in which no surveys have been made, however, the technique of analysis suggested in preceding pages is of academic interest only. Until the real property in such cities has been properly surveyed, analysts desirous of making intensive studies therein will operate under definite handicaps.

But our purpose in this monograph is not to point out the obstacles to be overcome—analysts themselves are only too well aware of their existence. It is, rather, to facilitate analyses of urban areas wherever they will be useful. For use in those cities in which the desired data have not been compiled, therefore, this chapter will endeavor to outline a suitable alternative technique of analysis.

The running commentary accompanying the series of maps illustrative of the quality of housing in Richmond, Va., in the previous chapter is suggestive of a convenient analytic tool. It will be recalled that, as each characteristic of low quality housing in that city was examined, it was noted in passing that each factor indicative of adverse housing conditions tended to be concentrated in homes in low-rent blocks. The greatest proportion of structures 35 years old or more, of tenant occupancy, of dwellings in poor condition, of units lacking a private bath, of occupants of a race other than white, of units lacking central heat and of overcrowded dwelling units, were all shown to be in the blocks in which rents averaged less than $10 per month. As the average block rent increased, each of the factors enumerated became less prevalent. As an aid in comparison, the proportionate representation of each of the factors in each of the several rental groups has been brought together in table X.

TABLE X.—*Percentage Representation of Housing Factors in Each Rental Group*

Richmond, Va., 1934

Average block rental	Structures 35 years old or more	Units tenant-occupied	Structures in poor condition	Units without private bath	Nonwhite occupancy	Units without central heat	Units overcrowded
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Less than $10	60. 8	82. 6	50. 6	89. 6	72. 7	97. 6	35. 2
$10 to $19.99	55. 0	74. 7	28. 6	48. 4	45. 8	94. 5	27. 1
$20 to $29.99	26. 4	62. 5	8. 6	8. 2	6. 7	62. 3	15. 9
$30 to $49.99	7. 6	56. 7	2. 8	1. 0	. 2	8. 2	5. 7
$50 or more	8. 3	41. 3	1. 5	. 3	0	2. 3	2. 9
Entire city	36. 3	66. 3	19. 5	30. 3	26. 6	60. 9	18. 6

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

As can be seen, in this city the transition for each of the factors from the lower rent groups to the higher rent groups is not smooth. There is a decrease in the proportion of each of the factors present in all the structures and units in each rent classification, but the rate of decrease is very uneven. Thus, the proportion of dwellings in poor condition, of units without a private bath, and of occupants of a race other than white, drops off most abruptly in the blocks averaging $20 per month or more when compared with those renting for less than $20 monthly. The sharpest decrease in the proportion of units without central heat, and to lesser degree in the case of structures 35 years old or more, occurs in passing to those blocks with average monthly rents of $30 or more. The proportion of overcrowded units within each rental group decreases more evenly than any of the factors just cited; and the transition of the ratio of tenant-occupancy, when ascending the rental scale, is of even greater regularity.

The proportion of each of these factors present in the number of units or dwellings contained in any of the classifications of average block rents will, of course, vary from city to city. And the point in the rental scale where the decrease is greatest will also vary from one city to another. It will be noticed that in the case of Richmond, Va., the proportion of structures 35 years old or more is greater, rather than lesser, in the rent group containing blocks with average rents of $50 and over than in the next lower rent class. This is a peculiarity that may also be found in other old cities in which the older inhabitants of the wealthier groups continue to live in and perhaps modernize their family homes. Local peculiarities in any city may be of sufficient influence to cause similar apparent nonconformance with relation to the trend of data for any particular factor when related to rent.

Thus, there is evidence that one of the very factors used as indicative of low quality housing is itself a reflector of a number of other factors. Of the several block factors used in the suggested technique, only rent is an absolute figure. It is also an average. And it is the only characteristic used about which much information is available concerning the past, as well as the present. This latter attribute will be found highly useful in part II in the discussion of the growth of urban residential areas.

Since low rent seems to be a reflector of adverse housing characteristics, let us explore the significance of rent generally and examine its relationship to other factors of measurement more closely. We are not concerned with theorizing in regard to rent as an economic concept, nor do we wish to indulge in a discussion as to how rent should enter into the valuation of real property, nor do we care to discuss the factors in the business cycle influencing increases or decreases in rent. We are only concerned with reasons for the gradations of rent which exist at any one time among the different residential areas of a city.

Rent, in the sense we are considering it, is the price paid for the use of a structure for dwelling purposes. Rent is determined for each unit by innumerable considerations which have been weighed in the minds of both the owner and the tenant. And an existing contractual relationship between owner and tenant is *a priori* evidence that, at the time of agreement, the rent was acceptable to both parties. The owner, on the one hand, is attempting to get as high a rent as possible. The tenant, on the other hand, is attempting to pay as small a rent as possible. If the owner sets his rent too high in comparison with rents of other dwelling units of the same quality, he will have difficulty in finding a tenant willing to pay. If the tenant seeks a dwelling unit that is of higher quality than that which customarily prevails at the rent he is willing to pay, he will have difficulty in finding a suitable unit. In any city, there will be innumerable gradations of rent for the different types of dwelling units it contains.

But gradations of rent will be dependent, of course, upon the relative quality and attractiveness of the dwelling units in the surrounding area. Relative quality and attractiveness, in turn, are judged by innumerable measurable and immeasurable factors. The presence or absence of each of these factors enters into all individual judgments. The peculiar combination of such factors in any dwelling unit serves as a guide to the rent it commands. If these factors form a combination of low quality and attractiveness, the rent will be correspondingly low. Throughout the rental scale, we will find different combinations of quality and attractiveness. The rents will be graded accordingly.

The choice of any particular tenant will be limited, of course, to those units renting at or below the price he is willing and able to pay. The smaller the rent, the more limited the choice, and the lower the

quality and attractiveness of the dwelling units which may be considered. His final selection will represent a nice mental balancing of all those mensurable and immensurable factors which, in his individual judgment, are considered of paramount importance. Such items as the age and condition of structures, the presence of modern conveniences, the character and race of other people in the community, the proximity to adverse influences, the closeness to stores, schools, churches, and clubs, all enter into individual judgments and are some of the factors influencing gradations in rent.

The force of the impact of each of these characteristics, of course, varies. This was seen in the uneven transition from the lower rent groups to the higher rent groups, in table X, for each of the factors there used. The uneven variation in the force of impact upon rent is due to the nature of the characteristics themselves rather than to the peculiarity of the city used for purposes of illustration. If we examine the relative concentration of these forces in the blocks in each rental grouping, we will get a clearer picture of the force of the impact of those characteristics in blocks of different average rent. In order to examine them more closely, each factor will be discussed separately. We will continue to use Richmond, Va., for discussion purposes.

Age of structures.—The pattern of the age of structures in cities depends primarily upon the results of each of the several building cycles through which the city has passed. In some periods, some cities may have grown little or not at all. In other periods, they may have grown extremely rapidly. Only a few cities show regular waves of growth which occur with every building cycle. Many old structures, especially in the more static towns, are being put to the same use today as when they were first put up. Ordinarily, however, in a growing city new building takes place on the outskirts of the city, and the older structures are occupied by people in lower income brackets or put to entirely different use. Successive transferences of occupancy to individuals in lower income groups may shift dwellings from the highest to the lowest rental brackets in a city. As the change takes place, the rental for the unit usually decreases because of lessening attractiveness of both the unit and the neighborhood. It is not necessarily true that older houses command lower rentals; but, all other things being equal, an older house will rent for less than a new house even though the character of the neighborhood is maintained.

It may be expected, therefore, that the older houses in a city will be represented in every gradation of rent. Table XI shows, for each rental group, the proportion of blocks with different degrees of concentration of structures 35 years old or more in Richmond, Va., in 1934. Horizontally, the blocks in each rent group are classified by the degree of concentration of aged structures. Vertically, all blocks in the city containing dwelling units are separated into rental groups by the average block rent.

TABLE XI.—*Percent of Blocks With Different Degrees of Concentration of Structures 35 Years Old or More*

Richmond, Va., 1934

Average block rental	Number of blocks	Percent distribution			
		Blocks with *no* aged structures	Blocks with *some* aged structures	Blocks with *all* aged structures	Total blocks in rental group
		Percent	*Percent*	*Percent*	*Percent*
Less than $10..	246	17. 1	46. 7	36. 2	100. 0
$10 to $19.99...	712	23. 3	57. 7	19. 0	100. 0
$20 to $29.99...	429	59. 4	34. 8	5. 8	100. 0
$30 to $49.99...	459	79. 5	17. 4	3. 1	100. 0
$50 or more....	160	83. 1	14. 1	2. 8	100. 0
Entire city.....	2, 006	47. 9	38. 7	13. 4	100. 0

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The blocks with lowest rent at the time of the survey had relatively few blocks entirely free of buildings 35 years old or more. Conversely, very few blocks in the highest rent group were entirely covered with aged structures. Note that the proportion of blocks only partially covered also tended to decrease in similar fashion as the rental scale increased. There was not a definite segregation of every single one of the aged structures into the low rental groups, nor were the older buildings entirely absent in blocks with high average rents. There is, however, an indication of definite gradations of rent. High concentration of aged structures existed in blocks with low average rent, and concentration decreased gradually and was lowest in blocks with high average rent. Thus, we may say that the age of the structure is one of the factors reflected in rent through all gradations.

Tenant occupancy.—There is no apparent reason why tenant occupancy should affect rent directly. Other considerations, such as cost of dwellings, degree of mobility of the working population, and whether structures are single- or multiple-family buildings, in turn determine the extent of tenant occupancy. Obviously, in areas covered by apartment buildings, there will be few owners—although in some instances apartments may be sold, like houses. As far as single-family dwellings are concerned, cost and mobility play an important part in the extent of tenant occupancy. For instance, persons in the lower rental groups cannot afford to purchase new homes with all modern conveniences in the best neighborhoods; so that, ordinarily, lower rental groups have a higher proportion of tenant occupants. As we ascend the rental scale, we will find, however, that the proportion of tenant occupants becomes less but does not reduce to zero. In every class, there are persons who for one reason or another desire to remain tenants. Tenant occupancy will naturally be less in the higher rental brackets—the relatively increasing immobility of occupations of the occupants induces them to buy rather than rent homes.

TABLE XII.—*Percent of Blocks With Different Degrees of Concentration of Tenant-Occupied Dwelling Units*

Richmond, Va., 1934

Average block rental	Number of blocks	Percent distribution			
		Blocks with *no* tenant occupancy	Blocks with *some* tenant occupancy	Blocks with *all* tenant occupancy	Total blocks in rental group
		Percent	*Percent*	*Percent*	*Percent*
Less than $10..	246	2.9	70.7	26.4	100.0
$10 to $19.99...	712	2.5	86.2	11.3	100.0
$20 to $29.99...	429	4.0	89.5	6.5	100.0
$30 to $49.99...	459	9.8	86.7	3.5	100.0
$50 or more....	160	27.5	69.4	3.1	100.0
Entire city.....	2,006	6.5	83.8	9.7	100.0

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The proportion of blocks with different degrees of concentration of tenant occupancy in Richmond, Va., in 1934 is shown in table XII for each of the several rental groups. The proportion of blocks entirely occupied by tenants is largest in the lowest rental group. The highest rental group contains, proportionately, the greatest number of blocks with no tenants at all. Most blocks in every group are of mixed nature.

As may be seen from the table, at the time of the survey there were relatively few blocks in the middle rental groups with either no tenant occupany or completely tenant occupied. If we break down the proportionate representation shown in the column labeled "Blocks with *some* tenant occupancy," we find that 33.0 percent of the blocks in the $10 to $19.99 rental group had a tenant occupancy of between 60 and 79.9 percent. In the rental group $30 to $49.99, 27.8 percent of the blocks showed only 20 to 39.9 percent concentration of tenant occupancy. In both groups, tenant concentration was lower in any other 20 percent interval on either side of the class interval quoted. In other words, as we ascend the rental scale, the blocks tend to show a lower concentration of tenant occupancy. Thus tenant occupany shows, as is also indicated by table X, a definite tendency to decrease as rent increases. As already indicated, however, it is not a direct reflector of housing conditions but of economic forces influencing the occupants and of the intensity of land use. As such, it does have a relationship to gradations of rent.

Condition of dwellings.—All of the dwellings in a city were new at one period or another but, as time passes, every dwelling inevitably requires repairs. If dwellings are relatively new, necessary repairs are apt to be slight, and the owners lose little time in attending to them. As buildings grow older, repairs are apt to become more frequent and expensive—both individually and collectively. If an aged dwelling is occupied by persons in good circumstances, such repairs will receive proper attention whether of major or minor character. If the area in which the dwelling is located has deteriorated, major repairs will tend to be postponed. This will be especially true if other surrounding buildings are in a similar state. Whole areas will be found in some cities which are so badly in need of major repairs that they have been condemned by the authorities as unfit for human habitation.

Table XIII shows the proportion of blocks in Richmond, Va., in 1934 with none, some, or all of the dwellings in the block in need of major repairs or unfit for use. The blocks in the city are segregated in groups according to the average block rental.

TABLE XIII.—*Percent of Blocks With Different Degrees of Concentration of Structures in Poor Condition*

Richmond, Va., 1934

Average block rental	Number of blocks	Percent distribution			
		Blocks with *no* structures in poor condition	Blocks with *some* structures in poor condition	Blocks with *all* structures in poor condition	Total blocks in rental group
		Percent	*Percent*	*Percent*	*Percent*
Less than $10...	246	23.6	58.9	17.5	100.0
$10 to $19.99...	712	30.6	64.8	4.6	100.0
$20 to $29.99...	429	69.9	29.6	.5	100.0
$30 to $49.99...	459	82.5	17.3	.2	100.0
$50 or more....	160	85.6	12.5	1.9	100.0
Entire city.....	2,006	54.4	41.5	4.1	100.0

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The table clearly shows that at the time of the survey only in the lowest rental group was there a large percentage of blocks entirely covered with structures in poor condition. The highest rental group had the largest proportion of blocks with no buildings in need of major repairs or unfit for use. It also reveals that a large proportion of blocks in the lowest rental groups had some structures in poor condition but that in blocks with an average rent of $20 or more, the great majority of blocks had no buildings in poor condition. Table X corroborates the fact that houses in poor condition do not show a smooth transition from low rental groups to high rental groups. Houses in poor condition are a dominating characteristic of the low rent groups and are present in much smaller proportions in blocks with average rents of $20 or more. Thus the condition of houses may be said to be a definite factor in the gradations of rent, but it is a factor of greatest importance in the lower rent categories.

Units lacking private bath.—At the present time, few houses are built in urban communities without a private bath; in these areas even the cheaper types of residential structures usually include this accommodation. Plumbing manufacture and habits of personal cleanliness have made great strides in the past decades. Decades ago there were few houses built with bathrooms. As demand increased and costs decreased, installations were more common in new construction of the time, and structures already erected were frequently modernized to keep pace with public demand. In most cases, however, modernization was undoubtedly a function of expense. If the owner could afford the accommodation, or the landlord felt that installation of private baths would yield monetary returns, modernization took place. If, on the other hand, owners were unable to afford the innovation, or rents yielded a sufficient return to landlords without the extra expense, modernization was postponed. The lack of a private bath, then, may be said to be indicative of obsolescence.

The table below shows, for Richmond, Va., the proportion of blocks with none, some, or all of the dwelling units in the block lacking a private bath in 1934. The blocks in the city are segregated in groups according to the average block rental.

TABLE XIV.—*Percent of Blocks With Different Degrees of Concentration of Dwelling Units Lacking Private Bath*

Richmond, Va., 1934

Average block rental	Number of blocks	Percent distribution			
		Blocks with *no* units lacking private bath	Blocks with *some* units lacking private bath	Blocks with *all* units lacking private bath	Total blocks in rental group
		Percent	*Percent*	*Percent*	*Percent*
Less than $10..	246	2.4	48.4	49.2	100.0
$10 to $19.99...	712	15.7	73.2	11.1	100.0
$20 to $29.99...	429	66.0	33.5	.5	100.0
$30 to $49.99...	459	90.4	9.6	0	100.0
$50 or more....	160	96.9	3.1	0	100.0
Entire city.....	2,006	48.4	41.5	10.1	100.0

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

Nearly all of the blocks in the lowest rent group were without private baths either entirely or to some degree. The next highest rent group was but little better off, although there were relatively few blocks in this group completely lacking private baths. Blocks with average rent of $20 or more included almost no blocks which completely lacked this modern convenience and only a small percentage of blocks with some units lacking a private bath. Clearly, dwelling units without private bath were preponderant in blocks with an average rent of less than $20 per month. Thus, in the gradations of rents, it is a factor of greatest importance in the lowest rental groups and has a significance quite

small in the blocks where higher average rents prevail.

Nonwhite occupancy.—This factor was useful in the illustration of our technique in the preceding chapter. Its very nature, however, precludes its use in the analysis of some cities. In northern cities, nonwhite occupancy is sometimes so small as to be almost negligible, and in others it is almost nonexistent. Also it is not necessarily indicative of low quality housing. There are many slum areas tenanted by whites which are in as poor or worse condition than areas tenanted by nonwhites. The same cities may also contain areas occupied by colored races where acceptable housing conditions prevail. In areas entirely occupied by nonwhite races, the same influences should be reflected in rent as in areas entirely occupied by whites. In wholly white areas, the gradual filtration of other than white races tends slowly to change the character of neighborhoods. The presence of even one nonwhite person in a block otherwise populated by whites may initiate a period of transition.

The proportionate concentration of nonwhite persons in each block is therefore significant in any study of rent gradations. This is shown in table XV, for Richmond, Va. As in preceding tables, the blocks have been grouped according to average block rent.

TABLE XV.—*Percent of Blocks With Different Degrees of Concentration of Nonwhite Occupants*

Richmond, Va., 1934

Average block rental	Number of blocks	Percent distribution			
		Blocks with *no* nonwhite occupants	Blocks with *some* nonwhite occupants	Blocks with *all* nonwhite occupants	Total blocks in rental group
		Percent	*Percent*	*Percent*	*Percent*
Less than $10...	246	25.6	29.3	45.1	100.0
$10 to $19.99...	712	52.8	27.5	19.7	100.0
$20 to $29.99...	429	93.7	3.8	2.5	100.0
$30 to $49.99...	459	98.9	.9	.2	100.0
$50 or more....	160	100.0	0	0	100.0
Entire city.....	2,006	72.6	14.3	13.1	100.0

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

The nonwhite population of this city at the time of the survey was almost entirely in blocks in which rent averaged less than $20 per month. Almost half the blocks in the lowest rental category were fully occupied by nonwhites. In blocks with average rents of $20 or more per month, the proportion of blocks either fully or partially occupied by nonwhites was relatively small. In the highest rental grouping, all occupants were white. There is thus a distinct tendency for blocks occupied by nonwhites to fall into lower rental groups. This is principally reflective of the economic conditions of the nonwhite population. In relation to gradations of rent, therefore, nonwhite occupancy is of significance. But the presence of nonwhite persons influences rent directly only in those blocks partially occupied by nonwhite persons. In some cities, rents in wholly white blocks adjacent to wholly or partially nonwhite blocks may also be affected.

Units lacking central heat.—As has been indicated previously, units lacking central heat are a commonplace in the southern tier of States where heating equipment is more a luxury than a necessity. In some locations, it may even be an unwarranted expense. For that reason, the geographic location of the city must be considered when this factor is used in measurement. Like plumbing equipment, however, central heating systems have been vastly improved during the past several decades. In the past, many homes of wealth were heated by methods which would be tolerated by very few people today. Like plumbing equipment, installations of central heating plants were an item of expense, and many buildings were constructed in the nineteenth century without any form of central heat.

The proportion, in Richmond, Va., of blocks in which none, some, or all of the dwelling units in the block lacked central heating equipment in 1934 is shown in table XVI. Rental groupings include only those blocks with the indicated average block rent.

The table shows that, at the time of the survey, a relatively large proportion of blocks in which all units lacked central heat were in the rent groups below $20 per month. Conversely, it also reveals that a large proportion of blocks in which no units lacked central heat were in the rent groups containing blocks with average rents of $30 per month or more. Break-downs of "Blocks with *some* units lacking central heat" show that in the two lower rental groups most blocks under this heading contained a preponderant concentration of units without central heat. The middle rent group in this

column has blocks more evenly spread from thin to high concentration of this factor. Blocks of the two upper rent groups in this column have most blocks with only small concentrations of units without central heat. Thus, in the gradations of rents, we may say that central heat is of most significance in the lower rental groups and is of small import in the higher average block rents. Geographical relationship, too, must be considered.

TABLE XVI.—*Percent of Blocks With Different Degrees of Concentration of Dwelling Units Lacking Central Heat*

Richmond, Va., 1934

Average block rental	Number of blocks	Percent distribution			
		Blocks with *no* units lacking central heat	Blocks with *some* units lacking central heat	Blocks with *all* units lacking central heat	Total blocks in rental group
		Percent	*Percent*	*Percent*	*Percent*
Less than $10...	246	0	9.7	90.3	100.0
$10 to $19.99...	712	.7	36.6	62.7	100.0
$20 to $29.99...	429	10.3	62.7	27.0	100.0
$30 to $49.99...	459	55.3	43.0	1.7	100.0
$50 or more....	160	84.4	13.1	2.5	100.0
Entire city.....	2,006	4.2	56.1	39.7	100.0

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

Overcrowded[1] *dwelling units.*—Overcrowding is an important consideration in the determination of the character of neighborhoods. Indirectly, it reflects the number of rooms per dwelling unit and the birth rates of different income groups of population. Insofar as it reflects the economic circumstances of any particular family, however, it is reflected in rent. In the choice of dwelling units open to a large family, a selection may be made so that a sufficient number of rooms is obtained, but other conditions more directly indicative of low quality housing would then be likely to be present. If, however, a choice is made of a small number of rooms so that other undesirable conditions are eliminated, overcrowding is likely to be present. Families of low income must choose the lesser of a multiplicity of undesirable conditions. The higher income groups seldom are cramped for space because of the fewer undesirable items they must eliminate in their choice of a home.

[1] See appendix for definition.

Table XVII shows the proportion in Richmond, Va., of blocks in which some, none, or all of the dwelling units in the block were overcrowded in 1934. Rental groupings include only those blocks with the indicated average rent.

TABLE XVII.—*Percent of Blocks With Different Degrees of Concentration of Overcrowded Dwelling Units*

Richmond, Va., 1934

Average block rental	Number of blocks	Percent distribution			
		Blocks with *no* overcrowded dwelling units	Blocks with *some* overcrowded dwelling units	Blocks with *all* overcrowded dwelling units	Total blocks in rental group
		Percent	*Percent*	*Percent*	*Percent*
Less than $10...	246	11.4	86.2	2.4	100.0
$10 to $19.99...	712	8.7	89.6	1.7	100.0
$20 to $29.99...	429	25.6	74.2	.2	100.0
$30 to $49.99...	459	43.6	56.0	.4	100.0
$50 or more....	160	73.7	25.7	.6	100.0
Entire city.....	2,006	25.8	73.1	1.1	100.0

Source: U. S. Department of Commerce, *Richmond Real Property Inventory, 1934.*

As may be seen from the table, very few blocks in even the lower rental groups were entirely overcrowded at the time of the survey. And there was a greater proportion of entirely overcrowded blocks in the highest rental groups than the two next lower groups. There is not a smooth transition in the column showing the proportion of blocks with no overcrowded dwelling units. In blocks with some overcrowding, however, a break-down of the figures reveals that the two lowest rent groups had larger concentrations of overcrowding than the higher rent groups. This is clearly indicated by intercomparing this table with table X which gives the percentage of units overcrowded in each rental group. Thus, in its relationship with rent gradations, overcrowding does have definite significance but is important only as a reflector of factors previously mentioned.

Having examined the relative concentration of each of the above factors within blocks in different rental categories, we now have a clearer view of how those forces interact and are reflected in average block rent. It has been noted that the relative concentration of any one of the factors discussed is of varying significance in reflecting gradations of block

rent. We may assert with confidence, however, that the presence of a number of the ponderable factors discussed is almost necessarily indicative of low rent. The greater the number of those factors present, the lower the attractiveness to the tenant, and the less he will be willing to pay as rent. Some of them are indicative of the quality of the structure itself, others are indicative of the neighborhood.

Any one factor, however, may be present in an isolated case and still permit a relatively high rent. An individual structure may be 35 years old or more and have none of the other characteristics enumerated above. The house may be tenant occupied and still be a new, modern, up-to-date tenant dwelling with no overcrowding. Major structural repairs may be necessary—and all other factors indicative of low-quality housing may be completely lacking—and so on down the entire list. A single factor may exist or some combination of those factors—and when single or few factors do exist, their presence does not necessarily throw that particular case into any particular rent grouping. As the tables in this chapter have shown, all of the factors are present to varying degree in all gradations of rent. Low rent does indicate that some combination of factors indicative of poor-quality housing are present. The combination may be different in different sections or blocks; they may even be different in adjoining buildings commanding the same rent. But in a given city, at a given time, different gradations of rent are a reflection of all the ponderable and imponderable factors considered by tenants in selecting a place of habitation.

In summary: extremely low rent is usually accompanied by a combination of adverse housing conditions, but the rise in rent from the middle to the upper ranges is not followed by any commensurable improvement in factors that measure the presence or absence of basic modern conveniences. Gradations of rent in the upper ranges measure, in increasing degree, those forces not recorded in real property surveys such as topography, style of architecture, accessibility to schools and shopping centers, the incomes of the residents, the proximity to adverse influences, restrictive covenants, and other features. Thus, having earlier shown the significance of average block rent as a measure of the rents of dwelling units in a block, we may now proceed to use the working hypothesis—*that average block rent is representative of a series of other housing factors.*

Accordingly, rent is the basic tool which may be used in the alternative technique in the analysis of those urban areas where broad basic data are not readily available. In such cases, the average rent of dwelling units in a block can be quickly ascertained on a sample basis. Sometimes adequate sampling is obtainable from records of rental units handled through real-estate agents. In such a case no door-to-door survey may be necessary, thus reducing the probable cost and time required to obtain the desired data. On the basis of records and estimates of rents based on the informed opinion of real estate agents, high, low, and intermediate rental areas may be defined for city areas that include a number of blocks. If the lines of transition between different types of areas are carefully noted, this short-cut method may produce fairly accurate results. It is thus possible to make a quick analysis of the structure of cities in which no surveys of real property have been taken and to compare the extent and location of the various rental areas in a short time.

Of course, this alternative method is no substitute for the intensive technique outlined in the last chapter. As was there pointed out, that method permits of great flexibility. Not only may the best or the worst areas in the city be clearly delineated within the urban mass; a judicious selection of the required factors for measurement, tempered by the use of appropriate class intervals for each factor used in measurement, will permit the delineation of numerous types of residential neighborhoods. A set of factors appropriate for the determination of areas in which to encourage mortgage lending may be entirely unsuited for the outlining of areas within which a problem in child psychology is to be studied. The segregation of areas within which to promote slum eradication activities will require the selection of different items and limitations than the location of areas of modern and well-kept homes. The selection of the proper factors, and, of equal importance, the limits to be imposed upon the factors chosen, is thus left completely to the analyst. His judgment in selection will, of course, be guided by the requirements of the problem and the scope of the data available. The data chosen for illustration in chapter III were illustrative of the most significant factors indicative

of housing quality in Richmond, Va. They were limited by appropriate class intervals for proper delineation of areas of worst housing conditions. As explained above, different factors and different limitations will need to be chosen for the solution of other problems—the judgment of the analyst is of great importance in the correct application of the tool here suggested. The technique is clearly applicable to a wide variety of uses where the data are available.

In those cases in which data are not available, the analyst may resort to the alternative technique of sampling rents as outlined above. As we have shown in this chapter, gradations of rent in some degree measure variations in housing quality. The use of this alternative technique, however, is limited to those cases were rent alone is a sufficient factor of guidance in the solution of the problem. It cannot be emphasized too strongly that it is of no significance in indicating the certain presence of any of the weighable factors contributing to the quality of housing.

Chapter V

The Composition of Urban American Dwellings and Their Inhabitants

WE have now shown two methods whereby residential neighborhoods in American cities may be analyzed by those interested in city structure. The first method is intensive. At the same time it is sufficiently flexible to prove of varied use in the delineation of types of residential areas. The second method is a short cut. It has been outlined for use by those desiring only a rough analysis, or for use in those cities for which the necessary basic data have not been compiled.

The significance of rent as a representative of a series of other housing factors was discussed at length in the previous chapter. It was noted that the more measurable adverse qualities of housing were of greater weight in the lower rental groups but that individual adverse characteristics were of less significance as rent increased. In the higher rental groups, the more imponderable forces were the more significant determinants of gradations of rent. Since it is the purpose of this section of this monograph ultimately to arrive at principles concerning the location of high, low, and intermediate rental areas in American cities, it is apropos at this point to dwell at some length upon the composition of urban American dwellings and their inhabitants.

Although a conglomerate mass of statistical data usually has little significance unless separated into properly coordinated component segments, a detailed description of each of a large number of American cities is beyond the scope of this volume. We do not wish to present an encyclopedia of factual data but do desire to give some indication of the characteristics of urban American dwellings and their inhabitants. Individual cities, of course, all have characteristics peculiar to themselves. Composite data giving the proportionate representation of characteristics common to a large number of cities, however, will afford an airplane view of the composition of American cities. We will have recourse to the summary of the voluminous data recorded for the first 64 cities in which real property surveys [1] were conducted in 1934. Since the largest city in this group is Cleveland, peculiarities attributable to large metropolitan centers like New York and Chicago will be avoided.

The cities surveyed contained 1,945,272 structures with 2,633,135 dwelling units in 100,770 blocks. Since, in previous pages, we have seen that the age and condition of the structures in any residential area is an important factor in the determination of rent, it is significant to note that, in these 64 cities in 1934, only 25.9 percent of the structures were less than 10 years old and 51.6 percent were less than 20 years old. The structures 30 years old or more constituted 30.2 percent of all the dwellings surveyed. In the array of age groupings, the number of buildings in each next older grouping was progressively smaller. It is interesting to note, however, that 7.9 percent of the structures in existence in these 64 cities in 1934 were 50 years old or more. Their condition was generally good, but 44.4 percent of all the buildings were reported as needing minor repairs. Those in need of major repairs constituted only 15.7 percent and those unfit for use, only 2.3 percent.

Only 19.6 percent of the 2,663,135 dwelling units on which reports were obtained in the 64 cities contained less than 4 rooms. Conditions of overcrowded dwellings were probably most prevalent in this category. Of the 519,227 dwelling units with less than 4 rooms, 59,738, or 11.5 percent,

[1] The appendix, pp. 124–128, gives the history of these and subsequent real property surveys, definitions of data gathered, and the use made of such data by maps or otherwise.

were vacant; on the other hand, of the 977,938 dwelling units with 6 or more rooms, only 51,280, or 5.2 percent, were vacant. As to overcrowding, 82.9 percent of all occupied dwellings were inhabited by families numbering 1 person per room or less. Only 15.6 percent of all occupied dwelling units contained between 1 and 2 persons per room. More than 2 persons per room was very rare—only 1.5 percent of the dwelling units had this condition of overcrowding.

Certain items for which data were obtained in the 64 cities were indicative of the extent of the use of modern conveniences. Thus, we have statistical data relevant to the presence or absence of running water, private indoor flush toilets, and bathing, heating, lighting, cooking, and refrigeration equipment. Only 8.0 percent of the dwelling units contained no running water, but 25.0 percent contained only cold running water. There were 17.1 percent which either shared or had no indoor flush toilet; but 6.2 percent of the dwelling units had 2 private toilets or more. There were 23.3 percent of the dwelling units which either shared or had no bathing equipment; only 3.0 percent had 2 or more baths.

Central heating equipment was contained in 50.5 percent of the homes. Heating stoves were in use in 42.5 percent of the dwelling units and other types of heating equipment by 6.7 percent; only 0.3 percent of the dwelling units contained no heating equipment at all. Of the homes which had heating equipment, over two-thirds, 67.7 percent, used coal and 11.9 percent still used wood. Only 11.7 percent of the dwelling units with heating equipment used gas for heating purposes and still fewer, 6.7 percent, used oil for heating.

TABLE XVIII.—*Characteristics of the Residential Areas* [1] *in 64 American Cities in 1934*

A. Intensity of Land Use

	Number	Percent
TYPE OF STRUCTURE (STRUCTURES)		
Single-family	1,536,806	79.0
2-family	250,670	12.9
3-family	26,434	1.4
4-family	21,669	1.1
Row house	7,051	.4
Apartment building	22,053	1.1
Other structures	80,589	4.1
Total reports	1,945,272	100.0
NUMBER OF STORIES		
1 story	938,670	48.2
2 stories	910,556	46.9
3 stories	88,766	4.6
4 stories or more	4,981	.3
Total reports	1,942,973	100.0
NUMBER OF DWELLING UNITS		
In single-family structures	1,536,806	58.3
In 2-family structures	501,340	19.0
In 3-family structures	79,302	3.0
In 4-family structures	86,676	3.3
In row houses	38,380	1.5
In apartment buildings	246,946	9.4
In other structures	143,685	5.5
Total reports	2,633,135	100.0

[1] Except where noted, includes all owner-occupied, tenant-occupied, and vacant dwelling units in all structures used for residential purposes in the 64 cities.

TABLE XVIII.—*Characteristics of the Residential Areas in 64 American Cities in 1934—Continued*

A. Intensity of Land Use—Continued

	Number	Percent
TYPE OF STRUCTURE (STRUCTURES)—continued		
4-family	21,669	1.1
Row house	7,051	.4
Apartment building	22,053	1.1
Other structures	80,589	4.1
Total reports	1,945,272	100.0
NUMBER OF STORIES		
1 story	938,670	48.2
2 stories	910,556	46.9
3 stories	88,766	4.6
4 stories or more	4,981	.3
Total reports	1,942,973	100.0
NUMBER OF DWELLING UNITS		
In single-family structures	1,536,806	58.3
In 2-family structures	501,340	19.0
In 3-family structures	79,302	3.0
In 4-family structures	86,676	3.3
In row houses	38,380	1.5
In apartment buildings	246,946	9.4
In other structures	143,685	5.5
Total reports	2,633,135	100.0

B. Age and Condition of Structures

AGE OF STRUCTURES		
Less than 5 years	131,488	6.8
5 to 10 years	370,992	19.1
10 to 15 years	264,228	13.6
15 to 20 years	234,771	12.1
20 to 25 years	203,641	10.5
25 to 30 years	148,892	7.7
30 to 35 years	189,536	9.8
35 to 40 years	81,577	4.2
40 to 50 years	161,446	8.3
50 to 75 years	124,615	6.4
75 years or more	29,216	1.5
Total reports	1,940,402	100.0
CONDITION OF STRUCTURES		
Good condition	730,525	37.6
Needs minor repairs	863,855	44.4
Needs major repairs	304,351	15.7
Unfit for use	44,341	2.3
Total reports	1,943,072	100.0

TABLE XVIII.—*Characteristics of the Residential Areas in 64 American Cities in 1934—Continued*

C. Intensity of Use of Dwelling Units

	Number	Percent
NUMBER OF ROOMS (all units)		
1 room	45, 857	1. 7
2 rooms	159, 181	6. 0
3 rooms	314, 189	11. 9
4 rooms	458, 096	17. 4
5 rooms	677, 874	25. 8
6 rooms	520, 502	19. 8
7 rooms or more	457, 436	17. 4
Total reports	2, 633, 135	100. 0

	Number	Percent	Percent vacant
VACANCIES (vacant units)			
1 room	6, 483	3. 2	14. 1
2 rooms	19, 100	9. 4	12. 0
3 rooms	34, 155	16. 7	10. 9
4 rooms	45, 187	22. 1	9. 9
5 rooms	48, 023	23. 5	7. 1
6 rooms	28, 800	14. 1	5. 5
7 rooms or more	22, 480	11. 0	4. 9
Total reports	204, 228	100. 0	7. 8

	Number	Percent
PERSONS PER ROOM IN OCCUPIED UNITS		
Units with 0.50 or less person	703, 636	29. 0
Units with 0.51–0.75 person	655, 017	27. 0
Units with 0.76–1 person	651, 930	26. 9
Units with 1.01–2 persons	379, 432	15. 6
Units with 2.01–3 persons	29, 284	1. 2
Units with 3.01 persons or more	6, 120	. 3
Total reports	2, 425, 419	100. 0

D. Appurtenances of Dwelling Units

	Number	Percent
RUNNING WATER		
Hot and cold	1, 762, 546	67. 0
Cold only	657, 921	25. 0
No running water	209, 884	8. 0
Total reports	2, 630, 351	100. 0
PRIVATE INDOOR FLUSH TOILET		
2 toilets or more	162, 454	6. 2
1 toilet	2, 015, 887	76. 7
Shared or no toilet	449, 627	17. 1
Total reports	2, 627, 968	100. 0

TABLE XVIII.—*Characteristics of the Residential Areas in 64 American Cities in 1934—Continued*

D. Appurtenances of Dwelling Units—Continued

	Number	Percent
BATHING EQUIPMENT		
2 baths or more	78, 895	3. 0
1 bath	1, 935, 977	73. 7
Shared or no bath	612, 977	23. 3
Total reports	2, 627, 849	100. 0
HEATING EQUIPMENT		
Central steam or vapor	316, 675	12. 0
Central hot water	194, 535	7. 4
Central warm air	818, 087	31. 1
Heating stoves	1, 117, 254	42. 5
Other	175, 077	6. 7
None	8, 110	. 3
Total reports	2, 629, 738	100. 0
LIGHTING EQUIPMENT		
Electric	2, 385, 876	90. 8
Gas	6, 010	. 2
Other	235, 566	9. 0
Total reports	2, 627, 452	100. 0
COOKING EQUIPMENT		
Electric	101, 953	3. 9
Gas	1, 828, 463	69. 6
Other or none	696, 848	26. 5
Total reports	2, 627, 264	100. 0
REFRIGERATION EQUIPMENT		
Mechanical refrigeration	447, 135	17. 1
Ice or none	2, 169, 296	82. 9
Total reports	2, 616, 431	100. 0
FUEL FOR HEATING		
Coal	1, 773, 380	67. 7
Gas	305, 964	11. 7
Oil	175, 340	6. 7
Wood	310, 328	11. 9
Other	53, 186	2. 0
Total reports	2, 618, 198	100. 0

Source: Works Progress Administration, *Urban Housing, a Summary of Real Property Inventories Conducted as Works Projects, 1934–36* (Washington D. C., 1938) table 2.

Present day lighting equipment where public utilities were used was almost universally of the electric type—only 0.2 percent of all dwelling units in the 64 cities used gas for lighting; but 9.0 percent used some

other media than either gas or electricity. Cooking, as might be expected, was done by gas in 69.6 percent of all dwelling units; only 3.9 percent used the most recent development of electric cooking. There were, however, 26.5 percent which either had no cooking equipment or used coal, wood, or kerosene stoves for cooking purposes.

Mechanical refrigeration was used in only 17.1 percent of the homes surveyed.

All of the items for the 64 city sample which we have just reviewed are directly reflective of the quality of housing in those cities. A summary of the characteristics is shown in table XVIII. We present these figures to give the reader some idea of the prevalence of the characteristics enumerated. They are present in numerous combinations and are reflective of gradations of rent. Individually, any one characteristic may or may not be present in every low-rent neighborhood. They have a significance, however, dependent upon their degree of combination. The age and condition of the structure, the modernity of the conveniences present or absent in the dwelling units, and other factors not here dwelt upon, all combine to distribute (*a*) the values of the owner-occupied single-family dwellings and (*b*) the rents of tenant-occupied and vacant dwelling units in the 64 city sample as shown in table XIX.

As may be seen from the table, 41.7 percent of the single-family homes in these cities were valued at less than $3,000 and 71.0 percent at less than $5,000 in 1934. Over one-third of the tenant-occupied and vacant dwelling units had a monthly rental value of from $10 to $19.99. Nearly 80 percent of all these homes in the 64 cities had a rental value of less than $30 per month.

The length of occupancy of dwellings is of interest in the structure of cities, not only as a reflector of the stability of home ownership but also as it reflects the mobility of tenant occupancy. The distribution of the duration of occupancy of both owner-occupied and tenant-occupied dwelling units is shown in table XX.

In the 64 cities covered here, 32.9 percent of the tenant-occupied dwelling units were tenanted by persons who had moved in less than 6 months prior to the date of the survey. Nearly two-thirds of the tenants had lived in their homes less than 2 years. Conversely, owner-occupied dwelling units had been occupied by more than three-fourths of all owner occupants in these cities for 5 years or more. Curiously, the percentage of owner occupants and of tenant occupants is almost exactly the same—10.7 percent and 10.6 percent, respectively—in the occupancy class interval of 3 to 5 years.

TABLE XIX.—*Distribution of Residential Values and Rents in 64 Cities in 1934*

(A) Value of Owner-Occupied Single-Family Dwellings

	Distribution	
	Number	Percent
VALUE GROUP		
Less than $1,000	68, 894	8. 0
$1,000 to $1,999	133, 964	15. 6
$2,000 to $2,999	154, 730	18. 1
$3,000 to $4,999	250, 515	29. 3
$5,000 to $7,499	146, 921	17. 2
$7,500 to $9,999	46, 169	5. 4
$10,000 to $14,999	31, 144	3. 6
$15,000 to $19,999	11, 405	1. 3
$20,000 or more	12, 550	1. 5
Total reports	856, 292	100. 0

(B) Monthly Rents of Tenant-Occupied and Vacant Dwelling Units

RENT GROUP		
Less than $10	247, 918	15. 8
$10 to $19.99	575, 180	36. 6
$20 to $29.99	412, 770	26. 3
$30 to $49.99	271, 575	17. 3
$50 to $74.99	49, 586	3. 2
$75 to $99.99	8, 074	. 5
$100 or more	4, 668	. 3
Total reports	1, 569, 771	100. 0

Source: *U. S. Department of Commerce, Real Property Inventories, 1934.*

TABLE XX.—*Distribution of the Duration of Occupancy of Dwelling Units in 64 Cities*

	Owner occupied	Tenant occupied	Total
	Percent	*Percent*	*Percent*
Less than 6 months	3. 2	32. 9	20. 2
6 months to 1 year	2. 2	15. 9	10. 1
1 to 2 years	3. 8	16. 3	11. 0
2 to 3 years	4. 1	9. 0	6. 9
3 to 5 years	10. 7	10. 6	10. 6
5 to 10 years	28. 9	9. 3	17. 7
10 to 20 years	30. 8	4. 6	15. 8
20 years or more	16. 3	1. 4	7. 7
Total	100. 0	100. 0	100. 0

Source: *U. S. Department of Commerce, Real Property Inventories, 1934.*

Apart from the impact of all those forces, both capable and incapable of measurement, which determine the quality of residential neighborhoods, many American cities contain residential areas characterized by the predominant presence of certain races and nationalities. As an aftermath of the influx of peoples from the tides of immigration in the decades prior to the World War, many sections in our cities became populated by persons of the same nationality. This was particularly true of non-English-speaking peoples. Thus, the Chinese quarter of San Francisco, the "Little Italy" of both Chicago and New York, the large sections of these and other cities largely populated by Poles, Germans, Slovaks, Czechs, Turks, Swedes, Norwegians, and other nationalities grew in size and were almost cities within the boundaries of our cities.

People of the same nationality tended to live together because of a desire for companionship with fellows of common background. Speaking different languages, inhabitants of those communities felt that they constituted a class different from earlier immigrants to our shores. Not until their children were educated in our schools and grew up in the American environment did any great diffusion of nationalities occur. In other words, time is an important factor in the "melting pot" aspect of American urbanism. Since immigration laws have been tightened considerably in the past two decades, the German, Russian, Polish, and other areas within our cities will undoubtedly tend to become more and more diffused within the common mass of the urban organism.

A more significant problem facing American cities, however, is the segregation of sectors populated by different races. Only in a few very old European cosmopolitan centers do we find members of different races living in harmony side by side. Segregation of races is of importance in other countries as well as in the United States—witness the American and European colonies in China. In the United States, a country largely settled by whites, Indians were the original settlers, Negroes are a heritage of pre-Revolutionary times, Chinese people (now banned by immigration authorities) settled here when they came in large numbers to participate in the California gold rush, and Mexicans [2] have long settled in lower California, Texas, and other States on our southern boundaries. In a country settled largely by the white race, such members of other races, of course, have not been absorbed. Intermarriage between members of different races exists but is frowned upon by almost all peoples of any color. Persons of mixed color are mostly products of the Negro and white races and, together with other races, have been classified in real property surveys as "other than white."

No statistical demonstration is required to prove the existence of Harlem in New York, the "Black Belt" in Chicago, or the Chinese quarter in San Francisco. It is a mere truism to enunciate that colored people tend to live in segregated districts of American cities. As we have said in previous pages, the reflection of adverse housing characteristics in rent should tend to operate in the same manner in areas populated entirely by colored races as in areas populated only by whites. It is in the twilight zone, where members of different races live together that racial mixtures tend to have a depressing effect upon land values—and therefore, upon rents.

Therefore, the exact extent of the concentration or dispersion of nonwhite peoples in American cities, the pattern of the nonwhite area and its relation to other neighborhoods, and the housing characteristics of solid and mixed racial blocks are significant in the study of the structure of the American city. Since the Negro population comprised 86 percent of the nonwhite population of the United States in 1930, we will begin our analysis with a broad survey of the distribution of the Negro segments in our population.

The distribution of the Negro population in the entire United States is characterized by extraordinary variations. Of the 11,891,143 Negroes in the United States in 1930, 75.0 percent were in the South, 24.0 percent in the North, and only 1.0 percent in the Pacific and Mountain States.[3] Thus, there is a relatively dense concentration of Negroes in the South, where they comprise 25.5 percent of the total population. There is almost an entire

[2] The U. S. Census Bureau, prior to the 1930 census, classified most Mexicans as "White"; but in 1930, persons of Mexican birth or parentage who were not definitely reported as "White" or "Indian" were designated as 'Mexican." Persons recorded as either "Indian" or "Mexican" were therefore included in the general class of "Other races."

[3] U. S. Department of Commerce, *Negroes in the United States, 1920–32*, (Washington, D. C., 1935), p. 9. In our discussion the New England, Middle Atlantic, East and West North Central States and Delaware, Maryland, and District of Columbia are classed as "Northern" States; and all other South Atlantic, and East and West South Central States are classed as Southern States.

absence of Negroes in the Mountain and Pacific Coast States, where they comprise only 1.0 percent of the total population; and in the North they form but 3.8 percent of the total population.

Not only is there the widest variation in the density of Negroes among different sections of the United States, but there is a wide difference between the North and the South in the distribution of the Negro population in urban and rural areas. The southern Negro is predominantly rural, with 70.2 percent living outside of urban territory. The northern Negro is to an even greater extent a city dweller, 85.4 percent living in urban communities.[4]

Not only do Negroes in the North live mainly in cities, but they reside in relatively few cities. Figure 25 shows the distribution of Negroes among the 79 northern and southern cities containing more than 10,000 Negroes in 1930 and gives the percentage of Negroes to the total population in each city. The 10 northern cities of largest Negro population contained 59 percent of all northern Negroes. The entire group of 28 northern cities includes 74 percent or 1,800,088 of the 2,435,088 northern urban-dwelling Negroes. Consequently, in most of the smaller urban communities in the North there are relatively few Negroes. Hence, the Harlem of New York and the "Black Belt" of Chicago are not typical of the average northern American city. In the South, on the other hand, only 29.8 percent of the Negroes live in cities. The 51 southern cities with 10,000 or more colored persons in 1930 shown in figure 25 had only 1,496,967 Negroes or 56.3 percent of the entire Negro urban population of the South, leaving almost half of the southern urban Negroes to be distributed among smaller cities.[5]

Figure 25 also shows a marked difference between northern and southern cities with respect to the percentage of Negroes in the total population. While six northern cities each had over 100,000 Negroes in 1930 and 28 northern cities had 10,000 or more Negroes in the same year, the ratio of colored persons to the total population in the northern cities was relatively low. Even the 327,706 Negroes in New York constituted only 4.7 percent of the total population in 1930, while the 233,903 colored persons in Chicago comprised only 6.9 percent of the total number of persons in that city. In the South only one city, New Orleans, had a population of more than 100,000 Negroes in 1930. In contrast to northern cities, Negroes comprised large proportions of the population in the southern cities—29 percent in Richmond, 28 percent in New Orleans, 33 percent in Atlanta, 38 percent in both Birmingham and Memphis, and 45 percent in both Charleston, S. C., and Savannah.

The general situation with respect to the distribution of the Negro population in the United States has been discussed for background purposes as a preliminary to further discussion of nonwhite racial urban segments. Closer examination of the segregation and concentration of nonwhite races in American cities will be facilitated by reverting to the voluminous data available for the 64-city sample used earlier in this chapter.[6] Except for the omission of the very large northern cities, this sample of cities is believed to be generally representative—available data for certain of the very large northern cities will be included at an appropriate point. Though we discuss nonwhite races as a whole, the preponderant presence of Negroes in such populations of northern and southern cities and the mixture of Mexicans, Chinese, Japanese, and Negroes in certain western and southwestern cities, should be kept in mind throughout. In studying the degree of internal concentration or diffusion of nonwhite races in different cities, we are referring to the extent to which the nonwhite population of any city, regardless of its relative proportion to the total city population, is concentrated in a segregated area within that city.

Of the 100,770 blocks in our 64-city sample, 85,478 or 84.8 percent were occupied exclusively by whites—there being 7,650,936 white persons in such blocks. On the other hand, 5,004 blocks or 4.9 percent were completely occupied by 341,565 nonwhite persons. The remaining 10,288 blocks or 10.3 percent were blocks of mixed occupancy—682,682 whites and 396,372 nonwhites. Thus, instead of being diffused throughout the 100,770 blocks, the nonwhite population of the 64-city sample was concentrated in 15,292 blocks.

As already shown for the Negro segment of the population by data from the 1930 census, the extent of racial concentration varies in different sections of

[4] *Op. cit., p. 53.*

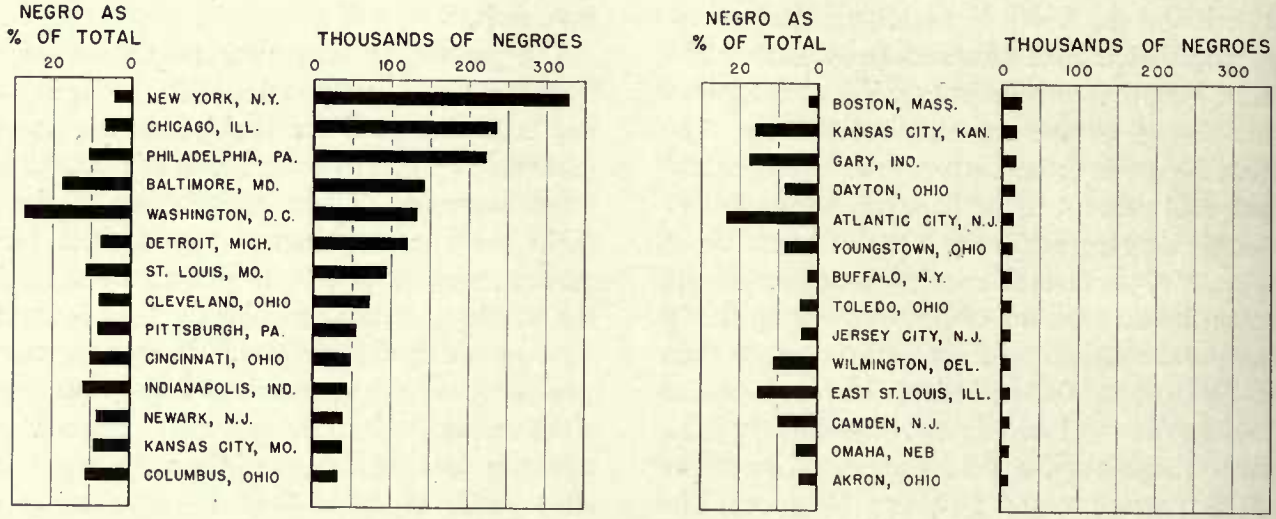
[5] *Op. cit., 54, 55.*

[6] Nonwhite races, as classified in this 64-city sample, are defined in the same manner as in the 1930 Census.

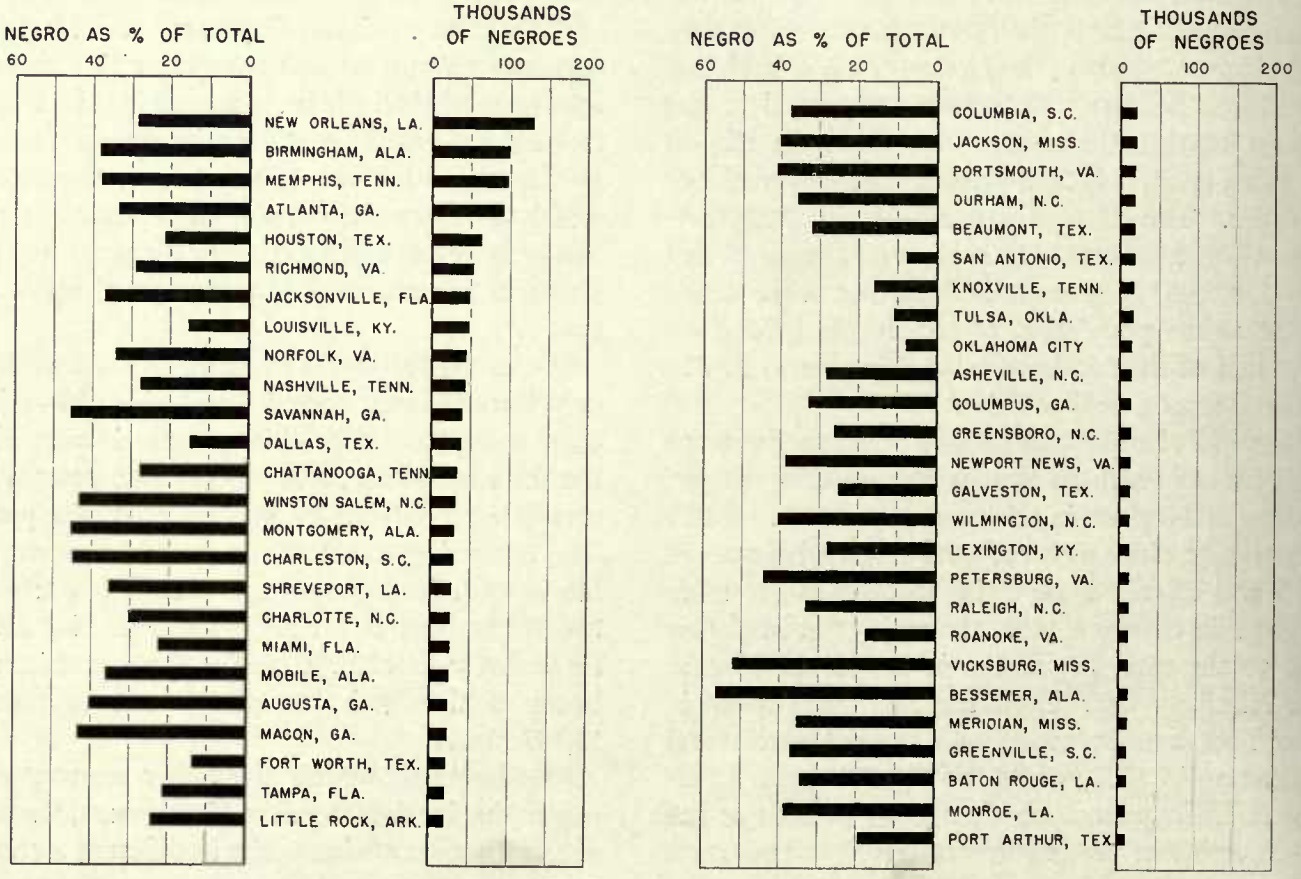
FIGURE 25

79 AMERICAN CITIES WITH MORE THAN 10,000 NEGRO POPULATION IN 1930

28 NORTHERN CITIES



51 SOUTHERN CITIES



SOURCE
U.S DEPARTMENT OF COMMERCE, *NEGROES IN THE UNITED STATES. 1920 - 1932*, (WASHINGTON, D.C., 1934), P 55

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the country. Because no northern or eastern cities with large nonwhite populations, except Cleveland, are included in our 64-city sample, it is heavily weighted by the large nonwhite population of southern cities. Since we are concerned with arriving at the degree of concentration of nonwhite persons in different cities and not, primarily, the differences between northern and southern cities, this weighting in favor of the South gives proper attention to cities which contain, proportionately, greater segments of nonwhite persons.

Not wishing to ignore northern cities which contain large numbers of other than white races, however, table XXI compares the distribution of nonwhites in enumeration districts with different concentrations of nonwhites in 5 northern and 5 southern cities. Enumeration districts are the only units of measurement available for Chicago, Ill., and somewhat larger units—census tracts—are available for Manhattan, N. Y. All other cities in this table are based on enumeration districts for purposes of comparison. These districts vary in size from 3 to 20 blocks and average figures are used for each district; census tracts are somewhat larger and are also average figures. In such areas there may, of course, be considerable variation in the density of nonwhite occupancy, and complete nonwhite occupancy occurs less frequently than when blocks are used.

TABLE XXI.—*Distribution of Nonwhite Occupancy in Selected Cities by Enumeration Districts in 1934*

City	Nonwhite population		Distribution of nonwhite population in enumeration districts				
	Number	Percent of total	50.0 percent or more nonwhite	10.0 percent to 49.9 percent nonwhite	1.0 percent to 9.9 percent nonwhite	Less than 1.0 percent nonwhite	All enumeration districts containing nonwhite
Northern:							
Chicago, Ill.	217,625	6.7	90.4	4.7	3.7	1.2	100.0
Manhattan, N. Y.	[1] 56,171	[1] 11.5	75.8	17.7	4.8	1.7	100.0
Cleveland, Ohio	69,988	8.4	75.8	19.0	3.6	1.6	100.0
Indianapolis, Ind.	40,409	11.8	73.4	20.5	5.7	.4	100.0
Washington, D. C	137,875	27.8	66.4	31.1	2.2	.3	100.0
Southern:							
Jacksonville, Fla.	49,420	38.1	89.6	9.1	1.2	.1	100.0
Shreveport, La.	27,845	37.2	77.3	21.5	1.2	.03	100.0
Richmond, Va.	44,084	25.6	77.0	21.4	1.5	.1	100.0
Birmingham, Ala.	95,663	40.2	76.2	21.7	2.0	.1	100.0
Greensboro, N. C.	13,820	27.3	69.3	25.6	5.0	.1	100.0

[1] Number of families by census tracts.
Source: U. S. Department of Commerce, *Real Property Inventories, 1934*, and Works Progress Administration, *Real Property Surveys, 1934*.

With the common standard of enumeration districts, the degree of nonwhite concentration appears to be approximately as great in the 5 large northern cities as in the 5 southern cities with large nonwhite population. In Chicago, nonwhite persons numbered 217,625 but comprised only 6.7 percent of the total population in 1934. Over 90 percent of the nonwhite population, however, lived in enumeration districts where 50.0 percent or more of the population were nonwhites. In Manhattan, where 56,171 nonwhite families comprised only 11.5 percent of all families, 76 percent of the nonwhite families lived in such enumeration districts. In southern cities with large nonwhite populations a similar picture is presented. Thus, in Jacksonville, where 49,420 persons or 38.1 percent of the population were of a race other than white in 1934, 90 percent of the nonwhite population lived in enumeration districts where 50.0 percent or more of the persons were not of the white race. In Richmond, Va., 25.6 percent of the population represented 44,084 nonwhite persons and 77 percent of them lived in such enumeration districts.

Returning to our 64 city sample, table XXII shows the distribution of nonwhites in *blocks* with different concentrations of nonwhites in each city. The cities have been arrayed in groups of 8 in order of the percentage of nonwhite races to the total population in each city. Because blocks afford closer examination than enumeration districts, the distri-

TABLE XXII.—*The Proportion of Nonwhites and Their Distribution in Blocks Grouped by Degree of Nonwhite Concentration in 64 Cities in 1934*

Location	Total number nonwhite race, 1934	Proportion of nonwhites in total population, 1934	Proportion of total population in 1930		Distribution of nonwhite population in blocks				
			Negroes	Other nonwhite	100 percent nonwhite	50–99 percent nonwhite	10–49 percent nonwhite	Less than 10 percent nonwhite	Total
		Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Charleston, S. C.	26,814	44.8	45.1	0.04	5.0	55.6	32.7	6.7	100.0
Birmingham, Ala.	95,663	40.2	38.2	.02	47.7	28.8	12.7	10.8	100.0
Jackson, Miss.	16,960	38.2	40.2	.01	55.8	24.4	13.7	6.1	100.0
Jacksonville, Fla.	49,420	38.2	37.2	.03	71.2	17.6	7.4	3.8	100.0
Shreveport, La.	27,845	37.2	35.5	.19	54.3	32.9	7.8	5.0	100.0
Atlanta, Ga.	92,468	35.2	33.3	.02	47.3	22.9	12.8	17.0	100.0
Columbia, S. C.	14,578	33.2	37.8	.04	37.3	37.5	17.4	7.8	100.0
Baton Rouge, La.	8,268	29.3	34.7	.02	17.1	48.8	25.8	8.3	100.0
Average	.....	37.0	37.8	.04	42.0	33.6	16.3	8.1	100.0
Austin, Tex.	15,894	27.4	18.6	9.49	29.5	37.8	21.4	11.3	100.0
Greensboro, N. C.	13,820	27.3	26.2	.01	72.2	14.4	10.3	3.1	100.0
Little Rock, Ark.	26,076	27.0	24.1	.03	27.7	28.8	29.4	14.1	100.0
Asheville, N. C.	11,959	27.0	28.4	.01	37.6	38.2	19.3	4.9	100.0
Richmond, Va.	44,084	25.3	29.0	.04	42.3	39.5	13.6	4.6	100.0
Dallas, Tex.	43,072	17.7	14.9	2.31	22.6	23.6	18.8	35.0	100.0
Phoenix, Ariz.	6,802	15.9	4.9	16.41	24.6	30.7	27.2	17.5	100.0
Knoxville, Tenn.	15,460	15.5	16.2	.004	38.4	25.8	21.4	14.4	100.0
Average	.....	22.9	20.3	3.5	36.9	29.9	20.1	13.1	100.0
Paducah, Ky.	4,486	14.3	20.1	.01	12.8	34.5	27.1	25.6	100.0
Indianapolis, Ind.	40,407	11.8	12.1	.04	25.9	26.1	23.1	24.9	100.0
Wilmington, Del.	11,201	11.1	11.3	.05	3.6	29.9	41.8	24.7	100.0
Topeka, Kans.	6,868	10.6	9.0	2.75	9.2	23.9	38.3	28.6	100.0
Wichita Falls, Tex.	3,734	10.1	9.9	1.68	54.6	2.5	15.7	27.2	100.0
Cleveland, Ohio	69,138	8.4	8.0	.16	2.4	40.4	17.2	40.0	100.0
Frederick, Md.	1,158	8.3	10.7	.01	1.8	23.7	53.5	21.0	100.0
Pueblo, Colo.	3,028	7.4	2.6	7.31	1.7	13.7	64.1	20.5	100.0
Average	.....	10.3	10.5	1.5	14.0	24.3	35.1	26.6	100.0
San Diego, Calif.	9,101	6.5	1.8	7.60	3.0	26.5	45.4	25.1	100.0
Sacramento, Calif.	5,107	6.4	1.2	8.96	1.0	24.2	42.9	31.9	100.0
Trenton, N. J.	6,739	6.1	6.5	.05	12.7	17.1	47.0	23.2	100.0
Wichita, Kans.	5,415	5.6	5.1	1.05	30.8	37.5	18.4	13.3	100.0
St. Joseph, Mo.	3,224	4.9	5.0	.56	2.7	17.2	48.6	31.5	100.0
Albuquerque, N. Mex.	1,215	4.6	1.7	3.14	9.0	8.4	48.0	34.6	100.0
Hagerstown, Md.	1,247	4.2	4.9	.02	10.4	32.5	43.9	13.2	100.0
Oklahoma City, Okla.	6,496	4.2	7.9	.91	47.5	26.7	14.1	11.7	100.0
Average	.....	5.3	4.3	2.8	14.6	23.8	38.5	23.1	100.0

TABLE XXII.—*The Proportion of Nonwhites and Their Distribution in Blocks Grouped by Degree of Nonwhite Concentration in 64 Cities in 1934*—Continued

Location	Total number nonwhite race, 1934	Proportion of nonwhites in total population, 1934	Proportion of total population in 1930		Distribution of nonwhite population in blocks				
			Negroes	Other nonwhite	100 percent nonwhite	50–99 percent nonwhite	10–49 percent nonwhite	Less than 10 percent nonwhite	Total
		Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Zanesville, Ohio	1,296	3.9	4.9	.01	4.8	15.2	44.6	35.4	100.0
Wheeling, W. Va	2,036	3.5	3.6	.03	.5	9.6	32.9	57.0	100.0
Decatur, Ill	1,847	3.3	3.4	.03	.2	14.9	46.4	38.5	100.0
Des Moines, Iowa	5,309	3.3	3.8	.29	2.2	19.1	37.3	41.4	100.0
Peoria, Ill	[1] 3,224	3.1	2.9	.19	.3	7.5	39.9	52.3	100.0
Springfield, Mo	1,536	2.8	3.1	.01	5.7	14.6	48.1	31.6	100.0
Williamsport, Pa	956	2.3	2.0	.02	0	23.8	33.3	42.9	100.0
Seattle, Wash	7,292	2.3	.9	3.21	2.7	18.1	42.1	37.1	100.0
Average	.....	3.1	3.1	.5	2.1	15.4	40.5	42.0	100.0
Providence, R. I	5,137	2.2	2.2	.09	.6	10.3	47.3	41.8	100.0
St. Paul, Minn	3,904	1.5	1.5	.35	.1	12.6	30.9	56.4	100.0
Casper, Wyo	213	1.3	.9	1.41	0	6.2	68.1	25.7	100.0
Lansing, Mich	970	1.3	1.8	.06	0	7.9	27.8	64.3	100.0
Waterbury, Conn	947	1.1	1.7	.05	0	.4	35.0	64.6	100.0
Butte, Mont	290	1.0	.4	.88	.2	1.8	10.4	87.6	100.0
Binghamton, N. Y	633	.9	.9	.04	.01	0	16.9	83.1	100.0
Salt Lake City, Utah	1,164	.9	.5	1.08	.1	.9	14.0	85.0	100.0
Average	.....	1.3	1.2	.5	.1	5.0	31.3	63.6	100.0
Erie, Pa	882	.9	1.0	.06	.03	.8	25.1	74.1	100.0
Portland, Oreg	2,325	.8	.5	1.35	3.5	3.2	33.4	59.9	100.0
Syracuse, N. Y	1,519	.8	.9	.12	.5	3.8	47.4	48.3	100.0
Minneapolis, Minn	3,003	.7	.9	.15	1.1	16.0	22.6	60.3	100.0
Worcester, Mass	1,034	.6	.7	.06	.6	2.1	36.6	60.7	100.0
Reno, Nev	102	.6	.7	1.88	1.5	0	40.5	58.0	100.0
Racine, Wis	384	.6	.7	.19	0	.6	24.9	74.5	100.0
Boise, Idaho	113	.6	.4	.56	2.6	1.6	22.9	72.9	100.0
Average	.....	.7	.7	.5	1.2	3.5	31.7	63.6	100.0
Santa Fe, N. Mex	47	.5	.7	5.11	0	0	1.0	99.0	100.0
Lincoln, Nebr	393	.5	1.3	.40	0	2.2	30.8	67.0	100.0
Sioux Falls, S. Dak	155	.5	.3	.18	1.2	0	52.7	46.1	100.0
Kenosha, Wis	201	.4	.4	.11	.2	.9	23.6	75.3	100.0
Burlington, Vt	57	.2	.4	.09	0	0	2.1	97.9	100.0
Portland, Maine	136	.2	.4	.07	0	.9	12.3	86.8	100.0
Nashua, N. H	60	.2	.2	.01	0	0	45.0	55.0	100.0
Fargo, N. Dak	31	.1	.1	.20	0	0	18.7	81.3	100.0
Average	.....	.3	.5	.8	.2	.5	23.3	76.0	100.0

[1] 1930.

Source: U. S. Department of Commerce, *Real Property Inventories, 1934*. U. S. Department of Commerce, *Fifteenth Census of the United States, 1930, Vol. II* (Washington, D. C., 1932), tables 15 and 16 for each State.

bution has been changed from that used in the previous table. We now include a separate column for blocks with 100 percent concentration and combine in 1 column all blocks of less than 10.0 percent concentration. It may be noted that, generally, in cities with a large proportion of nonwhite persons, a large percentage of such persons live in blocks of high nonwhite concentration.

We have already noted, in the comparison in table XXI, that a high degree of concentration obtains in both (1) cities of very large population with a small proportion but a large number of nonwhite persons and (2) cities with a large percentage and a large number of nonwhite persons. Table XXII clearly brings out the latter for our 64 city sample and also shows that a far smaller degree of concentration tends to obtain in cities having a small number of nonwhites, or where nonwhites constitute only a small proportion of the total population. It also shows that in cities with a large nucleus of blocks of 100 percent nonwhite concentration, there are more mixed racial blocks occupied by a high percentage of nonwhites than there are in cities that have a small proportion of solid nonwhite racial blocks.

For further analysis, table XXII contains averages for each group of 8 cities. Since each group contains cities with a successively lower proportion of nonwhite population, the averages forcefully demonstrate that as the percentage of races other than white decreases, the extent of concentration in blocks likewise decreases. Conversely, the column showing the proportion of blocks with the smallest concentration increases with a decrease in the percentage of nonwhites in the total population.

From the evidence presented in tables XXI and XXII we may, therefore, suggest the generalization that *the degree of nonwhite concentration in any city increases directly with the number and proportion of nonwhite persons in the population.* Either a large nonwhite population in absolute numbers, or a high proportion of nonwhite persons in the total population is necessary to produce concentrated nonwhite areas. Thus, the extent of the segregation or concentration of nonwhite races in American cities varies in accordance with the relative percentage of nonwhite persons in the total population.

The question now arises as to the extent to which these concentrated nonwhite blocks are aggregated in clusters. Examination of the maps of a number of cities delineating nonwhite blocks of different degrees of concentration shows a conglomeration of highly concentrated nonwhite blocks in broad areas, such as the "Black Belt" of Chicago and the Harlem of New York. In Chicago (fig. 26) as one goes east across Cottage Grove Avenue, from Forty-third to Fifty-fifth Street one passes from an area practically 100 percent nonwhite to an area that is almost 100 percent white. The cleavage is sharp and distinct. There is no penumbra or scattered fringe of nonwhites between the two solid sections, but an absolute and definite dividing line at Cottage Grove Avenue. On the other hand, along Lake Street there is a gradual thinning of nonwhite density from the central core to the areas surrounding it.

Similarly in Washington, D. C. (fig. 27), there is a central nucleus of blocks almost entirely occupied by nonwhites in the area that has its center at Seventh Street and Florida Avenue. This area is surrounded by a fringe of blocks in which nonwhite concentration is smaller. While there is thus a gradual transition in density of nonwhite population in the central part of Washington, the nonwhite areas come to an abrupt termination in the northwest quarter at Park Road and Monroe Street, and at Euclid Street between Sixteenth Street and Columbia Road. There are small detached colonies in Washington beyond this central nucleus in all directions. Outlying nonwhite colonies such as Anacostia in Washington, and at Ninety-fifth and State Streets in Chicago, are like satellites detached from the main mass.

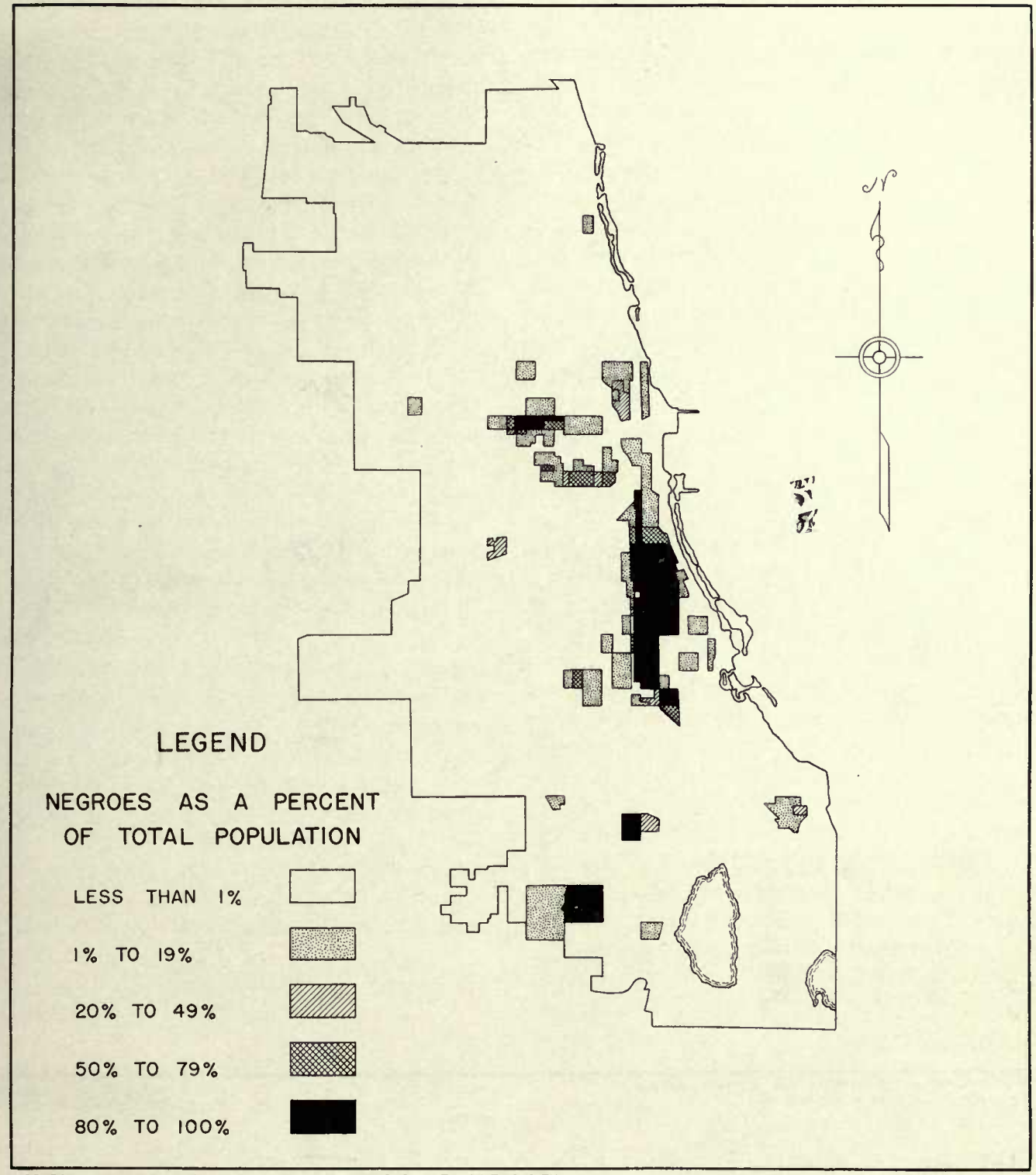
In southern cities, there is frequently a sharp transition between solid nonwhite and solid white areas at one street. As one goes east across Grayson Street between Livingston and Fortification Streets in Jackson, Miss., one passes from blocks occupied entirely by nonwhites to those occupied entirely by white persons. The racial maps of Richmond, Va., Birmingham, Ala., and Norfolk, Va. show similar sharp breaks between nonwhite and white areas. On the other hand, in Charleston, S. C., the blocks occupied by nonwhite persons are interspersed among blocks occupied by white persons almost at random, and there are few solid racial blocks.

Thus, in most cities that have a large number of nonwhite persons, either absolutely or relatively, there is a tendency to establish concentrated nonwhite areas. There are some detached nonwhite

FIGURE 26

PATTERN OF NON - WHITE POPULATION

CHICAGO, ILLINOIS 1934



SOURCE: NEWCOMB, C. S., AND LANG, R. O., *CENSUS DATA OF THE CITY OF CHICAGO, 1934* (CHICAGO, UNIVERSITY OF CHICAGO PRESS, 1934) PP. 686, 687

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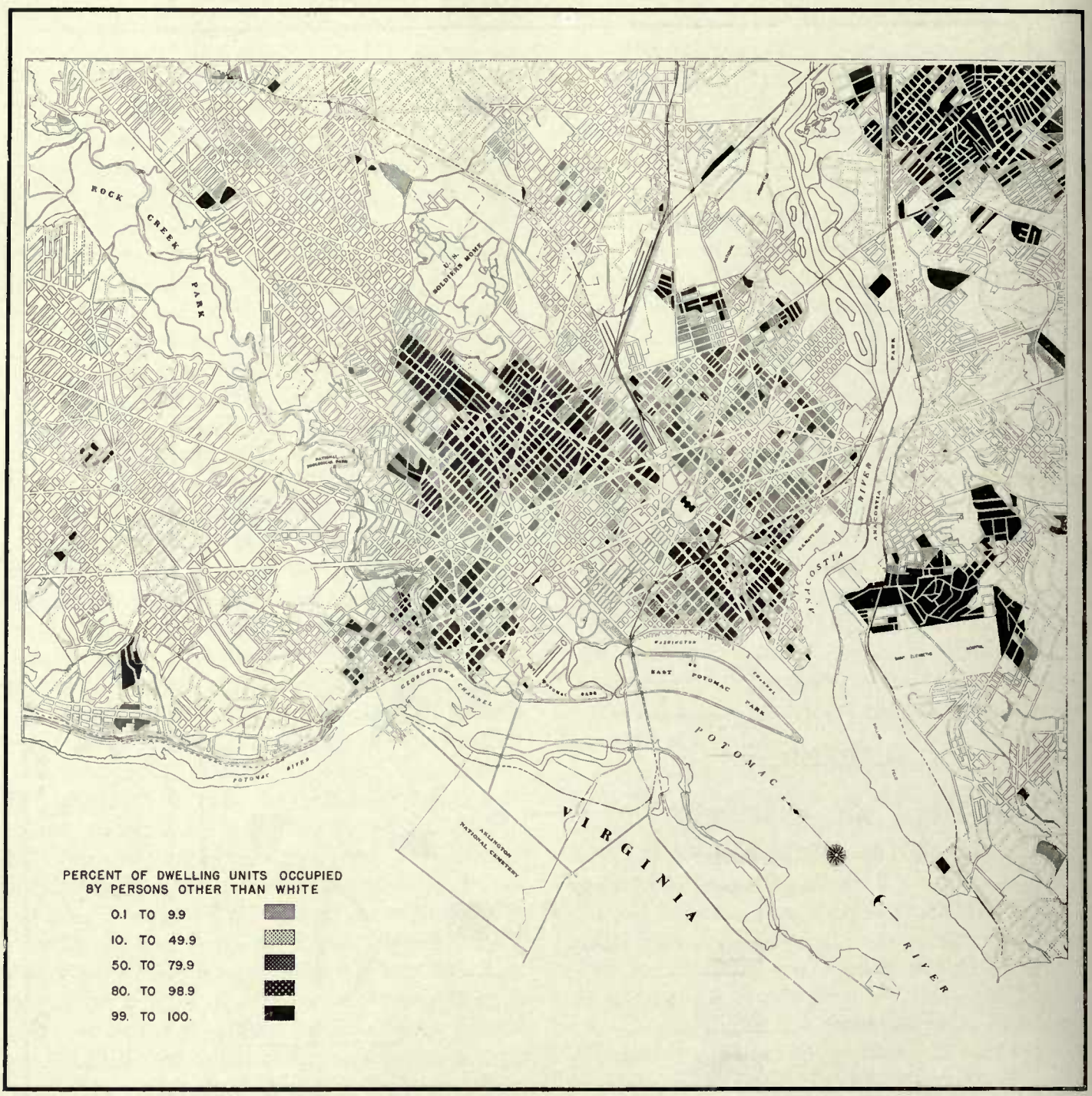
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 27

PATTERN OF NON - WHITE POPULATION

WASHINGTON, D. C. 1934



SOURCE: CIVIL WORKS ADMINISTRATION, *REAL PROPERTY INVENTORY FOR THE DISTRICT OF COLUMBIA, 1934*

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DIVISION OF ECONOMICS & STATISTICS

colonies and a few nonwhite persons living in a thin fringe near the central body, but sharp and distinct lines of cleavage between nonwhite and white areas are very frequent.

Where are these large nonwhite areas? Often they are located in the oldest part of the city near the central business district. The nonwhite areas of Richmond, Va., fall almost entirely in the areas settled prior to 1900. The nonwhite areas on the south side of Chicago and on West Lake Street in that city are located in areas settled before 1899.[6] Harlem in New York City is an area whose nucleus was settled as early as 1800 and that was entirely built up before 1900. The main nonwhite area of Detroit falls within the Grand Boulevard circuit in areas occupied by houses before 1910. In Miami, Fla., the chief colored section is in a district settled by 1921, which is relatively early for Miami. Similarly in St. Louis, Mo., Kansas City, Mo., Philadelphia, Pa., Baltimore, Md., Pittsburgh, Pa., Louisville, Ky., and many other cities, the nonwhite areas are in the oldest parts of the city. Hence, nonwhite races tend to occupy some of the oldest houses in American cities. There are also cities like Picayune and Natchez, Miss., in which the nonwhites live in an outlying belt surrounding the central part of the city. The cities with large central nonwhite areas tend to be industrial cities with large populations.

Thus, the extent of concentration of persons of races other than white in different sections of the country and in the segregated areas of our 64-city sample and a relatively limited number of large northern cities, has been measured. We have stated earlier that, directly, rents are only affected by the presence of nonwhites in otherwise white areas and that, in areas populated exclusively by one race, rents should reflect the character of housing similarly whether the population is white or some other race. But what are actual qualitative differences in the housing of different racial groups in American cities?

Data on rents in the dwelling units in the 64-city sample reveal that the average rent of dwelling units in blocks occupied exclusively by the white race was $23.08, in blocks occupied by a mixture of white and other races was $14.90, and in blocks occupied exclusively by nonwhite persons was $9.34. This gradation of rent reveals qualitative differences of housing as between white and nonwhite races. The differences are borne out by the relative condition of structures in blocks occupied by white, mixed, and nonwhite persons. Thus, 12.2 percent of the structures in the 85,478 blocks occupied exclusively by white persons were in need of major repairs in 1934 or were unfit for use. In the 10,288 mixed racial blocks, 38.6 percent of the structures were in this poor condition, and in the 5,004 blocks occupied exclusively by nonwhite races, the proportion of such structures rose to 50.9 percent.

Such figures compel us to conclude that other than white racial groups in American cities dwell largely in sections marked by low-quality housing. These are reflected in relative gradations of rent, which are representative of all those varying factors constituting the character of human habitations. If the millennium in housing arrives, and all classes of the population are provided with dwellings having none of the adverse characteristics dwelt upon earlier in this chapter, rents will be more reflective of economic and other imponderable factors. Since conditions of adverse housing do exist, however, we have attempted to show in this chapter the extent of their presence in a representative sample of American cities. Especial attention was given to a statistical analysis of the concentration of racial groups because of their importance in the structure of the American city. As we have just shown, their economic circumstances compel them to dwell, for the most part, in sections marked by low-quality housing.

[6] Compare racial maps and settled area maps—for Richmond, fig. 17 in pt. I. ch. III, and fig. 33 in the Map Supplement; for Chicago, fig. 26 in this chapter and fig. 35 in pt. II, ch. II.

Chapter VI

The Pattern of Residential Rent Areas in American Cities

HAVING suggested techniques for use in analysis of the residential areas of American cities and examined the prevalence of some factors in a large sample of American cities, we are now in a position to discuss the patterns formed by urban residential areas. Both here and in part II, we will find useful the basic tenet of the alternative technique suggested in chapter IV—*i. e.*, a single factor, rent, is representative of a series of other housing factors. Since the average rent of dwelling units in a block reflects the characteristics of the block which can and cannot be measured, patterns of rent may be fully relied upon to serve as a guide to the structure of residential neighborhoods.

First, however, the question arises as to the distribution of blocks in different rental ranges. Is there, in any city, an equal number of blocks with high, intermediate, and low average block rents? Or do they all form a regular distribution in rigid systematic conformity? In chapter III, figure 11 showed the distribution of rents in certain cities of all units within blocks falling in the same rental group—here we are concerned with the distribution of the blocks themselves among the several rental groups.

The percentage distribution among the several rental groups of the blocks in 25 widely scattered cities of varying size is shown in table XXIII. The figures reveal wide differences among the several cities in the relative proportion of blocks in high, intermediate and low rental groups at the time of the survey in 1934. In Wilmington, Del., nearly 12 percent of the total number of residential blocks had an average rent of $50 per month or more. Nearly 30 percent of the blocks in that city also commanded an average rent of between $30 and $49.99 monthly, but only 1 percent of the blocks had monthly rents of less than $10. Pueblo, Colo., on the other hand, had only 0.1 percent of its blocks in the highest rental range and over 80 percent in the two lowest rental groups of less than $20 per month. Wichita Falls, Tex., and Birmingham, Ala., had even a greater proportion of blocks with average monthly rents of less than $20—nearly 87 percent and over 84 percent, respectively. Both Syracuse, N. Y., and Waterbury, Conn., had only 0.1 percent of their blocks with average rentals of less than $10 per month. Of the two cities, the blocks in Syracuse were the more evenly distributed among the intermediate rental groups—blocks in Waterbury were greater, proportionately, in the lower rental ranges and lesser in the higher rental groups. Both cities, however, had a relatively large proportion of blocks, with average rents of $50 or more per month.

The range of the proportion of blocks in each of the rental groups among the 25 cities tabulated is considerably varied—with the greatest variation in the lowest rental group. Blocks in these cities with average rents of less than $10 per month constituted from 0.1 percent to 51.7 percent of all residential blocks with a median of 12.2 percent. In the rental group containing average block rents of $10 to $19.99 per month, the lowest proportion was 21.7 percent and the highest 59.8 percent with a median of 39.2 percent. Respective percentages in the $20 to $29.99 monthly rental group were 9.4 percent, 45.7 percent, and 23.6 percent; in the $30 to $49.99 monthly rental group—2.1 percent, 29.6 percent, and 14.0 percent; and in the $50 or more category—0.1 percent, 11.9 percent, and 3.5 percent. Percentages in each group ranged from a 52 percent variation in the lowest rental group to a 12 percent variation in the highest rental group.

TABLE XXIII.—*Distribution of Residential Blocks by Average Block Rents in 25 Cities, 1934*

City	Distribution among rental groups				
	$50 or more	$30 to $49.99	$20 to $29.99	$10 to $19.99	$9.99 and under
Wilmington, Del	11.6	29.6	32.2	25.3	1.0
Richmond, Va	8.5	23.7	22.3	33.5	12.2
Minneapolis, Minn	7.1	25.9	40.5	25.4	1.2
Phoenix, Ariz	6.7	16.1	18.8	40.5	18.0
Syracuse, N. Y	6.5	26.0	45.7	21.7	.1
Indianapolis, Ind	6.3	12.7	22.5	40.7	17.8
Waterbury, Conn	5.4	18.0	37.2	39.2	.1
St. Paul, Minn	5.0	23.4	37.1	32.8	1.7
Greensboro, N. C	4.4	14.8	12.5	34.1	34.2
Peoria, Ill	4.1	20.4	23.6	48.7	3.3
San Diego, Calif	4.0	14.4	41.3	36.0	4.3
Seattle, Wash	3.6	13.2	24.2	53.5	5.6
Oklahoma City, Okla	3.5	12.9	27.1	37.2	19.4
Baton Rouge, La	3.0	20.2	28.3	33.8	14.7
Huntington, W. Va	2.9	12.5	20.1	53.2	11.3
Atlanta, Ga	2.8	11.8	17.3	46.9	21.2
Dallas, Tex	2.4	14.0	31.1	42.2	10.4
Lansing, Mich	2.0	8.3	18.5	59.8	11.4
Shreveport, La	2.0	13.5	20.6	35.9	28.1
Cleveland, Ohio	1.8	12.1	43.1	41.8	1.2
Sioux Falls, S. Dak	1.7	19.2	34.4	39.2	5.5
Wichita Falls, Tex	1.6	2.1	9.4	35.1	51.7
Jacksonville, Fla	1.6	7.5	20.0	39.5	31.5
Birmingham, Ala	1.0	3.8	11.0	43.7	40.6
Pueblo, Colo	.1	5.2	14.3	49.1	31.3

Source: U. S. Dept. of Commerce, *Real Property Inventories, 1934*, and Federal Housing Administration, *Real Property Survey, Huntington, W. Va. 1935.*

Generally, northern cities in this group of 25 cities tended to have a greater proportion of blocks in the higher rent groups than the southern cities. Every city in the list is represented in every rent group, but there may be cities having a complete absence of blocks with either very high or very low average rents. The tendency is toward a dispersion among the several rent groups. Skewed distributions will appear, however, in almost every case because of those local factors tending to distort the representation toward either a high or low over-all average rent for the entire city.

We are primarily interested, however, in the patterns which are formed in cities by the distribution of blocks of different average rent. The pattern of distribution of the rent areas within cities is one of the most important of all from the standpoint of market analysis, mortgage investment, public welfare work and human ecology. If the higher income groups live mainly in high-rent areas, then firms selling articles purchased only by those groups should concentrate their effort in such sections. If the value of homes is most stable in areas where other homes are of similar value, then it is important for the mortgage investor to be familiar with the location of areas of different rental levels. If relief cases are likewise concentrated in low-rent areas, then it is important that public welfare agencies give special attention to such neighborhoods. Finally, if there is a pattern according to which the different income groups segregate themselves into definite areas, then the student of human ecology is furnished with the evidence of the pattern according to which social groups array themselves in the human environment.

There are many possible patterns of the distribution of blocks graded by average rentals. The rental blocks might be scattered at random throughout the city without any plan. Or, on the other hand, all the highest rental blocks might be concentrated in one compact area, and the low-rent blocks might be similarly aggregated in another section of the city. Whether there is a random distribution or a segregation of residential blocks by rents, or whether there is a succession of belts ranging from the lowest rents at the center to the highest rents on the periphery, or some other pattern of distribution of rental areas, is revealed by a study of block data maps which have been drawn for 142 cities.

There is no geometric pattern that can be superimposed upon a city to determine the location of high and low rental areas. Each urban center has a pattern of rent areas that is to a certain extent unique. No two cities have high-rent areas of the same size or shape or in the same location with respect to the center of the city. Topography, rapidity of urban growth, location of industries and transportation lines, the movement of leaders of society, all produce different rental area patterns.

There is, nevertheless, a general pattern of rent areas that applies to all cities. This pattern is not a random distribution. It is not in the form of sharply defined rectangular areas, with blocks in each rental group occupying completely segregated segments. It is not in the form of successive concentric circles, with the lowest rent area near the center and the highest on the periphery.

Study of the maps of 142 cities leads to the following observations. In every city there are one or more clusters of blocks in which the average rents paid for residences are the highest in the city. From these high-rent poles, there is a gradation downward on all sides, with successive rings of blocks of lower and lower average rent until the worst slum in the city is reached. There is frequently no sharp dividing line between blocks of different average rents. The blocks do not form solid geometric figures. Instead of the different rental areas changing abruptly, there are frequently transition zones, in which there is an intermingling of the higher rental blocks with blocks in which the average rent of the residences is slightly lower.

In some cities there is just one main high rent area. In small cities or cities of slow growth, this may be located near the center of the city as in Charleston, S. C., Zanesville, Ohio, Santa Fe, N. Mex., and Portland, Maine.

In other cities, the highest rental area is located on the periphery of one sector of the city, as in Wichita and Topeka, Kans., Des Moines, Iowa, Washington, D. C., Atlanta, Ga., Wilmington, Del., Greensboro, N. C., and Akron, Ohio. In these cities, there is a gradation downward from these high rent poles on one side of the city toward the lowest rents on the periphery of the opposite side of the city. Thus, in Washington, D. C., there is a gradation downward from the high rent area between Massachusetts and Connecticut Avenues in the northwest quadrant, as one goes northeast, southeast, or southwest. In Topeka, Kans., the downward progression of rents extends from the high rent pole on the western periphery to the low rent areas on the eastern city limits. In Wichita, Kans., the high rent pole is on the northern city limits, and there is a downward progression of rents from there to the periphery on the south, east, and west. In Des Moines, Iowa, there is the same downward gradient in rents from the western high rent pole to the eastern city limits.

Thus, in many cities there is a circular or rectangular area of a few blocks in which is located the peak rental area from which rents of all other blocks slope downward. Apparently, each income group tries to get as close as possible to the next higher group in the economic scale.

In a number of cities there are several high rent poles, as in Syracuse, N. Y., where there are high rent nuclei on the north, east, and west sides, with downward gradients to the low rent areas in the low ground between them along the railroad tracks. In Little Rock, Ark., and Oklahoma City, Okla., there are a number of nuclei of high rent areas, each surrounded by blocks with successively lower average rents for the dwelling units. All of these high rent blocks are in the same general section of the city, however. In areas where the average rent for structures in most of the blocks is less than $20 a month, there are a few blocks with average rents up to $30 a month, but very few in the higher rental groups.

In some cities, there is a wedge or radial development of the high rent area extending in a sector almost from the center of the city to the periphery. Thus, in Richmond, Va., there are high rent areas along the length of Monument Avenue, extending in a widening sector to the periphery, and another high rent area extending northward along Chamberlayne Street to the city limits. There are high rent sectors from the center to the city limits in Waterbury, Conn., Trenton, N. J., and Worcester, Mass. In Dallas, Tex., and Indianapolis, Ind., there are likewise high rent areas extending along the axes of principal radial streets.

Thus the high rent areas, although of extremely limited extent, are the peaks or ridges toward which all other rental areas slope upward. The intermediate rental areas usually surround or adjoin these high rent areas, and hence their shapes are often regulated by those of the high rent areas.

The lower rental areas, being of much larger extent, may extend from the center of the city to the periphery on one side of the city. The lowest rent area may extend through the center of the city to the periphery on both sides as in Jackson, Miss. It may occupy one entire half of the city, as in the case of the south side of Greensboro, N. C. The low rent areas are not located in the central slum area alone. Frequently, as in Wichita, Kans., Wichita Falls, Tex., Detroit, Mich., Richmond, Va., Jacksonville, Fla., St. Joseph, Mo., Springfield, Mo., and Wilmington, Del., rents grade downward to the periphery in the low rent sectors.

The rental area map of Richmond, Va., in figure 12 (by blocks), reveals both the relative concentration and the pattern of rent areas in one American city. Here are seen wedge-shaped groups of the high rent

blocks, radiating north along Chamberlayne Street and northwest along Monument Avenue, surrounded by blocks falling in the next lower rental group. There is not a perfect concentration of the highest rental blocks in one compact area but an intermingling of blocks in the highest rental group ($50 a month or over) with the next highest rental group ($30 to $49.99 a month). As one moves away from the center of the highest rental area, the proportion of blocks in which rents are $30 to $49.99 increases. Around this area there is a fringe of blocks where rents average from $20 to $29.99 a month; and they, in turn, intermingle on the border with blocks where rents average from $10 to $19.99 a month. These blocks with rentals of $10 to $19.99 a month, in turn, verge off into the lowest rental area, which winds through the river valleys in the central part of the city.

Only maps which show rents by individual blocks can show accurately the gradation of rents downward from the high rent areas. Such maps are the primary sources of data from which other more generalized maps are derived. In developing a theory of the spatial distribution of rent areas in American cities, however, the data may be presented in a form that will show the main tendencies without the minutiae of detail. For this purpose, so-called rental area maps have been prepared. In these maps, the blocks of similar rent are grouped together in relatively homogeneous areas, but usually some blocks are included that do not fall in exactly the same rental group. Hence the rental area maps smooth out to a certain extent the scattered appearance of the array of individual blocks. While such rental area maps do not show the intermingling of the blocks of different rental groups in the transition zones between the clusters of the highest rental blocks and those lower in the rental scale, they do bring out in sharp relief the location of the main rental areas.

Accordingly, the rental area maps of 19 selected cities are presented in the Map Supplement [1] for the purpose of showing in brief compass the main tendencies in the location of rent areas in American cities. Examination of those rental area maps shows wide variation in size, shape, and location of the rental areas in the different cities. Nevertheless, certain tendencies of city structure are clearly portrayed.

[1] Figs. 3–21, see pp. 138ff.

1. The highest rental area is in every case located in one or more sectors on the side of the city. Except for Oklahoma City, Okla., and Charleston, S. C., these high rent sections are on the periphery of one or more sectors of the city. The high rent area is on the northern periphery of Atlanta, Ga., and Indianapolis, Ind. It is in a northeast sector of Dallas, Tex., Jackson, Miss., and Providence, R. I. It is near the western city limits of Des Moines, Iowa, Knoxville, Tenn., and Topeka, Kans. It is on the eastern boundary of the settled area of Salt Lake City, Utah. The high rent areas are on the southern periphery of Jacksonville, Fla., and the southeastern edge of Minneapolis, Minn., and Reno, Nev. In Cleveland, Ohio, the main high grade residential area is on the eastern periphery in Shaker Heights, but there is likewise a high rent area in Lakewood extending along Lake Erie to the west. In Charleston, S. C., the main high rent area is located on the Battery near the place of original settlement. In Richmond, Va., high rent areas extend northward along Chamberlayne Street and northwest along Monument Avenue. In Peoria, Ill., one high rent area is located on the northern periphery, and another one along a bluff, northwest of the business center.

2. High rent areas take the form of wedges extending in certain sectors along radial lines from the center to the periphery as in Indianapolis, Ind., Reno, Nev., Providence, R. I., Dallas, Tex., Richmond, Va., Trenton, N. J., and Jackson, Miss. In other cities, the high rent section takes the form of a rectangular or circular area on the periphery of one sector. This is true of the high rent areas in Shaker Heights in Cleveland, Ohio, in Salt Lake City, Utah, Des Moines, Iowa, Topeka, Kans., Peoria, Ill., Jacksonville, Fla., and Minneapolis, Minn.

3. Intermediate rental areas, or areas falling just below the highest rental areas, tend to surround the highest rental areas or to adjoin such areas on one side. This is true of every one of the cities for which rental area maps are presented except Providence, R. I.

4. Intermediate rental areas on the periphery of other sectors of the city besides the ones in which the highest rental areas are located are found in certain cities. Thus, on the periphery of certain sectors in Atlanta, Ga., Dallas, Tex., Minneapolis, Minn., Indianapolis, Ind., and Providence, R. I.,

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there are intermediate rental areas that represent the peak rental areas of the lower grade sectors.

5. Low rent areas extending from the center to the edge of settlement on one side or in certain sectors of the city are found in practically every city. There may be a low rent wedge extending entirely through the center of the city as in Jackson, Miss., or from the center to the periphery on one side or sector as in Atlanta, Ga., Trenton, N. J., Des Moines, Iowa, Peoria, Ill., Oklahoma City, Okla., Indianapolis, Ind., Seattle, Wash., Minneapolis, Minn., Providence, R. I., Salt Lake City, Utah, and Knoxville, Tenn. Or a low rent area near the center of the city with an intervening higher rent area may be matched by an area with equally low rent on the periphery of the same sector as in Dallas, Tex., Jacksonville, Fla., and Cleveland, Ohio.

One or more sectors of a city thus acquire a low rent character, and in these sectors there is no tendency toward an upward gradation of rents from the center to the periphery.

Since observations for these 19 cities also apply to all of the 142 cities for which block data maps are available and which have been closely studied, it is clearly apparent that the concentric circle theory of city structure is defective. The rental area maps fail to reveal a series of concentric circles of rent areas with a gradation of rents upward from the center to the periphery in all the sections of the city. The upward gradation is confined to certain sectors in which high rent or intermediate rental areas are located, but there are always sectors in which there is no such upward gradation of rents.

It may be urged, however, that the concentric circle theory relates to an ideal pattern of city structure, and that if the rent areas of a city were fitted into a theoretical framework of concentric circles, a general tendency toward an upward gradation of rents from the center to the periphery of a city might be observed. Accordingly, the rent areas of 30 cities have been arranged in an ideal pattern of concentric circles in figure 28.

The high rent areas in all of the cities there shown except Oklahoma City, Okla., and St. Joseph, Mo., are located on or near or extend to the periphery of the city in one or more sectors. In none of the 30 cities does the high rent area occupy more than one-quarter of the concentric circle on the periphery of the city. The inner circle at the center is predominantly a low rent area, but in every city this low rent character is extended from the center to the periphery in one or more sectors of the city. Hence, even when the rental area data are put into a framework of concentric circles, there is revealed no general gradation upward from the center to the periphery in all sectors of the city.

From the evidence presented, therefore, it may be concluded that rent areas in American cities tend to conform to a pattern of sectors rather than of concentric circles. The highest rent areas of a city tend to be located in one or more sectors of the city. There is a gradation of rentals downward from these high rental areas in all directions. Intermediate rental areas, or those ranking next to the highest rental areas, adjoin the high rent area on one or more sides, and tend to be located in the same sectors as the high rental areas. Low rent areas occupy other entire sectors of the city from the center to the periphery. On the outer edge of some of the high rent areas are intermediate rental areas.

In small cities or cities of slow growth, the highest rental areas may occupy parts of sectors directly adjacent to the business center. As in the larger cities, the low rent sectors extend from the center to the periphery on one side of the city.

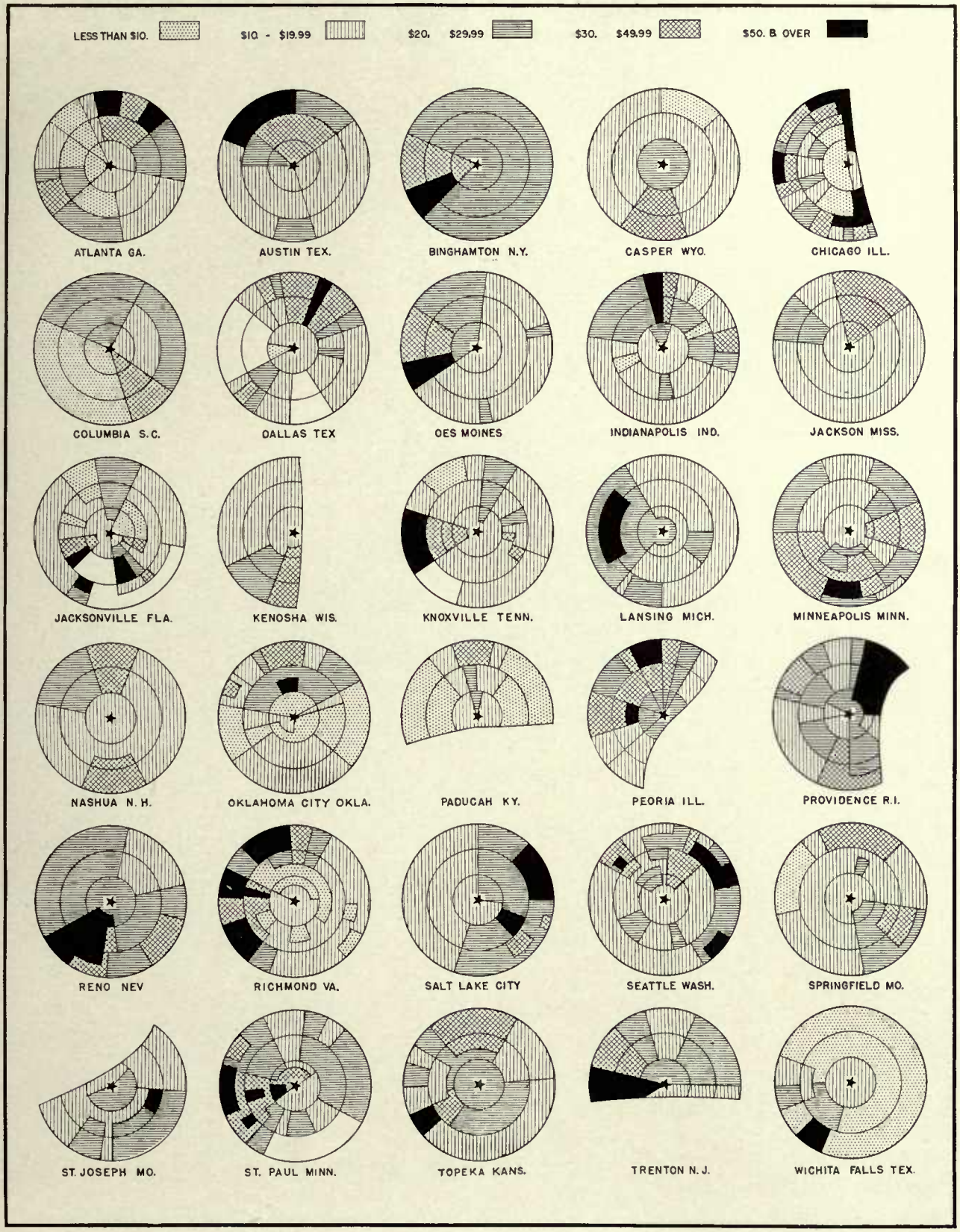
The sector theory of the location of rent areas in American cities here outlined is supported by the block-by-block data of 142 cities. In this large group, no city has been found in which there is an upward gradation of rents from the center to the periphery in all directions. There is an upward gradation of rents in the one or more sectors in which the highest rental area is located, but there are also low rent sectors in which there is no increase in rents as one goes from the center to the periphery of the city.

This sector theory of rent areas is of fundamental importance in analyzing neighborhoods in American cities for the purpose of locating markets for retail sales or for determining the risk in residential mortgages. Since the high rent area occupies only a limited portion of the periphery of the city and not its entire outer circumference, it is necessary to determine by the examination of each individual city where this high rent area is located.

If the concentric circle theory of the location of rent areas be accepted literally, all points on the

FIGURE 28

THEORETICAL PATTERN OF DISTRIBUTION OF RENT AREAS IN 30 AMERICAN CITIES



SOURCE: U.S. DEPARTMENT OF COMMERCE
REAL PROPERTY INVENTORIES, 1934

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periphery of the city are of equal importance as high rent areas, and no detailed examination of any city would be necessary. Since the high rent areas are located in the periphery of only one or more sectors, however, and are not distributed along the entire outer circumference of the city, it is necessary to ascertain for each city the location of the high rent sector. Therefore the forces that determine which one of the many sectors of the city will become the high rent sector are of vital importance to the analyst of city growth. These forces will be discussed in part II.

Part II

THE GROWTH OF RESIDENTIAL NEIGHBORHOODS IN AMERICAN CITIES

Chapter I

The Influence of the Rate of City Growth on Neighborhood Growth

THE city, at a given moment of time, has a rigid form. Its various component parts occupy definite locations. The slum and fashionable residential areas, the central and outlying business districts, the parks, and the factories, all occupy distinct areas on the urban map. The value of every parcel of real estate in the city is affected by its position with reference to these different areas. City planning or zoning, slum clearance, and market surveys all require a knowledge of the patterns formed by types of neighborhoods within the urban community. Techniques for analysis of city structures and the different patterns formed by urban residential areas were discussed in part I.

The structure of a city, however, does not remain static. The pattern of neighborhoods and land uses established at one period of time changes as the city grows. The rate of movement of neighborhoods, or the time required for a residential section to change its character, varies greatly from city to city and in any one city from one period to another. Because the forces that determine the speed of neighborhood transition are not clearly understood, there is often great apprehension that the changes in neighborhood character taking place at certain times will embrace entire urban areas. Hence, it is of vital importance that the dynamic forces producing movements or shifts in the boundaries of existing types of neighborhoods be analyzed. The second part of this monograph is accordingly devoted to the study of those forces that cause changes in city structure.

It is well known that in some cities certain areas retain the same character for long periods of time. In other cities there is a quick and sudden transition in the land uses or residential occupancy of an area. In general, the speed with which a residential area of a given type shifts to a new location appears to vary with the rate of population growth of the city.

In a static city, with little or no population growth, the residents may continue to live in the same houses and to shop at the same stores for long periods of time. There is no influx of newcomers to invade established residential areas and little or no expansion of stores or factories that will tend to cause change in existing land uses. While it is conceivable that residents may move to new locations and leave their old homes, there is no pressure to cause them to migrate; inertia and family ties are frequently sufficient to keep them rooted to a fixed spot for generations. In such cities, the pattern of land uses and neighborhoods remains unchanged for long periods of time.

On the other hand, the rapid growth of a city necessarily involves the introduction of new and strange elements into the city structure. If the population growth is attracted by new industries, factories may invade residential areas and render them undesirable for high-grade occupancy. Or, new industries may draw to the city unskilled laborers of foreign or nonwhite stock with low living standards. The entry of these newcomers into existing residential areas hastens changes in the character of neighborhoods. The increase of population in a city forces an expansion in stores, warehouses, and office buildings. This expansion frequently causes a transition in types of land use in areas bordering central business districts.

Of even greater importance is the effect of building new homes to take care of the added population. New residential structures on the periphery of the city compete with the old dwelling units. The influx of newcomers causes a shifting and filtering process that profoundly affects every neighborhood in the city. All of the new arrivals do not occupy

new homes. Many of the old residents move to new and more attractive homes farther removed from business and industrial sites, while many of the new arrivals enter old neighborhoods and occupy homes abandoned by the previous occupants. Thus, stresses and strains are set up that accelerate neighborhood change whenever a large number of new arrivals enter a city and cause a building boom. The added population causes a pressure for space, a rise in rents, and an increase in building. But the effect of its entry is not confined to a mere quantitative change in building supply; it also causes qualitative neighborhood changes.

The relationship between rate of population growth and rate of neighborhood change that might be expected to exist on the basis of deductive reasoning is actually found to hold true when case histories of individual cities are examined. A city of slow population growth may be contrasted with a city of rapid growth, and the differences in the rate of movement of the high-grade residential neighborhoods may be measured. A striking comparison may be made between the rate of population growth and the rate of movement of fashionable neighborhoods in two cities that were approximately the same size in 1930, Charleston, S. C., and Charleston, W. Va.

In Charleston, S. C., the population has only doubled since 1830 and has increased but 11.6 percent from 1900 to 1930. The fashionable residential area still remains near the location established over 100 years ago. Room for expanding the high-grade home area was obtained by filling in land on the Ashley River, a few blocks from the sites of the first mansions. In contrast with the fixity of position of the residential area in this static city is the movement of the fashionable areas of Charleston, W. Va., a city whose population increased from 11,099 in 1900 to 60,408 in 1930, a gain of nearly sixfold. In the West Virginia city, the fashionable residential neighborhood—located in the eighties on Clendennin Street two blocks from the juncture of the Elk and Kanawha Rivers—did not remain at the point of original settlement. By 1900 it had moved to Kanawha Street, and the vanguard had reached the present State Capitol grounds—over a mile from the area first occupied by fashionable homes. From 1900 to 1915, the movement of high-grade neighborhoods continued eastward along Kanawha Street, and two new fashionable residential areas were developed. One was along Edgewood Drive in West Charleston, and the other in Louden Heights across the river from the main business section. All these residential areas continued to expand in the period 1915 to 1935 so that the present fashionable home areas occupy districts a mile or more from the point of origin.

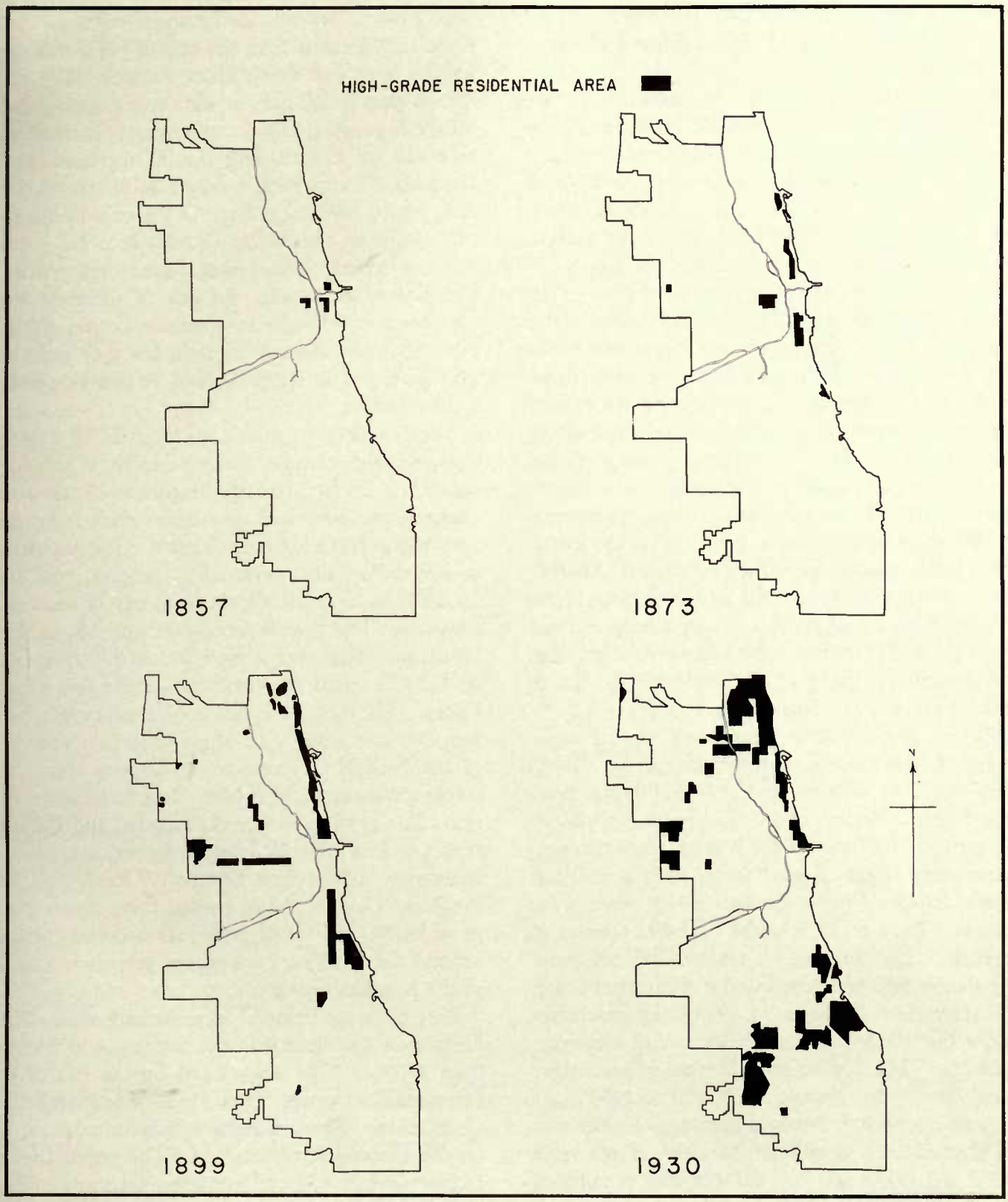
Also, during the past century, the high-grade home neighborhoods of Chicago were moving steadily outward from their original locations near the present "Loop." As the population of Chicago grew from 3,820 in 1836 to 93,000 in 1857, the vanguard of high-grade residential settlement had moved to Chicago Avenue on the north, Halsted Street on the west, and Harrison Street on the south, or nearly a mile from the point of origin. From 1857 to 1873, while the population of Chicago quadrupled, the farthest outpost of fashionable growth had moved 2 miles farther north and south and nearly a mile west. In the period from 1874 to 1899, when the number of people in Chicago tripled, there was a further extension of nearly 5 miles in the three bands of fashionable homes. In the next 35 years there was a continued outward movement of high-grade neighborhoods and an expansion of high-grade suburban neighborhoods, north, south, and west. Figure 29 shows the areas of new growth in Chicago during each of the periods cited. The suburban residential towns of Chicago, developed since the turn of the century, are from 10 to 30 miles distant from the "Loop." During the century of outward movement of high-grade residential neighborhoods, there was deterioration in the quality of areas in the rear of the line of march except for replacing of old structures with high-grade apartments on the "Gold Coast."

The same outward movement of high-grade residential neighborhoods took place in New York, Detroit, Los Angeles, Seattle, Washington, D. C., and other rapidly growing American cities. In Detroit, the population of which increased 450 percent from 1900 to 1930, the high-grade residential neighborhoods located on Jefferson Avenue (near the business center) and in Indian Village in 1900, had moved to Grosse Point, Palmer Park, and Rosedale—7 to 10 miles from the central business district. Other outposts of high-grade development, in Birmingham near Detroit, were 15 miles

FIGURE 29

GROWTH OF HIGH GRADE RESIDENTIAL AREAS

CHICAGO 1857-1930



SOURCE: HOYT, HOMER, *ONE HUNDRED YEARS OF LAND VALUES IN CHICAGO*, (CHICAGO, UNIVERSITY OF CHICAGO PRESS, 1933) P. 319

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and more from the downtown section. Thus, while many local forces, such as deed restrictions, character of the residents of an area, type of buildings, etc., affect the rate of neighborhood change, the rapidity of population growth is one of the most important determinants of the differences in the speed with which high-grade neighborhoods move to new locations.

Since the rate of change in the internal structure of a city varies to a considerable extent with the rate of increase in population, it becomes important to set forth briefly the main causes in the differences of population growth of cities at different times, and of the effect of these variable rates of growth upon variations in the rate of new construction.

Variations in the rate of population growth.—The rate of increase of population for the United States as a whole is governed by the net increase of births over deaths and the net difference between immigration and emigration. In considering the rate of increase of population of different American cities, however, we are also confronted with the phenomenon of internal migration responding to economic opportunities. This latter phenomenon, when superimposed upon normal countrywide population forces, makes for extraordinary variation between different cities. For example, in the three decades from 1900 to 1930, the percentage of population increase for cities of 25,000 population and over varied from 11.6 percent in the case of Charleston, S. C., to 10,062.4 percent for Tulsa, Okla.

Within single States there were similar wide ranges in the rate of population change. In 30 years' time, population changes in Florida cities ranged from a decline of 25 percent for Key West, to a gain of 6,482 percent for Miami. In Michigan, in the single decade from 1920 to 1930, population changes ranged from a decline of 9.1 percent for Ironwood City to an increase of 1,939 percent in Dearborn. Examination of table XXIV discloses that similar variations are found in State after State.

That wide variations in population increases exist in both large and small cities may be seen from figure 30. That chart shows the range in percentage change during the decade from 1920 to 1930 in 35 cities of over 250,000 population and 35 cities of less than 250,000 population in 1930. From table XXIV and figure 30, it is evident that population growth in American cities follows no uniform curve based on birth and death rates. It is rather, subject to extraordinary fluctuations due to the mobility of the American population and its migrations in search of economic opportunity.

In addition to the variations in the rate of population growth by decades between different cities, there are fluctuations in the rate of population gain for the same city for different decades. The sharp rate of population gain in the early stages, when a village is growing into a town or city, is frequently followed by a slackening rate of increase. Sometimes an old city with a slow rate of growth for a long period has a new burst of population increase, or cities have alternating decades of rapid growth and stagnation. These extraordinary differences in the rate of population growth in different cities are caused by changes in opportunities for employment that are afforded by industry and trade in a given city or by its growth in attractiveness as a tourist resort.

The population growth of 20 cities of different sizes, widely scattered geographically, is shown in figure 31. To facilitate the comparison of percentage changes, the curves of population growth have all been plotted on a logarithmic scale. The population of Key West, Fla., declined 25 percent from 1900 to 1930 as a result of the removal of the cigar industry. The population growth of Miami, Fla., which increased nearly one-hundred-fold from 1900 to 1925, is based on its attractiveness as a tourist resort. The increase in the population of Washington, D. C., is a reflection of growth in the activities of the Federal Government. The long time, relatively steady growth of New York City is a reflection of its growth as a world financial and business center and its strategic location for world trade and commerce. Cities like Portland, Oreg., and Los Angeles, Calif., which began their most rapid growth after the western frontier had been pushed beyond the Rockies, have grown extremely rapidly in the past half century.

Some cities are founded on single industries. The increase of 450 percent in the population of Detroit from 1900 to 1930 was caused by the rise of the automobile industry. Gary, Ind., was founded on steel; Akron, Ohio, on rubber; Schenectady, N. Y., on the General Electric plant. The population of each of these cities grew as these industries expanded. Usually, however, the support of the population of

TABLE XXIV.—*Maximum and Minimum Rates of Population Change for Cities in Each State*[1] *With Population of 10,000 and over in 1930 by Decades, 1900 to 1930*

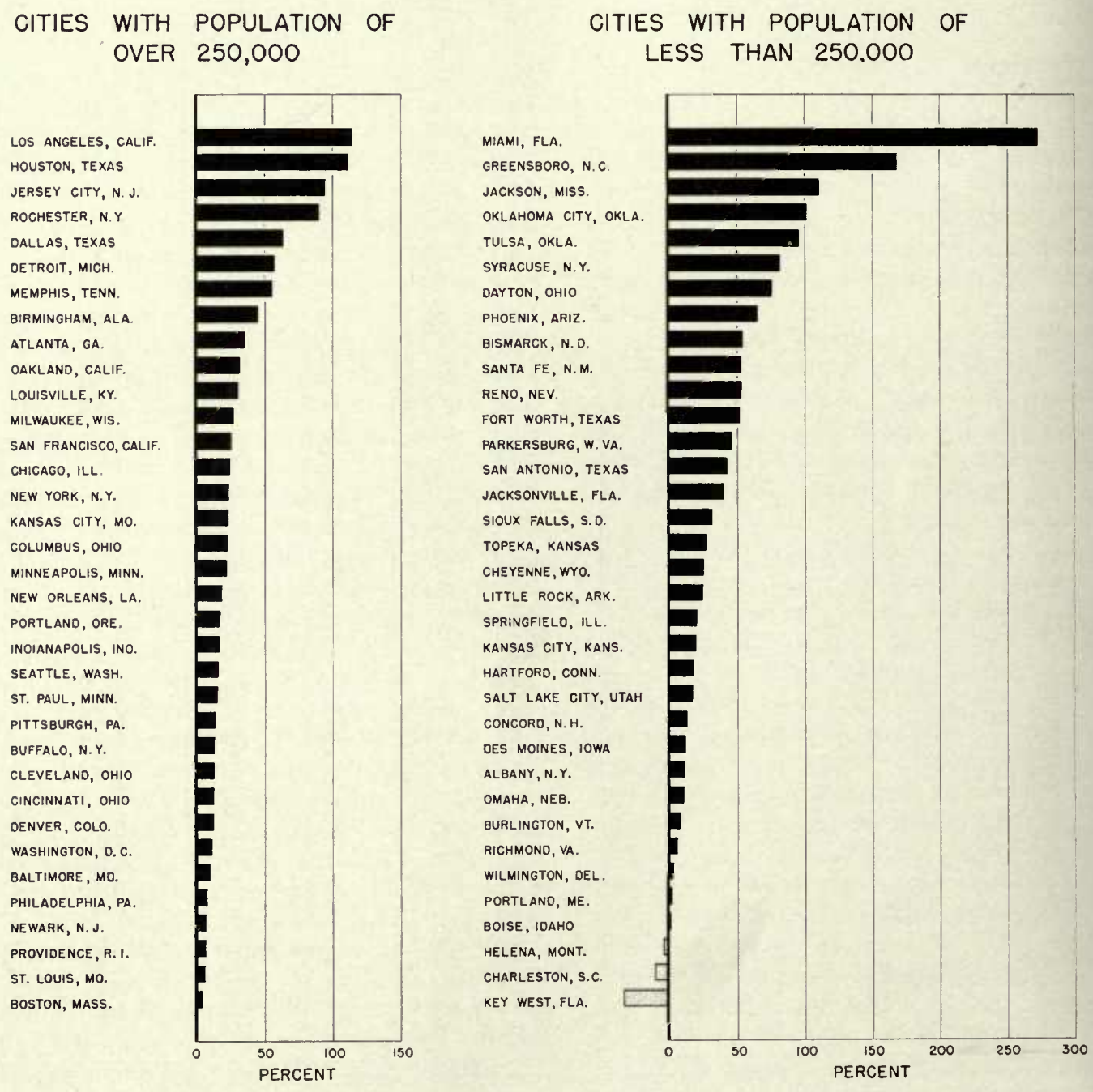
States	1900–1910		1910–20		1920–30	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Alabama	—5.7	245.4	5.3	71.9	15.5	72.2
Arizona	75.2	100.8	33.8	160.9	60.2	65.6
Arkansas	15.1	1,174.5	—19.0	67.5	7.7	322.5
California	11.7	232.2	—8.4	392.9	—14.1	2,485.9
Colorado	37.9	170.6	3.5	34.0	2.0	31.2
Connecticut	12.0	59.5	—6.4	299.0	—4.9	80.0
Florida	16.5	225.5	—6.0	440.5	—31.6	274.1
Georgia	4.1	144.7	9.5	205.0	—14.2	64.8
Illinois	—9.9	141.1	—1.7	142.3	—11.0	716.7
Indiana	—14.8	459.9	—3.0	229.6	—14.4	81.3
Iowa	—4.3	112.2	—5.6	78.7	—4.5	74.4
Kansas	—9.7	156.1	—23.1	251.4	—6.2	98.8
Kentucky	7.1	75.5	—6.3	69.5	—4.1	99.0
Louisiana	18.1	98.5	14.2	56.6	18.5	105.3
Maine	—10.3	20.9	4.7	56.8	—38.2	49.6
Maryland	1.0	56.4	6.3	70.0	9.7	45.6
Massachusetts	—9.0	75.3	—5.9	68.6	—11.1	84.3
Michigan	—18.0	864.9	—15.2	1,028.6	—9.1	1,938.8
Minnesota	—5.7	256.0	3.0	70.8	—14.7	50.3
Mississippi	—3.4	502.5	—13.2	85.1	2.3	111.6
Missouri	—24.8	273.6	—6.8	181.0	—1.6	280.0
Montana	—6.6	211.4	—3.8	72.9	—5.0	19.5
Nebraska	9.5	55.2	3.3	118.4	6.6	38.2
New Hampshire	.3	32.6	—1.6	36.7	—2.0	24.3
New Jersey	2.1	250.6	—3.1	187.9	—13.1	293.4
New Mexico	—9.5	201.2	14.0	42.7	54.4	75.3
New York	3.3	220.8	—8.3	209.8	—14.8	421.6
North Carolina	3.9	173.1	6.1	123.5	—1.8	169.7
North Dakota	49.5	384.6	12.3	69.3	22.1	55.7
Ohio	—3.2	232.9	5.0	415.6	—11.5	279.2
Oklahoma	—.3	1,722.6	—9.7	317.4	9.5	1,241.8
Oregon	14.5	517.0	—34.9	74.1	—26.2	235.2
Pennsylvania	—7.0	436.0	—5.4	478.9	—15.2	104.3
Rhode Island	21.0	58.2	5.9	39.3	—8.7	45.9
South Carolina	5.4	75.6	9.5	55.4	—8.4	37.5
South Dakota	37.3	187.2	30.1	78.8	8.7	80.1
Tennessee	8.7	83.0	7.2	114.1	17.6	109.3
Texas	—2.1	751.4	—2.6	388.8	—18.8	960.8
Utah	44.3	73.3	15.4	28.2	18.8	43.3
Vermont	9.8	27.1	—6.8	11.3	8.8	15.8
Virginia	2.9	90.5	.2	76.2	—16.0	710.8
Washington	—1.5	798.0	—19.9	198.0	3.1	90.4
West Virginia	7.1	382.8	12.4	202.9	3.6	52.5
Wisconsin	—11.3	170.2	—6.8	274.8	—9.0	408.6
Wyoming	—19.6	198.9	22.2	333.8	25.5	45.2

[1] Delaware and Nevada each contained only 1 and Idaho only 2 cities with populations of 10,000 or more in 1930.

Source: U. S. Department of Commerce, *Fifteenth Census of the United States*, Population, Vol. 1 (Washington, 1931), table 2 for each State.

FIGURE 30

PERCENTAGE OF INCREASE IN THE POPULATION OF 70 AMERICAN CITIES 1920 TO 1930



SOURCE: U.S. DEPARTMENT OF COMMERCE, *FIFTEENTH CENSUS OF THE U.S. 1930, POPULATION, VOL. I* (WASHINGTON, D.C., 1931) TABLE 11, 12 & 13

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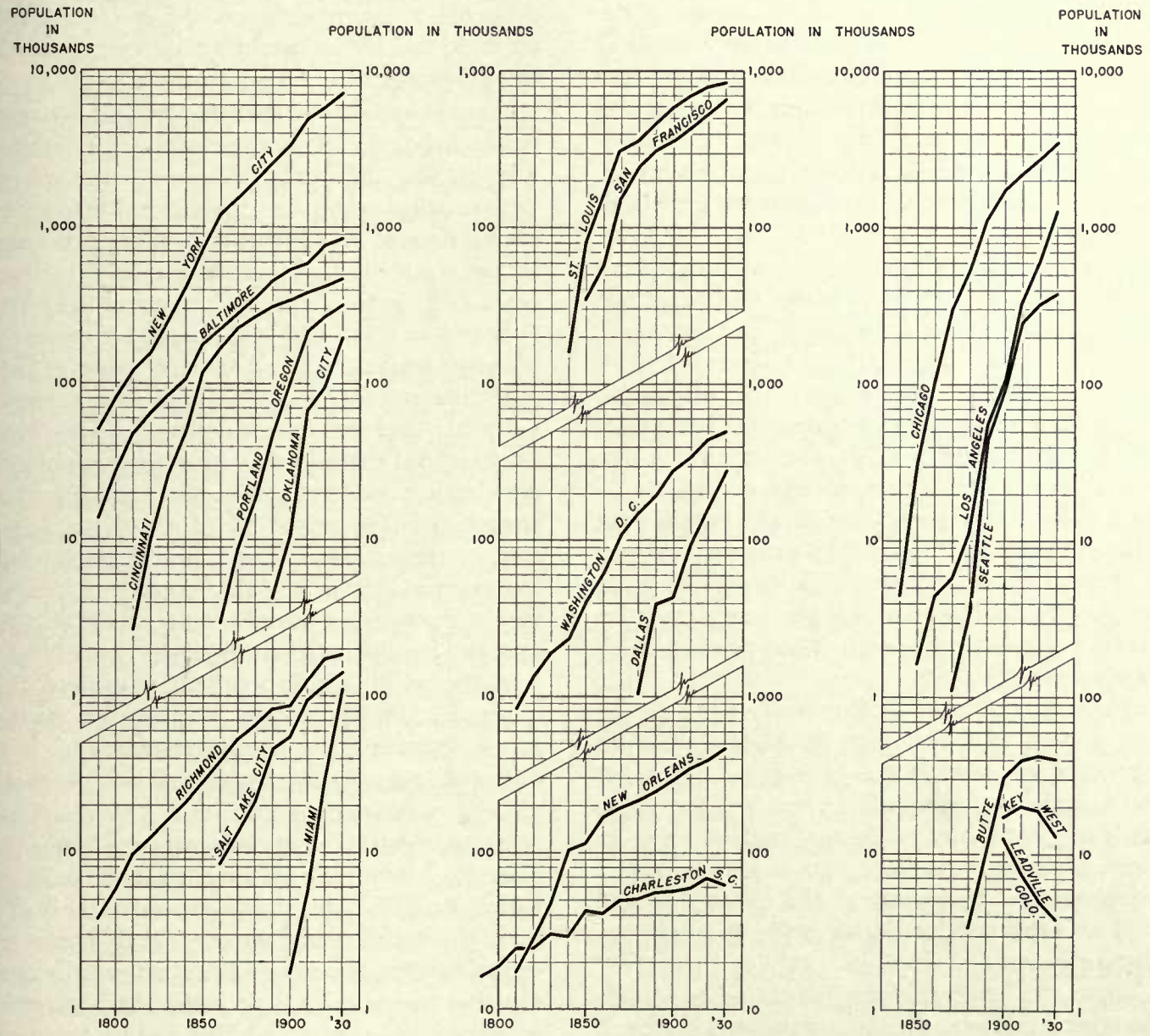
FIGURE 31

COMPARISON OF LONG-TIME POPULATION GROWTH OF 20 SELECTED AMERICAN CITIES



SOURCE: U.S. DEPARTMENT OF COMMERCE, *FIFTEENTH CENSUS OF THE U.S., POPULATION, VOL. I* (WASHINGTON, D.C., 1931) TABLE 2 FOR EACH STATE CONTAINING CITIES CHARTED.

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cities is not dependent on a single industry. In cities containing hundreds or thousands of industries, the expansion of the opportunities for employment in industry as a whole depends upon the balancing of growth or decline in employment opportunities in all the individual plants.

Some cities are almost entirely commercial and rely upon trade with their tributary area for their support. This category of wholesale and retail trade with the hinterland enters to a greater or less degree into the support of most cities. In this case, the growth in the size or population of the trading area requires a growth in the number of people in the principal city that performs the services of wholesale trade, banking, insurance, and transportation for that area. Educational institutions, political capitals, and mineral or timber resources all contribute to the population growth of towns or cities.

It is not intended to discuss in this monograph all of the complex interacting causes that make one city a favorable place for industry, or a crossroads of commerce, or a popular tourist resort, or all of these in varying proportions. The population growth of a city is dependent upon the advantages which make the given urban site a favorable spot for industry and trade or for recreation. The variations in the rate of population growth in American cities are thus due to variations in the net growth of demand for labor from all sources in the given city; and in some cases, to changes in the attractiveness of a city as tourist resort or as a place in which to enjoy other benefits.

An analysis of the underlying causes of the population growth of a city thus furnishes a basis for estimating the probable rate of neighborhood movement or the time that will be required for a high grade residential area to change its character.[1] In order to estimate the future rate of movement of a neighborhood, an analysis of the forces that will tend to attract industries or trade to the given city is required.

There are, however, forces that tend to qualify the general rule as to the effect of population growth on the rate of neighborhood change. Residential areas that are protected by deed restrictions, by natural geographic barriers, and by the stable character of the residents will maintain themselves longer in rapidly growing cities than other types of neighborhoods. Neighborhoods in which homes are well constructed of enduring materials and with a stable architecture will maintain themselves for greater periods of time than areas of flimsily constructed homes. However, even in slowly growing cities, deterioration in the quality of neighborhoods will result from the obsolescence and decay of the existing structures, and from the change in the character of the residents as the first inhabitants grow old and are replaced by a younger generation or by newcomers.

In a slow-growing or declining city, all the neighborhoods may decline at a similar rate. In this case, there is less differential change as between the various neighborhoods in the city since there is a general decrease in the quality of all the home areas in the community. In cities growing rapidly in population, on the other hand, there are more likely to be sudden transitions in the quality of some types of neighborhoods. There will be cases of some neighborhoods improving in quality, others remaining static, and still others declining. The rate of neighborhood change may vary even between cities growing in population at the same rate. The component elements of the added population are of extreme importance. There was a more rapid transition in residential neighborhoods in northern and midwestern industrial cities that attracted unskilled immigrants from other countries or Negroes from the South than in southern or western cities where the added population was largely of the same race and nationality as the first residents.

A new industry in a city does not necessarily cause a dislocation of existing neighborhood patterns, however. The workers attracted by the new plant may form a community, as in Pullman and Cicero near Chicago, that is separate and distinct from the other neighborhoods. High grade residential suburbs beyond the limits of a rapidly growing city may also maintain their character indefinitely as in the case of Oak Park and Evanston near Chicago. In this case, the original settlements were located at such a distance from the business center and industrial districts of Chicago that they could protect themselves from the movement of groups radiating out from the city center.

[1] See appendix, pp. 131–132, for a technique developed from studies made by the Federal Housing Administration for use in rating urban are asas an aid in selecting mortgage risks. The technique is a practical application of an analysis of those forces affecting urban growth discussed in this secion.

Thus, we have different rates of growth in different cities and in the same city at different times. The dislocation of neighborhood patterns will proceed at a pace regulated by the type and rapidity of expansion, the location of the neighborhood relative to business and industrial areas of growth, and local peculiarities tending to restrict rapid changes. Variations in urban growth generally are reflections of the immigration and internal migration of people in response to economic opportunities. Fluctuations in net immigration and the net flow of people from farms to cities are factors of urban growth superimposed upon normal growth or decline that is due to an excess or a deficit of births over deaths. Population shifts due to those causes do not occur spasmodically. They follow the pattern of the business cycle and are the result of the response of mobile populations to the expansion of urban employment opportunities in the period of the upswing of the cycle and to the cessation of immigration or the flow of people from city to country districts in the period of business recession.

The statistics on the number of immigrants admitted annually from 1820 to the present, shown in figure 32, clearly indicate the cyclical pattern of the immigration tide. The peaks of immigration were reached in periods of prosperity and peace in the United States, such as in the periods 1850 to 1854; 1865 to 1873; 1880 to 1882; 1885 to 1892; 1902 to 1907; 1910 to 1914; and 1921 to 1924. The intervening low points of 1858 to 1862; 1876 to 1879; 1894 to 1898; 1908 to 1909; came in years immediately following the trough of business depression. The ebb tide from 1915 to 1919 was the result of the World War. Restrictions in our immigration laws tended to lower the inflow in the prosperity period of the latter part of the 1920's, and the depression of the early 1930's resulted in a net departure of 113,000 aliens in 1932.

There are no comparable annual statistics on internal migration prior to 1920; but in the period 1920 to 1937, shown in table XXV, the migration from farms to cities was greatest in the periods of rising urban employment, and it ceased altogether and reversed itself in the depression year of 1932.

It is probable that migration from farms to cities in the past has followed the same cyclical pattern as immigration. People flock to cities in response to economic opportunities, and it is reasonable to infer that they come in greatest numbers in years of expanding urban employment.

TABLE XXV.—*Net Movement of Persons in the United States From Farms to Cities, 1920–37*

Year	Thousands of persons	Year	Thousands of persons
1920	336	1929	477
1921	564	1930	212
1922	1,137	1931	20
1923	807	1932	−266
1924	487	1933	281
1925	702	1934	351
1926	907	1935	386
1927	457	1936	447
1928	422	1937	288

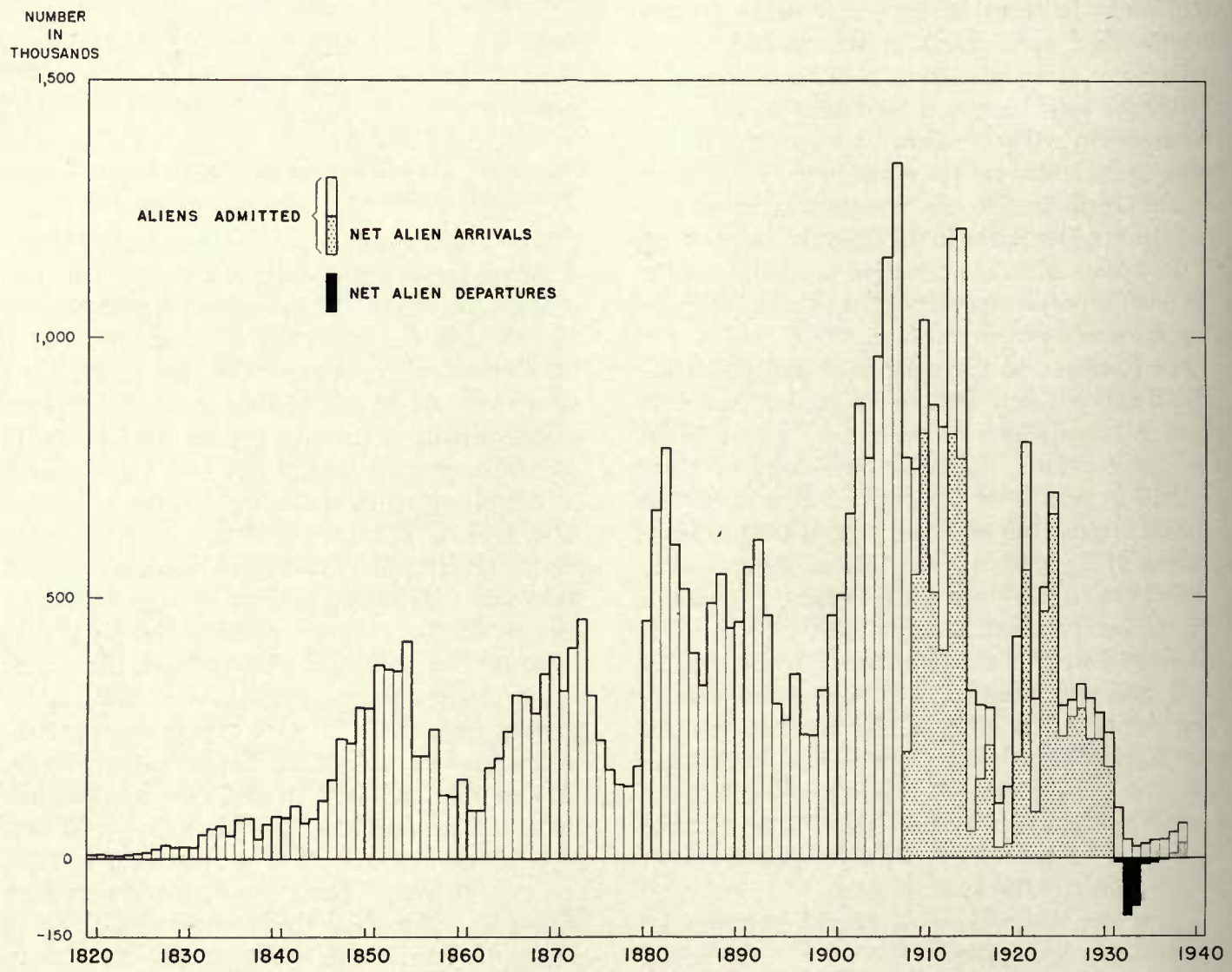
Source: U. S. Department of Agriculture, *Agricultural Statistics*, 1938 (Washington, D. C., 1938), p. 435.

This cyclical nature of population growth may also be shown by the annual rates of population increase of individual cities. The estimated annual percentage increases of population in Chicago from 1835 to 1934, and in Los Angeles from 1900 to 1937, are shown in figure 33. In Chicago, annual population estimates indicate that the highest annual rates of population growth for Chicago took place in such periods of expanding business in Chicago as 1845 to 1855, 1862 to 1872, 1879 to 1892, and 1920 to 1927. On the other hand, in periods of business recession, there was a slackening in the rate of growth or an absolute decline. In the depression years of 1837 to 1838, 1857 to 1858, and 1930 to 1933, there were actual declines in the population of this rapidly growing large city. The rate of population growth of Chicago was small during the depression periods, 1874 to 1877 and 1893 to 1897. In Los Angeles, the most rapid population growth in the period 1900 to 1937 occurred from 1900 to 1906, 1909 to 1913, and 1919 to 1923. There was a marked slackening in the rate of increase in the recession period 1907–8, during the World War, and from 1928–37.

There are not only extraordinary variations in the rate of growth of different American cities and the same city at different times; but, also, in the same city in the same period, there are differences in the rate of population growth of different sections. Even though the city as a whole may be increasing rapidly in population, there are usually areas surrounding the business center in which the population is declining.

FIGURE 32

IMMIGRANTS ADMITTED TO THE UNITED STATES, 1820 - 1938 COMPARED WITH NET ALIEN ARRIVALS OR DEPARTURES, 1908 - 1938



SOURCE: THOMPSON, W.S. AND WHELPTON, P.K., *POPULATION TRENDS IN THE UNITED STATES* (NEW YORK, McGRAW-HILL BOOK CO., INC., 1933) P. 293 U.S. DEPARTMEMT OF LABOR, *REPORTS OF IMMIGRATION AND NATURALIZATION SERVICE* (WASHINGTON, D. C.)

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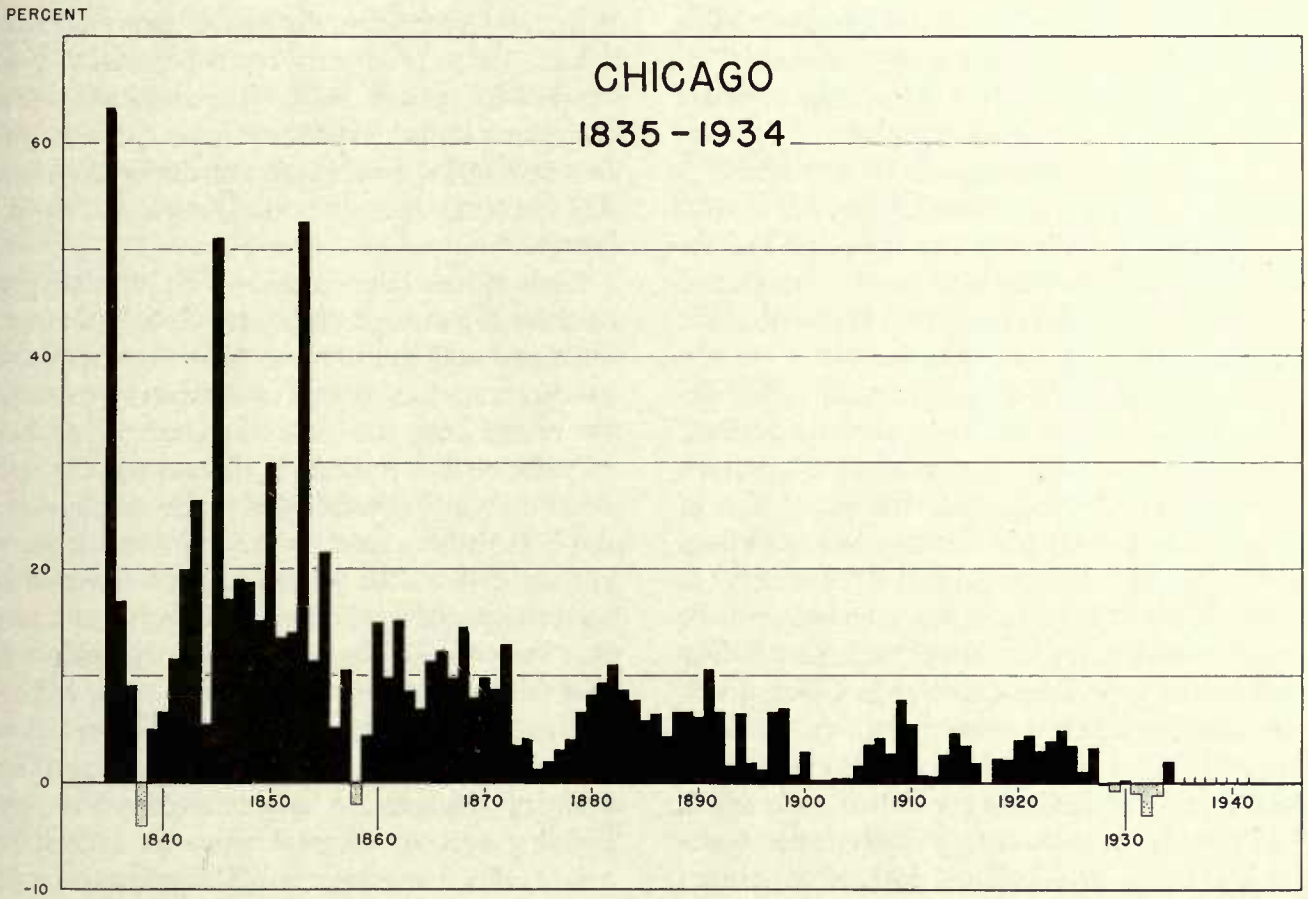
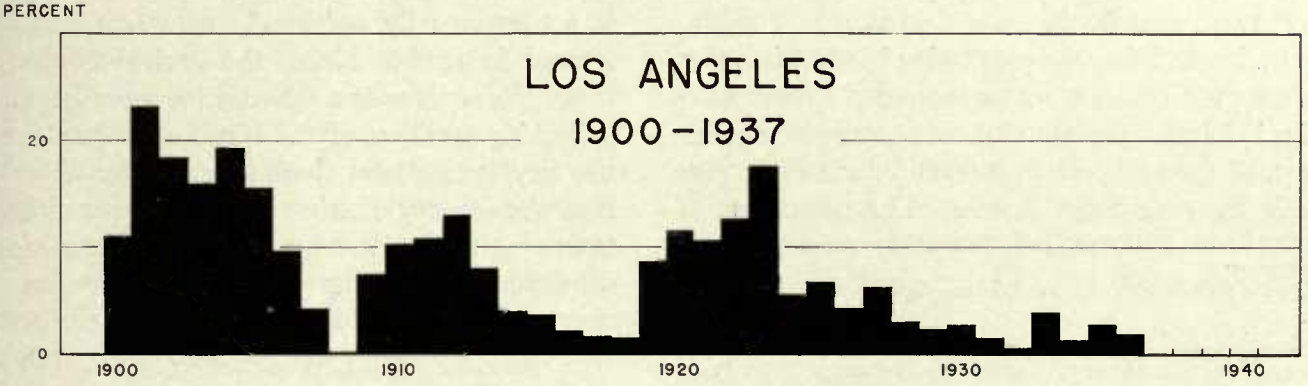
FIGURE 33

PERCENTAGE INCREASE IN POPULATION BY YEARS IN CHICAGO AND LOS ANGELES



SOURCE: HOYT, HOMER, *ONE HUNDRED YEARS OF LAND VALUES IN CHICAGO* (CHICAGO, UNIVERSITY OF CHICAGO PRESS, 1933), P. 483



SOURCE: CONSULTING ENGINEER, LOS ANGELES COUNTY, 1900 - 1929
CALIFORNIA TAXPAYERS ASSOCIATION, 1930 - 1937

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The tendency for the central parts of great cities to decline in population while the number of persons on the periphery increases is a world wide urban phenomenon. In central London, there was a decrease of 13.6 percent in the population between 1891 and 1921, while the population in the fringe of the city outside the county of London increased 110.1 percent. From 1921 to 1931 there was a decline of 0.4 percent in the population of the county of London, while the rest of greater London outside the county increased 20.9 percent. Similarly, in Paris and Berlin the greatest population increases in recent decades were on the periphery of the city.

In Chicago, the population of the area within 2 miles of the business center reached its peak in 1890 and subsequently declined. The population of the next mile zone reached its high point in 1900, and the number of persons living from 3 to 4 miles from the center reached a maximum in 1910.[2] In the same city, the population of an irregular area [3] extending 4 to 5 miles from the business center declined from 1,060,716 to 848,803, a drop of 20 percent between 1920 and 1934, while the population of the rest of the city outside this area increased from 1,641,000 to 2,411,200, a gain of 47 percent. In the period from 1920 to 1930, the population of the Chicago suburban area increased 72 percent.[4] The highest rate of population decrease in Chicago was in the area immediately adjacent to the business center, and the rate of loss declines until the boundaries of the area of declining population are reached. Beyond the edge of the territory of decreasing population is a fringe in which the rate of population growth was less than 10 percent from 1920 to 1930. Finally, on the periphery near the city limits, north and west, were areas with a population gain of 200 percent and over in the same decade.

In St. Louis, Mo., the population in the triangular area near the business center, bounded by the Mississippi River, Jefferson Avenue, and Angelica Street, reached its peak in 1900 and declined 33 percent in the next three decades. The population in the next zone between Jefferson and Grand Avenues attained its maximum in 1920 and declined slightly in the ensuing decade.[5] In the third zone, between Grand Avenue and Kingshighway, the population growth continued to 1930, but at a slackening rate of increase after 1920. In the fourth and last zone, between Kingshighway and the city limits, the rate of population growth was most rapid—increasing more than threefold from 1900 to 1920 and another 40 percent from 1920 to 1930.

In New York City, the population of Manhattan Island, the area of early rapid population growth, reached its apex in 1910. Its population decreased 29 percent in the next 25 years. In the same quarter of a century, the population of the Bronx increased 257 percent, and that of Queens increased 389 percent.[6]

Cycle of new construction.—The physical growth of cities is measured chiefly by the addition of new buildings and not by the growth of population. Despite a marked growth or contraction in the number of residents, the external appearance of the city may not be greatly altered. In one case the existing structures are overcrowded with much doubling up; in the other case there are many vacancies. The ebb and flow of the population tide, however, does tend to operate upon the profit motive in a manner that leads to the production of buildings in a cycle that follows the population cycle.

Since the fluctuations in the volume of new construction of a city affect the rate of internal neighborhood change, the sequence of events in the building cycle is of great value in understanding neighborhood movements. The primary or initial impulse that starts an upswing in construction is the beginning of recovery of industry and trade from the low point of a depression. The upswing is not necessarily universal. In a few industries, located in certain cities, the revival begins. At these places there is a demand for more labor. As increasing numbers of the qualified unemployed in the city secure jobs, there is an inflow of workers from the country districts and from other cities and towns to take advantage of the opportunities for employment. As the industrial expansion continues, there may be a rapid increase in the number

[2] *Report of the Chicago Traction and Subway Commission* (Chicago 1916), p. 73.

[3] Calculations based upon *Census Data of the City of Chicago, 1934*, edited, by Newcomb, C. S., and Lang, R. O. (Chicago, University of Chicago Press, 1934), pp. 692–695.

[4] U. S. Department of Commerce, *Fifteenth Census of the United States*, Population, Vol. I (Washington, 1931), pp. 289–290, Cook County, excluding Chicago city.

[5] City Plan Commission, St. Louis, Mo., *Urban Land Policy*, October 1936, p. 8.

[6] Data for 1910 from *Abstract of the Fifteenth Census of the U. S.*, U. S. Department of Commerce (Washington 1933), p. 22; 1935 data from *Official Directory, 1937*, The City of New York, p. 7.

of workers coming to the community. The sudden influx of this body of laborers and their families puts a pressure on housing facilities in the particular cities where industry or trade is expanding and causes any existing vacancies to vanish. Rents for dwelling units in these cities begin a rise which is slow at first and then rapid as available residential quarters become very scarce. The increase in rents causes a rise in the value of existing buildings. If the cost of new building does not rise faster than rents, it becomes profitable to build. As a result a construction boom is initiated, based on the hopes of the continuation of industrial expansion and the consequent continued attraction of individuals seeking economic opportunity. The absorption of land for new construction generates a land and subdivision boom.

About the time all of these speculative activities are at full tide, industrial employment has either reached peak levels or is increasing at a slower rate. The supply of houses overtakes and passes the increase in the number of home dwellers, with the result that vacancies begin to increase, and the rapid advance in rents comes to an end. There is a waiting period in which real-estate speculation subsides, and the market for real property becomes stagnant without any drastic declines. Finally, however, an industrial crisis terminates the era of full employment at high wages. Many laborers are forced to return to the country districts from which they came; others, because of reduced wages, are forced to "double up." As a result, vacancies increase rapidly and rents decline drastically.

As operating expenses do not fall as rapidly as rents, net income from rented properties falls even faster than gross rents. Foreclosures mount rapidly, and prices of existing buildings fall under the pressure of forced sales. While rents have fallen drastically, nominal union wage rates are maintained at peak levels. Building material costs have been lowered but slightly. Because of lowered returns with the maintenance of high costs of building production, it is not profitable to build, and new construction practically ceases. Meanwhile, the number of new urban families is increasing very slightly, if at all, because not only are many families leaving the city but many marriages are being deferred for economic reasons.

This downward spiral is reversed when there begins to be an improvement in industrial employment, and the whole process already described starts over again. Thus, the extraordinary variations in the annual rate of new construction in American cities often result from a sequence of events that is set in motion by shifts of population responding to the business cycle.[7] In Chicago, for example, between 1852 and 1932 five-sixths of all the buildings were erected in the 40 most active building years and only one-sixth of the structures were erected in the other 40 years. While 25 square miles of newly built-up areas were added to its territory in the 8 years from 1921 to 1929, the growth in the next 8 years was neglible. The population of Chicago increased most during years of great building activity. The growth from 2,600,000 in 1919 to 3,400,000 in 1927 led to a building boom in which the permit value of new buildings increased tenfold from $34,792,000 in 1918 to $366,586,400 in 1926. When population declined from 1927 to 1932, the value of new construction dropped 99 percent—to $3,824,500 in 1932. Similar fluctuations, although not always so violent, may be found in other cities.

One writer[8] has compared annual population growth and new construction activity in 17 American cities for the period 1875 to 1933 and found that there was a tendency for population growth to anticipate major changes in building activity by a year or two.

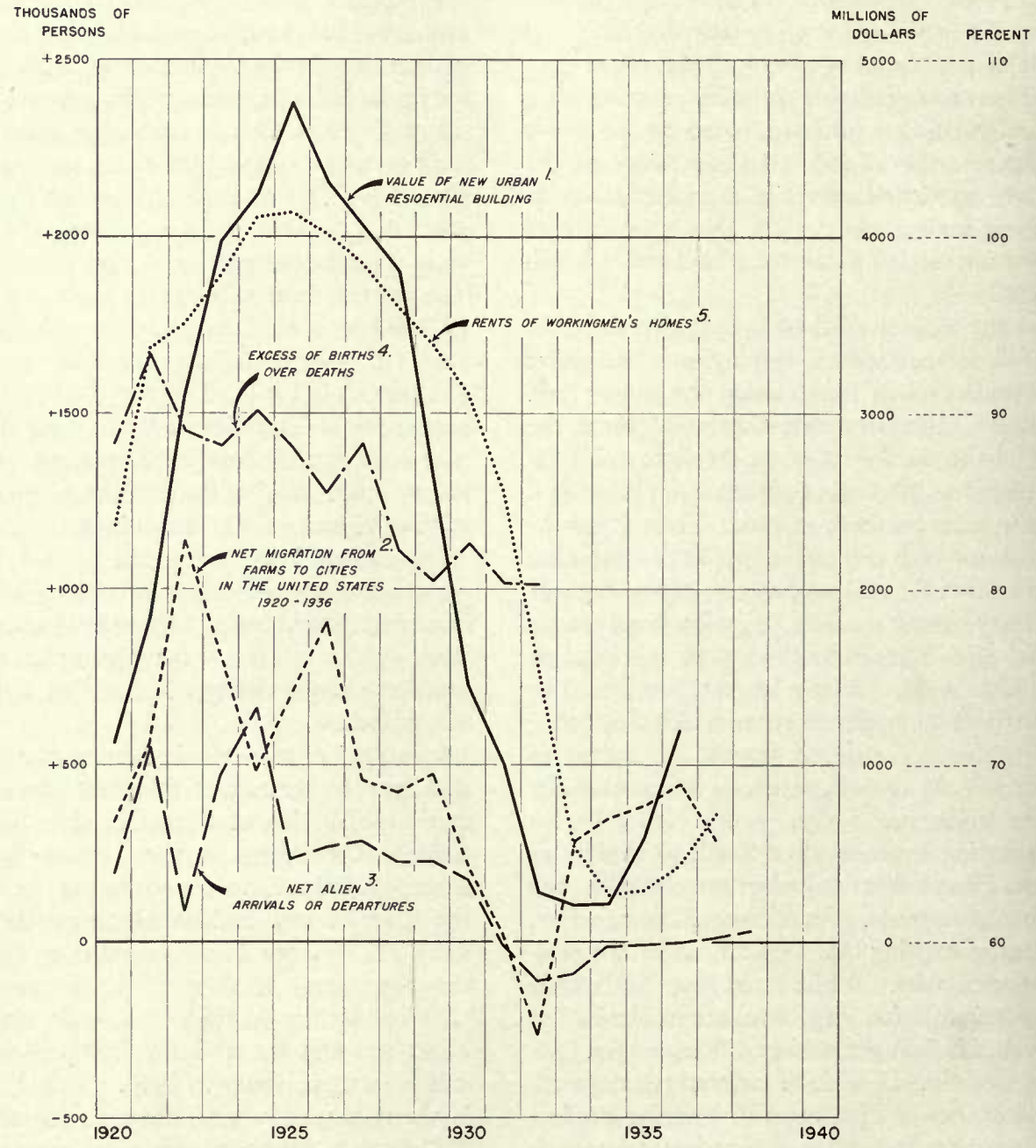
Examination of a single recent cycle reveals a striking corroboration of the effect of a rapid spurt in the population of American cities upon urban residential building in the United States. The basic population factors contributing to city growth, the value of new residential construction, and an index of rents are shown together in figure 34 for the years from 1920 to 1936. Economic opportunities after the World War caused a rush to cities. There was first the return of 5,000,000 soldiers and sailors to their homes in 1919. Second, the excess in the number of aliens arriving from abroad over the number departing increased from 19,000 in 1918 to 552,000 in 1921; and after a decline to

[7] See Hoyt, Homer, *op. cit.*, p. 411, fig. 99, The Chicago Land Value and Building Cycles Compared with General Business Activity in the United States, 1830–1933.

[8] Newman, W. H., "The Building Industry and Business Cycles," *The Journal of Business of the University of Chicago*, July 1935, pt. 2, pp. 32–39.

FIGURE 34

FACTORS AFFECTING URBAN POPULATION GROWTH COMPARED WITH VALUE OF NEW URBAN RESIDENTIAL BUILDING AND URBAN RESIDENTIAL RENTS



SOURCE:
1. WICKENS, D.L., AND FOSTER, R.R., *NON-FARM RESIDENTIAL CONSTRUCTION, 1920-1936.* NATIONAL BUREAU OF ECONOMIC RESEARCH, N.Y., BULLETIN 65, SEPTEMBER 15, 1937, P. 2
2. U.S. DEPARTMENT OF AGRICULTURE, *AGRICULTURAL STATISTICS, 1938* (WASHINGTON, D.C., 1938) P. 435
3. THOMPSON, W.S., AND WHELPTON, P.K., *POPULATION TRENDS IN THE UNITED STATES* (NEW YORK, McGRAW-HILL BOOK CO., INC., 1933) P. 296 AND DEPARTMENT OF LABOR, *REPORTS OF IMMIGRATION AND NATURALIZATION SERVICE* (WASHINGTON, D.C.)
4. THOMPSON, W.S., AND WHELPTON, P.K., OP. CIT. PP. 234, 266.
5. U.S. DEPARTMENT OF LABOR, *CHANGES IN COST OF LIVING,* JULY 15, 1938 (WASHINGTON, D.C.) P. 6

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87,000 in 1922, it rose to a new peak of 663,000 in 1924. Most of these aliens went to cities. Third, the net number of persons going from farms to cities rose from 336,000 in 1920 to 1,137,000 in 1922. Finally, even the natural increase due to an excess of births over deaths rose from the low point of 900,000 in 1918, the year of the influenza epidemic, to 1,656,000 in 1921. The acceleration of the marriage rate after the World War increased the number of new households at a rate in excess of the natural increase. All of the factors combined caused a demand for residential accommodations in American cities that sent rents upward, making it profitable to build and led to a residential building boom that reached its crest in 1925. Even before the value of new residential units reached its peak, however, there was a falling off in the rate of population growth. The tide of alien arrivals began to recede after 1924. Internal migration, while still large, failed to surpass the peak of 1922. There was an absolute decline in the excess of births over deaths despite the larger population.

The decline in alien arrivals after 1924 and in migration from farms to cities after 1926 had its effect on new residential building. Residential rents reached their peak in 1925, and began a decline that was slow until 1930 and thereafter was rapid. New residential construction likewise began to recede after 1925. The rate of population growth continued to slacken until 1932, when for the first time in a century American cities lost population. That was the year when the movement from farms to cities reversed itself, and there was a net movement of 266,000 persons going from cities to rural areas. In the same year there was a net loss of 113,000 aliens through emigration. After this year of absolute decline in urban population, new residential building reached its lowest ebb in 1933.

Even as the growth of population is most rapid at the periphery of the city, so also does most new construction of residential buildings take place in areas beyond the zone immediately surrounding the central business district. When the location of new residences is placed on a spot map of a city, it is surprising to note how few are located in the older neighborhoods. Figure 1 in the Map Supplement shows that most of the new residences erected in Detroit, Mich., in the first 4 months of 1937 were outside the boundaries of the area settled before 1920. In Chicago, the area of 51 square miles surrounding the central business district in which population declined from 1920 to 1934 has very few structures less than 40 years old.

In the periods of active building, solid rows of new homes are erected on the fringe of the city and few houses are erected in old neighborhoods even when there are vacant lots available. Although building costs are approximately the same in any location in the city, construction of a building in an old section may cause the new structure to lose a considerable part of its value because of the nature of its surroundings.

As a result of the tendency of cities to add successive rings of new residential structures by a series of spurts, there is frequently a considerable time lag between the ages of successive neighborhoods. A community of new homes built during the crest of one building boom may have no competition from other homes in the ensuing lull in construction. In the next building boom, some years later, other communities with homes in a newer and later style will tend to relegate this earlier crop of houses to the second rank. Neighborhoods in which the homes are built all at one time and of a similar type, however, may have greater stability than communities in which the houses were built at different periods of time.

Chapter II

The Form of City Growth

In the preceding chapter, it was noted that an increase of population and new construction activity in any city tends to cause the settled area to expand and its neighborhoods to move, and that the velocity of neighborhood change tends to vary with the rate of increase in the number of people in the urban community. The very next question that arises in the study of the dynamics of cities, however, is that of the direction and pattern of city and neighborhood growth. What is the shape of the path traced by the motion of growing communities? Faced with the fact that the addition of people and buildings to a city causes a change in its entire structure, students of city growth, property owners, or mortgage investors desire to know in what direction the city will grow and what areas will be affected by the process of neighborhood change.

In general, when a building boom is generated in a city, there are three ways in which new building may add to its supply of dwelling units. It may (1) expand vertically in areas already settled through the replacement of single-family by multifamily structures, (2) fill in the interstices in the existing settled area—*i. e.*, build on vacant lots in blocks already partially developed with structures, or, (3) extend the existing settled area on the periphery of the city by the erection of new homes on newly subdivided land.

The third method of growth—the lateral extension of urban areas—has been described by one writer [1] as growth about the central core, or growth in successive concentric circles around the original settled nucleus. More recently,[2] the lateral extension of cities has been diagnosed as a phenomenon which occurs by (*a*) axial growth—the extension of buildings in radial lines from the main body of the city along fast transportation lines so that the city assumes a star-shaped appearance, (*b*) growth of isolated nuclei of houses beyond the periphery of the main urban area, and (*c*) growth of isolated nuclei until they coalesce with each other or the main body of the city.

These various types of growth are not mutually exclusive. In fact, all of them may be taking place simultaneously in the same city. In this chapter, however, we will discuss principally the lateral extension of cities in the several patterns outlined above. But first, we must set up a technique for the delineation of city growth. Just as the first step in the analysis of city structure showed the physical body of the city in one sweeping view at one period of time, the first step in studying the form of city growth is to compare a series of settled area maps showing the form of city structure at successive time periods. Settled area maps do not show verti-

[1] Hurd, R. M., *op. cit.*, p. 59.

[2] Fisher, Ernest M., "Speculation in Suburban Lands," *American Economic Review*, Vol. XXIII, No. 1, Supplement, March 1933, p. 152.

"Around the fringes of all urban areas of any size, lies the territory into which the distinctly urban uses of land must expand as the community grows. This area has very appropriately been called the 'penumbra' of the urban community. * * * Here and there patches are definitely withdrawn from the rural or semirural uses, platted in small units served by common means of access, and offered for sale as building sites. Frequently, the public utilities necessary for urban uses are at least partially installed and completely promised, plans are presented for the development of such community activities as schools and churches, and houses and business premises are built.

"These patches of development are widely scattered through the penumbra of the urban area, frequently without relation to one another or to the urban community as a whole. They are isolated nuclei which gradually grow by the process of accretion, absorbing more and more of the penumbra until their borders meet. When the whole of the area has been absorbed into one or the other of the nuclei, it becomes a part of the original urban community.

"Thus, the advance of urban uses into the penumbra is by no means a steady or uniform one; the urban uses do not, as might be supposed, creep out into the penumbra at an even pace. They sometimes leap over considerable stretches of territory to establish themselves at spots remote from the fringe of existing uses, leaving the intervening area to be filled in slowly.

"There are then two distinct phases of the growth of urban uses in the penumbra, one is the expansion stage during which the new nuclei are being established, and the other, the filling-in stage during which the interstices between nuclei are being absorbed."

cal or interstitial growth of areas already settled. They do show, however, the pattern that cities assume at different time periods and thus reflect central and axial growth, the expansion and coalescence of existing outer nuclei, and the growth of new isolated nuclei on the fringe of the city.

The material for the construction of these settled area maps for different time intervals is derived from several sources. *First*, there are United States quadrangular survey maps of cities, showing the location of individual buildings for former periods of time beginning in the nineties. These maps do not cover regular time intervals, however, and vary considerably in the details presented. *Second*, Sanborn insurance atlases, showing location of individual houses are available for many cities for periods as early as the eighties. *Third*, in many cities such as Baltimore, Boston, and New Orleans, there are early maps, dating as far back as the period 1760 to 1800, that show the location of the individual structures. *Fourth*, early "bird's-eye" photographs of entire cities, such as Chicago in 1857, indicate the extent of the settled area at a given time. *Fifth*, from histories of cities, or from the files of newspaper accounts, information as to the building up of certain areas can frequently be obtained. *Sixth*, the record of building permits shows the age of the buildings in a given area. *Seventh*, from real property surveys showing age of structures, the period of time during which an area was first occupied by buildings may be derived. *Eighth*, the appearance and style of architecture of the oldest remaining buildings in an area tend to corroborate other records as to the age of structures. *Ninth*, the testimony of the oldest inhabitants as to the date when certain areas were first settled is useful in filling out gaps in the data or in corroborating other evidence.

When the material from these various sources is assembled, compared, and analyzed, a settled area map of the city for a certain period of time may be prepared by filling in all areas where there is more than one house to the acre. All clusters of dwellings are included in the settled area. The urban mass, as thus defined, varies greatly in density of buildings and population, and these variations are not indicated on the settled area maps. These maps do indicate, however, the general shape, direction, and velocity of the lateral extension of the city as it increases in population.

The settled area maps may be presented in two forms. In the first, there is a series of maps, each one showing the settled area of the city at a given time. The growth of the city can be observed by comparison. In the second form, the growth of the settled area of the city is shown on one map which indicates the original nucleus of settlement and the growth added in each successive time interval. Both types are illustrated in figure 35 which shows the growth of the settled areas in the Chicago metropolitan region.

History tended to repeat itself during the century that Chicago grew from a hamlet of a dozen log huts in 1830 to the fifth largest city in the world. As a result, several of the various types of city growth outlined above took place in Chicago simultaneously during each of the periods of growth mapped in figure 35.

Thus, from 1830 to 1857, there was, at the same time, a filling in of partially developed blocks in the area of first settlement, axial growth along plank roads—Milwaukee Avenue, Madison Street, and Ogden Avenue, central growth between the radial lines of the plank roads, and the growth of isolated nuclei beyond the fringe of the main settled area.

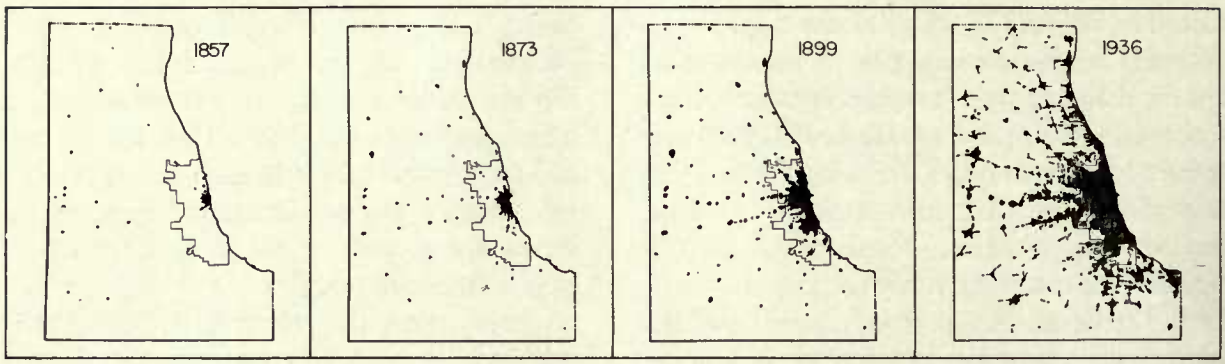
In the period from 1857 to 1873, all these processes of urban growth continued. There was a growth of houses on vacant lots between existing buildings in the older settled area. There was continuation of axial growth along Milwaukee Avenue, Madison Street, Ogden Avenue, Blue Island Avenue, and the Rock Island Railroad, which caused the settled area to extend farthest along these fast transportation highways. There was central growth or filling in between the radial lines. There was the establishment of isolated nuclei of growth on the periphery of the city. Finally, the earlier patches of settlement just beyond the fringe of the main body of the city of 1857 had coalesced with the central urban mass.

The period 1873 to 1899 witnessed a repetition of the process just described with the addition of another phenomenon—the replacement of single-family structures by apartments. Again, new radial lines of growth shot out; again, central growth filled in interstices between axial growths; again, isolated patches of growth sprang up on the periph-

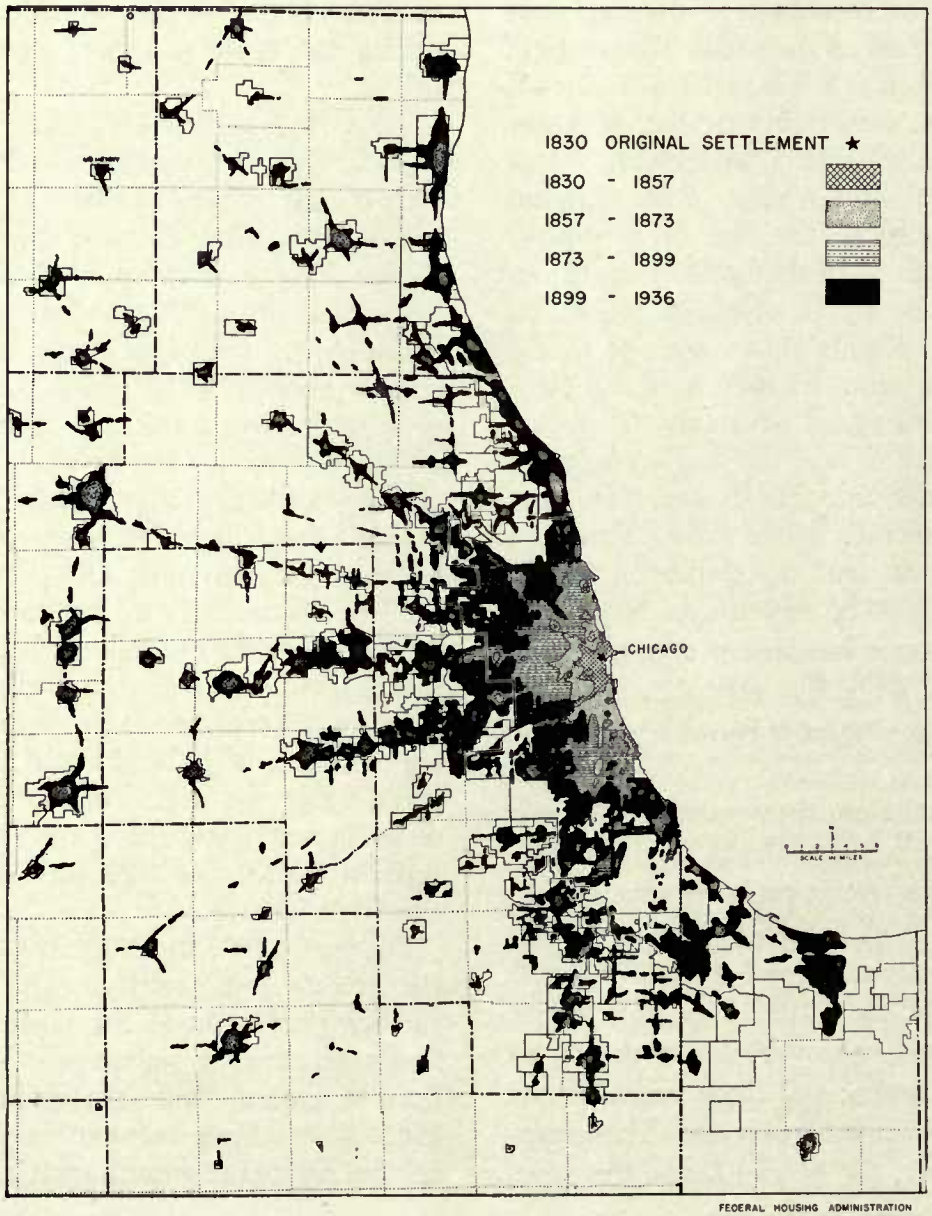
FIGURE 35

THE CHICAGO METROPOLITAN REGION

(A) SETTLED AREAS AT DIFFERENT PERIODS



(B) GROWTH OF SETTLED AREAS 1830 – 1936



ery of the city; and again, the scattered nuclei just beyond the main body of the earlier settled area were absorbed in the central growth of the main urban community.

And in the period from 1900 to 1929, there was *first*, replacement of single-family structures and utilization of vacant lots in Hyde Park and Wilson Avenue and the near North Side areas by multi-family dwelling units. *Second*, there was a filling in of partially built blocks in many sections of the city such as Hyde Park and Wilson Avenue. *Third*, there was a radial extension of the settled area or axial growth in long streamers along fast transportation lines on the North Shore, and westward and northwestward. *Fourth*, there was central growth, or the filling in of vacant areas between the radial lines of growth. This filling in was facilitated by crosstown street-car lines on the northwest and southwest sides. *Fifth*, new isolated nuclei of growth were established in the penumbra on the fringe of the city. *Sixth*, there was an expansion of existing nuclei of growth until they coalesced with each other and formed continuous bands of growth. Evanston, Wilmette, Kenilworth, Winnetka, Glencoe, Highland Park, Highwood, Lake Forest, Lake Bluff, North Chicago, and Waukegan grew together on the North Shore until they practically formed one continuous streamer of urban growth northward along the lake shore. Similarly on the west along the Chicago & Northwestern Railroad, Oak Park, Forest Park, Maywood, Bellwood, Elmhurst, Lombard, and Wheaton tended to coalesce in a band of growth. Northwest, along another line of the Chicago & Northwestern Railroad, Norwood Park, Park Ridge, Des Plaines, Mount Prospect, Arlington Heights, Palestine, and Barrington tended to reach toward each other in their process of growth.

Thus, in Chicago's most recent period of growth, we had all the forms of growth simultaneously in evidence—vertical and interstitial expansion, axial and central growth, the expansion and coalescence of existing outer nuclei, and the growth of new isolated nuclei on the fringe of the city. The reader may also study and compare the patterns of growth of the settled areas of 11 other cities in the Map Supplement.[3] The latter maps are of the comparative type—each period of growth is illustrated by a separate map for each city. Also for comparative purposes, every map shown in this group in the Map Supplement is drawn to the same scale as every other map on the same page. Map scales on different pages, however, are not comparable. The growth of several of the cities illustrated there is discussed below.

In New York City, the first settlement was at the tip of Manhattan Island; central and interstitial growth prevailed until the early 1800's. Only small tentacles of growth had stretched northward, and a few isolated nuclei had been established by 1861. By 1881, radial bands of settlement had grown north along the New York, New Haven, & Hartford Railroad. At the same time isolated nuclei of settlement had formed along the two lines of the Long Island Railroad. By 1903 these detached settlements coalesced to form continuous bands, and by 1934 they had spread on each side of the transportation system to cover a broad band of growth. Meanwhile, the detached settlements in the Bronx had coalesced between 1903 and 1934 to form a solid urban body. The present borough of Brooklyn originally consisted of a number of separate villages which gradually grew together into one urban mass. Thus, New York City expanded by axial growth, the flinging out of detached nuclei of settlements and the filling in by the process of central growth, and the growing together of isolated settlements. As the original detached settlements, like Greenwich Village and Harlem, were absorbed by the expansion of the main body of the city, additional independent settlements were developed in the Oranges and Maplewood, N. J., in towns like Pelham, Larchmont, Scarsdale in Westchester County, N. Y., and in Hempstead, Garden City, and other settlements on Long Island.

In Washington, D. C., the first areas of settlement were widely scattered over the four quadrants of the city, but the settlement in 1801 consisted of several nuclei along the axis of Pennsylvania Avenue from Sixth Street to Georgetown. By 1856 these settlements had grown together in irregular bands of growth that widened around the navy yard and the Capitol, and reached their greatest width between Sixteenth Street and New Jersey Avenue. There were large detached settlements of growth in the southwest quadrant and detached settlements beyond the main settled area but still within

[3] Figs. 22–24, see pp. 157–159.

Florida Avenue in the northwest quadrant. By 1887, all of this stringlike growth and the isolated nuclei had become welded together and had bulged out beyond Florida Avenue to the northwest. From 1887 to 1917, there was growth on the periphery and radial extension in the northwest along Wisconsin Avenue and along Georgia Avenue. Finally, in the last period from 1917 to 1934, there were great radial extensions of the settled area along Connecticut Avenue and to the east of Sixteenth Street and northwestward, leaving vacant intervening spaces between the bands of radial growth in Rock Creek Park and in the area blocked off from direct access to the center of the city by Soldiers' Home. While the earlier isolated nuclei were coalescing in the main body of the city, other isolated settlements sprang up in Arlington County, Va., and in adjacent areas in Maryland, which in turn began to flow together.

Baltimore is a good example of central growth, particularly for the period prior to 1904, when it grew solidly in compact concentric circles around the starting nucleus north of the Patapsco River. After 1904, electric street-car lines enabled it to send out long streamers of growth northward.

Philadelphia grew mainly by central growth before 1840, but between 1840 and 1881 detached settlements grew up beyond the periphery. These settlements expanded in size by 1900, and finally had grown together into an almost solid mass by 1934. Meanwhile, additional nuclei of settlement were flung out beyond the main body of growth.

Charleston, W. Va., from the starting point on the east bank of the Elk River at its junction with the Kanawha River, grew first mainly eastward along the narrow river valley, and then from 1902 to 1912 expanded toward both the east and west. Westward growth continued from 1912 to 1922. From 1922 to 1933, some settlements spread into the hills as a result of improved concrete roads, and others grew across the Kanawha River. In the case of Charleston, the topography virtually compelled a stringlike growth along the narrow river valley, hemmed in by high hills on each side. There was no room for isolated nuclei to spring up until the way was opened by concrete roads.

New Orleans expanded along the bend of the river until 1906; but from 1906 to 1929, it flung out radial bands of growth toward Lake Pontchartrain and established a few settlements across the river from the main body of the city.

Thus, while some cities exhibit every type of growth simultaneously and spasmodically repeat the process, as did Chicago in its 100 years of growth, other cities tend to expand in more orderly fashion. In some cases, one form of city growth predominates and other types of growth are subordinated. Although the same forces are in operation in all growing cities, the intensity of the impact of those forces determines the type of growth that will predominate at any time. Examination of the maps of the 12 illustrative cities referred to in this chapter indicates that, generally, the more rapid the growth of the urban area, the more rapidly will axial lines of growth be extended and outlying satellite areas, or nuclei, be established, grow, and coalesce with the urban mass. Slowly growing cities will tend to fill out interstices and have greater central growth with sluggish axial growth and only little expansion of outer nuclei. On the other hand, rapidly growing cities like Chicago (see fig. 35) will have active growth of all types—axial growth and the establishment, expansion, and coalescence of outer nuclei will proceed apace. The rapid growth of business and industrial activity at the central core with its consequent attraction of new inhabitants acts as a catalyst to the physical growth of the city itself and its outlying areas.

In the process of lateral growth, however, the topography of the urban area is a limiting factor. It is evident that hills, mountains, rivers, bays and lakes affect the form of cities located near them. Cities in narrow river valleys assume long stringlike forms like Charleston, W. Va. The configurations of rivers, bays, and ocean inlets affect the form of the settled areas of New York, Boston, San Francisco and other cities. Chicago's shape is influenced by the contour of Lake Michigan. Cities on one side of a broad deep river, such as New Orleans and Kansas City, expand chiefly on the side originally settled. A swamp limits the growth of New Orleans on one side. Mountain barriers, arising out of a plain, limit the expansion of Salt Lake City.

Such natural barriers to growth are overcome only with difficulty. Man's ingenuity has enabled him to throw bridges across wide rivers, like the spans connecting Manhattan Island with Queens, Brooklyn, Bronx, and New Jersey and the Oakland and

Golden Gate Bridges in San Francisco. He tunnels under rivers, as in the case of the Holland and Lincoln Tunnels under the Hudson River between New York and New Jersey. He reclaims land from lakes, as illustrated by the filled-in border of Lake Michigan forming Chicago's parkways between Sheridan Road and the lake. He fills in swamps, as in the case of the site of New York's 1939 World's Fair. He tunnels through mountains and levels off hills, as in Los Angeles. He fills in ravines, as in Washington, D. C. Numerous cases are known where streams have been diverted from their original courses.

All such cases, however, are limited by the benefits accruing from the expenditures necessary to alter or circumvent natural barriers. Generally, cities grow within the limits imposed by the topography of the terrain until the bursting growth makes large expenditures for such alterations or circumventions economically feasible. Thus, the principles of growth already discussed are generally applicable only within the limits imposed by nature.

The growth of the cities illustrated in the Map Supplement demonstrates that, except for growth facilitated by overcoming natural barriers, central and axial growth usually take place in broad, flat plains. On these, cities may extend built-up areas with equal facility in any direction. On the flat expanses of ground available about the core of the city, the chief force influencing city growth is the availability of transportation. Outer residential or business areas must have access to the central business and industrial districts.

The growth of isolated nuclei of houses beyond the periphery of the city is facilitated by suburban railroads with stations at intervals along the line, or by industrial plants furnishing employment to workers living nearby, or by prevailing automobile transportation which permits a wide diffusion of settlement.

Axial growth is the result of the existence of faster transportation from the center of the city to the periphery along certain main highways, elevated roads, or suburban railroads than in the intervening areas between these radial lines. The time required to reach the center of the city from all points of the periphery of the star-shaped city may be approximately equal. Of course, urban growth may extend farther in one direction in terms of time consumed in travel because of the superior attractions of one section of the city, or because of customary routes of travel.

Central growth is the result of forms of transportation that tend to be of approximately equal speed from the center of the city in all directions toward the periphery. It is not a question of absolute but of relative speed. Central growth may be as characteristic of automobile as of horse transportation. If the means of transportation is prefectly mobile and not tied to fixed routes or rails, urban growth may extend in concentric circles from the business center. Central growth also takes place as the result of a filling in of the interstices between radial lines of growth. There is a limit to the extension of settled areas along radial lines. After a certain point is reached, it is found that the time consumed in going to the most distant points on these radial lines is greater than the time required to take a slower crosstown line and to transfer to the main radial line at a point closer to the center of the city.

It is a noteworthy fact that the manner in which cities have grown has not changed with the evolution in the means of transportation during the past century. Chicago manifested the same types of growth during the horse car and early railroad era as during the electric street car and automobile ages.

While the various forms of city growth are not dependent entirely upon the form of transportation, it is true, nevertheless, that certain types of internal transportation within the city have favored one form of city growth rather than another. While there have been differences in the kinds of intraurban transportation in different cities, at the same time there have been certain major trends in the evolution of intraurban transportation in the United States that have influenced the form of city growth in certain periods.

The evolution of internal transportation in American cities may be divided in three main periods. The first period, that prior to 1890, was characterized mainly by horse-car lines, with steam railroads and cable cars (after 1882) furnishing fast transportation on main routes in some cities. The period between 1890 and 1917 was the era of the electric surface car. In this period, also, elevated railroads and subways provided the most rapid transportation on some radial lines in a few large cities.

Finally, the third period, from 1917 to the present, has been characterized by widespread use of the automobile.

The effect of the evolution in transportation upon the growth of cities is shown by the changes in the configuration of cities. As may be seen from figures 22–24 in the Map Supplement, most cities had a very compact circular form until late in the nineteenth century. In Chicago, New York, and a few other cities, cable lines and suburban steam railroads permitted axial growth in long streamers, but Baltimore, and most other cities relying principally upon horse-car transportation, were concentrated as closely as topography would permit around the central business district. Central growth characterized this period prior to 1880 when horse stagecoaches or horse-car lines were the chief forms of internal transportation for all American cities.

Axial growth was promoted by cables that were installed on main trunk lines in a few cities like Chicago and New York beginning in the eighties. The cable-car lines, which roughly doubled the horse rate of speed, increased in the United States from 20 miles of track in 1883 to a peak track mileage of 632 in 1895. Elevated lines, operated originally by steam power, first appeared in New York in 1878 and in Chicago in 1890. Elevated lines still form a main internal transportation system for Chicago, but they are relatively unimportant elsewhere.

The revolutionary change in transportation that affected nearly all American cities and enabled them to spread out in far-flung lines was the advent of the electric surface lines about 1890. The rapid growth in the mileage of electric surface lines from 1,262 in 1890 to 10,363 in 1895, and to 40,808 in 1912 enabled American cities to grow in bands along street-car lines in the decades from 1890 to 1910. Meanwhile, animal traction disappeared, while subways were inaugurated and extended in the largest American cities.[4] The transportation lines in Washington, D. C., are shown in figure 36 for four different periods of the city's history. Note, in each period, the settled area in the vicinity of trasportation lines and the lack of settlement in areas not served by local public conveyances.

The last great revolutionary change to date in internal transportation in American cities was afforded by the automobile. Between 1900 and 1937, the number of registered passenger cars[5] increased from 8,000 to 25,500,000, and their use by all except the lowest income groups became almost universal. Street-car traffic declined; neighborhoods built along street-car lines were supplemented by neighborhoods that were reached largely by automobiles. Moderate elevations, made accessible by hard-surface roads or high-grade residential developments near automobile highways, became favored sites for a new type of development that was not tied to the fixed line of street-car rails. Since the area on the periphery increases with the square of the distance from the city, the automobile opened up extensive areas because it had a speed on open highways several times greater than that of electric street cars.

In congested cities, outer drives, as in Chicago, or elevated and express highways, as in New York, enabled the automobile to speed past congested areas. To most cities, the automobile opened up new areas on the periphery so that its effect was to add a section built during the automobile age to sections that were the products of street-car transportation. Some cities like Detroit, Los Angeles, and Miami had their most rapid growth during the automobile age.

The (*a*) continued development of superhighways and consequent easier access to rural areas from central parts of cities, and (*b*) possible future mass production of aircraft so that transportation by air may be common for large segments of the population, may become highly significant in the future growth of American cities. What types of growth will such developments foster? What shape will cities assume? Will decentralization of cities become complete?

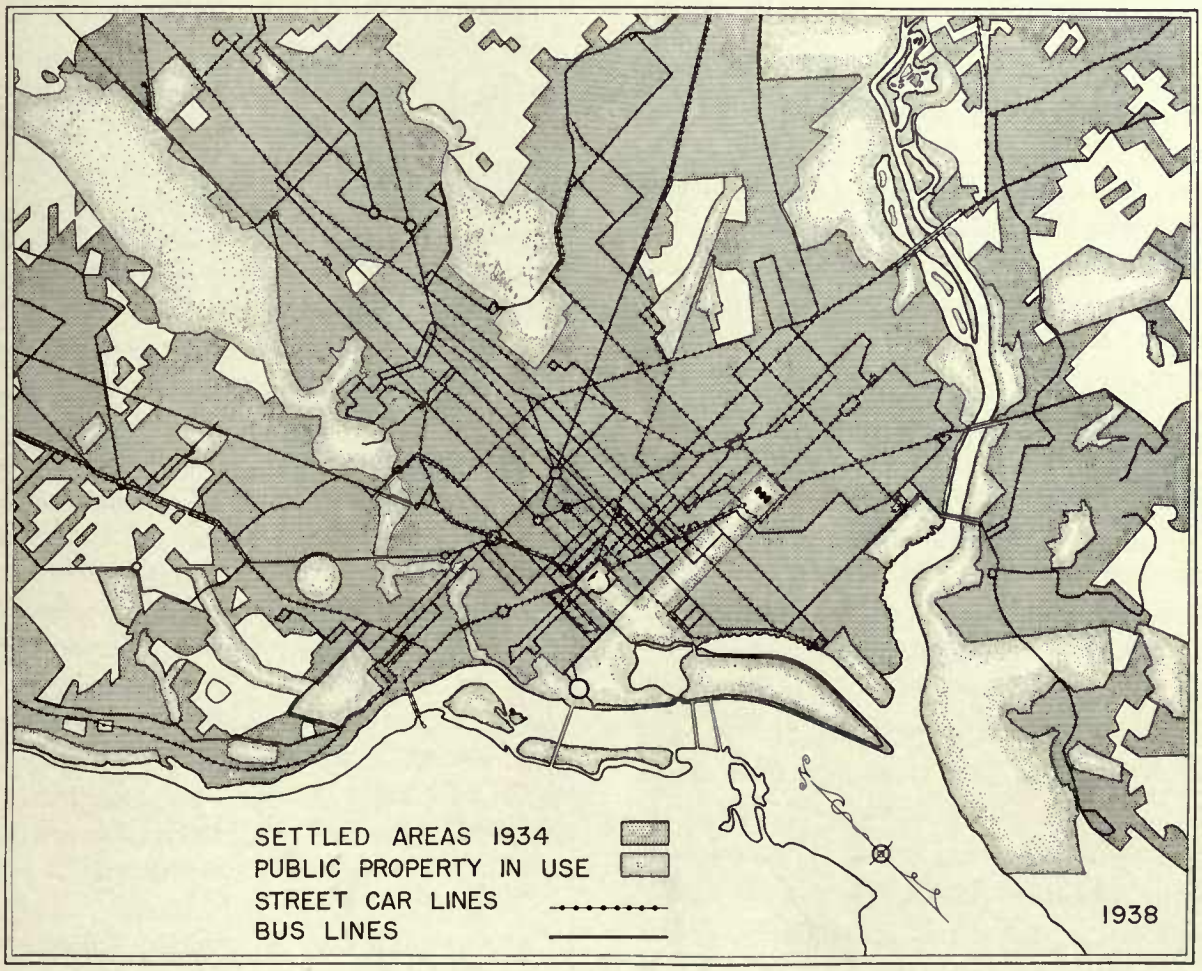
These questions cannot, of course, be answered with certainty. Possibly the same principles of growth, which applied in the three main periods just reviewed, may be depended upon in future years should superhighways and aircraft become common. Because of the fraternal nature of man, dwellings probably will not be scattered in helter-

[4] U. S. Department of Commerce, *Statistical Abstract of the United States, 1937* (Washington 1938), pp. 394, 399.

[5] Automobile Manufacturers Association, *Automobile Facts and Figures, 1938* (New York City), p. 16.

FIGURE 36

GROWTH OF SETTLED AREAS AND TRANSPORTATION LINES
WASHINGTON, D. C.
1857 - 1938



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skelter fashion over the landscape but may continue to be congregated in communities. Dwellings may not be built so closely together but may still cluster. One school of thought holds that these clusters will not be isolated but will still be close to—rather than on—arterial superhighways radiating from cities in axial fashion. Distances from outer nuclei to urban centers may be greater, but may still be easily accessible by future forms of transportation. Although there is already a tendency for manufacturing plants to locate apart from large urban centers, the increasing complexity of modern life will probably continue to make it imperative that our main shopping, financial, and business centers be located in the inner portion of the urban organism. Increasingly rapid transportation forms hasten the tempo of life and allow for more far-flung urban organisms. Radial rather than central growth probably will be accentuated, and congestion will probably decrease in urban centers. Complete decentralization of cities, however, is extremely doubtful in any organized society.

Chapter III

Changes In Urban Land Uses

THE pressure of population increase which brings about changes in the external form of a city also causes internal movements of residential neighborhoods and changing land uses. The latter will be treated in this chapter and the former reserved for discussion in following pages. The technique for showing the patterns formed by changing uses of the urban site requires the preparation of a series of maps showing the location of areas devoted to the principal land uses at successive intervals of time. By comparing the areas occupied by the different types of commercial, industrial and residential uses at different dates, the pattern of movement of each kind of use may be delineated.

The dynamic maps used in the previous chapter may be cross-hatched to designate the different types of land use in any period, and comparison of succeeding periods shows the movement of business, industrial, and residential areas. They also show the lateral extension of the urban site to new areas but do not show two other forms of expansion. These are, namely, the filling in of vacant interstices in a built-up, or settled, area and the vertical expansion of buildings. Thus, residences may be erected on vacant lots between houses in established home areas; or large apartment buildings may replace single or two-family structures; or large department stores covering entire blocks may occupy the ground formerly covered by small stores; or large office buildings may succeed smaller office buildings on the same site. Expansion of uses by increased intensity of utilization of the same area must be considered, as well as the lateral expansion or the shifting of location of given types of land uses.

The increased intensity of land utilization is, of course, most noticeable in the central portions of rapidly growing large cities. In Chicago:

> * * * the Chicago Loop buildings under the pressure of expanding business confined to a limited area have tapped successively higher layers of air. By 1893 over 10 percent of the air layer from 7 to 12 stories had been filled with buildings, and the highest towers extended to 16 stories. By 1923, when the new zoning law permitted tower buildings that contained as many as 44 stories, 37 percent of the area from 7 to 12 stories had been occupied, 17 percent of that between 12 and 16 stories, and over 6 percent of that between 16 and 22 stories. From 1923 to 1930 a new crop of a score of tower buildings arose in Chicago, which created a new skyline. * * *[1]

As a result, by 1933 over 50 percent of the area from 7 to 12 stories had been occupied, 37 percent of that between 12 and 16 stories, over 17 percent of that between 16 and 22 stories, and more than 1 percent of that between 22 and 44 stories.[1]

The increased intensity of land use in large cities is also typified by several sections in New York City. The segment of that city bounded by Fortieth and Sixtieth Streets and Third and Seventh Avenues had a rapid vertical expansion in the last half century. After the Civil War, confined space in lower Manhattan led to movement uptown and a gradual filling in of vacant interstices. At first the area was principally residential. With the building of Grand Central Terminal shortly after the turn of the century, however, the area became a focal business center. As the residences were displaced by office and business buildings, space became increasingly scarce and vertical expansion was accelerated. The period of most rapid vertical growth has been since the World War. At the present time, practically the entire area referred to above is covered with office buildings—the most recent additions being in Rockefeller Center. The two aerial photographs shown in figure 37 disclose the change in the Grand Central zone in the short time between 1922 and 1929.

[1] Hoyt, Homer, *op. cit.*, pp. 329–330.

FIGURE 37

THE INCREASED INTENSITY OF LAND USE IN THE GRAND CENTRAL ZONE NEW YORK CITY

1922

1929

COURTESY OF FAIRCHILD AERIAL SURVEYS, INC., NEW YORK.

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Thus, expansion by increased intensity of use must be studied by the analyst of the growth of any particular city, as well as lateral expansion. In the remainder of this monograph, however, we are principally concerned with the movement or the shifting of location of different types of land uses. The data for land-use maps portraying the segregated uses of land at prior periods of time are more difficult to secure than material for settled area maps. For proper historical perspective, it is necessary to ascertain not merely the fact that a building occupies a certain plot at a given time, but that it is devoted to a specific kind of use. In the case of many factory buildings, the ground plan of the structure may indicate the nature of the use, but this method cannot be employed in the case of light manufacturing plants which frequently occupy space in structures similar in form to office or commercial buildings. To reconstruct the land-use maps of former periods of time, reliance must be placed chiefly upon old photographs, the examination of surviving buildings of the period, historical accounts and records, and the verbal accounts provided by old residents of the city.

What are the principles governing the movement of the different types of land uses whose location was described in chapter II, part I? It will be convenient to use the method of treatment therein described and start with the movement of land uses at the center of the city. We will then consider, in order, the changes in the pattern of uses from that central point outward to the periphery.

Thus, in a growing city, changing land uses begin at the center with the expansion of retail or financial uses in the downtown area. In their process of growth, these uses press outward and impinge upon other types of land use of less intensity, forcing them, in turn, to thrust outward into the next encircling belt of land uses. Persons occupying residences near the heart of the city go farther out to live as business invades the area of their homes.

Just as a stone thrown in a pool causes a series of expanding circles, radiating outward from the point where the stone hit the water, so expansion of the highest land value uses at the business center of the city may impinge on other uses of less intensity and they, in turn, on others. Thus, in Chicago, as the retail commercial uses expanded from State Street to Wabash and Michigan Avenues, which were formerly occupied by residential and then by wholesale houses, they forced the wholesale uses southward on Wabash Avenue and northward across the Chicago River. Similarly, up to 1910 there was a tendency for factories located west of the Chicago "Loop" along the branches of the Chicago River, to expand on the near west, north, and south sides.

As the factories invaded the residential districts but failed to occupy the entire territory, there was an area called the zone of transition. This area was in a state of social disorganization and was frequently a breeding place for vice and crime. However, since it was expected that the continued expansion of industrial areas would ultimately absorb such land, this situation was regarded as only temporary.

Certain fundamental changes have occurred, however, which may slacken or stop almost completely this lateral expansion of commercial and industrial uses. In the first place, the introduction of the steel-frame skyscraper and the invention of the steam and electric elevator beginning in the eighties, led to a vertical rather than to a lateral expansion of central business districts. These business centers, like Rockefeller Center, can house thousands of workers in a single block. The skyline of Chicago in 1880 was one of six-story buildings. The height of the highest buildings in that city was successively raised to 10, 16, 22, and 44 stories. Downtown and midtown Manhattan in New York has expanded vertically so that today New York has several buildings with 80 and even 100 stories. As a result, there was much less lateral expansion in the area occupied by the central business district. The central business district also has been affected by another factor in recent decades, namely, the development of outlying business centers.

Secondly, the use of land for wholesaling may cease to expand because of direct purchases from factories in small quantities. Formerly large stores of goods were maintained in warehouses and wholesale houses near the central business district. There has been a great decline in the wholesale function as retailers buy goods directly from the factories. Quicker deliveries and changing styles have also caused increased hand-to-mouth buying from both wholesalers and factories.

Thirdly, there has been a great slackening in the expansion of industrial areas near central business districts. There are numerous factors already mentioned which tend to make it more economical for a

factory to locate in a specialized industrial district or on an outer belt line rather than in the heart of the city.[2]

As a result of the slackening in the expansion of commercial and industrial uses near central business districts, the so-called zone of transition surrounding the central business district has become a blighted area. In its present form, it is not wanted for any type of use except possibly for parking lots. New residential construction is discouraged because the value of a new home placed in slum surroundings may be less than its reproduction cost. On the other hand, to destroy slum neighborhoods would require the wholesale purchase and wrecking of buildings on wide areas of lands that are owned by thousands of individuals. Even by means of condemnation proceedings, the cost of acquisition of such properties is too great to warrant low cost housing projects; hence, the area is reclaimed neither wholesale nor piecemeal, and it progressively deteriorates.

New homes for the middle and upper classes tend to be located as far away as possible from these deteriorated areas and are usually erected on vacant land on the periphery of cities. The movement of these types of residential areas will be discussed in the next chapter.

While the central business district has slowed up in its rate of expansion, it does, nevertheless, tend to move. The retail shopping center tends to be pulled in the direction of the best residential area. Thus the stores in New York moved up Fifth Avenue in the wake of the high grade residential movement. The retail shopping center of Kansas City, Mo., moved southward from the river front to Third and Fourth Streets on Main Street, to Ninth on Main Street, and to Eleventh and Twelfth Streets on Walnut Street, as the high grade residential area grew southward.

The central business district of Chicago moved southward on Michigan and Wabash Avenues, and State, Dearborn, and La Salle Streets when the trend of fashionable direction was south. When the Lake Shore Drive and the Gold Coast Belt developed on the near North Side, and finally when the Michigan Avenue Bridge was constructed in 1920, the office building area burst the boundaries of the "Loop" and grew northward up Michigan Avenue. Similarly, the development of Miami Beach and the northeast section of Miami has pulled the business section of Miami eastward on Flagler Street. In Seattle, the business district has moved northeast toward the higher grade residential sections. In Detroit, the business section has tended to move northward up Woodward Avenue as the result of the growth of the higher grade area northward; but there have been pulls also on the east and west which have tended to keep the central business district near its point of origin.

Thus, in growing cities, the expansion of financial and business uses in the central portion presses outward and impinges on other land uses. They, in turn, thrust outward and impinge upon the next encircling belt of uses. The retail shopping center tends to be pulled in the direction of growth of the best residential areas. Lateral growth of financial, business, and retail uses of land has slowed up because of the vertical growth made possible by new inventions. Wholesale areas have declined in importance and also leaned toward vertical growth. Manufacturing zones have tended to locate in specialized districts rather than near central business districts. Changes in speed and direction of growth of business, commercial, and industrial uses of land have caused the growth of blighted areas within and adjacent to these uses. We will next consider the pattern of commercial areas outside the central business district and the movement of industrial land uses.

Commercial land uses outside the central business district.—In a small city, most of the commercial land uses, except that of isolated neighborhood grocery stores, drug stores, or gasoline filling stations, are concentrated in a central business district. The growth of population, however, which causes shifts in residential neighborhoods, likewise changes the simple commercial structure of a city with one business nucleus into a more complex pattern. The rapid growth of the population on the periphery of the city and the decline in the number of persons living near the center lead to the development of satellite business subcenters in the area of new homes. There are three forms of commercial areas that tend to rise beyond the limits of the original central business district as the city grows in population.[3]

[2] See pt. I, ch. II, pp. 20–23.

[3] For a thorough description of the various types of outlying business districts see Malcolm J. Proudfoot in Weimer and Hoyt, *Principles of Urban Real Estate*, Ronald Press, 1939, pp. 94–97.

The first is the line of stores strung out along the principal thoroughfares leading from the central business district. The main business center of the city may in fact move out along one of these principal highways as in the case of Euclid Avenue in Cleveland. The commercial uses along the main highways beyond the heart of central business districts are devoted to secondary commercial uses of less intensity than those in the downtown area. Thus in Charleston, W. Va., there is a growth of a line of stores along Washington Street.

A second form of commercial area is the outlying business center located at the converging point of two main automobile thoroughfares or at a streetcar transfer point, at subway, elevated, or suburban railroad stations. Here there is a piling up or intensification of commercial uses. The growth of these embryonic clusters of stores, providing groceries or drugs, to adult business subcenters with full complements of motion-picture theaters, banks, restaurants, branch department stores, and specialty stores, is carefully described in Ratcliff's thorough study of the outlying business centers of Detroit.[4]

Finally there is the third form of commercial area, the isolated neighborhood store, or store cluster, in the middle of a block of homes or on a thinly developed traffic artery.

The central business nucleus, located at the converging point of the main highways leading into the city, is surrounded by satellite business centers at the intersections of highways along the periphery of the city. Lining the principal thoroughfares are also strings of stores, and in the midst of some home areas are isolated stores. The outlying commercial areas have grown rapidly at the expense of the central business district.

In Philadelphia, in the early periods prior to the Civil War, practically all the retail trade and banking of the city was carried on in the confines of the present central business district because the entire settled area of the city was then in close proximity to the downtown section, and the present outlying shopping centers did not exist. As the city expanded in area and population, however, outlying community centers developed that attracted an increasing proportion of the retail trade. In 1935 the volume of retail sales made by the stores outside the central area was 62.6 percent of the total for the entire city.[5]

In Chicago, the elevated lines concentrated business in the central district or the "Loop," in the period from 1900 to 1915; but as new home areas developed beyond the elevated lines, there was a rapid rise in the relative importance of outlying shopping centers from 1915 to 1928. While the estimated value of land in the central business district of Chicago rose from $600,000,000 to $1,000,000,000 in the period 1910 to 1928, a rise of 67 percent, the estimated sales value of land in the outlying commercial sections increased from $200,000,000 to $1,333,000,000, or a gain of 567 percent in the same period.[6]

In general, the rise of the outlying business center has been the result of three major factors: *First*, the rapid growth of population on the periphery of the city and the decline in both the number and purchasing power of people living near the main business center; *second*, the friction of automobile traffic congestion in the central business district and the lack of fast transportation other than automobile from the new home areas of many cities to the downtown area; *third*, the development of facilities and services in the outlying shopping centers that are comparable to those provided in the downtown area. This development has been made possible by the location of the motion-picture theater, the rise of the outlying bank, the growth of chain stores, and the establishment of outlying department stores.

The movement of industrial land uses.—The pattern of movement of industrial land uses is significant only in cities that have industrial establishments and scarcely need be considered in cities like Washington, D. C., or Miami, Fla. However, the change in the pattern of location of industries in large manufacturing centers is striking. The changing location of industries in Chicago since 1857 may be observed in figure 38.

Prior to 1873 the early industrial growth of Chicago followed the Chicago River and its branches near the central part of the city because it was along

[4] Ratcliff, Richard U., *An Examination Into Some Characteristics of Outlying Retail Nucleations in the City of Detroit.* A doctoral dissertation—University of Michigan, 1935.

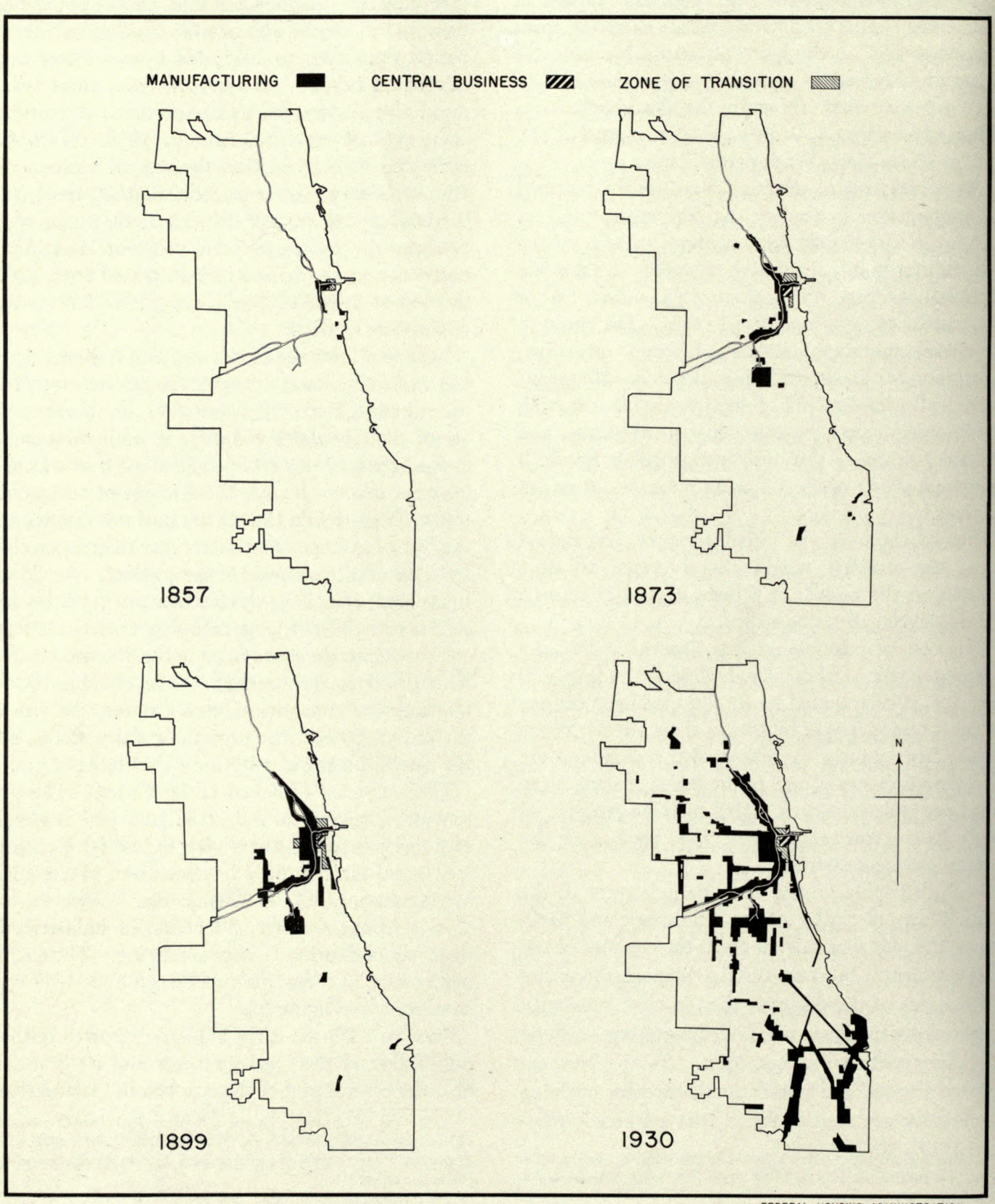
[5] U. S. Dept. of Commerce, Census of Business: 1935, *Intra-City Business Census Statistics for Philadelphia, Pa.* (Washington, D. C., May 1937), p. 25. The several different types of urban business districts are classified in this publication on pp. 3–5.

[6] Hoyt, Homer, *op. cit.*, p. 347.

FIGURE 38

GROWTH OF CENTRAL BUSINESS AND MANUFACTURING AREAS

CHICAGO 1857 - 1930



SOURCE: HOYT, HOMER, *ONE HUNDRED YEARS OF LAND VALUES IN CHICAGO*, (CHICAGO, UNIVERSITY OF CHICAGO PRESS, 1933) P. 319

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the river that the rail and lake commerce was interchanged, and a large proportion of the laboring population lived. As river and lake commerce declined in relative importance in Chicago, there began an expansion of industry in the area of the central business district of Chicago on the west, north, and south. This period of central growth culminated in 1910, and thereafter there was a rapid development of industries along outer belt lines on the edge of the city and a decline of manufacturing in the central area.

In all large cities, with the advent of the motor truck and the specialized industrial district served by belt line railroads, there has been a tendency for industries to move away from the congested area to locations on the periphery. It is no longer necessary for industries to locate near the workingmen's homes, because such a large proportion of the employees have easy access to quick transportation or come to work in their own automobiles from a wide radius. Thus the factories on the outer belt lines enjoy the advantages of the city as the center of a network of transportation and as a pool of labor. They avoid the heavier city taxes, the limited land area, and the disadvantages of multistoried industrial buildings which break the continuity of the industrial process on each floor level. Industrial managers also prefer to build factories on tracts of land on the periphery that are specifically designed for industrial use and that permit direct switch track connections on the most efficient angles, rather than to locate in the heart of cities where rigid street layouts and city traffic impose barriers to extension of railroad tracks.

Hence, the danger of industries invading residential areas, once the bane of the city planners, has, to a considerable extent, become a thing of the past. In an earlier period, industries invaded home areas of cities, as in Detroit and Brooklyn, creating a jumble of factories and dwellings. Today, however, the preferred location for most industries is on the belt line on the periphery of the city. The vacant land there is cheaper and consequently permits the erection of one-story buildings affording the greatest economy of factory operations.

Even if not prevented by zoning, manufacturers do not often seek to establish large factories in well-developed home areas, because they would have to pay for residential structures merely for the purpose of wrecking them. Nevertheless, the protection by zoning of home areas from invasion by industrial establishments is a wise precaution because it bars small light manufacturing plants that might be started on a vacant lot in the midst of homes.

Some of the changing trends in the pattern of commercial and industrial uses in American cities thus have been discussed briefly. The forces affecting the pattern of movement of residential rental areas, the main subject of this monograph, will be considered in the next chapter. Commercial and industrial uses have been discussed here chiefly because of their relation to residential areas. In the dynamic processes of city growth, expansion of commercial and industrial communities changes the character of the home areas. If land becomes suitable for a more intensive use, it may pay to tear down an existing structure still in good condition to make way for a taller building or a store yielding higher rent. Thus, single-family homes may be replaced, not only by stores or factories, but by multistory apartment buildings as well. It is seldom, however, that single-family homes are demolished to make way for new single-family homes.

Usually existing residential structures deteriorate and become obsolete with the passage of time. They are occupied by successive groups of people of lower incomes and lower social standards with the result that the quality of the neighborhood declines with that of the buildings. Hence, the new single-family structures of a city tend to be erected on the periphery. The manner in which the rental neighborhoods shift as a result of this new growth will now be considered.

Chapter IV

The Pattern of Movement of Residential Rental Neighborhoods

OF THE various shifts that take place in the internal structure of a city as a result of population growth, the movement of the residential rental neighborhoods most vitally concerns the home owner or the investor in residential mortgages. This monograph is primarily a study of residential areas; the other types of land uses are considered because of their influence upon the home sections of the city. Hence the technique for determining the pattern of movement of residential rental areas has unusual importance, and the formulation of the principles defining the path of neighborhood growth is one of the focal points of this study.

The manner in which the various residential neighborhoods are distributed in patterns according to rent was discussed in the closing chapter of part I. There the sector theory of residential rental areas was set forth. From the high rental areas that are frequently located on the periphery of one or more sectors of American cities, there is a downward gradation of rents until one reaches the low rent areas near the business center. The low rent areas are usually large and may extend from this center to the periphery on one side of the urban community. The high, low, and intermediate rental neighborhoods, however, did not always occupy these locations on the urban site. Their present positions are the points reached in the course of a movement taking place over a period of time. It is not a movement of buildings but a shifting and a change in the character of occupants that produces neighborhood change. New patterns of rent areas are formed as the city grows and adds new structures by both vertical and lateral expansion.

There is a need then for a technique for measuring the movement of the different types of rental neighborhoods so that the pattern of movement may be established. By tracing the course traversed by the residential communities of the various rental grades, principles may be formulated explaining the causes for neighborhood changes.

To measure the movement of rental neighborhoods over a period of time, a series of maps showing the average rent of dwelling units, block by block at different dates, would be desirable. Such maps are available for very recent years for those cities in which real property surveys have been conducted. Unfortunately, however, there is no *series* of real property surveys that will permit an exact comparison of rental areas at different time intervals. But the question of the shape and direction of movement of different rental areas is of vital importance, and it is necessary to use the best evidence available, even if it is not so accurate as real property survey data.

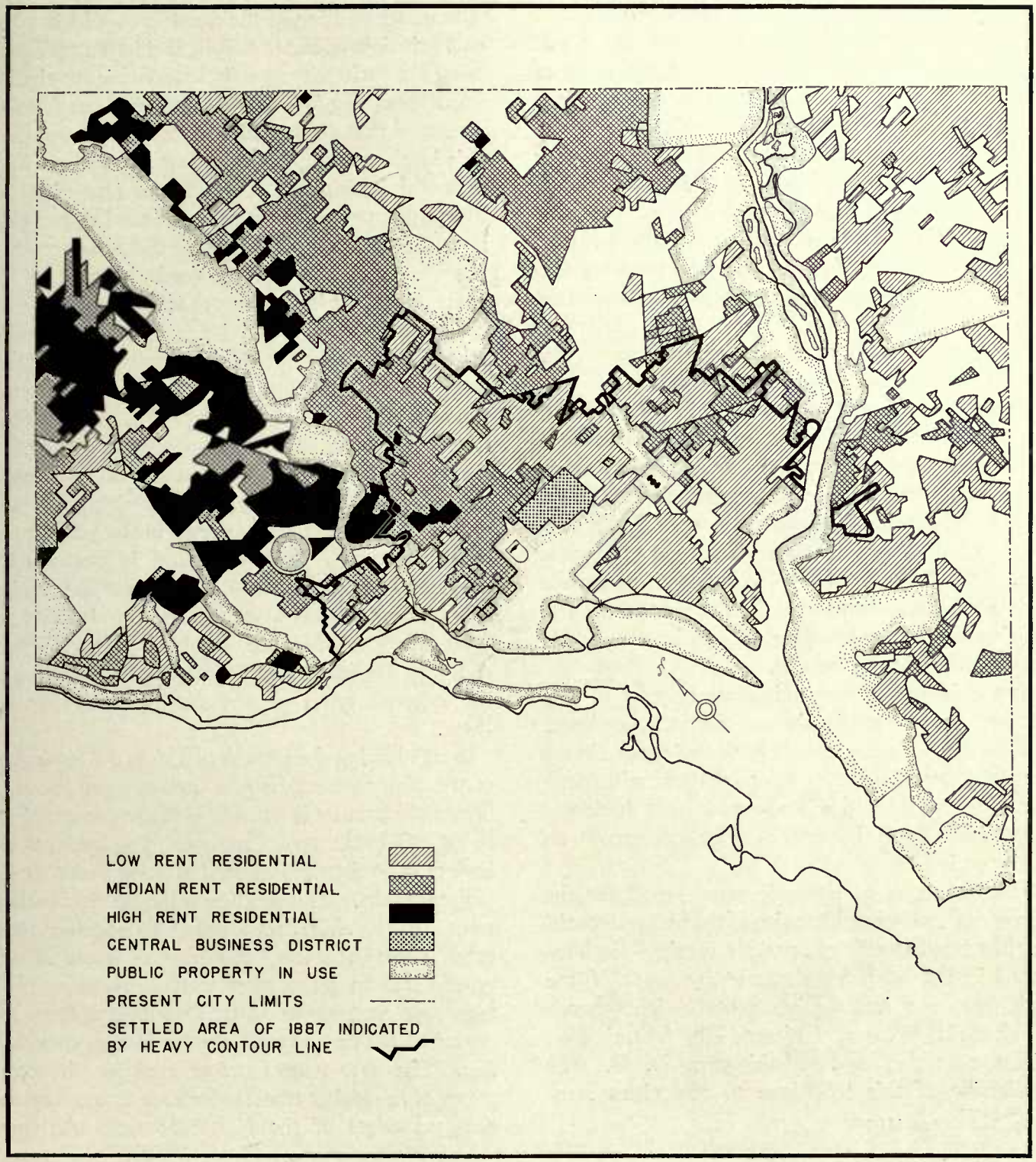
One method of showing the changes that have occurred is to compare a map showing the various rental areas today with a map showing the entire settled area at a previous period of time. When it is found, as in the case of Washington (fig. 39), that all the highest rental areas of 1934 lie beyond the limits of the settled area of 1887, it is evident that the best residential section has moved from some point within the area occupied by houses in 1887 to a new area that was entirely vacant at that time. Similar maps of five other cities in the Map Supplement [1] indicate a similar shift of the best residential neighborhoods.

The use of dynamic factor maps, however, indicates the changes in the location of residential neighborhoods more exactly. These are constructed

[1] Figs. 25–29, see pp. 160–164.

FIGURE 39

DISTRIBUTION OF RENTAL AREAS 1934 COMPARED WITH SETTLED AREAS OF 1887 WASHINGTON, D. C.



SOURCE: CIVIL WORKS ADMINISTRATION, *REAL PROPERTY INVENTORY FOR THE DISTRICT OF COLUMBIA, 1934*

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from evidence gleaned from old inhabitants. Those who have spent their lives in a city are often the only source of information on neighborhood changes. They have been eyewitnesses of the shifting character of neighborhoods. If a number of these residents are consulted independently and if they corroborate each other, much confidence may be placed in their evidence. To secure an accurate picture of the change, however, each of the residents should be asked to draw on a blank map of the city a line around the blocks in which the average rents of dwelling units were the highest in successive periods of time such as 1900 and 1915. Similarly, the same residents may be requested to draw, on another map, lines around the blocks in which the average rents of dwelling units were lowest at the same periods of time. Data for recent years are available, for a large number of cities, from real property surveys. In cities not surveyed, recent data may often be secured from local real-estate boards. Likewise the location of factory and commercial areas may be drawn for the same three periods of time.

In securing this type of evidence, it is desirable to ask only for the rental extremes—the most fashionable area on the one hand, the lowest rent area on the other. Persons depending upon memory might well fail to distinguish between intermediate gradations in rental areas that existed a number of years ago. It is desirable also to select time intervals a considerable number of years apart, so that there will be time for pronounced changes to have occurred that could easily be recalled.

The evidence of such witnesses may be further checked by an examination of the areas outlined. Old fashionable areas usually leave their traces in the form of a few obsolete mansions that are still standing. Frequently old photographic and historical records reveal the character of neighborhoods at an earlier period.

The technique of dynamic maps—used for the purpose of showing the location of the best residential neighborhood at different periods of time—is illustrated in the Map Supplement[2] by maps of the high, low, and intermediate rental neighborhoods of Bluefield, W. Va., Chicago, Ill., Miami, Fla., Richmond, Va., and Washington, D. C. The application of this technique to the cities mentioned reveals a striking principle of neighborhood growth.

The high rent neighborhoods of a city do not skip about at random in the process of movement—they follow a definite path in one or more sectors of the city.

Apparently there is a tendency for neighborhoods within a city to shift in accordance with what may be called the sector theory of neighborhood change. The understanding of the framework within which this principle operates will be facilitated by considering the entire city as a circle and various neighborhoods as falling into sectors radiating out from the center of that circle. No city conforms exactly to this ideal pattern, of course, but the general figure is useful inasmuch as in our American cities the different types of residential areas tend to grow outward along rather distinct radii, and new growth on the arc of a given sector tends to take on the character of the initial growth in that sector.

Thus if one sector of a city first develops as a low rent residential area, it will tend to retain that character for long distances as the sector is extended through process of the city's growth. On the other hand, if a high rent area becomes established in another sector of the city, it will tend to grow or expand within that sector, and new high grade areas will tend to establish themselves in the sector's outward extension. This tendency is portrayed in figure 40 by the shifts in the location of the fashionable residential areas in six American cities between 1900 and 1936. Generally speaking, different sectors of a city present different characters according to the original types of the neighborhoods within them.

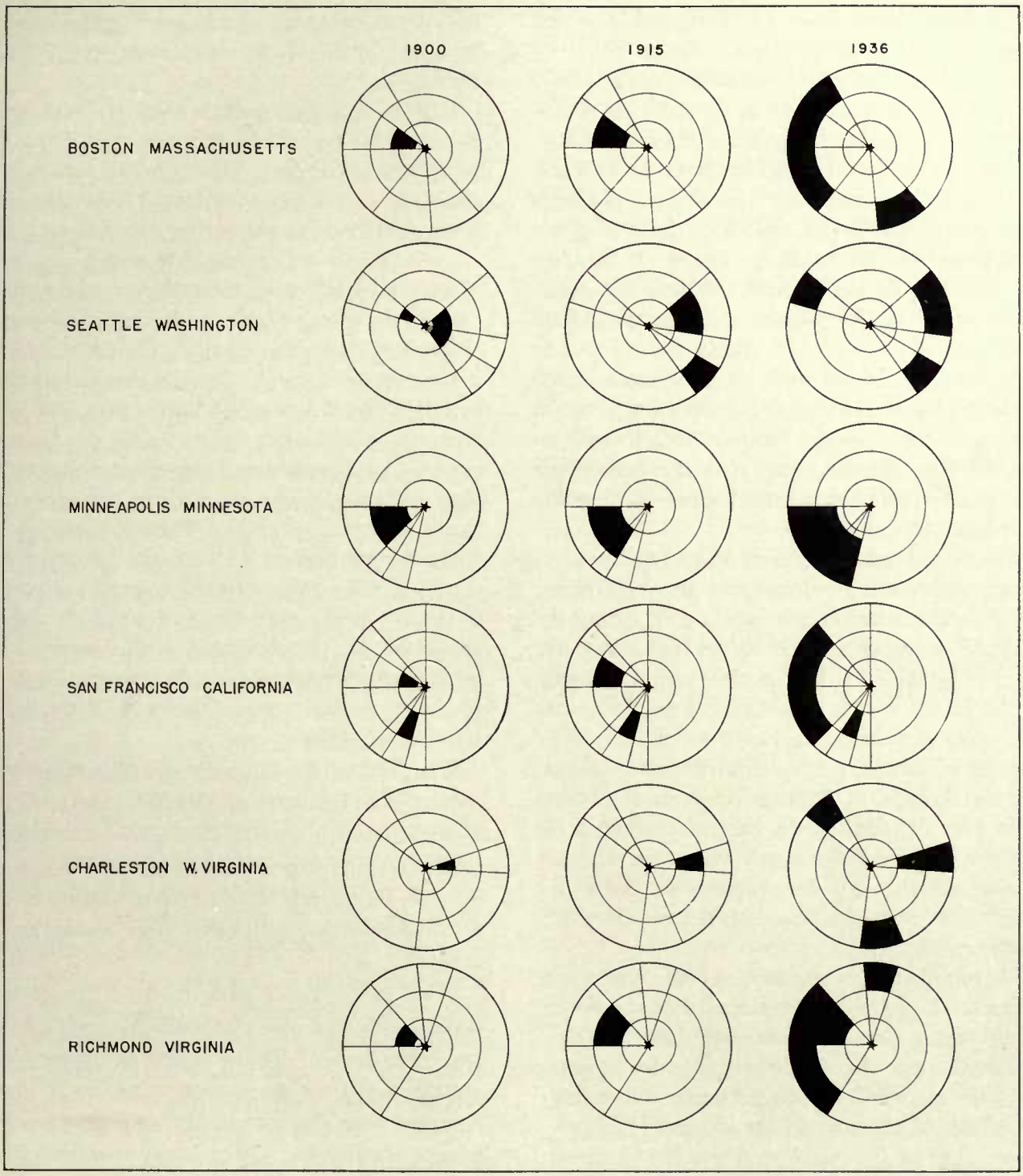
In considering the growth of a city, the movement of the high rent area is in a certain sense the most important because it tends to pull the growth of the entire city in the same direction. The homes of the leaders of society are located at some point in the high rent area. This location is the point of highest rents or the high rent pole. Residential rents grade downward from this pole as lesser income groups seek to get as close to it as possible. This high rent pole tends to move outward from the center of the city along a certain avenue or lateral line. The new houses constructed for the occupancy of the higher rental groups are situated on the outward edges of the high rent area. As these

[2] Figs. 30–34, see pp. 165–169.

FIGURE 40

SHIFTS IN LOCATION OF FASHIONABLE RESIDENTIAL AREAS IN SIX AMERICAN CITIES 1900 - 1936

FASHIONABLE RESIDENTIAL AREAS INDICATED BY SOLID BLACK



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areas grow outward, the lower and intermediate rental groups filter into the homes given up by the higher income groups. In New York City the movement was up Fifth Avenue, starting at Washington Square and proceding finally to Ninety-sixth Street in the course of a century. In Chicago, there were three high rental areas, moving southward along Michigan and Wabash Avenues, westward in the band between Jackson and Washington Streets, and northward along La Salle and Dearborn Streets to the Lake Shore Drive.

Sometimes the high rent pole jumps to new areas on the periphery of the city, as in the case of the development of Shaker Heights in Cleveland, Ohio, and Coral Gables in Miami, Fla., but usually these new areas are in the line of growth of the high rent areas. In Charleston, W. Va., the high grade neighborhood moved from the center of the city along Kanawha Street until it reached the river, and then the new high grade area jumped to new locations in the hills in the south and north. In Seattle, Wash., the high grade neighborhood started near the center of the city and moved northeast in one sector of the city—the location along the lake on the periphery. At the same time the high grade development sprang up to the northwest, jumping intervening low grade areas.

In Minneapolis, Minn., there was a movement of the high grade neighborhood to the southwest, starting at the center of the city and repeating the same type of growth until it reached the outer edge of the city in a lake region. In Richmond, Va., the sector of the city containing Monument Avenue first developed as a high grade area. The movement of the high grade neighborhood continued out along the line of Monument Avenue until it reached the city limits and then it expanded fan shape in a sector to the north and west. At the same time a high grade development started to the north in a sector which was bisected by Chamberlayne Street.

In Detroit, Mich., the growth of the high grade neighborhood proceeded eastward along Jefferson Avenue out to Grosse Pointe along Lake St. Clair. There was another band of high grade development west of the axis of Woodward Avenue. In Miami, Fla., bands of high grade development followed Biscayne Bay to the north and south and also to Miami Beach.

As a result of the outward movement of the high rent neighborhoods in American cities, present fashionable areas are mostly located beyond the earlier settled areas of American cities. Thus, figure 39 shows that in Washington, D. C., practically all of the high rent area of today is located in a section that lies beyond the area occupied by houses in 1887. Similarly, in the 14 other illustrative cities referred to in this chapter, most of the high rent areas of today are located beyond the areas occupied by houses at a relatively recent period of time.

High rent or high grade residential neighborhoods must almost necessarily move outward toward the periphery of the city. The wealthy seldom reverse their steps and move backward into the obsolete houses which they are giving up. On each side of them is usually an intermediate rental area, so they cannot move sideways. As they represent the highest income group, there are no houses above them abandoned by another group. They must build new houses on vacant land. Usually this vacant land lies available just ahead of the line of march of the area because, anticipating the trend of fashionable growth, land promoters have either restricted it to high grade use or speculators have placed a value on the land that is too high for the low rent or intermediate rental group. Hence the natural trend of the high rent area is outward, toward the periphery of the city in the very sector in which the high rent area started. The exception to this outward movement is the development of de luxe apartment areas in old residential areas. This will be treated more fully on a following page.

What determines the point of origin of the highest rental areas of the city and the direction and pattern of their future growth? The answer to this question is of vital importance to all students of urban growth, for the high rent sector is the pole or center of attraction that pulls the other residential areas with it.

In all of the cities studied, the high grade residential area had its point of origin near the retail and office center. This is where the higher income groups work, and is the point that is the farthest removed from the side of the city that has industries or warehouses. In each city, the direction and pattern of its future growth then tends to be gov-

erned by some combination of the following considerations:

(1) *High grade residential growth tends to proceed from the given point of origin, along established lines of travel or toward another existing nucleus of buildings or trading centers.*—This principle is illustrated by the movement of the high grade residential neighborhood of Chicago along the main axes of the roads like Cottage Grove Avenue, leading south around the bend of Lake Michigan to the east, of main roads like Madison Street leading westward, and of roads following the lake northward to Milwaukee. In Detroit, Mich., there was a trend of fashionable growth along the radial line of Woodward Avenue, the main thoroughfare to Flint and Pontiac, beginning within the Grand Boulevard Circuit and later extending to Highland Park, Palmer Woods, Ferndale, Royal Oak, and Birmingham.

(2) *The zone of high rent areas tends to progress toward high ground which is free from the risk of floods and to spread along lake, bay, river, and ocean fronts, where such water fronts are not used for industry.*—The movement of high grade residential neighborhoods away from river bottoms to higher ground or to wooded hills is illustrated by numerous examples. In San Francisco, Calif., the wealthy moved from the lowland along the bay to Knob Hill which was less subject to fogs and smoke. In Washington, D. C., the high grade neighborhoods moved from the mud flats along the Potomac in the southeast quadrant and from the lowland in the southwest quadrant, to the higher land in the northwest section. In Springfield, Mass., the best areas moved from the lowland along the Connecticut River to rising land and to Longmeadow. In Kansas City, Mo., St. Louis, Mo., and Cincinnati, Ohio, there has been a movement of settlement away from the river bottoms to the higher land.

In cities located on relatively flat land near rivers, bays, lakes, or oceans, the high grade residential neighborhood tends to expand in long lines along the water front that is not used for industrial purposes. Thus in Chicago, the lake front on the north side is the front yard of the city and is preempted for high grade residential use for a distance of nearly 30 miles north of the business center. In New York City, a high grade residential area grew northward along the Hudson River on Riverside Drive from 72d Street to Riverdale in the West Bronx. In Miami, Fla., the high rent areas extend along Biscayne Bay to the north and southeast and along the ocean front on Miami Beach. In Detroit, Mich., a high grade development extends along Lake St. Clair at Grosse Pointe. On the New Jersey coast, there is a long string of resorts along the ocean front with the highest paid residential use confined to the strip along the beach. In Charleston, W. Va., one high grade residential area extends along the high bank of the Kanawha River.

Thus, where such lakes, rivers, bays, or ocean fronts exist and offer the attractions of bathing, yachting, cool breezes in summer, and a wide expanse of water with its uninterrupted view, rent areas tend to follow the contour of the water front in long, narrow lines of growth.

(3) *High rent residential districts tend to grow toward the section of the city which has free, open country beyond the edges and away from "dead end" sections which are limited by natural or artificial barriers to expansion.*—The lure of open fields, golf courses, country clubs, and country estates acts as a magnet to pull high grade residential areas to sections that have free, open country beyond their borders and away from areas that run into "dead ends." Thus the highgrade neighborhood of Washington, D. C., grows northwest toward expanding open country and estates. Thus, the expansion of high grade neighborhoods to the north of Baltimore, Md., to the south of Kansas City, Mo., and to the north of New York City in Westchester County is into areas with a wide expanse of country beyond them.

(4) *The higher priced residential neighborhood tends to grow toward the homes of the leaders of the community.*—In Washington, D. C., the White House; in New York, the homes of the Astors and the Vanderbilts were the magnets that pulled the members of society in their direction. One fashionable home, an outpost on the prairie, standing near Sixteenth Street and Prairie Avenue in Chicago in 1836, gave prestige to the section and caused other leaders of fashion to locate near the same spot.[3]

(5) *Trends of movement of office buildings, banks, and stores, pull the higher priced residential neighborhoods in the same general direction.*—The stores,

[3] See Lynd, Robert S., and Helen M., *Middletown in Transition* (New York Harcourt, Brace & Co., 1937), pp. 81-82, for an interesting example of how the northwest section of Middletown became the outstanding residential section as a result of the movement of the most prominent family to that section.

offices, and banks in the central business district usually move in the direction of the high rent area, but follow rather than lead the movement of the high rent neighborhood. Sometimes, however, when an office building center becomes established at a certain point, it facilitates the growth of a high rent area in sections that are conveniently accessible to it. Thus the office building center in the Grand Central District in New York City has aided the growth of the de luxe apartment area in Park Avenue and also the exclusive suburban towns in Westchester that are served by fast express trains entering the Grand Central Station. The establishment of an office building center at Grand Boulevard and Woodward Avenue in Detroit, Mich., aided the growth of the high grade area to the north and west of it. In Washington, D. C., the northwestward trend of the office buildings, while the result of the pull of the high grade areas to the northwest, also favored the further growth of the northwest area because it made those areas more accessible to offices. Similarly, the trend of office buildings on North Michigan Avenue in Chicago favored the northward growth of the de luxe apartment area.

(6) *High grade residential areas tend to develop along the fastest existing transportation lines.*—The high grade residential areas in Chicago grew along the main plank road, horse car, cable car, and suburban railroad routes. In New York City, the elevated lines and subways paralleled Fifth Avenue. Fast commuters' trains connect New York City with the high grade suburban homes in Montclair, the Oranges, and Maplewood in New Jersey, in Scarsdale, Pelham, and Bronxville in Westchester, and in Forest Hills, Kew Gardens, Flushing, and Hempstead in Long Island. In Detroit, Mich., the high grade areas are located close to main arteries leading directly to the center of the city—Jefferson, Woodward, and Grand River Avenues. In Washington, D. C., the best areas are on the main transportation arteries—Connecticut Avenue, Massachusetts Avenue, and Sixteenth Street leading directly to the White House.

(7) *The growth of high rent neighborhoods continues in the same direction for a long period of time.*—In New York City, the march of the fashionable areas continued up Fifth Avenue from Washington Square to Central Park for over a century. The high grade neighborhoods in Chicago moved south, west, and north from their starting points in or near the present "Loop" to present locations—7 to 20 miles distant—in the course of a century. In the century after the Revolutionary War, the high grade area of Washington, D. C., moved from the Capitol to the Naval Observatory. The high rent areas of Detroit, Mich., moved from points near the present business center to Grosse Pointe, Palmer Woods, and Birmingham, 6 to 10 miles away.

In Miami, Fla., Minneapolis, Minn., Seattle, Wash., Charleston, W. Va., Salt Lake City, Utah., and many other cities, this same continuous outward movement of high rent areas has been maintained for long periods of time. Except under the unusual conditions now to be described, there have been no reversals of this long continued trend.

(8) *De luxe high rent apartment areas tend to be established near the business center in old residential areas.*—One apparent exception to the rule that high rent neighborhoods do not reverse their trend of growth is found in the case of de luxe apartment areas like Streeterville in Chicago and Park Avenue in New York City. This exception is a very special case, however, and applies only to intensive high grade apartment developments in a few metropolitan centers. When the high rent single-family home areas have moved far out on the periphery of the city, some wealthy families desire to live in a colony of luxurious apartments close to the business center. Because of both the intensive use of the land by use of multiple family structures and the high rents charged it pays to wreck existing improvements.

Such apartments can rise even in the midst of a poor area because the tall building itself, rising from humble surroundings like a feudal castle above the mud huts of the villeins, is a barrier against intrusion. Thus, when the railroad tracks were depressed under Park Avenue in New York City and the railroads were electrified, that street, originally lined with shanties, became the fashionable apartment avenue of New York City. In Chicago, the wall of apartments on the sands where Captain Streeter once had his shack is now occupied by the most exclusive social set. In both cases, there was a renaissance of an old neighborhood. It is only where intensive apartment uses occupy the land that such an apparent reversal of trend occurs.

(9) *Real estate promoters may bend the direction of high grade residential growth.*—While it is almost impossible for real estate developers to reverse the natural trend of growth of high grade neighborhoods, even by the expenditure of large sums of money and great promotional effort, it is possible for them to accelerate a natural trend or to bend a natural trend of growth.

Miami Beach, directly on the Gulf Stream in Florida, was favored by nature as the site for high grade resort homes. When it was a mangrove swamp, separated from the mainland by Biscayne Bay, it was almost inaccessible. Carl Fisher, by building a million dollar causeway and by pumping up 2,800 acres of land out of the bay and erecting thereon golf courses and hotels, made it possible for these natural advantages of Miami Beach to be utilized. Similarly, George Merrick acquired a great tract of land at Coral Gables, Fla., and, by spending millions of dollars in laying out streets, in planting flowering trees, and in establishing restrictions, gave the area a high grade character which it did not otherwise possess. So, likewise, did the developers of Roland Park in Baltimore, Shaker Heights near Cleveland, and the Country Club District of Kansas City take large areas in the line of growth and establish high grade communities by means of building restrictions, architectural control, community planning, and other barriers against invasion.

In all these cases, the high rent area was in the general path of growth; but which area of the many in the favored area became the fashionable center depended upon the promotional skill and the money expended by individual promoters.

As a result of some or all of these forces, high rent neighborhoods thus become established in one sector of the city, and they tend to move out in that sector to the periphery of the city. Even if the sector in which the high rent growth begins does not possess all of the advantages, it is difficult for the high rent neighborhood to change its direction suddenly or to move to a new quarter of the city. For as the high rent neighborhood grows and expands, the low and intermediate areas are likewise growing and expanding, and they are taking up and utilizing land alongside the high rent area as well as in other sectors of the city. When these other areas have acquired a low rent character, it is very difficult to change that character except for intensive apartment use. Hence, while in the beginning of the growth of the city, high rent neighborhoods may have a considerable choice of direction in which to move, that range of choice is narrowed as the city grows and begins to be filled up on one or more sides by low rent structures.

It is possible for high rent neighborhoods to take over sections which are marred by a few shacks. These are swept aside or submerged by the tide of growth. Negro houses have even been bought up and moved away in some southern cities to make way for a high grade development. This possibility exists where the houses are flimsy or scattered, where the land is cheap, where it is held by one owner, or where the residents are under the domination of others. It is extremely difficult otherwise. The cost of acquiring and tearing down substantial buildings and the practical impossibility of acquiring large areas from scattered owners, usually prevent high grade areas from taking over land once it has been fairly well occupied by middle or low grade residential uses.

Now that the radius of the settled area of cities has been greatly extended by the automobile, however, there is little difficulty in securing land for the expansion of high rent areas; for the high rent sector of the city expands with an ever widening arc as one proceeds from the business center.

The next vital question to be considered is how the various types of high rent areas are affected by the process of dynamic growth of the city and how the various types are related to each other in historical sequence.

The first type of high rent development was the axial type with high grade homes in a long avenue or avenues leading directly to the business center. The avenue was a social bourse, communication being maintained by a stream of fashionable carriages, the occupants of which nodded to their acquaintances in other passing carriages or to other friends on the porches of the fine residences along the way. Such avenues were lined with beautiful shade trees and led to a park or parks through a series of connecting boulevards. Examples of this type of development, in the decades from 1870 to 1900, are Prairie and South Michigan Avenues, Washington and Jackson Streets and the Lake Shore Drive in Chicago, Fifth Avenue in

New York City, Monument Avenue in Richmond, Va., and Summit Street in St. Paul, Minn. The fashionable area in this type of development expanded in a long string in a radial line from the business center. There was usually an abrupt transition within a short distance on either side of the high grade street.

The axial type of high rent area rapidly became obsolete with the growth of the automobile. When the avenues became automobile speedways, dangerous to children, noisy, and filled with gasoline fumes, they ceased to be attractive as home sites for the well-to-do. No longer restricted to the upper classes, who alone could maintain prancing steeds and glittering broughams, but filled with *hoi polloi* jostling the limousines with their flivvers, the old avenues lost social caste. The rich then desired seclusion—away from the "madding crowd" whizzing by and honking their horns. Mansions were then built in wooded areas, screened by trees. The very height of privacy is now attained by some millionaires whose homes are so protected from the public view by trees that they can be seen from outside only from an airplane.

The well-to-do who occupy most of the houses in the high rent brackets have done likewise in segregated garden communities. The new type of high grade area was thus not in the form of a long axial line but in the form of a rectangular area, turning its back on the outside world, with winding streets, woods, and its own community centers. Such new square or rectangular areas are usually located along the line of the old axial high grade areas. The once proud mansions still serve as a favorable approach to the new secluded spots. As some of the old axial type high rent areas still maintain a waning prestige and may still be classed as high rent areas, the new high rent area takes a fan-shaped or funnel form expanding from a central stem as it reaches the periphery of the city.

The old stringlike development of high rent areas still asserts itself, however, in the cases of expansion of high rent areas along water fronts like Lake Michigan, Miami Beach, and the New Jersey coast. The automobile, however, has made accessible hilly and wooded tracts on which houses are built on the crest of hills along winding roads.

The fashionable suburban town, which had its origin even before the Civil War, has remained a continuous type of high grade area. Old fashionable towns like Evanston, Oak Park, and Lake Forest near Chicago, have maintained their original character and expanded their growth. Other new high grade suburban towns have been established. The de luxe apartment area has been a comparatively recent development, coming after 1900, when the wealthy ceased to desire to maintain elaborate town houses and when the high grade single-family home areas began to be located far from the business center. A group of wealthy people, desiring to live near the business center and to avoid the expense and trouble of maintaining a retinue of servants, sought the convenience of tall elevator apartments.

The high grade areas thus tend to preempt the most desirable residential land by supporting the highest values. Intermediate rental groups tend to occupy the sectors in each city that are adjacent to the high rent area. Those in the intermediate rental group have incomes sufficient to pay for new houses with modern sanitary facilities. Hence, the new growth of these middle-class areas takes place on the periphery of the city near high grade areas or sometimes at points beyond the edge of older middle-class areas.

Occupants of houses in the low rent categories tend to move out in bands from the center of the city mainly by filtering up into houses left behind by the high income groups, or by erecting shacks on the periphery of the city. They live in either second-hand houses in which the percentage needing major repairs is relatively high or in newly constructed shacks on the periphery of the city. These shacks frequently lack modern plumbing facilities and are on unpaved streets. The shack fringe of the city is usually in the extension of a low rent section.

Within the low rent area itself there are movements of racial and national groups. Until only comparatively recently, the immigrants poured from Europe into the oldest and cheapest quarters on the lower East Side of New York and on the West Side of Chicago. The earlier immigrants moved out toward the periphery of the city. These foreign groups moved in bands or straight lines out from the railroad stations near the central business district. The Italian colony of Chicago moved westward along the area in the point between Harrison Street and Roosevelt Road and northwestward along

Grand Avenue. The Poles proceeded northwest along Milwaukee Avenue and expanded southwest along the stockyards. The Russian Jews moved west between Roosevelt Road and Sixteenth Street. The Czechoslovakians shifted southwest from Eighteenth and Loomis Streets to Twenty-second and thence westward to Cicero. With the decline of immigration after the World War, new immigrants ceased to fill the old houses in the downtown area and this outward progression of foreign groups slackened. Many of the tenements in the lower east side were boarded up, and some of the oldest quarters near the central business district of Chicago were demolished.

During the World War and after, however, there was a great influx of Negroes into the northern cities to take the place of European immigration. The Negro neighborhood in Harlem, New York, expanded in concentric circles. In Chicago, the Negroes burst the bounds of their old area along State Street and the Rock Island tracks, Twenty-second and Thirty-ninth Street and spread eastward to Cottage Grove Avenue and south to Sixty-seventh Street. In this movement in Chicago, they spread into an area formerly occupied by middle class and some high income families. The area, however, was becoming obsolete and did not offer vigorous resistance to the incoming of other racial groups.

Thus, in the framework of the city there is a constant dynamic shifting of rental areas. There is a constant outward movement of neighborhoods because as neighborhoods become older they tend to be less desirable.

Forces constantly and steadily at work are causing a deterioration in existing neighborhoods. A neighborhood composed of new houses in the latest modern style, all owned by young married couples with children, is at its apex. At this period of its vigorous youth, the neighborhood has the vitality to fight off the disease of blight. The owners will strenuously resist the encroachment of inharmonious forces because of their pride in their homes and their desire to maintain a favorable environment for their children. The houses, being in the newest and most popular style, do not suffer from the competition of any superior house in the same price range, and they are marketable at approximately their reproduction cost under normal conditions.

Both the buildings and the people are always growing older. Physical depreciation of structures and the aging of families constantly are lessening the vital powers of the neighborhood. Children grow up and move away. Houses with increasing age are faced with higher repair bills. This steady process of deterioration is hastened by obsolescence; a new and more modern type of structure relegates these structures to the second rank. The older residents do not fight so strenuously to keep out inharmonious forces. A lower income class succeeds the original occupants. Owner occupancy declines as the first owners sell out or move away or lose their homes by foreclosure. There is often a sudden decline in value due to a sharp transition in the character of the neighborhood or to a period of depression in the real estate cycle.

These internal changes due to depreciation and obsolescence in themselves cause shifts in the locations of neighborhoods. When, in addition, there is poured into the center of the urban organism a stream of immigrants or members of other racial groups, these forces also cause dislocations in the existing neighborhood pattern.

The effects of these changes vary according to the type of neighborhood and can best be described by discussing each one in turn. The highest grade neighborhood, occupied by the mansions of the rich, is subject to an extraordinary rate of obsolescence. The large scale house, modeled after a feudal castle or a palace, has lost favor even with the rich. When the wealthy residents seek new locations, there is no class of a slightly lower income which will buy the huge structures because no one but wealthy persons can afford to furnish and maintain them. There is no class filtering up to occupy them for single-family use. Consequently, they can only be converted into boarding houses, offices, clubs, or light industrial plants, for which they were not designed. Their attraction of these types of uses causes a deterioration of the neighborhood and a further decline in value. These mansions frequently become white elephants like those on Arden Park and East Boston Boulevard in Detroit, Mich.

On the other hand, houses in intermediate rental neighborhoods designed for small families can be handed down to a slightly lower income group as they lose some of their original desirability because of

age and obsolescence. There is a loss of value when a transition to a lower income group occurs, but the house is still used for the essential purpose for which it was designed; and the loss of value is not so great. There is always a class filtration to occupy the houses in the intermediate rental neighborhoods. Hence, a certain stability of value is assured.

Since the buildings in low rent areas are occupied by the poorest unskilled or casual workers, collection losses and vacancy ratios are highest. The worst buildings are condemned or removed by demolition to save taxes. Formerly these worst quarters in the old law tenements of New York or the West Side of Chicago were occupied by newly arrived immigrants. With the decline of immigration, this submarginal fringe of housing is being wrecked or boarded up as the residents filter up to better houses.

Thus, intermediate rental neighborhoods tend to preserve their stability better than either the highest or lowest rental areas.

The erection of new dwellings on the periphery of a city, made accessible by new circulatory systems, sets in motion forces tending to draw population from the older houses and to cause all groups to move up a step leaving the oldest and cheapest houses to be occupied by the poorest families or to be vacated. The constant competition of new areas is itself a cause of neighborhood shifts. Every building boom, with its new crop of structures equipped with the latest modern devices, pushes all existing structures a notch down in the scale of desirability.

APPENDIX

I. Data Used in the Analysis of City Structure

THE body of this monograph suggested a series of techniques for use in segregating the several types of residential neighborhoods in a city. Until comparatively recent years, practically no data were available which could be used to differentiate the conglomerate urban mass into its various segments. The increasing complexity of housing and real-estate problems, however, has made the need for fundamental statistics a prime necessity. Consequently, numerous attempts to gather data relative to urban housing problems have been made by various private and governmental authorities. As an aid in the use of the techniques suggested in this volume, therefore, we will outline in summary fashion the historical record of those governmental projects within the past several years which are related to the physical condition of residential units in American cities.[1]

1. In January 1934 a Federal Real Property Inventory of 64 urban centers was made as a Civil Works Administration project. This was the first survey collecting detailed information on the housing situation in the United States. The Bureau of Foreign and Domestic Commerce of the Department of Commerce supervised the survey and received the cooperation of the Bureau of the Census. A number of government agencies cooperated in formulating the detailed plans; valuable advice and assistance was also secured from numerous nongovernmental agencies and private individuals. The 64 cities varied considerably in size, location, age, and rate of growth, and were selected as representative of different types of economic development. Each State was represented by at least one city and only Texas was represented by more than two. Block summaries and block data maps have been prepared for each of these cities by the Federal Housing Administration.

2. In mid 1934 a number of other cities requested assistance from the Civil Works Administration in conducting similar surveys. These were conducted as local Civil Works Administration projects using the schedule developed by the Department of Commerce. That Department assisted some of the cities in setting up an organization for the surveys but they were made without supervision from Washington. Since the surveys arose from local interest, they emphasized problems of local concern. No summaries by blocks were prepared.

3. In late 1934 additional real-property surveys were made in Muncie, Ind., and in 13 places in Pennsylvania, using an enumeration schedule as revised by the Emergency Relief Administration. These were the first revisions made in the survey technique and corrected certain weaknesses which had appeared in the earlier surveys. Strict central supervision was received for the projects in each of these cities. In most of the cases, no summaries by blocks were prepared for the cities in this group.

4. In the winter of 1934–35, the survey technique was revised for the second time at the instigation of the Division of Economics and Statistics of the Federal Housing Administration. The latter agency, together with the Central Statistical Board, the Federal Emergency Relief Administration, the Federal Home Loan Bank Board, and the Housing Division of the Public Works Administration thoroughly reviewed the technique and scope of the real property surveys which had been made. This group developed a more comprehensive procedure through the revision of schedules, scope of the survey, instructions for enumerators, plan of organization, and standardized tabulations. The three most significant changes in the procedure were the addition of a

[1] For more detailed description than can be given here, and for an important collection of usable data, see the recent publication by the Works Progress Administration, *Urban Housing, A Summary of Real Property Inventories* Washington, D. C., 1938).

land use survey, summarization of all data by city blocks, and revisions in the general tables. The basic housing data are comparable for the most part with those secured in earlier surveys.

As a test of the revised survey procedure, the Federal Housing Administration selected 10 cities in West Virginia, Meadville, Pa., and Cheyenne, Wyo., for surveys to be made under their supervision. The projects were operated with personnel furnished by the Federal Emergency Relief Administration. The surveys made in these 12 urban places thoroughly tested the modified procedure.

Before the testing of the modified technique had been completed, surveys in 12 places in Indiana and 1 in Spartanburg, S. C. were started using the schedules developed in the first revision. Simple summaries by blocks were prepared and retained locally. The tabulations, however, are similar to those utilized in the second and final revision.

5. The *Standard Technique* thus developed was published on July 19, 1935, and contained (*a*) the survey procedure, (*b*) the tabulation instructions and, (*c*) a set of standard block tabulation and general survey tables.[2] All surveys have since followed the procedure prescribed in the Standard Technique. In all, surveys have been completed in 204 urban places, mostly from 1934 through 1936. In recent months, however, additional surveys in more than half a hundred other cities have been approved by the Works Progress Administration, and at least 18 are under way at the time of writing.

[2] Coordinating Committee of the C. S. B. and the W. P. A.; and the Division of Economics and Statistics, Federal Housing Administration, *Technique for a Real Property Survey* (Washington, D. C., 1935).

Accuracy of data.—The experience of the Census Bureau in its quests for census information indicates that absolute accuracy cannot be obtained in conducting house-to-house surveys. The judgment of the enumerator in border-line cases and incorrect information supplied by respondents result in some errors. In many of the early local real property inventories, inadequate training of workers and inexperienced local supervisors probably lead to additional inaccuracies. However, the use of the Standard Technique and supervision from Washington, including provision for proper training of personnel, spot checking of enumeration, careful reviewing of the schedules, and better organization of tabulation resulted in improved quality of results on the later surveys. It is believed that the quality is above the average for surveys of this type.

Because the cities were surveyed at different times since early 1934, there are slight variations in definition and in the completeness of the enumeration for different cities. The changes in economic conditions during this period, however, probably affect the complete comparability between cities more materially for some items than the above variations.

Definitions of data.—The illustrative form on the following page will give the reader a clearer indication of the type of data now gathered in real property surveys by use of the Standard Technique. All surveys made since the Standard Technique was developed have used this form and it is in current use. It differs slightly but not materially from the form used in the early surveys made in 1934. Definitions of the various items are also listed below.

ENUMERATION SCHEDULE FOR STANDARD TECHNIQUE, REAL PROPERTY SURVEYS

Form B 5/2/35

DWELLING SCHEDULE

DATE_____ CITY_____ STATE_____ E.D._____ BLOCK NO._____

ENUMERATOR_____ STRUCTURE NUMBER_____

STREET_____ STREET NO._____ APARTMENT NO. OR LOCATION_____

I. ENTIRE STRUCTURE

A. TYPE OF STRUCTURE
1. Single Family Detached ☐
2. Single Family Attached ☐
3. Two Family Side by Side ☐
4. Two Family Two Decker ☐
5. Three Family Three Decker ☐
6. Four Family Double Two-Decker ☐

No. of Units
7. Apartment ____
8. Business with Dwel. Units ____
9. Other Non-Converted ____
10. Partially Converted ____
11. Completely Converted ____

B. IF CONVERTED
1. Orig. Type ____
2. Yr. Converted ____ (1873)

C. BUSINESS UNITS
1. None ☐
2. No. of Units ____

D. EXTERIOR MATERIAL
1. Wood ☐
2. Brick ☐
3. Stone ☐
4. Stucco ☐
5. Other ☐

E. STORIES
Number ____

F. BASEMENT
1. No ☐
2. Yes ☐

G. YEAR BUILT ____

H. GARAGE
1. No ☐
2. Yes ☐

I. CONDITION
1. Good Condition ☐
2. Minor Repairs ☐
3. Major Repairs ☐
4. Unfit for use ☐
5. Under Const. ☐

IF OWNER OCCUPIED

J. VALUE OF ENTIRE PROPERTY $____

K. NO. MAJOR STRUCTURES INCLUDED IN VALUE ____

L. ENCUMBRANCE
1. Mortgage or Land Contract ☐
2. No Encumbrance ☐

M. FOR OFFICE USE
Persons per Room ____
1.____ 4.____
2.____ 5.____
3.____ 6.____

II. THIS DWELLING UNIT

A. OCCUPANCY
1. Owner ☐
2. Tenant ☐
3. Vacant ☐

B. DURATION
1. Time lived here Yrs.___ Mos.___
2. Length of Vacancy Yrs.___ Mos.___

C. MONTHLY RENT
$____

D. INCLUDED IN RENT

	No	Yes
1. Furniture	☐	☐
2. Garage	☐	☐
3. Heat	☐	☐
4. Hot Water	☐	☐
5. Light	☐	☐
6. Cook. Fuel	☐	☐
7. Mch. Refrig.	☐	☐
8. Refrig. Fuel	☐	☐

E. TOTAL ROOMS
Number ____

F. FLUSH TOILETS
Number ____

G. BATHING UNITS
Number ____

H. RUNNING WATER
1. Hot and Cold ☐
2. Cold Only ☐
3. None ☐

I. HEATING
1. Cent. Steam or Hot Water ☐
2. Cent. Warm Air ☐
3. Other Installed ☐
4. None Installed ☐

J. LIGHTING
1. Electric ☐
2. Gas ☐
3. Other ☐

K. COOKING
1. Electric ☐
2. Gas ☐
3. Other Installed ☐
4. None Installed ☐

L. REFRIG. EQUIPMENT
1. Electric ☐
2. Gas ☐
3. Ice ☐
4. None ☐

M. NUMBER AND AGE OF ALL PERSONS

Total	____
Under 1 year	____
1 - 4	____
5 - 9	____
10 - 14	____
15 - 19	____
20 - 64	____
65 and over	____

N. RACE OF HOUSEHOLD
1. White ☐
2. Negro ☐
3. Other ☐

O. ROOMERS
Number ____

P. EXTRA FAMILIES
1. No. Extra Fam. ____
2. No. Persons ____

FIGURE 41

Structures

Any building containing at least one dwelling unit is classified as a residential structure. Hotels, clubs, rooming houses, and institutions are excluded in all surveys.

A. *Type of structure.*—1. *Single-family, detached.*—A single structure with open space on all four sides intended for occupancy by one family.

2. *Single-family, attached.*—A structure built directly against an adjoining structure (whether residential or nonresidential) without open space between and containing one dwelling unit extending from basement to roof.

3. *Two-family, side by side.*—A structure containing two dwelling units, each of which extends from basement to roof. It may or may not have two separate entrances.

4. *Two-family, two-decker.*—A structure containing two dwelling units, where one unit occupies the first floor and the other unit occupies the second floor. The structure may be free standing or attached. This term does not apply to cases where one family lives in a basement and another lives on the ground floor.

5. *Three-family, three-decker.*—A structure containing three dwelling units, each of which occupies a complete floor. The structure may be either free standing or attached.

6. *Four-family, double two-decker.*—A special type of structure containing four dwelling units with two units on the first floor, each of which occupy half of the floor, and two units on the second floor, each of which occupy half of that floor. The structure may be either free standing or attached.

7. *Apartments.*—Any structure primarily residential in character which contains five or more dwelling units. It may contain business units providing the residential portion predominates.

8. *Business with dwelling units.*—Any structure primarily business in character, but which also contains dwelling units. The structure may have any number of dwelling units if business uses are more important.

9. *Other nonconverted structures.*—Nonconverted structures with four or less dwelling units which cannot be classified in preceding categories, including one-family dwellings which are not structures, such as tents or houseboats, and nonconverted structures with two to four dwelling units when these are not laid out as above.

10. *Partially converted.*—A structure is partially converted when it is arranged to provide a different number of dwelling units, or insertion of one or more business units, than intended in its original construction if the alterations are so slight the structure could be changed back to its original type without substantial expenditure of time or money. "Partially converted" means no important structural change has been made.

11. *Completely converted.*—A structure is completely converted when it is arranged to provide a different number of dwelling units, or insertion of one or more business units, than intended in its original construction if the change involved substantial structural alterations, such as new entrance or hall, installation of a new bathroom, installation of new partitions, etc.

Dwelling Units

A dwelling unit is defined as a room or group of rooms intended for the occupancy of one family or household as their home and where they sleep. Where part of a residential structure is rented out to another family without the quarters being completely closed off, it counts as a separate dwelling unit only if the family has exclusive use of those rooms with permanent cooking facilities and is able to live a separate family life. Quarters that are completely closed off do not require cooking facilities to qualify as a dwelling unit.

A. *Occupancy.*—Tenants include occupants who have agreed to pay rent or those who receive the use of living quarters in exchange for services, such as janitors, building managers, ministers who occupy parsonages, etc., and friends of owners who occupy dwelling units free of rent. Vacant dwelling units include dwelling units leased but vacant and available for sublease. Owner-occupied units include all units where the owner lives, even though other individuals or families also live there.

B. *Duration.*—The years and months that the dwelling unit has been continuously occupied by the present occupant, or the years and months since the last occupant moved out (respectively).

C. *Monthly rent.*—For tenant-occupied units it represents the rental the tenant has agreed to pay as reported by the tenant; for vacant units and units occupied by janitors, managers, and other nonowners not paying a rental, the estimated amount for which it would probably rent. The estimate is based on asking price for the unit and verified by comparison with rental of similar units in the same neighborhood. No allowance is made for furnishings, concessions, or items included in the rental. In the case of summer or seasonal properties, the annual rental is divided by 12 to obtain the average monthly rental.

D. *Included in rent.*—For nonowner-occupied units data are obtained on whether or not the following items are included in the rental of the unit; furniture, garage, heat, hot water, light, cooking fuel, mechanical refrigeration, refrigerating fuel.

E. *Total rooms.*—Dinettes and kitchenettes are counted as half rooms; bathrooms, pantries, closets, halls, unenclosed or very small enclosed porches are not counted. Rooms in basements and attics are not counted unless they are finished off and regularly used as living quarters.

F. *Flush toilets.*—A flush toilet is an indoor toilet with running water which may be in a bathroom or in separate room of its own. Chemical toilets and outside toilets of any kind do not count as flush toilets.

G. *Bathing units.*—Represents a bathtub or a separate shower. A bathtub and a shower in the same room are counted as one unit.

H. *Running water.*—Represents running water within the dwelling unit only.

I. *Heating.*—The principal type of equipment employed for heating the dwelling unit. Where no heating equipment is *permanently* installed, the entry of "none installed" is made.

B. *If converted.*—Self-explanatory.

C. *Business units.*—Self-explanatory.

D. *Exterior material.*—Only the principal material used in the exterior walls is noted. Brick veneer is considered as brick.

E. *Stories.*—Refers to the total number of stories in the structure. Basements are not counted. The top floor is considered as a whole story if it is finished as living quarters and has full ceiling height over entire area of that floor. If top floor has finished rooms but is cut into by the roof, it is considered a half story.

F. *Basement.*—Refers to space under the first principal floor of the structure. In general, a basement is some kind of excavation, and, to be counted, must be high enough for a person to stand in, and there must be enclosing walls.

G. *Year built.*—The year in which the construction of the building was completed. It refers to the original construction and not to the date of later remodeling, reconstruction, or conversion. The data are obtained from the owner or well-informed tenant, if possible; otherwise, the approximate year is estimated by the enumerator. (If the building is under construction, the year of enumeration is entered as the year built.)

H. *Garage.*—Applies to any private garage on the same parcel of land as the residential structure whether it is a separate building or attached to the residence itself. A garage on the property is to be counted whether it is used by the occupants of the main structure or not. A garage in some other location which the occupants are using is not counted.

I. *Condition.*[3]—Each structure is classified into one of the following condition groups based on the enumerator's judgment.

1. *Good condition.*—Refers to structures which are in good condition and need no repairs or paint.

2. *Minor repairs.*—Refers to structures which, while structurally sound, need minor repairs such as painting, papering, stopping of small leaks, pointing up of masonry, etc.

3. *Major repairs.*—Refers to structures which need major repairs, such as a new roof, replastering, foundations, new porches, etc., which, if neglected much longer, will seriously impair the property, but which, if made, will put the structure in reasonably good condition.

4. *Unfit for use.*—Refers to structures unfit for human habitation; that is, so obsolete or so hazardous to the safety or health of the occupant, or in such a dangerous condition that it should be destroyed (in the opinion of the enumerator).

5. *Under construction.*—Self-explanatory.

J. *Value of property.*—Obtained for structures occupied by the owner, by asking the following question: "What do you think you could get for this property if you wanted to sell it now?"

L. *Encumbrance.*—Obtained only for structures occupied by owner, and includes as mortgaged those subject not only to mortgage, but also to deeds of trust, vendor's liens and land contracts. Land contract refers to any contract under which the property is being bought, but where the change in title is to be made in the future.

[3] In the text of this monograph, unless otherwise noted, structures in "poor condition" include the total of those in need of major repairs and those unfit for use, as defined above.

This class includes such equipment as portable kerosene stoves or electric heaters.

J. *Lighting.*—The principal type of lighting equipment used in the dwelling unit.

K. *Cooking.*—The principal permanently installed cooking equipment in the dwelling unit.

L. *Refrigeration equipment.*—The principal type of equipment used in the dwelling unit for the refrigeration of food.

M. *Number and age of all persons.*[4]—The number of persons who regularly sleep in the unit, whether they have their meals there or not. Children away at school or other members of the household temporarily absent are included. Servants who sleep in the dwelling unit, all roomers, and all members of extra families are also included, but not persons staying in the dwelling unit on a temporary visit or those who only have their meals there. All persons in the household, including roomers, are classified by age on last birthday.

N. *Race of household.*—The principal race of the family.

O. *Roomers.*—Obtained by asking, "How many people were there in the dwelling unit not related to the principal family who have agreed to pay rent for their rooms?"

P. *Extra families.*—Obtained by asking, "Are there any individuals or groups of persons living here who plan to set up a home of their own when business picks up and jobs are available?" A son and his wife living with parents, a friend out of a job occupying quarters along with established families if they plan to move into a dwelling unit of their own when conditions improve. The purpose is to find out how many additional dwelling units will be required in the city when conditions improve.

[4] In the text of this monograph, unless otherwise noted, "overcrowded conditions" are deemed to exist where there is more than one person per room.

II. Types of Maps Useful in the Analysis of City Structure and Growth

SEVERAL types of maps have been used in this study as illustrative of the suggested techniques. Scattered throughout the text have been references to their method of construction. Here the several kinds of maps used in analysis are described.

1. *Land survey maps.*—The United States Geological Survey has made maps of a large number of urban areas which show the framework of blocks in a city and the watercourses, elevations, valleys, and other natural topographical features. These maps also show proportions of the land area which have been built upon. This type of map is available for some areas for periods as far back as the early nineties. They are useful in revealing the boundaries of the settled areas of cities, as well as the interstices within the inner structure.

2. *Land coverage maps.*—These maps are now made as a regular part of all real-property surveys. They do not indicate the specific location of buildings within the block but they do show the proportion of land in each block in permanent use and the portion that is occupied by structures. They do not indicate topographical features but they have the advantage of being of more recent date.

3. *Settled area maps.*—These are maps on which all areas have been filled in solidly in which the buildings are close enough together to be classed as urban—*i. e.*, where there is at least one house to the acre. Such maps are useful in showing the boundaries of urban development in a comprehensive view in which the detail of single structures is subordinated to the outline of the entire urban body.

4. *Land use maps.*—These maps show the type of use made of each parcel of land in the city. They may take one of two forms. Either each type of use in the city may be shown on a separate map or all the different types of land use are shown on a single map. Usually, the intensity of land use is indicated by the amount of street frontage occupied. Different types of cross hatching are used to represent different uses and no attempt is made to show separate structures in case adjacent buildings are devoted to the same type of use. This type of map is now made as a regular part of all real property surveys.

5. *Block data maps.*—This is a device that overcomes some of the disadvantages of other types of maps purporting to show data which have been gathered in real property surveys. Written in the blank space in each block on a map of a city are a number of different figures arranged in a definite order. Each figure represents a given characteristic for that block expressed either as an average of all dwelling units within the block or as a percentage of the total number of dwelling units or structures in the block. It is thus possible to make comparisons between numerous different factors in every block. The Division of Economics and Statistics of the Federal Housing Administration has block data maps for 142 cities. This type of map is now made as a regular part of all real property surveys.

6. *Special factor maps.*—Individual block characteristics are colored or cross hatched on single maps to portray keyed gradations of such characteristics. Thus, the relative condition of the several types of residential neighborhoods in a city may be seen at a glance when mapped according to gradations of individual characteristics. A series of such special factor maps superimposed upon one another may serve to delineate an area in which the quality of housing is within definite limits. This procedure was described at length in part I, chapter III. This type of map is now also prepared as a regular part of all real property surveys. For each survey, special factor maps are drawn for (1) average block rents, (2) age of structures, (3) condition of structures, (4) owner occupancy, (5) overcrowding, (6) race, (7)

sanitary facilities, (8) length of occupancy for both owners and tenants, and (9) mortgage status.

7. *Rental area maps.*—These maps show the rough pattern of distribution of rental neighborhoods in any city. The blocks of similar rent are grouped together in relatively homogeneous areas. Usually some blocks are included that do not fall in exactly the same rental group, but rental area maps thus smooth out to a certain extent the scattered appearance of the array of individual blocks. While such rental area maps do not show the intermingling of the blocks of different rental groups in the transition zones between the clusters of the highest rental blocks and those lower in the rental scale they do bring out in sharp relief the location of different types of residential rental areas. The data for maps of this type can either be obtained from real property surveys or from the sampling method outlined at the close of part I, chapter IV.

8. *Dynamic factor maps.*—Most of the maps listed above are primarily of use in the analysis of the structure of cities. However, a time series of settled area maps, land use maps, and rental area maps are useful in studying the growth of cities. Such series, spaced at appropriate time intervals are termed "dynamic factor" maps. The data for maps based on time intervals are difficult to obtain. The source materials and method of construction for maps of this type have been covered in part II, chapters II, III, IV.

III. Research in Urban Growth—An Aid in Selecting Mortgage Risks

A LARGE volume of data is readily available from numerous sources concerning those urban economic activities reflective of the growth of cities. It is not necessary that we enumerate here either the types of data available or their sources. Those are well known to economists and statisticians. It is wished to suggest, however, certain techniques which have been evolved for use in the better measurement of that element of risk inherent in economic areas.

In part II of this monograph, it was pointed out that urban growth is caused by both normal population increases and sporadic migrations of the population in response to economic opportunities. Since the inherent risk under discussion is measurably affected by the relative number of persons capable of meeting principal and interest payments on their homes, it may be stated that the expansion or contraction, the stability and the diversification of the basic sources of employment in the particular city, are of primary interest in any attack on this problem.

Gainful employment, however, depends upon a large number and variety of enterprises which may be grouped in categories. For our purposes, three broad categories have been used—under the headings of industry, trade, and specialty groups. In measuring the basic economic background factors without which the community would not exist, only employment depending upon income from, or distribution to, areas other than the one under examination should be considered.

Thus, the industry category may be regarded as including all those gainfully employed in manufacturing, assembling, fabricating, and refining products for distribution beyond the borders of the area under consideration. The trade category includes retail and wholesale trade with other areas, as well as finance and transportation. Trade with those residing in the area should not be considered. The category of specialty groups embraces those activities, not specifically covered under industry and trade, such as government, resort, education, mining, lumbering, fishing, and oil extraction.

The actual influence of these several types of employment activities upon the economic area is dependent upon the volume of employment embraced by each. The influence may be numerically expressed by the use of a weight which may be determined by the proportion of employment in each category to total employment in the area. Since it is estimated that the persons in basic sources of employment support on the average an equal number of persons in the service activities such as storekeepers, teachers, policemen, doctors, lawyers, building mechanics, druggists, etc., double weight should be given to the industry and specialty categories. Thus, if 14 percent of all gainfully employed persons are engaged in industry, the weight for the industry category should be 28 percent. The reason for giving this double weight is that if all the industry were withdrawn from this particular city, the total loss of employment would not only include those directly engaged in industry but also all that portion of the population that was engaged in performing services for these industrial workers

The weight for trade should be obtained by subtracting the sum of the weights of other applicable categories from 100 percent. In most large areas, both the industry and trade categories will apply. In small areas, other than manufacturing centers, the trade category alone may apply.

When the relative importance of the different basic categories has been determined, the next step is to estimate the probable long-run trend of employment in each category in the next ten years. Prospects of an increase in employment of ten per-

cent or more probably entitle the city to the highest rating because such expansion of employment opportunities creates an added market for housing. Conversely, prospects of a decline of ten percent or more in employment would usually warrant giving the city the lowest rating because such lessened employment volume usually means a shrinkage in housing demand, an increase in vacancies, and a decline in the value of homes.

Not merely the long-run trend but cyclical fluctuations in employment and diversification of employment have vital importance in evaluating mortgage risk. If there is extreme fluctuation in employment in a city between prosperity and depression, there is a risk that payments on homes cannot be maintained during the depression. Such a city should receive a lower rating on this score than one which tends to maintain a stable level of employment in good times and bad. Diversification is also an important factor in rating the economic background of a city. In the case of a single-industry town, all the eggs are in one basket. If the industry moves away, or dwindles because its products are outmoded, the demand for housing will suddenly be drastically reduced. Hence the rating for a one-industry city should be lower than the city with diversified industries where the losses in some lines of manufacturing may be offset by gains in other lines.

The economic background rating in a city is a composite grade in which the prospects of employment in each basic category are estimated and given their proper weight, and which is modified also by allowance for cyclical fluctuations and diversification.

Finally, the total of these weighted values may be adjusted to conform with the investigator's judgment (expressed as an index number) of the current marketability of typical properties to financially capable purchasers. This final adjustment is a combination of the numerous elements reflecting marketability.

The suggested procedure of analysis is the fruit of researches into urban growth in an endeavor to discover a method of measuring the relative risk underlying operation in certain areas. It is suggested here as a method of approach in the formulation of mortgage policy. Analysts may differ in their treatment of individual items, or decide to use different systems of weighting, but the use of such a measure of this element of risk should be of aid in the selection of good mortgage risks. Further researches in the fields of urban structure and growth may, of course, suggest refinements and improvements in technique. (See Sections 1807 *ff. Underwriting Manual* (Federal Housing Administration) Supt. of Public Documents, Washington D. C. Revised Feb. 1938.).

Map Supplement

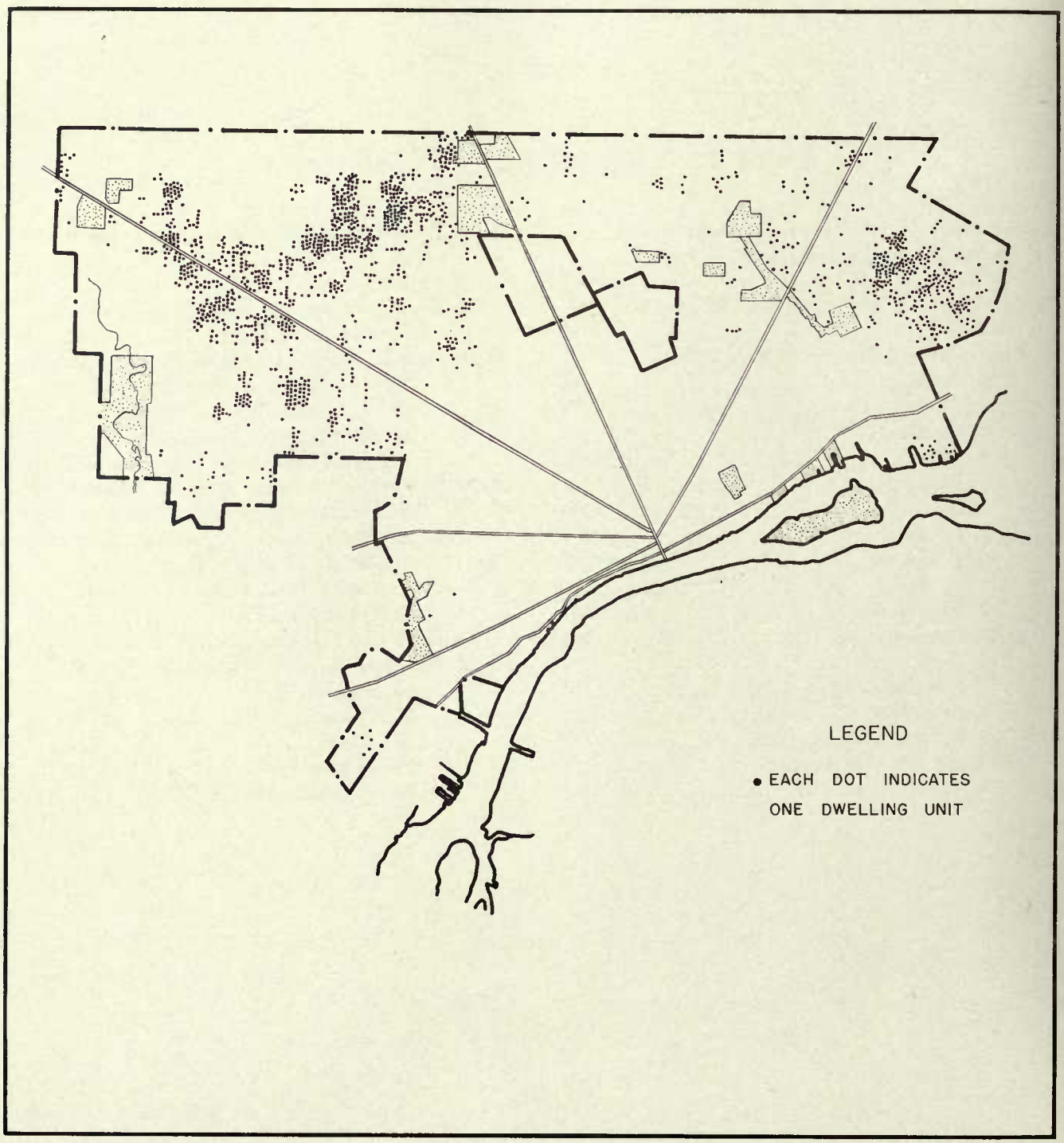
Index to Supplementary Illustrations

FIGURE 1

SPOT MAP OF NEW DWELLING CONSTRUCTION

DETROIT, MICHIGAN

JANUARY 1, 1937 TO APRIL 30, 1937



SOURCE: DEPARTMENT OF BUILDINGS AND SAFETY, DETROIT, MICHIGAN

FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 2

PATTERN OF AGE OF STRUCTURES
WASHINGTON, D.C., 1934

SCALE IN MILES

0 1 2 3

MEDIAN AGE OF STRUCTURES BY BLOCKS

1904 AND BEFORE
1905 - 1919
PUBLIC PROPERTY IN USE
1920 - 1934

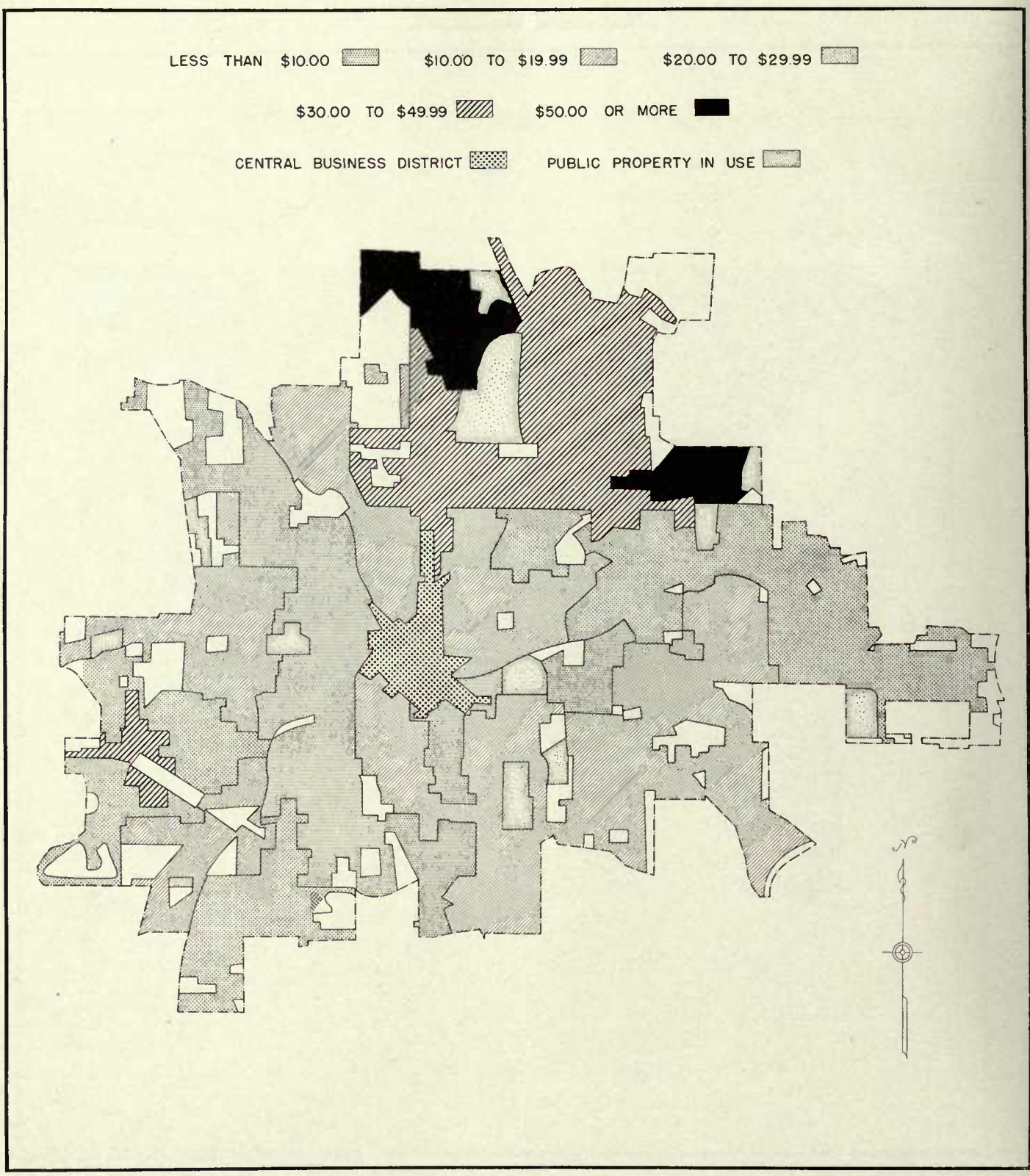
SOURCE: CIVIL WORKS ADMINISTRATION
DISTRICT OF COLUMBIA REAL PROPERTY INVENTORY, 1934

FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 3

AVERAGE RENTS IN RESIDENTIAL AREAS

ATLANTA, GEORGIA 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE,
ATLANTA REAL PROPERTY INVENTORY, 1934

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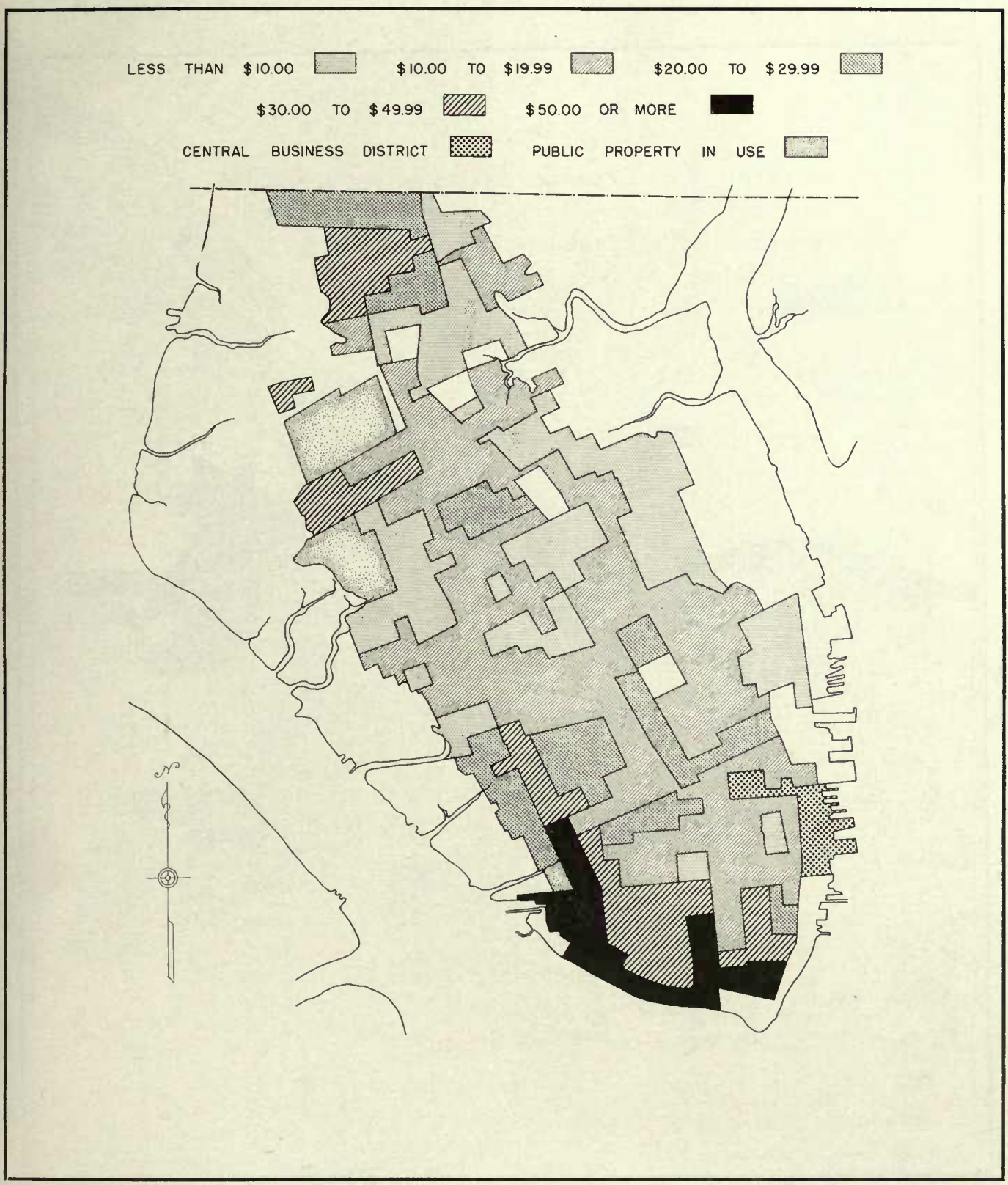
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 4

AVERAGE RENTS IN RESIDENTIAL AREAS CHARLESTON, SOUTH CAROLINA 1934



SOURCE: U S. OEPARTMENT OF COMMERCE
CHARLESTON REAL PROPERTY INVENTORY, 1934

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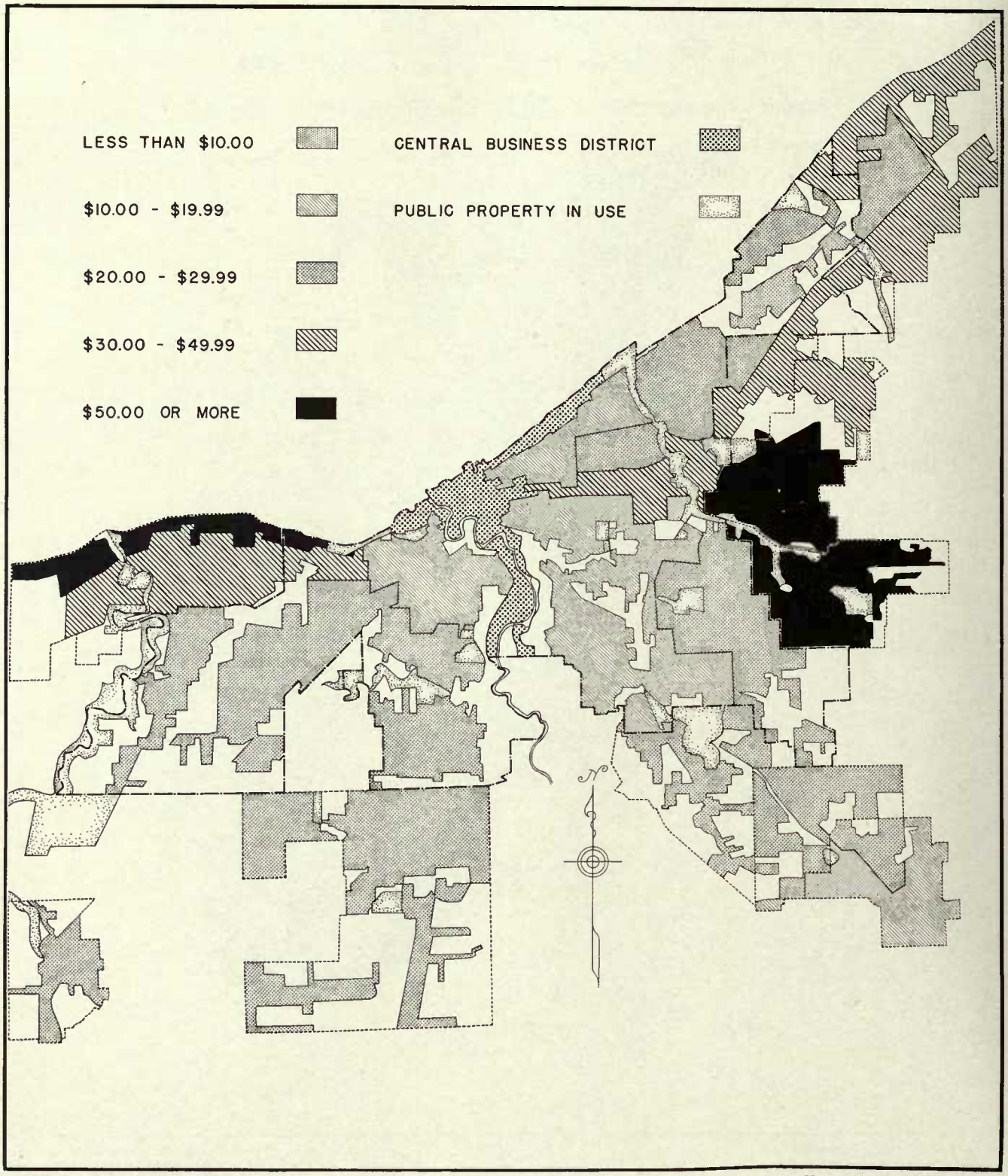
DIVISION OF ECONOMICS AND STATISTICS

163253—39——10

FIGURE 5

AVERAGE RENTS IN RESIDENTIAL AREAS
CLEVELAND, OHIO AND ENVIRONS
1934

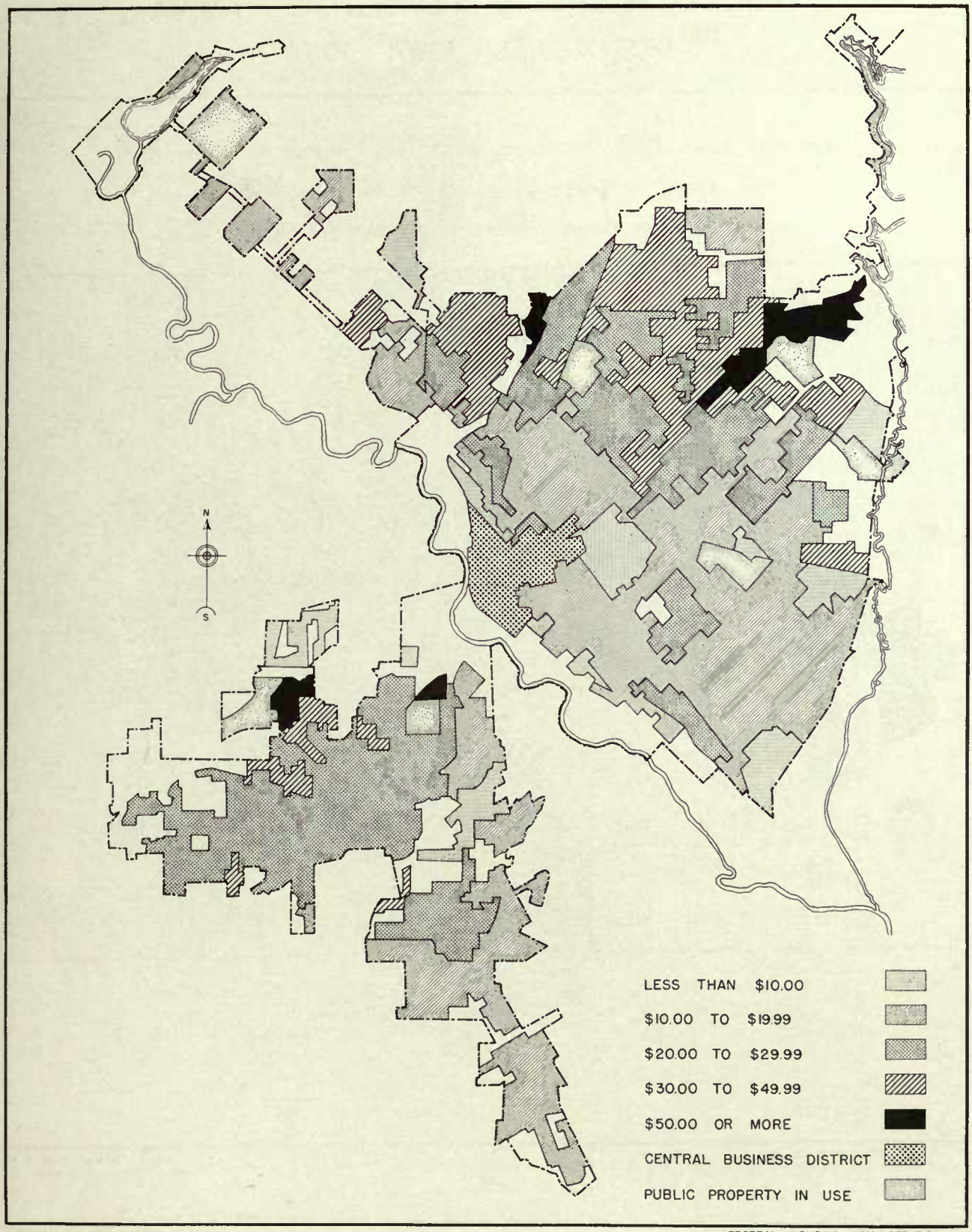


SOURCE: U. S. DEPARTMENT OF COMMERCE
CLEVELAND REAL PROPERTY INVENTORY, 1934

FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 6

AVERAGE RENTS IN RESIDENTIAL AREAS
DALLAS, TEXAS 1934

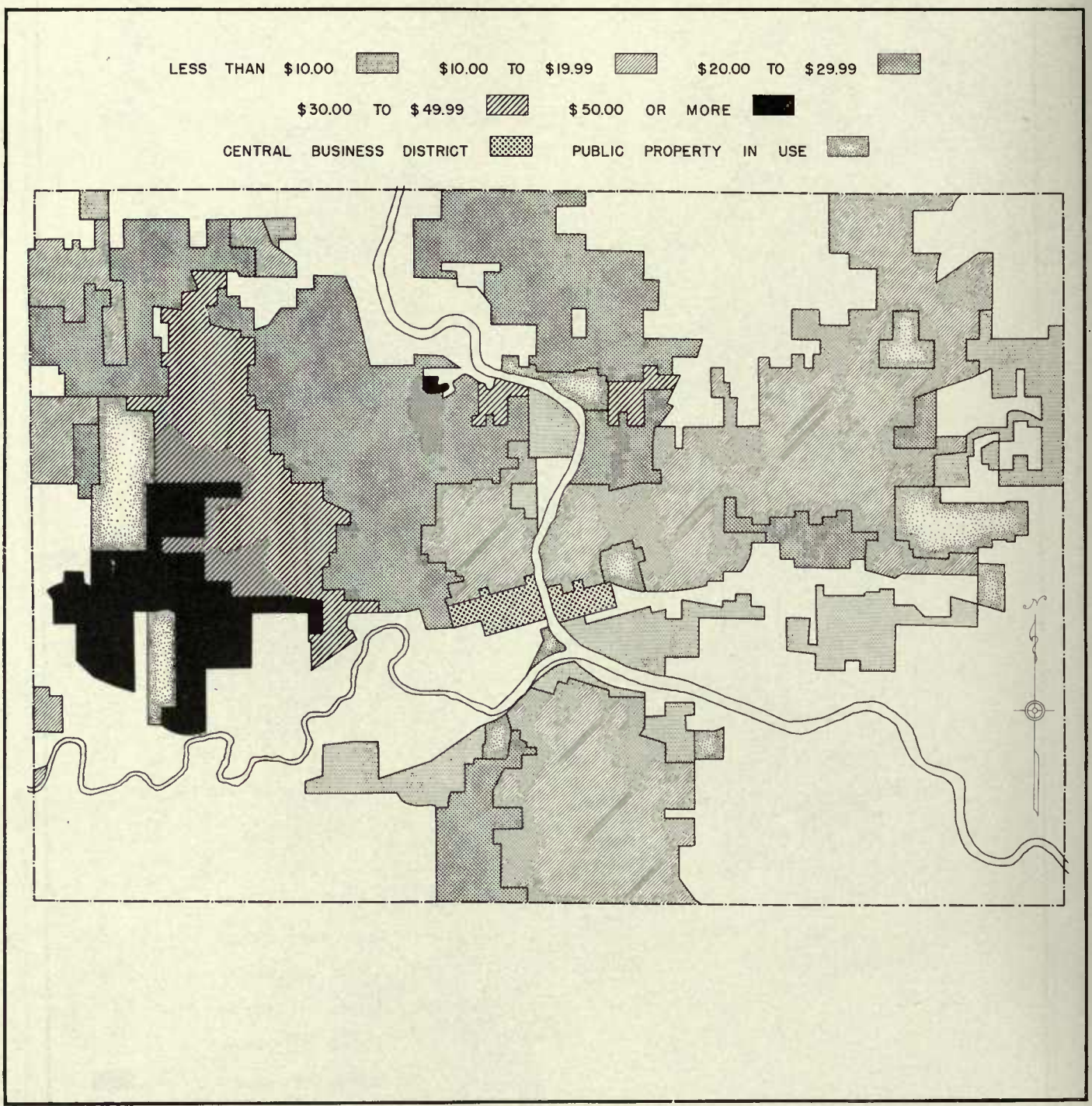


SOURCE: U. S. DEPARTMENT OF COMMERCE
DALLAS REAL PROPERTY INVENTORY, 1934

FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 7

AVERAGE RENTS IN RESIDENTIAL AREAS
DES MOINES, IOWA 1934

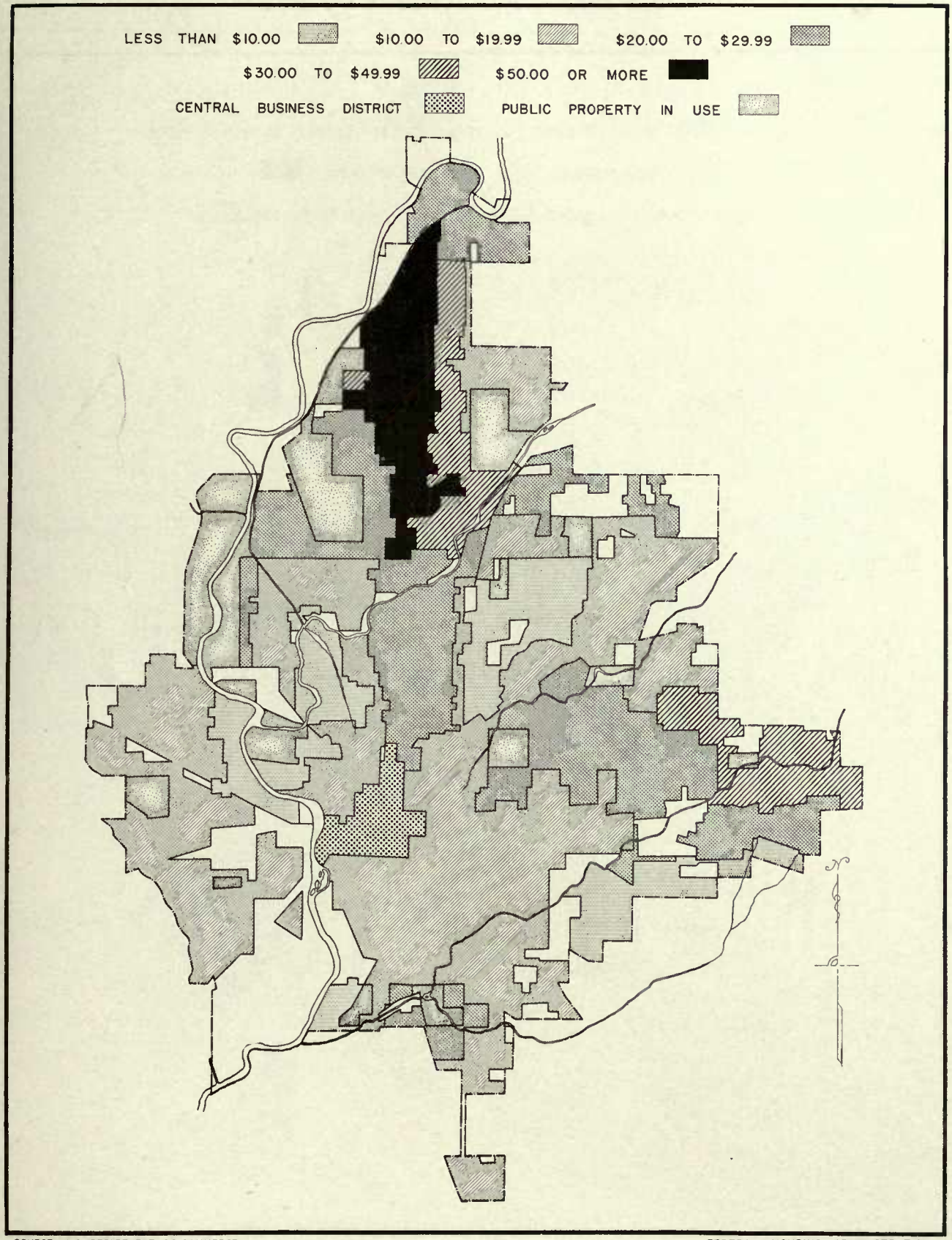


SOURCE: U.S. DEPARTMENT OF COMMERCE,
DES MOINES REAL PROPERTY INVENTORY, 1934

FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 8

AVERAGE RENTS IN RESIDENTIAL AREAS INDIANAPOLIS, INDIANA 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
INDIANAPOLIS REAL PROPERTY INVENTORY, 1934

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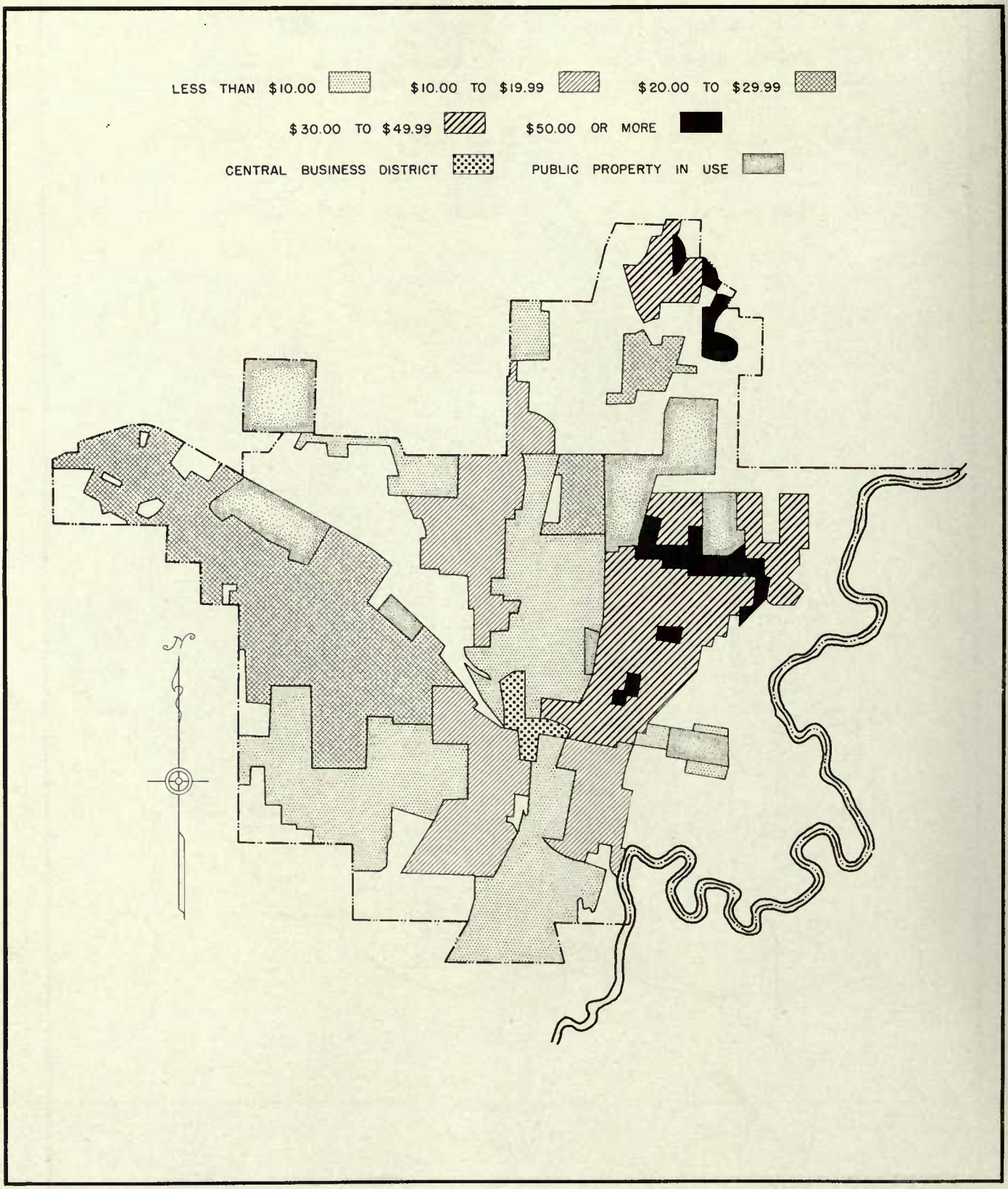
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 9

AVERAGE RENTS IN RESIDENTIAL AREAS JACKSON, MISSISSIPPI 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
JACKSON REAL PROPERTY INVENTORY, 1934

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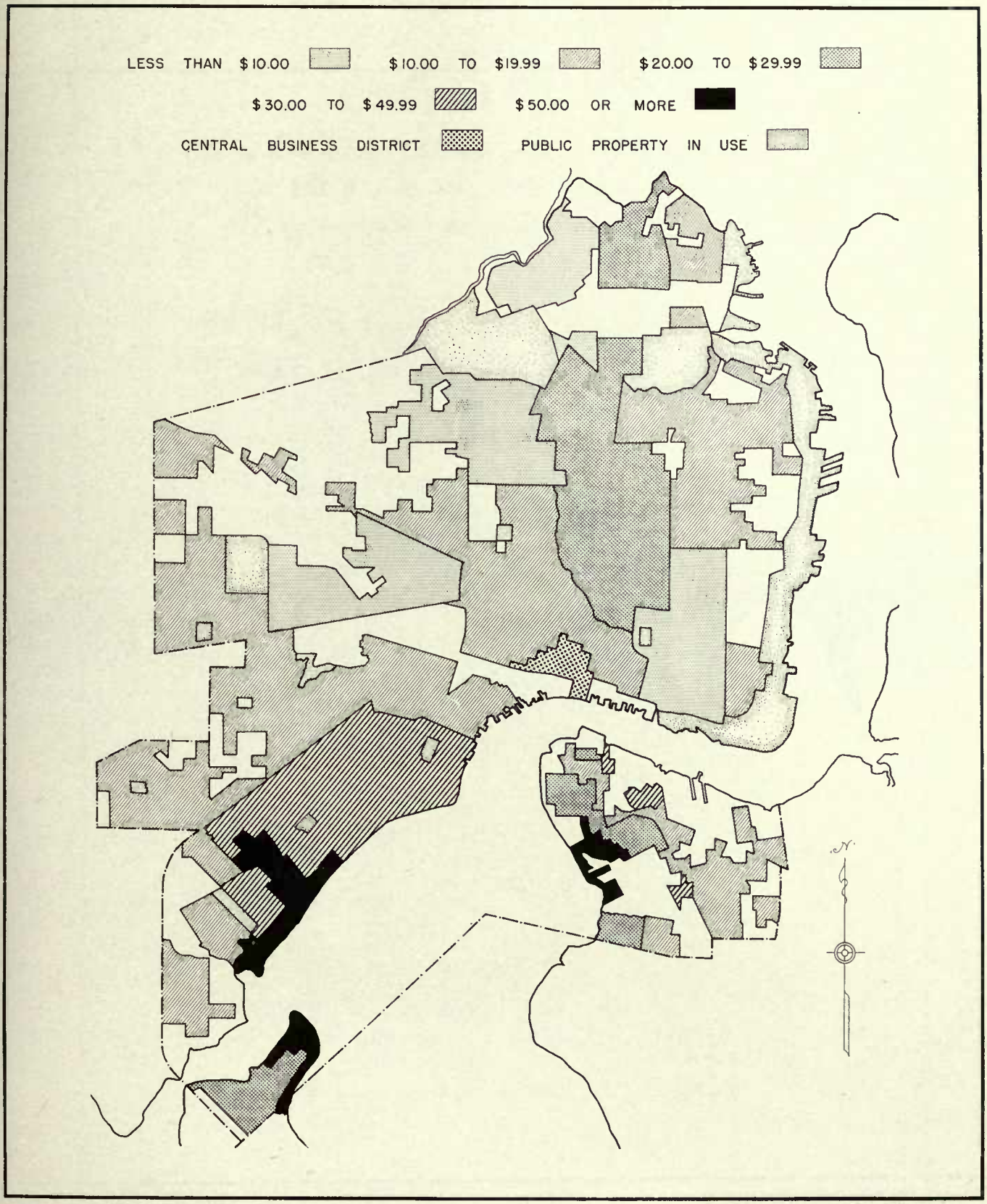
FIGURE 10

AVERAGE RENTS IN RESIDENTIAL AREAS JACKSONVILLE, FLORIDA 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
JACKSONVILLE REAL PROPERTY INVENTORY, 1934

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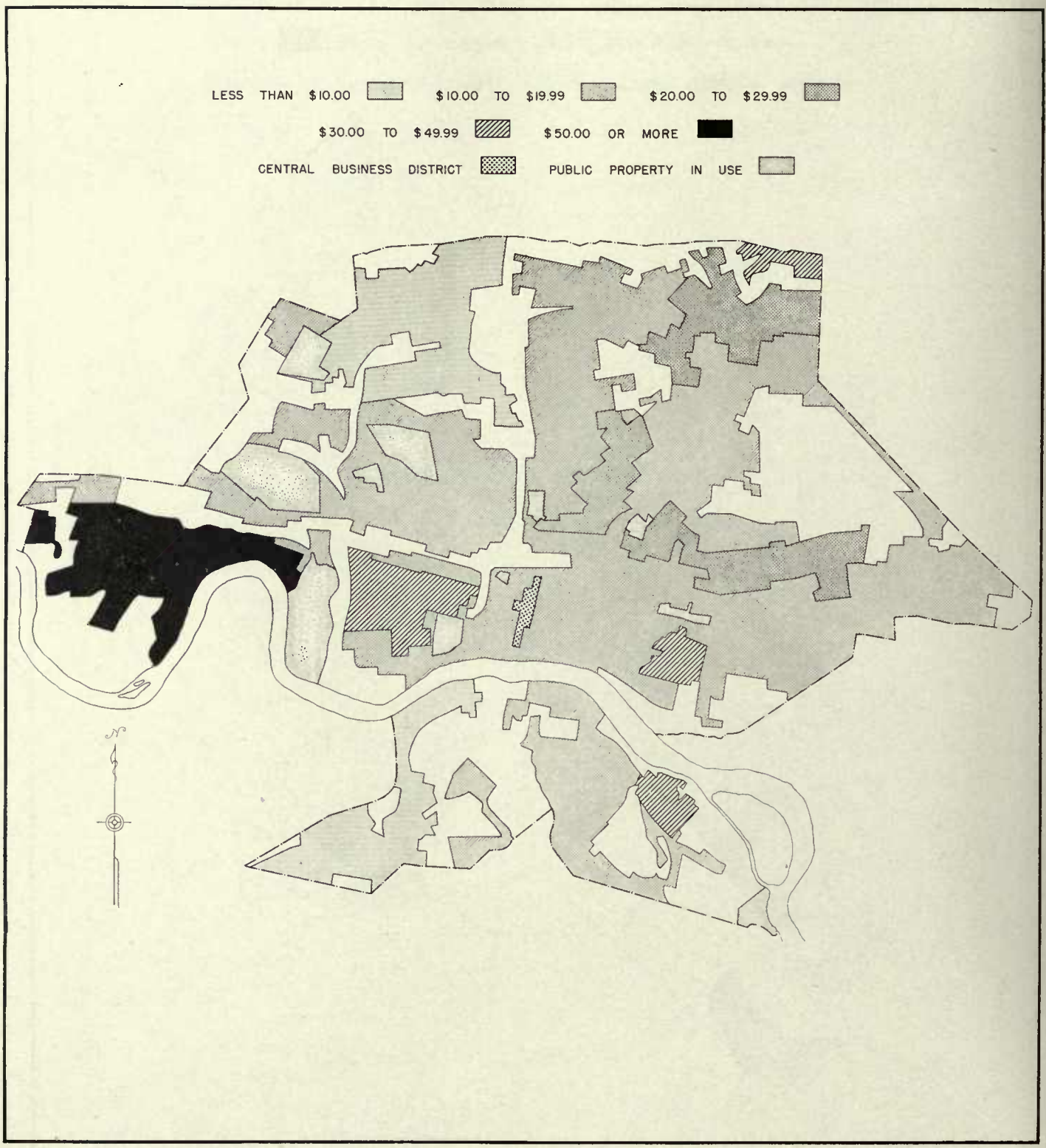
FIGURE 11

AVERAGE RENTS IN RESIDENTIAL AREAS KNOXVILLE, TENNESSEE 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE.
KNOXVILLE REAL PROPERTY INVENTORY, 1934

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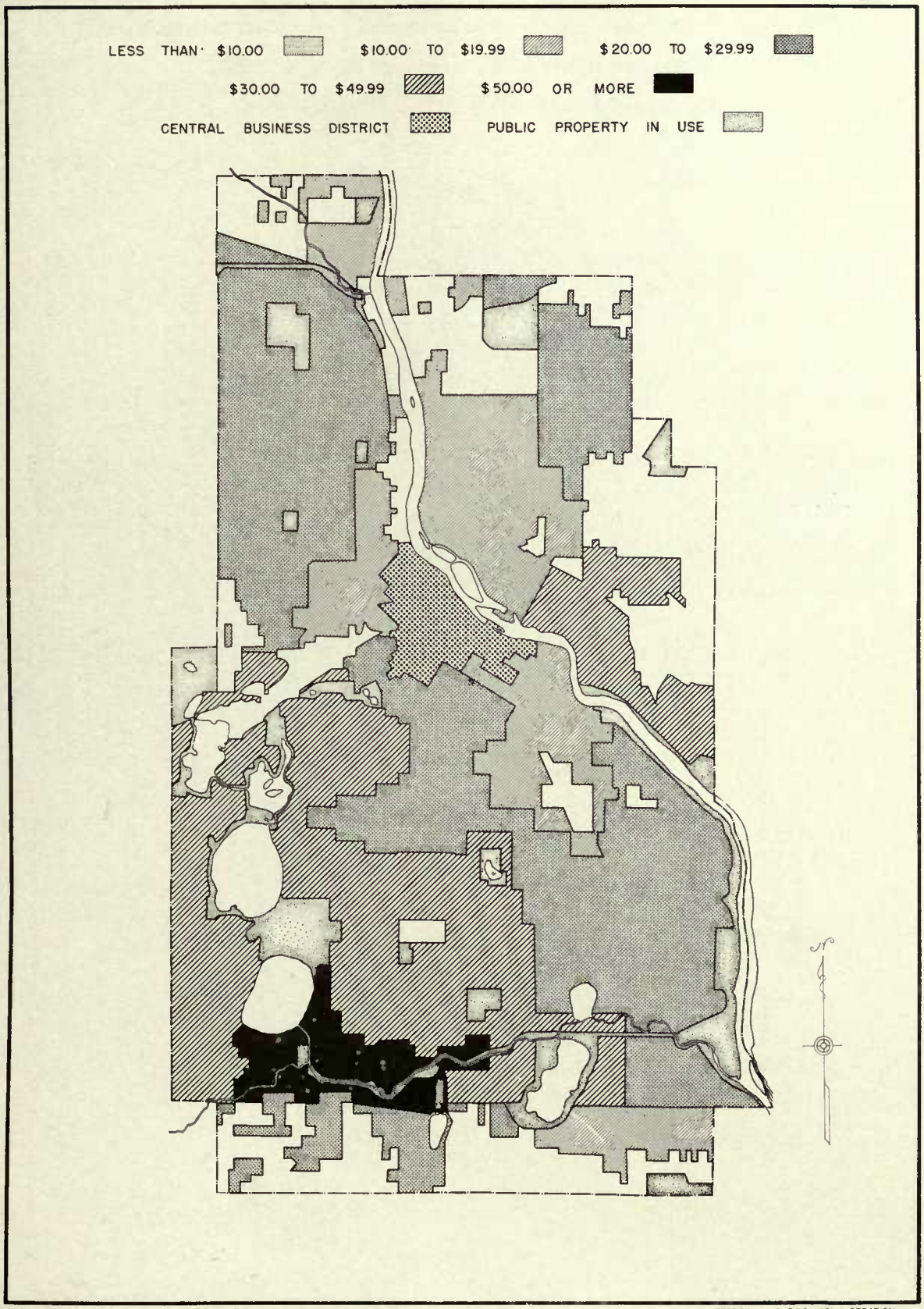
FIGURE 12

AVERAGE RENTS IN RESIDENTIAL AREAS MINNEAPOLIS, MINNESOTA 1934



SOURCE: U.S. DEPARTMENT OF COMMERCE
MINNEAPOLIS REAL PROPERTY INVENTORY, 1934

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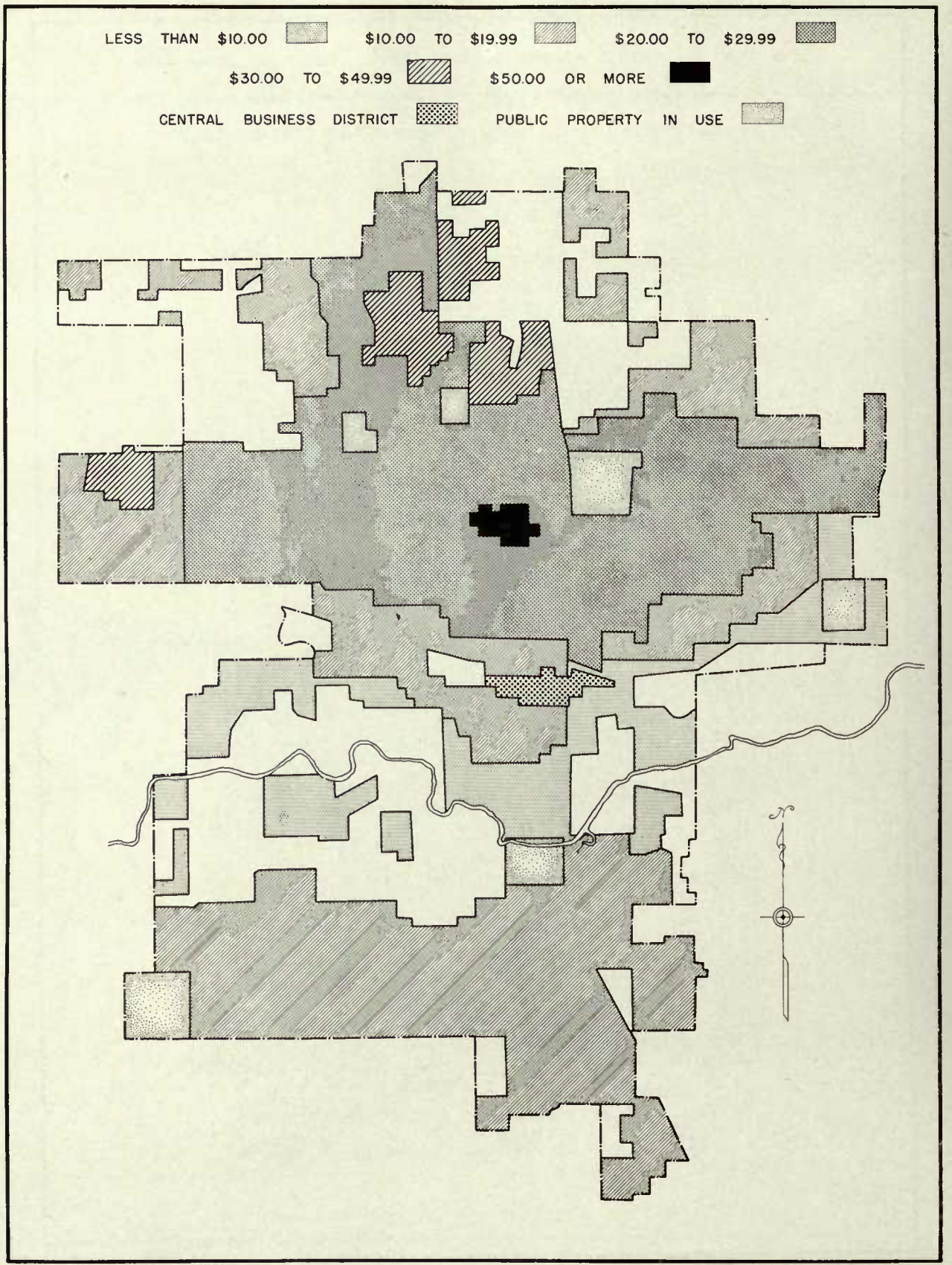
FIGURE 13

AVERAGE RENTS IN RESIDENTIAL AREAS OKLAHOMA CITY, OKLAHOMA 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
OKLAHOMA CITY REAL PROPERTY INVENTORY, 1934

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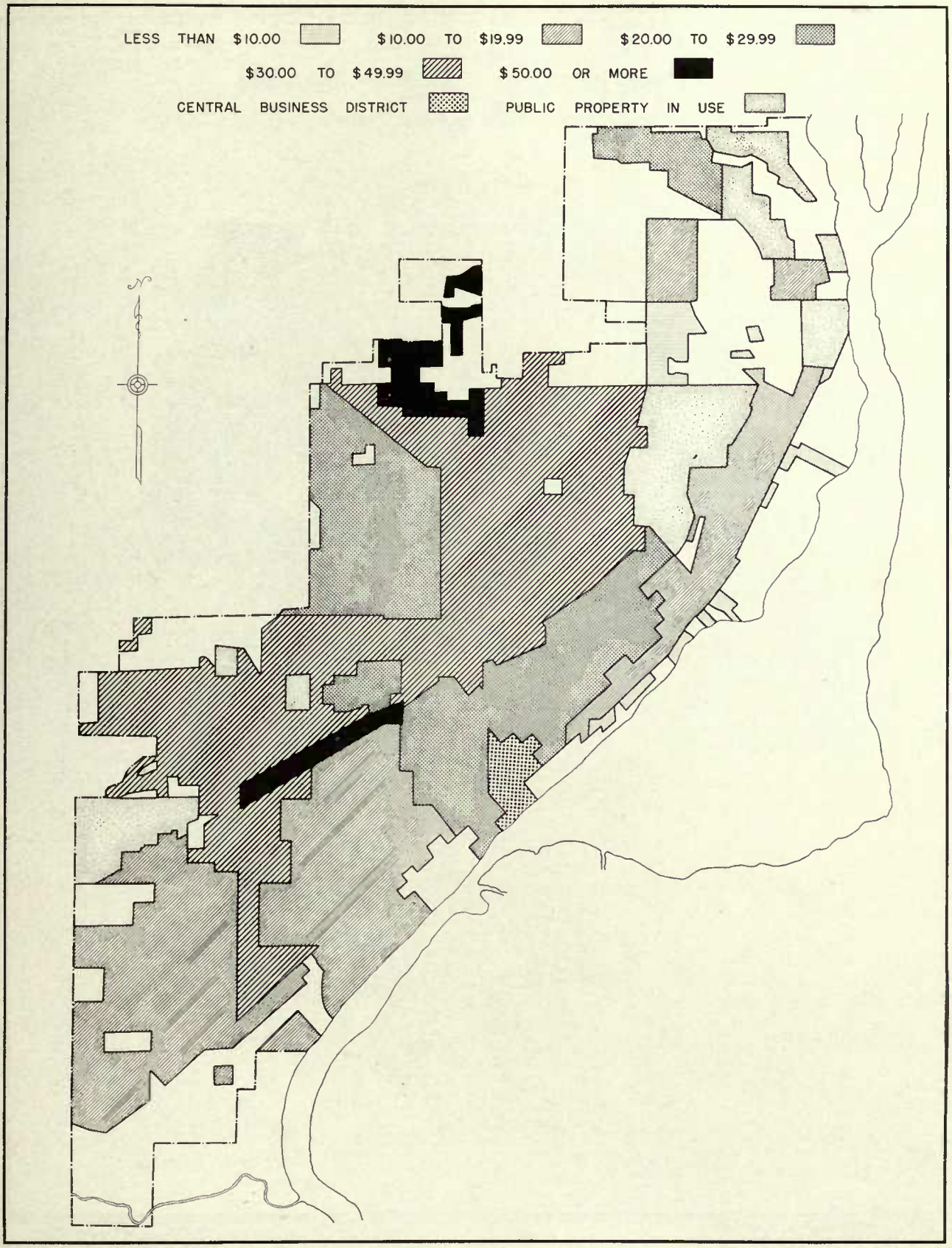
FIGURE 14

AVERAGE RENTS IN RESIDENTIAL AREAS PEORIA, ILLINOIS 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
PEORIA REAL PROPERTY INVENTORY, 1934

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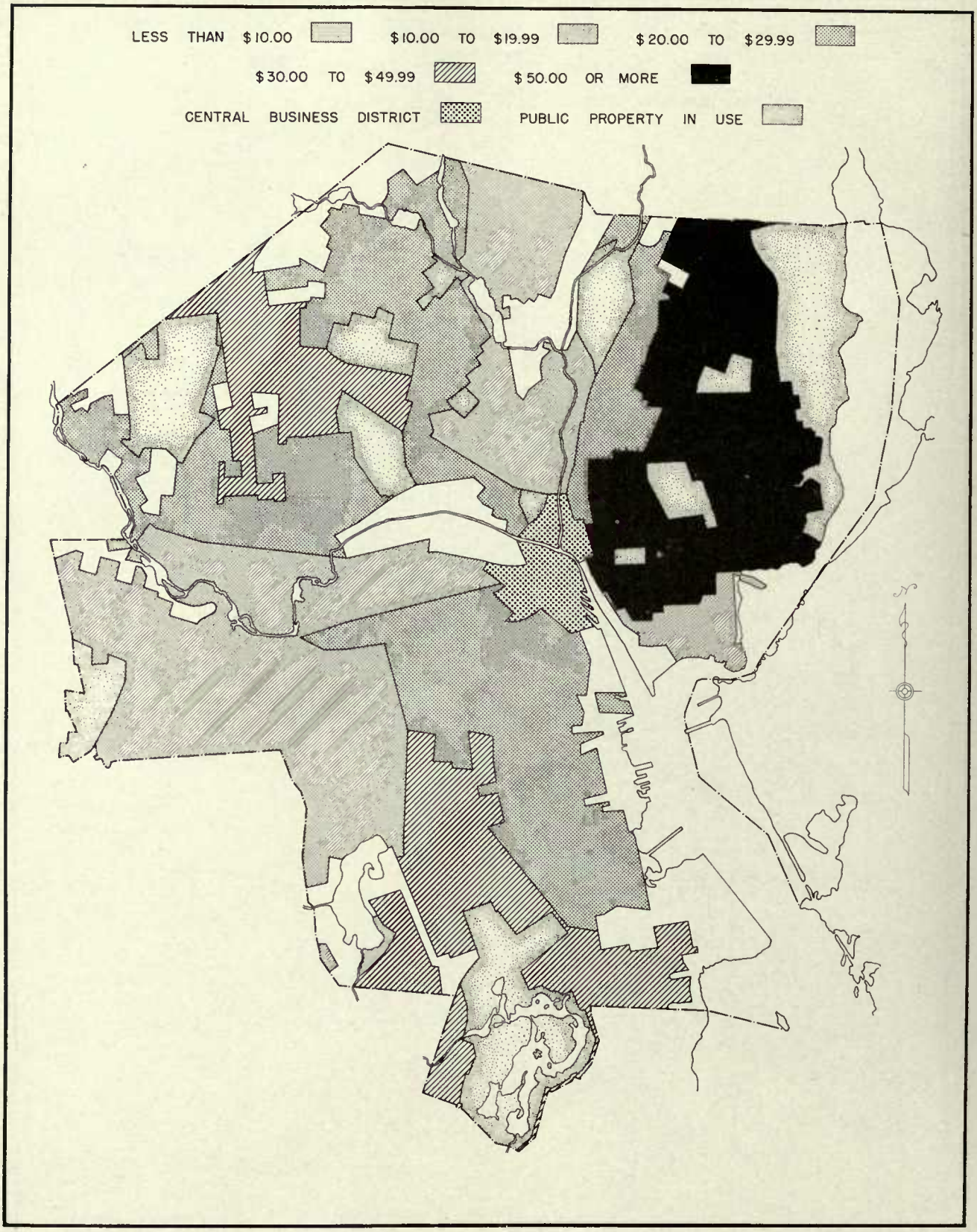
FIGURE 15

AVERAGE RENTS IN RESIDENTIAL AREAS PROVIDENCE, RHODE ISLAND 1934



SOURCE: U.S. DEPARTMENT OF COMMERCE
PROVIDENCE REAL PROPERTY INVENTORY, 1934

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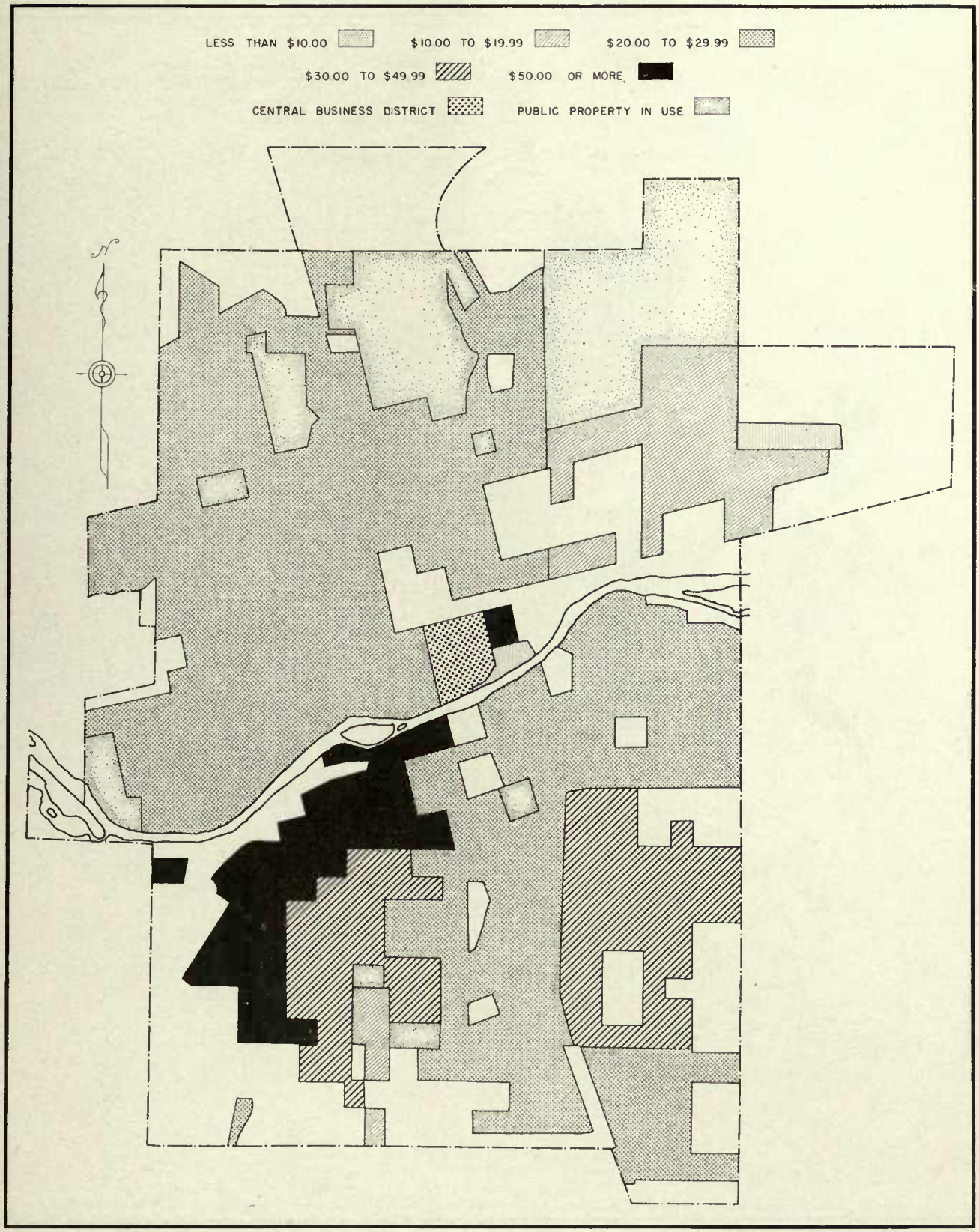
FIGURE 16

AVERAGE RENTS IN RESIDENTIAL AREAS RENO, NEVADA 1934



SOURCE U. S. DEPARTMENT OF COMMERCE
RENO REAL PROPERTY INVENTORY, 1934

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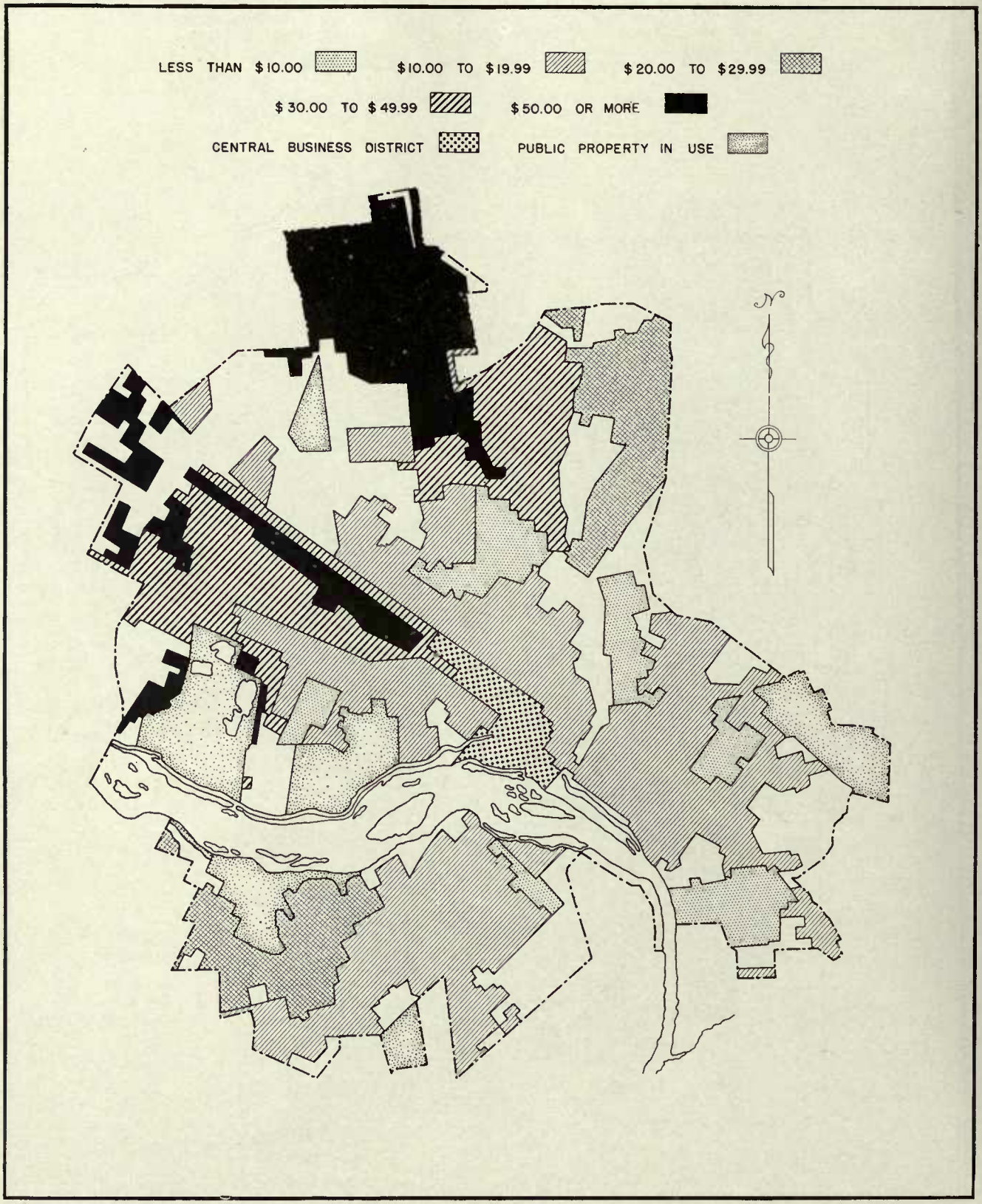
FIGURE 17

AVERAGE RENTS IN RESIDENTIAL AREAS
RICHMOND, VIRGINIA 1934



SOURCE. U S. DEPARTMENT OF COMMERCE
RICHMOND REAL PROPERTY INVENTORY, 1934

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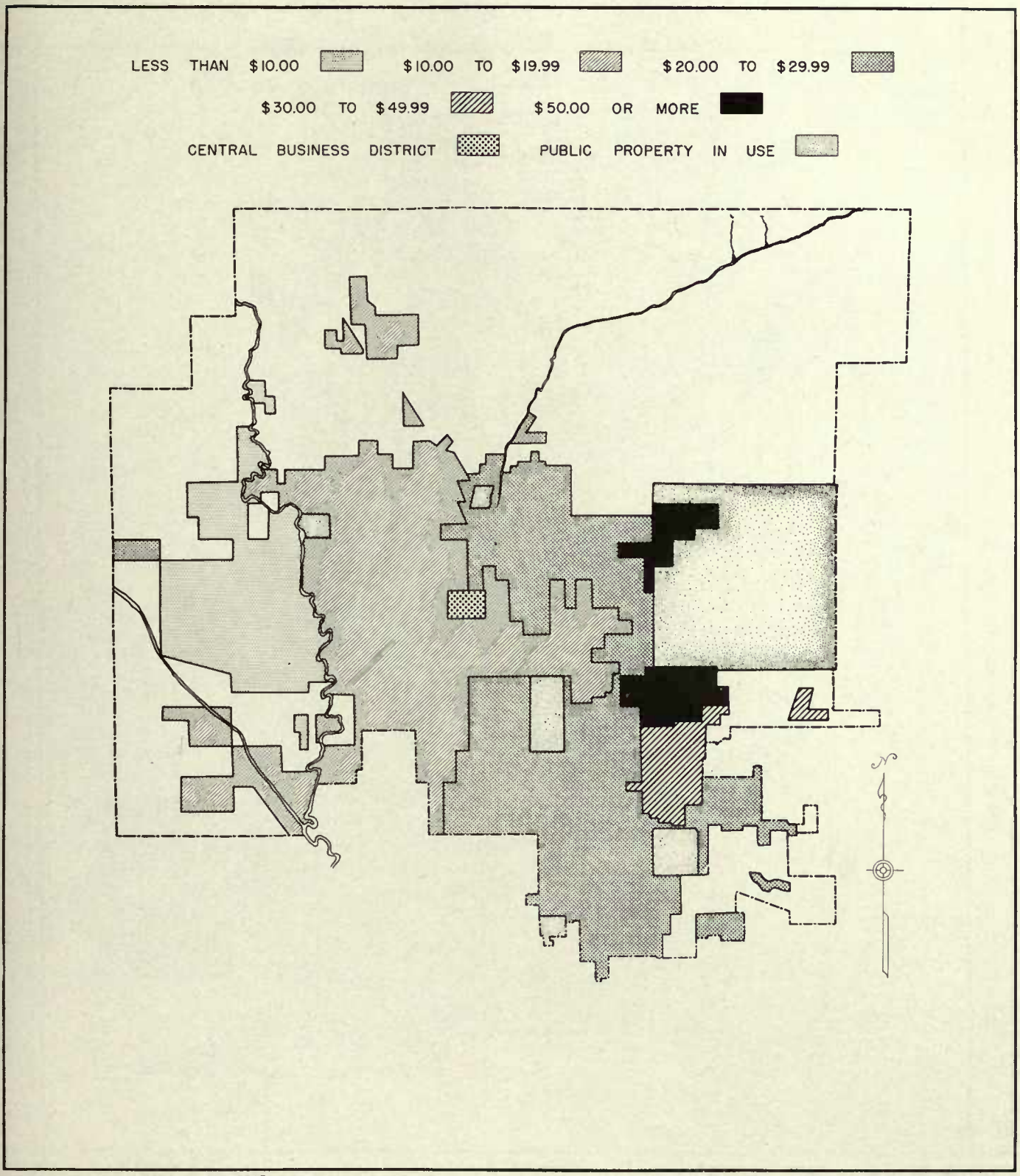
FIGURE 18

AVERAGE RENTS IN RESIDENTIAL AREAS SALT LAKE CITY, UTAH 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
SALT LAKE CITY REAL PROPERTY INVENTORY, 1934

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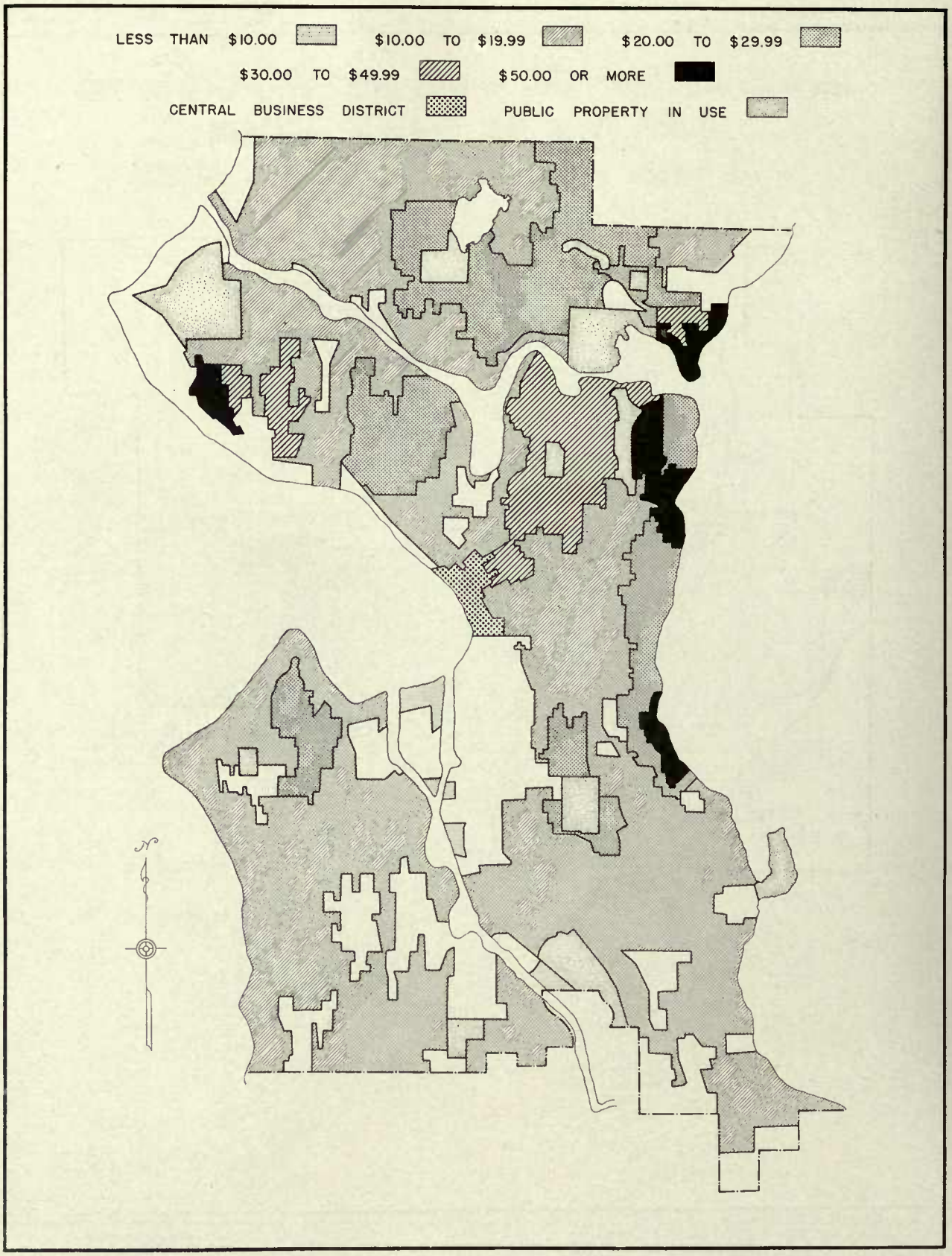
FIGURE 19

AVERAGE RENTS IN RESIDENTIAL AREAS SEATTLE, WASHINGTON 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
SEATTLE REAL PROPERTY INVENTORY, 1934

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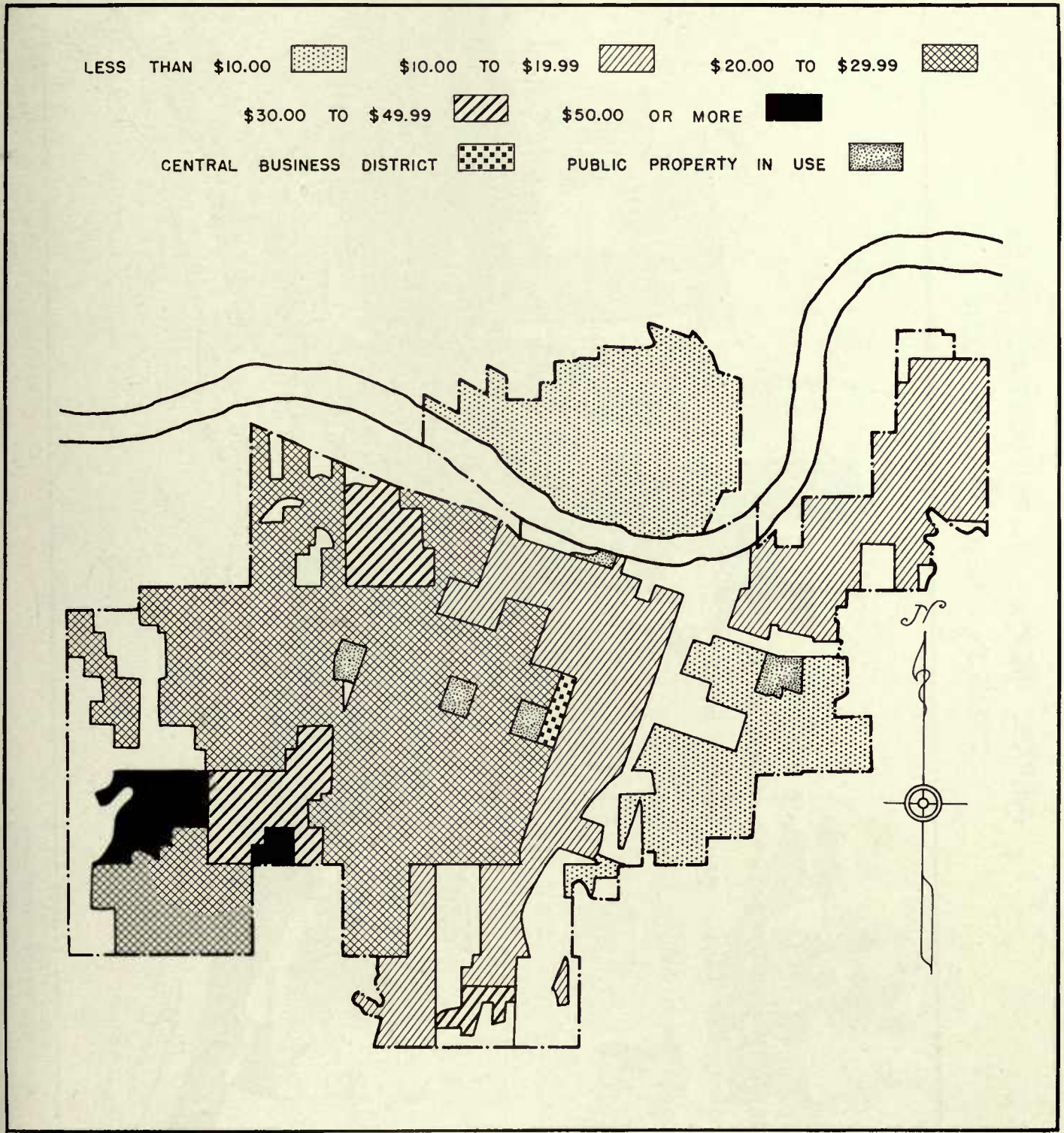
FIGURE 20

AVERAGE RENTS IN RESIDENTIAL AREAS TOPEKA, KANSAS 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
TOPEKA REAL PROPERTY INVENTORY, 1934

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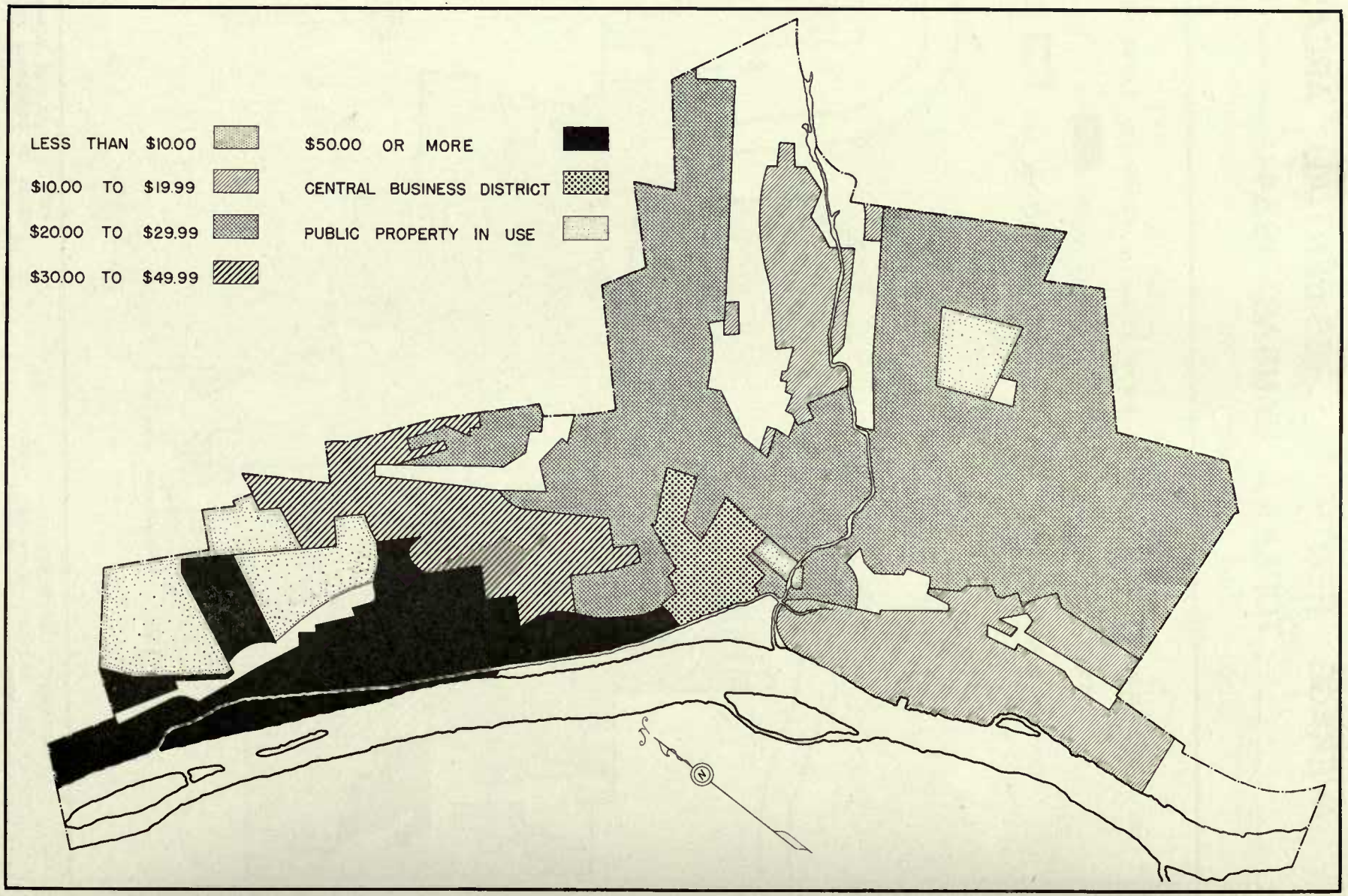
AVERAGE RENTS IN RESIDENTIAL AREAS
TRENTON, NEW JERSEY 1934



SOURCE: U. S. DEPARTMENT OF COMMERCE
TRENTON REAL PROPERTY INVENTORY, 1934

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FIGURE 21

FIGURE 22

GROWTH OF SETTLED AREAS
NEW YORK CITY
1800 - 1934

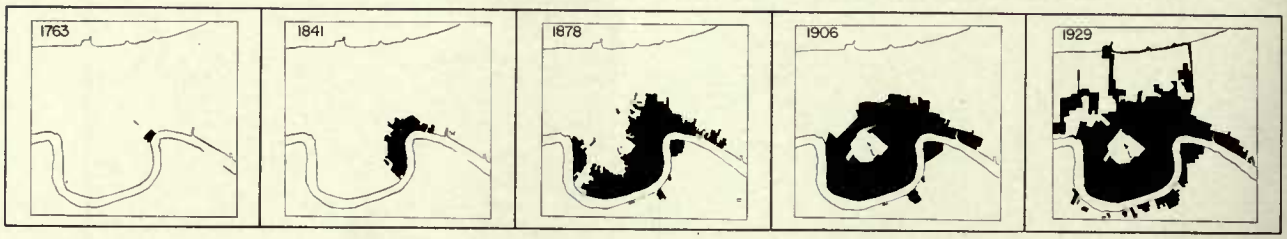
FEDERAL HOUSING ADMINISTRATION
DIVISION OF ECONOMICS AND STATISTICS

FIGURE 23

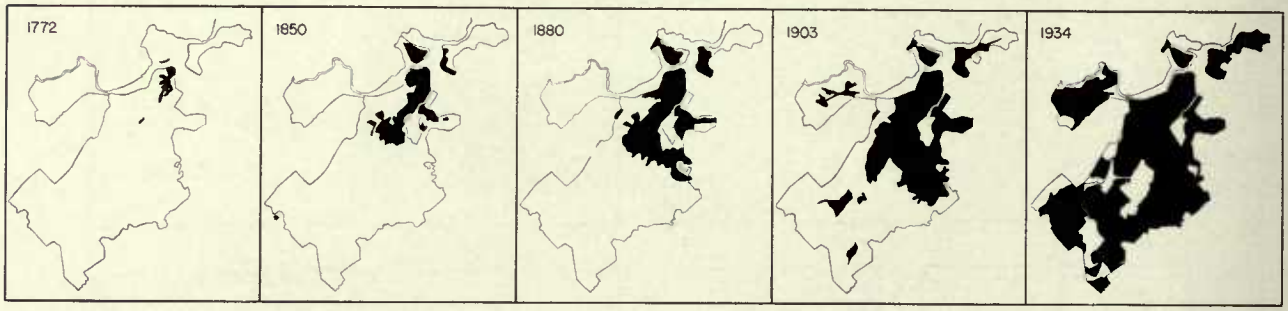
GROWTH OF SETTLED AREAS OF AMERICAN CITIES

MAPS SHOW EXTENT OF GROWTH AT INDICATED DATES

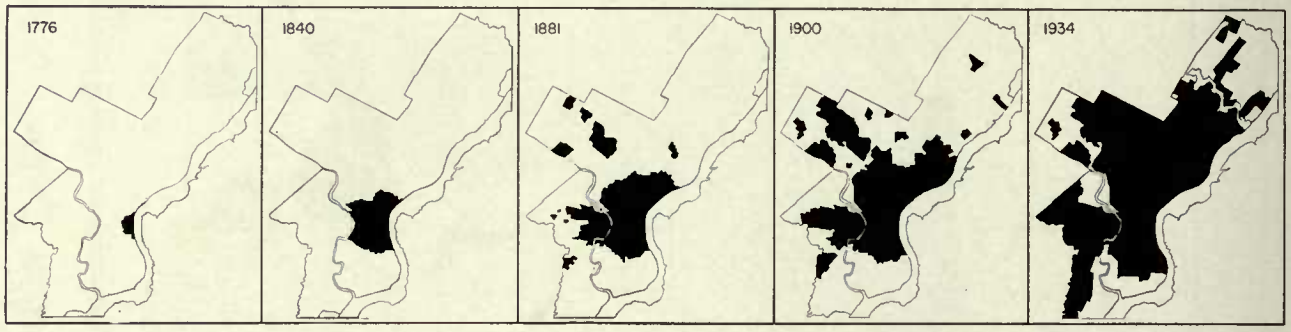
NEW ORLEANS



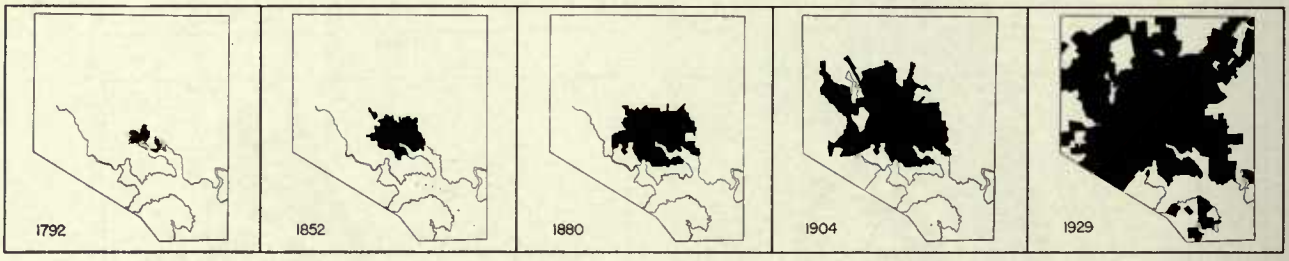
BOSTON



PHILADELPHIA



BALTIMORE



WASHINGTON D. C.

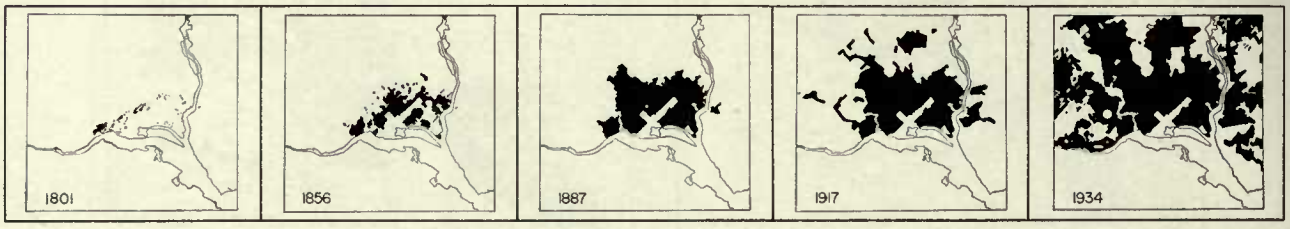


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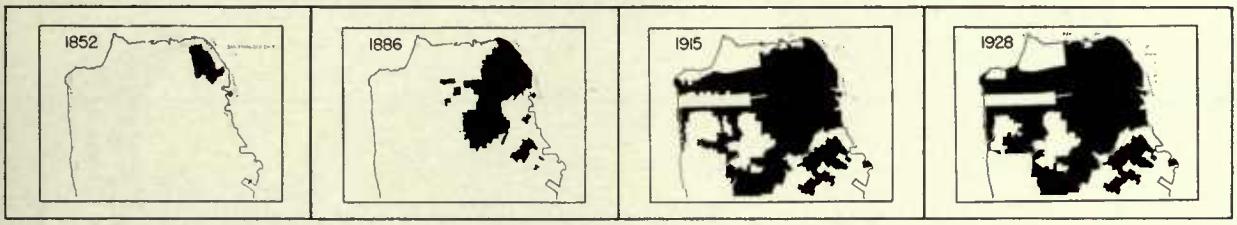
FIGURE 24

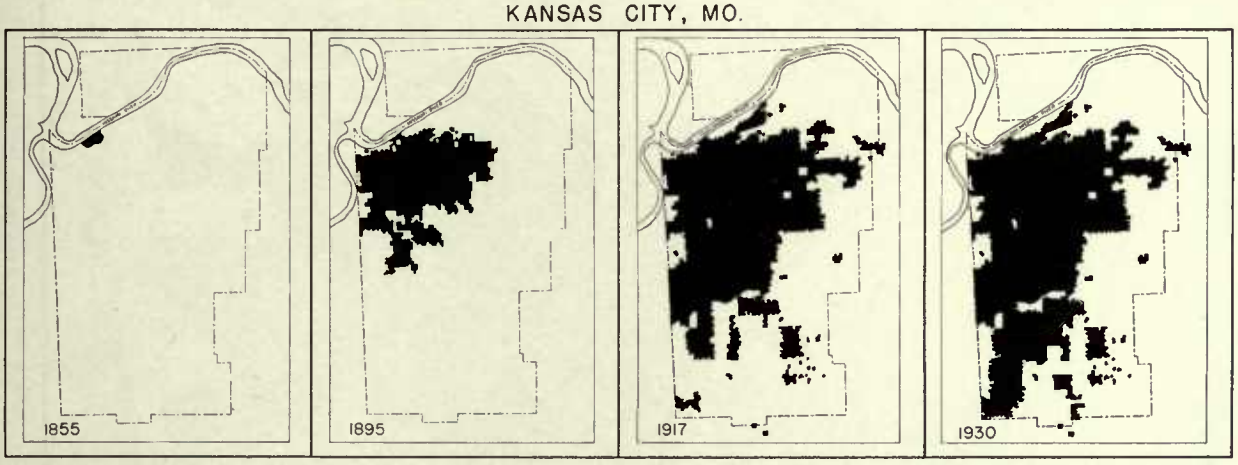
GROWTH OF SETTLED AREAS OF AMERICAN CITIES

MAPS SHOW EXTENT OF GROWTH AT INDICATED DATES

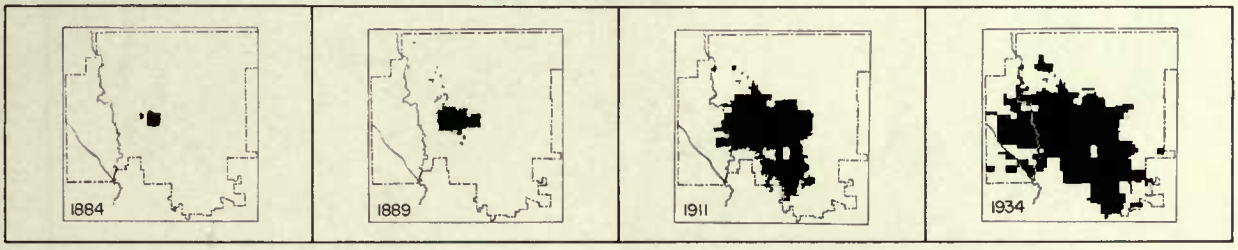
SAN FRANCISCO



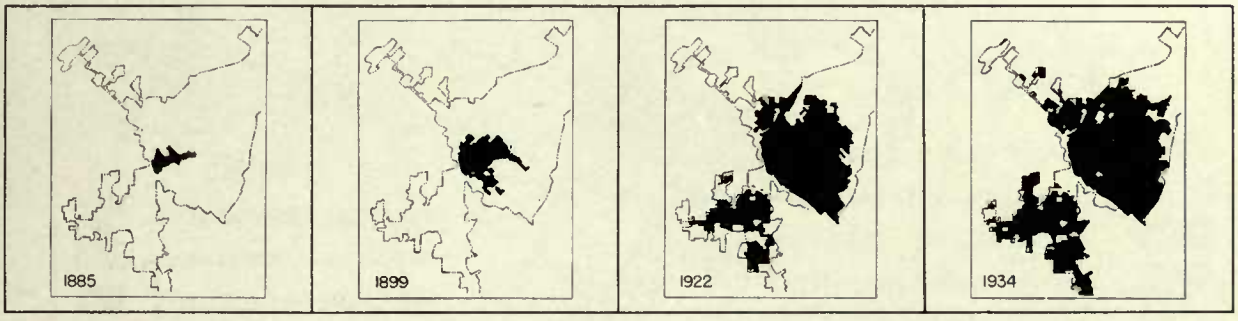
KANSAS CITY, MO.



SALT LAKE CITY



DALLAS



CHARLESTON, W. VA.

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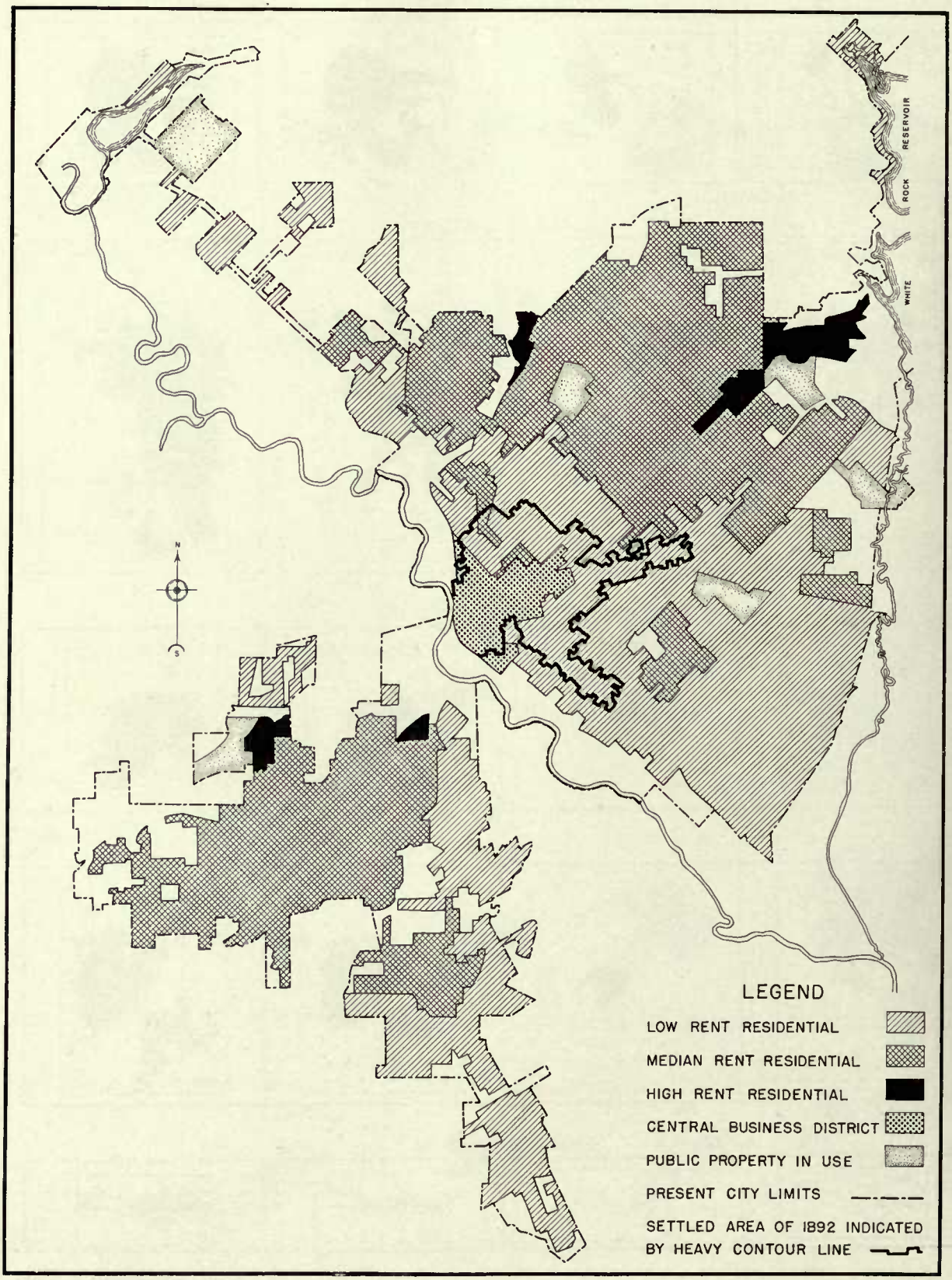
FIGURE 25

DISTRIBUTION OF RENTAL AREAS 1934 COMPARED WITH SETTED AREAS OF 1892 DALLAS, TEXAS



SOURCE: U.S. DEPARTMENT OF COMMERCE
DALLAS REAL PROPERTY INVENTORY, 1934

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FIGURE 26

DISTRIBUTION OF RENTAL AREAS 1936 COMPARED WITH SETTLED AREAS OF 1890 DETROIT, MICHIGAN AND ENVIRONS

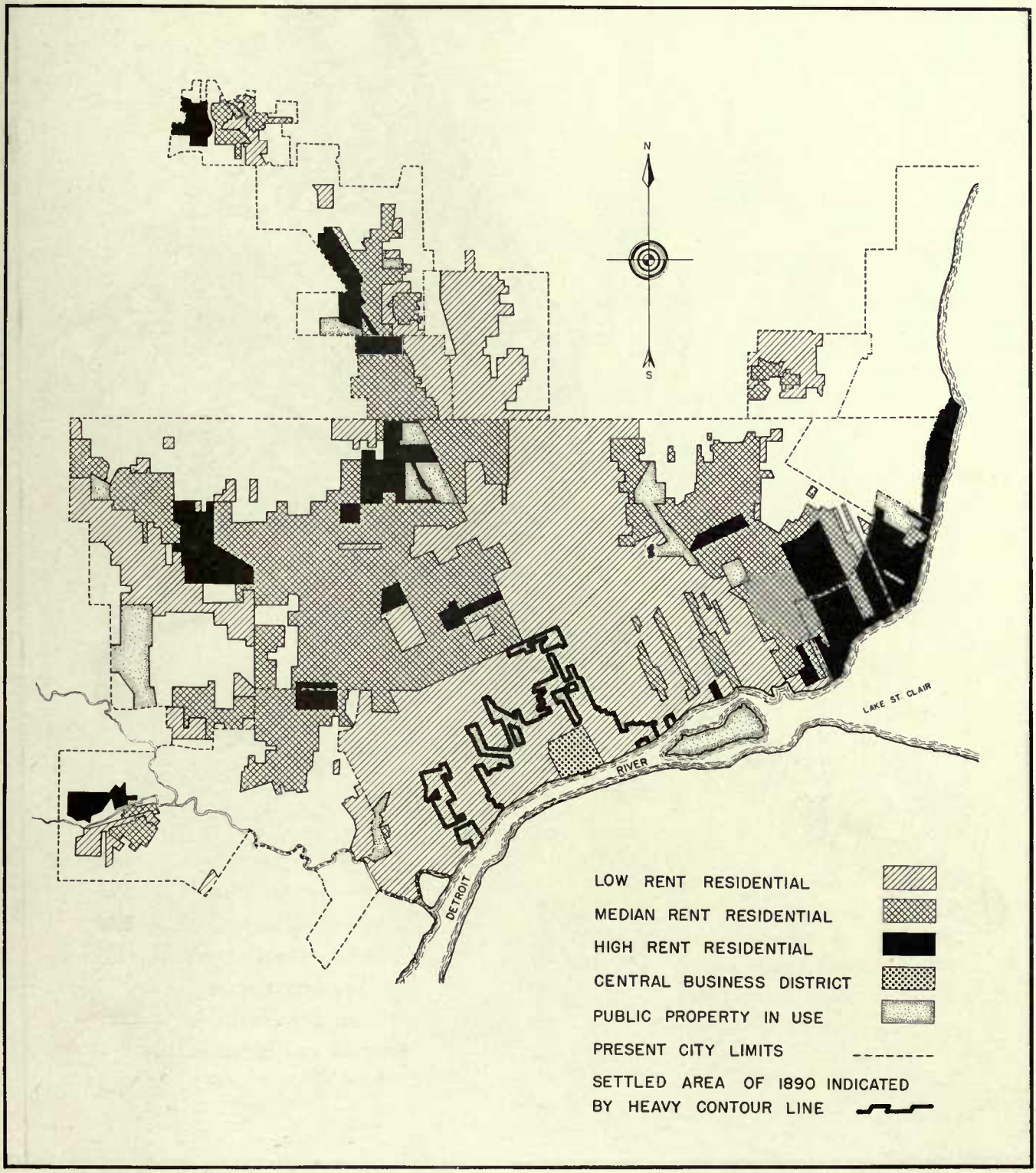

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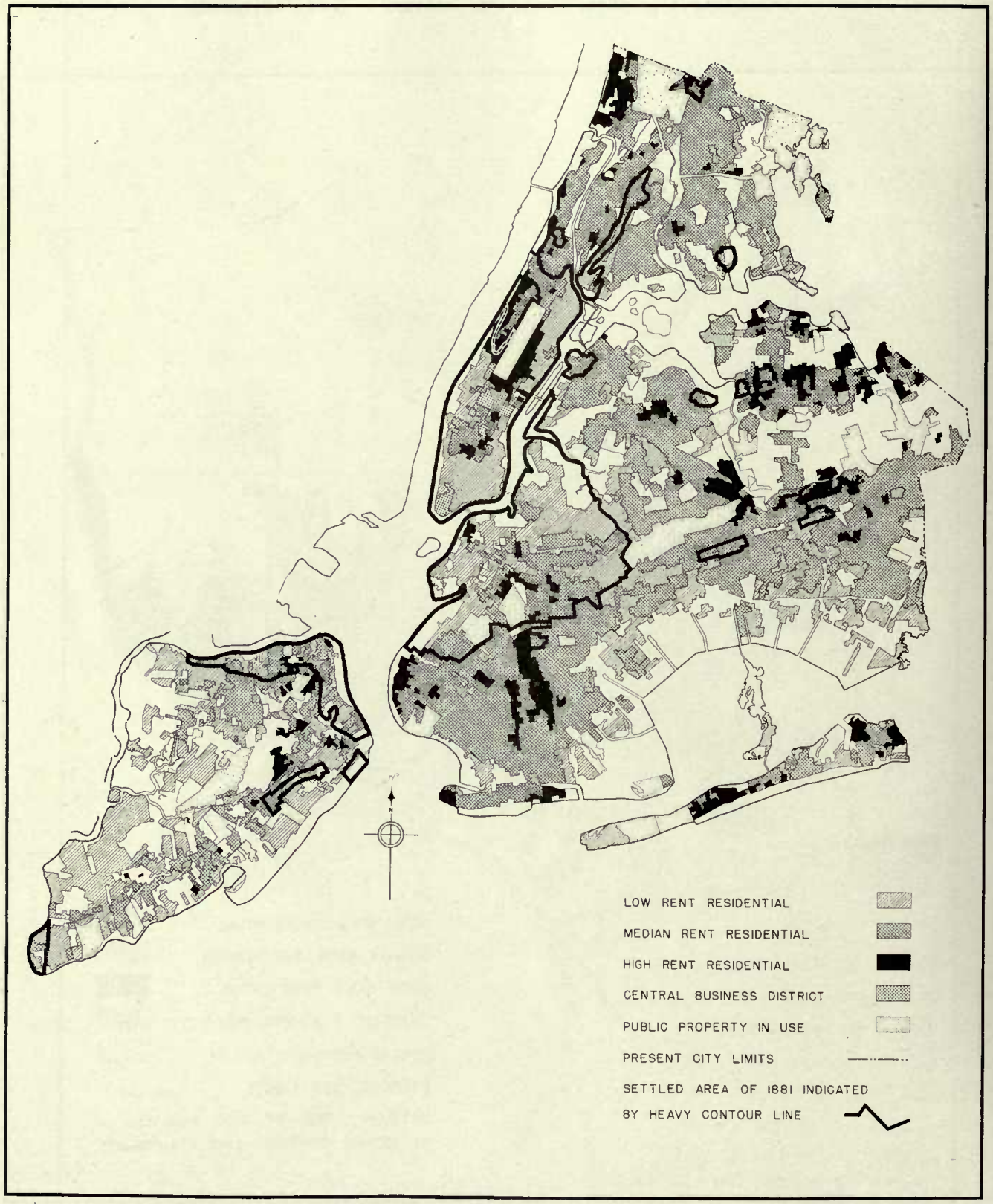
FIGURE 27

DISTRIBUTION OF RENTAL AREAS 1934 COMPARED WITH SETTLED AREAS OF 1881 NEW YORK, NEW YORK



SOURCE: RENT DATA FROM REAL PROPERTY INVENTORY, CITY OF NEW YORK, 1934
NEW YORK CITY HOUSING AUTHORITY

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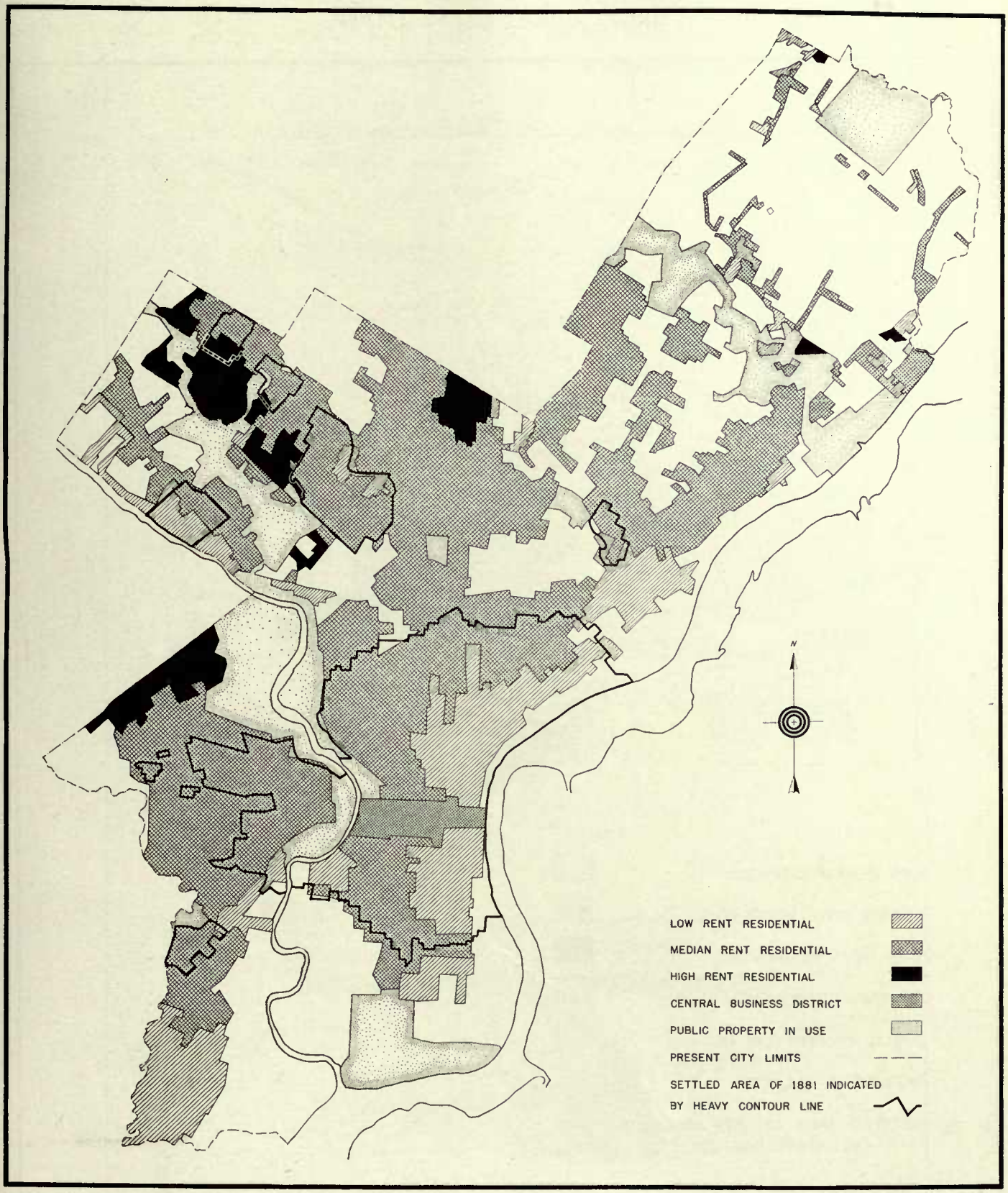
FIGURE 28

DISTRIBUTION OF RENTAL AREAS 1934 COMPARED WITH SETTLED AREAS OF 1881 PHILADELPHIA, PENNSYLVANIA



SOURCE: RENT DATA FROM PHILADELPHIA REAL PROPERTY SURVEY, 1934
PHILADELPHIA HOUSING ASSOCIATION

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FIGURE 29

DISTRIBUTION OF RENTAL AREAS 1934 COMPARED WITH SETTLED AREAS OF 1889 SALT LAKE CITY, UTAH

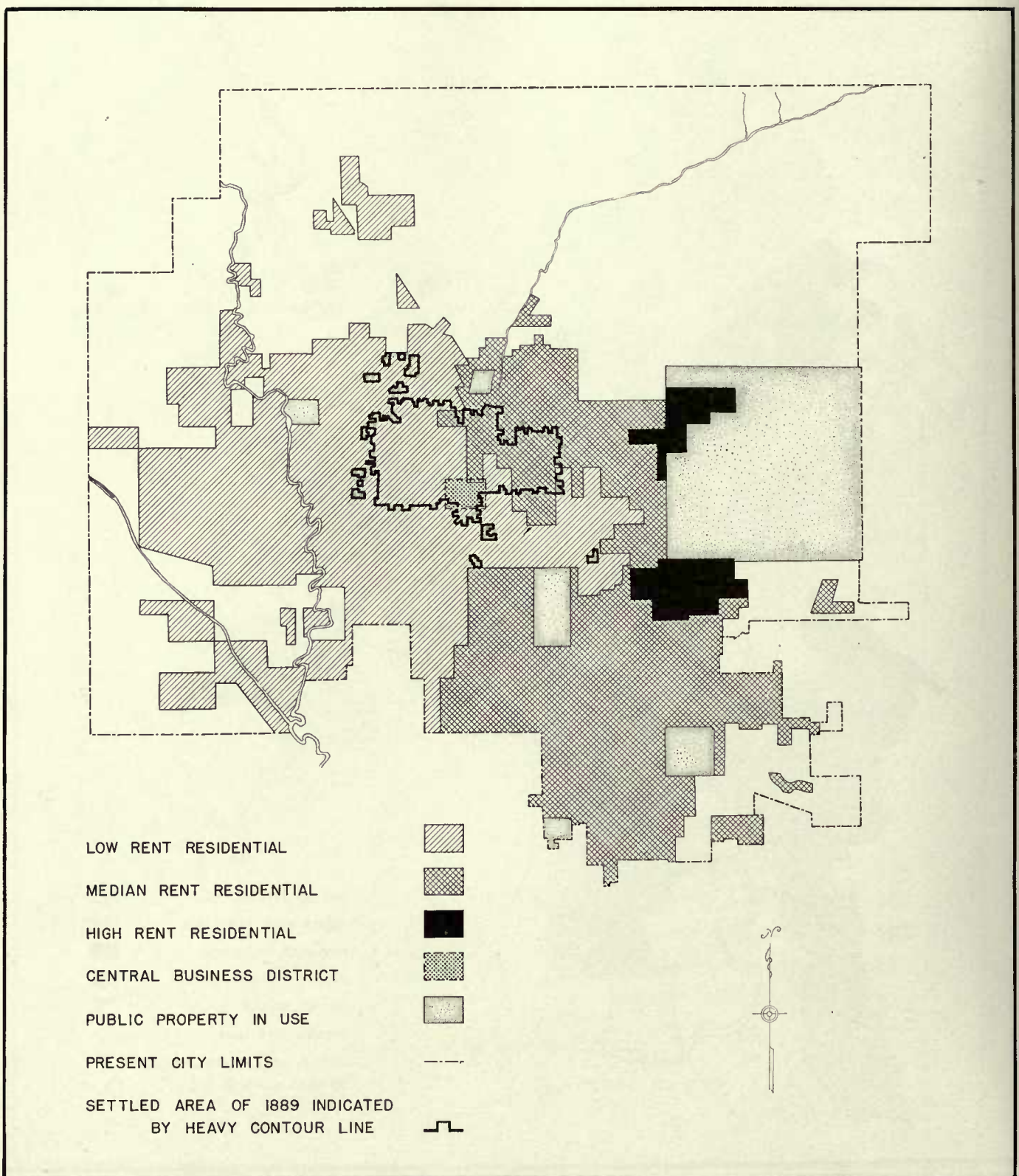

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FIGURE 30

GROWTH OF RESIDENTIAL AREAS
BLUEFIELD, WEST VIRGINIA
1900 - 1935

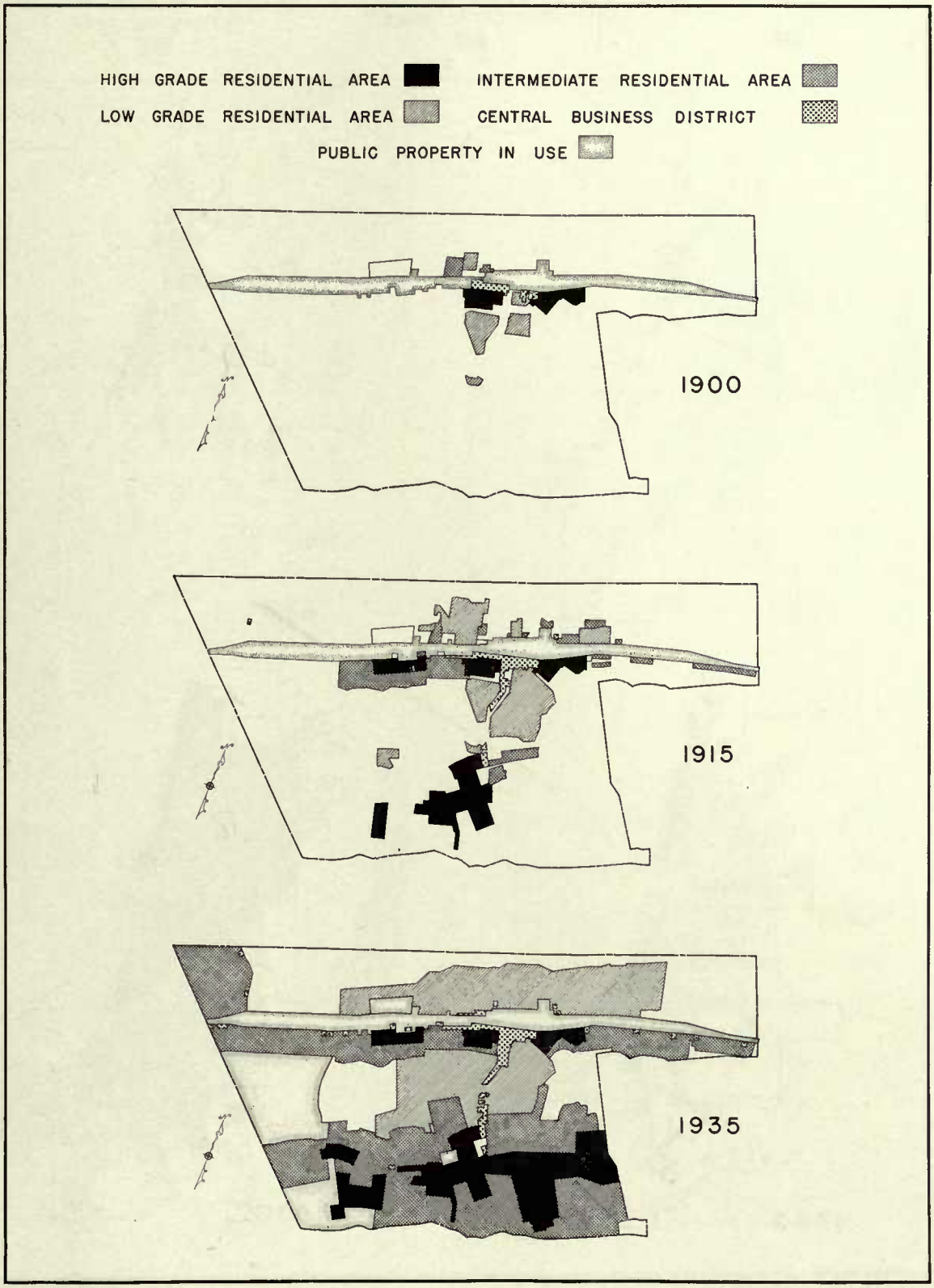

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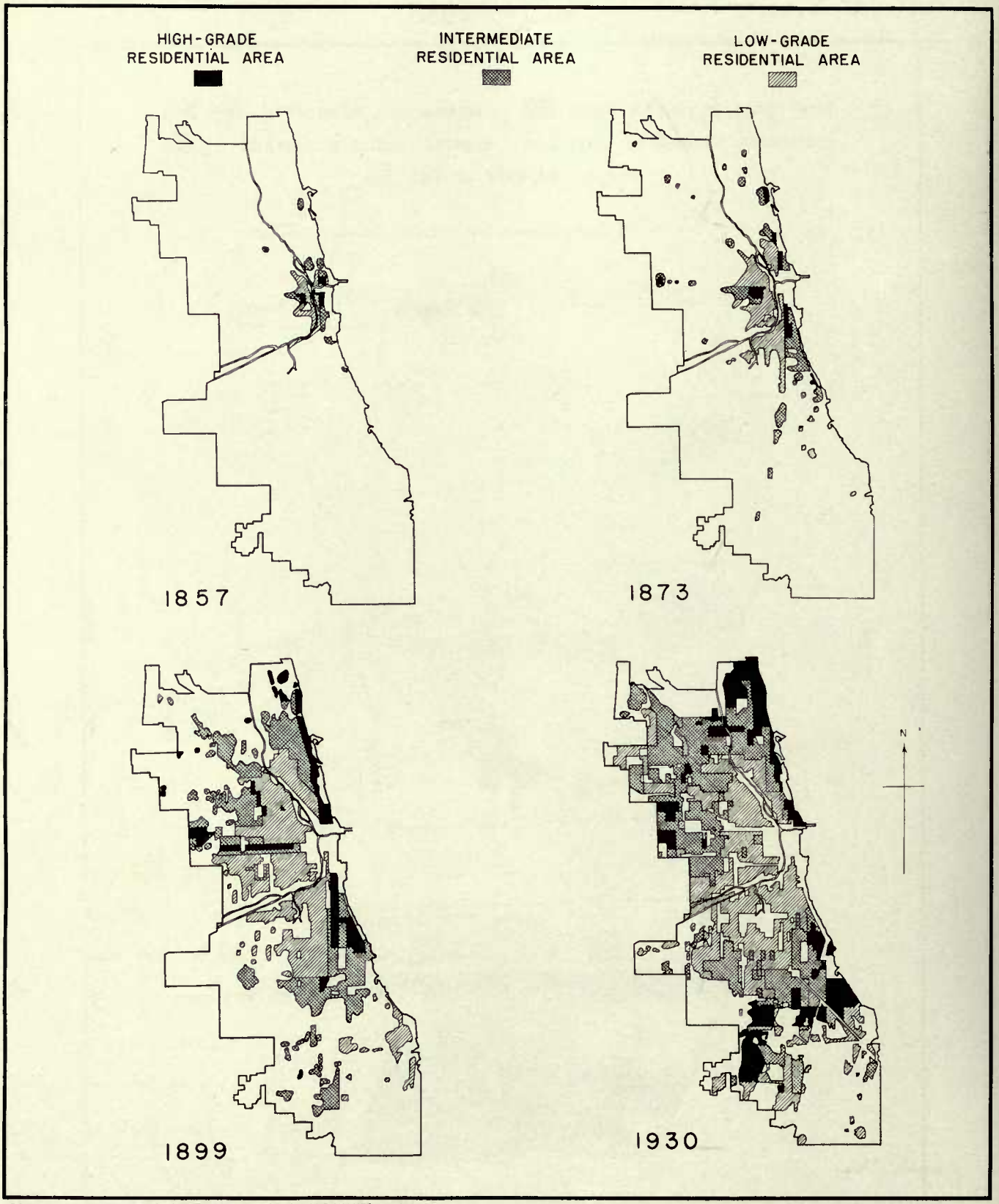
FIGURE 31

GROWTH OF RESIDENTIAL AREAS

CHICAGO 1857-1930



SOURCE: HOYT, HOMER, *ONE HUNDRED YEARS OF LAND VALUES IN CHICAGO*, (CHICAGO, UNIVERSITY OF CHICAGO PRESS, 1933) P. 319

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FIGURE 32

MOVEMENT OF TYPES OF RESIDENTIAL AREAS

MIAMI, FLORIDA 1921 - 1936

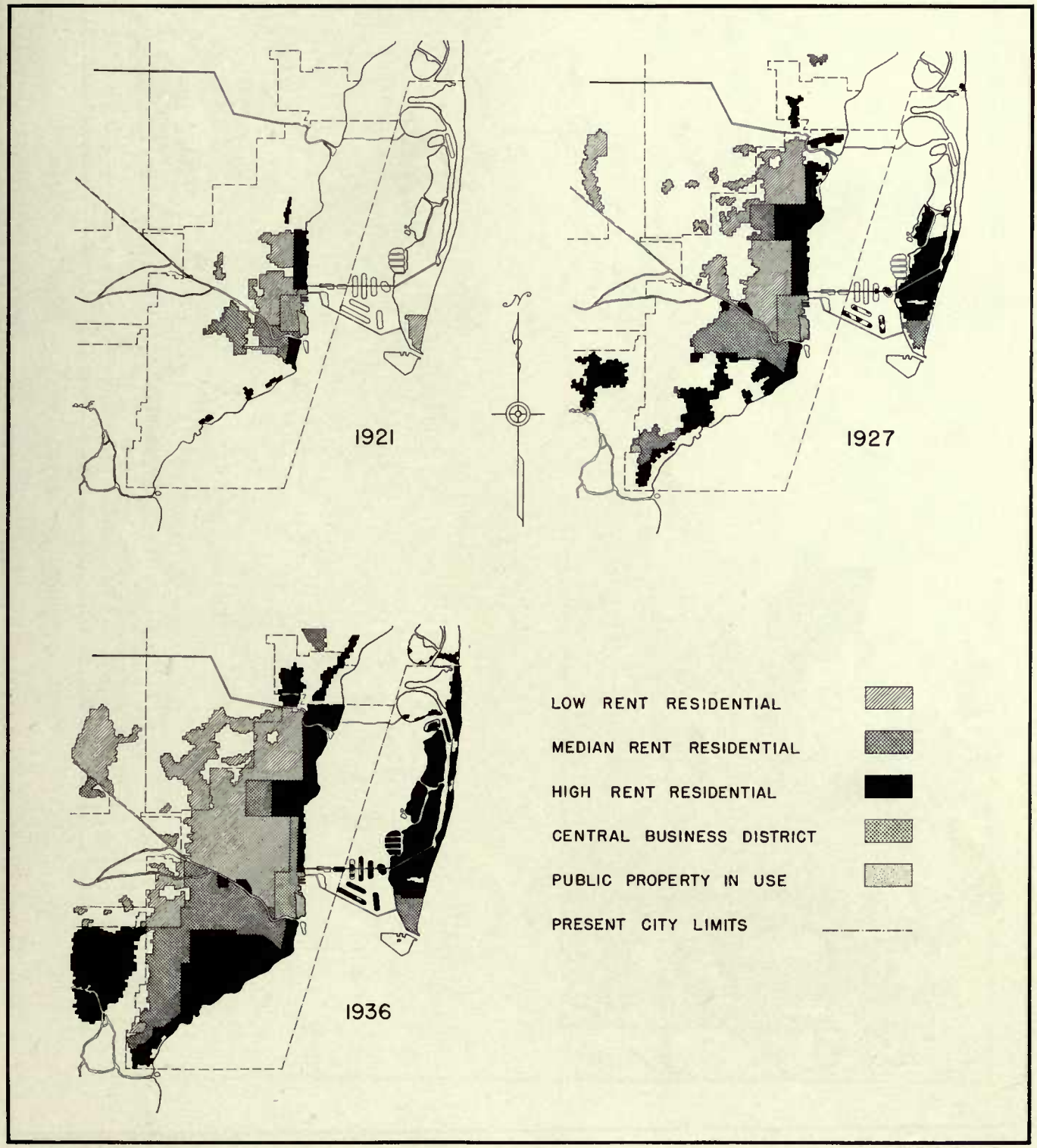

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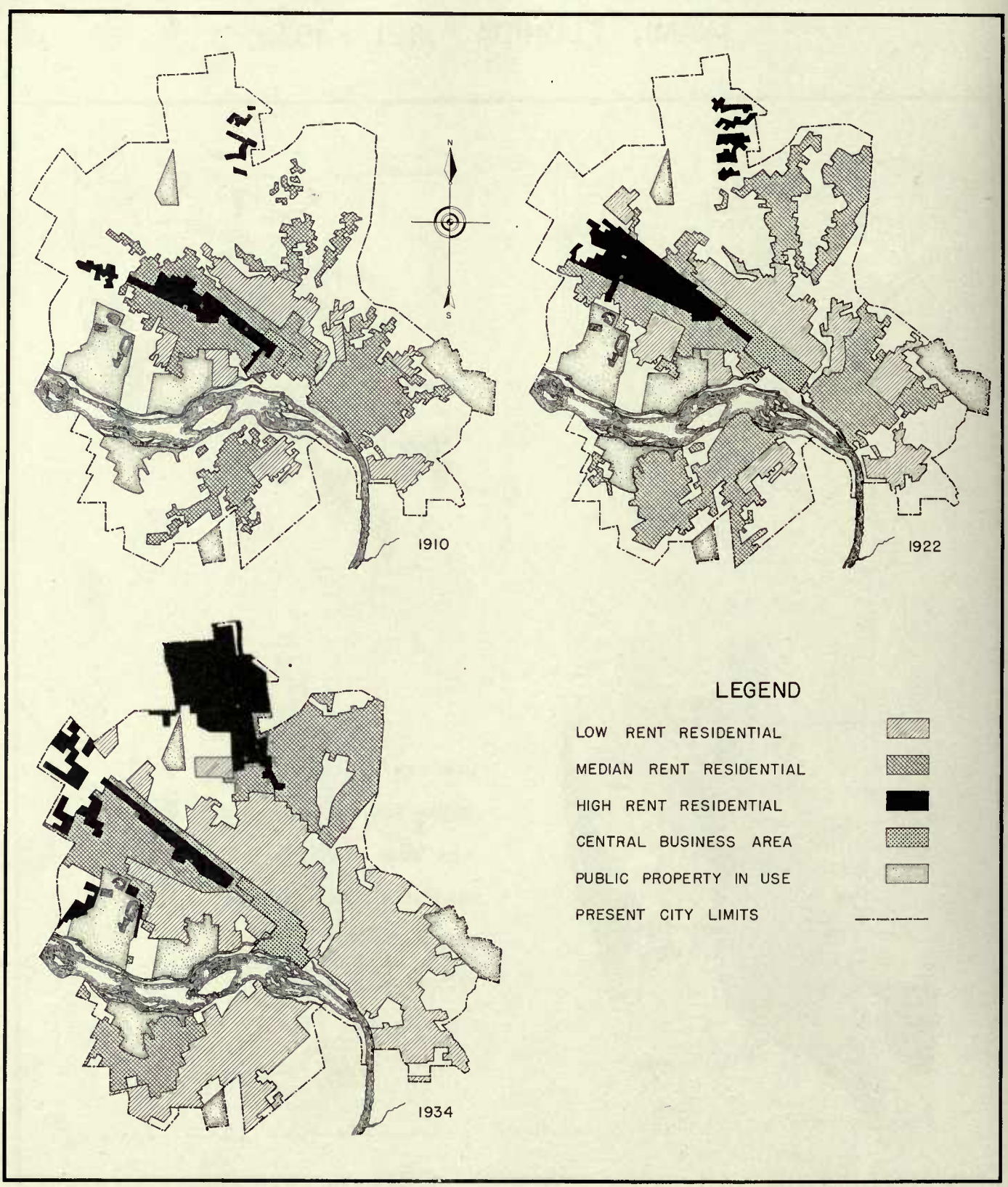
FIGURE 33

MOVEMENT OF TYPES OF RESIDENTIAL AREAS

RICHMOND, VIRGINIA 1910 - 1934



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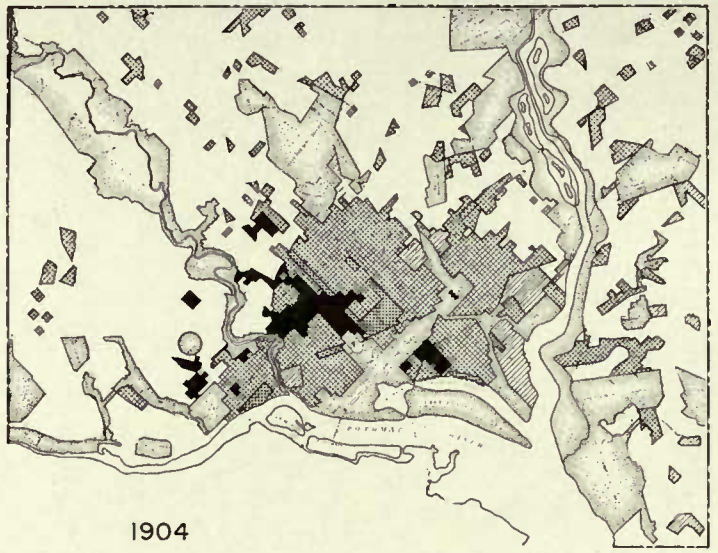
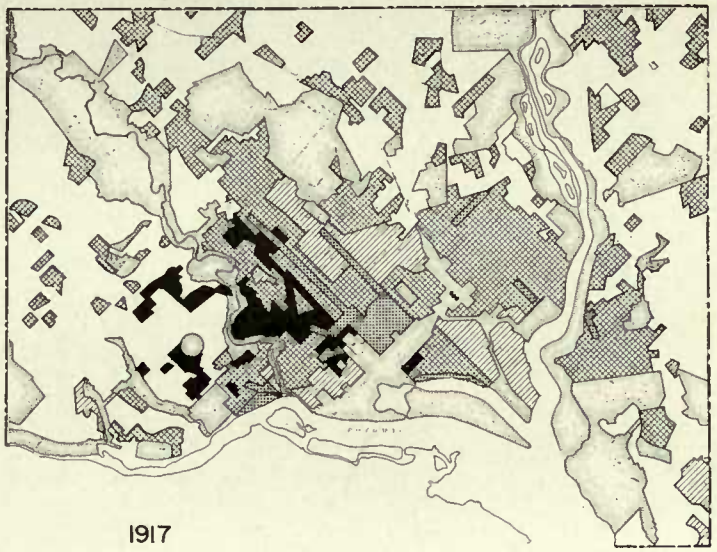
MOVEMENT OF TYPES OF RESIDENTIAL AREAS

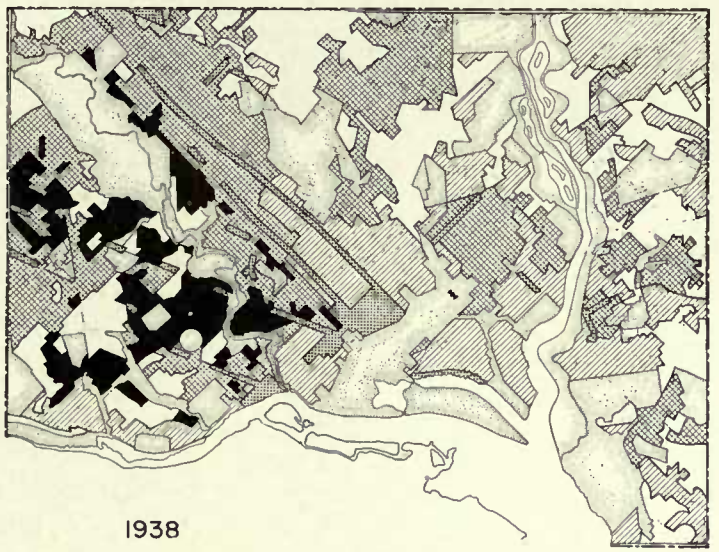
WASHINGTON D. C. 1904 - 1938



1904



1917



1938

LEGEND

LOW RENT RESIDENTIAL

MEDIAN RENT RESIDENTIAL

HIGH RENT RESIDENTIAL

CENTRAL AND OUTLYING BUSINESS AREAS

PUBLIC PROPERTY IN USE

PRESENT CITY LIMITS

FEDERAL HOUSING ADMINISTRATION
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FIGURE 34

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