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1949

THE
STRUCTURE
OF THE
METROPOLITAN COMMUNITY

A Study of Dominance and Subdominance

Donald J. Bogue

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1948

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the University of Michigan

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FOREWORD

This study of the dominance of metropolitan centers and the subdominance of hinterland cities grew out of course work in Human Ecology and participation in the interdepartmental Metropolitan Community Seminar at the University of Michigan. It was begun in 1941 as a research fell w in the latter program, and was resumed after the war in 1946. It has been undertaken with a belief that there is a genuine need in the social sciences for a definite body of theory concerning human communities, and that a most important area for research lies in the testing of ecological hypotheses concerning community and intercommunity structure and functioning. This predjudice does not arise from an opinion that ecological theory as it is now formulated is the most useful framework within which to undertake any sociological research whatsoever. The fundamental contentions of human ecology are so basic, and are so akin to the techniques and point of view of the biological and other sciences, that it has seemed to me that those ecological principles must actually be disproved before any system which denies them can be recognized as "science". If the relationships with which human ecology is primarily concerned are exploited and studied for all they are worth, and if ecological generalizations are forced to measure up to the standards for knowing to which all science subscribes, there is a promise of an eventual body of theory which will link the social with the other sciences, and which will be basic to all other social science research. By this view, the ecologist is a symbiont and not a predator in the community of social sciences.

ACKNOWLEDGMENTS

At each phase of the present study I have received invaluable assistance, without which this study would have been much less inclusive and conclusive.

To Dr. Amos H. Hawley, chairman of my committee and chairman of the Metropolitan Community Seminar, I am indebted for the aid and advice which only a generous scholar can give in defining the problem and in carrying out the work necessary for its solution. The reader who is also a student of human ecology will recognize the influence which his classroom and seminar instruction have had upon my formulation of the problem.

To Mr. Clark Tibbitts, Director of the Institute for Human Adjustment, I am indebted for many hours devoted to discussing the procedures by which factual materials may be brought to bear upon research problems in order to obtain scientific generalizations. He made every effort to equip me for the task of studying the problem of metropolitan dominance.

Dr. Warren S. Thompson, Director of Scripps Foundation, has gone over the entire theoretical and procedural groundwork with me in patient detail. As a result of his criticisms and suggestions I have enlarged the study to include the entire United States as the field for study, and have analyzed the position of the hinterland cities in much more detail than was originally planned.

All of the above scholars have read the entire manuscript in its preliminary draft, and have made many suggestions and corrections for which I am further indebted to them.

To Professor Edward M. Hoover of the Department of Economics, to Professor Robert B. Hall of the Department of Geography, and to the other members of the Metropolitan Community Seminar at the University of Michigan I owe many fruitful hours of discussing the metropolitan community as an area for research. To Professors Robert C. Angell and Lowell J. Carr of the Department of Sociology, as well as to Professors Hoover and Hall, I owe many thanks for a careful study and evaluation of my research plans and helpful suggestions for executing them. Professor Gardner Ackley, who replaced Professor Hoover as a member of the thesis committee, suggested several improvements in the final manuscript.

Mr. Alan D. Meacham, University of Michigan Tabulating Station, kindly placed his tabulating machines at my disposal for use outside working hours. Mr. Charles Koethen and Mr. John Ellsworth of his staff were of great assistance in solving problems of machine tabulation.

To the staff of Scripps Foundation I am indebted for many months of statistical aid. Mrs. Ruth Smith undertook the tedious job of coding the geographical units from especially prepared maps. She and Mrs. Evangelyn Minnis prepared the data for tabulation. Mrs. Smith had charge of deriving the final tables from the machine tabulations. Her keen interest and exceptional ability are manifest throughout the pages which follow. Mrs. Jean Calhoun, Mrs. Anita Stone, and Miss Ingrid Neuhaus assisted Mrs. Smith with the statistical work. The charts and maps are the work of Mrs. Stone.

The manuscript was typed by Mrs. W. Fred Cottrell, Mrs. Minnis, and Mrs. Beverly Weed. Mrs. Elizabeth J. Bogue, my wife, assisted in collecting the data and in making the machine tabulations.

The United States Bureau of the Census kindly provided me with totals for groupings of cities and counties for which the data for wholesale trade and manufactures had been withheld to avoid disclosing the operations of individual establishments.

To the Social Science Research Council I am indebted for a Demobilization Award which permitted me to resume my graduate studies after the war. To Scripps Foundation I am indebted for funds to complete the study as a part of its extensive program of research in the field of population distribution.

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PART I

THE PROBLEM OF STUDY, PROCEDURES AND TECHNIQUES, SUMMARY OF FINDINGS

CHAPTER ONE

THE HYPOTHESIS OF METROPOLITAN DOMINANCE

I

Introduction: The Goal of This Study

This study is an attempt to explore some aspects of the hypothesis that great cities, or metropolises, dominate the social and economic organization of technologically advanced societies. The hypothesis is one of long standing and one which has been propounded by students of many disciplines. Within recent years it has become a conception of human organization taken by many leading scholars of diverse fields. For this reason it has been stated from many points of view. In essence it is an extension and attempted refinement of the more general theory of urban dominance, that is, that cities are the foci about which the life of modern nations are organized. The intention in these pages it not to prove or to disprove that a single great city can dominate some of its environs; it is rather to examine the much broader proposition that collectively great cities can and do dominate a technologically advanced industrial and commercial society.

Those aspects of human organization which this study undertakes to analyze are those which pertain to the distribution over the land of human populations and of selected types of human activities involved in gaining a livelihood. Other less tangible aspects of

human culture such as morals, aspirations, values, and social activities not directed toward obtaining a livelihood are not considered, although these aspects of social organization are as germane to the problem under consideration and may be as easily dominated by great cities as are the more easily observed facts of human residence and labor.

The distribution in space of people and of selected activities is of interest here not for its own sake, but only for the insight which it can contribute to an understanding of the problem of metropolitan dominance. As a point of departure it has been assumed that if the great city is actually the dominating force in modern social and economic organization, then great expanses of land area, and the populations which inhabit them, should be found to be organized with respect to, and integrated with, the activities of the central metropolis, and that this organization and integration must manifest itself in some observable pattern of population arrangement and territorial division of labor. To determine whether such a pattern of population distribution exists, and whether there is a conjoined pattern of industrial and commercial interdependence, is the goal of this study. In brief, the aim is to determine whether, in the course of their rise to great size, cities which are considered to be metropolitan centers have also become the focal points of a much larger physical entity with a definite pattern or structure. This

larger entity, for reasons to be explained later, has been called the "metropolitan community". The problem of the study may be stated in the form of a series of questions about metropolitan communities:

a. Are there observable groupings and arrangements of people and human activities which may be termed metropolitan communities?

b. If so, by what pattern are these groupings arranged with respect to the metropolis?

c. Do metropolitan communities encompass all or only a part of the land areas and peoples of a technologically advanced society?

d. What implications does the arrangement of people and activities in the metropolitan community have for the operation of the individual city, village or farm which lies within the metropolitan community unit at a distance from the metropolis?

Since the hypothesis under study is a broad statement about the role of metropolitan centers in the organization of an entire society, its validity cannot be tested on a small segment of land area or population. For this reason one entire nation, the United States, has been taken as an example of a technologically advanced society. It has been subjected to study by subdividing its entire area into metropolitan communities, and by abstracting patterns of population distribution from various groupings of these metropolitan communities and of their parts.

In undertaking this task it has been necessary to begin with the basic facts upon which the theory of urban dominance rests. From these facts the hypothesis of metropolitan dominance is developed by reviewing the works of its leading exponents. After

examining the concept of "dominance" and determining the precise meaning to be given it, a procedure for studying the pattern of population distribution and the distributional patterns with respect to metropolitan centers of manufacturing, retail trade, wholesale trade, and service establishments is outlined. Not until this groundwork is completed is it possible to analyze concrete data and to assemble and erect the framework of metropolitan structure.

If these preliminary considerations which constitute the first two chapters appear to be unduly abstract and somewhat speculative, the reader will be reassured to find the ideas which are developed there later associated with a plentitude of factual materials with which he can determine for himself their validity, applicability, and utility in understanding the role which the great city plays, and the far-flung organization which supports it and which it supports.

II

The Urban and the Metropolitan Interpretation of Modern Life

A. The influence of cities upon social organization.

It would be difficult to state a principle about human organization which can command more agreement among students of many disciplines than the general observation that:

> The city has become the central feature in modern civilization and to an ever increasing extent the dominant one...This rural civilization, whose making engaged mankind since the dawn of history, is passing away. The city has erased the landmarks of an earlier society. Man has entered on an urban age....[1]

Cities have increased in number and size so rapidly since the beginning of the nineteenth century that more knowledge about urbanism is now a prerequisite to further progress in many branches of science and for arriving at a solution to many current problems. The sociologist, the political scientist, the economist, the geographer, the psychologist, and the historian find it difficult to fully explain some aspects of human behavior which they study without referring to the influence of the city. An industrialist selecting a site for a plant, a retailer attempting to distribute goods to a maximum number of people at minimum expense, a railroad, a telephone or a bus corporation expanding and extending its services must each make choices in which future

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[1] Frederic C. Howe, The City, the Hope of Democracy (New York: Charles Scribner Sons, 1906), p.22.

success depends to a considerable extent upon a correct judgment of the future course of urbanism. The social worker, the clergyman, the candidate for public office, and the educator must take account of the influence of the city upon those whom they serve. The establishments of city planning commissions and the great interest which chambers of commerce, real estate associations, and leagues of urban voters have taken in programs of urban development and redevelopment attest to the fact that even the units which have administered and promoted city growth have not understood, in the past, the full implications of their actions. The rise of the city has culminated, in the twentieth century, in a widespread and growing demand for more knowledge about cities, for a comprehension of urbanism seems to be required in order to understand our civilization. By becoming one of the principal characteristics of the political, economic, and social organization of the western world, the city has become a major area for research.

A corollary of this view that today's urbanism must be comprehended in order to understand today's civilization is the generally accepted opinion that a prediction of tomorrow's civilization necessitates a forecast of the form and extent of urbanism. A great variety of events whose future course we would like to predict and guide appears to be directly related to the city. What will be the population of the United States in the year 2000 A.D.? How many automobiles will be in use twenty years from now? What are the

possibilities of the United States surviving an atomic or a biological war? What are the probabilities that a labor party will elect a president of the United States in 1960? What will be the future trend of crime rates? One cannot progress far in speculating upon these and similar problems without making assumptions about the cities of the future. Whether one is seeking knowledge about human events, trying to forecast the future, or trying to operate a business successfully, he inevitably encounters the necessity of attempting to predict the behavior of cities.

If the judgment of so good an authority as Charles A. Beard is accepted, in times yet to come the urgency of the endeavor to understand urbanism will increase rather than decrease:

> It is from the urban centers that the national economy of the future will be controlled, whether we like it or not, and it is the culture of urbanism which dominates the future.[2]

B. Problems encountered in attempting an urban interpretation of modern life.

Despite the desire and the need for scientific generalizations about cities and of the role which they play in our civilization, the body of knowledge in this field is far from being complete, or even adequate. Many problems beset those who attempt to make a scientific study of urbanism. Two of these problems are extraordinarily difficult. First, cities are a very heterogeneous class of phenomena, and second, cities are not events which have occurred independently of each other.

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2 "The City's Place in Civilization", National Municipal Review, December, 1925.

Even a casual observation of the role which cities play in the life and organization of a nation quickly reveals the fact that cities are not all alike. They differ from each other in a great many respects. By definition, in the United States they vary in size from 2500 to several million inhabitants. Some function as simple rural service centers while others are huge and complex centers of industry, commerce, finance, and government. Some are highly specialized in one activity; others perform many functions. Cities can be alike in size and function and yet be composed of populations with very unlike characteristics as regards age, sex, nationality, education, or even religious and political affiliation.

In a great many of the dissimilarities between cities there is no norm about which the majority tend to cluster. In other words, there is no representative "average" city which can be taken as representative of all cities. Consider simply the size of cities, for example. If one adds together the population of all places in the United States which were considered urban in 1940 (74,423,702 people) and divides this population by the total number of urban places in 1940 (3464) he obtains an average size of 21,485 inhabitants for cities in the United States. Yet in 1940, 2990 or 86 percent of all of the urban places in the United States were smaller than this, and only 14 percent were larger. A city of 21,000 inhabitants can scarcely be said to be representative of New York City, or of Green River, Wyoming, (population 2640 in 1940). If one attempts to find the average urban dweller a similar difficulty is encountered. The "urban way of life" ranges from miserable poverty in a slum to year-

round residence in an expensive hotel, or from life in a small and isolated city in the Rocky Mountains to residence in an equally small but highly mobile suburban city in the shadow of a great metropolis. Within a city and between cities there are a great many ways of living. If one selects only one aspect of urban life and assigns an index value to every city in the United States, he will find, in many instances, that the average index value will differ, in a majority of cases, from the index values of those cities which he considers, on other grounds, to be the most important or the most typical of modern cities. Life in New York City may be more important for the study of urbanism than life in Pine Bluff, Arkansas, which in population size lay almost at the national average in 1940.[3] We correctly speak of the average height, weight, or intelligence of people because the distribution of each of these traits has a "central tendency", a norm about which individual values tend to cluster. One cannot speak of "the city" or of "the urban way of life" and convey the same precise meaning. Cities and urban conditions of living exhibit great diversity. There is no single norm which can be used to characterize them in all of their aspects.

The interdependence of cities is too familiar to require detailed comment. Many cities owe their birth and growth to the presence of other cities. Dormitory cities and manufacturing satellite cities are of this type. Each city has not emerged as an event which

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3 For a discussion of inter-city differences see W. F. Ogburn, Social Characteristics of Cities (Chicago: International City Managers Association, 1937) and E. L. Thorndike, Your City and 144 Smaller Cities, Harcourt Brace & Co., 1940.

is completely independent of similar events in the past, or of the behavior of other cities in the present. The study of cities must be pursued along lines which acknowledge this basic fact.

C. The hypothesis of metropolitan dominance.

Out of the attempts to understand cities and their place in the modern world has grown a generalization which may be called the "dominant city" hypothesis or the "hypothesis of metropolitan dominance". This hypothesis seeks to escape part of the aforesaid difficulties of understanding "urbanism" as a single characteristic, and to solve the problem of intercity interdependence. It classifies cities on the basis of the functions which they perform and their relative ability to "dominate" other cities and the surrounding countryside. The classification made in formulating this hypothesis is a dichotomous one; cities are divided into "metropolitan centers" and "hinterland cities." The metropolis is usually the largest and most complex (the farthest removed from the "average" city) of all of the cities in the territory. Because it is able to cheaply assemble a varied array of raw materials and products from all parts of the world; because a large number of specialized components and skills are required in the production of the goods required to sustain human beings at their present level of living; because up to a certain point machine production increases in efficiency with an increased scale of operations; and because certain mutual benefits appear to accrue to business enterprises from being located in proximity to each other,

the large city is able to produce and distribute more varied goods and services than a smaller city. The more specialized the goods, and the more the goods are amenable to mass production, the greater these industrial and commercial advantages of large cities seem to become. From these facts it has been concluded that the metropolis, or modern large and complex city, exercises an organizing and integrative influence on the social and economic life of a broad expanse of territory far beyond its civil boundaries and thereby dominates all other communities within this area. The hypothesis of metropolitan dominance assumes that there is a system of interdependency among cities, and that there are considerable differences between the activities of individual cities. It maintains that the organizing agent, and one of the forces making for intercity differentiation, is the metropolis.

Sufficient evidence has been accumulated to make of this view a very plausible hypothesis. Smaller cities and villages lying in the region about great cities appear to have been drawn into a division of labor with the larger urban center. They exchange for the specialized goods and services of the metropolis other products which can be most effectively produced from the resources in their immediate locality. Farm operators also appear to have become more dependent upon metropolitan markets, and consequently have regulated their activities to produce, if possible, those products which will yield them the greatest return in the metropolitan market. With these exchanges of material goods has also gone the exchange of ideas and human values. The metropolis appears to have become not only the focal point of our material activities, but of much of our moral and intellectual life as well. Repeatedly it has been pointed out that not only in activi-

ties such as non-agricultural production, distribution, or finance, but also in matters of government, of progress in the arts and sciences, of news dissemination and the formation of public opinion, of changed philosophies of religion, and of the emergence of new human values, the great metropolis is now the dominating center. To one who accepts such a view, progress toward understanding many economic and social problems of this century can come only from a thorough analysis of the metropolis and its relation to other communities.

Because the influence of metropolitan centers has not been analyzed for one complete society, the term "hypothesis of metropolitan dominance" rather than "theory of metropolitan dominance" is used throughout this study. Previous researches in this field have either:

a. Studied only the area immediately surrounding the metropolis and have ignored the outlying territory, or

b. Studied only one, or at best only a few, of the broader metropolitan areas - - usually those surrounding only the very largest cities. The first type of study is an extension of the urbanism theory; the second type suffers from sampling bias. Although the metropolitan hypothesis has been frequently expressed in the form stated here, it has never been submitted to a fair test of verification. However, the research which has been accomplished in the field of metropolitan dominance, although highly selective, is of such high quality that to accomplish the goal of this study it has been necessary to do little more than to assemble the various conclusions drawn by others from partial data, to organize these conclusions systematically as parts of the central hypothesis of metropolitan

dominance, and then to devise a procedure for determining their validity.

From the outset it must be emphasized that the distinction between urbanism and metropolitanism is preserved throughout this project. This is a study of metropolitan dominance, not of urban dominance; of metropolitanized society, not of urbanized society; of the structure of the metropolitan community, not of the urban community. By urban we mean "pertaining to all cities", by metropolitan we mean "pertaining to the metropolis". One can study the internal structure of either the city community or of the metropolitan community. A great deal of thought and research has been devoted to the study of urbanism and urban structure in general. By comparison, mush less effort has been made to trace out the influence of the metropolis and the degree to which our society is patterned or structured with respect to these larger urban centers.

III

Previous Studies of Metropolitan Dominance

Two formulations of the metropolitan hypothesis are outstanding for their completeness of detail and the care with which evidence has been collected for their expression. They are N.S.B. Gras' An Introduction to Economic History[4] and R. D. McKenzie's The Metropolitan Community.[5] Gras and McKenzie were among the first in their respective fields to attempt to link the present urbanized way of life to pre-industrial organization via the route of community analysis. The research of both men is based upon the premise that

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[4] New York: Harper & Brothers, 1922.

[5] New York: McGraw-Hill, 1933.

the community is the elemental form of social organization.[6] Aside from this common point of view, their techniques, their data, and their modes of analysis differ; yet they reach surprisingly similar conclusions. Gras arrived at the metropolitan hypothesis by an informal case study and natural history approach, using historical and anthropological information for the entire period of man's recorded history. McKenzie's statement of the metropolitan hypothesis is derived from a more formal statistical study of urbanism in the United States since 1790. Although the most recent complete statement of either scholar is now fifteen years old, the major writings of these two men summarize almost all that is known about the influence of Great Cities upon the economic and social life of the modern world.

A. N. S. B. Gras and the "Metropolitan Economy".

The basic thesis of Gras' Introduction to Economic History is that at each stage of technological development man has simultaneously developed a community organization which is suitable to the new techniques of wresting a livelihood from the resources of nature. By using existing information about the technological progress of man through the period of his recorded history, and comparable information about his economic and social organization, Gras informally correlates the two. He divides the continuum of technological and-

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[6] Although the point may appear to be a minor one in the light of current modes of thought, the shift from nineteenth century emphasis upon the state, or "great society", to the study of the communal aggregate in the twentieth century has permitted great forward strides in social science research. The focus upon the state as the unit of analysis permitted little more than philosophic speculation and the most informal and general observation of group behavior. The current emphasis upon the community as the unit of social organization has been both permissive and stimulative of intensive research based on controlled observation. Both Gras and McKenzie were among the first generation of students of the community.

communal development of Western Civilization into five major phases or periods: (a) the collectional economy, (b) the cultural nomadic economy, (c) the settled village economy, (d) the town economy, and finally (e) the metropolitan economy. Each phase is named for the dominant type of social development in that period. Throughout his history technological change has progressively released man from the necessity of sustaining himself from his immediate environment. Yet the lessening of this dependence upon the local area has been achieved only at the expense of a corresponding dependence upon a more complex system of production and exchange extending over a wider area. Such a system has invariably involved greater specialization and division of labor. In order to achieve the potential gains of each new major technological development, new and larger combinations of population and resources have been required. Consequently, new types of social organization have emerged which have been composed of units better adapted to operate under the new economy. Each major phase of technological development has been accompanied by a major change in the size, form, and organization of the community. Thus, in Gras' system, each of the five types of community enumerated above has arisen to operate a different type of economy, which in turn is the result of the attainment of a new level of technological advance.

The modern stage of metropolitan economy Gras describes as follows:

> We may think of metropolitan economy as an organization of people having a large city as nucleus. Or we may put it this way, metropolitan economy is the organization of producers and consumers mutually dependent for goods and services, wherein their wants are supplied by a system of exchange concentrated in a large city which is the focus of

> local trade and the center through which normal economic relations with the outside are established and maintained.
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> Just as villages remained when town economy prevailed, so do towns remain when metropolitan economy comes into existence. Towns remain, but in economic subordination to the metropolis. They continue to play a part, but as tributaries to a larger center. A closer examination of these dependent towns would show different types performing different functions, but all subordinate.[7]

Gras defines his metropolis in terms of function, not of size: Hence "...mere agglomeration of individuals, important as that is, does not constitute a metropolis in the sense used in this book. What counts most is commercial dominance over a wide area."[8]

The one situational factor which Gras holds to be absolutely essential for the development of a city aspirant to metropolitan status is the possession of a hinterland,[9] "a tributary adjacent population, rich in natural resources, accompanied by a productive population and accessible by means of transportation".[10] We are warned by Gras not to overemphasize either the metropolis or the hinterland in considering the metropolitan organization.

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[7] Op. cit., p. 184

[8] Ibid, p. 184.

[9] A concept developed by the geographers, See Eugene Van Cleef, "Hinterland and Umland", Geographical Review, April, 1941. pp. 308-311.

[10] Gras, op. cit., p. 185.

> It is true that in studying this organization we are inclined to emphasize the great metropolitan center; but to forget the large dependent district would be fatal to a correct understanding of the subject. Perhaps, indeed, it is somewhat incorrect to speak of the area as dependent upon the center, for though that is true, the center is also dependent upon the outlying area with its towns, villages, and scattered homesteads. Interdependence of parts is really the key to the whole thing.[11]

The striking element about the metropolitan hypothesis as formulated by Gras is not that great cities exist, nor even that they dominate a broad expanse of territory, but that the metropolitan economy is the characteristic and dominant type of modern social and economic organization. In this form Gras expresses the metropolitan hypothesis that ours is a "metropolitanized" culture. The metropolis and the hinterland are held to be parts of one organic whole. Our present day society operates in terms of, and is conditioned by, these metropolitan units. According to Gras, the metropolitan economy is a modern form of social organization by which man makes effective use of his advanced technology.

B. R. D. McKenzie and "The Metropolitan Community".

From its birth sociology has been an eclectic discipline. Hence it is not surprising to find sociologists quickly applying to their studies of human communities the principles and findings of workers in other disciplines. A most potent importation has been the application to human communities of the point of view of a group of biologists who study plant and animal communities and who term themselves

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[11] Ibid., p.186-187. (Italics are mine. D. J. B.)

"ecologists". R. D. McKenzie, one of these sociological students of bio-ecology, became the chief proponent of the ecological approach to the study of the human community. In a series of definitive statements he has outlined this approach.[12]

Ecology, according to two of its leading students, is the "science of community populations".[13] To the ecologist, the development of organized communities appears to be a universal technique by which all living matter adapts to external life conditions. Under conditions of universal scarcity of life-supporting resources, living units act upon, and react to, the behavior of other living units and to the conditions of the non-living environment. In the course of this complex process, the behavior of the living units is altered to minimize the effort to live and to maximize the livelihood obtained by a given amount of effort. Moreover, the living units modify the non-living environment to achieve this same end. The resulting integration of organism with organism is termed a "community". The non-living matter, as modified by the members of the community, is termed the "habitat".

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[12] "The Ecological Approach to the Study of the Human Community", American Journal of Sociology, November, 1924, pp. 287-361.

"The Scope of Human Ecology", American Journal of Sociology, July, 1926, pp. 141-54.

"Human Ecology", Encyclopedia of the Social Sciences, Vol.5, pp. 314-15.

"The Field and Problems of Demography, Human Geography, and Human Ecology", in L.L.Bernard (ed.) The Fields and Methods of Sociology, (New York: Ray Lang and Richard R. Smith, Inc., 1934.)

[13] Frederic E. Clements and Victor E. Shelford, Bio-ecology (New York: John Wiley & Sons, Inc. 1939), p. 3.

This postulate has been applied to the human realm in a direct and almost unaltered form by the human ecologist:

> The unit of ecological study is the communal organism, which is at once an aggregation of individual persons, a geographical and cultural habitat, and an interrelated and interdependent bio-social unity. The community thus conceived has many things in common with the plant and animal community. Its component units are bound together by the interdependence which arises out of specialization and division of labor.[14]

How a division of labor between unlike units can operate to form a functioning community is clearly indicated in the following statement:

> As the division of labor which thus develops approaches equilibrium such that the number of organisms engaged in each of the several activities is sufficient to provide all of the needs that are represented, the aggregate of associated individuals assumes the aspect of a compact viable entity, a super organism in fact. The (biotic) community, as such a functionally or symbolically integrated population may be called, is in effect a collective response to the habitat; it constitutes the adjustment, in the fullest sense of the term, of organism to environment.[15]

Human ecology, pursuing its study of human aggregates as an adaption to the environment, has also arrived at the metropolitan hypothesis. One of the series of monographs published under the direction of the President's Research Committee on Social Trends was McKenzie's The Metropolitan Community, a work devoted entirely to developing this hypothesis.

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[14] R. D. McKenzie,"The Field and Problems ofDemography, Human Geography, and Human Ecology", op. cit., p. 59.

[15] Amos H. Hawley, "Ecology and Human Ecology", Social Forces, May, 1944, p. 403.

> By reducing the scale of local distance, the motor vehicle extended the horizon of the community and introduced a territorial division of labor among local institutions and neighboring centers which is unique in the history of settlement. The large center has been able to extend the radius of its influence; its population and many of its institutions, freed from the dominance of rail transportation, have become widely dispersed throughout surrounding territory. Moreover, formerly independent towns and villages and also rural territory have become part of this enlarged city complex. This new type of super community organized around a dominant focal point and comprising a multitude of differentiated centers of activity differs from the metropolitanism established by rail transportation in the complexity of its institutional division of labor and the mobility of its population. Its territorial scope is defined in terms of motor transportation and competition with other regions. Nor is this new type of metropolitan community confined to the great cities. It has become the communal unit of local relations throughout the entire nation.[16]

McKenzie accumulated a detailed mass of evidence that the metropolitan center is a true dominant among community types. After reviewing the existing population data and data for many diverse economic activities he concludes:

> The super community therefore absorbs varying numbers of separate local communities into its economic and cultural organizations. In this pattern a dominant city — that is, dominant relative to surrounding settlement, functions as the integrating unit...In other words, there is developing within the United States, and in fact throughout the modern world, a pattern of settlement which may be designated as city regionalism. This new city regionalism differs from the regionalism of former times in that it is a product of contact and division of labor rather than of mere geographic isolation.[17]

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[16] R. D. McKenzie, The Metropolitan Community)New York: McGraw-Hill, 1933) p.7. (Italics are mine).

[17] Ibid, p.313.

The ecological view of cities may be summarized as follows:

a. The human community is an organization for adapting to the environment. This includes city communities.

b. New techniques of transportation and production (technological change) have permitted great cities to dominate smaller cities and other communities surrounding them.

c. These outlying communities are subordinate to the metropolis and are integrated with it.

d. This integration of outlying territory (hinterland) with the metropolis has become a standard form of social organization throughout the entire United States.

Gras and McKenzie therefore reached identical conclusions: Not cities in general, but metropolitan cities in particular, dominate our society today. This dominance has come about as an orderly change in human organization through the use of new techniques for supplying the necessities of life from the environment. Such an orientation of activities toward the metropolis is regarded as an epoch of community organization.

The careful reader will note that McKenzie has used the term "metropolitan region" to refer to the broader unit of metropolitan dominance and interdependence. Gras termed such a unit a "metropolitan economy". That McKenzie conceived the metropolitan region to be a community in the ecological sense is clear from his statement of the object of his study.

> The object of this study is to trace the rise of this new type of regional community, to note the forces which are bringing it about and determining its form and modus operandi.[18]

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18 Ibid, p. 7.

The term "region" has been widely used by geographers and other social scientists to denote areas of homogeniety. If the area of metropolitan dominance is organized on the basis of a division of labor and specialization, one would expect the greatest diversity of activity among its parts. Because "region" and "regionalism" do connote homogeniety, they seem inappropriate when applied to the area of metropolitan dominance.[19] In this study the simple expedient has been adopted of terming the whole area of postulated metropolitan dominance the "metropolitan community". Although this usage of the term "community" may be unconventional from some points of view, it can be justified on several grounds.

a. It accords with standard ecological usage.

b. There is no simple division point between the urban community of the metropolis and the hinterland. One fades into the other by degrees. The boundaries which are established must inevitably refer to some index of metropolitan influence. Since metropolitan influence in its broadest sense is the subject here, the broader definition of the metropolitan community is used.

c. It is generally assumed that the largest cities are breaking up, that new metropolitan centers are arising, and that in the not too distant future the metropolitan community, as defined here, may coincide with the local community of the metropolis where (daily) "communication" and "commuting" are the chief indices.[20]

Throughout this study the term "metropolitan community" will be used to refer to the metropolis and its hinterland as a unit. In this sense it

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[19] I am indebted to Dr. Amos Hawley for this distinction.

[20] W. S. Thompson "Urbanization" Encyclopedia of the Social Sciences, Vol.15, pp.189-92; Homer Hoyt, "The Structure of American Cities in the Postwar Era", American Journal of Sociology, January, 1943, pp. 475-81.

is synonymous with the area embraced by Gras' "metropolitan economy" and McKenzie's "metropolitan region". The terms "central city", "metropolitan center", or "metropolis" will be used to refer to the hypothetically dominant aggregate at the center of the metropolitan community.

IV

The Metropolitan Hypothesis as a Problem of Ecological Dominance

The term "dominance" has been used repeatedly in the foregoing discussion to characterize the relationship between the metropolis and the hinterland. McKenzie's statement of the metropolitan hypothesis from the ecological point of view seems to depend almost entirely upon this term. Gras likewise stated that "commercial dominance" over a wide area is the chief characteristic of metropolitan centers. It will be remembered that in the above quotations from the works of Frederick C. Howe and Charles A. Beard the term "dominant" was used by both to express the present and estimated future position of the city in civilization. In signifying the relationship between urban and rural peoples, between great and small cities, some form of the word "dominant" has been found to be meaningful to many scholars. The bio-ecologists also have found this same term to be a most meaningful one in expressing the interrelationship between the units of plant and animal communities. The act of dominating, the process of dominance, or the status of being a dominant unit appears to occur at all levels of communal organization. In an effort to clarify and to give more specific content to the term "metropolitan dominance" the use of the term by bio-ecologists will be explored.

To the bio-ecologist, dominance has a meaning which differs somewhat from its popular connotation.

> ....A dominant is an organizm with such definite relations to climate and such significant reactions upon the habitat ....as to control the community and assign to the other species subordinate positions of varying rank.[21]

Hence, dominance, in its ecological meaning, is a special kind of control over a community of interfunctioning units.

An example from the field of plant ecology will perhaps serve to clarify the meaning of the term dominance. A single hardwood tree standing alone in a field has very little control over the number and types of plants which grow in the field. Its presence changes the field very little except in its immediate vicinity. The situation would be very different if the field were populated with many hardwood trees. Whereas the leaves which fall from the single tree are quickly blown away by the wind, the forest of trees breaks the wind, permitting the leaves to fall to the ground at the base of the trees. Humus is produced; the soil is thereby enriched, and the water-holding capacity of the soil is increased. The combined shade of the trees controls the amount of sunlight and modifies the temperature of the soil. Referring to the definition of dominance given above, this forest has "reacted upon the habitat" in a very definite manner in terms of the amount of available moisture, light, and soil fertility and in terms of temperature. Only those species which are adapted to the conditions imposed by the forest can thrive within it. Species which cannot adapt to these conditions are extinguished. The smaller species are dependent upon the dominant species for maintaining cer-

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[21] Clements and Shelford, op.cit., p. 239.

tain environmental conditions necessary for their survival. The dominant species may be dependent upon the lesser species for other functions, such as preventing erosion, maintaining fertility, or discouraging the invasion of potential threats to the dominant by destroying their seedlings. Thus, a genuine community of interdependent units emerges, based upon the hardwood trees as dominants.

The hardwood community did not come about as a fortuitous event, however. Many other species capable of accomplishing the same or similar controls undoubtedly made a bid for the position which the hardwoods attained. These other species failed, the bio-ecologists tell us, because they were less able to cope with all of the conditions of the environment. Perhaps they froze out in the winter. The growing season might not have been long enough for them. A predator might have destroyed their seeds and thus made reproduction impossible. The ecologists assure us that this position of control which the hardwoods have achieved, in our example, is attained only because of an ability to meet and survive under the particular conditions of the environment. If this forest plot were moved to a spot 10,000 feet above sea level or to the equator; if the annual rainfall were quartered or quadrupled, the dominance of the hardwoods would quickly disappear in favor of other species. Again referring to the above definition of dominance, it is evident that in our example the hardwoods do have such "definite relations to climate" and, as has been shown, "have reacted upon the habitat" in such a definite manner, that the entire field (community of plants)' is controlled by the hardwoods. The other members of the community must accept subordinate (dependent) positions of varying rank as determined by the presence of the dominant hardwoods.

Thus, a dominant in nature exercises its control not by ordering and forbidding, not by virtue of any authority or right to command, but by controlling the conditions of life. The right to this control is earned only after demonstrating the ability to adjust to the wide variety of conditions in the environment. The dominant species may be thought of also as a product of the struggle of all life to adapt. It is a life form which has proved conspicuously successful in surviving, first by adapting to the conditions surrounding it and second by reacting upon and altering the environment to benefit its own needs. If one reflects upon the relationship between the great city and the territory surrounding it, he will be impressed by the similarity of this relationship to that found in plant and animal communities by the bio-ecologist. Metropolitan centers have no legal authority to give orders to their smaller neighbors to produce or not to produce a given type of commodity, to inhabit or not to inhabit the land with a given number of persons per square mile, to think specific thoughts and hold specified beliefs about political, moral, or economic events. If the metropolis does dominate its environment, it does so without coercion and edict.

If the above example of the single tree and the forest is applied to the problem at hand, the applicability of the ecological concept of "dominance" becomes clearer. At the time the territory which is now the United States was first settled, human communities were forced to deal directly with the physical environment. The villages and small cities which were established were in much the position of the lone tree in the field: they drew their nurture from the immediate

vicinity, local catastrophe threatened their existence at all times. They specialized primarily in extracting the most easily obtained resources of the environment as fur, lumber, fish, game, and the simpler agricultural products. A considerable amount of the materials extracted or produced were removed from the area by external forces, as were the leaves from the lone tree, for the original colonies were raw material exporters. Just as the single tree derives benefit from the production of leaves, but is able to derive the secondary benefit of the complete consumption of the product only by interacting with others of its kind, so the individual colonies were able to realize the full benefit of their productive efforts only when they were able to establish intercommunity trade and exert some control over the external forces. Beard has well documented the struggle of the colonial communities to gain for themselves the complete nourishment of their products.[22]

As the interdependencies of the colonial cities increased, and as they grew in number and size, a greater degree of control over the environment was achieved. The cities had not only adapted to the particular conditions of their environment, but had entered the phase of dominance by modifying and differentiating that environment through new types of activity. Canals, railways, and highways were cut through the wilderness. Budding manufacturing activities and new trade opportunities encouraged deforestation and the use of the land to produce

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22 Charles A. Beard, An Economic Interpretation of the Constitution of the United States. (New York: The Macmillan Company, 1913.)

raw materials and food for fabrication and exchange through urban centers. As the cities grew they became market centers, and placed their own value upon the products and activities of outlying areas. Cities consciously strove to annex new territory to their trade areas, to gain for themselves a hinterland. As the frontier advanced westward, "gateway" cities sprang up to provide the functions which earlier colonial towns had performed.[23] Gradually the frontier areas too have become "forested" with metropolitan centers. As the number of these centers has multiplied and the system of interchange among them has grown more complex, control over the physical environment has been progressively extended.[24] Presumably this process has not yet attained a climax stage in which a point of equilibrium is attained between the dominating species and the supporting environment. In the meantime, individual communities have thrived when they specialized (adapted) relative to the conditions imposed by metropolitan centers. If their activities have not been so adapted they have tended to become ghost towns. Such is the interpretation which can be placed upon the dominance of the great city. Not control through ordering and forbidding, but control through the more subtle means of heightened interdependence, alteration of the physical habitat, and a modification of the conditions under which smaller communities may thrive, are the elements by which the great city may dominate its neighbors. Such is the point of view with which this study begins.

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[23] Arthur M. Schlesinger, "The City in American History", Mississippi Valley Historical Review, June, 1940. pp.43-66.

[24] National Resources Committee. Our Cities: Their Role in the National Economy. (Washington: Government Printing Office, 1937). pp. 33-34.

By adopting the ecological point of view concerning the dominance of great cities this study assumes that if the metropolis is a dominant species among all communities, then its dominance is akin to ecological dominance in nature. The problem of the study can therefore be expressed by such inquiries as:

a. Are the metropolitan centers a group of organisms which control the entire area of the United States by controlling the conditions of life at the present stage of technological development of culture?

b. Have these metropolitan centers collectively altered the use of the area of the United States in such a fashion as to affect all portions of the area and consequently the activities of the inhabitants of smaller communities lying at even considerable distance from a metropolis?

c. If the factors of which dominance is composed do exist, do they tend to result in typical arrangements of people and activities? If so, what is the pattern of these arrangements? What are the typical distributions of population, of manufacturing, retail activity, of wholesale activity, of service functions with respect to the metropolis? Are all segments of the population woven into this pattern, or only some segments of it?

If it can be shown not only that this dominance exists, but that it has a definite pattern in which the various parts of the society stand in a definite relation to each other, it can be concluded that the society is organized with respect to the metropolis. Or to state it differently, the metropolis and its surrounding territory could be considered parts of one large organization, an organization with a definite structure. A given society would then consist of some grouping of these organized metropolitan units.

This statement of the metropolitan hypothesis in terms of the principles of general or bio-ecology is not intended as the drawing of a mere analogy between human and plant and animal communities. Man,

like other living forms, must live in a universe containing limited resources for maintaining life. Centuries ago his numbers outstripped a level of life based upon a subsistence by mere collection or extraction from the immediate territory. Further increases in his numbers in any given territory, and in security against extinction by natural forces (including other members of his species), have been effected only by developing new techniques for adjustment, and by organizing to apply those techniques more effectively. Students of both human ecology and of population accept as a basic postulate the principle that the human community and basic community activities are a functional response to the continuing pressure of the human species to perpetuate itself under conditions of maximum security and comfort in an environment containing limited resources for life.

V

Summary

This study seeks to verify or disprove the following hypothesis of metropolitan dominance derived from the writings of N.S.B. Gras and R.D. McKenzie and restated in terms of general, or bio-ecology:

1. The metropolis is a true dominant, as defined by the bio-ecologists. As such it modifies and organizes its habitat, thereby establishing life conditions which set limits to the activities of the other communities and of the dispersed populations occupying the same habitat.

2. In effecting an adaption to the total world environment as well as to local environmental circumstances, the population of the United States has distributed itself in such a manner that several metropolitan dominants have emerged.

3. The number and scope of influence of these dominants has increased to the extent that at the present time the entire area has been, or is in the process of being, invaded by the metropolis and its influence. The entire area of the United States may be broken down into a series of areas, each area being dominated by a metropolis.

4. By a process of reciprocal adjustment, the human aggregates which inhabit each such area have already evolved, or are evolving, a pattern of distribution and arrangement with respect to each other and to the metropolis.

5. The net effect of this process is to establish a number of large communities which are composed of smaller communities.

6. Within this multiple-community complex, which may be called the metropolitan community in deference to its dominant species, the individual local community must occupy a subordinate position. The activities of the local community are a function not only of its immediate locality, but also of its relative ecological position with respect to the dominant metropolis.

7. A characteristic pattern of arrangement of local communities, population, and sustenance activities can be shown to exist as an integral part of the organization of metropolitan communities. This pattern may be spoken of as the structure of the metropolitan community.

This hypothesis is necessitated by the fact that a theory of urbanism alone cannot account for all of the facts concerning the functioning of cities. Cities are not alike in composition or function. They are also interdependent. There is no single norm to which they tend to conform. A division of cities on some functional basis appears to be necessary. The basis selected is that of dominance, a principle which governs community relations in the realm of plants and the lower animals.

CHAPTER TWO

A PROCEDURE FOR ANALYZING METROPOLITAN DOMINANCE AND METROPOLITAN STRUCTURE

I

Introduction

In the preceding chapter it was concluded that dominance in nature consists in controlling some of the conditions of life. The hypothesis was there developed that metropolitan dominance, if it exists, is of this same type. What line of reasoning should one follow, what specific observations should one make of communities in the United States, and what procedure should one use in classifying these observations in order to test this hypothesis of metropolitan dominance? These considerations are the subject matter of this chapter.

It has been assumed that if metropolitan centers do dominate the remainder of the nation that fact will reveal itself, in one aspect, by the presence of a distinct pattern of population distribution and division of labor among the various parts of the hinterland. In other words, one manifestation of metropolitan dominance is the presence of a definite physical structure, or arrangement, of people and at least some human activities. A system of community sizes, distance zones, and sector types is the framework which will be used to determine whether such a structure exists. Every part of this system has been designed to test some aspect of the hypothesis in its ecological formulation. The discussion which follows deals individually with each of the major problems of procedure encountered. The bearing which each problem has upon the goal of the study is explained. The

ecological considerations and the information from the research of others which have prompted the use of certain procedures, classifications, and data as aids in solving these problems are summarized. The intention of this chapter is to acquaint the reader with the specific conditions under which the inference of dominance may be properly made, as well as with the machanics by which statistical data have been arranged to conform to those conditions.

II

How Can the Fact of Metropolitan Dominance be Established?

The actual mechanisms by which control is exercised obviously vary from one type of community to another. A given species may dominate an area through the control of sunlight and moisture, through control of the gas content of water (aquatic communities), or by controlling freight rates and prices. For a given community, if one were to ask the questions: "How does this community operate?", "How did this community arrive at its present structure?", or "How does species 'X' dominate this community?", an intensive analysis of the functional interrelationships between the parts of the community would be required. The functions which each member perform for each other member would then be the subject of inquiry. If, however, one seeks only to determine whether or not dominance exists, and the pattern of that dominance, he need only ask the questions:

a. Is there a distribution of functionally related parts about a selected part, e.g., the metropolis, in a manner which is <u>not necessarily dictated by the physical environment</u>?

b. If so, is there a pattern to this distribution: that is, is there a pattern which is non-random with respect to the metropolis?

This much simpler inquiry is made possible by the shift in point of view. In a study of a distributional pattern which presumably is a result of dominance, it is not the processes at work in the community which are the focus of attention. Rather, the central problem is the distribution and arrangement in the community of the parts of which the community is composed, and the determination of whether the distribution of those parts is necessitated entirely by the conditions of the environment. If the population of the various communities which constitute the metropolitan community are distributed as they are because the environmental conditions are such that there is no alternative, and if at the same time they are randomly distributed with respect to the metropolis, neither the hypothesis of metropolitan dominance, nor the assumption of the existence of a metropolitan community, is warranted from these data. If the individual populations of the sub-communities within the metropolitan community are distributed in a pattern which is related directly to conditions which can be attributed only to the influence of the metropolis, the hypothesis of metropolitan dominance is justified.[1]

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1 The sociological reader has undoubtedly already recognized that this study is merely an attempt to develop for hinterland areas a typical pattern of the general type which Richard M. Hurd developed for the internal structure of cities at the turn of the century and which later was introduced to sociologists as the "zonal hypothesis". The writer hastens to point out one distinction between this study and the sociological hypothesis of zones within the city: the findings are completely based upon statistical data for a great many cases. Although geometric representations and schematic diagrams can be very useful in abstracting the general pattern by which a given number of parts are typically arranged, they can also be

If dominance is non-existent, one should find a random distribution and a random combination of units in those cases where the metropolitan hypothesis would lead one to anticipate a significantly non-random distribution. If, on the other hand, dominance is being exercised, one would expect to find significantly fewer numbers of some units in certain portions of the community, and concentrations of the same type of units in other parts of the community. Moreover, proportions in which units of each type are found should vary from one part of the community to another. If these differences in distribution are directly related to conditions which can be attributed to the influence of the metropolis, and if nothing else in the environment requires this same distribution, then it can reasonably be inferred that the metropolis is exercising dominance over the area. By generalizing the distribution of numbers, densities, and combinations as they are related to the conditions attributable to the metropolis, the dominance of the metropolis may properly be inferred. The specific form which these distributions take can be of great potential use in characterizing the internal structure of the area which has been defined as the metropolitan community. If the metropolis is a dominant species of community, then it must control to a greater or lesser extent the organization of life in the hinterland. If it controls this

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1 (continued from preceding page)
misleading, and may become the objects of fruitless controversy, unless presented with carefully derived supporting evidence in which the "distorting" or uncontrolled factors are fully accounted for. The controversy over whether cities in the United States "really" tend to be zonal in structure has found its counterpart in England in a dispute over whether or not there is "really" a coffin-shaped "axial belt" of industry connecting London and Liverpool. (See J.N.L.Baker and E.W.Gilbert "The Doctrine of an Axial Belt of Industry in England", Geographical Journal, vol.103, pp.49-72). In the present study the "disturbing factors" of topography, historical accident, and other unknowns have been taken into account using data for a great many cases upon which these other forces have had their effect. The general

organization of life, then one should find distributions of population and of human activities which cannot be explained by reference to the natural environment alone. Moreover, these distributions will be related to a set of conditions which can be attributed to the metropolis. The following example will illustrate the procedure and the line of argument.

The farm population must have arable land before it can farm. If the farm population were subjected to no dominance; that is, if its activities were not controlled in any way by proximity to other communities, one would expect the farm population to be distributed entirely with respect to arable land. If the metropolis or other communities did not dominate the farm population, one would expect metropolitan centers and other aggregates to arise with little relationship to the amount of arable land or of farm populations lying about them. Densities of farm population would then be quite randomly distributed with respect to metropolitan centers, and metropolitan centers themselves would be quite randomly distributed with respect to the farm population and to arable land. Suppose one finds, however, that the number and density of farm population distinctly vary with different conditions attributable to the metropolis. This non-random distribution, definitely patterned with respect to the metropolis, permits

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1 (continued from preceding page)
patterns which are found will not be present in the same form, and with the same distinctness, in all metropolitan areas, for all types of extraneous conditions have been permitted to enter into the data. These patterns are, however, central tendencies toward which actual events tend to conform. The reader is not asked to perform the difficult mental feat of imagining what the data would be like if certain actual conditions were not present to affect the average tendency.

the tentative inference that:

> The distribution of the farm population is "controlled" to some extent by conditions imposed by the metropolis.

Suppose that not only farming, but other activities such as manufacturing, retail trade, wholesale trade, and services are also discovered to have a distinctive pattern of distribution with respect to the metropolis. The above inference now becomes:

> Since human residence, farming, manufacturing, retail trade, wholesale trade, and services are all patterned with respect to the metropolis, all of these activities are more or less "controlled" by conditions imposed by the metropolis.

Now, if it can be shown that the natural environment alone does not impose these distributions, and if it can be shown that these distributions are related to environmental conditions, then we can conclude that the metropolis is - to quote again the ecological definition of a dominant:[2]

> ....An organism with such definite relations to climate [the external environment] and such significant reactions upon the habitat [hinterland]... as to control the [metropolitan] community and assign to the other species [local communities] subordinate conditions of varying rank.

The pattern which this subordination takes can then be described, and the structure of the metropolitan community characterized. This is the basic procedure which will be used in establishing the fact of metropolitan dominance.

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[2] See Chapter One, Section IV.

It should be noted that at no point in the above illustration can one infer that the metropolis commands an event which is forbidden by the environment. If there is no arable land, the metropolis cannot command open field farming; if no raw materials can be made available, the metropolis cannot force manufacture. But the demonstrated fact that there is a pattern of location about the metropolis, as an adaptation to the limits imposed by nature, is strong evidence for the support of the metropolitan hypothesis. By the ecological interpretation of this hypothesis, the metropolis itself is controlled by external conditions, and is a product of those conditions through struggle and adaptation. Although the metropolis may modify its hinterland, adding certain conditions of life which originally were not present, it cannot be said to "cause" a given distribution any more than a forest can force a non-adapted plant to live within it - - and for exactly the same reason. If the hinterland is patterned around the metropolis, it is equally correct to say that in the universal struggle to adapt, the metropolis is a species of local community which has been most conspicuously successful by virtue of the fact that it began its career at the center of a favorable environment and is a product of the environment through adaptation. Although dominance is a process of control, it is also regarded here as a status which is achieved through a complicated process of mutual interaction and mutual influence. In this study of structure the object is not to examine processes, but to seek for different statuses, and to characterize the combinations by which they appear under varying conditions attributable to the metropolis.

Another note of caution should be sounded concerning the structure or pattern which dominance takes. Since the chief interest of this project is to study structure, observations have been taken for only a single instant of time, the years 1939-40. From such observations one can learn very little about change; yet the pattern of dominance can change rapidly with changed conditions. Bio-ecologists have shown that the dominant itself can so modify the environment as to destory the very combination of circumstances by which its dominance was attained and preserved (seral dominance). A study of change in structure must be preceded by a study of structure as such.[3] At no point in this study should the reader regard the patterns described as being inevitable, permanent, or not subject to change with changed conditions. Undoubtedly the patterns which will be described are sufficiently stable not to be subject to capricious reversal. Nevertheless, they are not predestined. The industrial and technological change which has presumably given rise to these patterns has shown few signs of having run its course. There is no basis whatsoever for assuming that a condition of equilibrium has been attained between metropolitan communities, between central cities and their hinterlands, or between the parts of the hinterland.

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3 A study of changes which are taking place in the structure of metropolitan communities is now in preparation as a sequel to this study of structure.

III

How Shall a Sample of Metropolitan Centers be Selected?

There has been little agreement as to which cities should be considered as metropolitan centers. Gras would admit only the eleven largest cities in the United States to this status.[4] The one attempt to delimit the boundaries of a set of metropolitan communities in the United States considered only Federal Reserve cities as metropolitan centers,[5] a rough criterion of metropolitan status suggested by Gras. To be considered as the center of a "metropolitan district" the Census required in 1940 that a central city have only 50,000 inhabitants.

For this study sixty-seven of the largest cities in the United States were selected as metropolitan centers. The manner of selection, while somewhat arbitrary, appears to have a reasonable basis for use in the present study. The requirements for being selected as a metropolis were as follows:

Requirement 1. Every candidate for metropolitan status should contain not less than 100,000 inhabitants, either in 1930 or 1940. The dividing line between "big cities" and "medium sized cities" has traditionally been at this point.[6] Cities of 100,000 or more inhabitants

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[4] Op.cit., p. 292.

[5] From a study by R. E. Park and Charles Newcomb, reported in McKenzie, The Metropolitan Community, p. 107.

[6] Mark Jefferson, "Great Cities in the United States in 1930". Geographical Review, January, 1933, pp.90-100; Karl Bucher "Die Groszstadt", in Die Groszstadt (Dresden: Zahn & Jaensch, 1903) p.4. See also George von Mahr "Die Bevolkerung der Groszstadt" in the same volume, p. 78.

receive special statistical treatment by the Census.[7] This convention appears to have a good foundation in fact, for it is at about this size that the urban economy becomes widely diversified.[8]

Requirement 2. Each metropolis must have a sizeable hinterland. This requirement makes it necessary to exclude those cities of 100,000 or more which lie adjacent to, or very near to, larger cities. The reason for this rule is that if the large cities lying very close to cities which are still larger are taken as metropolitan centers, the hinterlands of the very largest cities in the United States are reduced to almost zero land area. Thus, if Yonkers, N.Y., and Elizabeth, Jersey City, Newark; and Paterson, N. J. (all places of more than 100,000 inhabitants in 1940), are considered to be metropolitan centers, the land area about New York City must be divided between New York City and these other large cities. The result would be to give to these other cities the majority of the land area and to leave only a very narrow zone of a few miles depth as New York City's hinterland. In other words, a metropolis must be large compared to its immediate neighbors, for only such places can be truly "dominant" over a broad hinterland. This problem of determining how large a hinterland should be cannot be solved by one single definition. Setting a minimum distance between centers is hardly practical, for Washington, D. C. and Baltimore; Dallas and Fort Worth lie close to each other yet each has a sizeable trade territory on the side away from the other. Raising the minimum size of cities to be defined as metropolitan centers from 100,000 to 250,000 in the north-

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7 The Bureau of the Census also makes a distinction between principal metropolitan districts and other metropolitan districts, using central cities totalling 100,000 or more inhabitants as the criterion for a principal metropolitan district.

8 Grace Kneedler "An Economic Classification of Cities" Municipal Year Book, 1945 (Chicago: The International City Managers Association, 1945) pp. 30-38, especially table II, p. 38.

eastern states gave most of the largest centers a hinterland.[9]

Davenport, Iowa; and Rock Island, and Moline, Illinois; because of their position with respect to each other, because their combined population was more than the minimum required, and because they appeared to be in a position to dominate a sizeable hinterland area, were considered to be a single metropolis.

The 67 metropolises selected by the application of these requirements to cities in the United States, in order of size, are as follows:[10]

New York, N.Y.
Chicago, Ill.
Philadelphia, Pa.
Detroit, Mich.
Los Angeles, Cal.

Cleveland, Ohio
Baltimore, Md.
St. Louis, Mo.
Boston, Mass.
Pittsburgh, Pa.

Washington, D.C.
San Francisco, Cal.
Milwaukee, Wis.
Buffalo, N.Y.
New Orleans, La.

Minneapolis, Minn.
Cincinnati, Ohio
Kansas City, Mo.
Indianapolis, Ind.
Houston, Texas

Seattle, Wash.
Rochester, N.Y.
Denver, Colo.
Louisville, Ky.
Columbus, Ohio

Portland, Ore.
Atlanta, Ga.
Dallas, Texas
Memphis, Tenn.
Toledo, Ohio

Birmingham, Ala.
San Antonio, Texas
Providence, R.I.
Omaha, Neb.
Dayton, Ohio

Syracuse, N.Y.
Oklahoma City, Okla.
San Diego, Cal.
Richmond, Va.
Fort Worth, Texas

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[9] Newark, Oakland, Long Beach, Jersey City and St. Paul still constitute exceptions, and were arbitrarily considered hinterland cities because of their proximity to centers larger than they.

[10] Cities of 100,000 or more inhabitants excluded from metropolitan status were, in order of size:

Newark, N.J.
Oakland, Cal.
Jersey City, N.J.
St. Paul, Minn.
Akron, Ohio
Worcester, Mass.
Youngstown, Ohio
Long Beach, Cal.
New Haven, Conn.
Flint, Mich.
Bridgeport, Conn.
Yonkers, N.Y.
Paterson, N.J.
Trenton, N.J.
Kansas City, Kan.
Camden, N.J.
Fall River, Mass.
Wilmington, Del.
Gary, Ind.
Cambridge, Mass.
Reading, Pa.
New Bedford, Mass.
Elizabeth, N.J.
Tacoma, Wash.
Canton, Ohio
Somerville, Mass.
Lowell, Mass.
Utica, N.Y.

Jacksonville, Fla.
Miami, Fla.
Nashville, Tenn.
Hartford, Conn.
Grand Rapids, Mich.

Des Moines, Ia.
Salt Lake City, Utah
Springfield, Mass.
Norfolk, Va.
Tulsa, Okla.

Scranton, Pa.
Albany, N.Y.
Chattanooga, Tenn.
Spokane, Wash.
Fort Wayne, Ind.

Erie, Pa.
Wichita, Kan.
Knoxville, Tenn.
Tampa, Fla.
Sacramento, Cal.

Peoria, Ill.
South Bend, Ind.
Duluth, Minn.
Charlotte, N.C.
Davenport, Ia;Moline,Ill; Rock Island, Ill.
Evansville, Ind.
El Paso, Tex.

The inclusion of Springfield, South Bend, and Hartford as metropolitan centers is perhaps subject to criticism because each has a very small hinterland and lies near a larger center. However, a glance at a map of the United States will reveal the difficulty of assigning them as hinterland cities to any one specific metropolis.

IV

How Shall the Total Area of the United States be Assigned to Metropolitan Centers as their Hinterlands?

As indicated above, only one previous attempt has been made to determine the boundaries of metropolitan dominance throughout the United States.[11] In that study, the circulation of metropolitan newspapers tended to wane with increasing distance from the metropolis, and finally to give way to the newspaper circulation of a neighboring metropolis. The fact that Park and Newcomb used only Federal Reserve cities as

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11 Park and Newcomb's study of newspaper circulation reported in McKenzie, The Metropolitan Community.

metropolitan centers does not permit the use of their boundaries for dividing the total land area of the United States into metropolitan communities. Moreover, it is doubtful whether the single index of newspaper circulation may be taken as a reliable measurement of the outer limits of metropolitan dominance in the inclusive sense of this study. Hence, some system of subdividing the land area of the United States into smaller parcels, and of assigning each of these parcels to some metropolis as a part of its hinterland, had to be designed.

Unfortunately the allocation of all land area to the hinterlands of the various metropolitan centers requires some of the very knowledge which this investigation is seeking to obtain. Before one can study metropolitan dominance in the nation as a whole, some tentative hypothesis about the location of metropolitan community boundaries is required. Although it is desirable that the boundaries established for this first analysis be a close approximation of the "real" boundaries, it is also desirable that provision be made in the experiment to reveal the degree of error in the first delimitation. The procedure adopted contains this provision.[12]

In the absence of any clear-cut precedent the following hypothesis about the location of the outer boundary of metropolitan communities was adopted: Distance is the most important single factor in determining the limits of metropolitan dominance. Each metropolis claims as hinterland all of that area which lies closer to it than to any other metropolis. The following rule was adopted:

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12 A separate study of metropolitan boundaries, not included in the present study, is being prepared. The amount of error, revealed by special tabulations, is used to correct the boundaries as arbitrarily established for the study.

> A metropolis can dominate all the area which lies closer to it than to any other similar city, even if the other metropolis is larger. The boundaries of metropolitan areas therefore pass through the points bisecting the airline distance between adjacent metropolitan centers.

In effect, this definition assumes that the entire area of the United States is blanketed with metropolitan dominance and that any given area is subject to the dominance of the metropolitan center which lies nearest it.

The procedure followed in drawing the actual boundaries is as follows: (See Chart 2-1)

a. Draw lines from a given metropolis to each adjacent metropolis.

b. Bisect each of these lines.

c. At the midpoint of each line draw a boundary line at right angles to the original line. The area included within the intersecting boundary lines lies closer to the enclosed center than to any other center, and is taken as an estimate of the hinterland of that center.

d. Assign each county of the United States to some metropolis on the basis of the boundaries within which the greater part of its area falls.

e. Consider all cities to lie within the hinterland of the metropolis which claims the county in which they are located.

A few minor changes in the geometric procedure were made in coastal areas where bodies of water isolated a few counties from the closer metropolis but a principally traveled route connected these areas to a metropolis only slightly more distant. The boundaries of the sixty-seven metropolitan centers, as they were delimited by this procedure, are shown on the map 2-3.

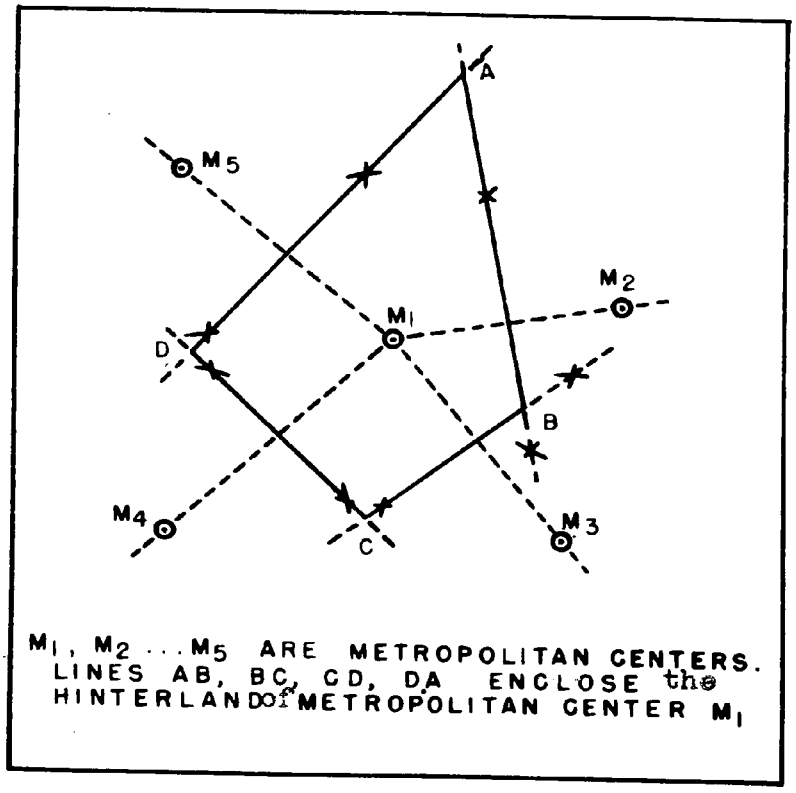


CHART 2-1 GEOMETRIC PROCEDURE FOR DELIMITING THE BOUNDARIES OF METROPOLITAN COMMUNITIES

V

What Units Should be Used in Studying the Structure of Metropolitan Dominance, and How Should these Units Be Classified?

The preceding discussion has characterized the hypothetical metropolitan community as a "community of local communities". In the last analysis, the control exercised over the hinterland by the metropolis must consist of establishing conditions to which the activities of individual local communities located in the hinterland must be adapted. Hence, the unit of analysis must be the individual local community.

The hinterland contains a great variety of communities, ranging from cities of more than 100,000 inhabitants down to small villages and local farming communities. For this reason it cannot easily be assumed that the conditions set by the metropolis force one pattern of adjustment in all areas about the metropolis. Nor can it be assumed that all hinterland communities are oriented solely toward the metropolis. It is a well-known fact that the larger hinterland centers are local shopping, manufacturing, wholesaling and general service centers for a large area surrounding them. Although these outlying centers may be under the dominance of the metropolis, they are also in active competition with the metropolis for the privilege of serving the areas in their vicinity. Smaller cities, villages, and even some open country areas are also shopping and service centers for some goods and services. Hence, certain parts of the hinterland appear to be subjected to an influence from sub-centers which varies only in degree, not in kind, from that exercised by the metropolis. This general observation makes it evident that some system of classifying the hinterland communities must be adopted, and that this classification must be in terms of <u>amount of influence exercised by the hinterland communities</u>.

From the foregoing it can be concluded that dominance is not an attribute but a variable. Dominance, it appears, can take any value, from high to low; it is not something which a community either possesses or does not possess (in the sense that persons either do or do not have blue eyes). It is here hypothesized that dominance is a status which every community whatsoever possesses in some degree with respect to other communities with which it interacts. The proposal to classify all individual hinterland communities along a scale of dominance is therefore consistent with the aim of the study. The ecologists have provided us with a very useful scale for classifying degrees of dominance. This scale is as follows:[13]

Dominants
Subdominants
Influents
Subinfluents

The hinterland communities may be divided into four major groups corresponding to these four steps in the dominance continuum:

Community type	Dominance type
Metropolitan centers.	Dominants
Hinterland cities.	Subdominants
Rural-nonfarm populations[14].	Influents
Rural-farm populations[15].	Subinfluents

From the ecological point of view, decreasing values along this scale refer to two types of change in dominance: (1) decreasing range or area of dominance, and (2) decreasing number of functions over which dominance is exercised. A rural-nonfarm village may conceivably exert

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[13] Clements and Shelford, op. cit., p. 234-250.

[14] As defined by the United States Census.

[15] Ibid.

an intense control in the single function of education, but only over a small area. By way of contrast, a large hinterland city may dominate a broad territory and control the conduct of several different types of human activities. In order to clarify the full meaning of this ecological classification, the applicability of each class in the dominance scale to each type of community to which it has been equated will be discussed.

A. The Dominant Metropolis.

The ecological meaning of the term dominance has already been explained and has been applied to the hypothesis of the dominant metropolis. (Chapter I, Section IV).

B. The Subdominant Hinterland Cities.

> A subdominant has been defined as a species that exhibits a secondary dominance within the area controlled by a dominant....Subdominants are the successful competitors among the species that accept the conditions imposed by the dominants.[16]

A great mass of evidence that cities lying in the hinterland exercise a considerable degree of influence over the area immediately surrounding them has been collected by students of market research and city trading areas.[17]

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[16] Clements and Shelford, op.cit., pp.239-240.

[17] Evan W. Read, An Analysis of the Retail Trading Relationships of Elgin, Illinois: A Satellite City. (Chicago: University of Chicago Press, 1938.

U. S. B ureau of Foreign and Domestic Commerce, Market Data Handbook of the U.S., 1929, (Washington, 1929).

Clarence Schettler, "Relation of City Size to Economic Service" American Sociological Review, February, 1943.

Richard P. Doherty, Trends in Retail Trade in the Metropolitan Boston Retail Area,(Boston: Boston University Bureau of Business Research,1941).

Edmund D. McGarry "Consumers Buying Habits in Satellite Cities" Statistical Survey, Supplement.(University of Buffalo Bureau of Business and Social Research). November, 1932, pp.1-12.

To the extent that it can be shown that all hinterland cities are patterned with respect to the metropolis, even while dominating a smaller area, we are justified in terming them as "subdominants". For under such circumstances they would truly be the units which "accept the conditions imposed by the dominants" and under these conditions "exhibit a secondary dominance within the area controlled by a dominant". A demonstration that this is true will be one major endeavor of this study.

It should be noted that the terms "suburb" and "satellite" have no genuine functional meaning. Many so-called suburbs are not at all "sub-urban", but are urban places in their own right. The use of the word "satellite" has a functional meaning only in a metaphorical sense. It is difficult to construct a mutually exclusive classification of cities as "suburbs," "satellite cities," and "other cities." In this study all cities, except the metropolitan centers, are termed simply "hinterland cities". It is a part of the metropolitan hypothesis that hinterland cities are physically and literally subdominants, as the word is used by ecologists. In their own right the "satellite" and open country cities appear to dominate a local trade area, yet are subordinate to the metropolis. Hence their classification as subdominants.

Setting 2500 inhabitants as the lower limit of subdominance is somewhat arbitrary, as must be all divisions of a continuum. Investigations of retail trade activities and of other economic functions have shown that cities smaller than this in size possess relatively few specialized service institutions and that they service an area

of only a few square miles.[18] [19] Perhaps even more important than a lack of specialized retail and other service establishments in village centers is their lack of specialized wholesale and manufacturing facilities, both of which connote exchange and distribution over a wide area and consequently some dominance in these activities. Only under unusual conditions do places of less than urban status perform extensive manufacturing or wholesaling functions.

C. Rural-nonfarm Populations as Influents.

Influents are:

> Suppressed forms that are usually effective in modifying the well-being or numbers of the dominant groups without changing the essential structure of the community.[20]

The collective effectiveness of the village trade centers for the well-being of the metropolis can be inferred from the many studies by rural sociologists and others of the role which villages play as local collecting and distributing centers for larger urban places and as service centers for the farm population producing food and raw materials for

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[18] Harold F. Dorn, The Social and Economic Areas of Yates County, New York, Cornell University Agricultural Experiment Station, (Ithaca, 1930).

Bruce L. Melvin, Village Service Agencies, New York, 1925, (Ithaca, Cornell University Agricultural Experiment Station, 1929).

William J. Reilly, Methods for the Study of Retail Relationships, (Austin: University of Texas Bulletin, No.2944, 1929).

[19] This generalization is not at all precise, but varies with the characteristics of the inhabitants, as well as the size, of the city or village. A. H. Hawley, An Analysis of the Relation of Service Institutions to Urban Populations in the United States, 1935., Ph.d. Dissertation, University of Michigan (Sociology), Ann Arbor, 1940.

[20] Woodbury, cited by J. Richard Carpenter in An Ecological Glossary, op. cit., p. 147.

the economy.[21]

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[21] J. H. Holb and R. A. Polson, Trends in Town-Country Relations University of Wisconsin Agricultural Experiment Station Bulletin No.117 (Madison, 1933).

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D. G. Marshall, "Hamlets and Villages in the United States: Their Place in the American Way of Life", American Sociological Review, February, 1943.

H.H. McCorly, "Market Functions of Villages in Eastern Iowa", Annals of the Association of American Geographers, March 1941.

That the rural-nonfarm populations are a more "suppressed form" than are cities, that is, that they are less able to control the conditions of their own existence, has been shown by these same studies. Villages seem to be vulnerable to hinterland changes of many kinds. The increased use of the automobile, new systems of marketing and retailing, the mechanization and electrification of rural areas, have caused large numbers of villages to die and other villages to be born.[22] Cities seem to have significantly superior abilities to resist the loss of population. From figures compiled by Gillette, it can be shown that 33 percent of the incorporated villages in the United States declined in numbers between 1930 and 1940, whereas only 23 percent of the cities suffered a decrease in population in the same period. Thus, between 1930 and 1940 those forces which make for the loss of community population were effective in 40 percent more cases among village communities than among urban communities.[23] Likewise, it can be shown that many villages are born in quick response to conditions created by the more dominant urban places. For example, the village population within metropolitan districts increased at a faster rate in the 1930-40 decade than did either the urban population or population of unincorporated areas.[24]

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[22] See the various studies cited above which compare farm trade centers at different periods of time.

[23] J. M. Gillette, "Some Population Shifts in the United States, 1930-1940", American Sociological Review , October, 1941, p. 621. Gillette excluded the New England States from his tabulation.

[24] Amos H. Hawley and D. J. Bogue, "Recent Shifts in Population: The Drift Toward the Metropolitan District, 1930-40", Review of Economic Statistics, August 1942.

The rural-nonfarm population therefore appears to be much less controlled and less self-controlling than the hinterland urban population. It appears in response to favorable conditions in small areas, disappears in response to unfavorable conditions, and gains little or no control over the conditions which created it.

Because the functions which villages and rural-nonfarm populations pursue are collectively effective in modifying the well-being and number of more dominant cities, but because individually units of this type are unable to change the essential structure of the entire economy, they are classified here as being influents in the hierarchy of dominance. This is consistant with their inferior ability to control the conditions of their survival.

D. Rural-farm Populations as Subinfluents.

According to the ecologists, subinfluents are:

> Forms present during part of the year or especially a part of the growing season and others exercising a secondary influence.[25]

While subinfluents are members of the community, and participate in a division of function with the other units of the community, they tend to have only a periodic effect. They have an even smaller degree of control over their conditions of life than do the influents. That these facts are true of the rural-farm populations is almost self-evident. The individual association of the farm population is usually very small. Its area of direct control is at best only a few hundred acres. The majority of its influence over the total community is seasonal in nature. Even at the season of greatest farm influence the metropolitan market determines the amount of return which each farm unit receives for its activities. This is equivalent to saying that the dominant, subdominant,

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[25] V. E. Shelford, cited by Carpenter, op. cit., p. 261.

and influent populations regulate the return received by the rural-farm population. This classification of the rural-farm population as subinfluential emphasizes this seasonal nature of its influence, the very minute portion of the total environment which each unit controls, and its almost complete lack of control over the behavior of other communal units. The effect of one unit upon the whole is negligible.[26]

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26 Ecology recognizes the cyclical nature of the influence and controls exerted by the less dominant forms. Although not verified by research, general observation would lead one to conclude that in human communities (as in other natural associations) the proportion of cyclical to total activity increases with decreasing dominance. In villages and small cities, public school education, retailing, and church functions are relatively more important than in more dominant places. All of these activities have a definite periodicity. Institutions for processing and marketing seasonal farm crops, and for serving seasonal needs of the farm population, are also relatively more important in these smaller places. The cyclical nature of much farm income would induce one to suspect that retail and other activities in the smaller places also have a much more seasonal life than do their counterparts in the larger centers.

For those who are interested in exploring that oft-debated problem of the relation of man to the lower life forms, and of the relation of human ecology to general ecology, the remainder of the ecological continuum of dominance provides a most interesting insight. Below the category of "influents" the bio-ecologist reclassifies the size of the habitat, prefixing each item in the scale with the word "micro". Thus, microhabitats have "microdominants" (or "dominules"), "microsubdominants" (or "subdominules"), etc. The entrance of man into the environment, and his mastery over it, has the effect of breaking it up into microhabitats for the lower forms of life. Activities performed or regulated by human beings, as tilling, grazing, or mowing, tend to break the habitat up into microhabitats in which man is the microdominant and other animal or plant forms occupy positions of varying degrees of microsubdominance along the scale. Thus, the dominance of the metropolis may determine the number and frequency of grassland microhabitats and the intensity of the grazing of microsubdominant milk animals in them. Within each microhabitat the various plant and animal species have an order of microdominance with respect to the conditions imposed by the microhabitat. By such a view, not only the individual members of the human species, but also the aggregations and organizations of the human species, fit into the "balance of life" so evident in the world of plants and lower ani-

In this study communities are not classified according to the type of activities which they perform, for specialization in certain community activities under given conditions of dominance is one principal subject of inquiry. The preceding classification of populations according to degree of dominance is, however, a necessary step in studying the metropolitan hypothesis. It should be kept in mind that this classification is even hypothetically valid only from the point of view of the metropolitan dominant.

As is true for any form of life, one cannot say that a hinterland city is subdominant under any and all conditions. From a local point of view such a city may be the outstanding dominant in the immediately surrounding territory; even if, in the metropolitan hierarchy, its position may be subdominant in character. The reader may take exception to the classification of the rural-farm population as a subinfluent, pointing out that the entire nation must eat. It should be emphasized that the dominance scale is a scale of relative degree of control, not relative importance to the well-being of the economy. To the extent that the farm population desires radios, automobiles, style clothing, and the other elements of a "high standard of living", and obtains those items through exchange; using tractors, milking machines, trucks, electric motors, and other mechanical devices to produce a surplus for exchange, the individual farm unit has almost no control over the conditions of its own participation, and is hence a subinfluent.

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26 (continued from previous page)

mals. From this point of view, the agricultural problems of sheet erosion, cut over areas, or wind erosion on the great plains may be regarded as large numbers of man created microhabitats undergoing one form of disclimax.

Four types of units will be used in studying the population structure of metropolitan dominance. These four are metropolitan centers, or dominants; hinterland cities, or subdominants; rural-nonfarm populations, or influents; and rural-farm populations, or subinfluents. These units are classified in a scale of decreasing dominance. Each type of unit controls fewer conditions of life, and exerts its control over a smaller area than the units above it in the scale. All are considered to be parts of the same large community, the metropolitan community. In the pages which follow a scale of dominance within each major dominance type will be developed.

VI

What Sub-classification of Local Hinterland Communities Should Be used in Studying the Structure of Dominance in the Metropolitan Community?

A. Dominant Metropolitan Centers.

Since size of city has been a major element in selecting metropolitan centers, and since dominance is postulated as being a variable rather than a fixed attribute, one cannot easily assume that all of the 67 metropolitan centers dominate their hinterland with an equal intensity. The dominance of New York or Chicago over its hinterland should differ considerably from that of Spokane or El Paso. In order to study this probable finding, all metropolitan communities have been divided into four major classes on the basis of the size of their metropolitan center:

Class of Metropolitan Community	Size of Metropolitan Center, 1940.
A	1,000,000 or more inhabitants
B	500,000 - 999,999 inhabitants
C	250,000 - 499,999 inhabitants
D	100,000 - 249,999 inhabitants

In all subsequent analyses aimed at determining the existence of metropolitan dominance, or the pattern of metropolitan dominance, a separate inquiry will be made for each of these size-classes of metropolitan communities.

B. Subdominant Hinterland Cities.

In 1940 there were in the United States 3464 urban places of which only 69 have been defined as metropolitan centers for the purposes of this study.[27] The remaining 3395 urban places, which have been classed as centers of subdominance, or hinterland cities, range in size from 2500 to 430,000 inhabitants.[28] If size alone is an indication of subdominance, then the larger hinterland cities must exercise a great deal more subdominance over the immediate hinterland than do the smaller ones. In other words, within the group of hinterland cities one could expect a great deal of variation in degree of subdominance, ranging from "near-dominance" of the largest hinterland cities to "near-influence" of the cities of 2500 inhabitants. In recognition of this fact, not all cities in the hinter-

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27 Rock Island, Moline, Davenport constitute one central city in this study.

28 Including the 28 cities of 100,000 or more inhabitants which were excluded from the status of being a metropolis.

land should be treated as one single class, but should be ranked in a scale of subdominance. Size of city is the only index available. In this study hinterland cities are classified by size into the following groups:

Size of Hinterland City, 1940	Number in the U.S., 1940
50,000 - over	132
25,000 - 49,999	211
10,000 - 24,999	665
5,000 - 9,999	965
2,500 - 4,999	1422
Total	3395

It is assumed that the average amount of subdominance exercised by any one group is greater than that of the group below it, and less than that of the group above it.

C. The Influential and Sub-influential Rural Populations.

The rural populations, classified as influents (rural-nonfarm) and subinfluents (rural-farm), are dispersed over 2,957,000 square miles of territory (19,214 square miles being devoted to urban uses in 1940). According to the hypothesis set up, the pattern of distribution of the rural-nonfarm population should be related to both the dominance of the metropolis and the subdominance of the hinterland cities. Just as the several hinterland cities vary in the amount of subdominance which they exercise, so should the rural-farm and rural-nonfarm populations differ from one part of the metropolitan community to another according to their relative ability to exert influence or subinfluence locally. To treat each individual village and farm aggregate of the United States as a unit is clearly impossible because of the large number of units

involved. How then, may the pattern of influence and of subinfluence of the rural population be studied? The expedient adopted in this study has been to treat the rural-nonfarm and rural-farm populations in county units. There were 3098 county units in the United States in 1940, of which 36 were also cities, or were composed entirely of urban places. Each of the remaining 3062 counties were located in the hinterland of some metropolis and were potential places of residence for both rural-farm and rural-nonfarm populations. The problem of classifying these rural populations by the amount of influence or subinfluence which they exercise is one of classifying the hinterland county units along some scale analagous to that of subdominance.

It would be very difficult to devise a scale to measure the degree of influence and subinfluence of the rural populations which would be even as approximate as the comparable scale for subdominance of hinterland cities which was constructed above. Theoretically, the greater the subdominance of the hinterland city, the smaller the relative importance of rural influence would be. Using this as a premise, a very rough scale of influence is used in this study, namely, size of largest hinterland city contained in the county. The validity of this classification depends upon three assumptions, in addition to those made for the subdominance classification of hinterland cities, viz, that:

a. As the degree of subdominance in a local area increases, the degree of rural influence decreases. It is assumed that in the vicinity of large cities the rural-nonfarm and rural-farm populations have a smaller and less diversified sphere of control than in areas containing only small cities.

b. The rural population of a county is only under the subdominance of cities contained in that county, or at least no other city outside the county exerts a greater control than the largest city within the county.

c. The degree of subdominance exercised is measured by the size of the largest city rather than the composite of all cities in the county. To the extent that counties containing the larger cities are more urbanized and contain a full complement of smaller cities, this assumption appears to be justified. To the extent that some counties contain numerous cities of the same size class in lieu of one or fewer larger cities, this assumption is less valid.

The county units of rural-farm and rural-nonfarm population are therefore classified in a scale of subdominance as follows:

Size of Largest City contained in County	Number of Counties in U.S. in 1940
50,000 - over	97
25,000 - 49,999	135
10,000 - 24,999	370
5,000 - 9,999	509
2,500 - 4,999	634
No city	1,255
Other - and counties containing central city	98

Even though this classification cannot be defended as a refined index, either of the local effectiveness of the rural populations as influents and as subinfluents or of the degree of urban subdominance over rural areas, the ranks to which it does assign the individual county units of population should be a reliable indication of the general amount of influence present in the areas containing largest cities of each size. The major exceptions, of course, will arise when a city larger than any city contained within the county lies just outside the county borders. In such cases an indeterminate proportion of the rural population will be placed too low in the scale.

In this study it is assumed that the average amount of influence or subinfluence exercised by the rural population of any category is less than that over the population in the class below it and greater than that over the population in the class above it.

VII

How Should the Hinterland be Subdivided in Order to Study the Pattern of Metropolitan Dominance?

Students of city structure and growth made great progress in understanding the internal structure of cities by developing the concept of "natural areas" and by using this concept to subdivide the city into parts for intensive study. In early studies of city growth it was observed that:

> The general effect of the continuous process of invasions and accomodations is to give to the developed community well-defined areas, each having its own peculiar selective and cultural characteristics. Such units of commercial life may be termed "natural areas".[29]

From this, and even earlier appreciations of differences between various parts of the city, came a movement to subdivide cities into more or less homogeneous sub-areas for purposes of research and planning. The census tract, now an indispensable tool of urban research and of urban planning, grew out of this movement.[30]

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29 R. D. McKenzie, "The Ecological Approach to the Study of the Human Community", Chapter III in The City, (Chicago: University of Chicago Press, 1925) p. 77. See also R. E. Park, "The Urban Community as A Spatial Pattern and a Moral Order", in The Urban Community, E. W. Burgess, (Chicago: University of Chicago Press, 1926) p. 11

30 Howard Whipple Green and Leon E. Truesdell Census Tracts in American Cities (Census Tract Manual) Department of Commerce, Bureau of the Census. (Washington, D. C. 1937).

In order to determine whether there is a pattern to metropolitan dominance, it is necessary to divide the hinterland into sub-areas which are more or less homogeneous. Yet the principle upon which this subdivision is made must differ from the previously described natural areas of the city on one important point. Just as cities were classified by a scale of their expected subdominance, rather than the functions which they perform, so must the hinterland be subdivided into homogeneous dominance areas, rather than areas of homogeneous activity. The question:"What areas of the hinterland may be expected to be subjected to a like amount of metropolitan dominance?" must be answered, and its answer used to classify every unit in the hinterland. The tentative answer which has been developed and applied in this study was derived either from the theory of metropolitan dominance itself, or was borrowed from the work of those who have studied the internal structure of cities.

These principles by which areas of like degree of dominance are delimited are among the principal variables of this study. From them are derived the tools for uncovering the elements of a pattern of metropolitan organization. It is to them that one must refer in discussing the control of the metropolis. A system of distance zones and sector types is used to delimit the natural dominance areas of the metropolitan community. The assumptions and corollaries upon which this system is based follow:

A. Accessibility is everywhere and at all times the most basic element in metropolitan organization. Scholars of several generations have linked city growth and development to mobility. The location of the principal metropolitan centers of the world have been shown to

have been determined in a large part by factors associated with movement. Great cities have arisen at points where streams of movement converge or at points where such streams are broken by a shift from one form of transportation to another.[31] Without movement the vast and complicated system of production and exchange upon which the metropolis lives could not exist. The site of the metropolis is inevitably an accessible one, either by natural endowment or as a result of the efforts of men. That the metropolis occupies a highly accessible spot in the hinterland can be verified very quickly by picking out each of the 67 metropolitan centers of this study on a standard highway, railway, or airline map. Inevitably no other center enjoys the convergence of so many different routes as the central city.

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[31] Friedrich Ratzel "Die Geographische Lage der Grossen Stadte" in the Grossztadt, op. cit. p. 49.

Adva F. Weber, The Growth of Cities in the Nineteenth Century (New York: MacMillan Company, 1899), pp. 72-209.

Charles Horton Cooley "The Theory of Transportation", Publications of the American Economic Association, IX, May, 1894, pp. 1-148.

N. S. B. Gras, op. cit., pp.219-243.

R. D. McKenzie, "The Scope of Human Ecology", op. cit., p. 177.

Edward Ullman "A Theory of Location for Cities", American Journal of Sociology, XLVI, May, 1941.

If one point in an area is more accessible than is any other point to the entire area, as one proceeds away from that point accessibility will gradually decrease until at some isolated spot at the periphery of the area accessibility will be at a minimum. In terms of time, cost, and expenditure of energy the entire area can most easily enter into a division of labor with a city located at a highly accessible point. Exchange and interaction with a city at the most inaccessible point could be achieved only at a maximum expenditure of time, cost, and energy. Since time, cost and energy are all elements of life which must be conserved in order to survive most economically, it can be reasoned that since they vary with accessibility the following assumption can be made:

Varying degrees of accessibility must represent varying degrees of interaction with the metropolitan center.

By such a view, the metropolis is a metropolis only because of its superior ability to serve and be served by the hinterland. Any ability which the metropolis may have to organize and control activities in the hinterland must depend upon its superior accessibility. Conversely, the degree to which any hinterland unit is integrated with, and controlled by, the metropolis must depend upon the degree of accessibility of the metropolis. The more accessible the metropolis, the more intense the dominance exercised by the metropolis; the less accessible the metropolis, the less intense the dominance over the hinterland unit. By making this assumption, the problem of delimiting areas of like degree of dominance becomes a problem of delimiting areas of like degree of accessibility. Accessibility is taken to be a variable which will co-vary with dominance.

B. Distance. Accessibility may be defined as "relative opportunity to enter". Obviously it contains more than one element. The distance to be traveled, the availability of a route, and the relative ease of traversing the route, are only some of the factors which limit opportunity to transport goods, services, and persons to or from a metropolis. Accessibility is therefore an abstraction which changes with each modification in the mode of transportation, the multiplicity of routes, or in the cost of traversing them. One permanent requirement in changing the location of any object is the necessity of overcoming distance. Time and cost may be reduced; more direct and more numerous routes may be built, but under any given system, or combination of systems, of transportation the element of mileage distance remains. Although in any given area cost rates and time rates do not stand in a fixed ratio to mileage, it is nevertheless true that they do have a functional relationship to mileage. In the United States this function of their change with mileage is approximately the same for all areas. Hence, if the actual number of miles which must be traveled, via actually existing routes of transportation, in order to go from each point in the hinterland to the metropolitan center were measured, these measurements should constitute a reasonably good index of accessibility at any one instant of time. The ratio of time-cost to distance would change with distance at approximately the same rate for all areas. This claim could not be made, of course, were mileage measured on an "as the

crow flies", or straight line, basis.[32]

McKenzie holds that the metropolitan community has been made possible by the superimposition of motor vehicle transportation upon the established waterway and railway pattern.[33] Almost every part of the hinterland is now available to the metropolis via motor vehicle transport. In this study actual mileage distance from the metropolis via most direct highway route has been taken as the chief index of metropolitan and hinterland accessibility.[34] After coding each city and county unit with its actual highway mileage[35] the frequency distribution of these mileages was studied, class limits set, and a series of accessibility zones established about each metropolitan center.

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[32] The major exceptions to this generalization are, of course, the reputed differentials between regions and the methods of computing rates into and through "breaking points". Nevertheless within the metropolitan community the pattern of transportation costs with distance from the metropolis is essentially the same as that within other metropolitan communities. The competition of the motor truck helps contribute to this uniformity.

[33] Op. Cit., p. 143.

[34] The task of classifying units on this basis was greatly facilitated by use of Standard Highway Mileage Guide (Chicago: Rand McNally & Company, 1946).

[35] See Section IX-C of this chapter, for details of the coding procedure.

It is not contended here that overland distance is an absolute measure of accessibility. It is assumed, however, that each zone outward from the metropolis is, on the average, less accessible than the one lying immediately inside it, and that there is a considerable degree of homogeniety in this respect among the units lying within each zone.

This patterning of the hinterland into distance zones has a long precedent in the study of the internal structure of the city. In 1903 Richard M. Hurd outlined a theory of internal city structure and growth based on a system of zones and axes. Hurd's most excellent analysis anticipates the results of subsequent research on the subject of city structure.[36] In a later work entitled "The Growth of the City"[37] E. W. Burgess emphasized the zonal aspect of city growth and patterning. The "Burgess Zonal Hypothesis" has been a guiding principle in interpreting the internal structure of the city for students of sociology for more than two decades.

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[36] See his Principles of Urban Land Values (New York: Beacon Press, 1903) especially pages 19, 58-59.

[37] The City. (Chicago: University of Chicago Press, 1925).

Following is a list of other urban studies which have employed either the zonal technique or distances in studying city patterns and various other aspects of the city:

James H. Bossard, "Ecological Areas and Marriage Rates", American Journal of Sociology, XIV, 1939, pp. 180-89.

Raymond V. Bowers, "Ecological Patterning of Rochester, New York", American Sociological Review IV (1939) 180-89.

[illegible] R. Davie, "The Pattern of Urban Growth", ed. G. P. Murdock, Studies in the Science of Society, 1937, pp. 133-61.

Carl A. Dawson and Warner W. Gettys "The Ecological Structure of the Metropolis", An Introduction to Sociology, 1935, pp. 129-156.

37 (continued from preceding page)

E. L. Faris and Warren Dunham, Mental Disorders in Urban Areas. (Chicago: University of Chicago Press, 1939).

E. Franklin Frazier, "Negro Harlem: An Ecological Study", American Journal of Sociology, XLIII, (1937), pp.72-88.

R. M. Haig and R. C. McCrea, Regional Plan of New York and Its Environs, Vol.I: Major Economic Factors in Metropolitan Growth and Arrangement, (1927), pp. 31-43.

Asael T. Hansen, "The Ecology of a Latin-American City", ed. E. B. Reuter. Race and Culture Contacts, (1934), pp. 124-42.

Norman S. Hayner, "Delinquency Areas in the Puget Sound Region", American Journal of Sociology, September, 1933, pp. 314-28.

Homer Hoyt, The Structure and Growth of Residential Neighborhoods in American Cities, (Washington: Federal Housing Administration, 1939).

R. D. McKenzie, The Metropolitan Community, op. cit., Chapter XVIII.

Ernest R. Mowrer, Family Disorganization (Chicago, 1927) Chapter V.

Andrew W. Lind, "Some Ecological Patterns of Community Disorganization in Honolulu", American Journal of Sociology, XXXVI, (1930), pp. 206-20.

Elsa Longman and Erle Young, "Ecological Interrelationships of Juvenile Delinquency, Dependency, and Population Mobility", American Journal of Sociology, XLI, (1938), pp. 598-610.

Clifford R. Shaw, Delinquency Areas, (Chicago: University of Chicago Press). 1929.

That the zonal technique is also efficatious in studying the pattern of city influence in the hinterland has been demonstrated by a few previous studies which have made use of distances and distance zones with a city as center. They are:

Edmund deS. Brunner "Rural-Urban Relationships", Chapter V in Rural Social Trends (New York: McGraw-Hill, 1933).

Warren S. Thompson and Nelle E. Jackson "Fertility in Rural Areas in Relation to their Distance from Cities", Rural Sociology, June, 1940, pp. 143-163.

After studying some indexes of the distribution of retail trade, wholesale trade and banking with respect to distance from a few of the largest metropolitan communities, McKenzie concludes:

> The foregoing data seem to warrant the general conclusion that the influence of a large city over surrounding settlement tends to wane with distance outward.[38]

Underlying all of these applications of the zonal technique is the assumption that distance, as a measure of accessibility, serves to differentiate the parts of the whole. That same assumption is made in this study in this form: distance, as a measure of accessibility and hence of dominance, serves to differentiate the intensity of the control which the metropolis exercises over the hinterland.

On the basis of the frequency distribution of all distances from all metropolitan centers, the following zones were established for the analysis which is to follow. (See Chart 2-2).

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37 (continued from preceding page)

R. D. McKenzie, The Metropolitan Community, p. 73- 78.

A. H. Hawley, An Analysis of the Relation of Service Institutions to Urban Population.

38 Op. cit., p. 76.

Zone Number	Distance from the nearest metropolis (miles)
1	0 - 4
2	5 - 9
3	10 - 14
4	15 - 24
5	25 - 34
6	35 - 44
7	45 - 64
8	65 - 114
9	115 - 164
10	165 - 264
11	265 - 464
12	465 - over

The classification of county units by distance zones is illustrated in Map 2-1.

C. Direction From the Metropolis.

The circular pattern of accessibility can be distorted by several factors, two of which are of considerable importance for the hypotheses of dominance. The first of these distortions arises from the fact that a large hinterland city is, in a sense, an extension of the metropolis, and makes the metropolis more accessible to certain portions of the hinterland than to other portions. The second distortion is created by the interdependence of metropolitan centers themselves. These two factors are of sufficient importance to warrant the introduction of a new variable into the process of delimiting areas of like amounts of dominance.

1. Accessibility and the Presence of Large Hinterland Cities.

According to the hypotheses of this study the metropolitan community is an organization of local communities, all of which are bound together by mutual interdependencies and a division of labor,

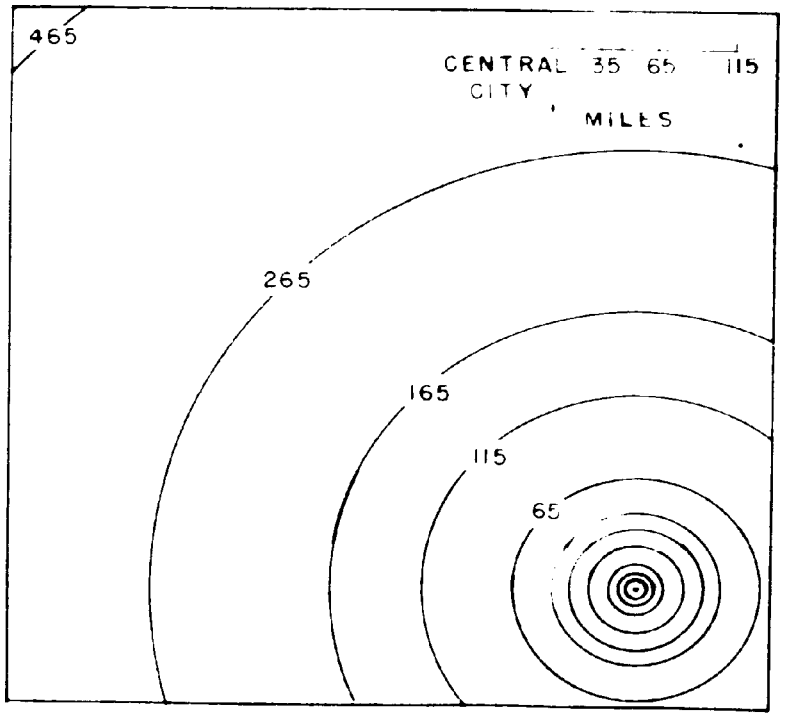
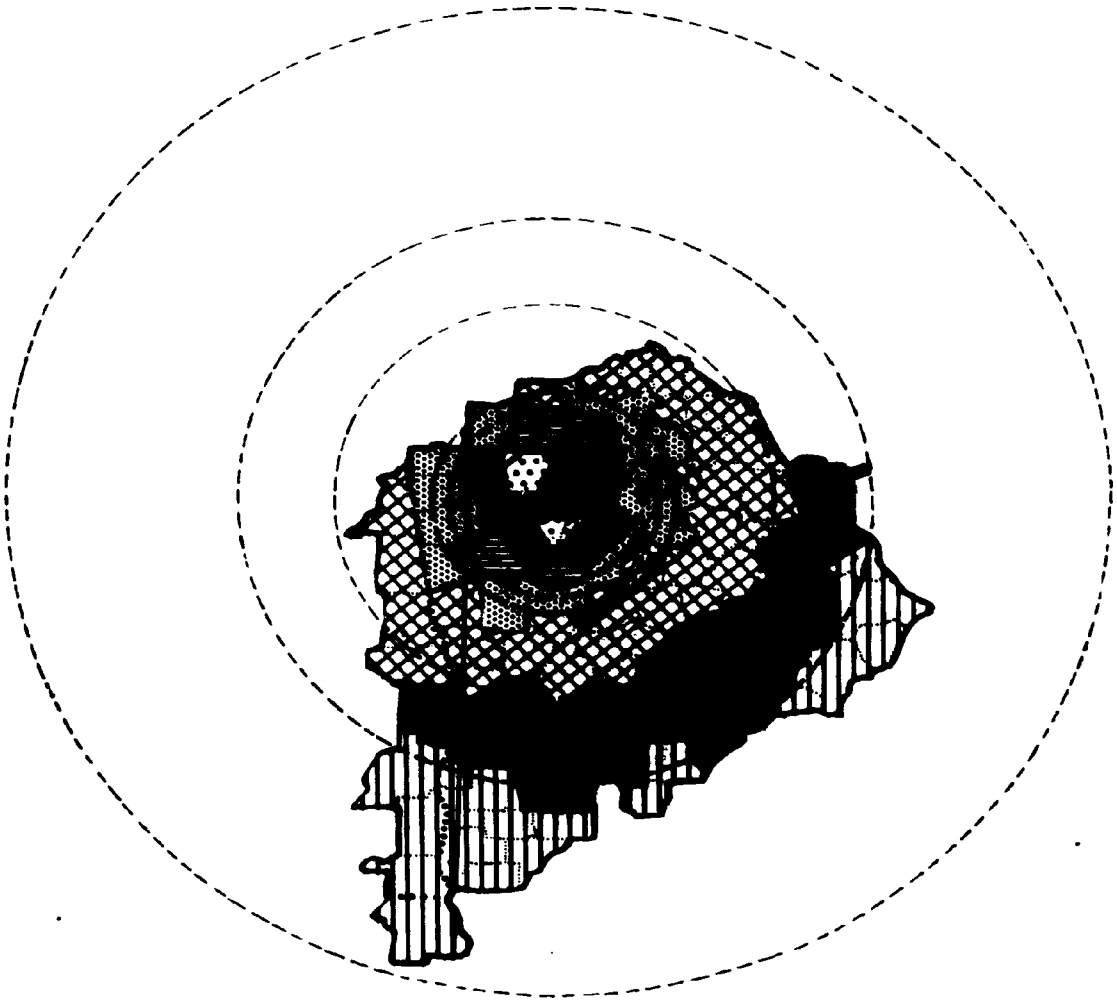


CHART 2-2 SCHEMATIC REPRESENTATION OF TWELVE DISTANCE ZONES FOR STUDYING THE ACCESSIBILITY OF THE METROPOLIS



DISTANCE ZONES (MILES)

COUNTY CONTAINING CENTRAL CITY

0 TO 24
25 TO 34
35 TO 44
45 TO 64
65 TO 114
115 TO 164
165 TO 264

MAP 2-1 ZONAL CLASSIFICATION OF COUNTY UNITS IN THE ATLANTA, GEORGIA METROPOLITAN COMMUNITY

the metropolitan being the dominant organizing influence. In this system the larger hinterland cities can be expected to play a more dominant role than the other smaller communities. Through these outlying centers the metropolis can "come to the country" to distribute its goods and services, and to collect other goods and services from the hinterland. Thus, a very highly developed organization between the metropolis and a hinterland city can arise to effect an exchange of goods between the metropolis and a broad area of the hinterland. Not only can the hinterland city stock a wide variety of goods produced in the metropolis, but also this close interdependence can produce more frequent and better transportation service between the metropolis and the subdominant city. Those areas of the hinterland which lie between the metropolis and the hinterland city, or in the vicinity of the latter, can enjoy a higher degree of accessibility than can other sections of the hinterland lying within the same distance zone. This advantage may be even greater due to the existence of competitive freight and transportation rates along such routes of travel. Hence there is reason to suspect that those hinterland areas lying in the general direction of a major subdominant city are more accessible to, and hence more dominated by, the metropolis than are other hinterland areas. In other words, a hinterland area is not forced to move to the gates of the metropolis in order to enjoy a higher degree of accessibility than do other areas, and to participate in a mutually beneficial division of function with the metropolis. This consideration, of course, modifies considerably the purely zonal pattern of accessibility outlined above.

2. Accessibility and Intermetropolitan Division of Labor

A second modification of the zonal nature of accessibility, recognized by both Gras and McKenzie, is that metropolitan communities are not self-subsistent entities. The metropolis carries on a lively exchange with other centers throughout the world. Gras recognized two distinct types of trade carried on by the metropolis, a "hinterland trade" and an "extended trade" with other urban centers outside the immediate hinterland. He termed the first type "intrametropolitan" trade and the second type "intermetropolitan" trade. Of these two types of trade he observed:

> The hinterland trade is the wheel of the machine, the extended trade the belt connecting the wheels.[39]

McKenzie notes the same phenomena as follows:

> The regional city tends to grow more self-sufficient and therefore to become a competing unit within the larger interregional economy. But this self-sufficiency is limited by the concentration of certain industries and certain raw materials. There is a countertendency toward a closer functional relation among the metropolitan centers of the nation. Just as communities within the metropolitan region preserve a certain degree of independence and local identity, yet are closely bound within the economical and cultural network of the central city; so the regional communities themselves are independent in many things, yet are parts of a national and international economy.[40]

The importance of this fact for our analysis of metropolitan structure is that under present modes of transportation, inter-metropolitan exchange requires the movement of goods through some sector of the hinterland.

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[39] Op. cit., p. 194.

[40] The Metropolitan Community, p. 313.

Movement of goods, services, or persons is inevitably a channelized affair, for movement must follow definite routes. The areas containing main thoroughfares into or out of a city exhibit many characteristics of the city center by virtue of the fact that, being more accessible in terms of time and cost, they are more highly developed than are other areas lying away from the thoroughfare. It has been demonstrated that within the city the principal channels of movement are highly differentiated with respect to the remainder. In fact, the transportation network of the city may be said to be the framework of urban structure, about which the various parts are arranged.[41]

There is considerable scattered evidence which, when assembled, indicates that this same phenomenon extends far into the hinterland. Those parts of the hinterland which are avenues of travel and exchange between adjacent metropolitan centers appear to be much more accessible to the metropolis than areas which have no such intermetropolitan location. The evidence which gives rise to this view may be reviewed briefly:

(a) Outlying cities and towns appear to be located in strings along principal routes of travel. The Bureau of Public Roads, in recommending a system of interregional highways (actually intermetropolitan highways connecting cities of 100,000 or more inhabitants) found that more than 54 percent of the cities of 10,000 or more lie

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41 "...The problem of traffic is more involved than the overt conditions might imply. It affects the entire structure of the community". Miller McClintock,"Trends in Urban Traffic" Chapter XX in The Metropolitan Community.

along the 36,000 miles of highway (1.04 percent of all mileage of total U. S. highways) required to connect the major cities. This minimum system directly serves:

82.6 percent of urban population in cities of 10,000 or more
45.2 percent of total U. S. rural population (passes through county)
83.0 percent of value added by manufacturing (cities of 10,000 plus)
43.3 percent of farm produce marketed (which is 46 percent higher than other counties)[42]

(b) Moreover, the volume of average daily movement along the minimum intermetropolitan system described above is at a maximum. Adding the mileage required to connect more cities to the system decreases the average volume of daily movement and adds only a disproportionately small amount of population, manufacturing or retail sales in relation to the added mileage. This can only mean that a large proportion of population and economic activities are clustered on a few dominant routes.[43]

(c) Additional evidence is found in the so-called "ribbon" developments which extend from the central cities into the rural areas along main highway, rail, and water routes like spokes from a hub.[44] Main highways seem to retain an urban nature at great distance from the center, and conceivably can "break out" into

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42 Interregional Highways, (Washington: Government Printing Office, 1944), pp. 15-22.

43 Ibid, p. 49.

44 Ibid, pp. 83-88.

urban development more easily than can any other point in the hinterland. With only slight encouragement, such as intersecting or converging with another similar route, or traversing an area containing some scarce resource, they can "blossom" into a settlement, village or town. Additional evidence is furnished by the frequency with which the trade of small country towns "dies" when a major thoroughfare passes close to but not through them. The town commerce tends to go to the highway or disappears as its residents join the stream flowing on toward a larger center.[45]

(d) Another reason to suspect that the hinterland surrounding large cities is organized with respect to main thoroughfares is the fact that most cities of commercial or industrial importance now in existence were established prior to the automotive age, and were located along railroads at a time when water or rails were the only means of long-distance transportation. Main highways have tended to parallel the main railroads. Thus the pattern of major towns being located in strings along intermetropolitan railways has been little affected by through highways.[46] Just as certain portions of the hinterland are more accessible by virtue of their lying between a metropolis and a hinterland city, so may other portions of the hinterland be more accessible because of their location on a main route of travel between metropolitan centers.

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45 See C. R. Hoffer Changes in the Retail and Service Facilities of Rural Trade Centers in Michigan 1900 and 1930. Michigan State College Special Bulletin No.261, (East Lansing, 1935).

46 McKenzie The Metropolitan Community, pp. 133-140.

The evidence cited leads to the hypothesis that outlying parts of a metropolitan area are differentiated not only in terms of distance from the metropolis, but also in terms of direction from the metropolis. Directionality appears to be particularly important in terms of two types of channels of movement:

a. Portions of the hinterland lying in the direction of a major hinterland city.

b. Portions of the hinterland lying along a main channel of intermetropolitan travel.

Because of these added factors, one would anticipate a marked differentiation of the hinterland on the basis of direction from the central city whether along an intermetropolitan thoroughfare, a metropolis-hinterland city route, or in a direction which provides neither of these aids to accessibility.

This study attempts to express this directional aspect of metropolitan pattern by a sector, or wedge-shaped segment of the hinterland whose vertex is at the metropolitan center and the body of which extends outward toward the periphery of the metropolitan community. (See Chart 2-3). All sectors are of 30° arc. In the completely circular hinterland, the direction of any unit can therefore be expressed as lying within one of twelve sectors. When the cities and counties of the hinterland are cross-classified by <u>both</u> distance and sector, the metropolitan community is divided into a series of sub-areas as shown in Chart 2-4.

If now the sectors are classified into three types, on the basis of the type of accessibility, they include a much more realistic estimate of accessibility will have been made. Three types of sectors are recognized by this study:

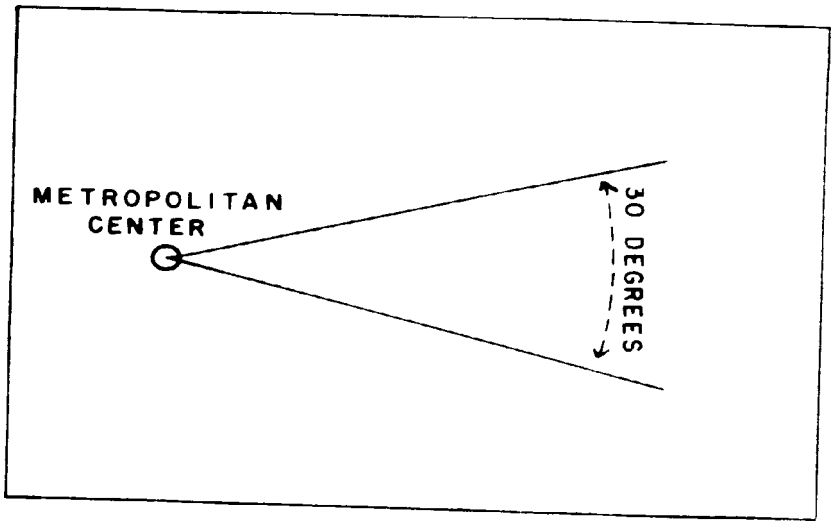


CHART 2-3 SCHEMATIC REPRENTATION
OF A SINGLE SECTOR

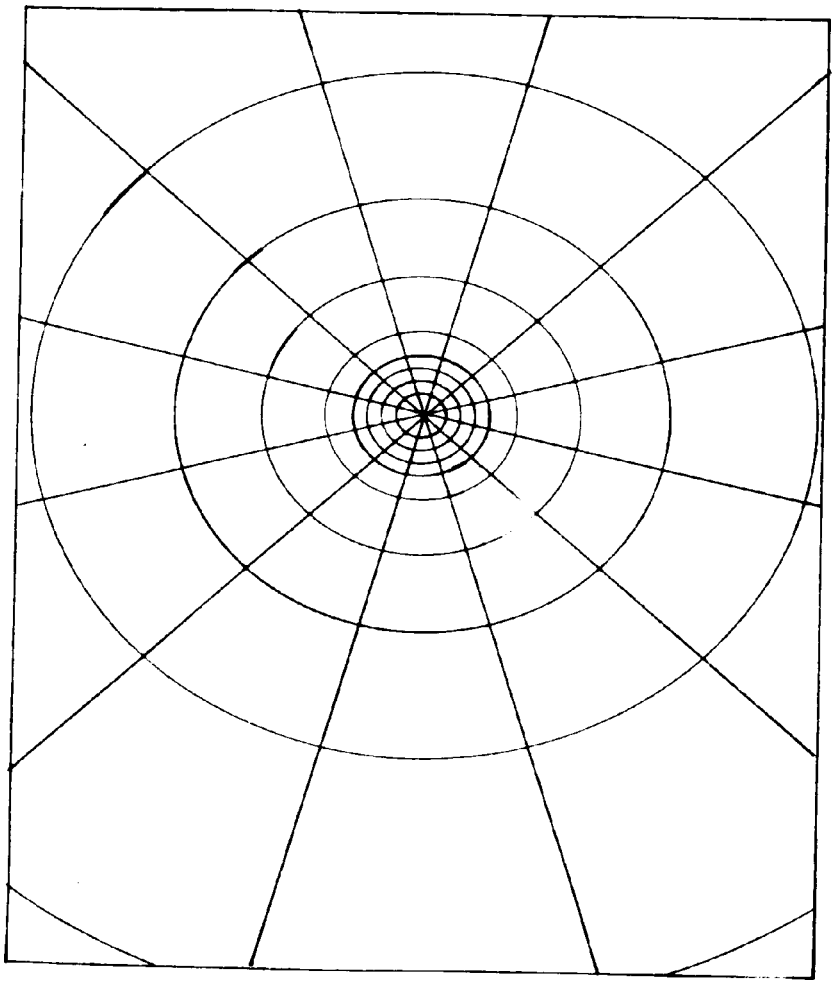


CHART 2-4 SCHEMATIC REPRESENTATION OF THE SYSTEM OF DISTANCE ZONES AND SECTORS SUB-DIVIDING THE HINTERLAND INTO ACCESSIBILITY AREAS

Intermetropolitan sectors -- sectors containing a major route of transportation between two metropolitan centers.

Subdominant sectors -- sectors not containing an intermetropolitan thoroughfare, but containing a major hinterland city of 25,000 or more inhabitants lying 10 miles or more from the metropolis.[47]

Local sectors -- sectors containing neither an intermetropolitan thoroughfare nor a major hinterland city.

The entire next section is devoted to describing in more detail the procedure used in constructing these sectors in the 67 metropolitan communities, the manner in which the sectors were classified by the three types, and the method of coding the city and county units by their sector type.

VIII

A System of Sectors

A. Considerations in Constructing a System of Sectors.

1. Why Use Sectors? In attempting to distinguish between the various directional aspects of metropolitan dominance, it is conceivable that another geometric form, such as a square or a rectangle could be employed. The sector appears to be superior for the following reasons:

a. Starting at a point in the central city, a sector with a 30° angle increases in arc at a constant rate as the distance from the center increases. Twelve such sectors cover the entire area. A system of squares or rectangles would leave gaps if laid out along transport routes. Yet any geometric design which is not arranged with respect to principal transport routes would not

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47 In classifying the sectors, the presence of a highway has been allowed to take precedence over the presence of a large hinterland city. Thus, intermetropolitan sectors may contain cities of 25,000 or more inhabitants.

fit the hypothesis of dominance as related to accessibility.

b. The sector appears to conform to the general pattern of main transportation routes radiating outward from the central city. Starting from the metropolis, these routes fan out in all directions. The routes between large cities seldom run in a straight line. They deviate to avoid topographic obstacles, follow valleys, or veer off course to provide a metropolitan connection to hinterland cities. Thus, although the route may be a main thoroughfare to another metropolitan center or to an outlying large city, an ever increasing "slice" of territory is required to contain it. The sector meets this need, although there are exceptional cases in which no simple geometric figure can contain the full length of a main transportation route.

2. Should Sectors be of Equal Size? By arbitrarily enlarging or decreasing the size of individual sectors to include desired and to exclude undesired or exceptional cases it would be possible to verify almost any given hypothesis about metropolitan dominance. One way of assuring that there be no such bias in classifying the cities as to their direction from the metropolis is to make all sectors of equal size, even if this means that occasionally a thoroughfare will ramble over into another sector. Expressed in terms of the sample, each hinterland city or county unit should have an equal chance of falling within a given sector. By arbitrarily making all sectors of a fixed size, applying these sectors to maps of the areas, and allowing each unit to fall where it will, systematic bias is avoided. When the

boundaries of sectors are once established, if a disproportionate share of population, manufacturing, retailing, etc. fall within a given sector, the disproportion cannot be attributed to biased selection due to arbitrary inclusion or exclusion of individual areas.

3. What Size Should the Sectors Be?

Sectors should be able to differentiate clearly between areas through which intermetropolitan transportation facilities pass and areas not having such facilities, and between areas containing major hinterland cities and areas not containing such places. In order to subdivide the hinterland on these bases, areas which do not lie near major transportation routes should lie within different sectors from those areas which do lie along such routes. Sectors should therefore be as small in arc as is feasible. Each sector should contain only one main route. On the other hand sectors must be large enough to "contain" the routes which do not travel in a straight line. By studying the highway maps of the metropolitan communities as they have been delimited, it was found that there were an average of 6 to 7 main highways radiating from each metropolis to neighboring metropolitan centers. If, on the average, there is to be one nonintermetropolitan sector for each intermetropolitan one, this would necessitate dividing the total circumference of the metropolitan area into 12 to 14 parts.

Sectors which are of arc 30 degrees (one-twelfth of a complete circle) have been found to satisfy the practical requirements outlined above. In general, sectors of this size are broad enough to follow the wanderings of a main thoroughfare headed toward another metropolitan

center, to avoid including two intermetropolitan highways in one sector, and yet narrow enough at their outer extremities to avoid including areas lying a considerable distance from the transportation route running through the center of the sector. The final system of sectors established is illustrated on the accompanying map of the Memphis metropolitan community.

B. Types of Sectors.

Sectors, being potential channels of mobility, can be classified by the principal termini which are served through them. A threefold classification is used here:

Intermetropolitan: serving other metropolitan centers

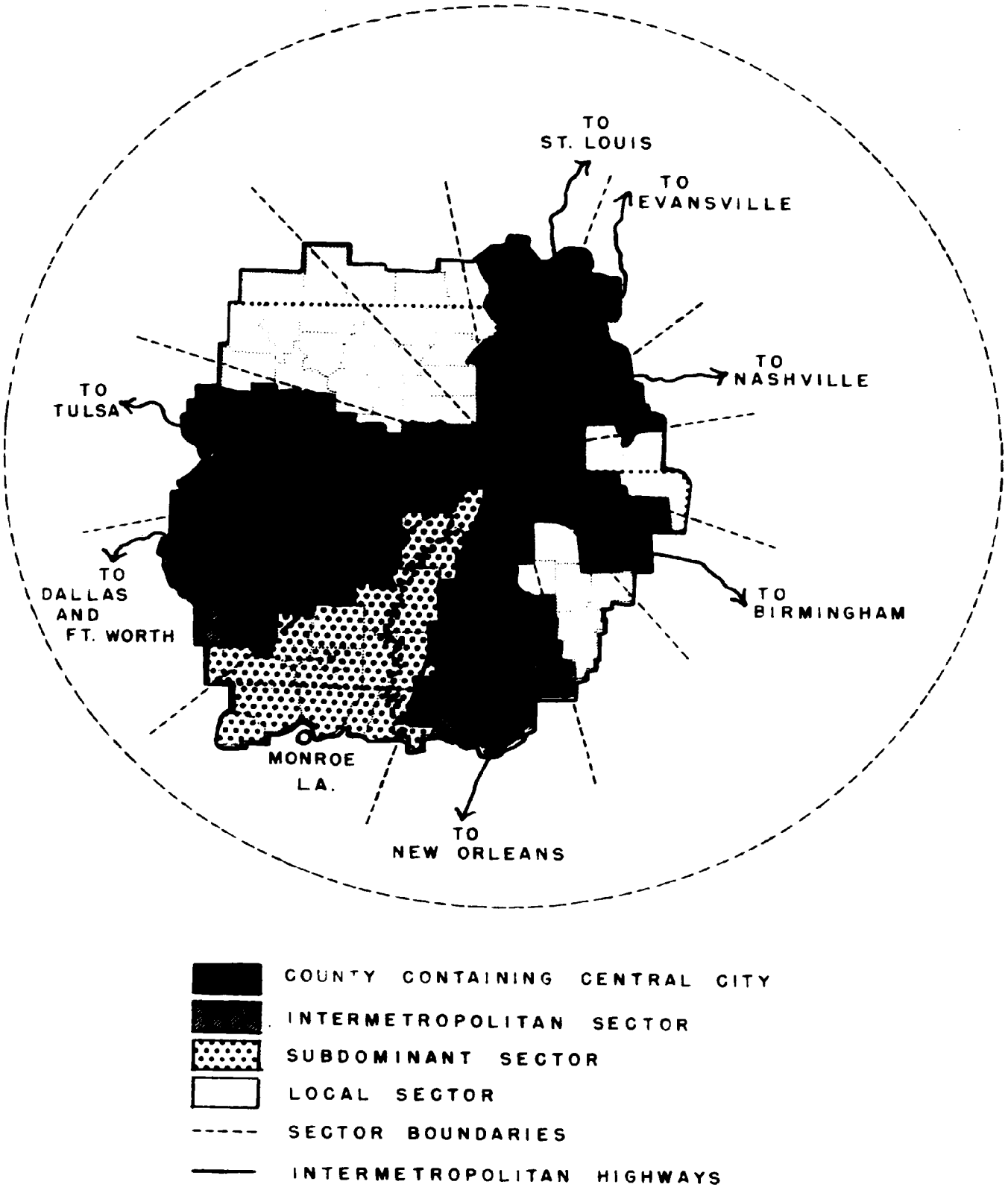
Intrametropolitan-subdominant: serving a major hinterland city

Intrametropolitan-local: serving no neighboring metropolitan centers or major hinterland cities.

C. The Method of Drawing and Classifying the Sectors. (Map 2-2).

The sectors were drawn as follows:

1. The major intermetropolitan highway routes from each metropolis to its neighboring metropolises were determined. A transparent circular template, divided into twelve equal sectors, was placed over the map of the metropolitan community. By rotating the template an attempt was made to get each route to fall within a single sector. Each route was "centered" as nearly as possible in its sector. Since in effect, all twelve of the 30° sectors for one metropolitan community were "linked together" into one circle, rotating one sector required the rotation of the remaining eleven sectors. An effort was made to get all inter-



MAP 2-2 CLASSIFICATION OF COUNTY UNITS BY TYPE OF SECTOR IN THE MEMPHIS, TENNESSEE METROPOLITAN COMMUNITY

metropolitan routes to lie as near to the center of a sector as possible. When this condition had been approximated, the ends of the 12 sectors were plotted on the map and lines drawn to the center of the central city.

In determining the major intermetropolitan routes the following procedure was used:

a. Only U. S. highway and principal state routes were considered.

b. By referring to highway maps the apparent closest route from the given center to each adjacent center was recorded.

c. This was checked by reference to a traffic flow map of the United States, prepared by the Bureau of Public Roads, showing the average daily volume of traffic on all principal U. S. and state highways.[48]

d. A further check was made with the interregional system of 78,800 road miles, (a system, prepared by the Bureau of Public Roads, which includes the most-traveled routes between major centers).[49]

2. Those sectors which contained an intermetropolitan highway were then coded as intermetropolitan sectors.

3. Of the remaining sectors, those which contained a city of 25,000 or more inhabitants and located at a distance of 10 miles or more from the

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48 Map showing the average daily volume of traffic in 1941 on major routes of the federal system of the United States highways, Bureau of Public Roads, 1945.

49 Interregional Highways, p. 142.

central city, were designated as "subdominant" sectors.[50]

4. The remaining sectors were classed as intrametropolitan-local sectors, for there was no evidence of intermetropolitan or major metropolis-hinterland city activity in their direction.[51] Table I in the Appendix lists for each metropolitan center the number of sectors of each type.

Like the zonal measure of accessibility, the sector technique of separating zones into sub-types has a precedent in the study of the internal structure of cities. The notion of differentiating between thoroughfare and non-thoroughfare portions of the city is contained in Hurd's work of 1903.[52] In a study of residential neighborhoods in cities, Homer Hoyt has made what is to date the most systematic use of sectors in studying the internal structure of cities.[53] The sectors constructed for this study differ from those used in Hoyt's work in that:

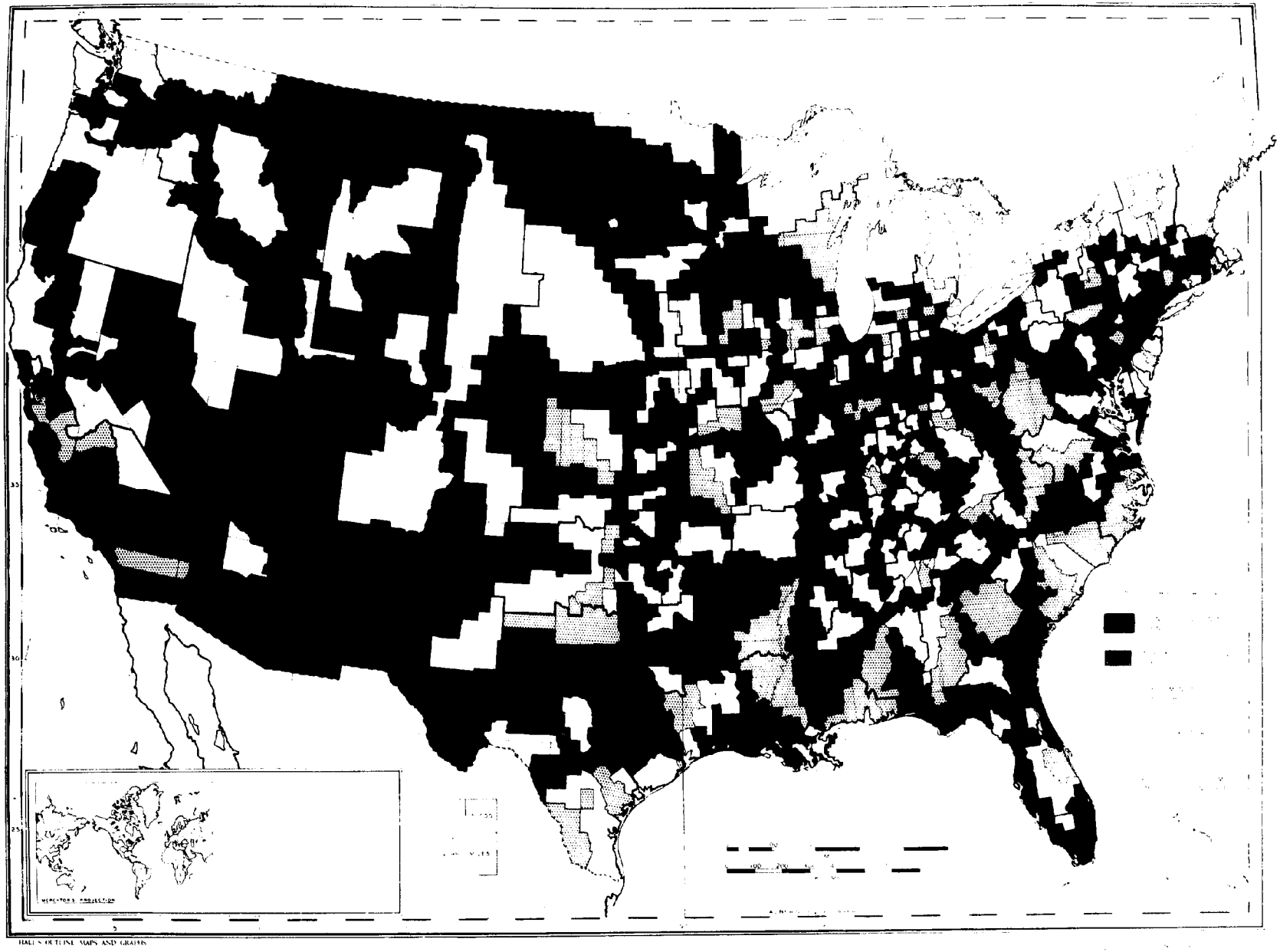
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50 In a few cases, if a large hinterland city lay just outside the metropolitan community boundary, and if there was evidence of considerable traffic between the metropolis and this city, the sector in that direction was coded as "subdominant" also.

51 Subsequently referred to as "local" sectors. Local sectors may contain a city of 25,000 inhabitants or more only in the 0-10 mile zone.

52 R. M. Hurd, op. cit.

53 Homer Hoyt, op. cit.



MAP 2-3 BOUNDARIES OF 67 METROPOLITAN COMMUNITIES AND CLASSIFICATION OF COUNTIES BY THE TYPE OF SECTOR IN WHICH THEIR GEOGRAPHIC CENTERS LIE

a. Here they are a sampling device rather than an illustrative device. The primary purpose of sectors in this study is to subdivide the many hinterland units into groups which are more or less homogeneous in their position with respect to the metropolis, and then to determine whether the populations of these various samples of communities differ from the populations of all hinterland communities. It is for this reason that they are all of equal size. Hoyt's sectors, on the other hand, were used to describe differences already found, and were varied in size to delimit areas of residential likeness.

b. The sectors of this study have a basis in a theory of the structure of the community, and are drawn because of an hypothesis of accessibility. Hoyt's sectors were not linked to any theoretical formulations of the relationships between the parts being studied.

In spite of these differences, the reader who is acquainted with Hoyt's very useful technique will find that he is already quite familiar with the procedure used here to break up the distance zones into smaller areas which are internally more homogeneous than is a broad belt of territory surrounding a center. Nor will he be surprised at the marked differences which will emerge when the factor of direction as well as distance is introduced into the study of structure.

D. Coding Hinterland Areas by Sectors and Distance Zones

In this and in the preceding section a scheme was developed for delimiting areas which are homogeneous with respect to accessibility to the metropolis. Two variables, distance and direction were used to subdivide the hinterland. The analysis to follow distributes several

different sets of data by the classification of area established. The data to be used, however, are available only for political units of area, that is, for individual cities and counties. In order to perform the analysis, it is necessary to assign these political units, and hence the data, to specific sectors and zones.

Cities may be assigned directly to the sectors and distance zones into which they fall. Counties, on the other hand, exceed the breadth of the sectors in many cases, and in all cases the sectors as drawn cut across county lines in quite a random fashion. The geographic center of each county was determined and the entire county assigned to that sector and distance zone in which this center lies. Thus, every city and every county unit in the entire United States was coded by its most approximate distance zone and sector type. Maps 2-1 and 2-2, appearing in the preceding pages, illustrate the manner in which county units have been assigned to specific distance zones and sector types in each of the metropolitan communities.

IX

What Functions Should be Used to Measure the Influence of the Metropolis over the Hinterland?

In the foregoing discussion of metropolitan organization, the general terms "function", "division of labor", and "interdependence" have been used to refer to the activities involved in the relation of the metropolis to its hinterland. The all-inclusive nature of the hypothesis under consideration has permitted the discussion to proceed as if any community activity whatsoever is influenced by the metropolis. Indeed, in its most extreme form, this is the claim of the metropolitan hypothesis.

In designing an experiment to test this hypothesis, it is clearly impossible to study all community activities, or even all types of community activities which could be subject to metropolis-centered control. Aside from the labor which would be involved, the lack of available information limits the extent of the investigation which can be made into the activities of all communities in an entire nation. Any selection of functions for use in studying the pattern of metropolitan dominance must be perforce only a choice from a sample of many types of community activities for which useable information is available in some form.

The ecological theory holds that in the plant and animal community those functions related to sustenance must follow a dominance pattern. Due to the presence of dominance, only units with certain characteristic ways of sustaining themselves are admitted to community participation. The limitations may be upon certain types of root systems; requirements for acidity, moisture, or humus in the soil; restrictions to sizes of plants, or to density of plant population; or to any combination of these and many other traits related to surviving, thriving, and reproducing. Although control of color of flower, shape of leaves, and the ratio of the number of leaves to the size of the leaf may also be subject to the same dominance, this control may be less readily apparent. It would appear reasonable to anticipate that if a comparable metropolis-centered control exists among human communities, that dominance would be manifest in human sustenance activities. This is not to deny that dominance of an

equally intense or identical pattern might not operate in other human activities which are less clearly related to human sustenance. Modes of thought and opinion, morals, and even styles of dress and of recreation, may be patterned by metropolitan dominance either directly or through some relation to the sustenance functions. In this study the functions of retail trade, of wholesale trade, of services, and of manufacturing have been selected for study because of their basic sustenance nature, and because of the availability of data for them. The United States Census provides general information for all of these activities for individual city and county units and for the entire nation. A more reliable and more comparable set of data of community activities for the entire nation does not exist. Many other elements of community sustenance, such as financial control, may have been even more useful in studying dominance. They have not been considered because of lack of sufficiently detailed data.

In this study the following data have been selected for the analysis of metropolitan dominance.

Number of Cities, United States, 1940, by size.[54]

Population, United States, 1940[55]

Urban
Rural-nonfarm
Rural-farm

Manufacturing, United States, 1939[56]

Number establishments
Number wage earners
Value added by manufacture

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[54] Sixteenth Census of the United States, Census of Population, Vol's.I and II.

[55] Ibid.

[56] Sixteenth Census of the United States, Manufactures, Vol.III.

Wholesale Trade, United States, 1939[57]

Number establishments
Number wage earners
Value of sales

Retail Trade, United States, 1939[58]

Number establishments
Number wage earners
Value of sales

Services, United States, 1939[59]

Number establishments
Number of wage earners
Receipts

All data were taken from the United States Census for the years indicated.

The work required to pattern the data for a single function for the many counties and urban places in the United States by size of metropolis, size of hinterland city, distance, and sector type, is considerable. Although it would have been very desirable to have studied each one of these types of sustenance functions by major sub-types (e.g., the iron and steel industry, services to business, food stores, wholesale grocery activities, etc.) the tabulations which would be required in order to do this appeared not to be justified until the fact of dominance of any kind, and its general pattern, if any, had been described. For this reason, only the total amount of manufacturing, of wholesale trade, of retail trade, and of service activities have been analyzed. Each one of these functions has been measured in terms of three indexes: Number of

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57 Sixteenth Census of the United States, Census of Business, Wholesale Trade, Volume II.

58 Sixteenth Census of the United States, Census of Business, Retail Trade, Vol. I.

59 Sixteenth Census of the United States, Census of Business, Service Establishments.

establishments, number of employees, and "dollar value" of the activity. Singly, no one of these indexes can tell the "whole story" of that function. Together they characterize it much more adequately. Therefore, a measurement of metropolitan dominance over number of establishments, over number of persons engaged, and over monetary value of activity will be sought for each of these four types of community sustenance activities.

X

How Shall the Metropolitan Pattern of Each Variable be Studied?

In this chapter hypotheses have been advanced that metropolitan dominance varies with

size of metropolis
size of subdominant hinterland city
distance from metropolis
type of sector (direction)

The analysis will consist of simultaneously examining each type of population and each function (manufacturing, retail trade, etc.) by the above four variables. For example, the data for manufacturing will be analyzed by a four-way classification of the four variables. Each function will be studied in two ways:

A. The pattern of aggregation of function — What percent of the total function is concentrated in any specific accessibility area under given conditions? How does this compare with concentration in other accessibility areas? How does it compare with concentration of other functions in the same area?

B. The pattern of intensity of performance of functions — What amount of the function is performed by each 100 inhabitants in each accessibility area? How does it vary with changes in degree of accessibility?

A metropolitan pattern may be said to exist if:

1. At a given distance, sector type, and community size, there is a consistent increase or decrease of relative difference or intensity of a given function with increasing size of metropolis.
2. At a given distance, sector type, and size of metropolitan center, there is a consistent increase or decrease of relative difference or intensity of a given function with increasing size of hinterland city.
3. For a given size of metropolitan community, sector type, and size of local county, there is a consistent increase or decrease in relative difference or intensity with increasing distance.
4. At a given distance, metropolitan community size, and size of local community there is a marked difference among the sector types which is in the direction of making the intermetropolitan and satellite sectors more urban in nature than the local sectors. This is equivalent to saying that apparent randomness in distributions involving size of the metropolitan center, distance, and sector type denote lack of metropolitan dominance, size of community being held constant. Stated positively, a consistent change in the pattern of distribution with distance, size of metropolitan center, and sector type, size of community being held constant, will be taken as evidence of metropolitan dominance.

What interpretation should be placed upon these non-random differences? Shall one say the metropolis causes them, and that metropolitan influence creates the pattern of differences? Or should this be reversed and the metropolis be interpreted as the result of this

pattern of differences, and that therefore metropolitan dominance is really a product of a basic resource pattern and the adaptation of the hinterland population to this pattern?

In this study neither point of view is adopted. The hypothesis is simply a statement of relationship between metropolis and hinterland. A random distribution would indicate the lack of such relationship. A non-random distribution can be interpreted only as a metropolis-hinterland relationship which cannot be explained by a chance arrangement of population and economic activities, nor by reference solely to "conditions of environment". No statistical nor logical justification can be found for claiming that the metropolis alone causes the hinterland to be patterned as it is, nor that the resource pattern of the hinterland is the sole cause for the metropolis to be as large as it is, to be located where it is, or to be surrounded with a given pattern of population and human activities. It can be stated with confidence, however, that if a population, in adjusting to its environment, has evolved a pattern which is not a chance affair, but is organized and systematically patterned, and that the units of this pattern are interrelated by a set of variables which express a hypothesis of metropolitan organization, then the facts of metropolitan dominance can be assumed to exist.

XI

Limitations of the System of Zones and Sectors

There are several characteristics of the system of sectors and zones described above which, though not readily apparent, do set limits to the degree of precision which can be obtained in this study. It is therefore necessary to examine each of these characteristics, to discuss the limits of trustworthiness imposed by each, and to foresee the possible bias which each can introduce.

A. Adopting the Geographic Center of the County as the Location of the County.

This is, of course, by far the most serious weakness of the system. The median area of counties in the United States is about 623 square miles. If all counties were perfectly square in shape, each side of an average county would then be almost exactly 25 miles long. Yet at the inner distance zones there are distance categories in which the interval between the upper and lower limits are much smaller than this. Hence, at the inner zones, parts of an average county may lie in three different distance zones, yet the entire county must be classified as lying in one of these zones. In the vicinity of large cities very different conditions may exist on opposite sides of the same county. The side nearest the metropolis may be suburban in character, while the opposite side may be completely rural. Yet by giving the entire county one distance classification according to the position of its geographic center no allowances can be made for such differences. Those differences which exist with distance will be revealed, but only roughly. The error will consist of underestimating the amount of

difference which exists, for in each case the values are only an average value for a range of distances.

The size of the average county also impairs the ability of the individual sectors to correctly classify areas as lying in an intermetropolitan, a subdominant, or a local direction from the metropolis. Moreover, the central city will be contained in a county roughly 25 miles square. Inasmuch as the county data cannot be divided, no sector units can be postulated for the county in which the central city lies. Hence almost nothing can be said about sector type for the open country area immediately surrounding the metropolis.

The geographic centers of the first ring of counties will lie about the metropolis on the average at a distance of 25 miles from the center. In order to be correctly coded as lying within an intermetropolitan sector, the geographic centers of counties at this distance must fall at some point along a line which is also 25 miles in length. Yet at 25 miles, the arc of a 30° sector is only about 13 miles, or slightly more than 50 percent, of the possible range of county centers. Theoretically, a great sphere of intermetropolitan area may be "lost" by misclassification and a great deal of local area misclassified as intermetropolitan. On this basis the sector cannot be depended upon to classify counties with complete correctness at a distance shorter than 50 miles from the metropolis.

To offset this apparent lack of ability of the sectors to properly classify county units at the near distances is the fact that to be coded as "intermetropolitan", a route must traverse the county between its geographic center and one side. Since the centering of the sector

process is with respect to the route, the probability that the centers of counties so traversed by the route will be classed as intermetropolitan is considerably greater than the statement above would indicate.

Chart 2-5 illustrates the ability of the sectors to include intermetropolitan counties under varying types of conditions. As shown in the "A" section of this chart, when the highway runs down the center of the sector there is very little error in classifying areas, even at short distances. Section "B" shows that the worst possible error is likely to occur when the highway runs along one extreme side of a sector. Since the procedure for "fitting" the sectors calls for centering all major intermetropolitan routes as closely as possible this extreme type of error should be very infrequent. In actual practice it was avoided by observing the rules for centering highways. Section "C" of the chart, which reveals the average amount of error, shows that the sectors will discriminate fairly well at distances of 25 miles, and can be depended upon to reveal marked differences between sectors at distances greater than this. The defect is one of lack of precision. Those differences which are revealed between sectors are reliable for under no circumstances can the procedure of classifying be completely reversed for a large number of cases. Some differences which exist may not be revealed because of an occasional inclusion of a non-intermetropolitan county, and the reverse. Likewise, the system will tend to underestimate those differences which it does reveal by occasionally including a county of lower order of accessibility in a category of a higher order of accessibility, and the reverse. This entire limitation

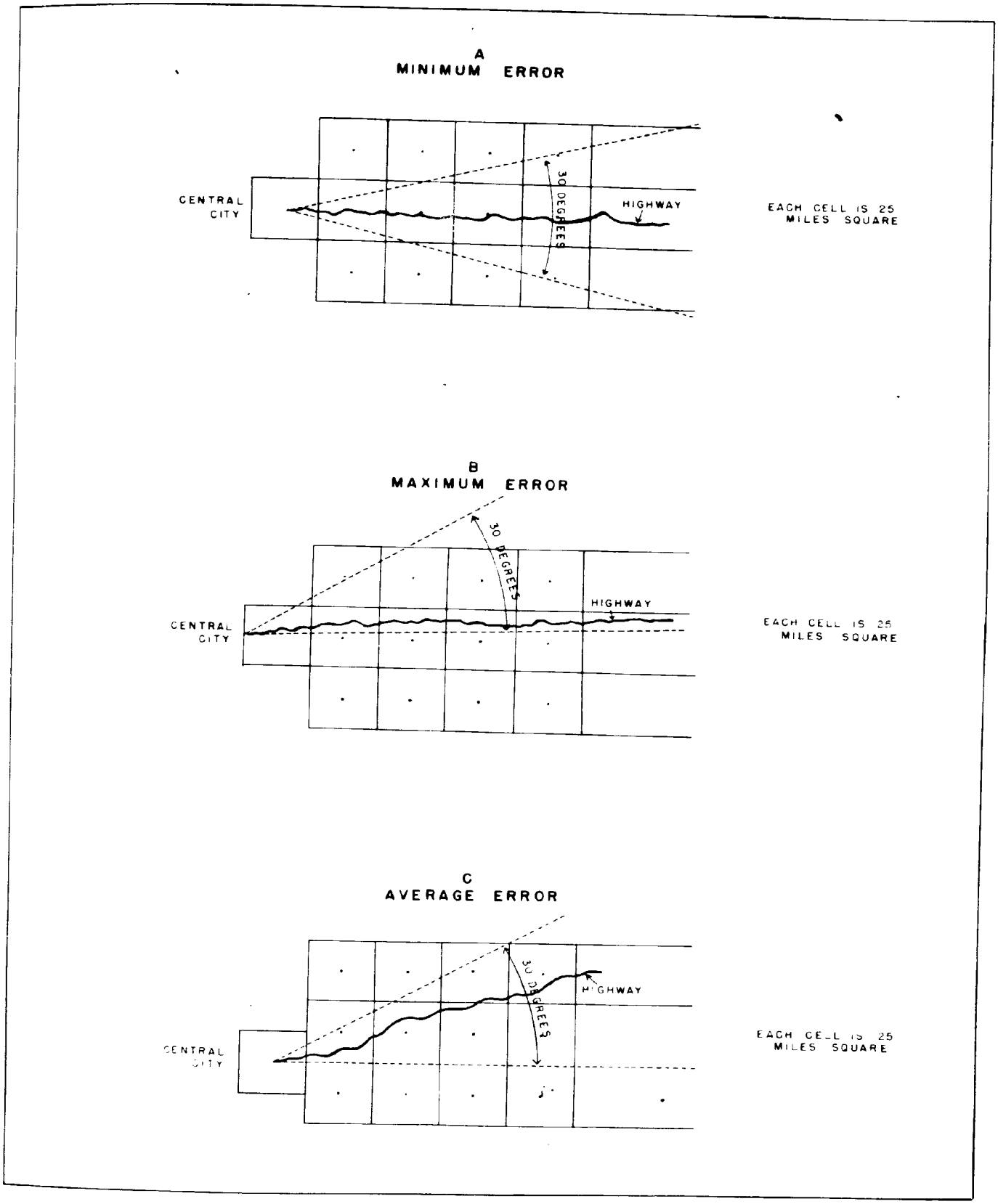


CHART 2-5 SCHEMATIC REPRESENTATION OF THE ABILITY OF SECTORS TO PROPERLY CLASSIFY INTERMETROPOLITAN AREAS USING COUNTY UNITS OF AREA

is upon the rural, or county, units only. Cities can be properly classified by sector type in all of the distance zones.

B. Measuring Intermetropolitan Dominance Only with Respect to Adjacent Metropolitan Areas.

This system of distance zones and sectors permits the study of the change in population distribution from one central city to the next. The size of the respective centers, the distance from one of them, and their characteristics, are used as variables. There is an implicit assumption that each metropolis provides all of the dominance that may exist in its surrounding hinterland. This of course is not strictly true. The size of Detroit, Pittsburgh, Chicago and New York City cannot be understood merely in terms of their dominating the territory immediately surrounding them and their carrying on trade with adjacent centers. Intermetropolitan dominance can apparently extend completely across several intervening metropolitan areas. Common sense observations would indicate this influence to be primarily a matter of the most highly specialized products and activities - fashion clothes, rubber, steel, automobiles, industrial loans, or chemicals, for example. That is to say, that beyond the metropolitan economy there is the intermetropolitan or national economy.in which each of the various metropolitan centers diffuses its dominance over the entire nation and is itself but a unit jointed with other metropolises in a division of labor. In fact, the metropolitan economy can be postulated at all only by admitting one of its chief functions to be that of mediating between, and organizing the efforts of smaller areas into, the larger national economy. This

study should leave a considerable "residue" of unexplained events which are of this type. Consequently, it cannot explain "why" population density or intensity of a given activity is greater in one metropolitan community than in another, nor can it claim that the actual population density at one point is due entirely to the combined activities of the population of the hinterland and of the metropolis. It can only study the pattern of activity with respect to the center, given the existing size of the metropolitan community and the amount and type of activities carried on within it. Thus a limit is set to our interpretations. If in the study the various indexes quickly level off with distance, revealing a stable, almost unchanging relationship with further distance, metropolitan dominance cannot be said to be present on this plateau for apparently the activity would be conducted in the absence of any one metropolitan center, or only in the presence of all existing metropolitan centers. This stable element cannot be studied in the distance-sector type framework. Thus, the pattern of such a function as cattle ranching in Texas may be dominated by Dallas and Forth Worth, but the extent to which cattle ranching is carried on in Texas is not determined by these centers so much as by the national economy.

C. Vagaries of the Transportation System.

Our modern transportation system is relatively new, and is still in the process of expansion and change. These channels of mobility therefore are not like rivers, necessarily flowing in the path of least resistance to time and space.

1. Not every central city has a direct route to neighboring central cities (e.g., Peoria to Chicago, Wichita to Kansas City, Rochester to Albany). In these instances a considerable volume of goods may move

via an extended branch to another major route, following two sides of a triangle rather than the one direct side. Time and change may alter this, but if transportation routes are effective differentiators of accessibility, the sectors must represent what actually exists. Therefore, some of the intermetropolitan highways do not go in a direct line between adjoining adjacent metropolitan centers, or there may not be a direct intermetropolitan highway at all, a branch route from another metropolis being used to reach the center.

2. The skirting of lakes and other barriers may make it necessary for a metropolitan center to have <u>two</u> intermetropolitan sectors to reach a neighbor. In this case, the route must curve from one sector into another one, the remainder of the original sector passing over water or some other barrier. The second sector is really a continuation of the first sector at the point where the first sector "loses" the route due to the intervening barrier. Here, both sectors must be coded as intermetropolitan, even if considerable wasteland is added to the intermetropolitan classification.

3. A third vagary is the presence of two equally long and equally traveled routes between two centers, instead of a single route. In such cases, both have been termed intermetropolitan. Where possible to do so, both routes have been included in one sector. At times their spread prevents this. (Cincinnati to Columbus, Los Angeles to San Francisco).

The net effect of these transportation peculiarities has been to require the size of the sectors to be larger than would have been necessary otherwise. In addition, it introduces an element of inexactness

into the classification of sectors. A sector classified as facing another metropolitan center may in reality be the channel for two such centers. The existence of alternate routes, and consequently of two intermetropolitan sectors, may reduce the influence exhibited by the metropolitan center upon each unit along both routes. In compensating for the curvature of a route to skirt an obstruction, the necessity of using two sectors instead of one invariably includes extraneous area which would have been excluded under other conditions. This study accepts these conditions as a part of the hinterland, and attempts to discover whether, on the average, certain patterns manifest themselves in spite of the accidents of topography and history.

D. The Locational Pattern of Metropolitan Centers Themselves.

Another circumstance which this study does not control is the tendency for certain of the metropolitan centers themselves to be strung out along main transportation routes. For example, a line of heavy mobility connects New York-Albany-Schenectady-Rochester-Buffalo-Erie-Cleveland-Toledo-Fort Wayne-Chicago. A similar one connects Boston-Hartford-New York-Philadelphia-Baltimore-Washington-Richmond-Jacksonville. The influence of non-adjacent metropolitan areas can easily become cumulative under these circumstances. Under such conditions certain intermetropolitan sectors of small metropolises in these chains may exhibit an unusually intense concentration of population or sustenance activities. As in most previous limitations, the effect is to destroy differences which would otherwise be marked. In this case, the differences between the dominance of various sizes of metropolises will be understated.

E. Lack of Sufficient Cases for Making Full Use of the Classifications Established.

Where communities are simultaneously cross-classified by the four classifications of size of metropolis, sector type, distance, and size of local community, the number of cases which fall into some cells of the table is too small to permit statistical inference. In all such cases the procedure has been to combine the classifications into broader groupings. Thus, in the tabulations which follow, the reader will find that wherever each of these variables is treated singly, a detailed classification of distance zones or sizes of communities has been used, but that in the multiple cross-classifications fewer and broader groupings have been made in order to obtain sufficient cases for statistical treatment.

XII

Mechanics of Tabulation for Statistical Analysis

Two alternatives presented themselves for the tabulation of the data within the framework which has been established. The data for each individual metropolitan community could have been classified and tabulated separately, or the data for all metropolitan communities could have been tabulated together, by dividing the metropolitan communities into the four size classes and allowing the data for all metropolitan communities of one size to fall into one set of categories. While the former experimental design is the more efficient, it entails many times the labor of the second. Its chief virtue lies in the ability to study the deviations of individual metropolitan communities

from the general pattern for all metropolitan communities of a class. Because of the exploratory nature of the study, the entire theoretical framework upon which the entire procedure rests was relatively untried, and could give no guarantee that the mass of detailed computations for individual metropolitan communities would be justified. It appeared wiser to determine first whether there was a general pattern, using the simplest and most direct means, before studying variation away from the unknown general pattern.

The data which are to be analyzed in the following chapters are based on the total population and sustenance activities within each major grouping of metropolitan communities. The extent to which individual metropolitan communities conform to the general patterns is as yet unknown.[60] The generality of the patterns must be inferred from the fact that the data for any one metropolitan community are only a small fraction of the data for the whole. A single metropolitan community could not, statistically, impose its pattern upon the entire group of metropolitan communities.

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[60] All tabulations were performed by the use of punched cards. In actual fact a separate tabulation was made for each of the 67 metropolitan communities as well as obtaining the grouped data analyzed in this study. These data are available for an analysis by anyone interested in the pattern of dominance in a specific metropolitan community.

XIII

Summary

1. Metropolitan dominance may be inferred from a demonstration that non-random differences exist between the distribution over the land of population and sustenance activities on the one hand, and conditions which may be attributed only to the metropolis on the other hand.

2. Dominance is not regarded as a fixed attribute, but as status which can vary in degree from unit to unit. All local communities in the metropolitan community are considered to possess some degree of dominance over some portion of the hinterland. They may be classified into four broad classes according to the range and variety of the controls which they exercise as dominants (metropolitan centers), as subdominants (hinterland cities), as influents (rural-nonfarm populations), and as subinfluents (rural-farm populations).

3. Each of these major dominance types may be subdivided and considered to represent a continuum. Metropolitan centers, and hence all metropolitan communities, are classified into four major classes on the basis of the size of the metropolis. Hinterland cities are classified on the basis of their size in 1940, and rural non-farm and rural-farm populations are classified according to the size in 1940 of the largest city contained in the county in which they reside.

4. The degree of dominance which the metropolis exercises over the hinterland is limited by the relative opportunity to enter into some functional division of labor with the hinterland communities. This

opportunity varies with the degree of accessibility of the hinterland to the metropolis.

5. Accessibility, and consequently degree of dominance, may be expressed as a function of:

a. Distance over standard highway routes, measured in miles and grouped by class intervals, or distance zones.

b. Direction from metropolis, denoted by the type of sector in which the community is located. Three types of sectors are recognized: those containing intermetropolitan highways, those not containing such a route but containing a hinterland city of 25,000 or more inhabitants, and those containing neither a route nor a major city.

By cross-classifying all hinterland units by these two variables, the hinterland may be subdivided into areas of hypothetically like degree of dominance.

6. Metropolitan dominance may be expected to vary with two additional variables: (See "3" above, in this summary)

c. Size of metropolitan community.

d. Size of hinterland city (or size of largest city contained in county of residence for the rural populations).

7. Functions involving sustenance, or earning a livelihood, may be expected to most clearly reveal the existence of a pattern of metropolitan dominance. The raw data of this study consist of data for population, manufacturing, wholesale trade, retail trade, and services, and are taken from the Sixteenth Census of the United States for the years 1939-40.

8. In order to test the above postulates, 67 metropolitan centers were established. The entire area of the United States was divided

among these centers as their hinterlands. Classifications of distance, direction, size of metropolitan community, and size of local community were given to each city and county hinterland unit.

9. The full pattern of dominance may be studied by seeking consistent, non-random differences in four-fold cross-classifications of variables a, b, c, and d, above ("4" and "6" above, this summary).

10. The procedure which was outlined has certain limitations. In most cases the limitations consist in underestimating the amount of difference which exists, or in being forced to employ broad categories in instances where narrower ones would be desireable.

11. The design used in tabulating has been to combine the data for all areas or communities of a like dominance and accessibility type, to compute averages and indexes for all such categories, and to make inter-comparisons between them which will reveal a pattern of non-random average differences.

PART II

THE POPULATION STRUCTURE OF METROPOLITAN COMMUNITIES

CHAPTER THREE

THE STRUCTURE OF THE METROPOLITAN COMMUNITY: A SUMMARY OF FINDINGS

I

Introduction

Because each of the analytical chapters of this study deals with only one aspect of population distribution or the distribution of sustenance activities, it is necessary that at some point the findings be assembled and related to each other and to the hypothesis of metropolitan dominance. That synthesis is made in this chapter, rather than at the end of the analysis, for two reasons. First, the analysis is a rather lengthy one. A preliminary summary and synthesis of the materials to be examined in detail later will enable the reader more readily to place each of the following chapters in its proper relation to those which precede and those which follow it. A second reason for placing the summary here has been to make Part I a complete and abbreviated unit of the entire study. The reader who desires only to review the study in its broadest outlines will find all of the information necessary to attain his objective in Part I.

Since each of the following chapters concludes with a summary of the detailed findings, no attempt will be made to recatalogue them here. The objective of this chapter is to weave certain of the findings into a test of the hypothesis of metropolitan dominance. Because of the desire to present as concise a picture as possible, many descriptive findings and many detailed observations of relationships have not been drawn upon, even where relevant. Reference is freely made to the

findings of other chapters without presenting the data upon which they are based. Yet in order to establish the major conclusions upon concrete and illustrated facts, a few tables and charts have been prepared in condensed form for use in this summary. This has been accomplished by combining the data into broad classifications. The reader who does not intend to read beyond this summary is warned that the full picture is not as neat and orderly as these condensed tabulations might lead him to believe. The range of diversity in the area of 2,977,000 square miles comprising the United States, particularly after that area has been occupied by a race of city-builders for more than three centuries, is so great that any general tendency, upon closer examination, reveals sufficient complexity to make it difficult to reach unqualified conclusions using only a few variables.

II

Distance from the Nearest Metropolis and Size Class of Metropolitan Community

A. Population and Sustenance Activities per Unit of Land Area. (Table 3-1 and Chart 3-1).

If the differences in the amounts of land area lying in successive zones outward from the metropolis are eliminated by expressing data for population and sustenance activities on a "per unit of land area" basis, a most consistent pattern of distribution with distance emerges. On the average, as the distance from the metropolis increases, the number of persons per square mile of land area decreases. With increasing distance each square mile of land area supports steadily decreasing average amounts of retail trade, services, wholesale trade, and manufacturing activities. This finding is noteworthy for the following reasons: First it is a

statement of a set of conditions which applies to the entire land area of the United States. The data shown in Chart 3-1 are statistical averages of the data for all urban places and for the rural portions of all counties in the United States classified by the distance which they lie from one of the central cities. The pattern is not an "ideal type" which has been arbitrarily constructed by conceptually eliminating disturbing factors of topography, resources, and historical accident: Nor has it been obtained by generalizing from a single metropolitan area. Undoubtedly there are many areas which deviate from this average pattern. Nevertheless, marked changes in the intensity of land settlement and in degree of specialization in sustenance activities are the usual, rather than the unusual, correlates of increased or decreased distance from the metropolis.

Second, the distance pattern encompasses the entire area which has been called the "hinterland". The effect of distance from the metropolis does not cease to exist at the point where the suburbs of the metropolis fade into the hinterland, but continues throughout all distances. Distance from the metropolis appears to be a factor in determining the level of land occupancy and the intensity with which sustenance activities are performed in zones which are a full day's journey from the metropolis via automobile or rail. Such areas cannot possibly be related to each other on the basis of intimate daily contact between their populations.

Third, the distance pattern for the suburban and for the most distant zones are shown here to be only different aspects of the same

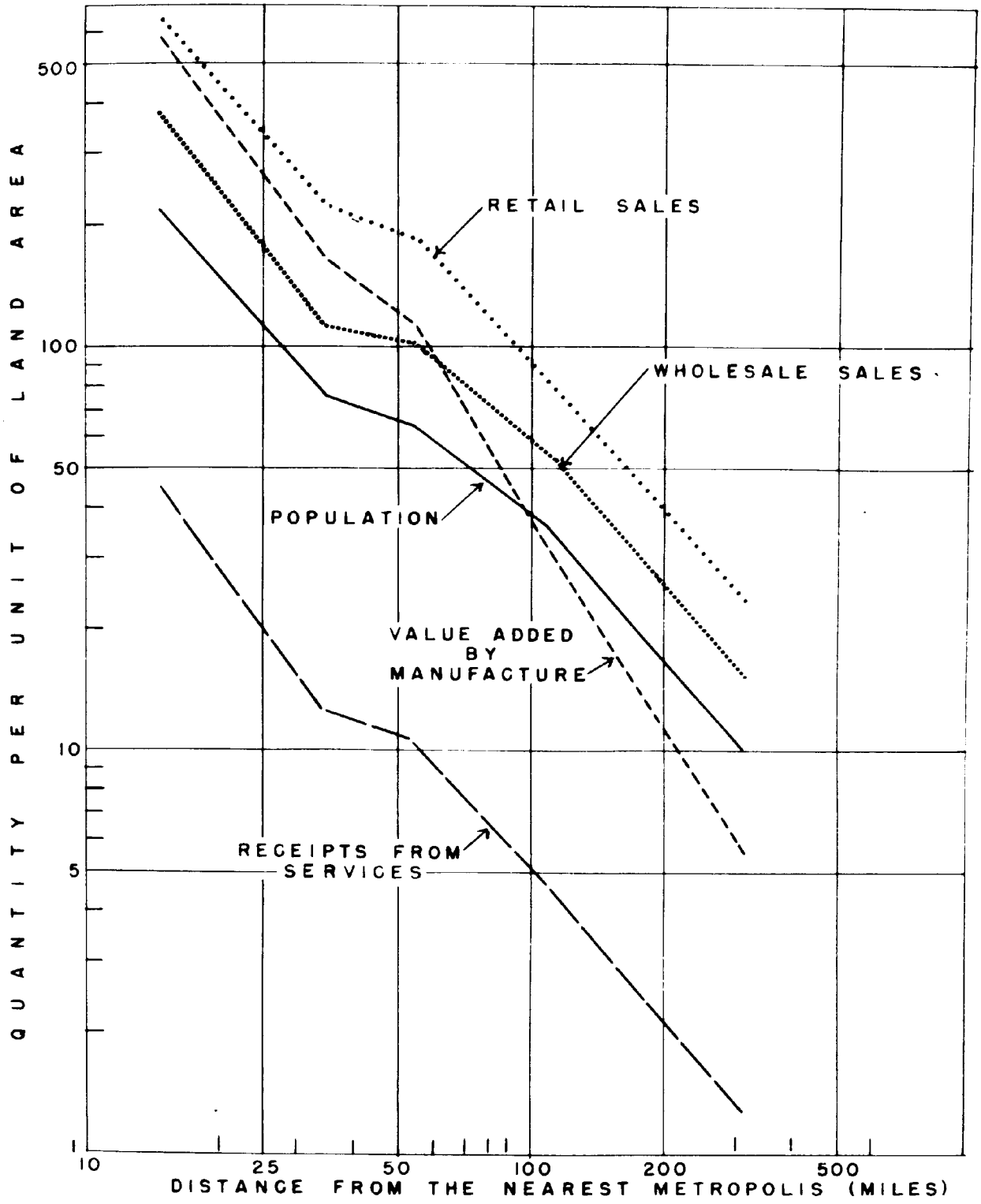


CHART 3-1 POPULATION PER SQUARE MILE AND DOLLAR VALUE OF SELECTED SUSTENANCE ACTIVITIES PER 1/100 SQUARE MILE OF HINTERLAND AREA, BY DISTANCE OUTWARD FROM THE NEAREST METROPOLIS. 67 METROPOLITAN COMMUNITIES, UNITED STATES, 1939-40.

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

phenomenon. There is a fairly constant rate of change between relative decreases in land occupancy and relative increases in distance.[1] Thus, the suburb, the industrial satellite, and the metropolitan district represent only one aspect of an apparent tendency for population and the sustenance activities to resist decreasing accessibility to the metropolitan center. This reaction to distance is not directly proportional to the change in the number of miles, but is related to proportional changes in distance.

Fourth, although the four sustenance activities have approximately the same general distance pattern as population, the rates of their change with distance are not identical to those for population, nor are they like each other. Because this is true, it is apparent that the population of some zones must be more specialized in some types of activity than the populations of other zones. This immediately raises the question,

> Is the distance pattern for population accompanied by a pattern of territorial and local community specialization - division of labor- interdependency - exchange?

This question may be answered by expressing the data for the sustenance activities in terms of the "amount per unit of population" rather than in terms of "amount per unit of land area". A community with a higher than average per capita wholesale sales, for example, is more specialized in

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[1] Note that Chart 3-1 is plotted on logarithmic scales.

wholesale trade than a community with a lower than average per capita wholesale sales. Since specialization in any activity is indicative of a division of labor and interdependence with other portions of the population, the indexes of specialization can be used to study the pattern of interdependency among the parts of the metropolitan community. Throughout this study the distribution of population has been studied in terms of the population per unit of land area, while the distributions of the sustenance activities have been analyzed in terms of amount per unit of population.[2]

B. Size Class of Metropolitan Community and Intensity of Land Settlement. (Table 3-1 and Chart 3-2).

The size of the central city is also related to the intensity with which the entire hinterland is occupied. Metropolitan communities with large central cities (here considered to be central cities of 500,000 or more inhabitants) have a considerably higher population per square mile than metropolitan communities with small central cities (central cities of less than 500,000 inhabitants). Moreover, the rate of change in land occupancy with relative change in distance is much greater for the hinterlands of large than of small central cities. The suburban zone of the large metropolitan communities fades into the intermediate and distant zones with only a slight deceleration in rate of change, whereas in the small metropolitan communities a tendency of populations to attain

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In most cases only one of the three indexes of sustenance activities, the "per capita dollar value" is used in this summary. For similar information concerning the "number of establishments per 1,000 inhabitants" and "number of wage earners per 1,000 inhabitants" see Chapters 10-14. I am indebted to the United States Bureau of the Census for preparing special tabulations in which the manufacturing and wholesale activity of areas for which information had been withheld to avoid disclosure of the operations of individual establishments were grouped by the variables of this study and totals for each group provided.

Table 3-1

Indexes of land occupancy and territorial specialization - distance and city size. Urban and rural population per square mile of land area, and per capita dollar value of retail service, wholesale and manufacturing activities of central cities and all hinterland areas classified by distance from the nearest metropolis. United States, 1939-40.

Distance from nearest metropolis (miles)	Population per square mile[a]				Sustenance activities (per capita dollar value)			
	Total	Urban	Rural-nonfarm	Rural-farm	Retail sales	Receipts from services	Wholesale sales	Value added by manufacture
All classes of metropolitan communities								
Central cities	9,046.7	9,046.7	-	-	471	55.4	1172	284
0-24[b]	214.6	138.8	54.5	21.3	303	21.2	175	273
25-44	74.7	35.9	21.2	17.6	301	17.0	146	224
45-64	63.3	27.0	17.5	18.8	293	16.7	161	178
65-164	36.0	11.6	9.8	14.6	236	13.4	157	95
165-over	10.0	2.6	3.1	4.3	240	12.7	156	56
All hinterland[c]	32.9	13.7	9.1	10.2	267	15.8	160	154
All metropolitan communities[d]	44.2	25.0	9.1	10.2	319	26.0	420	187
Classes A and B: Metropolitan communities with large central cities (500,000 or more inhabitants)								
Central cities	13,012.0	13,012.0	-	-	457	60.2	1295	302
0-24	711.8	561.6	128.4	21.7	346	26.8	192	317
25-44	216.1	130.3	63.2	22.7	351	20.6	166	313
45-64	122.8	61.4	39.8	21.6	347	19.1	175	249
65-164	57.1	24.1	18.5	14.5	306	16.5	162	157
165-over	13.4	4.0	4.9	4.6	290	15.0	169	111
All hinterland[c]	96.3	57.8	25.6	12.9	335	21.4	176	259
All metropolitan communities[d]	164.4	126.1	25.5	12.8	386	37.6	643	277
Classes C and D: Metropolitan communities with small central cities (100,000 - 499,999 inhabitants)								
Central cities	5,672.3	5,672.3	-	-	499	46.0	933	250
0-24	147.0	47.4	38.5	21.2	243	13.4	150	209
25-44	50.2	19.8	13.9	16.7	264	14.3	132	160
45-64	48.0	18.1	11.7	18.1	256	15.0	152	129
65-164	33.1	9.9	8.6	14.6	219	12.7	156	80
165-over	8.7	2.5	3.0	4.3	234	12.4	154	49
All hinterland[c]	25.1	8.2	7.1	9.8	235	13.2	152	105
All metropolitan communities[d]	29.4	12.6	7.1	9.8	273	18.0	265	126

a) All populations divided by total land area of each zone.

b) Includes counties containing central cities.

c) Excludes central cities.

d) Includes central cities.

Source: Compiled from Sixteenth Census of the United States.

an equilibrium with respect to distance at the intermediate zone between 45 and 64 miles is more pronounced.[3] This more rapid decline of settlement with distance for the larger units results from a much higher level of land occupancy at the inner zones and only a moderately higher level of land occupancy in the outer zones.

C. Types of Hinterland Population and Intensity of Land Settlement. (Table 3-1 and Chart 3-2).

The urban, the rural-nonfarm and the rural-farm population each occupies the hinterland with its own characteristic distance pattern. The differences between them arise primarily from differences in the level of their land occupancy, their average rate of change with relative change in distance, and their characteristic alteration in this rate of change with change in distance. Yet all three types tend to cluster toward the metropolis.

This clustering tendency is most marked for hinterland urban populations. With increasing distance from the central city the number of urban residents per unit of hinterland area falls off very rapidly. With each increase in distance the rural-nonfarm population also decreases, but at a much less rapid pace than the urban population. Although there is a very high concentration of rural-farm population within the suburban zone, (out to 25 miles), this concentration is almost equally as high in the intermediate zone of daily railway and trucking service (35 to 64 miles). In all of the above comparisons of the distance patterns for the three types of population, the

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3 "Large" and "small" metropolitan communities are used throughout this chapter to refer to the size of the central city, as defined above.

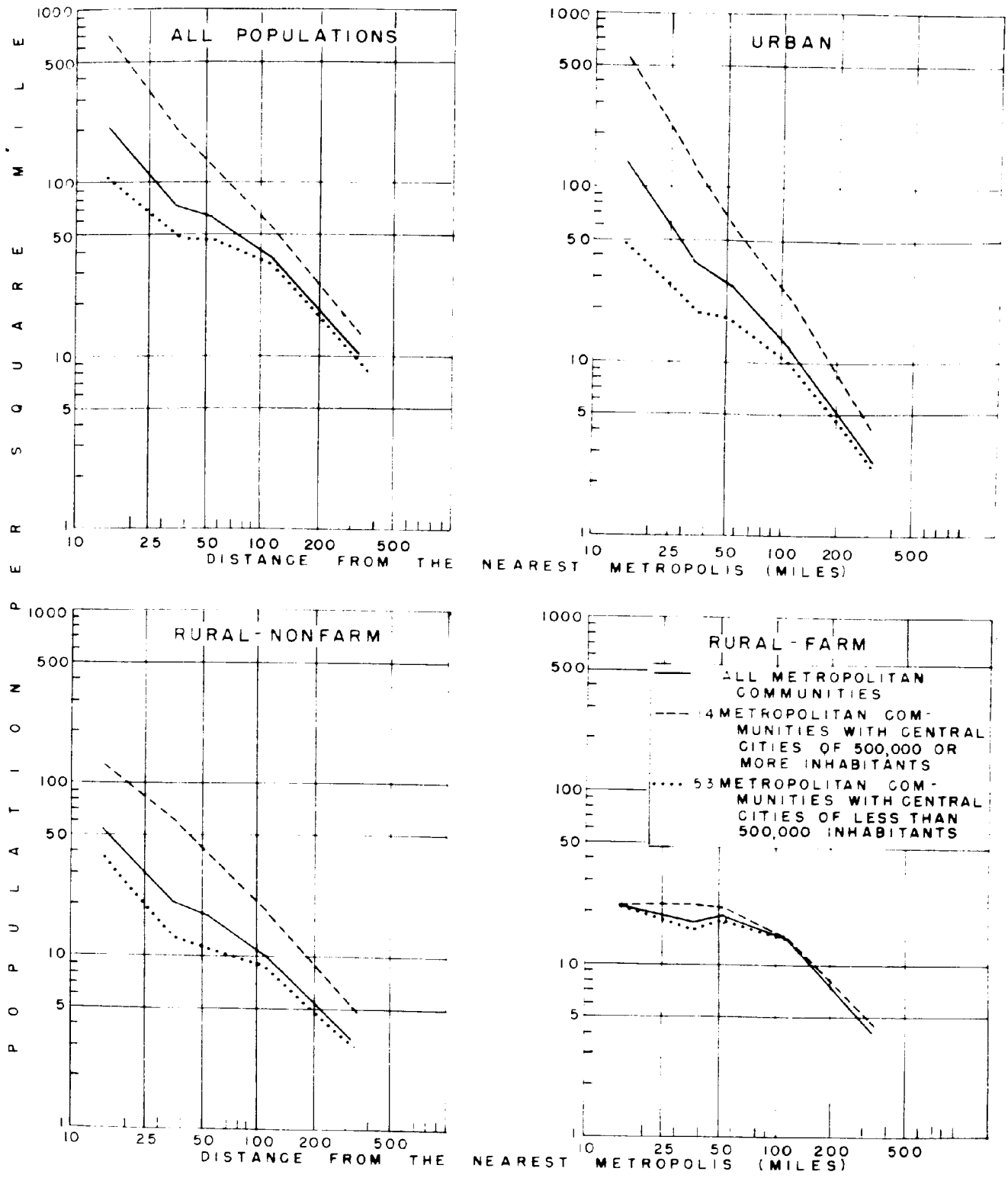


CHART 3-2 URBAN AND RURAL POPULATION PER SQUARE MILE OF HINTERLAND BY DISTANCE FROM THE NEAREST METROPOLIS AND SIZE CLASS OF THE METROPOLIS. UNITED STATES, 1940

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

differential effect of the large and of the small metropolis is very much in evidence. Thus, there are more urban, more rural-nonfarm, and more rural-farm residents per square mile at all distances in the hinterlands of large metropolitan communities than of small metropolitan communities, even at distances of 165 miles or more from the central city.

D. Urban-Rural Composition of the Hinterland Populations.(Chart 3-3)

The differential change in the intensities with which the urban, the rural-nonfarm, and the rural-farm populations inhabit the hinterland as distance from the metropolis increases produces a change in the urban-rural composition of the hinterland from the center to the periphery. With increasing distance, the proportion of the total population which is urban decreases, and the proportion of the population which is rural-farm increases. The proportion of the population which is rural-nonfarm does not follow the pattern in the metropolitan communities with large central cities as it does in those with small central cities. In the former, the proportion of the population which is rural-nonfarm steadily increases with distance. In the latter, the proportion of the population which is rural-nonfarm tends to decrease from the central city out to about 65 miles from the metropolis, and then to increase with further increases in distance. At all distances the hinterlands of large metropolitan communities are more urban in composition than the hinterlands of small metropolitan communities. The activities of small metropolitan communities include a much larger agricultural element than those of large metropolitan communities.

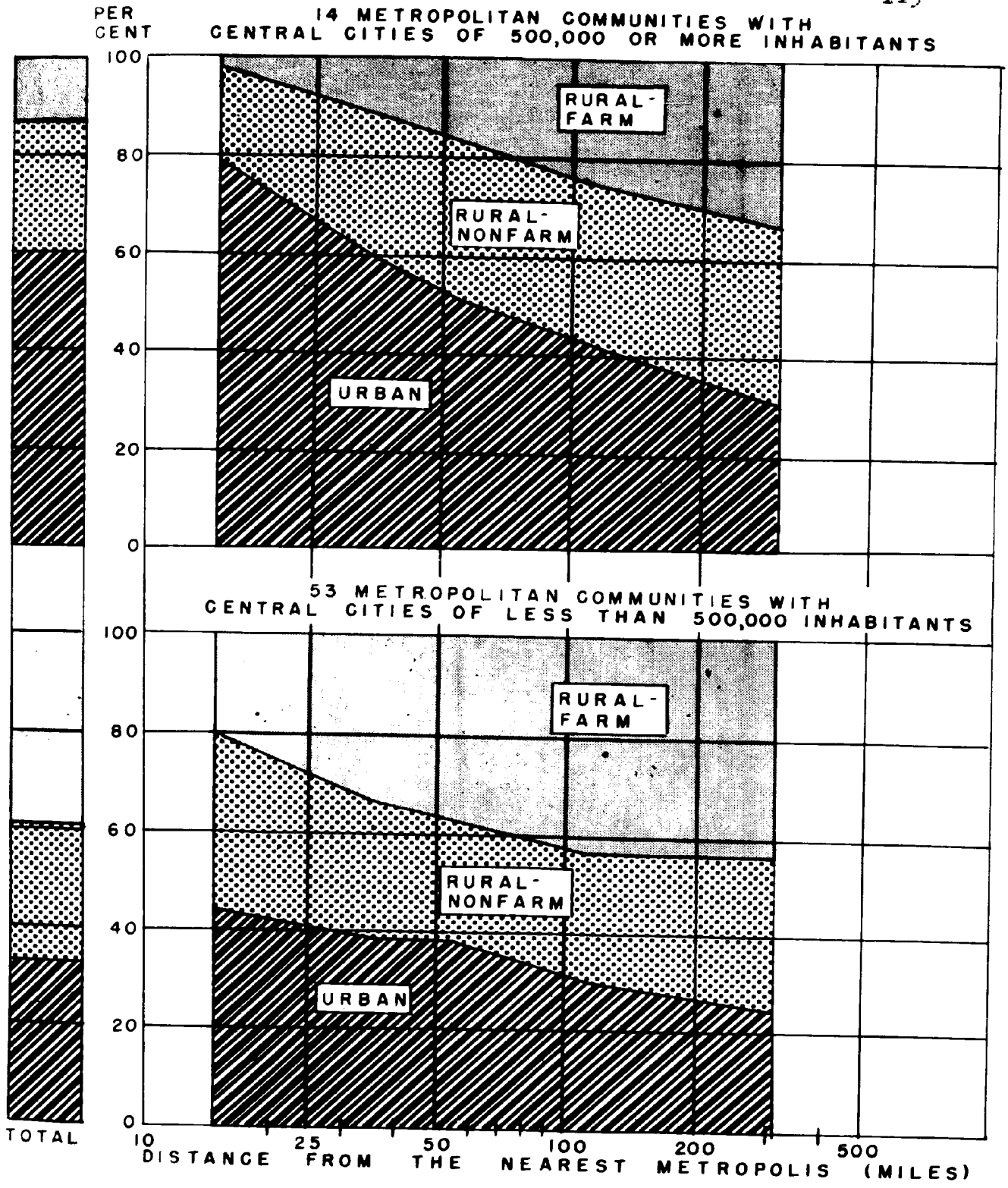


CHART 3-3 URBAN-RURAL COMPOSITION OF THE HINTERLAND POPULATION BY DISTANCE FROM THE NEAREST METROPOLIS AND SIZE CLASS OF THE METROPOLIS. UNITED STATES, 1940

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

E. Relative Population Concentration (Chart 3-4).

The tendency for all hinterland population to settle the land more sparsely with increasing distance produces broad patterns of positive and negative population concentration about the metropolis. Populations are usually thought of as being concentrated only in central cities and their immediate environs. Relative to the average intensity with which the entire land area of the United States is occupied by each population, all zones within 65 miles of the metropolis are areas of positive concentration for all populations. In metropolitan communities whose central cities are 500,000 or more inhabitants, this zone of positive concentration extends as far as 165 miles into the hinterland. In metropolitan communities with central cities of less than 500,000 inhabitants, only the rural-farm population is concentrated to this distance. Beyond 165 miles from central cities of all sizes, there are on the average fewer urban and rural people per square mile than in the nation as a whole. Thus, the ability of the metropolis to concentrate people about itself extends over an area which is much larger than the metropolitan district or the suburbs of the metropolis. This positive concentration over such a broad area has its obverse side in a huge ring of population deficit lying 165 miles or more from the metropolis.

Relative to their own levels of land occupancy, the rural-nonfarm and the urban population are much more concentrated toward the center than the rural-farm population. The urban population in particular tends to be very concentrated in the zones within 45 miles of the metropolis. Although the rural-nonfarm population also is very intensively concen-

trated in these same shorter distance zones, it also tends to follow the rural-farm population out into the outer zones, presumably as a local service population as the urban population becomes increasingly sparse. The concentration of rural-nonfarm population near the center reflects the great suburban aggregation.

F. Specialization of Function in the Hinterland. (Table 3-1 and Chart 3-5).

The above patterns of population distribution with distance have their counterpart in distinctive patterns of retail, service, wholesale, and manufacture specialization with distances. The pattern for no two of these functions is alike.

1. Central cities are more specialized in retail trade, service, and wholesale trade than any zone of their hinterlands. Large central cities are less specialized in manufacturing than the inner zones of their hinterland although small central cities are slightly more specialized in manufacturing than the inner zones of their hinterland.

2. Within 35 miles of the central city the population tends to have a low retail specialization index. This reflects a dependence of suburban and other areas upon the central city for the purchase of many items, presumably the more specialized ones. Beyond the 35 mile zone there is no indication that the metropolis functions to any great extent as a retail center for the hinterland population. The gradual decrease in per capita retail sales at distances greater than 65 miles probably reflects the increasing rural composition of the population and hence smaller per capita needs for retail activities. In other words, the function of retailing is so intimately related to the current needs of

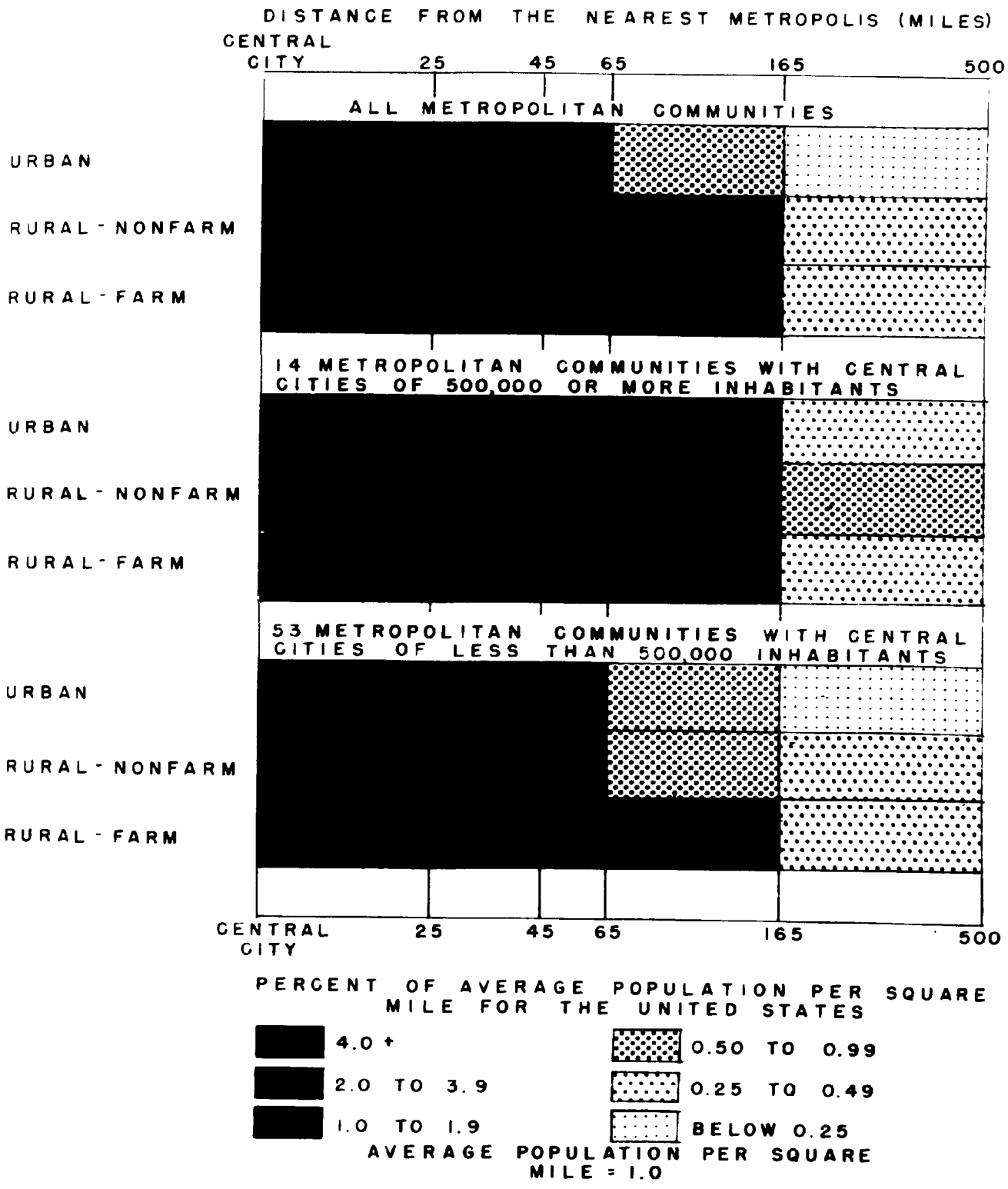


CHART 3-4 RELATIVE POPULATION CONCENTRATION —— RATIOS OF HINTERLAND URBAN AND RURAL POPULATIONS PER SQUARE MILE TO THEIR AVERAGE POPULATION PER SQUARE MILE IN THE NATION, BY DISTANCE FROM THE NEAREST METROPOLIS AND SIZE CLASS OF THE METROPOLIS. UNITED STATES, 1940

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

the population that it tends to be distributed much as the population is distributed. Metropolitan communities with large central cities tend to have a higher per capita retail index at all distances than those with smaller central cities. This is also interpreted as being due primarily to the more urban composition of the hinterlands of the larger central cities.

3. The extent to which hinterland areas specialize in service activities is influenced considerably by their metropolitan position. In metropolitan communities with large central cities this specialization declines steadily with increasing distance. In metropolitan communities with small central cities, the hinterland areas within 45 miles of the metropolis appear to be dependent upon the metropolis for many services, as they are for retail trade. At distances greater than this the hinterland appears to provide a somewhat larger share of the services which it requires. The full extent of dependency upon the metropolis can be only roughly estimated, for the rural populations can forego, or produce in their own households, many services. (See Section H, "Dependence upon the Metropolis").

4. Wholesale trade is a function which is extremely concentrated in the metropolis, and one in which the metropolis is highly specialized. All distance zones appear to be unable to provide all of the wholesale trade activities which their populations require. Wholesaling activities appear to be somewhat dispersed outward from the metropolis into the 0-24 mile zone. The 25-44 mile zone appears to

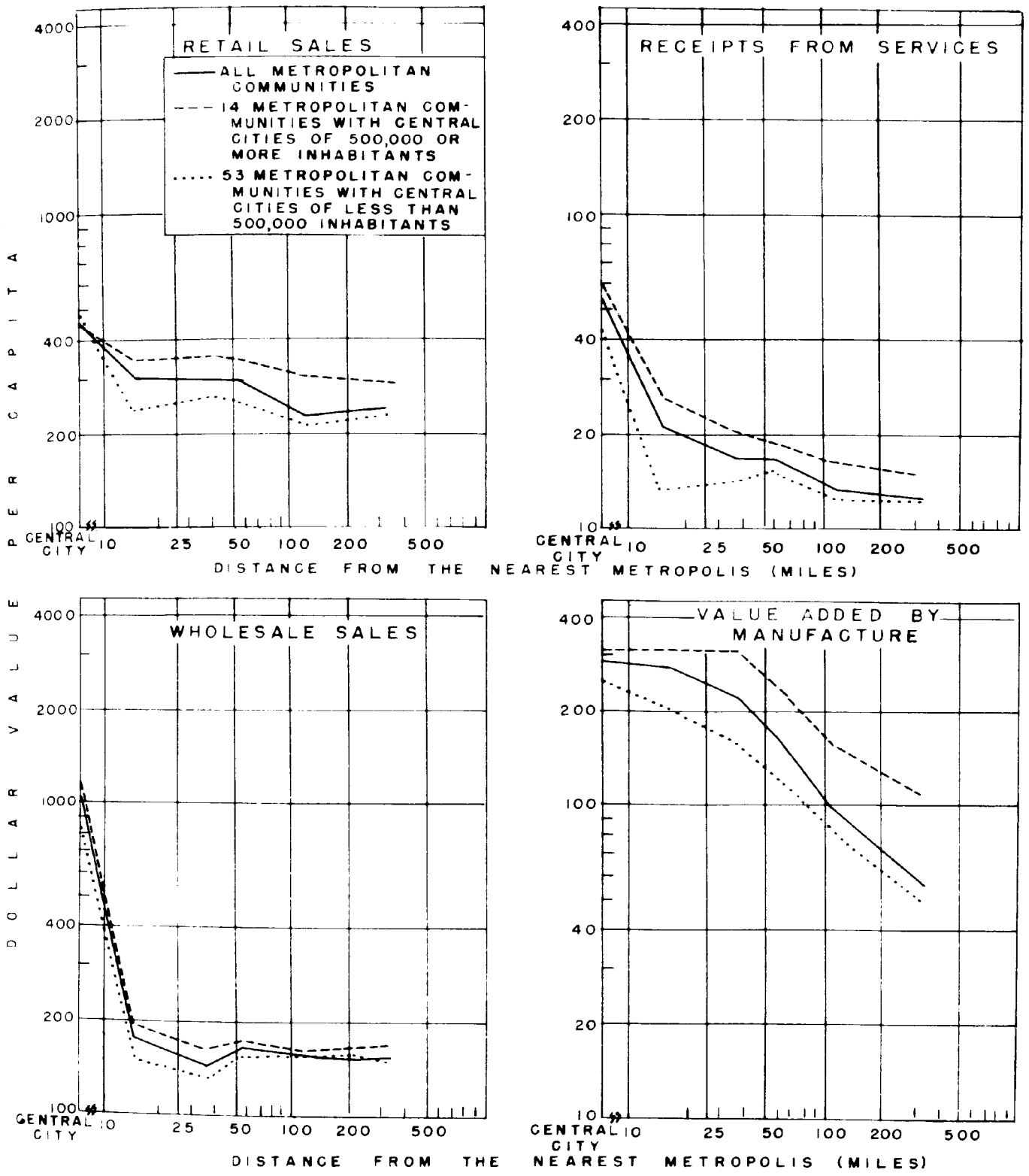


CHART 3-5 INDEXES OF SPECIALIZATION IN RETAIL TRADE, SERVICES, WHOLESALE TRADE AND MANUFACTURING BY DISTANCE FROM THE NEAREST METROPOLIS AND SIZE CLASS OF THE METROPOLIS. UNITED STATES, 1939-40

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

be in considerable deficit, compared to the remainder of the hinterland. In the 45-64 mile zone there appears to be a small revival in wholesale specialization; with further increase in distance, specialization in this function tends to remain on a plateau, far below the national,or average, level.

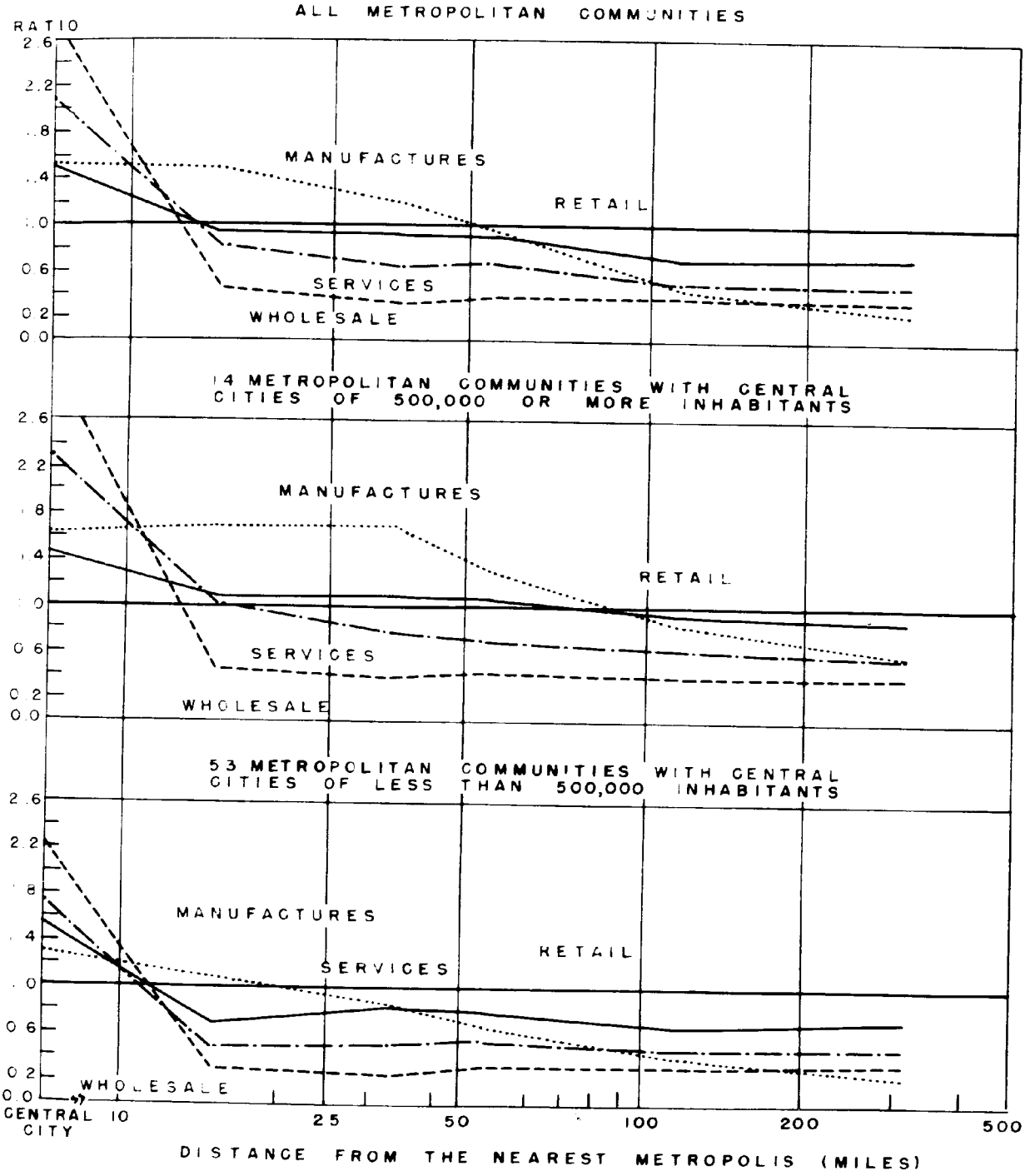
5. Although specialization in manufacturing is not a distinguishing characteristic of central cities, certainly manufacturing is a function which has flourished only in the metropolis and the inner zones. Within 45 miles of the central city the population tends to be highly specialized in manufacturing. Beyond this distance each zone outward is considerably less specialized than the zone inside it.

G. Dominance and Relative Functional Specialization of the Distance Zones. (Chart 3-6).

After having observed the general pattern of specialization of each of the major functions individually, it is of considerable importance that all four of these patterns be compared with each other directly. A comparison may be accomplished by expressing each of the per capita indexes for each function as a ratio of its average per capita value for the nation as a whole. A ratio of 1.0 then means "as specialized as the nation as a whole". Values above and below 1.0 indicate greater or lesser specialization than the national average. Thus, the functions within each distance zone, as well as in the central cities, of larger and smaller metropolitan communities may be compared directly. A lower than average value for any distance zone is indicative of some degree of dependence upon another area.

From Chart 3-3 it is already known that with increasing distance from the metropolis there is a progressive increase in the proportion of the total population which is rural-farm. From other sources it is known that rural-farm populations expend considerably less than the non-farm populations. For these reasons the 1.0 level is not a completely accurate measure of specialization in exact proportion to needs at all distances. To avoid overestimating the amount of the dependence of the hinterland upon the central city, because of the differences in urban-rural composition, let us assume that since retail trade follows population closely (and since it can be shown that, except for mail-orders and shopping for infrequently purchased and specialized items, the central city exerts almost no direct retail influence upon the outer distance zones), beyond the 45 mile zones retail trade will be used as the base line for indicating dependence upon the metropolis. This finds another logical basis in the fact that goods which are retailed must also, in most cases, be manufactured and wholesaled. The difference between the 1.0 line and the retail trade line makes liberal allowance for the smaller needs of the rural populations for wholesaled and manufactured food products. It also makes allowance for the fact that rural populations may forego or produce in their own homes some of the services offered by service establishments.

If the index for retail trade is used to measure the extent of dependency of any zone beyond 45 miles upon another part of the metropolitan community for services, wholesale trade, and manufactures, then it can be stated categorically that <u>every zone in the hinterland is dependent upon the metropolis for wholesale trade and services, and that</u>



PER CAPITA VALUE FOR NATION = 1.0

CHART 3-6 RELATIVE CONCENTRATION OF SELECTED SUSTENANCE ACTIVITIES. RATIO OF PER CAPITA DOLLAR VALUES TO AVERAGE PER CAPITA VALUE FOR THE NATION, BY DISTANCE FROM THE NEAREST METROPOLIS AND SIZE CLASS OF THE METROPOLIS. UNITED STATES, 1940.

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

the outer zones are dependent upon the metropolis and the inner zones for manufacturing. In short, from the point of view of this study, a large part of the dominance of the metropolis rests upon the inability of the hinterland population to provide most economically or most expeditiously all of the wholesale, service, and manufacturing activities which they require to sustain themselves at present levels of living.

The fact that the metropolis and those zones which are in daily contact with the metropolis (in the case of manufacturing) are the principal source of these needed activities constitutes one of the "conditions of life" for the individual community lying in the hinterland, and a very real condition to which an adaptation must be made. Because these necessary goods and services must perforce be transported from the center to the dependent community, one very obvious adaptation, other things being equal, is for individual units of the population to locate near the source of supply. Because a dependent community must obtain needed wholesale, service, and manufacturing services from the center it must specialize in some other activity and then exchange the product of that specialization in order to supply its needs. Since the metropolitan market is the principal mechanism by which these exchanges are effected, there is additional reason for population to concentrate in the vicinity of the metropolis in the modern industrial-commercial society. Hence the pattern of decreasing land occupancy with increasing distance from the source of needed goods and services and the principal market center is not surprising. Furthermore, since wholesale trade, services, and manufacturing are urban-centered

phenomena, it is to be expected that the surplus goods produced in the outer zones of the metropolitan community are primarily agricultural rather than manufactured products. It is also to be expected that the rural-farm population cultivates the land more intensively in the vicinity of large cities than in the vicinity of small cities, and tends to concentrate within these distances which permit the efficient use of the farm truck in marketing.

From this point of view, metropolitan dominance is of the same type as that which exists in nature -- control of the conditions of life. The local community must accept its dependence upon the nearest metropolis for those needed wholesale services and manufacturing activities which it cannot provide itself, or else sustain its population at a lower level than other communities which do accept those conditions. But accepting those conditions means specialization in some activity which will cause the needed goods and services to flow into the community from the central city or other specialized areas. The valuation of the metropolitan market will ultimately influence the activity which is chosen as a specialty.

If this view is a plausible one, then the consistent patterns of population distribution and of territorial specialization constitute a broad territorial organization, a true community with form and structure. It is because of this view that the existence of a metropolitan community is accepted as one conclusion of this study. The acceptance of this conclusion, however, has a corollary in that this pattern of organization, this structure, embraces and characterizes

the way in which the entire nation supports itself. The area of close interdependence, over which the metropolitan pattern extends, is much larger than the metropolitan district, and embraces many more people and their sustenance activities than does the metropolitan district. The data which have been marshalled to develop these patterns account for all land area, all populations, all retail trade, all services, all wholesale trade, and all manufacture in the United States. Although individual areas may conform less closely than other areas, or may even appear to constitute major exceptions for one reason or another, yet the average remains as the typical structure of land occupancy and sustenance activities.

H. The Dependence of the Hinterland Upon the Metropolis. (Table 3-2 Chart 3-7, and Chart 3-8).

In order to make a precise measurement of the dependence of the hinterland areas upon the metropolitan center, and hence to be able to know fully the extent of the division of labor and exchange between them, it would be necessary to know the actual requirements of the hinterland population for retail trade, services, wholesale trade, and manufacturing. If the requirements of each part of the hinterland population for each type of activity were known, they could then be compared with the actual quantity of these activities performed in each zone. A very crude estimate of the requirements of the population of central cities and of the residents of each distance zone has been made and expressed as a ratio of the actual quantities of retail trade, services, wholesale trade, and manufacturing performed by the population of each distance zone.[4] Chart 3-7 presents graphically the pattern

[4] These estimates are not reported in the detailed analysis for each sustenance activity in Chapters 11-14, but are reported here for their use in testing the hypothesis of the study.

which these ratios take for each of the functions. A ratio of 1.0 indicates self-sufficiency in that activity. A ratio of less than 1.0 indicates dependence upon other areas, whereas a ratio larger than 1.0 is indicative of production in excess of local requirements.

It is obviously impossible to make an accurate estimate of the requirements of a population for such activities as wholesale trade or manufacturing on any simple basis. The procedure adopted here has been to establish a per capita requirement figure for the urban, the rural-nonfarm, and the rural-farm population which, when multiplied by the population of each, will yield the total "dollar value" of the activities as reported by the Census for the year 1939. Differences between the requirements of the urban, the rural-nonfarm, and the rural-farm populations were established by the use of consumer expenditure data prepared by the National Resources Planning Board.[5] If it is assumed that these general levels roughly measure the per capita requirements for retail trade, services, wholesale trade, and manufacture, then the total dollar value of these activities as reported by the Census may be assigned to the various populations on the basis of requirements. Using the National Resources Planning Board levels of expenditure as a basis, the following per capita requirements were estimated for each population:

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5 National Resources Planning Board, Family Expenditures in the United States, 1941. Table 40, p. 13.

Table 1.2

ratios and cumulative ratios of actual dollar value of retail sales, receipts from services, wholesale sales, and value added by manufacture to the estimated requirements of the population for these activities, by distance from the nearest metropolitan area and size class of metropolitan area, United States, 1948-50.[a]

Distance	ALL METROPOLITAN AREAS: Retail sales	ALL METROPOLITAN AREAS: Receipts from services	ALL METROPOLITAN AREAS: Wholesale sales	ALL METROPOLITAN AREAS: Value added by manufacture	METROPOLITAN COMMUNITIES WITH CENTRAL CITIES OF 500,000 OR MORE INHABITANTS: Retail sales	METROPOLITAN COMMUNITIES WITH CENTRAL CITIES OF 500,000 OR MORE INHABITANTS: Receipts from services	METROPOLITAN COMMUNITIES WITH CENTRAL CITIES OF 500,000 OR MORE INHABITANTS: Wholesale sales	METROPOLITAN COMMUNITIES WITH CENTRAL CITIES OF 500,000 OR MORE INHABITANTS: Value added by manufacture	[illegible]: Retail sales	[illegible]: Receipts from services	[illegible]: Wholesale sales	[illegible]: Value added by manufacture
	Ratio of actual dollar value to estimated requirements											
Central city	1.17	1.74	2.22	1.21	1.1[illegible]	1.6[illegible]	2.[illegible]	1.2[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]
0-24[b]	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
25-34	.[illegible]	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
35-44	.99	.[illegible]	.[illegible]	1.[illegible]	1.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
45-64	1.01	.71	.[illegible]	1.09	1.1[illegible]	.7[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
65-114	.91	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
115-164	.83	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
165-264	.87	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
265-464	1.13	.73	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
465-over	1.16	.[illegible]	.[illegible]	.[illegible]	-	-	-	-	1.1[illegible]	.[illegible]	.[illegible]	.[illegible]
Total	1.00	1.00	1.00	1.00	1.0[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
	Cumulative ratio of actual dollar value to estimated requirements (center to periphery)[c]											
Central city	1.17	1.74	2.22	1.21	1.1[illegible]	1.[illegible]	2.[illegible]	1.[illegible]	1.2[illegible]	1.[illegible]	1.[illegible]	1.[illegible]
0-24[b]	1.07	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]
25-34	1.06	1.[illegible]	1.[illegible]	1.[illegible]	1.0[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]
35-44	1.05	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]
45-64	1.05	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]
65-114	1.02	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]
115-164	1.01	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
165-264	1.00	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
265-464	1.00	1.00	1.00	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
465-over	1.00	1.00	1.00	1.[illegible]	-	-	-	-	.[illegible]	.[illegible]	.[illegible]	.[illegible]
	Cumulative ratio of actual dollar value to estimated requirements (periphery to center)[d]											
Central city	1.00	1.[illegible]	1.[illegible]	1.00	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
0-24[b]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
25-34	.93	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
35-44	.93	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
45-64	.92	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
65-114	.90	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
115-164	.[illegible]	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
165-264	.[illegible]	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
265-464	1.1[illegible]	.[illegible]	.[illegible]	.[illegible]	1.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]	.[illegible]
465-over	1.16	.[illegible]	.[illegible]	.[illegible]	-	-	-	-	1.1[illegible]	.[illegible]	.[illegible]	.[illegible]

a) Adjusted for differences in levels of consumption between the urban, the rural-nonfarm, and the rural-farm populations.
b) Includes county containing the central city.
c. Ratios computed from cumulative distributions of actual and estimated dollar values from central city to outer zone.
d) Ratios computed from cumulative distributions of actual and estimated dollar values from the outer zones to the center.

Source: Based upon average per capita requirements estimated from expenditure data reported in National Resources Planning Board, Family Expenditures in the United States, 1941, Table 40, p. 12. Population data compiled from Sixteenth Census of the United States.

Function	Type of Population			
	All populations	Urban	Rural-nonfarm	Rural-farm
Retail sales	$319.0	$402.0	$283.0	$149.0
Receipts from services	26.0	32.7	23.0	12.1
Wholesale sales	420.0	529.0	372.0	196.0
Value added by manufacture	187.0	235.0	165.0	87.0

Since these values "account for" the total quantity of each of the functions, any errors made in establishing these per capita estimates must necessarily consist of overestimating the requirements of one type of population and thereby underestimating the requirements of another population type.

When the above estimated per capita requirements are multiplied by the urban, the rural-nonfarm, and rural-farm population residents in each zone of the hinterland and by the residents of central cities, the total estimated requirements of each of these populations are determined. Table 3-2 and Chart 3-7 present the ratio of actual dollar values of the activity performed to the estimated total requirements, by distance zones. To the extent that the requirements of the rural-farm population have been underestimated (requirements of the urban population overestimated), the extent of the dependence of each part of the hinterland has been understated.

1. If the estimated requirements of the population are even approximately correct, the hinterland population is dependent upon the metropolis for retail trade only as far as about 45 miles into the hinterland. According to the estimates, in the zone 25-44 miles the population obtains 98 percent or more of its retail requirements locally. Even if allow-

ance is made for a considerable error in the factors used, the fact remains that at about 45 miles the hinterland appears to become completely self-sufficient in retail trade. The excesses of retail activity at the greater distances, and the deficit of retail trade at distances between 65 and 265 miles from the metropolis may reflect: (a) changing consumption patterns of the three populations with distance, (b) the use of mail orders, and (c) regional differences in consumption (a larger than average proportion of the population of the South falls in the 65-264 mile interval. See Chapter 9). Only a very small proportion of the hinterland may positively be said to be dependent upon the metropolis as a shopping center, and in no case is the extent of this dependence large. On the average, the retailing activities of central cities are only 17 percent greater than the estimated volume of requirements of their own populations. The residents of the suburbs (0-24 miles) consume almost all of this excess, leaving very little apparent dependency at distances between 25 and 45 miles, and none beyond 45 miles, save that which might arise from purchases via mail or infrequent shopping trips by a small segment of the population.

2. All parts of the hinterland are dependent upon the central city for services and wholesale trade. The dependence upon wholesaling is particularly of great magnitude. It is assumed that the dependence of the hinterland population for services is primarily of the "service to business" and other specialized types. Barber shops, laundries, and the other personal service establishments are thought to be distributed much as retail trade. If data were available for the distribution of

capital for new enterprises, banking, and other financial activities it would undoubtedly show a per capita distance pattern similar to that for wholesale and services. One condition of life to which hinterland populations must adjust, therefore, is a sizeable dependence upon the wholesale and business service activities of central cities, and also a similar dependence in financial matters.

3. The dependency pattern for manufacturing differs from both of the other two types of patterns. In this case the entire area beyond 65 miles is dependent upon the entire area within 65 miles. The central city, and a broad zone surrounding it, produce quantities of manufactured products which are in excess of their requirements.

Thus, within the hinterland, there does exist a broad territorial division of labor which makes for interdependence of the various parts and for exchange. The fact that for certain basic activities this interdependence takes the form of the entire hinterland being dependent upon the center gives rise to the potentialities for dominance.

Another way of viewing the structure of dependency in the hinterland is to show how the excesses of each activity balance the deficits. The surplus of wholesale trade activity in the central city, for example, is gradually consumed by the hinterland, which is deficient in this activity, until at the outermost zone the surplus is zero because it has all been distributed. Table 3-2 presents the cumulative excesses and deficits out through distance zones for each of the four sustenance activities in large and small metropolitan communities.[6]

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[6] Note that the estimates of Table 3-2 indicate that small metropolitan communities are dependent upon large metropolitan communities for a part of their needs for each of the four sustenance activities. Presumably it is interdependencies of this type which give rise to extensive intermetropolitan exchange.

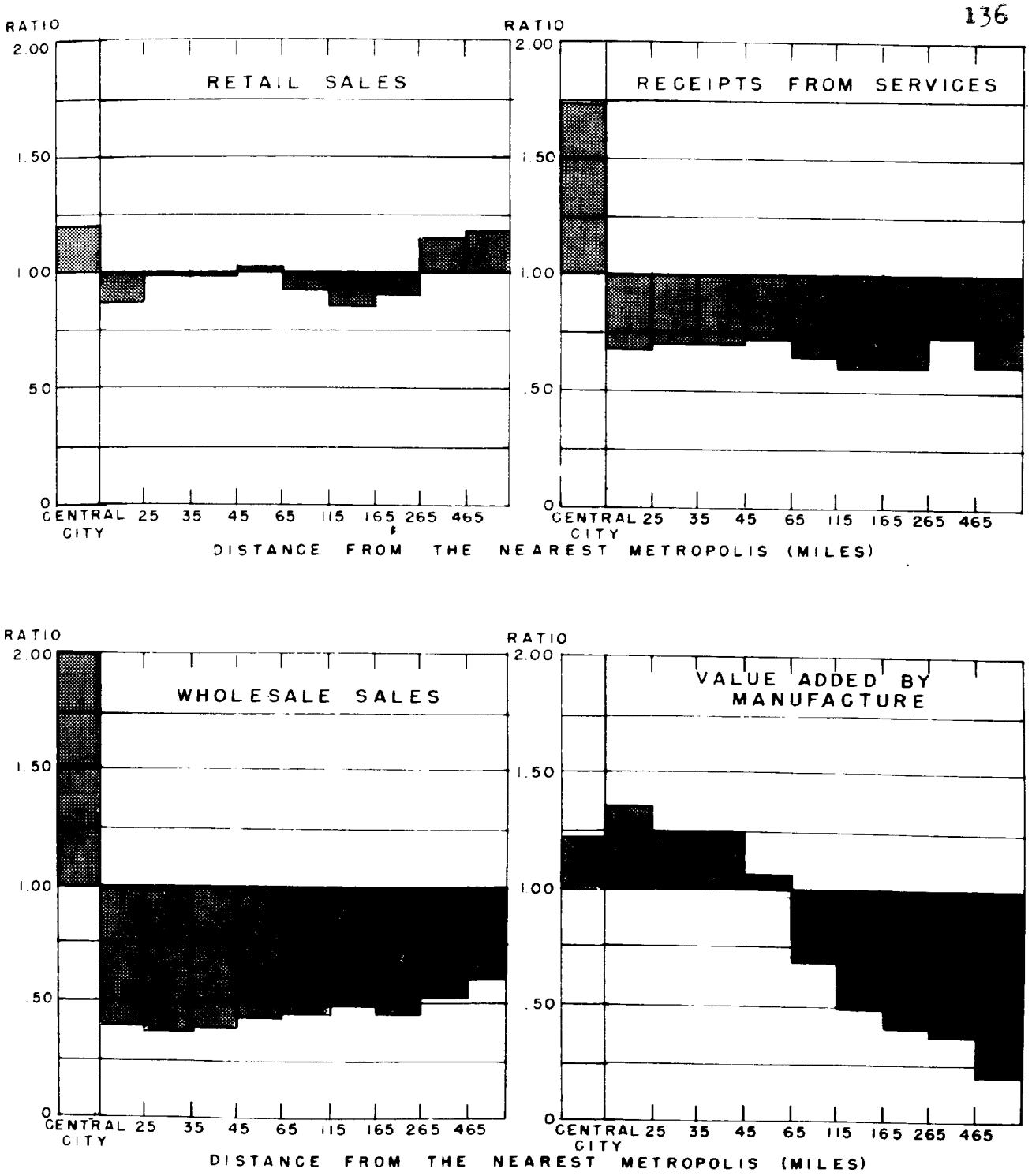


CHART 3-7 RATIO OF ACTUAL RETAIL SALES, RECEIPTS FROM SERVICES, WHOLESALE SALES, AND VALUE ADDED BY MANUFACTURE TO ESTIMATED REQUIREMENTS FOR THESE FUNCTIONS, BY DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

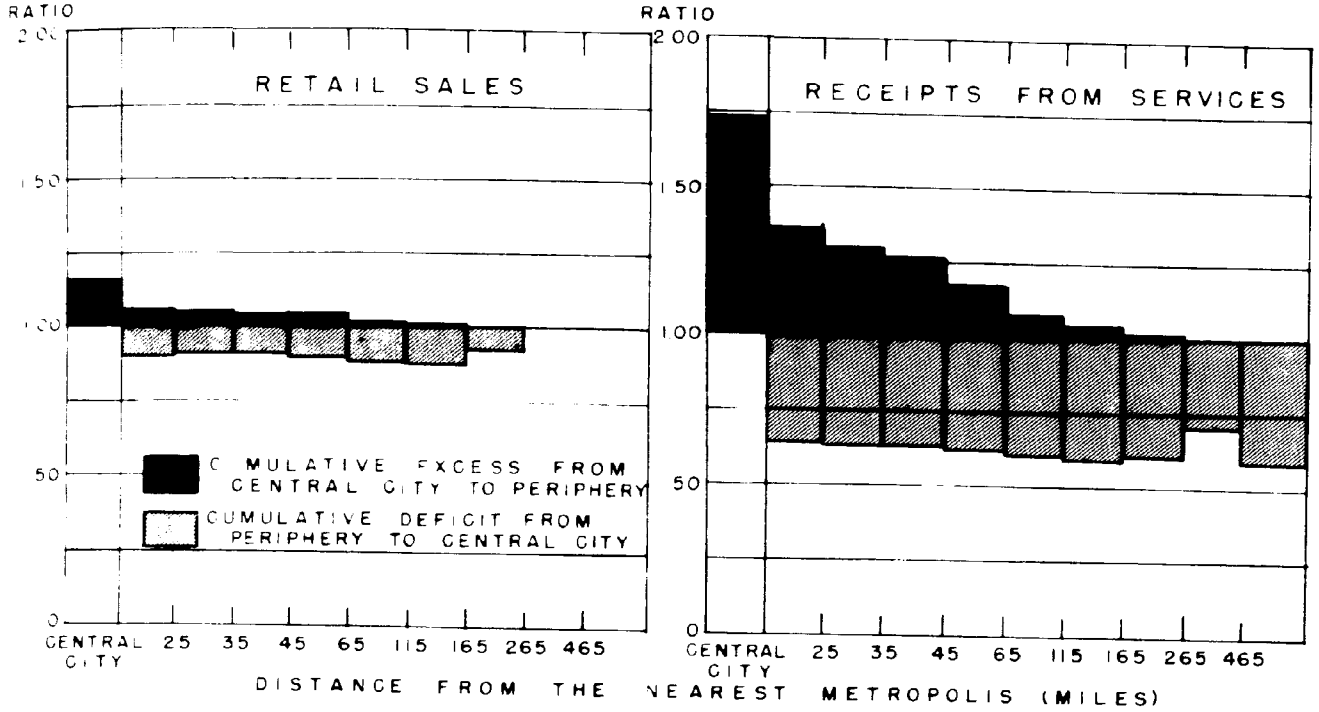
SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

Chart 3-8, illustrating this tabulation, shows that at 45 miles, for example, the cumulative retail excess of the central city has been reduced to a relative value of 105 percent of estimated requirements, while the index for services is 118, for wholesale trade is 126, and for manufacturing is 122 percent. The deficits, calculated from the outer zone toward the center, represent the load of hinterland dependency carried by the metropolis, or the metropolis and the inner zones (in the case of manufacturing).

III

Type of Sector and the Metropolitan Pattern

In spite of the fact that all hinterland zones appear to be dependent upon the metropolis for some of their sustenance needs, this dependence is far from being complete dependence for any single type of activity. In every zone there are some retail trade, some wholesale trade, some service, and some manufacturing activities. Within the hinterland there are 3464 cities and urban places ranging in size from 2500 to more than 100,000 inhabitants. In addition there are many thousands of incorporated and unincorporated villages or hamlets which serve as local community centers. Through these centers must flow the goods which the local population must obtain from the metropolis or from other areas. To them falls the task of producing or collecting a large share of the surplus commodities which are needed for exchange. Because of them, the hinterland is not directly dependent upon the metropolis for all of its retail, wholesale, service, and manufacturing needs. Conceivably the broad distance structure may be accompanied by many



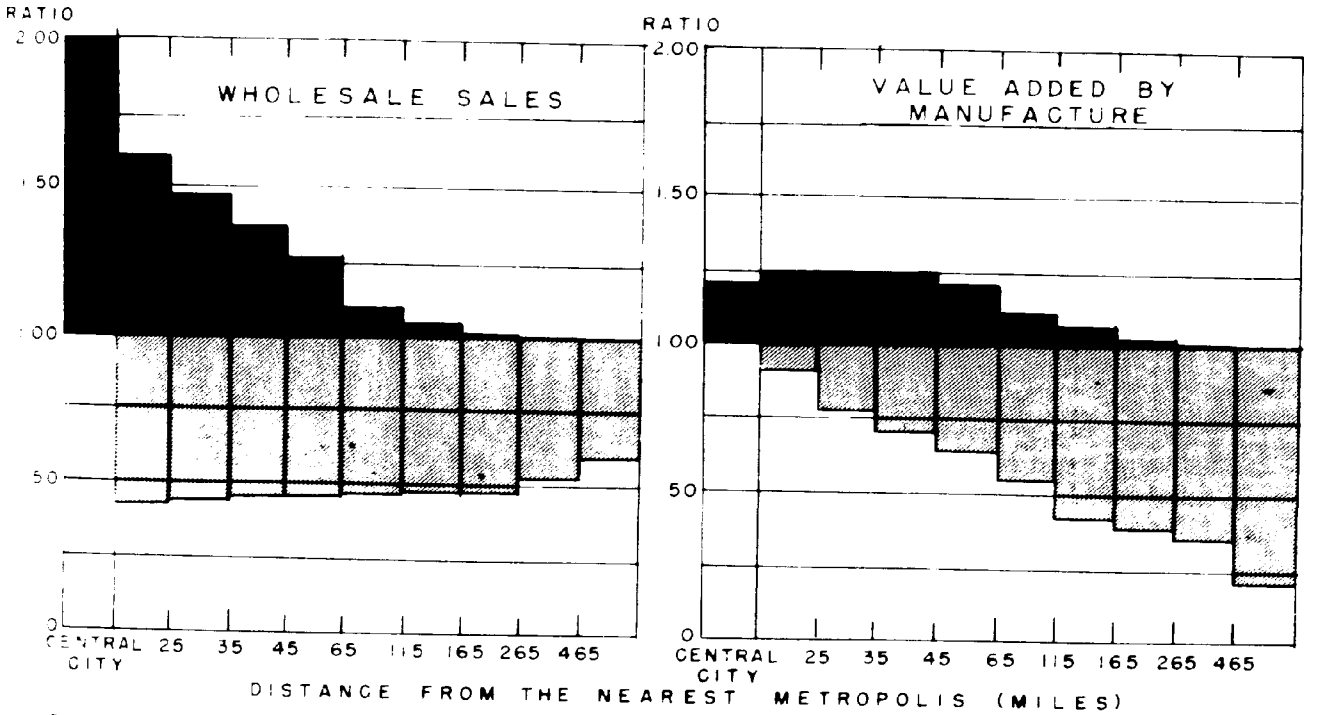


CHART 3-8 RATIO OF CUMULATIVE RETAIL SALES, RECEIPTS FROM SERVICES, WHOLESALE SALES, AND VALUE ADDED BY MANUFACTURE TO ESTIMATED REQUIREMENTS FOR THESE FUNCTIONS, BY DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1939-40

SOURCE COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

other basic patterns of population distribution and functional dependency which arise from the functioning of these hinterland centers. It was hypothesized in Chapter Two that one such pattern is "direction from the metropolis", or "type of sector".

A. Population Distribution (Table 3-3 and Chart 3-9).

1. From Chart 3-9 it may be seen that those sectors of the hinterland which contain a major transportation route between two neighboring central cities have a higher than average level of land occupancy of urban, the rural-nonfarm, and the rural-farm populations. Such "intermetropolitan" sectors comprise 57 percent of the total land area of the hinterland.

2. Those sectors which do not contain a major intermetropolitan thoroughfare, but do contain a major hinterland city of 25,000 or more inhabitants ("subdominant" sectors) have an even larger population per square mile than the intermetropolitan sectors. This greater intensity of land occupancy includes not only the urban population (something to be expected because of the large hinterland city contained by definition), but also both the rural-nonfarm and the rural-farm populations as well. Such sectors comprise 10 percent of the total hinterland area.

3. Those "local" sectors which contain neither an intermetropolitan thoroughfare nor a major hinterland city have much lower than average levels of land occupancy of all three types of population. They constitute 33 percent of the land area.

4. Thus, intermetropolitan and subdominant sectors tend to disperse the population farther into the hinterland and to support concentrations of population at much greater distances from the metropolis than would otherwise seem possible.

B. Functional Specialization (Table 3-3 and Chart 3-10)

1. These intersector differences are accompanied by definite differences in the degree of specialization in sustenance activities among the sectors. Intermetropolitan sectors are slightly more specialized in three of the four types of functions than are the other two types of sectors in retail trade, in services, and in wholesale trade. This relative advantage of the intermetropolitan over the subdominant sectors is of very minor importance compared to the much higher specialization of both of these types of sectors than local sectors. Wholesale establishments which are located in the hinterland appear to prefer a location along an intermetropolitan route which will enable them to draw upon the elaborate wholesale mechanism of two or more metropolitan centers or in a sector containing a hinterland city of 25,000 or more inhabitants.

2. The existence of a set of local conditions favorable to manufacturing (such as a fortuitous combination of natural resources) appears to be one major cause for the rise of large hinterland cities away from the intermetropolitan transportation routes. This is indicated by a smaller index of manufacturing specialization in intermetropolitan than in subdominant sectors, at all distances. Yet manufacturing is not the sole specialization of the sectors containing

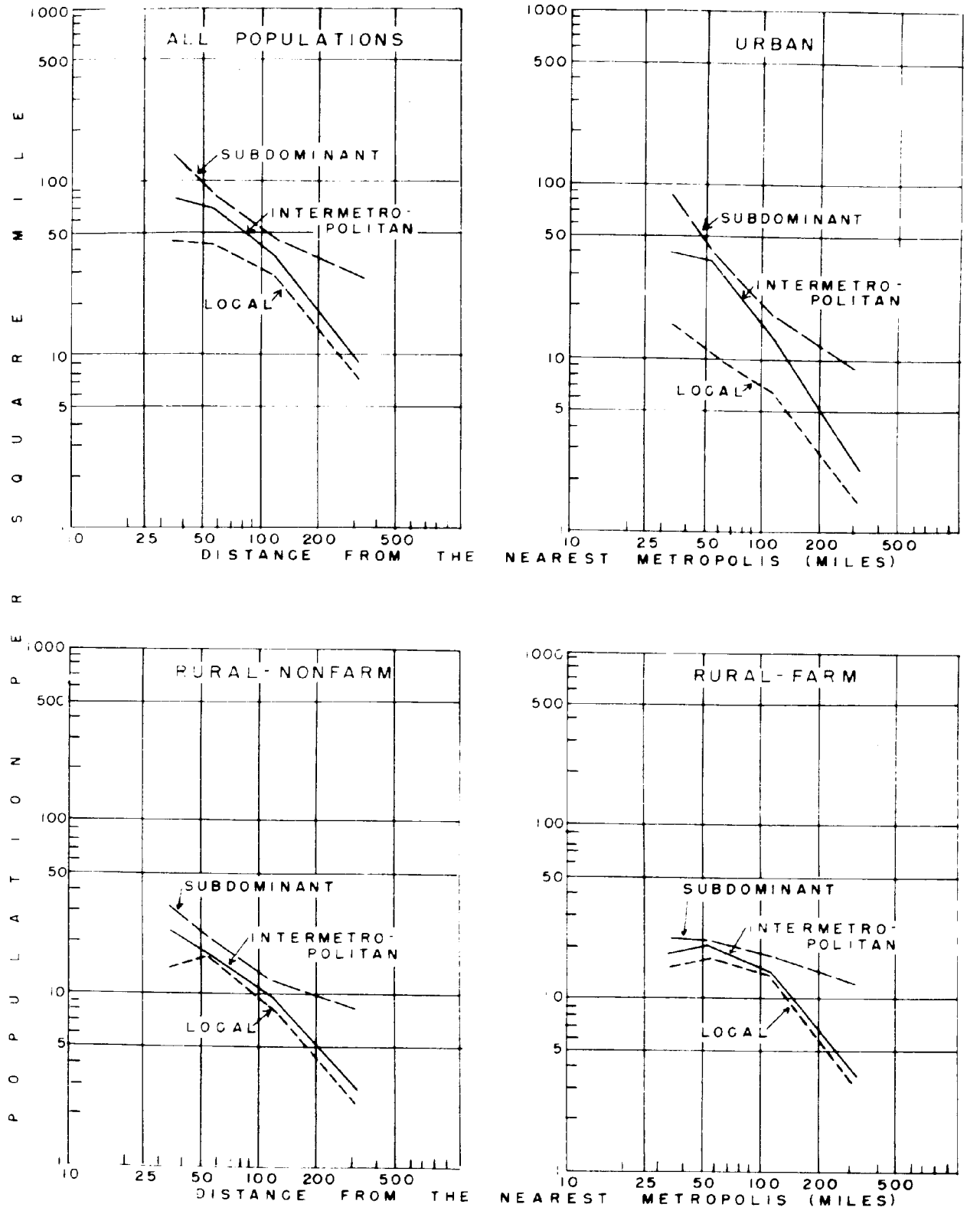


CHART 3-9 URBAN AND RURAL POPULATION PER SQUARE MILE OF HINTERLAND BY DISTANCE FROM THE NEAREST METROPOLIS AND TYPE OF SECTOR. UNITED STATES, 1940

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

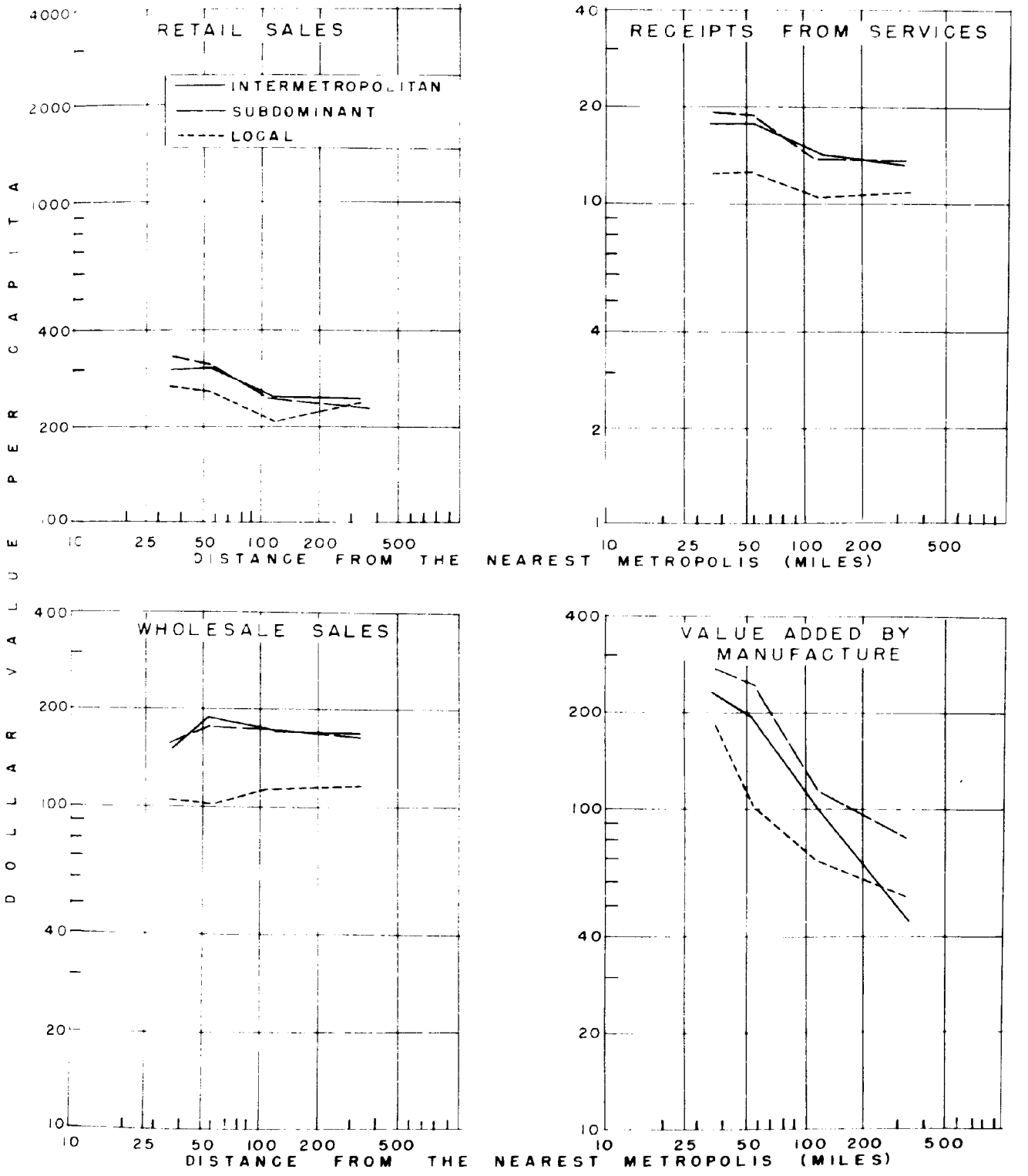


CHART 3-10 INDEXES OF SPECIALIZATION IN RETAIL TRADE, SERVICES, WHOLESALE TRADE AND MANUFACTURING BY DISTANCE FROM THE NEAREST METROPOLIS AND TYPE OF SECTOR. UNITED STATES, 1940

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

Table [illegible]

[illegible] Metropolitan and nonmetropolitan counties classified by type of sector and [illegible] rural populations per square mile [illegible] land area, and per capita dollar value of retail, service, wholesale and manufacturing activities classified by type of sector and [illegible] the nearest metropolis, United States, 1 [illegible]

Miles from nearest metropolis and type of sector	METROPOLITAN COMMUNITIES WITH CITIES 50,000 AND OVER - CLASS A AND B								NONMETROPOLITAN COMMUNITIES WITH CITIES OF LESS THAN 50,000 - CLASS C AND D							
	Population per square mile of counties				Sustenance activities (per capita dollar value				Population per square mile of counties and				Sustenance activities (per capita dollar value			
	Total	Urban	Rural-nonfarm	Rural-farm	Retail trade	Service trades	Wholesale trade	Manufacturing	Total	Urban	Rural-nonfarm	Rural-farm	Retail trade	Service trades	Wholesale trade	Manufacturing
Intermetropolitan sectors																
0-24	711.8	561.6	126.4	21.7	340	176.8	192	317	107.0	47.4	38.5	21.2	243	134	150	209
25-44	245.2	139.9	71.7	33.7	321	21.7	177	401	72.4	22.4	19.1	17.3	269	144	143	171
45-64	133.1	74.3	39.1	21.1	328	14.7	163	257	55.7	22.7	11.7	19.4	277	141	176	149
65-104	56.8	26.2	14.1	14.6	322	14.3	170	175	34.0	11.2	5.7	14.2	284	137	173	82
105-over	9.1	2.3	2.4	2.8	304	15.2	170	76	9.2	2.4	2.9	3.9	244	130	168	45
All distances	112.2	74.8	25.0	12.4	354	24.2	188	277	24.5	9.1	6.2	9.2	240	144	176	168
Subdominant sectors																
0-24[a]	711.8	561.6	126.4	21.7	340	26.8	192	317	107.0	47.4	38.5	21.2	243	134	150	209
25-44	240.6	184.8	47.3	23.6	347	21.0	175	338	75.4	34.2	19.4	21.8	300	143	110	166
45-64	143.9	91.3	38.6	23.9	348	20.1	210	309	55.9	20.4	12.8	20.7	258	170	158	154
65-104	47.6	17.6	12.0	14.0	284	14.1	173	114	36.2	27.3	1.9	13.9	312	164	180	170
105-over	24.4	9.9	4.3	12.1	227	13.5	148	81	22.7	7.2	8.1	7.3	293	157	177	131
All distances	57.0	27.6	13.0	16.4	276	14.5	172	171	40.7	50.5	14.1	12.1	335	19.9	173	262
Local sectors																
0-24[a]	711.8	561.6	126.4	21.7	340	26.8	192	317	107.0	47.4	38.5	21.2	243	134	150	209
25-44	45.1	15.7	14.3	15.1	244	12.4	105	190	11.6	57.7	37.8	17.2	308	134	82	334
45-64	43.6	10.6	17.5	15.5	251	12.6	102	102	85.1	21.4	43.0	20.8	344	14.0	105	150
65-104	24.8	6.3	8.6	13.9	209	10.4	111	70	44.8	4.5	16.9	10.3	251	11.4	113	87
105-over	7.2	1.5	2.4	3.4	233	10.7	117	54	8.3	0.9	2.5	5.1	188	7.4	76	55
All distances	22.7	4.9	4.9	8.9	234	12.1	111	107	72.7	32.2	26.0	14.5	305	16.0	108	192
									19.1	5.1	5.5	8.5	221	11.0	111	84

[a] Includes counties in the central cities. Because intersector comparisons of population are unreliable in the 0-24 mile zone, all sectors have been combined and a single figure reported for comparison with these zones. The All distances, however, exclude the counties containing the central cities and include the remaining counties in the 0-24 mile zone.

[b] Per capita values are for retail sales, receipts from services, wholesale sales, and value added by manufacture.

Source: Compiled from Sixteenth Census of the United States

such cities, as is indicated by their greater than average specialization in the other three types of functions.

3. The local sectors, having much lower degree of accessibility to the metropolis and to major hinterland cities than the other two sector types, are much less specialized than the other sectors. This deficit is greatest for wholesale trade and manufacturing, which average only 69 percent of the average hinterland specialization in these two activities. It is least, as would be expected, for retail trade. The extent of the deficit for services is about midway between that for retail trade and manufacturing and wholesale.

4. Thus, those sectors which are most closely associated with the interconnection between two metropolitan centers, or between a metropolis and a major hinterland city, tend to be much more specialized in those activities in which the metropolis is specialized than "local", or less urbanized and less accessible, hinterland areas. When the metropolis-centered activities of wholesale trade and manufacturing do "go to the hinterland" they tend to cling to their metropolitan moorings and choose a location which will permit them ready access to the metropolis.

5. It would appear that these outlying units are, for the most part, not independent enterprises operating in direct competition with the wholesale and manufacturing units of the central city. Rather the evidence indicates that they are appendages of an extended metropolis-centered system of production, marketing, and distribution. If the hinterland wholesale and manufacturing units were competitive rather than supplemental units, then the relative indexes for the local

sectors would be higher than those of the intermetropolitan sectors. For it would appear that hinterland populations would most successfully develop their own service, wholesale, and manufacturing units in competition with the central city in those local sectors which are most remote and inaccessible to the metropolis, and least subject to competition from the metropolis. In such a case the more accessible intermetropolitan and subdominant sectors would remain relatively unspecialized and more dependent upon the wholesale and manufacturing institutions of the central city. Since the actual situation is the opposite to this, it can only be surmised that wholesale trade and manufacturing in the hinterland are highly integrated with an extensive system, the center of which is located in the central city. In that case, establishments of this type located in the hinterland also must adapt to the activities of the metropolis. The individual wholesale establishment undoubtedly finds its sources of supply or its market (if an assembler of products) located in the central city. The individual manufacturer undoubtedly finds his only source of certain raw materials and component parts necessary to fabricate his product, and the distribution outlet for his product, located in the metropolis. It may be presumed that it is for these reasons that the shorter distance zones and the more accessible sectors have a pattern of sustenance activities more nearly like that of the metropolis than local sectors. Beyond certain distance limits the cost of serving the entire hinterland area from the central city appears to become prohibitive and the task to be a physical impossibility. Under such conditions local establishments tend to arise at those points which

most nearly approximate the conditions of the metropolis and provide easy access to the metropolis.

Thus, an additional element in the metropolitan structure is the transportation system between central cities, and between central cities and large hinterland cities of 25,000 or more inhabitants. Each such route appears to have become an axis along which the urban, the rural-nonfarm and the rural-farm populations cluster more intensively than in local sectors, which contain no such thoroughfare. This clustering does not appear to produce competition with the metropolis so much as further integration into the metropolitan system. It appears to be opportunity to enter into a division of labor with the metropolis, rather than opportunity to compete with the metropolis, which leads to specialization in wholesale trade, manufacturing, and to a lesser extent, services.

IV

The Place of Principal Hinterland Cities and Other Areas in the Metropolitan Structure (Table 3-4 and Chart 3-11)

In the study of sector types it was noted that those sectors which contain a large hinterland city promote greater population concentration and higher indexes of specialization than local sectors containing no such cities. This would indicate that the larger cities of the hinterland are focal points of concentration and specialization. This question is further explored in Table 3-4 and Chart 3-11. Here the per capita value of each function for cities of 10,000 inhabitants or more is compared with the same value for other hinterland areas, by distance. The question here is, what part do the principal hinterland cities play in the pattern of interdependency and exchange between the metropolis and the

hinterland?

1. The central city is more specialized in services and wholesale trade than the principal hinterland cities lying in any zone. This is not true, however, for retail trade and manufacturing activities. The principal hinterland cities lying more than 45 miles from the metropolis are all more specialized than the metropolis in retail trade. As a whole the principal hinterland cities lying less than 65 miles from the metropolis are more specialized in manufacturing than the central city.

2. With increasing distance from the central city the specialization of the principal hinterland cities in retail, services, and wholesale tends to <u>increase</u>. The specialization of the other areas tends to decrease somewhat with increasing distance or to remain relatively unchanged.

3. Thus, as one progresses from the metropolis into the hinterland, the hinterland cities of 10,000 or more inhabitants tend to be a great deal more specialized in retail and wholesale trade, and slightly more specialized in services. Beyond about 45 miles these same cities become steadily less specialized in manufacturing with increasing distance.

4. The fact that the "other" hinterland areas, comprising rural areas and cities of less than 10,000 inhabitants, make no change of such magnitude with increasing distance indicates that the type of retail, service, and wholesale activities found in these areas is of such a nature that they must follow the distributional pattern of population closely. Presumably a great proportion of these enterprises are concerned with the distribution of nonspecialized items for which there is a general and frequently recurring need. Grocery stores, filling

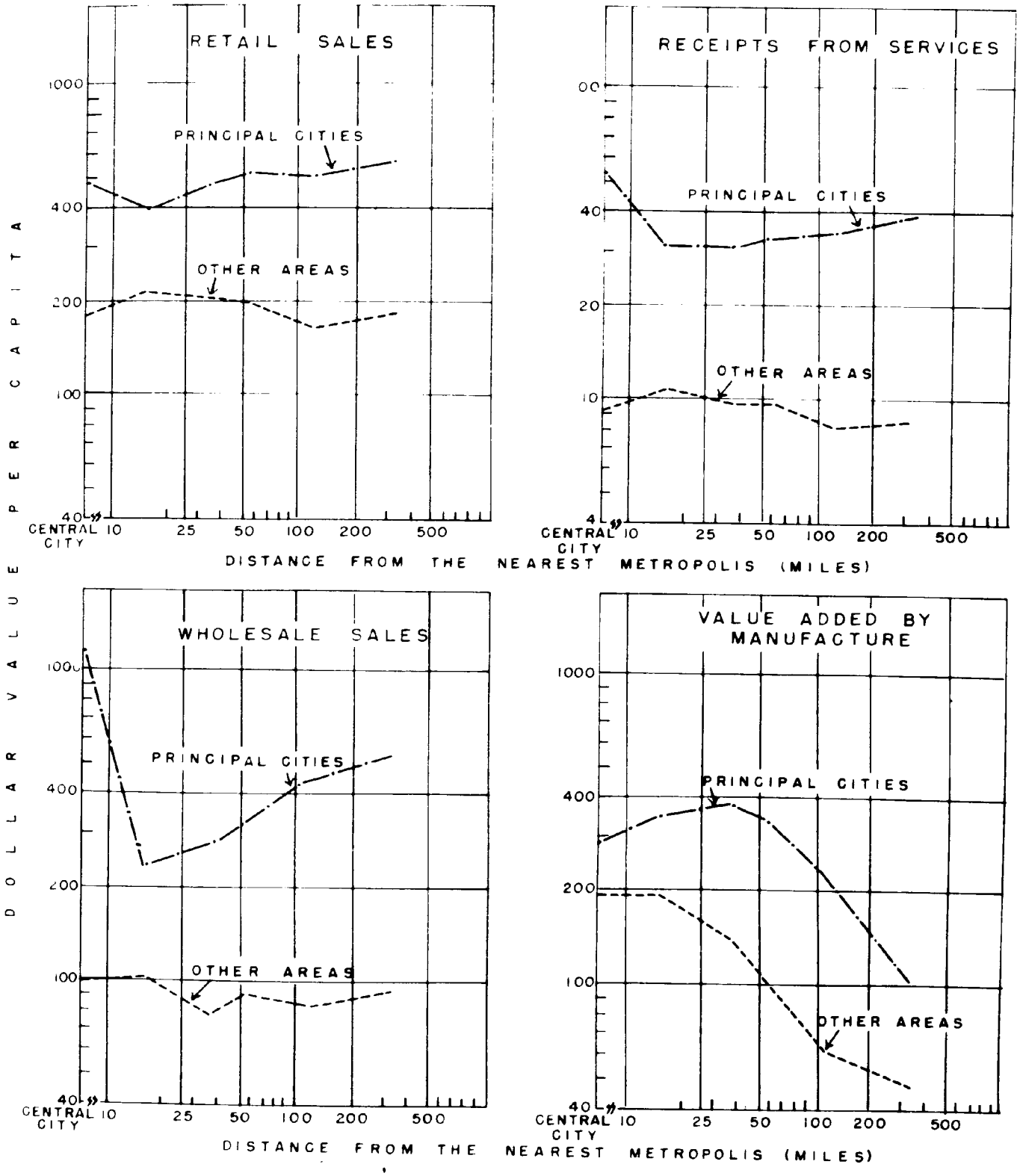


CHART 3-11 INDEXES OF SPECIALIZATION IN RETAIL TRADE, SERVICES, WHOLESALE TRADE, AND MANUFACTURING FOR CENTRAL CITIES AND HINTERLAND CITIES OF 10,000 OR MORE INHABITANTS AND "OTHER AREAS", BY DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

stations, barber shops, wholesale grocers, and assemblers of farm products would fall in this class.

5. The temptation to infer from Chart 3-11 that because the degree of specialization of the hinterland cities increases with increasing distance from the metropolis that the hinterland areas as a whole tend to become more independent of the metropolis for these functions should be carefully avoided. While it is true that the rising indexes for commercial activities with greater distance does reflect an increasing tendency for cities to perform as shopping and distributing centers for a broad "trade territory", it does not follow that the dominance of the metropolis decreases in proportion to the rise in the indexes of specialization of the hinterland cities. In Chapter 7, Section IV it is demonstrated that as the distance from the metropolis increases the average size of the trade territory of each hinterland city also increases. This enlarged territory occurs because cities are more sparsely distributed at these distances, leaving a larger number of square miles, and a larger total population, to be included in the average trade territory of each hinterland city. As the distance from the metropolis increases, populations must travel greater average distances to patronize the retail, service, and wholesale establishments of a city of 10,000 or more inhabitants. The average number of people who are dependent upon each such center is also greater at the greater distances. Hence, the total volume of business, relative to the size of the city, is also larger. For example, the rise in the index of retail specialization with increasing distances beyond 45 miles from the metropolis may be attributed almost

Table 4.4

Indexes of territorial specialization - principal hinterland cities and "other areas". Per capita dollar value of retail, service, wholesale, and manufacturing activities of hinterland cities of 10,000 or more inhabitants and of other hinterland areas classified by distance from the nearest metropolis and size class of the metropolitan community. United States, 1939-40.[a]

Distance from the nearest metropolis (miles)	PER CAPITA DOLLAR VALUE							
	Retail sales		Receipts from services		Wholesale sales		Value added by manufacture	
	Principal cities	Other areas	Principal cities	Other areas	Principal cities	Other areas	Principal cities	Other areas
	All classes of metropolitan communities							
Center[b]	471	161	55.4	9.2	1,172	90	284	141
0-24	447	215	31.3	10.7	239	102	351	135
25-49	453	204	30.1	7.7	273	79	360	141
50-74	511	190	32.8	7.7	325	90	347	105
75-124	502	187	33.7	8.1	443	83	225	61
125-over	563	186	38.6	8.4	534	93	103	48
All distances	466	193	32.5	8.8	331	87	303	85
	Classes A and B: Metropolitan communities with large central cities (500,000 or more inhabitants)							
Center[b]	457	222	60.2	13.8	1,295	155	302	241
0-24	440	236	33.3	12.8	216	130	370	216
25-49	492	237	31.0	12.1	276	76	407	235
50-74	517	241	32.4	10.8	418	89	395	160
75-124	521	215	33.1	9.6	353	83	320	90
125-over	596	234	36.3	11.1	484	111	196	95
All distances	493	230	32.8	11.0	284	91	370	156
	Classes C and D: Metropolitan communities with small central cities (100,000-499,999 inhabitants)							
Center[b]	490	162	46.0	7.0	933	73	250	145
0-24	384	198	25.3	7.4	304	72	299	169
25-49	473	186	34.0	8.4	271	81	347	91
50-74	504	175	33.2	7.0	384	92	297	74
75-124	494	157	33.9	7.8	479	83	141	5
125-over	549	150	36.9	8.0	504	91	91	43
All distances	481	166	32.3	8.1	402	85	239	63

a. Hinterland cities of 10,000 or more inhabitants are termed "principal cities". County units in rural areas and cities of less than 10,000 inhabitants are classified as "other areas".

b. Values shown under "principal cities" are those for central cities; values shown under "other areas" are those for counties containing central cities.

Source: Compiled from Sixteenth Census of the United States.

entirely to the enlarging trade territories of such cities with increasing distance. The fact that there is not a comparable rise for services indicates that the population and business units of outlying areas either forego many services or else obtain a considerable share of them directly from the central city. The sharp increase in wholesale specialization of the hinterland cities, even above the rate for retail, indicates that in those cases in which it is more economical for a wholesale establishment to be located in the hinterland rather than in the metropolis, the larger hinterland city is preferred to the small city and open country. Meanwhile, the other areas are thereby made more heavily dependent upon the principal hinterland city for wholesale activities than for retail, yet Chart 3-7 has indicated that there is an apparent decrease in total dependency for wholesale sales with increasing distance. Thus, the rise in the wholesale specialization indexes of large hinterland cities is a function both of increasing average size of trade territory and increasing self-sufficiency. The data for manufacturing indicates that this is one activity in which the opportunity for even a large hinterland city to specialize is restricted to a fairly narrow zone within or about the central city.

6. Although cities of 10,000 or more inhabitants occur much less frequently in the hinterland than cities of 2,500 to 9,999, their greater relative importance is indicated by the fact that the population per square mile of hinterland is much greater for the large hinterland cities than for the smaller. Although there are more of the smaller places, the total number of people actively engaged in serving each unit of area is greater for the cities of 10,000 or more inhabitants.

7. The pattern by which population occupies the land, and the tendencies for the degree of specialization in the four sustenance activities to fit into that pattern, permit us to infer that an area in the hinterland may stand in one of two principal relations to the metropolis. It may participate directly in the activities of the metropolis or it may stand in an exchange relationship with the metropolis. It may also stand in a third relation which is, in reality, a mixture of the first two. This third relation may be called one of interchange.

a. The zone within 25 miles of the central city is obviously a zone of direct participation. The level of land occupancy is high; dormitory towns are numerous; the cities located there are more deficient in retail trade, wholesale trade, and services than cities lying in other parts of the hinterland. Because they provide space and yet are able to participate directly in the advantages of the metropolis, the principal hinterland cities attain a high degree of manufacturing specialization in this zone. For this same reason the "other areas" appear to be able to become more specialized in all phases of the sustenance activities than in any other zone. Throughout this zone it would appear that to all intents and purposes, the populations and the functional establishments are residents of the metropolis. They are not "suburban", but "submetropolis" populations.

b. Beyond 65 miles from the metropolis begins the rise in the retail, service, and wholesale specialization of the principal hinterland cities, indicating the presence of a trade territory for each, and their subdominance over that trade territory. In this zone, the

factors favoring manufacturing progressively decline, both for principal cities and "other areas". Beyond 65 miles, the "other areas" attain a plateau in retail, service, and wholesale specialization. They appear to provide locally the more standard commodities which are needed frequently or in large quantity and to depend upon the metropolis and the hinterland city for the more specialized ones. This dependence must take the form of exchange. Hence, this zone may be termed the zone of exchange. The functions of collection and distribution characterizes its principal cities; agricultural production and extraction characterize its "other areas".

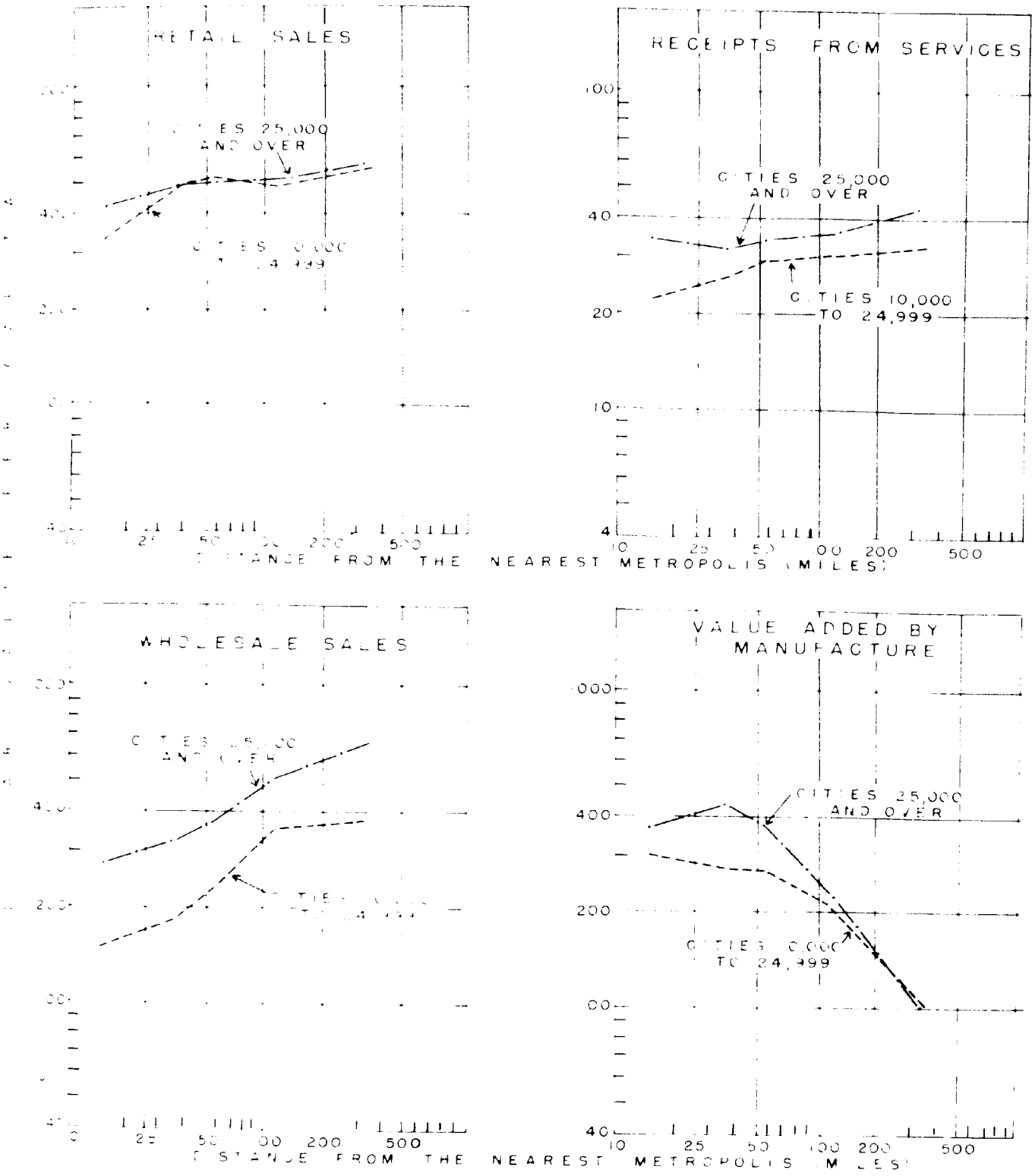
C. The zone between 25-64 miles appears to be a mixed zone. The level of land occupancy tends to vary with size of central city and type of sector. In Chapters Six, Seven and Eight it is shown that at some point in this zone population tends to attain a point of equilibrium with distance, and that there is a measurable concentration of large hinterland cities in the 45-64 mile portion of this zone. That these cities are outlying distributing and manufacturing points is evident from Chart 3-11. Because this zone does contain such a mixture, it may be called a zone of interchange, for it mediates between the metropolis and its direct participants and the outlying zone of exchange. From such outlying centers in this zone secondary highways radiate to the more remote portions of the hinterland. For this reason the cities in this zone may be called "hinterland-access cities".

In the metropolitan communities with large central cities the zone of participation appears to have expanded outward from the center and to have merged into the zone of interchange, whereas in the metropolitan

communities with small central cities the pattern of population distribution and of functional specialization appears much more clearly. If such is the case, then it must be assumed that the three types of relationship in which the hinterland cities may stand with respect to the metropolitan center were laid down in the era of rail transportation, and that motor transportation, electric power, and other technological developments are fostering their convergence. If one were to take the pattern of the large metropolitan communities as the ultimate end of the aggregation process, he could only assume that the process of dominance and subdominance has as one end result the almost complete elimination of the zone of exchange and the co-mingling of the zones of participation and interchange. This, however, could come about only by a multiplication in the number of metropolitan centers as has obviously been the case in the geographic regions in which cities of 500,000 or more inhabitants lie. In those parts of the United States in which central cities of this class are primarily found, the average distance between centers is not in excess of the 65 miles marking the outer limits of the zone here classified as a zone of interchange.

V
Size of Hinterland City and Metropolitan Structure (Table 3-5 and Chart 3-12)

1. The previous section demonstrated the fact that large hinterland cities are the principal focal points about which the activities of the outlying areas are oriented. From Table 3-5 and Chart 3-12 the additional fact may be observed that the larger the hinterland city the greater its degree of specialization tends to be. Hinterland



2 INDEXES OF SPECIALIZATION IN RETAIL TRADE, SERVICES, WHOLESALE TRADE, AND MANUFACTURING FOR HINTERLAND CITIES OF 10,000 OR MORE INHABITANTS, BY SIZE AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1939-40

SOURCE COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

cities of 25,000 or more inhabitants are more specialized, on the average, in retail, service, wholesale, and manufacturing activities (except at extreme distances) than cities of 10,000-24,999 inhabitants. This is true at all distances and in metropolitan communities with both large and small central cities. Yet too much emphasis must not be placed upon the fact of size of city. In the detailed tabulations of Chapters Eleven to Fourteen it is found that sector type, size of metropolis, and a more detailed distance classification modify this general conclusion considerably.

2. A basis for this phenomenon of increased average specialization of larger cities is developed in Chapter Seven, where it is demonstrated that the average trade territory of a large hinterland city is inevitably larger than that of a small central city, that it contains a larger population, and that this disparity tends to increase with greater distance from the metropolis. Thus, the most specialized retail service or wholesale activities in the hinterland tend to be located in the larger hinterland cities where they are available to the maximum number of people coming from the greatest possible areas. This alone would account for the greater degree of specialization of the cities of 25,000 or more inhabitants over those with only 10,000-24,999 inhabitants. Again reference must be made to Chart 3-7 and to the fact that except for wholesale trade the total degree of dependency upon the metropolis does not change materially outside the 45 mile zone.

Table 3-5

Indexes of land occupancy and specialization - Principal hinterland [illegible], by size of population per square mile of hinterland and per capita dollar value of retail, service, wholesale and manufacturing activities [illegible] of the hinterlands of [illegible] inhabitants, classified by size, distance from the nearest metropolis, and size class of metropolitan [illegible] the United States, 1939-40.

Distance from the nearest metropolis (miles)	Population per square mile		P E R C A P I T A D O L L A R V A L U E							
			Retail sales		Receipts from services		Wholesale sales		Value added by manufacture	
	10,000-24,999	25,000- over	10,000-24,999	25,000- over	10,000-24,999	25,000- over	10,000-24,999	25,000- over	10,000-24,999	25,000- over
All classes of metropolitan communities										
0-24[a]	31.9	81.7	333	422	22.5	34.7	149	274	303	400
25-44	9.1	17.0	480	485	24.4	32.7	192	323	275	438
45-64	6.2	13.1	517	508	29.2	34.5	230	370	272	332
65-164	3.1	4.3	499	505	30.2	38.1	353	506	212	235
165-over	0.7	0.9	558	547	32.7	43.5	383	661	107	111
All distances	3.4	9.4	455	473	27.5	39.2	252	373	285	435
Class A and B: Metropolitan communities with large central cities (5[illegible] or more inhabitants										
0-24[a]	129.1	345.9	336	425	22.8	37.1	142	272	318	390
25-44	29.0	58.0	480	447	27.3	32.6	161	324	304	382
45-64	12.7	36.0	530	513	29.9	33.3	240	411	316	428
65-164	5.5	9.9	497	545	29.6	35.4	268	444	234	297
165-over	1.1	1.8	455	748	22.0	51.7	237	756	208	153
All distances	13.5	32.1	418	468	25.7	35.7	157	309	315	342
Classes C and D: Metropolitan communities with small central cities (100,[illegible] inhabitants t										
0-24[a]	10.7	24.8	326	416	21.7	24.9	200	41	281	5[illegible]
25-44	5.7	8.0	480	466	25.[illegible]	32.9	200	321	[illegible]	41[illegible]
45-64	4.5	7.3	507	502	28.4	30.1	233	395	248	3[illegible]
65-164	2.6	3.6	499	490	30.5	36.4	383	[illegible]	1[illegible]	212
165-over	0.6	0.8	574	547	34.5	42.[illegible]	405	[illegible]51	[illegible]1	41
All distances	2.1	5.2	[illegible]74	47[illegible]	24.8	34.5	32[illegible]	452	134	[illegible]

a) Land area of counties [illegible] central cities included in [illegible] mile zone for computation of population per square mile.

Source: Compiled from Sixteenth Census of the United States.

3. Because data for all four of the sustenance activities are not available for small cities, this analysis of the specialization of the various sizes of cities cannot be carried out for urban places of less than 10,000 inhabitants. Chapter Seven demonstrates, however, that the size of the average trade territories of these smaller cities also decreases with decreasing size of hinterland city, that it increases in area and population with distance in the same manner as cities of 10,000 or more inhabitants. It is almost certain to be true, therefore, that these smaller sized cities tend to be progressively less specialized than the larger cities in all functions, with the possible exception of retailing, and that with increasing distance the degree of their specialization in all activities also increases. Whatever the size of a city, it must be specialized in some function at a level above the hinterland average. Otherwise it has no reason for existence, no function to perform in the hinterland, and no visible means of supporting its population. The great concentration of wholesale, service, and manufacturing activities in the large hinterland cities and/or in the inner zones indicates that the hinterland city of less than 10,000 inhabitants and which is located 65 miles from the metropolis must support itself by retail specialization primarily, with a much lower level of specialization in services and wholesale trade.

4. Specialization in manufacturing, because it involves many unique "production factors" in which access to markets is only one aspect, (and a secondary one when compared to all of the other factors combined),does not show this total response to changes in the average size of trade territory. The simple fact seems to exist that within

about 65 miles of the metropolis these production factors appear to be present in a favorable combination, that outside the 65 mile zone they become increasingly unfavorable, and that no other consideration will suffice to promote manufacturing. Opportunity to escape competition from the metropolis appears to be less important to the manufacturer than access to the factors of production. Increasing size of trade territory seems to be no incentive whatsoever to move into the hinterland if it means sacrificing a location which provides these factors economically.

5. The inevitable conclusion from the analysis of the specialization of hinterland cities of each size is that within the hinterland there is a very definite pattern of functional specialization corresponding to the distribution of population in cities of various sizes. Some set of conditions associated with distance from the metropolis and type of sector seems to have operated to produce a characteristic distribution of cities in the hinterland and to have regulated the size which they have been able to obtain. Individual cities appear to have adapted to this frame of reference and have achieved degrees of specialization in retail trade, services, and in wholesale trade commensurate with the degree of dependence of the hinterland population upon the central city, the size and population of the local trade territory available to them, and the type of relationship which they can establish with the metropolis. In those areas of the metropolitan community which possess favorable combinations of manufacturing, the hinterland cities have specialized in this activity. The larger hinterland cities attain a somewhat higher

level of specialization than the smaller ones, presumably because they were most able to provide the most favorable conditions. Hence, the hinterland cities not only present themselves as true subdominants, but also show varying degrees of subdominance within their ranks. The largest hinterland cities present a degree of subdominance over their local areas which, in terms of level of specialization in many sustenance activities and scope of service, begins to approach the dominance of the metropolis. The smaller hinterland cities show smaller degrees of subdominance over their local areas by having lower levels of specialization particularly in wholesale and manufacturing activities. No group of hinterland cities at any point in the hinterland is able to challenge the dominance of the metropolis by showing higher than average levels of specialization for all four sustenance activities.

VI

The Place of Rural Areas and Minor Cities in the Metropolitan Structure (Table 3-6 Chart 3-13)

The problem of subdominance may be explored further by comparing the intensity of land occupancy and of functional specialization in the immediate vicinity of hinterland cities of various sizes. The classification of the rural areas of counties remaining after all cities had been subtracted (population analysis) and of the "other areas" remaining after all principal cities had been subtracted (analysis of specialization), provides a most useful framework for making this exploration. In this study these county units of "rural

areas" and "other areas" have been classified on the basis of the "size of the largest city contained".[7]

1. The presence of a city in a county area, and the size of that city, is very closely related to the average number of people per square mile in the rural portion of the county. Each increase in the size of the largest city contained is accompanied by an increase in the average intensity of land settlement. This phenomenon extends to both the farm and the nonfarm populations alike, to the hinterlands of large and of small central cities, and is present at all distance zones and in all sector types. Just as there is an intense aggregation of population in the immediate vicinity of central cities, so there is a similar aggregation of rural populations about hinterland cities. The intensity of the aggregation, also like that about central cities, increases with city size.

2. This tendency to cluster about hinterland cities has its functional aspect. The "other area" portions of the county units are extremely deficient in all three of the commercial sustenance activities, but particularly so in wholesale trade and services. The small hinterland cities of less than 10,000 inhabitants and rural shopping

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7 The analysis of the four functions was made for cities of 10,000 inhabitants or more only. The "other areas" remaining after these city totals were subtracted from county totals therefore included the small cities of less than 10,000 inhabitants. The analysis of population, on the other hand, included all urban places. The residual areas after all urban places were subtracted were therefore the completely rural areas. In Table 3-5 the population section refers to rural areas, while the sections for the sustenance activities refer to the "other areas", or the rural area plus the cities of 2,500 to 9,999 inhabitants.

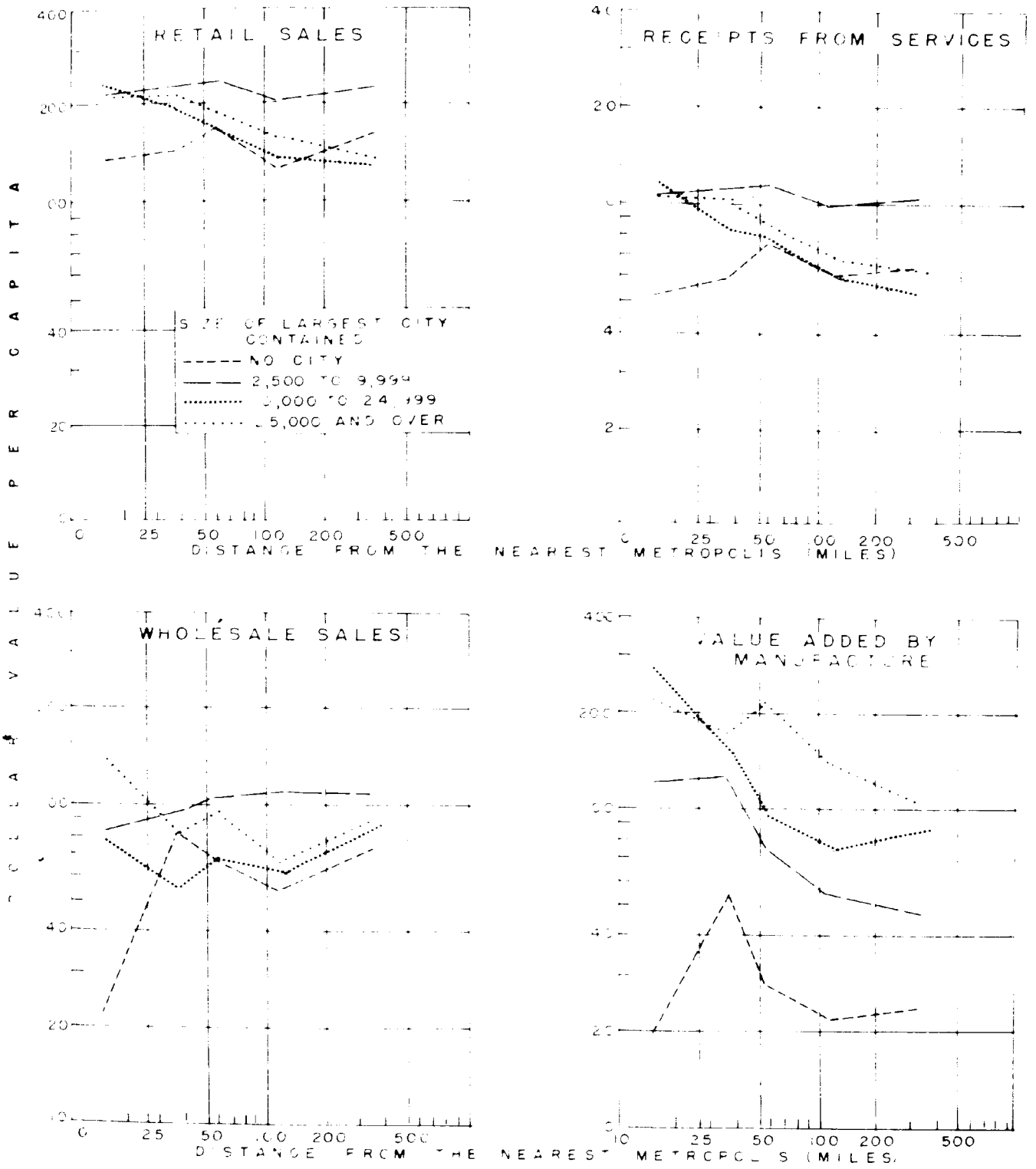


CHART 3-13 INDEXES OF SPECIALIZATION IN RETAIL TRADE, SERVICES, WHOLESALE TRADE, AND MANUFACTURING FOR RURAL HINTERLAND AREAS AND CITIES OF LESS THAN 10,000 INHABITANTS COUNTY UNITS CLASSIFIED BY SIZE OF LARGEST CITY CONTAINED AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

SOURCE COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

centers appear to be able to satisfy a considerable proportion of the retail requirements in each county unit (but not all of it), but are themselves heavily dependent upon larger hinterland cities, as well as upon the metropolis, for a great deal of their wholesale and service requirements. County units with no city have low indexes of specialization in all four functions. The presence of a city of less than 10,000 inhabitants is associated with an increase of several points in the commercial activities, indicating that such counties as a whole are more specialized. Yet the "other area" of counties containing a city of 10,000-24,999 is very little more specialized than the rural areas of counties containing no city, indicating that the small cities present in counties with larger cities as well as the rural populations, are heavily dependent upon the principal hinterland city.

3. Manufacturing, as in all previous cases, occurs in those rural areas in which there is a high level of urban land occupancy. The presence of a city of 10,000 or more inhabitants is conducive to manufacturing in small cities and rural areas. With each increase in size of largest city contained, there is a marked increase in the degree of manufacturing specialization, particularly in the inner zones. In this, there is no indication that the manufacturing institutions of the larger hinterland city are a substitute for establishments which would otherwise be located in small cities and rural areas. The situation is quite the reverse; the presence of manufacturing in the large hinterland city is conducive to manufacturing in the entire county.

Table 3-5

Indexes of land occupancy and specialization. Rural population per square mile of hinterland and per capita retail sales, receipts from services, wholesale sales and value added by manufacturing for county units classified by size of largest city contained, distance from the nearest metropolis, and size class of metropolitan community. United States, 1939-40.

Distance from the nearest metropolis (miles)	ALL METROPOLITAN COMMUNITIES				METROPOLITAN COMMUNITIES WITH CENTRAL CITIES OF 500,000 INHABITANTS, CLASS A and B.				METROPOLITAN COMMUNITIES WITH CENTRAL CITIES OF LESS THAN 500,000 INHABITANTS, CLASS A and B.			
	No city	2,500-9,999	10,000-24,999	25,000- over	No city	2,500-9,999	10,000-24,999	25,000- over	No city	2,500-9,999	10,000-24,999	25,000- over
	Population per square mile of hinterland											
0-24	44.6	54.2	48.0	146.0	64.5	138.0	232.2	180.5	43.5	48.0	96.8	45.7
25-44	24.8	28.7	47.5	71.5	40.9	65.5	102.3	110.0	24.9	29.3	34.3	43.7
45-64	25.8	33.4	38.0	53.2	36.4	54.4	57.6	85.7	25.7	30.6	30.3	38.8
65-164	19.8	23.5	30.0	39.3	27.9	29.7	39.5	37.4	13.3	22.4	28.0	40.3
165-over	5.7	8.5	10.1	14.5	6.0	11.9	17.9	8.7	5.7	8.2	7.6	14.2
All distances	11.5	18.1	28.2	41.3	18.9	24.2	56.0	48.6	11.2	17.0	23.0	32.3
	Per capita retail sales (dollars)											
0-24	135	215	228	214	252	232	268	224	121	204	197	179
25-44	142	225	193	215	138	277	224	232	137	214	162	190
45-64	146	232	176	183	277	313	221	204	148	206	131	148
65-164	128	202	137	153	158	253	142	214	125	165	119	115
165-over	161	226	129	135	162	289	175	202	161	219	122	107
All distances	143	215	161	179	181	273	219	219	139	205	133	137
	Per capita receipts from services (dollars)											
0-24	5.3	10.8	11.0	10.7	[illegible]	12.1	14.1	11.7	5.2	10.4	7.4	6.4
25-44	6.0	11.4	8.5	10.4	7.1	17.2	[illegible]	12.9	5.4	10.3	7.5	7.4
45-64	7.6	11.9	8.1	8.7	10.4	14.0	10.2	7.1	7.1	10.9	6.5	7.4
65-164	5.3	10.4	[illegible]	[illegible]	7.6	11.4	[illegible]	9.4	[illegible]	9.9	5.7	9.4
165-over	6.5	10.7	6.4	7.4	[illegible]	13.8	[illegible]	11.7	[illegible]	10.4	5.2	6.3
All distances	5.4	10.7	7.9	[illegible]	7.7	13.1	10.1	10.7	6.3	10.2	6.2	6.1
	Per capita wholesale sales (dollars)											
0-24	22	34	[illegible]	141	13	24	102	137	24	[illegible]	51	35
25-44	32	85	56	81	61	68	52	93	45	101	[illegible]	9
45-64	66	104	66	44	76	110	73	79	69	103	[illegible]	134
65-164	55	110	[illegible]	57	[illegible]	109	71	70	54	110	24	5
165-over	73	110	54	71	41	114	56	120	75	108	89	40
All distances	63	107	[illegible]	[illegible]	54	107	66	101	54	107	54	[illegible]
	Per capita value added by manufacture (dollars)											
0-24	20	124	273	214	74	49	137	214	14	130	56	10
25-44	55	127	159	177	26	345	219	261	59	96	109	117
45-64	25	75	92	213	23	100	94	253	29	49	47	134
65-164	22	54	77	149	32	62	92	145	21	92	70	144
165-over	24	48	84	135	54	77	171	147	22	44	73	49
All distances	25	64	116	171	35	111	149	214	23	93	140	1[illegible]

Source: [illegible] filed from Sixteenth Census of the United States.

4. Perhaps in no single tabulation of this study can the simultaneous operation of the dominance of the metropolis and the subdominance of the hinterland city be more clearly envisaged than in Table 3-6. Even as hinterland cities aggregate rural populations in accordance with their size, and as the populations of the "other areas" attain a given degree of specialization commensurate with the size of the largest city contained in their county, the factors of distance from the metropolis and size of the metropolis are seen to be in operation at all points. From this it should be obvious that dominance and subdominance are two coacting forces in the hinterland. The rural populations adapt to conditions associated with both hinterland cities and metropolitan centers. Hinterland cities adapt to conditions associated with the presence of other hinterland cities larger than themselves and to the presence of the metropolis. The evidence presented here indicates most clearly that the distribution of population and sustenance activities in the metropolitan community cannot be understood without referring to the influence of the individual hinterland city, just as the influence of the individual hinterland city cannot be understood without reference to the nearest metropolis. The metropolitan community thus appears to be an organization of many mutually interdependent and inter-functioning subcommunities oriented about the hinterland cities, which in turn are subdominant to the dominant metropolis and are interdependent with and interfunction with the metropolis. The entire community organization appears to be held together by a system of community specialization and exchange of locally

produced surpluses for needs which cannot be most efficiently satisfied by local institutions.

VII

The Metropolitan Community and the Physical Environment

In Chapter Two it was acknowledged that the patterns which have been described here would have meaning only if it can be demonstrated that these patterns are not completely required by conditions of the environment. The simplest and most direct way of making this demonstration is to show, as has been done in Chart 3-14, that within each broad geographic region (generally regarded as being a fairly homogeneous part of the total physical environment) the metropolitan pattern still exists. This does not deny that regional differences exist. Throughout this study it has been emphasized that the metropolitan community must be regarded as a way of adapting to the environment; therefore, differences in that environment must necessarily become an element in the adjustment. Nevertheless, the general elements of the metropolitan pattern are present in each geographic region. With the exception of the farm populations, differences associated with dominance and subdominance are greater <u>within</u> each region than the average differences <u>between</u> regions.

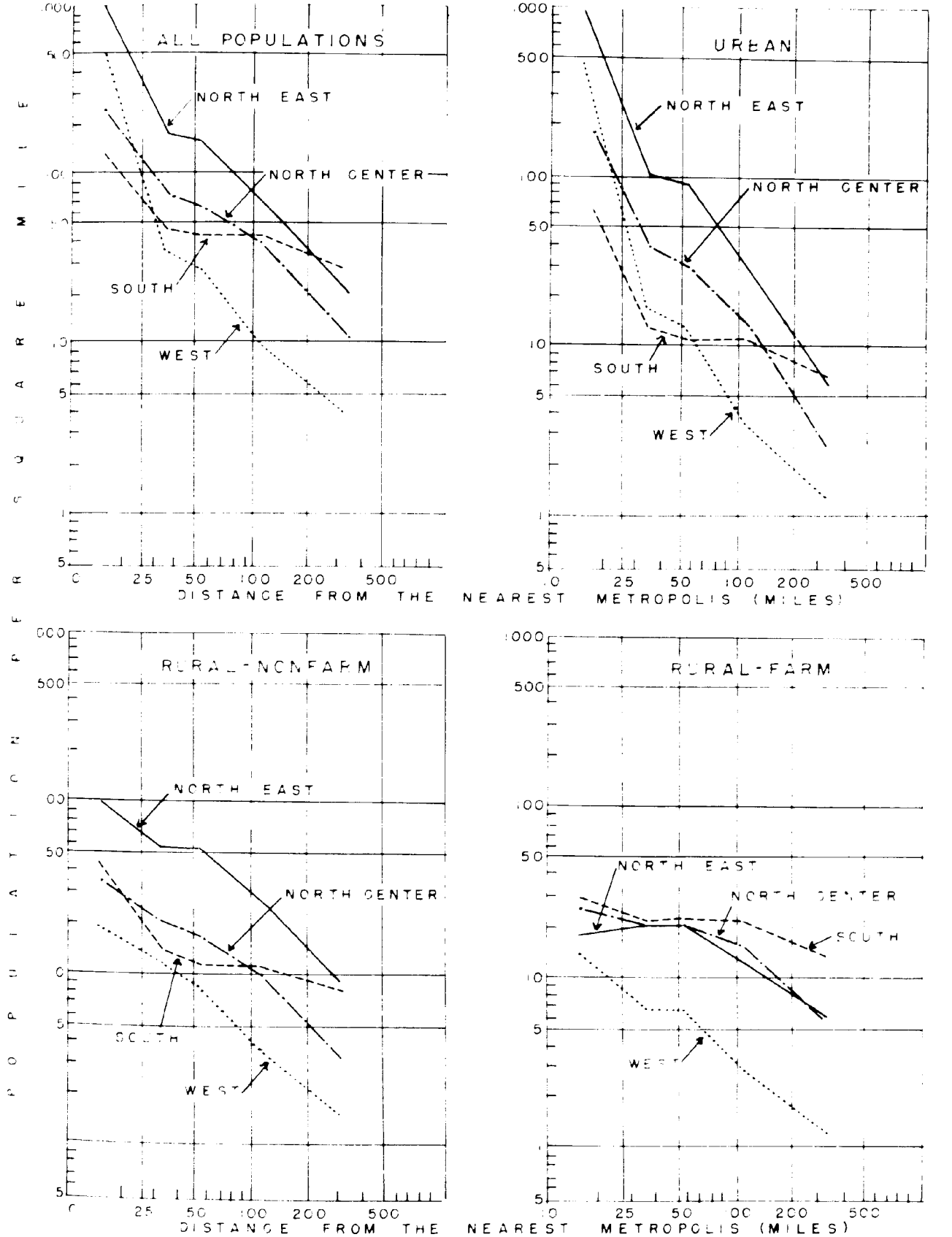


CHART 3-14 POPULATION PER SQUARE MILE OF HINTERLAND, BY GEOGRAPHIC REGION AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1940

SOURCE: COMPILED FROM SIXTEENTH CENSUS OF THE UNITED STATES

VIII

Conclusion

1. A dominant city is a city which controls many of the conditions of life of all communities lying within a broad area surrounding it. This control arises from a higher than average degree of specialization in such functions as services and wholesaling, and an ability to foster industrial development in its immediate vicinity by providing favorable combinations of the factors of production. Other communities must accept these conditions of life by specializing in other activities and becoming dependent upon the central city for those goods and services which they cannot provide locally. The metropolitan market mediates the exchange, and thereby exerts a control and direction over the activities of outlying communities.

2. A subdominant city is a city which adapts to the condition of general dependence upon the center and functions as an intermediary between the metropolis and the outlying areas by specializing in one or more of the sustenance activities. The subdominant therefore has a trade territory comparable to the hinterland of the metropolis, but smaller in size. The subdominant cannot specialize in all sustenance activities. To the extent that a large hinterland city is able to provide its trade territory with all of the principal sustenance activities required, and to promote a higher than average level of manufacturing in its immediate environs, it is passing from a subdominant to a dominant status. Dominance and subdominance are hence only two parts of one continuum of degree of control.

3. Influent and subinfluent populations are communities with very small trade territories. They are moderately specialized in providing the most standardized, frequently needed, and universally consumed items for which other populations are dependent. Although influent populations may be highly specialized in retail trade, they are not specialized in wholesale trade and manufacture, but are dependent upon subdominant and dominant communities for such activities. Subinfluent populations are primarily agricultural and extractive, being widely dispersed in small units, and completely dependent upon the influent, subdominant, and dominant populations for a very large proportion of their livelihood. They produce a negligible portion of the manufactured products, wholesale, service, and retail activities which they require. Even though collectively they are of tremendous importance in providing food and raw materials for the support of the entire population, the amount of control exerted by any one unit is at a minimum, and at present levels of living, the amount of their dependency upon other communities is at a maximum.

4. A metropolitan community is an organization of many subdominant, influent, and subinfluent communities, distributed by a definite pattern about a dominant city, and bound together in a territorial division of labor through a dependence upon the activities of the dominant city. Subdominant communities produce surpluses for exchange throughout the area. They aid in interchanging the surpluses of the central city for the surpluses of the influent and subinfluent populations. The metropolitan community is not independent of the physical environment, but

is an adaptation to the environment. It utilizes the techniques of production and exchange common to populations with an industrial-commercial culture to exploit environmental resources and to maintain maximum security against catastrophe. Undoubtedly many other conditions of life are subject to control or modification by the central city. The complete structure of the metropolitan community may include the functions of finance, government, education, religion, and innumerable other aspects of the institutional composition of the individual hinterland community. The four broad types of functions which have been considered here can only hint at the detailed patterns which will emerge with further research which employs new and more refined varieties of data and additional variables.

5. The metropolitan community has come to be a characteristic pattern by which at least one urbanized commercial-industrial society, the United States, is organized. This pattern reflects an underlying set of interrelationships which are based on interdependence and a division of labor. In making use of new techniques of production, transportation, distribution, and exchange the population of the nation appears to have arranged itself by a pattern which is repeated, with individual variations, many times.

6. Because even newer techniques in all of these activities are daily being introduced, and improvements upon and more extensive use is being made of old ones, the patterns which have been presented here for the years 1939-40 can at best be regarded as representing an

unstable equilibrium. In view of this fact, it would seem that a profitable course of action for all communities whose occupants are genuinely interested in their future would be to determine more accurately their functional position within the larger metropolitan community, to learn by what process that position has been attained, and the direction in which it has moved in the recent past, and to attempt a forecast of their position should those trends continue.

7. The statistical evidence which has been assembled here supports and adds detail to the work of McKenzie and Gras, and to their hypothesis. These data have led to an interpretation which places considerably more emphasis upon the unity and integrity of the individual hinterland community as one aspect of structure than either McKenzie or Gras acknowledged. The functioning of the local hinterland community is regarded as basic to dominance itself. Dominance on a broad scale appears to be possible only when accompanied by the phenomenon of subdominance, influence, and subinfluence. If this be a valid inference from the data which have been presented here, the importance of the local hinterland community as a unit in social organization will not diminish with time. The number of such communities may increase or decrease. They may gain additional functions from other hinterland communities, or from the central city, or lose them as the case may be. But in the foreseeable future the element of intercommunity exchange remains the basis for the metropolitan pattern of population distribution. Many more metropolitan centers may arise,

and some of the present ones may decline in importance. Yet the probability that there will be a definite pattern of population distribution about points which supply a variety of needs to a dependent population, and that this pattern will reflect the manner in which the entire population supports itself, remains a very high one. As Gras has stated, "Interdependence of parts is really the key to the whole thing."[1].

PART II

THE DISTRIBUTION OF POPULATION WITH RESPECT TO METROPOLITAN CENTERS

Introduction to Part II

The study of the distribution of population with respect to metropolitan centers will proceed in four steps, each step corresponding to one of the four major variables of distance, sector type, size of metropolis, and size of local community. A full interpretation of the findings, in terms of the metropolitan hypothesis, will be found in Chapter Three. Chapter Four begins this analysis by dealing with the first variable, distance. The findings of this chapter will be refined and supplemented in the three subsequent chapters, each of which takes up one of the three remaining variables.

Although the analysis which follows is a statistical one, and involves some rather large statistical tables, the nonstatistical reader should not be discouraged. The tools employed are very simple and readily grasped. To the greatest extent compatible with the conservation of space, the major points are clarified by charts, . . . and diagrams. Perhaps an understanding of the analysis will be facilitated if the reader selects the metropolitan community with which he is most familiar and keeps it in mind as he reads, informally verifying the findings of this study from his own experience, or noting exceptions, if that should be the case, as he proceeds.

CHAPTER FOUR

DISTANCE FROM THE METROPOLIS

I

Description of the Hinterland and of the Distribution of Population

A. What is the Shape of the Average Metropolitan Community?

Because the land area of the United States has been subdivided into hinterlands by bisecting distances between metropolitan centers, it might appear that if all metropolitan communities were combined and an average taken, the resulting average hinterland should be roughly circular in shape. In such a case, since the area of a circle is a function of the square of its radius, one would expect each successive zone outward from the metropolis to include a great deal more area than the zone lying inside it. For several reasons, the shape of the average hinterland of a central city in the United States is not circular. First, many of the metropolitan centers have a less than the full twelve sectors (one complete circle) because they are seaboard and lake front cities, and have no land area on one side. Second, metropolitan centers lying near a seacoast or lake short have abnormally short sectors on their side toward water. Third, the sectors are of varying lengths, depending on the distance to the nearest neighboring metropolis. Hence, almost no metropolis lies in the exact center of its hinterland. Fourth, the sparsity of metropolitan centers in the Southwest and Mountain divisions permit some of the metropolitan centers to have extremely large hinterlands,

particularly in one direction. Noteworthy are the El Paso, Denver, Salt Lake City, Minneapolis, and Spokane metropolitan communities. The combined effect of these factors is to place the land area in such a position with respect to the metropolitan centers that the "average" metropolitan community is not circular and the central city does not lie at the geographic center.

There is such a wide diversity in the total number and length of sectors which characterize individual metropolitan communities and in size of hinterlands among the metropolitan communities that an "average hinterland" would not be a very useful tool in analyzing the structure of the metropolitan community. It is very useful, however, for describing how the total land area of the United States is distributed by distance from metropolitan centers. While not representing any one metropolitan community, it does characterize the distance pattern for the United States as a whole.

To obtain a picture of the accessibility pattern of the hinterland one can compare the actual land area lying in each zone with the land area which would be expected to be within that zone if every hinterland contained all twelve sectors, and if each metropolis lay in the exact geographical center of its hinterland. Table 4-1 presents the data for such a comparison, and Chart 4-1 illustrates the form which the hinterland takes when the area in each zone is expressed as a percentage of the expected area. It can plainly be seen that the land area of the United States is not at all evenly distributed about metropolitan centers, but takes the shape of an elongated heart with a very pointed tip. At the very shortest distance zone,

the actual land area is approximately three-quarters of the expected area, indicating that water fronts, shore lines, and extremely short sectors cut away approximately one-fourth (three sectors) of the average hinterland.[1] In the second and succeeding zones outward, the percentage which the actual area is of the expected area decreases steadily as the shorter sectors encounter the boundaries of neighboring metropolitan centers. At about 365 miles the actual land area is only about 2 percent of the amount which would be expected at this distance if all sectors were present and extended through the 265-464 mile zone. Green County, Montana, the most distant hinterland area in the United States, lies almost 800 miles from a metropolis.

This general picture of the distance pattern of the hinterland should be kept in mind throughout the remainder of the analysis. When hinterland distances greater than 65 miles are being discussed, the picture of the hinterland which should come to mind is not that of a broad circular expanse of territory surrounding the metropolis. The longer distances include a large amount of territory lying on one side of the metropolis as the longer sectors reach out toward more distant metropolitan centers. With increasing distance, a greater proportion of the land area consists of the tips of the longest sectors in the individual metropolitan communities. The maps of the

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[1] The 67 metropolitan communities have a combined total of 628 sectors which contain some land area. This is an average of 9.4 sectors per metropolitan community, or a loss of 2.6 sectors per metropolitan community because of the factors named.

Table 4-1

Land area lying within each distance zone from the nearest metropolis and land area expected to lie within those zones if all metropolitan communities were circular. United States, 1940.

Distance zone (miles)	Radius (miles)	Land area (square miles)		Ratio of actual to expected area
		Expected[a]	Actual[b]	
0-24[b]	25	131,554	97,296	74.0
25-34	35	126,293	77,071	61.0
35-44	45	163,390	99,544	59.1
45-64	65	463,071	208,163	45.0
65-114	115	1,894,385	543,500	28.7
115-164	165	2,946,321	471,981	16.0
165-264	265	9,050,950	722,363	8.0
265-464	465	30,731,131	619,245	2.0

[a]Computed by subtracting from the area of a circle of each radius the area of a circle of the next smaller radius, then multiplying by 67.

[b]Includes area of central cities and of counties containing central cities.

Source: Sixteenth Census of the United States. Compiled from Areas of the United States, 1940, Tables 2, 3, and 4.

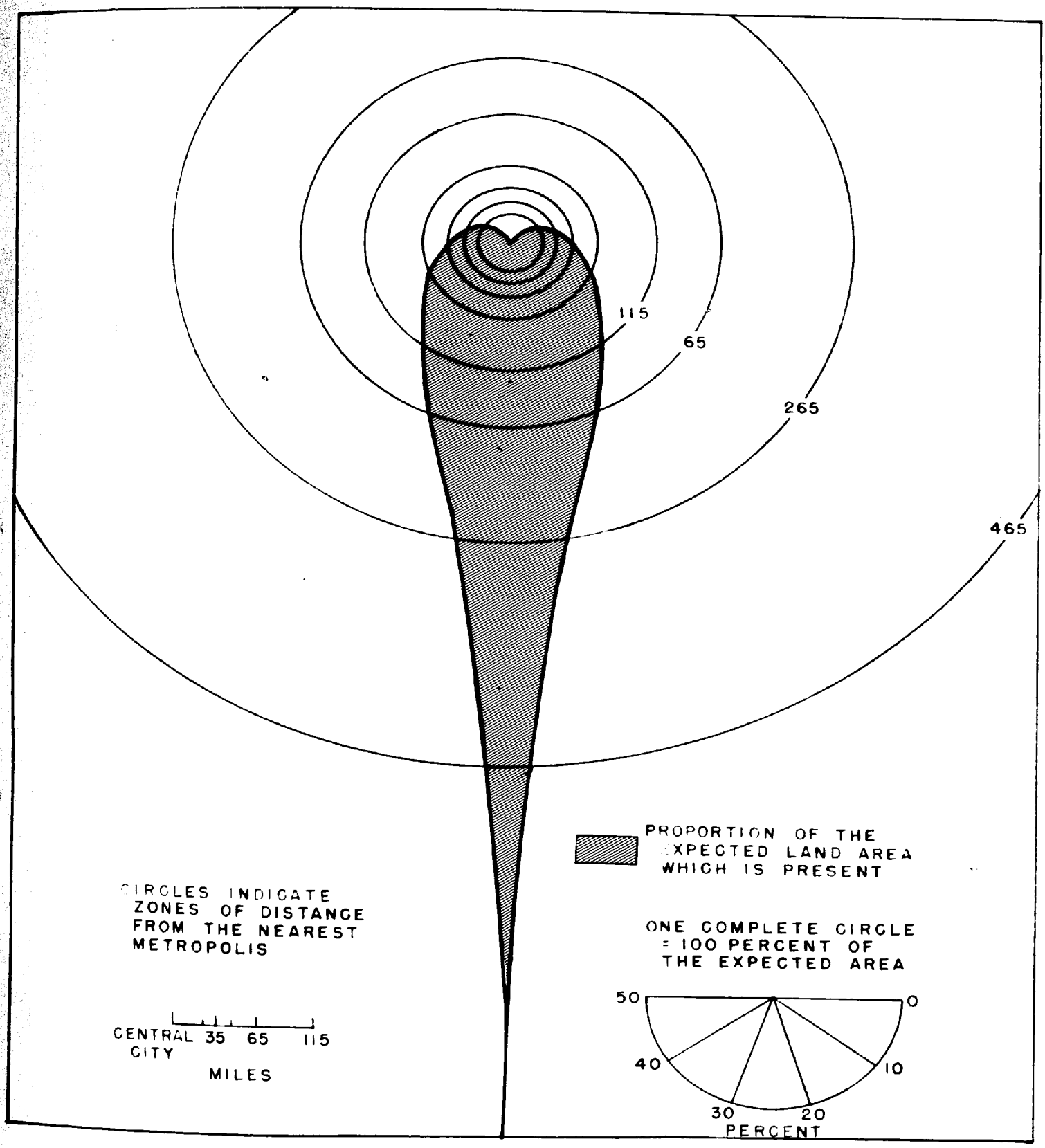


CHART 4-1 PERCENT WHICH ACTUAL LAND AREA IS OF THE LAND AREA EXPECTED IF THE METROPOLITAN COMMUNITIES WERE CIRCULAR, BY DISTANCE FROM THE NEAREST METROPOLIS

Memphis and the Atlanta metropolitan communities, presented in Chapter Two (Maps 2-1 and 2-2), illustrate the manner in which different lengths of sectors distort the hinterland from a circular distance pattern.

B. What Percentage of Land Area and Population Lie in Each Distance Zone?

1. Land Area. It should not be inferred from the foregoing section that the great bulk of the land area of the United States lies within a very few miles of the metropolis. Table 4-2, showing the percentage of the total land area contained in each distance zone, shows that fully half of the hinterland lies 165 miles or more from a metropolis. The maximum extension of a hinterland seems to be about 465 miles, for less than 5 percent of the total land area lies at a greater distance than this.

2. Population. From Table 4-2 it is very evident that the population of the United States, and particularly the urban population, is distributed about the metropolis in a very different fashion than is the land area. One out of four people live in the 0.126 percent of the total area of the United States which is occupied by central cities. One additional person in seven lives within easy commuting distance (0-25 miles) of the metropolis,[2] and three out of five people live either in a

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[2] The inner zone is always of indeterminate size because the metropolis is also located in that zone, and because the county containing the central city can be given no distance value. Although "0" is used to indicate the inner distance value of this zone, in every case the central zone consists of the land area from the city limits of the metropolitan centers out to some specified distance in the hinterland. Thus "0-24 miles" means "from the city limits of the metropolis out to 25 miles from the center of the metropolis, including all of the counties containing the central cities." In plotting the data for the inner zone on the charts which follow, a radius of five miles has arbitrarily been assigned to the central city. The midpoint used for plotting purposes, therefore, falls midway between five miles from the metropolis and the outer limit of the zone.

metropolis or within 65 miles (about two hours journey) by automobile of the metropolis. Only one person in 34 lives 265 or more miles (more than six and one-half hours via automobile) from the metropolis. This tendency for population to concentrate toward the shorter distances is even more marked for the urban population. Almost two out of three urbanites live either in or within easy commuting distance of the metropolis. Almost four out of five live within two hours journey, and only seven in 500 urban people live more than six and one-half hours via auto from a metropolis.

This apparent concentration of population at the shorter distances is the first evidence of metropolitan control. By analyzing it further it can be measured, stated in more quantitative terms, and generalized as an element of metropolitan organization and structure.

II

Concentration of the Population About the Metropolis

A. The Hinterland Populations Are Concentrated in the Inner Zones of The Metropolitan Community.

At first glance it will appear that there is little new in this discovery of a concentration of people in and about the metropolis. The inclusion of the population of central cities in the above percentage comparisons will necessarily denote an unusual concentration of people relative to land area. Also the fact is well known that immediately surrounding each of the major cities there is a concentration of population in suburbs and in the open country. Because a large proportion of the people in many of these communities live and work in the metropolis, such areas are generally regarded as being a

Table 4-2

Percentage distributions of land area, total population, and urban population, by distance from the nearest metropolis. United States, 1940.

Distance zone (miles)	Percentage distribution			Difference, in percentage points, between land area and--	
	Land area	Total population	Urban population	Total population	Urban population
Central cities	0.196	25.7	45.4	25.6	45.3
Hinterland:					
0-24[a]	3.1	15.2	17.5	12.2	14.4
25-34	2.6	5.4	5.0	2.8	2.4
35-44	3.3	4.6	3.6	1.3	0.3
45-64	7.0	10.0	7.5	3.0	0.5
65-114	18.3	17.3	10.8	-1.0	-7.5
115-164	15.9	10.5	5.1	-5.4	-10.8
165-264	24.3	8.4	3.7	-15.9	-20.6
265-464	20.8	2.5	1.3	-18.3	-19.5
465-over	4.6	0.4	0.1	-4.2	-4.5
All zones	100.0	100.0	100.0	11.8[b]	62.9[b]

[a] Includes counties containing central cities.

[b] Coefficient of dissimilarity between distribution of land area and population.

Source: Sixteenth Census of the United States. Compiled from Population, Vol. I, State Tables 3 and 5; Areas of the United States, 1940, Tables 2, 3, and 4.

part of the central urban community. This peripheral concentration is commonly regarded as a circumstance arising from the relative inflexibility of city boundaries in the face of persistent urban growth. As large cities are unable to extend their boundaries to provide room for growth, population and business establishments merely overflow into the area adjacent to the city. The Census Metropolitan District, delimited on the basis of continuous density outward from the city, has been established in order to delimit the large urban community more realistically.

A more exact measurement of concentration can be made by excluding the population and area of the metropolitan centers and considering only the hinterland and its population, as has been done in Table 4-3. There is no simple way to separate the people in the inner zones who are, to all intents and purposes, residents of the metropolis from those of the "hinterland" in that they do not actively participate in daily activities centered in the metropolis. The Census Metropolitan Districts tend to include many more communities than "dormitory" communities and areas of "overflow." Some hinterland communities lie as much as 65 miles or more from the central city and yet are considered to be a part of the metropolitan district. Therefore, the city limits of the central city have been taken as delimiting the metropolis, and all suburban communities have been included in the hinterland. As an aid to understanding the full extent of population concentration about the metropolis in Table 4-3 the 0-44 mile zone has been divided into two parts: the metropolitan districts of the

Table 4-3

Percentage distributions of hinterland land area and population, by distance from the nearest metropolis, United States, 1940.

Distance zone (miles)	Land area	Hinterland population				
		Total	Urban	Rural	Rural-farm	Rural-nonfarm
Central counties[b]	1.7		c	7.1	3.3	11.3
0-4c	--	13.8	4.2	--	--	--
5-9c	--		9.3	--	--	--
10-14	0.2		8.4	1.0	0.4	1.7
15-24	1.2	6.7	10.2	4.3	2.9	5.8
25-34	2.6	7.3	9.1	6.0	5.1	7.0
35-44	3.3	6.2	6.5	5.9	5.2	6.8
45-64	7.0	13.5	13.8	13.2	13.0	13.4
65-114	18.3	25.3	19.8	25.7	27.8	23.3
115-164	15.9	14.1	9.3	17.5	21.3	13.3
165-264	24.3	11.3	6.0	14.6	16.4	12.6
265-464	20.8	3.3	2.4	4.0	3.9	4.1
465-over	4.6	0.5	0.2	0.7	0.8	0.6
All zones	100.0	100.0	100.0	100.0	100.0	100.0
0-44 mile zone	9.0	34.0	47.7	24.3	16.9	32.6
Metropolitan districts[d]	1.1	19.9	33.6	10.1	--e	--e
Remainder of zone	7.9	14.1	14.1	14.2	--	--

[a]Excludes area of central cities.

[b]Counties containing the central cities.

[c]Distance of hinterland area, rural-farm, and rural-nonfarm populations were determined on the basis of geographic centers of the county in which they lie, whereas the distances of cities were individually determined, regardless of the county in which located. Hence no urban population is reported for central counties and no rural population is reported for the individual zones at distances of less than 15 miles.

[d]Includes that portion of the metropolitan districts of the 67 metropolitan centers which lies outside the central city.

[e]Rural-nonfarm and rural-farm population not reported for metropolitan districts by the Census.

Source: Sixteenth Census of the United States, Compiled from Population, Vol. I, State Tables 3 and 5; Population, Vol. II, State Tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

67 central cities, and the remainder of the area of the 45 mile zone. This permits a comparison of population concentration in the metropolitan districts with concentration in the areas immediately outside the metropolitan districts.

It requires considerable study of a statistical table to grasp the full import of a general pattern which is composed of the differences between several percentage distributions. A more accurate and easier judgment concerning population concentration can be made by using the tabulation of percentage-point differences between the percentage distribution of population and that of land area, shown in Table 4-4. Since the hinterland contains three types of population (urban, rural-nonfarm, rural-farm) and since these three types of population all reside in each distance zone, the pattern of differences in their concentration with distance can quickly and easily be obtained by subtracting the percentage of the land area in a given zone from the percentage of each of the populations residing in that zone. Thus, the zone 0-24 miles contains 3.1 percent of the hinterland area and 32.1 percent of the hinterland urban population. Subtracting the percentage of land area from the percentage of urban population (32.1 minus 3.1) shows a difference of 29.0 percentage-points between the relative distribution of land and of urban people in this zone. This means that 29.0 percent <u>more</u> of the total hinterland urban population resides in zone 0-24 miles than would be expected if this population were distributed in proportion to the land area.

Table 4-4

Differences, in percentage points, between the percentage distributions of land area and population, by distance from the nearest metropolis. United States, 1940.

Distance zone (miles)	Hinterland population[a]				
	Total	Urban	Rural	Rural-nonfarm	Rural-farm
Central county	[b]	[b]	5.4	9.6	1.6
0-24[c]	17.4	29.0	3.9	6.1	1.9
25-34	4.7	6.5	3.4	4.4	2.5
35-44	2.9	3.2	2.6	3.5	1.9
45-64	6.5	6.8	6.2	6.4	6.0
65-114	5.0	1.5	7.4	5.0	9.5
115-164	-1.8	-6.6	1.6	-2.6	5.4
165-264	-13.0	-17.5	-9.7	-11.7	-7.9
265-464	-17.5	-18.4	-16.8	-16.7	-16.9
465-over	-4.1	-4.4	-3.9	-4.0	-3.8
0-44 mile zone	25.0	38.7	15.3	23.6	7.9
Metropolitan districts	18.8	32.5	9.0	[d]	[d]
Remainder of zone	6.2	6.2	6.3	--	--
Coefficient of dissimilarity	36.4	46.9	30.4	35.0	28.7
Coefficient of similarity	63.6	53.1	69.6	65.0	71.3

[a]Positive values indicate concentration of population; minus signs indicate a deficit of population relative to land area.

[b]Urban population distributed by actual distance of city rather than location inside or outside central county.

[c]Grouping of inner zones necessary to make urban population coincide with land area.

[d]Data for rural-farm and rural-nonfarm populations by metropolitan districts not reported.

Source: Sixteenth Census of the United States. Compiled from Population, Vol. I, State Tables 3 and 5; Population, Vol. II, State Tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

If people were distributed in all zones in exactly the same proportions as land area, there would be no concentration with respect to the metropolis. But since a larger proportion of the total population actually resides in some zones than zero concentration (equal percentages of people and land area) would indicate, one is justified in terming all percentage of population in excess of the percentage of land area "population concentration." In the above case it can be stated positively that an excess of 29.0 percent of the hinterland urban population is concentrated in zone 0-24 miles from the metropolitan centers. When used in this sense, concentration is a relative term, and means that one area is more intensively occupied by a given population than the average intensity of land occupancy for all areas. On the same assumptions, an area may have a deficiency, or disproportionately small share, of population in relation to its area. The percentage-point differences therefore show proportions of the total which are concentrated or deficient in each category.

If percentage-point differences are computed for all distance zones, and between the percentage distribution of land area and each of the three classes of population (being careful to prefix each percentage point-difference with the proper signs), the tabulation shown in Table 4-4 results.[3]

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[3] The sigh before a percentage-point difference is a matter of arbitrarily choosing which distribution is to be subtracted from the other. The choice made here has been such that relative concentration will always appear as a positive quantity and relative scarcity as a negative one.

The percentage-point differences reported in Table 4-4 are most revealing. Note particularly that:

a. Not only the urban population, but all three hinterland populations show a distinctive pattern of concentration with respect to the metropolis.

b. This concentration is not merely a "suburban" phenomenon, but population is consistently concentrated at great distance into the hinterland, in fact, as far as 115 miles.

c. The pattern of concentration does not merely fade to zero difference, but passes over into a negative value at the greater distances and continues right out through the last zone of the hinterland as a relative lack of concentration.

d. The metropolitan district accounts for about 90 percent of the concentration of the hinterland urban population in the 0-44 mile zone and about 60 percent of the rural concentration in this zone. Concentration of population extends far beyond metropolitan district boundaries.[4]

Thus not only the hinterland population as a whole but also each of the major types of hinterland population has a definite pattern of distribution with distance from the metropolitan center. This pattern is one of consistent concentration out to about 115 miles, and then of relative lack of concentration out through the outer distance zone. Imagine for a moment what the pattern of distribution would have been had there been no pattern of concentration with distance. Either the differences would all have been small (near zero) or would have been randomly positive or negative with little regard for distance. The fact that this pattern of differences is obtained by arranging the urban, the rural-farm, and the rural-nonfarm populations of the United States by the distance which they lie from the nearest metropolis indicates that distance from large cities measures a deep and

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[4] The subtraction of the metropolitan district area and population from its 0-44 mile zone slightly understates the amount of concentration outside the metropolitan district in that zone, for in a few instances metropolitan districts extend for distances greater than 45 miles from the central city (e.g. Pittsburgh and San Francisco Metropolitan Districts). This has the effect of including some land and population in the 0-44 mile zone which is actually not there.

universal set of elements which go into our organization as a nation.

B. The Amount of Population Concentration in the Metropolitan Community

Referring back to the way in which the percentage-point differences between population and land area were computed, it will be noted that all positive differences indicate population concentration, that all negative differences indicate a deficiency of land settlement. In either case, the amount of the difference shows the proportion of the total population which is in excess or deficit of the proportion of land in that zone. By adding all of the positive (or negative) differences together it is possible to obtain a measure of the over-all amount of concentration, and of the proportion of the total population which is concentrated.[5] If there had been absolutely no difference between the percentage distributions of land area and of population, all percentage-point differences would have been zero, and their sum would also have been zero. The greater the differences between two distributions the larger some of the percentage-point differences between them become. Hence the sum of their positive or negative values is an index of over-all difference between any two percentage distributions. If the positive differences are all in the inner zones, and the negative ones all in the outer zones, it is then evident that the concentration of population with respect to land is oriented toward the metropolis and forms a definite pattern. The sum of the differences of one sign is a summary measure of total concentration produced by this pattern.

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[5] Since each of two percentage distributions add to 100, the sum of the individual differences between them must add to zero. In other words, the sum of the positive quantities will equal the sum of the negative ones.

This measure may be called a "coefficient of dissimilarity" and theoretically can vary in value between 0 and 100 percent (or 1.0). It can be employed to summarize the total amount of dissimilarity between any two percentage distributions in which the two sets of percentages are distributed by the same classes and refer to the same units.[6] If this coefficient of concentration is subtracted from 100 percent the total proportion of similarity between two distributions can be found. Such a measure will be referred to hereafter as a "coefficient of similarity." It measures the percentage of two distributions which are distributed in the same proportions among the various categories.

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[6] Because of their extreme simplicity, ease of calculation, and ready interpretability, several measures of this general type will be used throughout this study. For this reason it is well to describe some of the characteristics of this coefficient in more detail. The values obtained indicate the proportion of the total of one distribution which must be redistributed among the categories of opposite sign in order to render the two distributions alike. The value obtained varies with the number of units into which the percentage distribution is divided; increasing the number of categories tend to raise its value. The manner in which the whole has been subdivided also affects its value. Hence coefficients of this type can be compared only with similar coefficients computed from data which refer to the same units and which are divided into the same classes. In some applications a coefficient of complete dissimilarity (coefficient of 100 percent) is impossible, as in the comparison of the distribution of people and land, for it would require all of the people to live on zero land area.

For a full description of this device, and some applications, see: PEP (Political and Economic Planning), Report on the Location of Industry (London: PEP, 1939) pp.291-293.

E. M. Hoover, "Interstate Redistribution of Population, 1850-1940, Journal of Economic History, 1 (May 1941) pp. 199-205.

P. S. Florence, W. G. Fritz, and R. E. Gilles, "Measures of Industrial Distribution," Chapter 5, National Resources Planning Board, Industrial Location and National Resources, (Washington: Government Printing Office, 1943).

Returning to Tables 4-2 and 4-4, where the coefficients of dissimilarity and of similarity are reported for the zonal distribution of the various populations with respect to the comparable distributions of land area, it is found that the values of these measures are as follows:

Population type	Coefficient of dissimilarity	Coefficient of similarity
United States total	44.8	55.2
United States urban (including central cities)	62.9	37.1
Hinterland urban	46.9	53.1
Hinterland rural	30.4	69.6
Rural-nonfarm	35.0	65.0
Rural-farm	28.7	71.3

Of the total population of the United States, 44.8 percent resides at a distance closer to the metropolis than would be found if there were complete dispersion over the land. When the hinterland populations are considered separately it is found that all have an impressively high degree of concentration. Thus 46.9 percent of the hinterland urban population is concentrated relative to distance from the central city, while 28.7 percent of the rural-farm population is concentrated. The rural-nonfarm population has a concentration value about midway between these two (35.0 percent).

The complementary values of the coefficient of similarity are measures of the linkage of the three types of population to land. The higher degree of correspondence between the rural-farm population and the land indicates the necessity for this population to compromise the concentrative tendency with the availability of arable land. The low degree of correspondence between the hinterland urban population and land indicates greater freedom to follow the concentrative pattern.

The remarkable compromise of the rural-nonfarm population half way between the values for the hinterland urban and the rural-farm populations leads to an inference that the rural-nonfarm population is influenced in its distribution both by those factors which give the urban population its characteristically high degree of independence from the land, and the rural-farm population its relative dependence on the land. Apparently these two sets of factors are about equally effective in distributing the rural-nonfarm population in metropolitan communities.

It will be noted that it would be necessary to move 44.8 percent of the total population of the United States (including population of the central cities) from the central zones out into the periphery before a complete "decentralization" of the metropolitan community, as delimited here, could be obtained. If one desired to completely decentralize the urban population, including the residents of central cities as well as the hinterland urban population, it would be necessary to move 62.9 percent of the total city dwellers from the inner zones out beyond the 115 mile zone. Such is the magnitude of the concentration of population in the inner portions of the metropolitan community.

III

The Pattern of Population Settlement with Distance from the Metropolis

The study of population concentration with change in distance from the metropolis has been made by comparing the relative amounts of land area and population in each distance zone. The yardstick for measuring concentration has been the principle that under conditions of no concentration equal proportions of land area should contain equal proportions of the population. Variations away from this equality repre-

sent concentrative excesses or deficits. The comparison of percentage-point differences yielded a statement of the proportion of the total population which is concentrated in a given distance zone. The sum of those differences summarized the total proportion of concentration at all distances. Having demonstrated the existence of concentration and measured its amount, the next step is to find whether or not there is a definite pattern of distribution of population with distance from the metropolis. Only by so doing will it be possible to generalize a population structure for metropolitan communities. Evidence that there is such a pattern has been indicated by the large percentage-point differences in the inner zones, and the neat division of all the plus differences in the inner zones from all of the minus differences in the outer zones.

From the above it is apparent that the distinctive pattern of population distribution with respect to the metropolis will be one of aggregation, or intensity of land settlement. Since aggregation is a variable which can take on any given value from extremely low to very high, it would appear that the pattern of population distribution will consist of variations in intensity of aggregation with distance. Although the method of percentage-point differences is very useful for demonstrating that concentration exists, and for measuring its amount, it is not the most suitable technique for studying the pattern of population distribution. Its usefulness for the study of population patterns fails because it cannot state the intensity with which the populations of different areas are aggregated or settled. This failure arises from its inability to control the

differences in land area which inevitably occur from one zone to another. To characterize accurately the pattern of population distribution in the hinterlands of metropolitan communities a measure of intensity of land settlement, or rate of occupancy of the land, is needed. This measure must eliminate existing differences in land area between the various parts.

A familiar measure of the intensity of land occupancy, the "number of persons per square mile" (or per 100 square miles), will be used to eliminate differences in area. It is computed by dividing the population of each zone (urban, rural-nonfarm, or rural-farm) by the land area of the zone. Although the arithmetic procedure for computing this measure is the same as that for computing "densities," as the number of persons per square mile in cities, the meaning intended here is not the same as that usually associated with density figures. The term "density," when applied to population, frequently connotes crowding or the average proximity of residence. In this sense the number of urban persons per square mile of hinterland can scarcely be spoken of as the "density" of the urban population in the hinterland, for it in no way measures the crowding of urban residents or their proximity to each other. It does, however, measure the extent to which the urban population is present in any one part of the hinterland. With differences in land area eliminated, all parts of the hinterland become directly comparable to each other. The intensity or rate at which each part is settled, or occupied, by each type of population can be stated with exactitude. In order to avoid confusion with density figures as usually interpreted, the measures of the number

of people per unit of hinterland area which are used in this study are called "habitation ratios." The habitation ratios are not intended as measures of the number of persons which each square mile of the hinterland "supports" or is capable of supporting. They are interpreted as rates of occupancy, measures of the intensity of land settlement, or indications of the degree to which the hinterland is utilized and manipulated by the population of a given type.[7]

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[7] Whereas the method of percentage-point differences states directly the amount of population concentration in each zone, the habitation ratio indicates only the intensity of habitation. However, the amount of population concentration may be measured upon the premise that under conditions of no concentration, equal amounts of land area will contain equal amounts of population and that amounts which differ from some arbitrarily adopted standard of intensity of land occupancy represent positive or negative concentration. A simple starting point for measuring the intensity of concentration is to assume that zero concentration exists at any point if the population per square mile at that point is the same as for the hinterland as a whole. If all distance zones are found to contain the same number of people per square mile, the habitation ratio for each zone would be the same as for the hinterland as a whole, and concentration would be zero in every zone. Variations in the number of persons per square mile above and below the habitation ratio for the metropolitan community as a whole may be taken as indexes of the positive or negative absolute rate of concentration, respectively. If these variations are expressed as a percentage of the habitation ratio for the metropolitan community as a whole, they then measure the positive or negative relative rate of concentration. The absolute rates of concentration may be converted into the percentage-point differences between land and area by applying the absolute concentration rate to the land area of the zone and expressing the resulting number of people concentrated in excess of average land occupancy as a percentage of the total population of that type in the hinterland.

A. The Intensity of Land Settlement - Habitation Ratios at Each Distance.

That there is a distinctive pattern of intensity of land occupancy with distance from the metropolis is obvious from Table 4-5 and Chart 4-2, which report the urban, the rural-nonfarm, and the rural-farm population per square mile of hinterland for each distance zone. In the inner zone the habitation ratio for each population type is at a maximum. With increasing distance the number of residents per square mile decreases until at the greatest distances the population per square mile is only a small fraction of its original value. For example, the habitation ratio of all hinterland population for the areas beyond 465 miles from the metropolis is only 3.9 percent of the habitation ratio in the 25-34 mile zone.

The overall pattern of land settlement in metropolitan communities appears to be a precipitous decline from the central city out through the 35-44 mile zone, followed by a leveling off or even a slight rise in the 45-64 mile zone, and then a very steady decline to the outer limits of the hinterland. Within 65 miles of the metropolis the land is more intensively occupied by urban than by rural populations. Within 35 miles of the metropolis the land is more intensively occupied by the rural-nonfarm than by the rural-farm populations. At distances greater than 115 miles the rural-farm population occupies the hinterland more intensively than either the urban or the rural-nonfarm. At about this same point the rural-nonfarm surpasses the urban population in the rate of land occupancy. Thus, at the very periphery of the hinterlands all populations

Table 4-5

Habitation ratios: Urban and rural population per square mile of hinterland, by distance from the nearest metropolis. United States, 1940.[a]

Distance zone (miles)	All hinterland population	Type of hinterland population			
		Urban	Rural	Rural-nonfarm	Rural-farm
Mean habitation ratio	32.9	13.7	19.3	9.1	10.2
0-24	214.6	138.8	75.8	54.5	21.3
25-34	92.6	47.9	44.8	24.7	20.1
35-44	60.8	26.6	34.1	18.4	15.7
45-64	63.3	27.0	36.3	17.5	18.8
65-114	41.9	14.8	27.1	11.6	15.5
115-164	29.2	8.0	21.2	7.6	13.6
165-264	15.4	3.8	11.6	4.7	6.9
265-464	5.2	1.6	3.6	1.8	1.9
465-over	3.6	0.7	2.8	1.1	1.7

[a]Total land area of the United States, excluding area of central cities, used in computing all habitation ratios.

Source: Sixteenth Census of the United States. Compiled from Population, Vol. I, State Tables 3 and 5; Population, Vol. II, State Tables 26 and 27. Areas of the United States, 1940, Tables 2, 3, and 4.

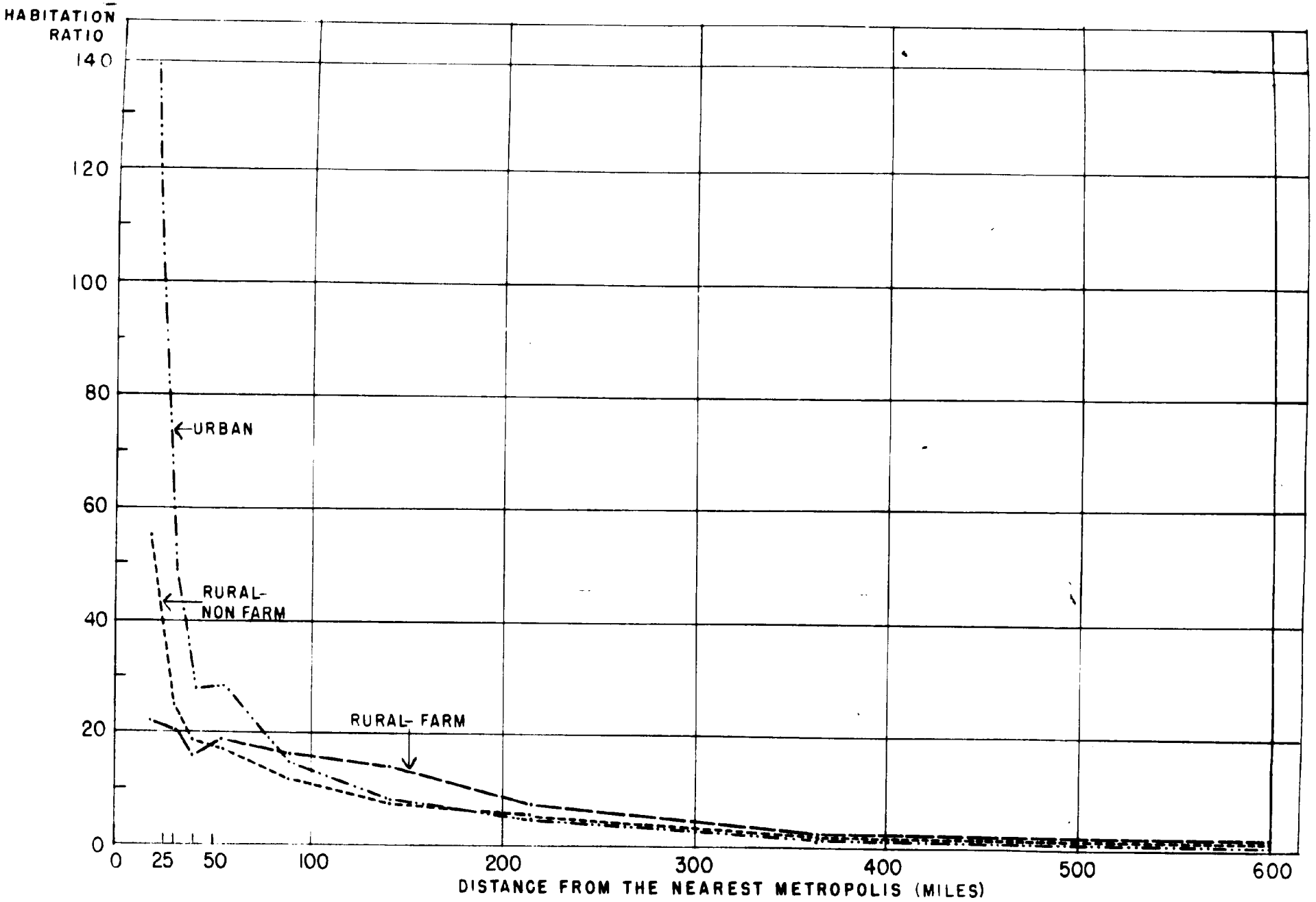


CHART 4-2 HABITATION RATIOS: POPULATION PER SQUARE MILE OF HINTERLAND, BY DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1940

occupy the land with a very low intensity and in a combination which is the complete reverse of the one which is found in the inner zones. As will be seen in later chapters, this general pattern is modified somewhat when other variables are considered.

Chart 4-3 presents the same information which is plotted on Chart 4-2. In Chart 4-3, however, the distance scale and the scale for the habitation ratios are logarithmic instead of arithmetic. The "reverse J" shape of the curves in Chart 4-2 reveals the fact that a given mileage change in distance is not accompanied by a constant amount of change in the habitation ratios; with a given change in mileage distance, the amount by which the habitation ratios change tends to decrease as the distance increases. Neither is there a constant rate of change in the habitation ratios with a given mileage change in distance; the rate of change tends to be greater at the short distances than at the longer ones. There does, however, tend to be a fairly constant rate of change in the habitation ratios with proportional change in distance. This fact is demonstrated graphically by the logarithmic plotting of Chart 4-5. The urban and the rural-nonfarm populations approximate a linear pattern with distance when plotted on scales of this type. Change in relative distance, rather than linear distance, has a tendency to be accompanied by a fairly constant rate of change in the intensity of land occupancy. Halving or doubling the distance from the metropolis tends to be more directly associated with a constant rate of change in the intensity with which the land is occupied than adding or subtracting a given

number of miles. Because they illustrate most clearly the nature of the relationships between land occupancy and distance, logarithmic rather than arithmetic charts will be used throughout this study. The shape of these distributions when plotted on an arithmetic scale should not be forgotten, however. By comparing the slopes of the lines for the different populations at different distances, one can observe patterns in the rates of change. Thus, the more gentle slope for the rural-nonfarm than for the urban population indicates that there is a smaller rate of change in the intensity of land occupancy with relative change in distance for the rural-nonfarm than for the urban population. The pattern for the rural-farm population appears to consist of two separate rates of change, one extending from the metropolis out to about 165 miles, and another from this point out to the edge of the hinterland. At distances of less than 115 miles the rural-farm population exhibits a small increase in the rate of land occupancy with relative increasing proximity to the central city. In this respect it is very different from both the urban and the rural-nonfarm populations, which tend to show a rapid decrease in habitation ratio with each increase in distance from the metropolis. At the far distances (beyond 115 miles) the rural-farm population seems to undergo a marked alteration in its pattern of distribution, and to approach the rate of change which is characteristic of the other two populations at these distances. There is a tendency for all three populations to attain the same or even a smaller habitation ratio in the 35-44 mile zone than in the 45-64 zone before plunging further

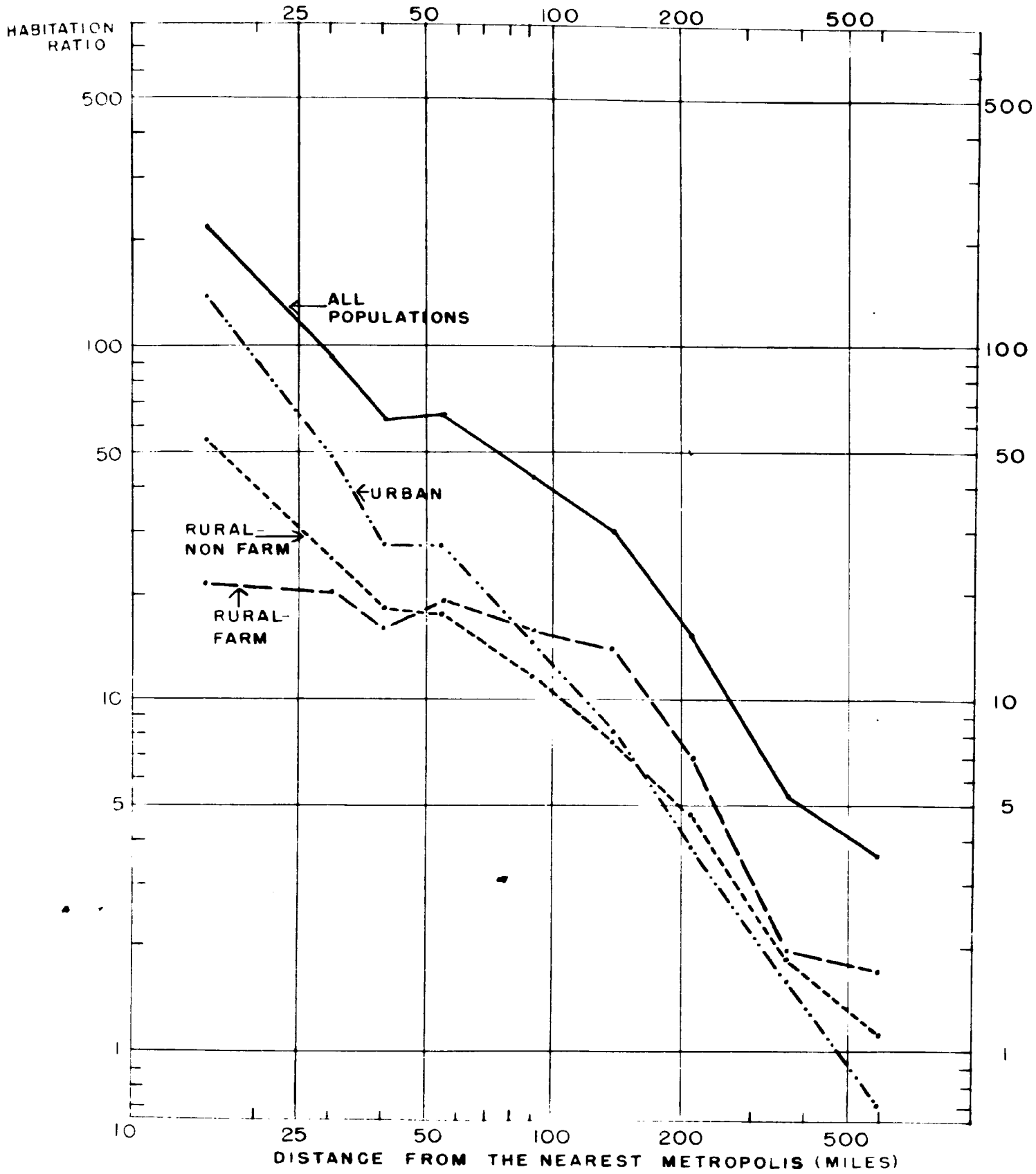


CHART 4-3 HABITATION RATIOS: POPULATION PER SQUARE MILE OF HINTERLAND, BY DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1940

into the dispersion side of the chart. This is a phenomenon worthy of more than passing note. It appears that if the metropolis exerts any effect upon population at this distance it is to stabilize or even to discourage settlement of the land. Beyond the 35-44 mile zone the metropolis tends to be ringed with a greater concentration of urban and rural-farm population. As will be seen, this tendency persists, in some degree, for all sizes of metropolitan communities and for all sector types in one or another of the intermediate zones between 25 and 45 miles. Several hypotheses could be formulated to explain this tendency:

(a) Thirty-five miles marks the outer limit of the influence of the metropolis, and the remainder of the pattern of land settlement is due entirely to other factors not controlled by this study.

(b) The metropolis may impose one set of limiting conditions upon the area immediately surrounding it and another set upon more distant areas. The 35-64 mile zone may represent a shift from one type of metropolitan control to another, or a point of dquilibrium between the two types of control.

(c) The 25-34 and the 35-44 mile zones are the only two distance zones which are as small as ten miles wide. The other zones are two or more times as wide. The low value for the 25-34 mile zone represents only a random fluctuation which would not appear at all if the distance limits of the zones were larger.[8]

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[8] The 25-34 mile zone contains 142 counties, and the 35-44 mile zone contains 158 counties. Evidence that ratios computed on the basis of such a large area is a stable one is given by the fact that this tendency persists at some intermediate point in each class size of metropolitan community and hence is not caused by one extreme case. It is true, nevertheless, that if the 25-44 mile zones are combined into one zone, the leveling off in the rate of change with relative distance disappears completely and is replaced by a more gentle slope of the curve in this zone than in the other zones.

To examine this detail of the population patterns, and to choose among the above hypotheses, would require the introduction of the remaining three variables by which the distribution of population is to be examined, and a review of the data for retail trade, wholesale trade, services, and manufacturing for cities and rural areas at this distance. For the present it is sufficient to call attention to this unique trait of population distribution with distance from the metropolis. As the other variables are introduced these variations will be traced to their source.

The evidence presented thus far indicates that the general pattern of land occupancy in the hinterland is one of:

a. Sharply decreasing intensity of settlement out to about 45 miles from the metropolis.

b. Little change or slight increase in the intensity of settlement between 45-64 miles from the metropolis.

c. Continuation of the decrease in intensity of settlement with increasing distance from the metropolis.

B. The Intensity of Population Concentration in the Hinterland.

The pattern of the intensity of land occupancy with change in distance from the metropolis has been observed. It may now be asked, "How far from the metropolis is population concentrated in excess of the average habitation ratio for the metropolitan community as a whole, and how intense is this concentration at each distance for each population?" Since each population has its own average habitation ratio for the hinterland as a whole, the deviations of individual areas from these average habitation ratios cannot be used as measures of relative intensity. By expressing these deviations as a ratio of their habitation ratios for the hinterland as a whole such comparisons

can be made. Such a ratio may be called an "index of concentration."

The deviations of the habitation ratio from the mean habitation ratio of each hinterland population at each distance, and the corresponding indexes of concentration, are presented in Table 4-6. Chart 4-4 presents a visual impression of the location in the hinterland of the areas of the greatest and of the least degree of concentration of each population. The area of positive concentration is within 115 miles of the metropolis. The area beyond this distance, which it will be remembered, constitutes the long "tail" of the land lying to one side of the metropolitan community, is primarily an area of negative concentration. The intensity with which the urban population is concentrated relative to its own habitation ratio is much greater than the intensity with which the rural-nonfarm and the rural-farm populations are concentrated with respect to their habitation ratios.

The urban population tends to be relatively as well as absolutely more intensively concentrated in the shorter distance zones than the rural populations. Likewise, the rural-nonfarm tends to be more concentrated at the shorter distances than the rural-farm population. All populations show a lack of concentration approaching 100 percent at the outer distance zones. Here, however, the urban population shows the largest negative concentration, followed by the rural-nonfarm population. Thus, the urban populations not only tend to occupy the land more intensively at the shorter distances than either of the rural populations, but there is a strong tendency for the entirety of the hinterland urban population to be concentrated in the shorter distances. By way of contrast, the rural populations

Table 4-6

Absolute and relative deviation of the habitation ratios for the hinterland populations, by distance from the nearest metropolis, from the mean habitation ratios for the hinterland as a whole. United States, 1940.

Distance zone (miles)	All hinterland population	Type of hinterland population			
		Urban	Rural	Rural-nonfarm	Rural-farm
Mean habitation ratio[a]	32.9	13.7	19.3	9.1	10.2
	Absolute deviation from the mean habitation ratio				
0-24	181.7	125.1	56.5	45.4	11.1
25-34	59.7	34.2	25.5	15.6	9.9
35-44	27.9	12.9	14.8	9.3	5.5
45-64	30.4	13.3	17.0	8.4	8.6
65-114	9.0	1.1	7.8	2.5	5.3
115-164	-3.7	-5.7	1.9	-1.5	3.4
165-264	-17.5	-9.9	-7.7	-4.4	-3.3
265-464	-27.7	-12.1	-15.7	-7.3	-8.3
465-over	-29.3	-13.0	-16.5	-8.0	-8.5
	Ratio of the absolute deviations to the mean habitation ratio				
0-24	5.5	9.1	2.9	5.0	1.1
25-34	1.8	2.5	1.3	1.7	1.0
35-44	0.8	0.9	0.8	1.0	0.5
45-64	0.9	1.0	0.9	0.9	0.8
65-114	0.3	0.1	0.4	0.3	0.5
115-164	-0.1	-0.4	0.1	-0.2	0.3
165-264	-0.5	-0.7	-0.4	-0.5	-0.3
265-464	-0.8	-0.9	-0.8	-0.8	-0.8
465-over	-0.9	-0.9	-0.9	-0.9	-0.8

[a]All hinterland population of a given type divided by the total hinterland area, in square miles.

Source: Sixteenth Census of the United States. Compiled from Population, Vol. I, State Tables 3 and 5, Population, Vol. II, State Tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

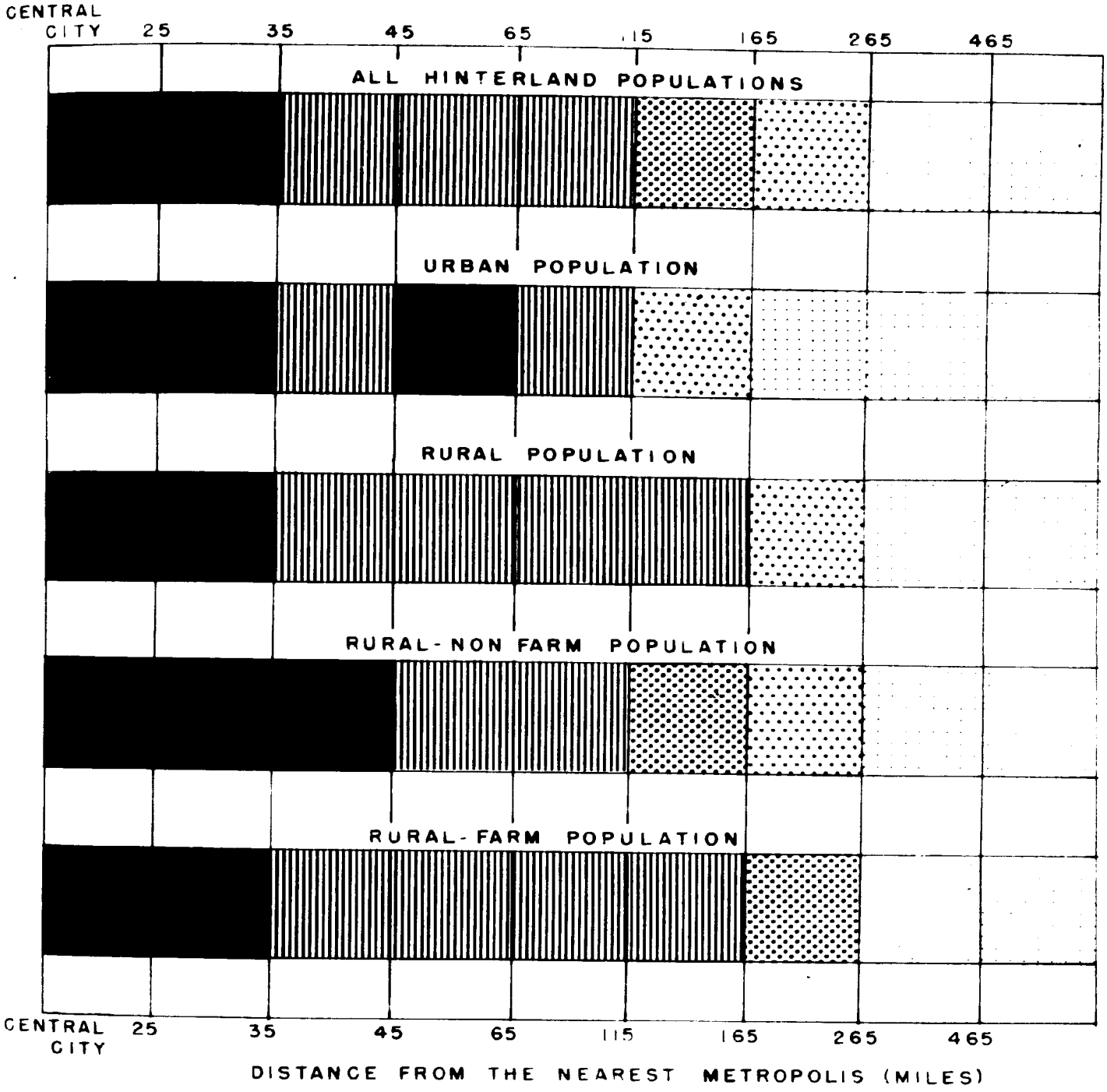


CHART 4-4 RELATIVE EXCESS OR DEFICIT OF POPULATION PER SQUARE MILE, BY DISTANCE FROM THE NEAREST METROPOLIS.* UNITED STATES, 1940

are much more dispersed. The rural-nonfarm population tends to lie between extremes of the urban and the rural-farm populations in relative intensity of concentration. A summary measure of the total difference between the populations in this respect is made in the next section.

C. How Independent are the Hinterland Populations of Each Other at Varying Distances from the Metropolis?

How independent are the populations distributed with respect to each other at each distance? The method of computing percentage-point differences, and of computing coefficients of dissimilarity and of similarity which was employed for comparing the distribution of population and land area is now used to answer this question. The necessary information is presented in Table 4-7. The differences are much smaller in this case than for land area, for the common tendency for all populations to be distributed with respect to land area reduces the amount of difference between them. The measures of dissimilarity and similarity between the distributions are:

Comparison of Hinterland Populations	Coefficient of Dissimilarity	Coefficient of Similarity
Urban with rural-farm	31.6	68.4
Rural-nonfarm with rural farm	16.3	83.7
Urban with rural-nonfarm	15.8	84.2

A total of 31.6 percent of the hinterland urban population fails to correspond to the distribution of the rural-farm population, and all of this difference is in the direction of concentration in the near zones. Compared to the urban population, the rural-nonfarm population shows a deficit in the inner zones and a relative concentration in the outer zones, but compared to the rural-farm population the rural-

nonfarm group is concentrated in the inner zones and is deficit in the 65–264 mile zones, with an extremely small concentration in the outer two zones. In general:

a. The populations which have been considered to be the farthest apart in the dominance scale show the least degree of similarity of distribution.

b. The rural-nonfarm population, occupying the middle position in the dominance scale, shows almost an identical degree of association with the rural-farm and with the urban population.

c. The rural-farm population shows only slightly more independence from the distribution of hinterland urban population than from the land itself (28.7 with respect to land).

IV

The Urban-Rural Composition of the Hinterland Population

In each zone the total hinterland population is the sum of the urban, the rural-nonfarm, and the rural-farm residents. The very fact that each of these populations has its own pattern of land occupancy with distance from the metropolis gives rise to a general distance pattern of urban-rural population composition. In no two zones are the three types of population combined in the same proportions. While this fact may be inferred from the preceding tables and charts, it has been made precise in Table 4-8 by computing the ratio of each type of population to each other type in each distance zone.

Excluding the population of the central cities, throughout the entire hinterland there is an average of

0.7 urban residents for each rural resident
1.5 urban residents for each rural-nonfarm resident
1.3 urban residents for each rural-farm resident
0.9 rural-nonfarm resident for each rural-farm resident

Table 4-7

Differences, in percentage points, between the distributions of the hinterland populations, United States, 1940.

Distance zone (miles)	Pairs of hinterland populations:[a] Urban and rural	Urban and rural-farm	Urban and rural-nonfarm	Rural-nonfarm and rural-farm
0-24	19.7	25.5	13.3	12.2
25-34	3.1	4.0	2.1	1.9
35-44	0.6	1.3	-0.3	1.6
45-64	0.6	0.8	0.4	0.4
65-114	-5.9	-8.0	-3.5	-4.5
115-164	-8.2	-12.0	-4.0	-8.0
165-264	-7.8	-9.6	-5.8	-3.8
265-464	-1.6	-1.5	-1.7	0.2
465-over	-0.5	-0.6	-0.4	-0.2
Coefficient of dissimilarity	24.0	31.6	15.8	16.3
Coefficient of similarity	76.0	68.4	84.2	83.7

[a]Positive values indicate excess of first population named over second population; minus signs indicate a deficit of first population named relative to second.

Source: Sixteenth Census of the United States. Compiled from Population, Vol. I, State Tables 3 and 5; Population, Vol. II, State Tables 26 and 27.

These ratios are approximately equal only in one zone, the 45-64 mile zone. In all other zones the urban-rural composition of the hinterland population differs considerably from these values. In the near zones there are more urbanites than rural residents. The ratio of urban to both types of rural population declines rapidly with distance. At distances up to 65 miles the hinterland population contains a greater than average ratio of urban residents to rural residents. At distances greater than this the hinterland population is comprised of a disproportionate share of rural residents of both the nonfarm and farm types. The pattern of combination is one of a gradual change over distance, with the highest values for the urban population in the short distances and for the rural populations at the greater distances. The ratio of rural-nonfarm to rural-farm population also undergoes a gradual change with increasing distance. The latter is disproportionately more numerous at distances greater than 65 miles.

Chart 4-5 illustrates the changing urban-rural composition of the hinterland population with change in distance from the metropolis. For this chart the urban, the rural-nonfarm, and the rural-farm population of each zone have been expressed as percentages of the total population residing in that zone.

Table 4-8

Ratio of each type of hinterland population to each other type of hinterland population, by distance from the nearest metropolis, United States, 1940.

Distance zone (miles)	Ratio of urban to:			Ratio of rural-nonfarm to rural-farm
	Rural	Rural-nonfarm	Rural-farm	
All zones	0.7	1.5	1.3	0.9
0-24	1.8	2.5	6.5	2.6
25-34	1.1	1.9	2.4	1.2
35-44	0.8	1.4	1.7	1.2
45-64	0.7	1.5	1.4	0.9
65-114	0.5	1.3	1.0	0.8
115-164	0.4	1.0	0.6	0.6
165-264	0.3	0.8	0.6	0.7
265-464	0.4	0.9	0.8	0.9
465-over	0.3	0.7	0.4	0.6

Source: Sixteenth Census of the United States. Compiled from Population, Vol. I, State Tables 3 and 5; Population, Vol. II, State Tables 26 and 27.

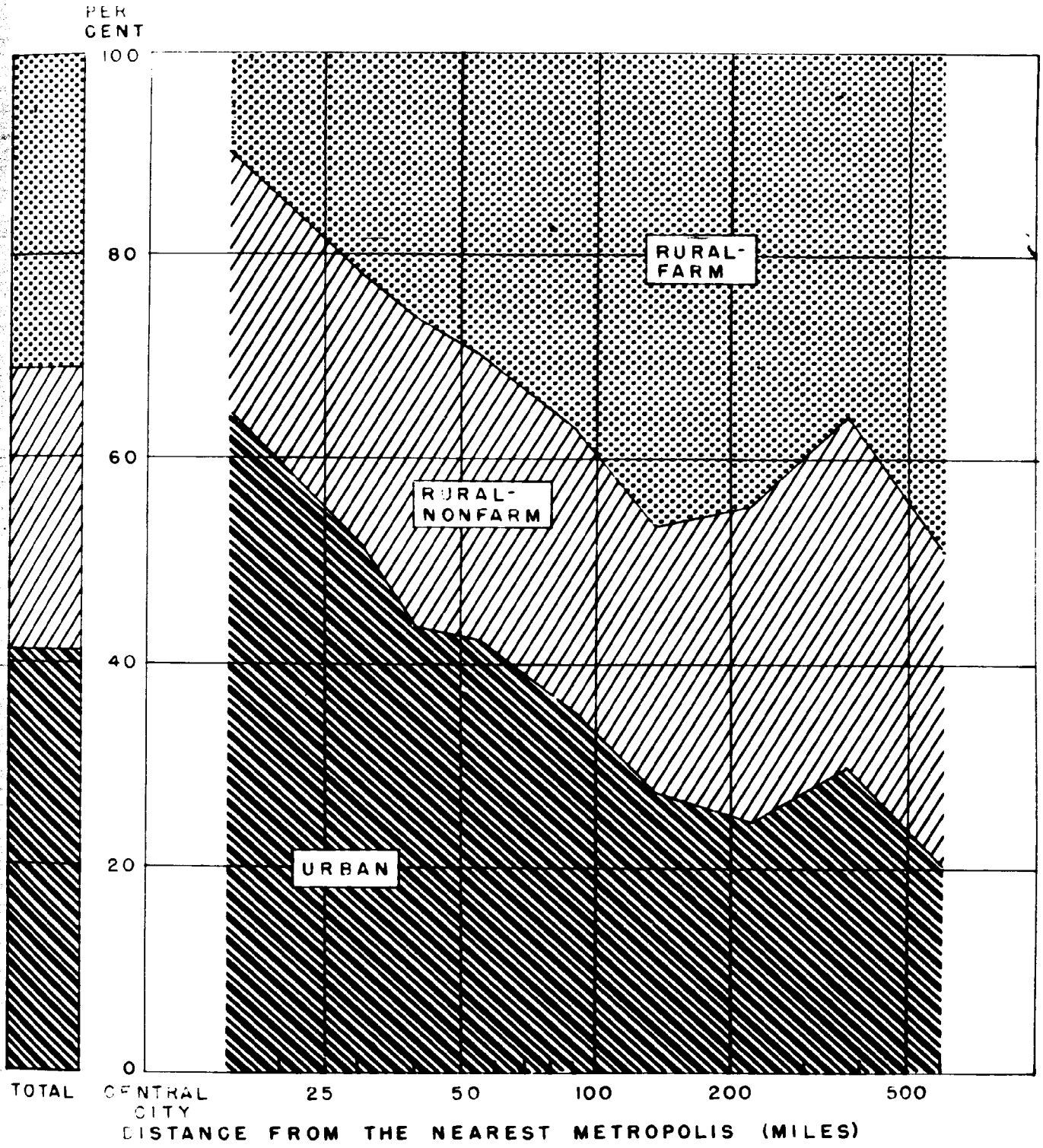


CHART 4-5 URBAN-RURAL COMPOSITION OF THE HINTERLAND POPULATION, BY DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1940

V

Are These Patterns of Distribution Required by the Environment?

In Chapter Two it was concluded that the hypothesis of metropolitan dominance could be employed to describe given patterns of population distribution only if there were no elements in the natural environment which would account for those distributions. Having observed a far-flung and consistent pattern of population concentration with distance from the metropolis, it is necessary to determine whether or not distance from the metropolis merely measures some element of the physical environment and has no significance whatsoever for the hypothesis of metropolitan dominance. In order to answer this question, a somewhat detailed analysis of the resource pattern of the hinterland and a study of geographic regions is required. Inasmuch as this same question will arise at the conclusion of each of the three succeeding chapters, and the same evidence must be marshalled to answer the question each time, the discussion of them will be deferred until all four variables have been studied in detail. Chapter Nine, which concludes this section on population patterns, deals exclusively with this problem. For the present it can be assumed that there is no sufficient environmental cause for this pattern of distribution. Yet it cannot be assumed that the metropolis is the sufficient cause. A great deal of evidence must yet be accumulated before an inference about the necessary and sufficient conditions for the existence of the metropolitan community is justified. These uniform patterns by which the hinterland populations are distributed and combined merely justify the initial formulation of the hypothesis of dominance in the structure of the metropolitan community.

VI

Summary

1. The land area of the United States is distributed about the 67 metropolitan centers in a distance pattern which is not circular. The general conception of the metropolis as lying in the center of its hinterland does not apply to the average metropolitan community. Lake and sea shores, unequal sector lengths, and differences in the overall size of individual metropolitan communities distort the average pattern of land distribution to such an extent that the territory of the United States as a whole is not at all distributed by the circular or zonal pattern. When expressed as a percentage of the land area expected if all sectors were of equal length, the distributional pattern of land assumes a shape which resembles an elongated heart with a pointed tip.

2. About one-half of the land area of the United States lies within 165 miles of the 67 metropolitan centers, yet 94.9 percent of the urban, 82.8 percent of the rural-nonfarm, 78.9 percent of the rural-farm population, and 88.7 percent of the total population resides within this zone, denoting a very intense concentration of population about the metropolis.

3. This apparent pull of the metropolis upon populations of all types is of far greater magnitude than is generally recognized. The suburbanization of the population in the immediate environs of the central city is only one aspect of a general pattern of land occupancy which extends to the very periphery of the area which has been defined as the metropolitan community. This pattern is one of rela-

tively decreasing intensity of land occupancy with relatively increasing distance from the metropolis. It appears to consist of three separate phases: a rapid decline from the central city out to about 45 miles, a leveling off or slight rise between 45 and 65 miles, and then a more gentle but consistent decline to the boundary of the metropolitan community. Within 115 miles of the metropolis the average number of people per square mile is in excess of the national average; beyond this distance there is a deficit of population density. The metropolitan district encompasses only the core of a general area of high population density.

4. The urban, the rural-nonfarm, and the rural-farm populations each has a characteristic pattern of land occupancy with increasing distance from the metropolis. The urban population is very heavily concentrated in the zones within 45 miles of the metropolis and is very sparsely distributed in the zones beyond 115 miles. The rural-farm population inhabits the land with a gradually decreasing intensity out to about 165 miles, and then reacts to increasing distance much as does the urban populations. The rural-nonfarm population appears to lie midway between the pattern for the urban and that for the rural-farm population at all distances. In the inner zones it tends to follow the pattern of heavy concentration of the urban populations, in the outer zones it tends to follow the more gradual reaction to increasing distance of the rural-farm population.

5. The magnitude of the concentration of population within the 115 mile zone can be fully appreciated when the total proportion of the population concentrated in excess of the proportion of the land area

lying within this zone is calculated. To accomplish a dispersal of population which would equate the proportion of land area and populations lying at all distances it would be necessary to remove almost 45 percent of the total population, 63 percent of the urban population, and 35 percent of the rural population from an inner to one of the outer peripheral zones.

6. The difference between the urban and rural population in the intensity with which they occupy the land creates a definite pattern of population composition in the hinterland which changes with increasing distance from the metropolis. The proportion which the urban population is of the total hinterland population decreases with increasing distance until in the outer zones (265 and over) it is only about 29 percent of the total. The rural-farm population gradually increases in proportion to the other two populations until at distances of more than 65 miles it is greater than either of the other two. The proportion of the rural-nonfarm population tends to decrease fairly steadily from the center to the periphery.

7. In all of the distributions of population by distance from the metropolis, the pattern of change with distance is exponential in nature. It appears that relative change in distance rather than mileage change is associated in a rough linear pattern with relative change in the intensity of land occupancy.

8. This analysis of the intensity of land occupancy with change in distance is not positive proof that metropolitan dominance exists throughout the hinterland. However, by showing that there is a very definite and unmistakable pattern of population distribution with

respect to the metropolis, and by demonstrating that this pattern is an average for all of the land area and all types of population in the United States, the hypothesis of the metropolitan community and of metropolitan dominance is given additional plausibility. With such evidence at hand there is justification to seek further into the population structure and into the pattern of functional specialization in order to find factors which can reasonably be considered to "explain" these population patterns.

CHAPTER FIVE

DIRECTION FROM THE METROPOLIS: SECTOR TYPE

I

Introduction

Evidence in support of a thesis that population is not uniformly distributed within each distance zone, but that direction from the metropolis is an important element to be considered in studying distributional patterns of hinterland populations, was presented in the procedural notes of Chapter Two. The evidence there cited suggested the hypothesis that a seeming tendency for population to concentrate in one direction from the metropolis, rather than in another direction, is associated with the major routes of transportation and movement to and from the metropolitan centers.

To the extent that central cities participate in a division of labor with other metropolitan centers, and with major hinterland cities, certain sectors of the hinterland must become channels for movement. This results from the fact that an extensive division of labor between large centers necessitates the exchange on a large scale of many different kinds of material objects and services. Yet such an exchange between metropolitan centers, or between a metropolis and a large hinterland city, can be carried out only by transporting the objects of exchange through the hinterland along some established route. From scattered data obtained from several sources it was inferred that hinterland areas

lying along these major routes might well be suspected to contain populations which are distributed quite differently from the populations of other areas not so favored with good transportation. Specifically, it was surmised that the intensity of land occupancy and of population concentration with distance would not be the same in areas traversed and in areas not traversed by such routes, and that the location of a city of 25,000 or more inhabitants in the hinterland would also modify the pattern of distribution with distance.

In order to provide for testing this hypothesis the hinterlands of the 67 metropolitan communities were subdivided into sectors. Each sector was then classified as being one of three types: intermetropolitan, subdominant, or local, depending upon whether it contained a major intermetropolitan route, a major hinterland city, or neither of these.

This chapter is devoted to comparing the distributions of population within these three types of sectors. In making these comparisons, the distance analysis of the preceding chapter is not disregarded, but is continued and supplemented. An attempt will be made to demonstrate the fact that some types of sectors are more intensively occupied than other types of sectors. It will be found that the combined action of these sector differences, and of the differences with distance, operate to produce a pattern of population distribution which neither distance nor sector type alone can adequately explain. This demonstration is made possible by cross-classifying the population and land area data for the hinterland units by both their distance and sector type classifications. Differences in the intensity with which the types of sectors

are occupied can then be observed for each distance zone. This procedure of cross-classifying zones with sectors has the effect of subdividing the entire hinterlands of the metropolitan communities into a series of subareas. Each subarea is of a common accessibility type. In the tables which follow, each cell contains the data for all subareas which have the same distance and sector-type classification. The procedure in constructing these tables is essentially the same as that which would be followed if all of the census tracts of a given city were classified on the basis of some one characteristic, and the population data for all tracts of each class then added together for purposes of comparison. In general, there are nine different distance zones cross-classified with three different sector types, making a total of 27 different types of subareas in the hinterland. Each type of subarea is considered to represent a different degree of accessibility to the metropolis.

It will be remembered that certain limitations which are inherent in the use of county units make intersector comparisons at distances of less than 25 miles untrustworthy. Moreover, the counties which contain the central cities necessarily lie in all sectors, and therefore cannot be assigned to any one type of sector. In the tables which follow, the entire 0-24 mile zone has not been subdivided into sector types, but is presented as a unit at the head of each column for comparison with the sector-type data for the remaining distances.

Because the statistical tools of this chapter are the same as those which have been explained in the preceding chapter, and because illustrative charts accompany most of the analytical tables, it has

been deemed unnecessary to describe the full contents of each table. The text is confined for the most part to stating, in outline form, the pertinent differences between the distributions of population in the sector types. Additional notes or comments are added where they are needed to clarify or to place an interpretation upon the materials.

II

Description of the Location and Distribution of Land and Population in the Three Types of Sectors.

A. Land Area. (Table 5-1)

1. More than one-half (56.4 percent) of the land area of the United States is located in a direction from the nearest metropolis which places it in a sector containing a major intermetropolitan thoroughfare connecting pairs of metropolitan centers. Such a large proportion of the hinterland must be classified as intermetropolitan because each metropolis has an average of six or seven metropolitan communities bounding it, in most cases with a highway route to each. The result of this multiplicity of neighboring metropolitan centers is to expose a very large share of the hinterland to any influence which is associated with an intermetropolitan location.

2. Only about one-tenth (10.4 percent) of the hinterland is located in a sector containing a hinterland city of 25,000 inhabitants or more.

3. One-third (33.2 percent) of the hinterland does not have ready access to either the intermetropolitan or to the metropolis-hinterland

Table A-1

Distribution of land area and hinterland population, by sector type, United States, 1940.

Area and population	All sectors	Inter-metropolitan	Subdominant	Local
	Type of sector			
Land area[a] (thousand square miles)	2021.0	[illegible]	[illegible]	[illegible]
Population (thousands)				
Total hinterland	93743	[illegible]	17424	22015
Urban[b]	[illegible]	25[illegible]	[illegible]	[illegible]
Rural[a]	53101	29020	8044	15718
Nonfarm	[illegible]	13717	[illegible]	[illegible]
Farm	20210	15[illegible]	4086	[illegible]
	Percentage distribution			
Land area	100.0	56.4	10.4	33.2
Population				
Total hinterland	100.0	53.1	18.6	23.5
Urban	100.0	52.9	20.0	16.5
Rural	100.0	54.4	15.8	28.8
Nonfarm	100.0	55.5	16.5	28.0
Farm	100.0	53.4	17.1	29.5

a) Excludes counties containing the central cities.

b) Includes urban population outside central cities but located in county containing the central cities.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

city streams.[1]

B. Population.

1. An even higher proportion of the population than of land area is located in intermetropolitan and subdominant sectors. More than three-fourths of the hinterland population has a locational position which would enable participation in the stream of movement between metropolitan centers or the enjoyment of easy access to a major hinterland city. Less than one-fourth of the population has a location which lies outside both of the above aids to accessibility in a local sector. Hence, there is a measurable concentration of population in intermetropolitan and subdominant sectors and a deficit of population in the local sectors.

2. The three types of population are not distributed in like proportions among the sectors. Unduly large proportions of the urban population are found, relative to land, in the intermetropolitan and subdominant sectors. The rural-nonfarm and the rural-farm populations

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[1] The percentage of the land area contained in each type of sector is not the same at all distances from the metropolis. The proportions reported in Table 5-1 are averages for the sector as a whole. In classifying the sectors, precedence was given to the intermetropolitan category over the subdominant category; otherwise, the classification would not have been mutually exclusive. (Some sectors containing major thoroughfares also contain major hinterland cities.) This precedence had the effect of raising the proportion of the hinterland classified as intermetropolitan to 64.4 percent in the 25-34 mile zone (8.5 percent subdominant and 27.1 percent local.) At 165-264 miles the hinterland is 53.1 percent intermetropolitan, 12.2 percent subdominant, and 34.7 percent local. It is one characteristic of the subdominant sectors to be shorter, on the average, than the other two types of sectors. At distances of 465 miles and over there are no sectors of the subdominant type. The intermetropolitan sectors constitute 64.4 percent of this area, while the local sectors comprise 35.6 percent.

are concentrated, relative to land, in the subdominant sectors, and show a slight deficit in both the intermetropolitan and in the local sectors. This deficit is greatest for rural-farm population in the intermetropolitan sectors and for rural-nonfarm population in the local sectors.

III

The Pattern of Population Settlement in the Three Types of Sectors.

A. The Intensity of Land Occupancy: Habitation Ratios. (Table 5-2, Chart 5-1)

1. The overall distance pattern for each sector type for all populations is one of a fairly steady and very marked decrease in the intensity of occupancy with increasing distance from the metropolis. Hence, each sector does not deviate from the general distance pattern for the hinterland as a whole.

2. The subdominant sectors are much more intensively settled than are the other two types of sectors. With only minor exceptions, this is true for all distances and for all types of hinterland population.[2]

2

A portion of the more intense settlement of the urban population in the subdominant sectors, and the lack of urban population in the local sectors, is to be expected because of the definition used in classifying these sectors. The requirement that a sector must contain a hinterland city of 25,000 or more inhabitants before it can be classified as a subdominant sector would necessarily raise the average number of urban persons per square mile in this type of sector. Similarly, classifying as local all sectors which do not contain such a large hinterland city necessarily lowers the habitation ratio for sectors of this type. However, in Chapter Seven it will be shown that all of this difference in occupancy is not due solely to the population of a large hinterland city in the sector, for in the subdominant sectors there is also a very genuine concentration of small-city population. The exceptionally large habitation ratios in subdominant sectors of the rural-nonfarm and rural-farm populations are in no way a product of the manner of definition.

Table 8-2

Habitation ratios: Urban and rural population per square mile of hinterland, by sector type and distance from the nearest metropolis. United States, 1940.

Distance zone (miles)	Type of hinterland population and type of sector											
	All populations			Urban[a]			Rural-nonfarm			Rural-farm		
	Intermetro-politan	Subdom-inant	Local	Intermetro-politan	Subdom-inant	Local	Intermetro-politan	Subdom-inant	Local	Intermetro-politan	Subdom-inant	Local
Mean habitation ratio	33.0	57.0	22.7	15.4	27.6	6.9	8.1	13.0	6.9	9.5	16.4	8.9
0-24[b]	214.6	214.6	214.6	138.8	138.8	138.8	54.5	54.5	54.5	21.3	21.3	21.3
25-34	88.8	222.2	61.0	45.1	149.2	22.5	24.2	48.3	18.5	19.5	24.6	20.0
35-44	74.2	82.7	36.2	34.4	42.0	11.8	22.7	19.9	12.0	17.2	20.8	12.4
45-64	71.6	84.9	43.6	34.8	41.4	10.6	17.1	21.7	16.5	19.7	21.8	16.5
65-114	44.0	59.6	32.5	16.8	26.1	7.8	12.1	14.4	9.8	15.1	19.1	14.9
115-164	28.9	39.1	23.9	8.9	11.6	4.3	7.1	10.3	7.0	12.9	17.2	12.6
165-264	14.6	33.1	10.3	3.5	10.3	2.0	4.7	9.0	3.2	6.5	13.9	5.0
265-464	5.0	16.1	4.3	1.7	4.0	1.0	1.6	6.2	1.6	1.7	5.9	1.7
465-over	3.8	c)	3.1	0.8	c)	0.7	1.2	c)	1.0	1.9	c)	1.5

a) Excludes area and population of central cities.

b) Includes land area and population outside central cities but in counties containing central cities. All sectors are combined in this zone. The combined figure is reported as the value for each sector type for comparison with values for other distances.

c) No land area at this distance and sector type.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 5 and 6; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

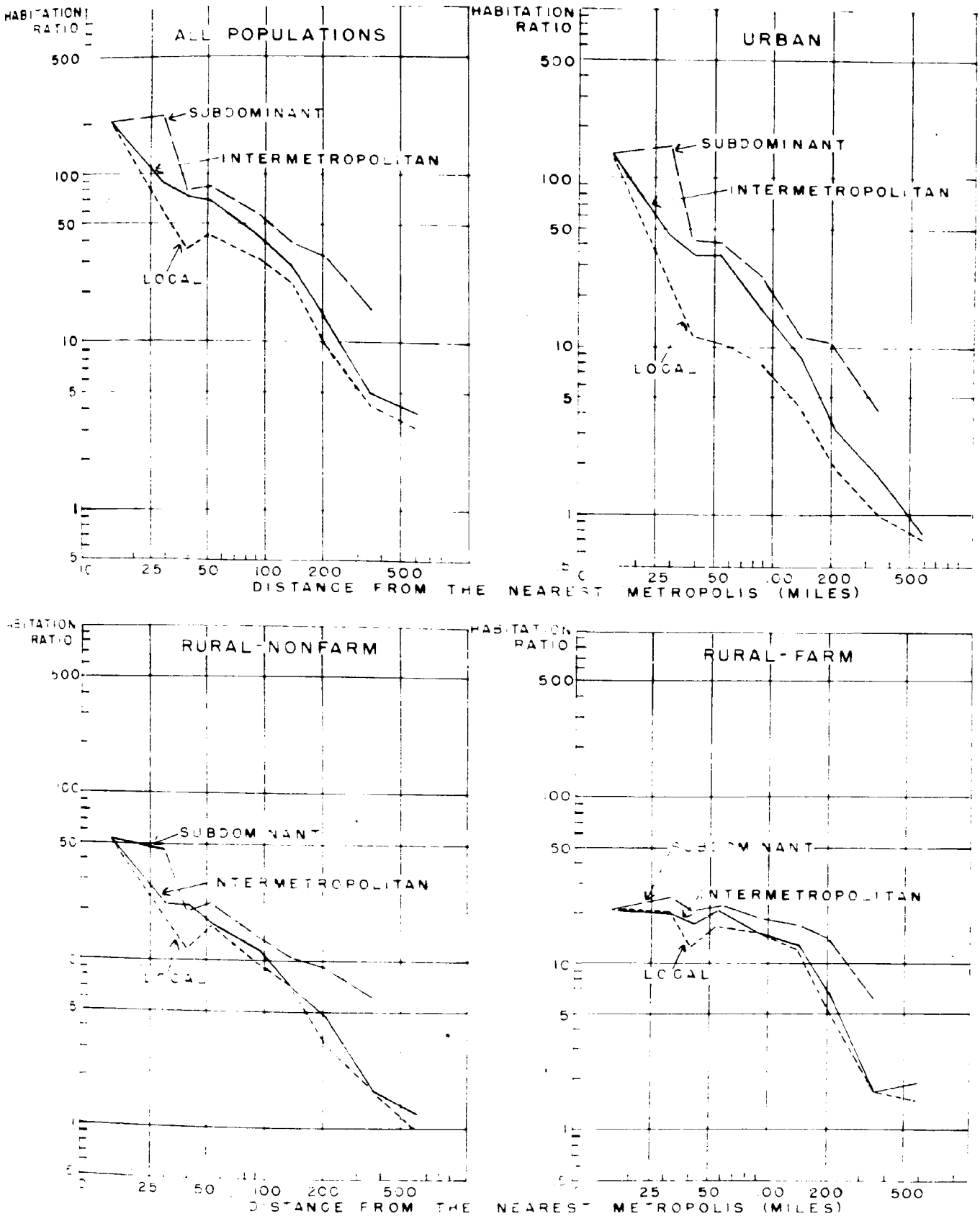


CHART 5- HABITATION RATIOS POPULATION PER SQUARE MILE OF HINTERLAND, BY TYPE OF SECTOR AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1940

3. The intermetropolitan sectors are more intensively occupied than are the local sectors. This too is a difference which exists with only very minor exceptions for each of the three population types through all distances.

4. The subdominant sectors have a considerably higher habitation ratio than do the intermetropolitan sectors. With only one minor exception for the rural-nonfarm population in one distance zone, this difference persists through all distances for all populations.[3]

5. The general sector pattern of population distribution with distance therefore is: The subdominant sectors are consistently more intensively occupied by all populations at all distances than are the two other types of sectors. The local sectors are consistently the least intensively occupied by all populations at all distances. Intermetropolitan sectors are occupied with intermediate intensity at all distances. Hence, the pattern of hinterland settlement appears to be closely associated with the pattern of intermetropolitan routes and of the location of major hinterland cities, as well as with distance from the metropolis.

6. The effectiveness of the intermetropolitan sectors in facilitating intense settlement seems to be greater at distances of 115 miles or

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[3] At least some of the difference in habitation ratios between the subdominant and the intermetropolitan sectors is due to the definitions used in classifying the sectors by type. The requirement that each subdominant sector contain a large hinterland city, whereas the intermetropolitan sectors were required only to contain an intermetropolitan route, with or without hinterland cities, would tend to account for some of the greater concentration of urban population in the subdominant sectors. Chapter Seven, which studies concentration by size of community, will eliminate this element of necessary difference and will measure the absolute concentration in the two types of sectors in a manner which will permit more precise comparisons between the two.

less from the metropolis. At distances greater than this, the advantage of the intermetropolitan over the local sectors to promote settlement becomes smaller, even though evidences of this ability remain at the greatest distances. At these greater distances the sectors have "spread" to the extent that counties through which the intermetropolitan route does not actually pass are also classified as "intermetropolitan". It may very well be that this slight leveling off or actual concentration at the greater distances represents a fairly heavy concentration of population in the immediate area through which the intermetropolitan route passes, but that concentration is hidden by the inclusion of the broad sector area. In such a case, the concentrative effect of main thoroughfares would be confined to a small strip of area along each side. Since the interest of this study was in measuring the effect upon broader segments of the hinterland, no provision was made for holding "distance from intermetropolitan route" constant. Hence, the validity of this possibility cannot be tested here.

7. Each of the three types of sectors participates in the tendency previously noted for population to level off or to decline in the 35-44 mile zone, and to rise in the 45-64 mile zone.[4] The population of intermetropolitan sectors exhibits this tendency the least, and the local sectors exhibit it in the strongest degree. It is least evident for the urban population in each type of sector. It is most evident for the rural-nonfarm population in the local and subdominant sectors. For the rural-farm population it is quite marked in all sectors. The fact that this "leveling off tendency" remains with further subdivision of

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[4] See Chapter Four, Section III.

the data indicates that the hypothesis of its being a completely random combination of events must be discarded. The fact that each type of sector, including those containing large hinterland cities, still exhibit the typical pattern of distribution as the distance increases beyond 65 miles, makes the hypothesis that 35 miles is the outer limit of metropolitan dominance less plausible. This characteristic of the pattern of land settlement will be explored further in the succeeding chapters.

8. The fact that the intensity of settlement declines in all directions with increasing distance from the metropolis, even in those sectors which contain large hinterland cities, lends additional support to the inference that the metropolitan community is a functional organization of a broad expanse of territory. The steady decrease in intensity of occupancy of the land with distance under the three very different sets of conditions represented by the three sector types, can be rationalized only by some such hypothesis.

9. The pattern of population distribution in the subdominant sectors may be taken as evidence that those sectors are correctly named. The fact that in sectors of this type there is a distinct pattern of land occupancy which is of the same general type as that of other sectors indicates that the populations of the major hinterland cities do "accept the conditions imposed by the metropolis" and adapt themselves to those conditions. Yet the much more intense settlement in the sectors containing hinterland cities than in the other two types of cities makes it appear that these hinterland cities exercise a strong influence of their own which differs only in degree, not in kind, from

the influence of the metropolis. If one accepts decreasing intensity of settlement with distance as one symptom of dominance, then the data presented here demonstrate quite clearly the existence of a widespread dominance by the metropolis, and, within that dominance, the persistent subdominance of large hinterland cities.

IV

The Pattern of Population Concentration in the Sectors.

A. Population Concentration Relative to Average Settlement of the Hinterland. (Table 5-3, Chart 5-2)

In Table 5-3 the average population per square mile for all hinterland areas has been subtracted from the average population per square mile in each sector type and each distance zone. The value in each cell in the left portion of this table indicates the average number of inhabitants per square mile which is in excess or in deficit of the average for all hinterland areas in the United States. In the right-hand portion of the table these excesses and deficits are expressed as ratios of the national average for the population of that type. This measure will be called an "index of concentration". For example, the index of concentration of 2.0 for the urban population settlement in subdominant sectors of the 45-64 mile zone indicates that there is an average excess of urban population in this zone which is twice the national average intensity of urban settlement in the hinterland. Stated in another way, the urban habitation ratio of this type of location in the hinterland is 200 percent greater than the urban habitation ratio for the hinterland as a whole.

1. There is a marked and uniform pattern of population concentration in all of the sector types. This pattern is one of decreasing concentration with increasing distance.

Table 8-8

Absolute and relative deviation of the habitation ratios for the hinterland populations, by sector type and distance from the nearest metropolis, from the mean habitation ratio for the hinterland as a whole. United States, 1940.

Population type and distance zone (miles)	Absolute deviation, by type of sector			Relative deviation, by type of sector		
	Intermetropolitan	Subdominant	Local	Intermetropolitan	Subdominant	Local
Total population (mean habitation ratio - 32.9)				(mean habitation ratio - 0.0)		
0-24 a)	151.7	181.7	181.7	5.5	5.5	5.5
25-34	55.9	189.3	28.1	1.7	5.8	0.9
35-44	41.3	49.8	3.3	1.3	1.5	0.1
45-64	38.7	52.0	10.7	1.2	1.6	0.3
65-114	11.1	26.7	-0.4	0.3	0.8	-0.0
115-164	-4.0	6.2	-9.0	-0.1	0.2	-0.3
165-264	-18.3	0.2	-22.6	-0.6	0.0	-0.7
265-464	-27.9	-16.8	-30.6	-0.8	-0.5	-0.9
465-over	-29.1	b)	-29.8	-0.9	b)	-0.9
Urban population (mean habitation ratio - 13.7)				(mean habitation ratio - 0.0)		
0-24 a)	125.1	125.1	125.1	9.1	9.1	9.1
25-34	31.4	135.5	8.8	2.3	9.9	0.6
35-44	20.7	28.3	-1.9	1.5	2.1	-0.1
45-64	21.1	27.7	-3.1	1.5	2.0	-0.2
65-114	3.1	12.4	-5.9	0.2	0.9	-0.4
115-164	-4.8	-2.1	-6.4	-0.4	-0.2	-0.7
165-264	-10.2	-3.4	-11.7	-0.7	-0.2	-0.9
265-464	-12.0	-6.7	-12.7	-0.9	-0.7	-0.9
465-over	-12.9	b)	-13.0	-0.9	b)	-0.9
Rural-nonfarm population (mean habitation ratio - 9.1)				(mean habitation ratio - 0.0)		
0-24 a)	45.4	45.4	45.4	5.0	5.0	5.0
25-34	15.1	39.2	9.4	1.7	4.3	1.0
35-44	13.6	10.8	2.9	1.5	1.2	0.3
45-64	8.0	12.6	7.4	0.8	1.4	0.8
65-114	3.0	5.3	0.7	0.3	0.6	0.1
115-164	-2.0	1.2	-2.1	-0.2	0.1	-0.2
165-264	-4.4	-0.1	-5.9	-0.5	-0.0	-0.6
265-464	-7.5	-2.9	-7.6	-0.8	-0.3	-0.8
465-over	-7.9	b)	-8.1	-0.9	b)	-0.9
Rural-farm population (mean habitation ratio - 10.2)				(mean habitation ratio - 0.0)		
0-24 a)	11.1	11.1	11.1	1.1	1.1	1.1
25-34	9.3	14.4	9.8	0.9	1.4	1.0
35-44	7.0	10.6	2.2	0.7	1.0	0.2
45-64	9.5	11.6	6.3	0.9	1.1	0.6
65-114	4.9	8.9	4.7	0.5	0.9	0.5
115-164	2.7	7.0	2.4	0.3	0.7	0.2
165-264	-3.7	3.7	-5.2	-0.4	0.4	-0.5
265-464	-8.5	-4.3	-8.5	-0.8	-0.4	-0.8
465-over	-8.3	b)	-8.7	-0.8	b)	-0.9

a) Habitation ratios from which deviations are measured excluded the land area and population of the central cities, included other land area and population residing in counties containing the central cities, and combining all sectors in the 0-24 mile zone.

b) No land area at this distance and sector type.

Source: Sixteenth Census of the United States. Derived from compilations for Table 5-2 of this study.

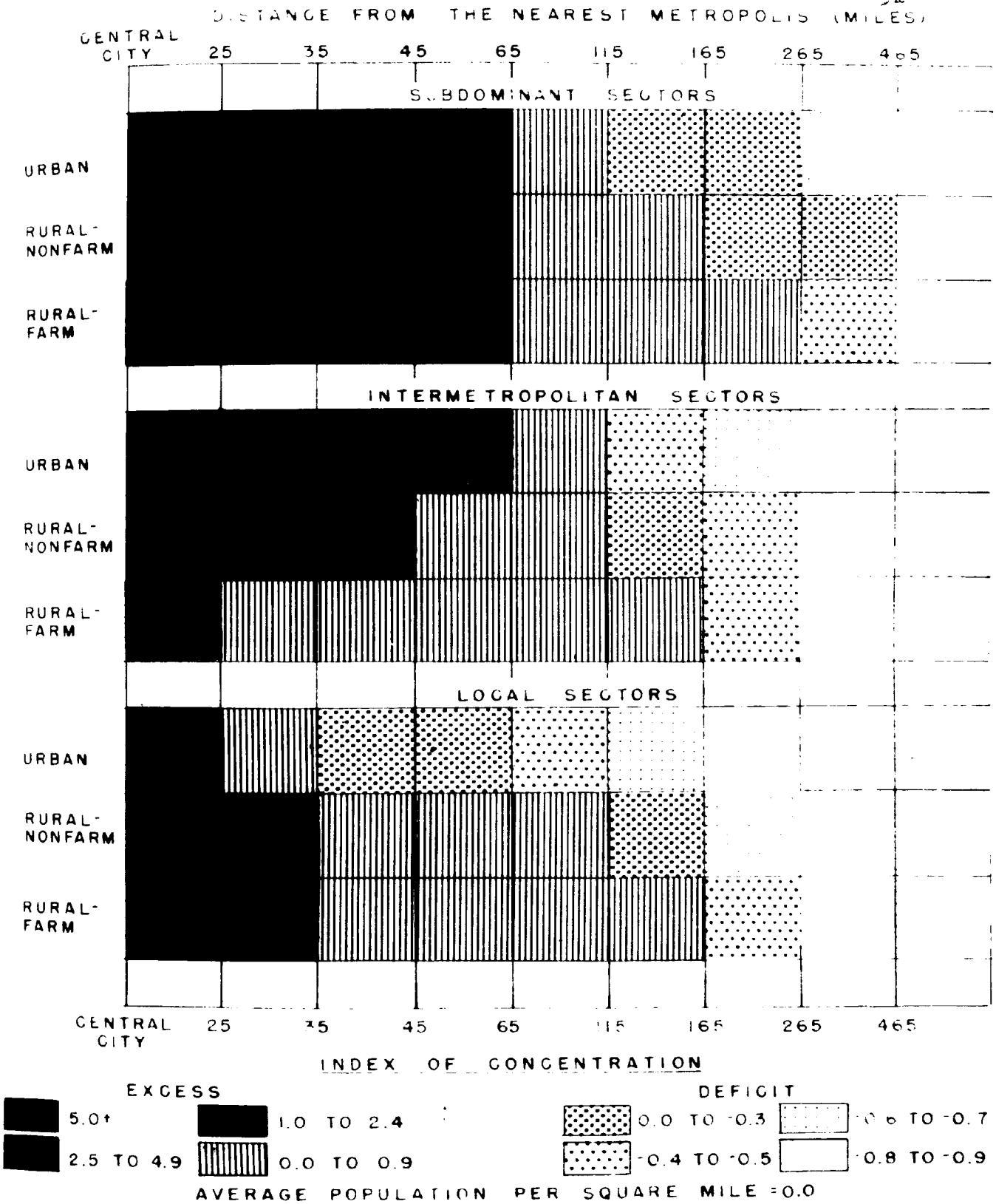


CHART 5-2 RELATIVE EXCESS OR DEFICIT OF POPULATION PER SQUARE MILE, BY TYPE OF SECTOR AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1940

2. The subdominant sectors are relatively more concentrated throughout their entire length than are the intermetropolitan and local sectors.

3. The intermetropolitan sectors are equally or more concentrated throughout their entire length than are the local sectors. The one exception is the greater concentration of the rural-farm population in the 25-34 total mile zone of local sectors.

4. The 25-34 mile zone, the first zone in which a distinction between sector types can be made, shows the highest degree of concentration in the subdominant type sectors. Other than the central zone itself, this is the point of highest concentration in the hinterland for all populations.

5. Aside from the deficit of urban population in the local sectors, there is positive concentration of all populations in all zones out to 115 miles from the metropolis. Except for a near-zero concentration of rural-farm population in the subdominant zone there is a deficit of concentration in all sectors at distances beyond 165 miles.

6. Population concentrations in excess of the national average, therefore, appear to be associated, in general, with proximity to the metropolis, with a location along a major intermetropolitan thoroughfare, or with a location in a sector of the hinterland containing a major subdominant city. The greatest deficits of settlement occur in local sectors and at distances of more than 165 miles from the metropolis along intermetropolitan routes. This generalization holds for the urban and for both the rural-farm and rural-nonfarm populations.

Chart 5-2 explains more clearly than can words, the location in the hinterland of the areas of various degrees of concentration, and the extent to which each of the sector types fosters the concentration of each type of population at each distance.

B. The Amount of Concentration Relative to Land in Each Sector Type. (Tables 5-4 and 5-5)

As was explained in the previous chapter, concentration can be measured relative not only to the average habitation ratio, but also relative to the comparative distributions of population and land. Table 5-4 presents the percentage distributions of the hinterland area and populations for the sector types. Table 5-5 contains the percentage-point differences between the percentage distributions. Coefficients of dissimilarity and of similarity are presented in this table to measure the total amount of concentration.

It will be remembered that the coefficient of dissimilarity is a useful device for summarizing concentration relative to a given distribution of land. Since the comparison here is between the distribution of population and land within the sector, the percentage-point differences ignore the fact that there are more persons per square mile in the subdominant and the intermetropolitan sectors than in the local sectors, and ask only the question, "How concentrated are the people in each zone of each sector relative to the proportion of the land of the sector which lies in that zone?" The coefficient of dissimilarity tells what proportion of people it would be required to move from the inner zones to the outer zones in each sector in order to effect an even distribution of population over the land in that sector only. If these proportions of populations were actually redistributed, the percentage-point differences

Table 5-4

Percentage distributions of hinterland area and population, by sector type and distance from the nearest metropolis. United States, 1940.

Distance zone (miles)	Land Area[a]			Hinterland population, by type of sector								
				Urban			Rural-nonfarm[a]			Rural-farm[a]		
	Intermetro-politan	Subdom-inant	Local	Intermetro-politan	Subdom-inant	Local	Intermetro-politan	Subdom-inant	Local	Intermetro-politan	Subdom-inant	Local
0-4				3.9	4.5	5.2						
5-9				8.8	8.3	12.3						
10-14	1.4	1.2	1.5	9.7	4.9	7.4	8.6	5.1	10.4	3.6	1.7	3.7
15-24				10.6	10.4	8.3						
25-34	3.0	2.2	2.2	8.8	11.7	7.0	9.0	8.0	5.7	6.2	3.3	4.8
35-44	3.2	3.0	3.8	7.2	4.6	6.6	9.1	4.6	6.6	5.8	3.8	5.4
45-64	6.5	8.8	7.7	14.6	13.2	11.8	13.7	14.6	18.3	13.5	11.7	14.2
65-114	18.3	19.6	18.8	19.9	18.5	21.2	27.6	21.7	26.6	29.3	22.7	31.4
115-164	14.8	27.9	14.7	8.5	11.8	9.3	13.1	22.0	14.9	20.2	29.3	20.9
165-264	23.3	29.0	25.8	5.3	10.8	7.3	13.4	20.0	12.1	15.9	24.6	14.6
265-464	24.1	8.2	20.4	2.6	1.2	3.1	4.8	3.9	4.6	4.3	2.9	3.9
465-over	5.4	b)	5.0	0.3	b)	0.5	0.8	b)	0.7	1.1	b)	0.8
All zones	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Summary												
0-44	7.6	6.4	7.5	49.0	44.4	46.8	26.7	17.7	22.7	15.6	8.8	13.9
45-164	39.6	56.3	41.2	43.0	43.5	42.3	54.4	58.3	59.8	63.0	63.7	66.5
165-over	52.8	37.2	51.2	8.2	12.0	10.9	19.0	23.9	17.4	21.3	27.5	19.3

a) Excludes area and rural population of counties containing the central cities.

b) No land area at this distance and sector type.

Source: Sixteenth Census of the United States, compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

between land and population would be zero, and the number of people per square mile in each zone of each sector would be exactly the average for the sector as a whole. Yet the differences in habitation ratios between sectors would remain unchanged. In other words, Table 5-4 attempts to compare the tendencies of the populations in each type of sector to "crowd toward the metropolis," disregarding the fact that some types of sectors are more intensively occupied than other types of sectors.

From these data it is evident that a given sector type can concentrate its population toward the metropolis, or disperse its population evenly over the land, and at the same time have either a high or a low number of inhabitants per square mile. For example, if a local sector contained only 100 persons, yet if all of these 100 persons lived in the innermost zone, the concentration of this zone relative to land would be almost unity, whereas a subdominant sector with 1,000 persons living in each of its zones would be relatively much less concentrated because its population would be dispersed throughout its entire length. Although the pattern of absolute concentration (settlement in excess of average settlement) and concentration relative to land (dispersion of people over the land) are very closely related, they are separate entities.[5]

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[5] While the pattern of concentration relative to land can be computed by expressing the habitation ratio of each accessibility area to the average habitation ratio of the sector as a whole (rather than to the national average) the method of percentage-point differences has been retained because the individual differences indicate the proportion of the total population of the sector involved in each concentration at each distance and because the coefficient of concentration can be computed as a simple yet accurate summary of relative concentration relative to land.

Table 6-b

Differences, in percentage-points, between the percentage distributions of land area and population, by sector type and distance from the nearest metropolis, United States, 1940.

Distance zone (miles)	Hinterland population by type of sector: Urban[a] Intermetropolitan	Urban Subdominant	Urban Local	Rural-nonfarm Intermetropolitan	Rural-nonfarm Subdominant	Rural-nonfarm Local	Rural-farm Intermetropolitan	Rural-farm Subdominant	Rural-farm Local
0-24	31.6	24.9	31.7	7.2	3.9	8.9	2.2	2.1	1.2
25-34	5.8	9.5	4.8	0.0	4.8	3.5	4.2	1.1	0.3
35-44	4.0	1.8	2.8	5.9	1.3	2.8	2.0	0.8	1.1
45-64	8.1	4.3	4.1	7.2	5.8	10.6	7.0	1.4	1.1
65-114	1.6	-1.1	2.4	0.3	2.1	7.4	11.0	3.1	1.1
115-164	-0.3	-10.1	-5.4	-1.7	-5.3	0.2	-4.4	1.1	0.1
165-204	-18.0	-19.2	-15.5	-9.0	-7.0	-13.7	-7.4	-1.1	-0.1
205-404	-21.5	-7.0	-17.3	-19.8	-4.1	-11.8	-19.8	-4.1	-1.1
405-over	- 5.1	0	-4.5	-4.1	0	-4.1	-7.3	0	0
Coefficient of dissimilarity[b]	40.2	30.6	43.9	33.5	14.2	33.8	31.4	4.1	0.2
Coefficient of similarity[b]	50.8	59.4	56.1	64.5	92.9	66.2	68.6	95.9	99.2

a. Area of counties containing central cities (1.7 percent of all area) omitted from the percentage distribution used for comparing differences. Since urban populations were tabulated by actual distance and sector type, regardless of area in which located, hinterland urban population of counties containing central cities is included in the distribution. The percentage-point differences for the urban populations at 0-24 miles are therefore too large by about 1.8 percent. To correct for the urban population of this zone with other populations, subtract 1.8 percentage-points from the urban population of each sector type.

b. Coefficients of dissimilarity and of similarity have been adjusted by 1.8 percentage-points, in accordance with footnote "a".

c. No land area at this distance and sector type.

Source: Sixteenth Census of the United States: Unpublished tabulations for Table 6--, this st[illegible].

The coefficients of dissimilarity for the three types of sectors for each hinterland population are as follows:

	Type of sector		
Population	Intermetropolitan	Subdominant	Local
Urban	49.2	40.6	43.9
Rural-nonfarm	35.5	19.2	33.8
Rural-farm	31.4	9.7	31.8

1. The intermetropolitan sectors are relatively most concentrative of population; they are followed closely or equalled by the local sectors. The subdominant type of sector is least inclined to concentrate its population toward the metropolis.

2. In fact, the subdominant sector appears to be a very dispersive force. While it reduces the concentration of the urban population relative to land by 8.2 percentage-points (or by 17 percent, part of which is to be expected because of the large hinterland city in these sectors), it succeeds in reducing the concentration of the rural-nonfarm population by 16.0 percentage-points (45 percent) and the concentration of the rural-farm by 19.2 percentage-points (66 percent)! Therefore, the dispersive effect of the hinterland city is two and one-half times as effective on the rural-nonfarm and four times as effective on the rural-farm population as it is on the dispersion of the hinterland city populations. This could only indicate that large hinterland cities are focal points for the intense subaggregation of rural

populations, a finding which will be examined in more detail in Chapter Seven.[6]

3. The concentrative effect of both the intermetropolitan and the local sectors relative to land seems to arise from the very intense concentration of population in the 0-24 mile zone, counterbalanced by very large deficiencies in the 165-464 zones. One significant difference between the two types of sectors is that the degree of relative concentration for the intermetropolitan sectors tends to remain fairly large out to 65 miles from the metropolis, whereas the degree of

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It was stated in Chapter Four that the coefficients of concentration can be compared only when the data have been taken for the same units. The above coefficients do not strictly meet this requirement. The percentage-point differences are computed for the same categories, but the county units which were added together to obtain the land area for the intermetropolitan sectors were not the same county units which were used to determine the land area of the subdominant and local sectors. Since the area and population in each sector do refer to the same units, because the number of units which comprise each sector are randomly selected on every basis except the ones upon which they are classified, and because a sufficient number of county areas falls into each cell to average out extreme variations, the conditions necessary for the use of the coefficient of concentration are approximated. However, only the very large differences in distribution, such as those pointed out here, can be inferred to be due to the different types of areas rather than due to random variations in the different county units in each distribution. In any case, the coefficients do report the proportion of population which it would be necessary to redistribute in each sector in order to have population distribution in the same proportions as the land of that sector.

concentration of the local sectors tends to slump in the 25-34 mile zone and to remain lower than the intermetropolitan sectors in the next one or two zones.

V

The Population Composition of the Sectors.

From the foregoing discussion of the effect of the sector type upon the distribution of the various hinterland populations it is evident that the hinterland urban, the rural-nonfarm, and the rural-farm populations must be combined in very different proportions in the different sector types at various distances in the hinterland. To show clearly this to be true and to make these differences in composition explicit, the ratio of the various hinterland populations to each other are presented below:

A. The Ratios of the Hinterland Populations to Each Other by Sector Type and Distance. (Table 5-6)

1. Throughout most of their length the subdominant sectors maintain a higher ratio of urban to rural-farm populations than do either of the other two sector types. Likewise, they have a higher ratio of rural-nonfarm to rural-farm population.

2. The intermetropolitan sectors have a higher ratio of urban to rural-nonfarm and to rural-farm populations than the local sectors throughout most of their distance. They also have a higher ratio of rural-nonfarm to rural-farm population at almost all distances than local sectors.

3. In the 35-44 mile zone of local sectors, the ratio of the urban to the rural-farm and to the rural-nonfarm population quickly falls

Table 5-6

Ratio of each type of hinterland population to each other type of hinterland population, by sector type, and distance from nearest metropolis. United States, 1940.

Distance zone (miles)	Ratio urban to rural			Ratio urban to rural-nonfarm			Ratio urban to rural-farm			Ratio rural-nonfarm to rural-farm		
	Inter-metro-politan	Subdom-inant	Local	Inter-metro-politan	Subdom-inant	Local	Inter-metro-politan	Subdom-inant	Local	Inter-metro-politan	Subdom-inant	Local
0-24	4.9	8.2	2.2	7.3	11.6	3.2	14.6	28.0	0.8	2.0	2.4	2.1
25-34	1.0	2.0	0.6	1.9	3.1	1.2	2.3	6.1	1.1	1.2	2.0	0.9
35-44	0.9	1.0	0.5	1.5	2.1	1.0	2.0	2.0	1.0	1.3	1.0	1.0
45-64	1.0	1.0	0.3	2.0	1.9	0.6	1.8	1.9	0.6	0.9	1.0	1.0
65-114	0.6	0.8	0.3	1.4	1.8	0.8	1.1	1.4	0.5	0.8	0.8	0.7
115-164	0.4	0.4	0.2	1.2	1.1	0.6	0.7	0.7	0.3	0.6	0.6	0.5
165-264	0.3	0.4	0.2	0.8	1.2	0.6	0.5	0.7	0.4	0.7	0.[illegible]	0.[illegible]
265-464	0.5	0.3	0.3	1.0	0.7	0.7	1.0	0.7	0.6	0.9	1.0	0.9
465-over	0.3	a)	0.3	0.7	a)	0.7	0.4	a)	0.4	0.6	a)	0.7

a) No land area at this zone and sector type.

Source: Sixteenth Census of the United States, Population, Vol.I, State Tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

below that for the other two sector types, and remains so for most of the remaining distance.

4. The ratio of the rural-nonfarm population to the rural-farm population remains higher, on the whole, along the subdominant sectors than along the other two. This can mean either that sectors containing large hinterland cities also have many small villages serving the rural-farm population, or (more likely) that large hinterland cities also have a great deal of suburban rural-nonfarm population lying outside their city limits.

5. The intermetropolitan sectors maintain an uninterruptedly high ratio of rural-nonfarm to rural-farm residents out to 45 miles. This could be explained either as suburbanization about the cities which are concentrated in this type of sector at these distances or as a measure of the preference of suburban commuters who reside at great distances to be located along a major thoroughfare into the metropolis.

6. It is difficult to formulate a hypothesis in explanation of the ratio of the rural-nonfarm to the rural-farm population in the local sectors. It could have been expected that, in a sector which contained no large hinterland city to serve the rural-farm population, this function would be taken over by village populations. Such an event would tend to maintain a high ratio of rural-nonfarm to rural-farm population throughout the entire length of the sector. This tendency exists only out to 65 miles from the metropolis, after which the ratio of rural-nonfarm to rural-farm inhabitants tends to drop off even more sharply than in the other sector types. The problem of the place of

the rural-nonfarm population in the local sectors is given special attention in Chapter Seven, where the effect of the size of the hinterland city is held constant and the distribution of the rural-nonfarm and rural-farm populations can be most readily compared. It is evident from Table 5-6 that either there is a great deal of suburban residence in the zones within 165 miles of the central city and that the number of rural-nonfarm residents required to service the rural-farm population is less than one-to-one, or else that at the most distant areas the rural-farm populations insist on obtaining a larger proportion of their services from urban centers, even though it requires a longer journey.

7. In general, the greater the intensity of settlement and the greater the relative degree of concentration, the higher the ratio of urban to rural-nonfarm and to rural-farm populations. The ratio of rural-nonfarm populations tends to be high in those distance zones of each of the sector types which exhibit these same conditions, with significant exceptions at distances greater than 165 miles from the metropolis.

Summary

1. Due to the multiplicity and widely scattered distribution of major cities in the United States, a very large proportion of the nation's total land area is directly exposed to any effect which might accrue from the interchange of goods and services between such centers. More than one-half of the total land area lies in intermetropolitan sectors connecting the 67 metropolitan centers as defined by this study. An additional one-tenth of the land area lies in subdominant sectors containing at least one major hinterland city. Only about

one-third of the hinterland lies in a direction from the metropolis which prevents exposure to the heightened accessibility created by intermetropolitan routes or the presence of major hinterland cities, that is, in local sectors.

2. Differences in the intensity of population settlement are unmistakably associated with direction from the metropolis as expressed by the type of sector. Sectors containing a major hinterland city have higher habitation ratios in all zones than do the intermetropolitan and the local sectors. The intermetropolitan sectors in turn have higher habitation ratios than do the local sectors.

3. The pattern of concentration (population in excess of the average population per square mile in the hinterland as a whole) is also different between sector types. In the local sectors there is such a concentration only in the inner zones. The subdominant sectors have a concentration of population throughout almost their entire length. The intermetropolitan sectors show a concentration of population only slightly less intense than that of the subdominant sectors out to about 115 miles, but at greater distances this type of sector tends to show a deficit of population concentration almost as great as that of the local sectors at these distances.

4. The intermetropolitan sectors tend to aggregate their population toward the metropolis to a higher degree than do the other two types of sectors. The local sectors are only slightly less aggregative in this respect. The subdominant sectors, on the other hand, tend to have their populations distributed more evenly throughout their entire

length, and hence are more dispersive of population than are the other two sector types, even while fostering the most intense settlement.

5. The urban-rural composition of the population differs among the sector types. In general, wherever there is a high habitation ratio in any sector there tends also to be a high ratio of urban to rural-farm and to rural-nonfarm populations, and of rural-nonfarm to rural-farm populations. The greater the total intensity of land occupancy, the more urban the population tends to be.

6. The uniformity and consistency in all sector types of both the relative and absolute concentration of each of the three types of hinterland population with distance from the metropolis may be taken as additional evidence that the hypothesis of metropolitan dominance is a plausible one. Similarly, the orderly differences between the distributions of population in the subdominant sectors and the distributions of population in the other two sector types tend to support the hypothesis of the hinterland city playing a role of subdominance.

CHAPTER SIX

THE EFFECT OF THE SIZE OF THE METROPOLIS UPON THE DISTRIBUTION OF POPULATION

I

Introduction

To this point in the analysis of the population structure with distance and direction from the metropolis, the data for the hinterland areas of all 67 of the metropolitan communities have been combined in order to develop one "average" metropolitan pattern. Because population in the environs of the very largest cities is many times larger than the population in the vicinity of the smaller places selected as metropolitan centers, one might well be skeptical that the patterns of population distribution which have been described exist at all in the areas about the smaller central cities. Conceivably, those patterns may be very pronounced in the hinterlands of the largest cities, and the combining of all hinterlands may have made them only appear to extend to the hinterlands of the smaller places. If this were true, nothing in the preceding analysis would have revealed that fact, for all of the data have been added together to obtain a single average value for each sector type and each distance.

In order to make it unmistakably clear that the principles which have been developed hold true for the smaller as well as for the larger metropolitan communities, in this chapter the 67 metropolitan communities are divided into four size groups, or classes, and a separate examination of the distance-sector type pattern is made for each group. But this

chapter has a second objective. In the statement of procedure (Chapter Two) it was hypothesized that the intensity of metropolitan dominance is related to the size of the metropolis: in general, the larger the metropolis the greater its dominance. To submit this hypothesis to partial test is the second objective of this chapter. The division of the 67 metropolitan communities into four size classes will not only permit a separate test of the distance and type of sector patterning in metropolitan communities with small and large central cities; it will also permit a determination of whether there is a consistent change in those patterns as one progresses from the metropolitan communities with the largest to those with the smallest central cities.

Just as there is a consistent set of differences in the distribution of population as one passes from one distance zone to another, or from one type of sector to another in the average metropolitan community, so may it be expected that a similar set of differences should be observed as one goes from each distance zone and sector type of the smallest size class to successively larger size classes of metropolitan communities. The size of the metropolis then becomes a new variable in the analysis. To accomplish these objectives, the distributions of the previous chapters must be cross-classified with the variable of "size of metropolitan center". The resulting statistical tables simultaneously classify all hinterland areas and populations by the categories of distance, sector type, and size of metropolitan center.

The size grouping of the 67 metropolitan communities is as follows:

Identification letter	Number of inhabitants in central city	Number of metropolitan communities
A	1,000,000 or more	5
B	500,000 to 999,999	9
C	250,000 to 499,999	19
D	100,000 to 249,999	34

In order to save space in the headings of the tables which follow the identification letter (A, B, C, D) will be used, rather than the class limits.[1]

II

Description of the Distribution of Land Area and Population Among the Various Size Classes of Metropolitan Communities.

A. The Proportion of the Total Land Area and of Population Living in Each Size Class of Metropolitan Community. (Table 6-1)

1. The bisection procedure of establishing boundaries to metropolitan communities has divided the land area of the United States very unequally among the four size classes of metropolitan communities. Yet the proportions of the total population which live in each class are within 7 percentage-points of being exactly one-fourth of the total.

2. The five largest metropolises claim only about one twenty-fourth (4.2 percent) of the land area of the United States as hinterland, yet

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[1] This grouping of metropolitan communities according to the size of their central cities is the only size classification for metropolitan communities, as units, made in this study. The term "size of metropolitan community" is used frequently in examining the differences between the metropolitan communities when they are grouped by the size of their metropolis, and refers to the size of the metropolis in 1940, not to the amount of land area or population contained in the metropolitan community as a whole or in its hinterland.

Table 6-1

Population and land area distributed by size class of metropolitan community. United States, 1940.

Population and land area	All metropolitan communities[b]	Size class of metropolitan community[a]			
		A	B	C	D
Population (000)[c]					
Total	131,673	29,456	24,184	35,317	42,716
Urban	74,428	25,057	16,079	15,572	17,719
Metropolis	33,826	15,911	6,457	6,507	4,951
Hinterland	40,602	9,146	9,622	9,065	12,768
Rural	57,246	4,399	8,104	19,745	24,997
Nonfarm	27,029	3,320	4,991	7,620	11,098
Farm	30,216	1,079	3,113	12,125	13,899
Land area (s.m.i.)[c]					
Total	2,976,325	124,363	201,957	992,106	1,657,899
Urban	19,213	3,697	4,947	4,326	6,243
Metropolis	3,739	1,219	500	1,014	1,006
Hinterland	15,474	2,478	4,447	3,312	5,237
Rural	2,957,109	120,665	197,010	987,779	1,651,655
Percentage distribution					
Population					
Total	100.0	22.4	18.4	26.8	32.4
Urban	100.0	33.7	21.6	20.9	23.8
Metropolis	100.0	47.0	19.1	19.2	14.6
Hinterland	100.0	22.5	23.7	22.3	31.4
Rural	100.0	7.7	14.2	34.5	43.7
Nonfarm	100.0	12.3	18.5	28.2	41.1
Farm	100.0	3.6	10.3	40.1	46.0
Land area					
Total	100.0	4.2	6.8	33.3	55.7
Urban	100.0	19.2	25.7	22.5	32.5
Metropolis	100.0	32.6	13.4	27.1	26.9
Hinterland	100.0	16.0	28.7	21.4	33.8
Rural	100.0	4.1	6.7	33.4	55.9

a) Size class of each metropolitan community determined by population of metropolitan center in 1940.

b) Equivalent to U. S. total.

c) Individual cells rounded to nearest thousand, hence, some totals do not equal sum of parts. The population of cities with 10,000 or more inhabitants was tabulated with numbers rounded to the nearest hundred persons. The land area of cities was tabulated to the nearest tenth of a square mile: in subtracting city from county totals to obtain rural area by machine tabulation it was not possible to round exactly the resulting rural areas to the nearest square mile. For these reasons, the totals for urban population and for land area do not exactly match the U.S. totals of the original data.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

contain 22.4 percent of the total population. Disproportions between land area and population are the rule rather than the exception in each of the four size classes. Relative to the proportion of land, the two largest sizes have a sizeable concentration of all populations except rural-farm. In class C there is a deficit of all except rural-farm population, and in class D of all populations, relative to the proportion of land.

3. In general, the larger metropolitan communities contain the greatest excesses of the urbanized populations--metropolis, hinterland urban, and rural-nonfarm, while the smaller ones contain the largest shares of the rural populations.

4. It should be noted in passing that of the almost 3,000,000 square miles of land area in the United States, only 19,213 square miles are devoted to urban land uses. If all of the cities of the United States were fitted into a square, with no vacant space between them, each side of that square would be only 139 miles long. The 67 metropolitan centers, if similarly placed, would make a square only 61 miles long on each side. San Bernardino County, California, is larger by more than 900 square miles than the total area of the 3,464 urban places in the United States. Almost one-fourth of this urban land area is occupied by the metropolises, and three-fourths by the hinterland cities. Compared to the proportion of the total land area which they comprise, and to the number of central cities of their class, the larger metropolitan centers and their hinterlands contain a very high proportion of this urban land area.

B. The Average Metropolitan Community of Each Size. (Table 6-2)

While there is a great deal of variation in size, even within each size class of metropolitan communities, an average land area and average number of inhabitants of each type are presented for each size of metropolis in order that the general magnitude of the populations under consideration may be known.

1. The class A and B metropolitan communities have hinterlands which are, on the average, less than half as large as those of the class C and D groups.

2. In spite of this difference in land area, there is a consistent increase in average population from class D to class A. The smallest average metropolitan community contains a million and one-quarter inhabitants, while the class A group contains an average of 6 million inhabitants.

3. Of all of the averages, those for the class A metropolitan communities are the least representative. In the B, C, and D groups there are definite class limits in which the very largest metropolis in the group cannot be more than 2.5 times the smallest. In the class A group, however, there is no upper limit, and New York City is more than four times the size of Detroit, the smallest. The greater number of cases in the B, C, and D groups also adds to the representativeness of their averages.

4. There is a larger average metropolis, urban, and rural-nonfarm population in each larger size class than in the next smaller one.

5. The rural-farm population shows no such uniform increase or decrease in numbers with change in the size of the metropolis. There

Table 6-2

Population and land area per metropolitan community of each size class, United States, 1940.

Population and land area	All metropolitan communities[b]	Size class of metropolitan community[a]			
		A	B	C	D
Population (000)[c]					
Total	1,965	5,891	2,687	1,859	1,256
Urban	1,111	5,011	1,787	820	521
Metropolis	505	3,182	717	342	146
Hinterland	606	1,829	1,069	477	376
Rural	854	880	900	1,039	735
Nonfarm	403	664	555	401	326
Farm	451	216	346	638	409
Land area (sq.mi.)					
Total	44,423	24,873	22,440	52,216	48,762
Urban	287	739	550	228	184
Metropolis	56	244	56	53	30
Hinterland	231	496	494	174	154
Rural	44,135	24,133	21,890	51,988	48,578

a) Size class of each metropolitan community determined by population of metropolitan center in 1940.

b) Equivalent to U.S. total.

c) Individual cells have been rounded to the nearest thousand; hence, all totals do not exactly equal sum of their parts.

Source: Sixteenth Census of the United States, compiled from Population, Vol.I, State Tables 3 and 5; Population, Vol.II, State Tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

tends to be fewer rural-farm people in the large metropolitan communities than in the smaller ones.

C. The Population Composition of Metropolitan Communities of Each Size. (Table 6-3)

1. With increasing size of metropolis there is a tendency for an increasing proportion of the total population of the metropolitan community to live in the metropolis itself.

2. With increasing size of metropolis there is a tendency for a decreasing proportion of the total population to live in village and other rural-nonfarm locations.

3. The rural-farm population constitutes a very small share of the total population of class A and B metropolitan communities, but is a very large share of the population of classes C and D.

4. The population of hinterland cities constitutes a smaller proportion of the total population in the two smallest than in the two largest size groups, but there is no consistent trend along the scale of size of metropolis in this respect. Class B has a higher proportion than class A, and class D a higher proportion than class C.

5. In class A and B metropolitan communities, the rural population is preponderantly of the nonfarm type; in class C and D metropolitan communities the rural population is preponderantly of the farm type.

D. The Distance Distribution of the Land Area of the Four Sizes of Metropolitan Communities. (Tables 6-4, 6-5)

1. The land area of each of the size classes of metropolitan communities is distributed by the same "elongated heart" pattern noted for all hinterlands in Chapter Four.[2] In no size of metropolitan community

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[2] See Section II for description of the procedure used in computing the ratio of actual to expected land area as reported in Table 6-4.

Table 6-3

[illegible] distributions of population and land area by size class of metropolitan community, United States, 1960.

Population and land area	All metropolitan communities	Size class of metropolitan community			
		A	B	C	D
Population					
Total	100.0	100.0	100.0	100.0	100.0
Urban	56.5	65.1	66.5	44.1	41.5
Metropolis	25.7	54.0	26.7	18.4	11.6
Hinterland	30.8	11.0	39.9	25.7	29.9
Rural	43.5	1.9	33.5	55.9	58.5
Nonfarm	20.7	11.2	20.6	21.6	26.0
Farm	22.9	3.7	12.9	34.3	32.5
Land area					
Total	100.0	100.0	100.0	100.0	100.0
Urban	9.6	3.0	2.4	0.4	0.4
Metropolis	3.1	1.0	0.9	0.1	0.1
Hinterland	6.5	2.0	1.2	0.3	0.3
Rural	90.4	97.0	97.6	99.6	99.6

Source: [illegible] of the United States. Based upon compilations for Table 6- of this study.

does the average hinterland approximate a circle. Short sectors and water fronts are present in each case to remove a sizeable proportion of the hinterland at even the shortest distances.

2. The smaller average size of the class A and class B metropolitan communities is due primarily to a deficit of land area lying at distances of greater than 65 miles. It is a characteristic of cities of this size class to have near neighboring metropolitan centers which cut off an extension of their hinterland.

3. The very large "ratio of actual to expected" area for the class A metropolitan centers in the 0-24 mile zone is largely fictitious. Los Angeles County extends far beyond the 25 mile zone. By necessity this central county must be coded at zero distance and included in this zone. Like the majority of the group B metropolitan centers, class A central cities are water-front cities and have a sizeable proportion of their possible hinterland thus cut away.

4. The land area at distances greater than 115 miles from class A central cities is contributed entirely by Los Angeles and constitutes wasteland of Nevada and California. In the tables which follow the areas lying beyond 115 miles from Class A central cities have not been considered as being representative of the hinterlands of metropolitan communities of this class, and for this reason are excluded from the analysis. For the remaining three classes of metropolitan communities, the smaller the central city the larger the proportion of its hinterland area which lies more than 165 miles from the metropolis tends to be. The median distance of the hinterlands from their central cities in

Table B-4

Land area lying within each distance zone, and land area expected to be within those zones, if all metropolitan communities were circular, by size class of metropolitan community. United States, 1940.

Distance zone (miles)	Size class of metropolitan community A	B	C	D
	Expected area			
0-24	9,820	17,676	37,316	66,776
25-34	9,425	16,965	35,815	64,090
35-44	12,565	22,617	47,747	85,442
45-64	34,560	62,208	131,328	235,008
65-114	141,370	254,466	537,206	961,316
115-164	219,910	395,838	835,658	1,495,388
165-264	675,445	1,215,801	2,566,691	4,593,026
265-464	2,293,370	4,128,066	8,714,806	15,594,916
	Actual area			
0-24	8,238	10,122	27,444	51,492
25-34	5,937	8,366	25,473	47,295
35-44	4,622	7,095	30,131	57,696
45-64	15,918	26,635	69,840	101,770
65-114	18,471	54,050	198,951	372,028
115-164	10,265	40,032	173,445	[illegible]
165-264	39,723	86,041	251,408	399,201
265-464	21,189	19,626	164,893	413,537
465-over	a)	a)	56,518	80,638
	Ratio actual to expected area			
0-24	83.9	57.3	73.5	77.1
25-34	63.0	49.3	71.1	73.8
35-44	36.8	31.4	63.1	67.5
45-64	46.1	42.8	53.2	43.3
65-114	13.1	21.2	37.0	[illegible]
115-164	4.7	10.1	20.8	16.6
165-264	5.9	7.0	9.8	[illegible]
265-464	0.9	0.5	1.9	2.7

a) No land area in this size at this distance.

Source: Sixteenth Census of the United States. Compiled from Areas of the United States, 1940, Tables 2, 3, and 4.

Table 6-5

Percentage distribution of land area by distance from nearest metropolis and size class of metropolitan community. United States, 1940.

Distance zone (miles)	Size class of metropolitan community			
	A	B	C	D
0-24 a)	6.7	5.0	2.8	3.2
25-34	4.8	4.1	2.6	2.3
35-44	3.7	3.5	3.0	3.5
45-64	12.8	13.2	6.4	6.1
65-114	14.9	26.8	20.1	16.4
115-164	8.3	19.8	17.5	15.0
165-264	31.9	17.8	25.3	23.8
265-464	17.0	9.7	16.6	24.9
465-over	b)	b)	5.7	4.9
All zones	100.0	100.0	100.0	100.0
Median distance	158	110	159	180

a) Includes area of the central cities and of counties containing central cities.

b) No land area in this class at this distance.

Source: Sixteenth Census of the United States. Compiled from Areas of the United States, 1940. Tables 2, 3, and 4.

each of these classes of metropolitan communities is as follows: class B--110 miles; class C--159 miles; class D--180 miles.

E. The Proportion of Land Area and Population Classified as Intermetropolitan, Subdominant, and Local in Each Size Class of Metropolitan Community. (Table 6-6)

1. The class A metropolitan communities have a very large proportion of their land area classified as intermetropolitan. Compared to the other metropolitan communities, the class B group has a large proportion of land area classified as subdominant. Both class A and B have a much smaller proportion of their area classified as local than do the two smallest classes of metropolitan communities. The larger metropolitan communities, therefore, have a larger proportion of their land area exposed to intermetropolitan and metropolis-subdominant influence.

2. A comparison of the percentages of land area and of population in each sector type shows definite evidences of concentration of the urban and rural-nonfarm populations in the intermetropolitan and subdominant sectors. The rural-farm population shows both concentration and dispersion in these sectors. These tendencies will now be measured by studying the pattern of land occupancy in each size of metropolitan community, by distance and sector type.

III

The Comparative Intensity of Land Occupancy and Population Concentration in Metropolitan Communities of Each Size Class, by Distance and Sector Type. (Table 6-7, Chart 6-1)

Table 6-7 presents the habitation ratios for each distance zone of each sector type for each of the four classes of metropolitan communities.

Table 6-6

Percentage distribution of [illegible] by type of sector and size of [illegible] areas, United States, [illegible].

Type of sector	[illegible]	[illegible]	[illegible]	[illegible]
			3	4
Land area:				
Intermetropolitan	[illegible]	[illegible]	[illegible]	[illegible]
Subdominant	[illegible]	[illegible]	[illegible]	[illegible]
Local	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]
All Population				
Intermetropolitan	[illegible]	[illegible]	[illegible]	[illegible]
Subdominant	[illegible]	[illegible]	[illegible]	[illegible]
Local	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]
Urban population				
Intermetropolitan	[illegible]	[illegible]	[illegible]	[illegible]
Subdominant	[illegible]	[illegible]	[illegible]	[illegible]
Local	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	100.0	100.0	100.0
Rural-nonfarm				
Intermetropolitan	58.9	53.5	57.5	55.0
Subdominant	10.1	[illegible]	15.9	12.5
Local	[illegible]	29.2	26.6	[illegible]
	100.0	100.0	100.0	100.0
Rural-farm				
Intermetropolitan	51.7	[illegible]	[illegible]	[illegible]
Subdominant	[illegible]	[illegible]	[illegible]	[illegible]
Local	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	100.0

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State Tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

The data in this table are arranged to facilitate comparisons among size classes of metropolitan communities.

A. The Total Hinterland Population. (All Sector Types Combined)

1. In general, the same pattern of decreasing intensity of land occupancy with relative increase in distance from the metropolis, which has been observed for all metropolitan areas combined, may now be seen to exist for all sizes of metropolitan communities. This pattern for the smallest metropolitan communities is no less definite and uniform than for the largest sizes of metropolitan communities. Thus, the pattern of land settlement by distance described in the two preceding chapters is not confined to a few of the metropolitan communities.

2. The uniformity of this trend for each size of metropolitan community can only lead to the inference that this pattern expresses one characteristic way in which population in the United States is arranged with respect to large central cities. While similar data cannot be presented here for each of the 67 metropolitan communities to show that this same tendency exists for each one individually, it can safely be inferred that a complete absence of this pattern in any one hinterland would be the exception rather than the rule. By grouping metropolitan communities by size, it becomes virtually impossible for the pattern of any one, or even of several, metropolitan communities to overbalance the general pattern for the size group as a whole. There is the ever present possibility, of course, that in selecting the 67 centers, errors in judgment were made; that too many or too few places were selected as central cities and hence as focal points of population aggregation. While a

Table 6-7

Habitation Ratios: Urban and rural population per square mile of hinterland, by size class of metropolitan community, sector type, and distance from the nearest metropolis. United States, 1940.

Distance zone (miles)	All sector types A	All sector types B	All sector types C	All sector types D	Intermetropolitan A	Intermetropolitan B	Intermetropolitan C	Intermetropolitan D	Subdominant A	Subdominant B	Subdominant C	Subdominant D	Local A	Local B	Local C	Local D
A. All populations																
0-24[a]	957.0	532.9	145.4	86.9	957.0	532.9	145.4	86.9	957.0	532.9	145.4	86.9	957.0	532.9	145.4	86.9
25-34	291.6	177.0	59.5	60.2	372.8	159.6	58.8	58.0	216.3	470.0	158.8	76.7	146.1	76.4	43.2	62.6
35-44	227.7	167.8	40.2	45.0	248.6	195.1	50.3	52.3	210.9	142.2	45.6	64.5	175.5	111.4	29.7	28.7
45-64	155.9	103.0	48.6	47.6	177.7	111.7	57.9	54.1	163.2	129.3	51.7	55.2	115.5	64.7	33.5	37.3
65-114	62.8	76.3	38.0	36.5	59.0	82.3	41.5	37.0	187.7	110.9	48.8	50.0	44.7	51.2	27.6	31.7
115-164	d)	40.2	30.5	27.4	d)	39.2	32.5	25.1	d)	46.8	39.4	42.1	e)	27.4	20.2	25.6
165-264	d)	29.4	20.5	11.7	d)	39.7	21.7	10.6	e)	29.6	35.1	34.4	c)	16.0	12.4	9.6
265-464	d)	11.4	5.7	4.9	d)	e)	6.7	4.8	e)	10.9	48.3	17.9	e)	14.8	3.8	4.6
465-over	e)	e)	3.6	3.6	c	e)	4.6	3.4	e)	e)	e)	e)	e)	e)	2.2	4.0
B. Urban population																
0-24[a]	789.3	395.5	66.5	37.4	789.3	395.5	66.5	37.4	789.3	395.5	66.5	37.4	789.3	395.5	66.5	37.4
25-34	186.0	129.7	24.4	23.6	267.8	92.7	22.5	21.9	91.4	356.1	29.3	37.0	60.5	39.5	9.4	25.5
35-44	114.8	94.4	10.4	19.7	109.8	106.8	16.2	25.5	159.3	93.2	10.5	25.2	94.3	60.6	4.9	9.2
45-64	85.7	46.9	17.0	18.8	118.9	51.8	23.1	25.8	92.8	72.6	16.4	22.7	27.4	17.3	8.1	8.9
65-114	28.1	35.2	11.9	12.0	26.3	42.4	13.8	13.2	139.5	61.1	19.1	18.2	8.1	11.6	5.8	8.4
115-164	d)	13.1	8.0	7.4	d)	13.4	9.0	8.2	d)	16.3	12.0	11.7	e)	4.7	3.5	4.7
165-264	d)	10.1	4.8	2.8	d)	12.1	5.1	2.6	e)	10.9	9.5	10.7	d)	1.1	2.3	1.9
265-464	d)	1.2	1.7	1.6	d)	e)	1.9	1.7	e)	0.9	10.9	7.9	e)	3.3	1.1	1.0
465-over	e)	e)	0.4	0.9	e)	e)	0.7	0.8	e)	e)	e)	e)	e)	e)	0.1	1.2
C. Rural-nonfarm population																
0-24[a]	150.8	112.1	52.9	30.9	150.8	112.1	52.9	30.9	150.8	112.1	52.9	30.9	150.8	112.1	52.9	30.9
25-34	80.0	44.7	15.5	17.7	77.2	43.1	15.5	19.3	97.5	86.6	8.6	14.7	67.8	18.4	16.6	13.6
35-44	93.0	51.4	11.9	11.8	120.0	64.4	12.4	12.6	31.6	29.6	13.1	18.6	58.0	32.0	11.4	8.8
45-64	48.7	34.4	11.4	12.0	38.1	38.8	11.7	11.5	44.4	34.3	13.7	12.3	69.0	25.4	10.2	12.5
65-114	21.5	23.7	9.0	10.4	24.5	22.2	9.7	11.0	20.9	30.6	11.1	12.7	14.6	23.3	7.0	8.9
115-164	d)	13.3	6.9	7.4	d)	12.5	7.1	6.4	d)	15.5	8.8	10.3	e)	11.0	5.0	7.7
165-264	d)	8.7	5.6	3.9	d)	10.3	6.4	3.6	e)	9.0	8.3	9.8	d)	3.7	3.2	3.4
265-464	d)	6.7	1.7	1.6	d)	e)	1.9	1.6	e)	6.5	9.2	5.4	e)	7.7	1.3	1.6
465-over	e)	e)	1.0	1.2	e)	e)	1.2	1.1	e)	e)	e)	e)	e)	e)	0.7	1.5
D. Rural-farm population																
0-24[a]	16.9	25.3	26.0	18.6	16.9	25.3	26.0	18.6	16.9	25.3	26.0	18.6	16.9	25.3	26.0	18.6
25-34	25.6	22.6	19.6	18.9	27.8	23.8	20.8	16.9	27.2	25.4	21.0	25.0	17.7	16.5	17.2	23.4
35-44	19.9	22.0	17.8	13.5	18.8	23.9	21.3	14.1	19.9	19.4	22.0	20.7	23.2	18.8	13.4	10.7
45-64	21.6	21.6	20.1	16.8	20.8	21.2	23.1	16.8	26.0	22.3	21.7	20.2	19.1	21.9	15.3	15.9
65-114	13.3	17.5	17.0	14.1	8.1	17.8	17.9	12.9	27.3	19.1	16.6	19.1	22.0	16.4	14.8	14.3
115-164	d)	13.8	15.5	12.6	d)	13.4	10.4	10.5	d)	15.1	18.6	20.1	c)	11.6	11.7	13.2
165-264	d)	10.6	10.1	5.0	c)	17.5	10.2	4.4	e)	9.6	17.3	13.9	c)	11.2	6.8	4.3
265-464	d)	5.5	2.3	1.7	d	e)	2.8	1.6	e)	3.5	20.1	6.6	e)	3.7	1.4	2.0
465-over	e)	c	2.1	1.5	c)	e)	2.7	1.4	e)	e)	e)	e)	e)	e)	1.4	1.5

a) Includes land area and population of counties containing central cities, but excludes central cities.

b) Excludes area and population of central cities.

c) No land area at this distance and sector type.

d) Areas consisting entirely of land and population of Los Angeles metropolitan community excluded.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 2c and 2d; Areas of the United States, 1940, Tables 2, 3, and 4.

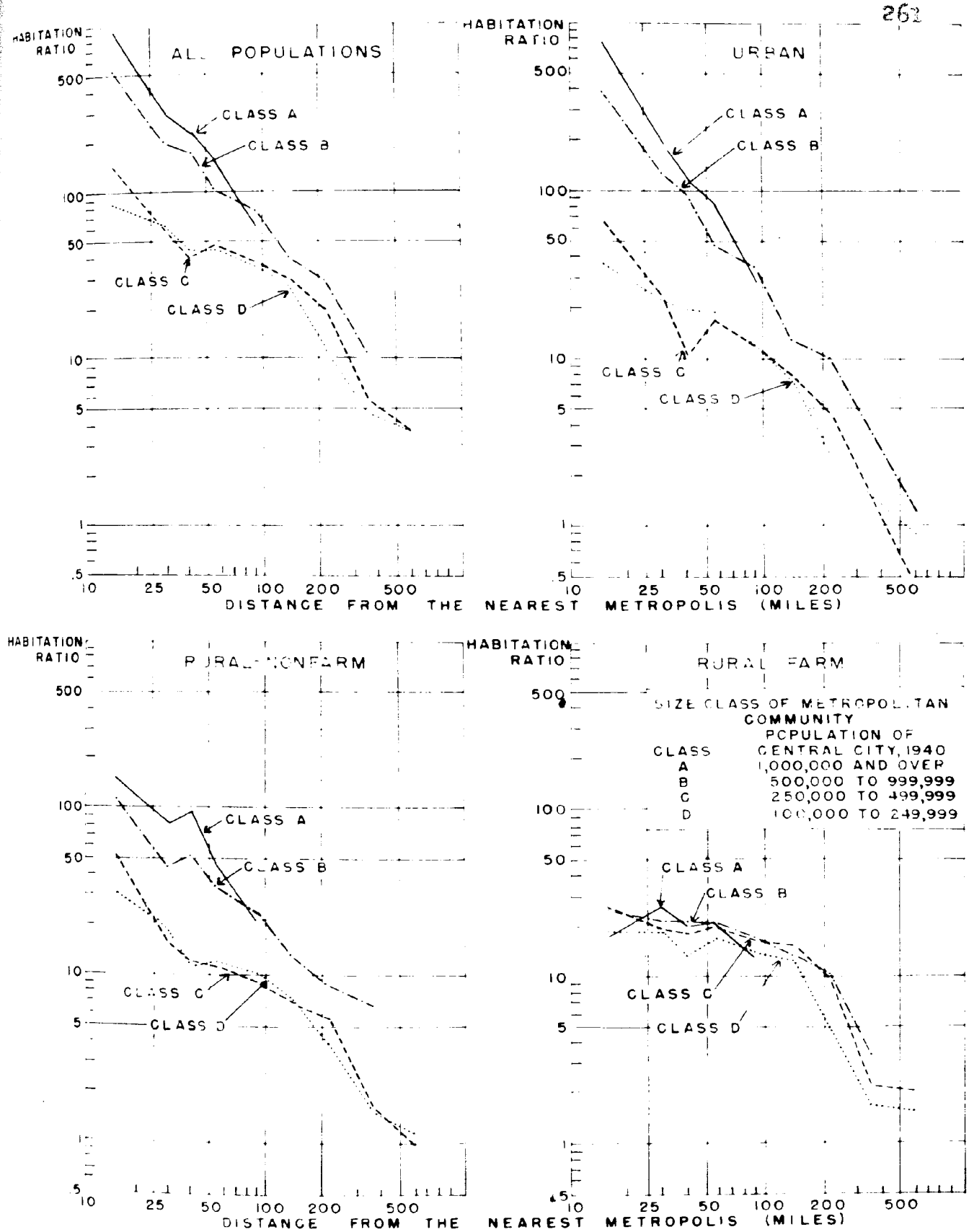


CHART 6-1 HABITATION RATIOS: POPULATION PER SQUARE MILE OF HINTERLAND, BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1940

detailed analysis of the individual metropolitan communities would undoubtedly lead to a qualification and refinement of these findings, in general it could only reverify the general nature of the pattern for most hinterlands, and perhaps suggest more appropriate subdivisions of the land area between individual metropolitan communities. Since this pattern of population distribution could have emerged only over a period of time, an analysis of the individual metropolitan communities for two or more decades could also reveal areas where this pattern appears to be in the process of emerging, but is as yet incomplete.

3. In each size of metropolitan community the distribution of population by sector types also closely follows the pattern which was outlined for all metropolitan communities. The subdominant sectors are more intensively occupied than are the intermetropolitan sectors and the local sectors, and in these sectors the populations tend to be more evenly distributed through all distances rather than being closely concentrated in the inner zones. One outstanding exception to these sector differences is the tendency of class A metropolitan communities to have a more intense occupancy of land in the intermetropolitan sectors. As was noted above, the intermetropolitan sectors appear to play a most important role in the organization of the largest metropolitan communities. Not only do they constitute a higher proportion of the total hinterland area, but they are much more intensively occupied, than are the other sector types.

4. In spite of the fact that the general pattern of land settlement is manifest in all sizes of metropolitan communities, there are variations in this pattern which appear to be associated with the size

of the metropolis itself. When all sector types are considered together, there is a consistent tendency for the intensity of land occupancy at any given distance to increase with increasing size of the metropolis.[3] Even at 65-114 miles from the metropolis the number of persons per square mile in the class A and B metropolitan communities is almost twice that for the class C and D metropolitan communities. The differences between the C and D sizes of metropolitan communities are small compared to the differences between C, B, and A metropolitan communities. Being located in a metropolitan community whose central city contains 100,000 to 249,999 inhabitants appears to be associated with only a slightly smaller average intensity of settlement than being located in a metropolitan community whose central city contains 250,000 to 499,999 inhabitants. On the other hand, an increase in size of metropolis beyond 500,000 inhabitants tends to be associated with a large increase in the habitation ratio. The largest single difference between class D and class C metropolitan communities is in the 0-24 mile zone, in which the increased size of the central city is very definitely accompanied by an increase in the intensity of land occupancy.

5. At distances greater than 45 miles from the metropolis, the habitation ratios are patterned in almost perfect array by size of metropolitan community by distance.[4] Each larger size of metropolis has a higher

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[3] Since the land area lying 115 miles or more from class A centers belongs almost entirely to a single metropolitan community, and is of such an unusual character, it will be disregarded in discussing the pattern of distribution in class A metropolitan communities.

[4] Note the single exception in the class A metropolitan communities.

habitation ratio at a given distance in its hinterland than the next smaller size of metropolis. Simultaneously, each zone has a higher habitation ratio than the zone lying outside it. This same uniformity is exhibited by the intermetropolitan sectors. In the local and subdominant sectors class D metropolitan communities tend to have a higher habitation ratio than class C metropolitan communities. This may be due in part to the fact that proportionately more areas from the southern and central portions of the United States are included in the class C communities, whereas proportionately more areas from the northern and eastern portions of the United States are included in the class D. It must be concluded that while class C and D centers both have the same pattern of population distribution as the larger metropolitan centers, the concentrative effect of the size of the metropolis, considered as an additional variable in the analysis, operates only weakly in hinterlands dominated by a metropolis of less than 500,000 inhabitants, and then primarily in the intermetropolitan portion (about 50 percent) of the hinterland. Whatever the factors are which operate in the subdominant and local sectors of these smaller metropolitan communities to nullify the association between the intensity of land occupancy and size of metropolis, they appear to be inoperative or counterbalanced by other forces in the hinterlands of the larger metropolitan communities.

B. The Urban Population of the Hinterland. (Table 6-7, Chart 7-I)

1. A comparison of the habitation ratios for the urban population with those for the total population indicates that many of the differences in land occupancy noted above between the sizes of metropolitan communities

are produced by the hinterland urban population. In fact, the general pattern for the urban population, by size of metropolis, distance, and sector type is, on the whole, an accentuated form of that for the total hinterland population. The rate of change in intensity of land occupancy with relative change in distance is much greater for the urban than for the total population. The difference between the metropolitan communities of class A, B, and C and D (considered together) are also much greater. The tendency for population to be distributed with decreasing intensity by distance is evident in all sectors except the subdominant sectors of the class A metropolitan communities.

2. The tendency for urban habitation ratios to level off or to actually decline between 25 and 44 miles, and to rise in the 45-64 mile zone may now be traced as being present in all four size classes of metropolitan communities. Hence, this phenomenon is not associated with absence of great metropolitan influence, but with the very situations in which the most intense metropolitan influence may be expected to be present. Only the intermetropolitan portion of the class D metropolitan communities share in this general pattern, and there very high concentrations of urban population in the subdominant sectors more than counterbalance this tendency. The low points in these fluctuations do not occur at the same point. All sectors of the class C metropolitan communities dip in the 35-44 mile zone. The decline in the class A and class B metropolitan communities is closer to the metropolis, in the 25-34 mile zone, and is at all large only in the subdominant and local sectors.

If one interprets these fluctuations as random variations introduced, for example, by the presence of large amounts of wasteland at these distances from the metropolis, then by combining the 25-34 and 35-44 mile zones into one zone, every case of these fluctuations is smoothed out, and the pattern of decreasing land occupancy with distance from the metropolis appears to be almost uniform throughout. If one further combines the A and B and C and D metropolitan communities into two "size of metropolis" groupings instead of four, then the general pattern which has been drawn for differences in population distribution, with size of metropolis, sector type, and distance is made to appear as if there is only a slight change in the rate of decline of land settlement with increasing distance. In this study the practice of showing maximum, rather than minimum variation from overall patterns has been followed by retaining as detailed breakdowns as possible. Combination has been made only when it was evident that area from the hinterland of only one or a small proportion of the metropolitan communities would otherwise be permitted to stand for the class as a whole. Since at these shorter distances almost all metropolitan communities are represented by some land area in all types of sectors, and since the number of county units involved, particularly in the B, C, and D groups, are sufficiently large to avoid selecting area from any one group of metropolitan communities, it has been deemed necessary to seek further explanation of this phenomenon.

In view of the uniformity with which the population lying more than 65 miles from the metropolis is distributed about the metropolis by

distance and sector type, it cannot easily be concluded that these variations in the habitation ratio between 25 and 44 miles represent the outer limits of metropolitan influence, and that beyond this point the population is distributed by some new principle. It is difficult to visualize how the distribution of population by some factor independent of the metropolis could be so uniformly and so well expressed by an irrelevant set of variables measuring location with respect to the metropolis. If the possibility of some new variable is thus ruled out, one can only conclude that the variations in the pattern of population distribution represent some characteristic element of metropolitan influence, and that this element is part and parcel of the metropolitan structure. It then becomes necessary to develop a hypothesis concerning the nature of this element and how it operates to produce this distortion of the general pattern of population distribution.

When the disturbances in the 25-64 mile distances are examined for the manner in which they fit into the general pattern for all distances, it becomes apparent that the disturbance is not so much of the nature of an abnormally low value in the 25-34 or the 35-44 mile zones as an abnormally high value in the 35-44 or the 45-64 mile zones. There appears to be a greater concentration of urban population, in the 35-44 mile zone of class A and B metropolitan communities, and in the 45-64 mile zone of the class C metropolitan communities, than the general trend of land occupancy with distance would lead one to expect. These distances appear to be unusually favorable locations for the growth of hinterland cities. It is here hypothesized that cities in these zones are located

at a point where direct dominance by the metropolis changes over to an indirect dominance. The area within 25 miles of the metropolis is within easy daily commuting distance and direct participation in the activities of the metropolis. This area the metropolis organizes directly with respect to itself. Beyond 45 miles from its limits the metropolis must dominate the hinterland indirectly, that is, by working through major subdominant hinterland cities. By this view, a location just outside the zone of easy commuting would seem to be a preferred locational point for hinterland cities. In the next chapter it will be possible to isolate the cities which create this increase in the habitation ratio and to state how numerous and how large they are. In later chapters it will be possible to study the functions which these cities perform in comparison with the metropolis itself and with other hinterland cities.

3. The failure of the class C metropolitan communities to have a higher total habitation ratio than class D metropolitan communities in subdominant and local sectors is due in part to the concentration of subdominant cities in these sectors of the class D communities. Between 25 and 114 miles the subdominant and local portions of the hinterlands of the class D metropolitan communities contain more urban population per square mile than do the class C metropolitan communities.

C. The Rural-Nonfarm Population.

1. The division of the distance-type of sector distributions by the four sizes of metropolitan communities necessitates very few modifications of the general principles which have been developed earlier for populations

of this type. The general pattern is the same as that for the urban populations. The rate of change with relative change in distance is smaller for the rural-nonfarm than for the urban population, as is indicated by the slope of the graph of its habitation ratios. The fact that the habitation ratios, by size of metropolitan community, follow the A, B, C-D pattern evidences the fact that the size of the metropolis is also associated with the intensity with which the land is occupied by this type of population.

2. The unusual tendency, noted in Chapter Six, for rural-nonfarm populations to occupy subdominant sectors more intensively than intermetropolitan sectors appears to be a characteristic of class C and D metropolitan communities. In the larger class A and B metropolitan communities, both the intermetropolitan and the subdominant sectors tend to be very intensively settled by rural-nonfarm populations, and there seems to be no great preference for either type of sector. The multiplicity of hinterland cities in all sectors of metropolitan communities with central cities of 500,000 or more residents may make it very easy for the rural-nonfarm population to diffuse over the entire land area.

3. The variations in the habitation ratios between 25 and 64 miles, which have been discussed in some detail for the urban population, are also present, at these same points, for the rural-nonfarm population. By the hypothesis which has been developed, these unusual aggregations of rural-nonfarm populations may be regarded as suburban settlements around the peripheries of the larger hinterland cities in the 45-64 mile zones. This hypothesis will be examined in detail in Chapter

Eight, where individual county units of rural-nonfarm population are classified by the size of the largest city contained in them.

D. The Rural-farm Population.

That the intensity of land settlement by the rural-farm population is associated by distance and direction from each class of metropolitan centers seems to be evident, but the principles which govern this settlement are not readily apparent. It will be remembered that the distribution of the total rural-farm population by distance as presented in Chapter Four appeared to be composed of two separate trend lines. Out to about 115 miles from all metropolitan centers there appeared to be only a very gradual rate of decline in the intensity of land occupancy with relative change in distance. Beyond this point there was a rapid rate of decline, as for the other hinterland populations. This same general pattern also held for the rural-farm population when its distance distribution was examined by sector type. The only modification encountered was that the subdominant sectors tended to extend the zone of gradual change at all distances with distance farther into the hinterland, and to have a greater average intensity of land occupancy than the other two sector types. When the rural-farm population is further classified by the size of the metropolis certain new facts appear:

1. The rural-farm population tends to have a lower habitation ratio in the zone surrounding the central city (0-24 miles) than in the 25-34 mile zone. Since the figures of Table 6-7 are based upon the total hinterland area, including the area of subdominant cities, it might be concluded that this low ratio might be due to the farm population

being "pushed out" by urban land uses. That city areas as such do not account for all of this lower rate may be shown by the following tabulation of the rural-farm population per rural square mile of land area (area of all cities removed):

Distance zone (miles)	Class of metropolis A	B	C	D
0-24	20.3	28.8	26.8	19.0

The fact remains that heavy concentrations of the rural-nonfarm population may displace the rural-farm population from the inner zone. That this appears to be the case is demonstrated by the class A metropolitan communities, in which the rural-farm population in all sectors is more concentrated in the 25-34 mile zone than in the 0-24 mile zone. This same tendency for the rural-farm population in the second zone to be equal to or greater in land occupancy is present in one or more sectors of every class of metropolis except the C group, in which the characteristics of the hinterlands of such places as Denver, San Antonio, Birmingham, Portland, Kansas City, Minneapolis may produce the lower habitation ratio in the second zone.

2. In the class A metropolitan community there is a general rise from the central city out to a distance of 65 miles in the intermetropolitan sectors and out to 115 miles in the subdominant and local sectors. This is all of the land area in the class A metropolitan communities which is considered to be representative of the class. The evidence available here indicates that there is a slight inverse relationship between the intensity of land occupancy by the rural-farm population and distance from metropolitan centers of one million inhabitants or more.

Whether this phenomenon can be interpreted as a lack of available space for farming, or as a lack of arable land, cannot be stated. Certainly the five metropolises of one million or more inhabitants are not located at points most favorable to agricultural pursuits. Whatever the cause, it must be concluded that the concentrative pattern of distribution of the rural-farm population with distance from the metropolis is inoperative in the five largest metropolitan communities.

3. In the B, C, and D sizes of metropolitan community the tendency for a decreasing habitation ratio with relative decrease in distance from the metropolis does seem to be present, but in a modified form. The subdominant sectors of the C and D metropolitan communities appear to be able to maintain a very high ratio of population to land as far into the hinterland as 200 miles. In these classes it is only the local and the intermetropolitan sectors which lose population per unit of area with increasing distance. In the class B metropolitan centers the habitation ratios of all sector types decrease with distance. The deviations from this general pattern occur, as for the rural-nonfarm and the urban populations, in the 25-44 mile zone. Evidence will be presented in Chapter Eight to show that these deviations also are associated with the presence of major hinterland cities in the 45-64 mile zone.

4. In addition to the fact that the rural-farm pattern of concentration with distance does not follow one single pattern for all sizes of metropolitan communities, it should also be observed that there is no great difference between the rural-nonfarm habitation ratios of the various sizes of metropolitan community. Hence, for the rural-farm

population, the intensity with which land is inhabited tends to increase only slightly with increasing size of metropolis. This tendency can be observed at all only by comparing the class A and B metropolitan communities with the class C and D, and even this tendency fades out at 115 miles from the central city.

In Chapter Four it was demonstrated that the rural-farm population was distributed with respect to land with a degree of association equal to its degree of association with the urban population. This finding takes on new meaning in the light of the present analysis. Great cities appear to repel, or at least not to aggregate, intense settlement by the rural-farm population. The size of the metropolis appears to have only a slight effect upon the intensity of agricultural activities at any distance. There does appear to be a tendency for the rural population to be distributed with distance along some sector types, and to be concentrated in subdominant sectors. It would appear that such factors as:

a. the existence of arable land

b. a limit to the intensity with which agricultural land can be cultivated

c. competition for space with nonagricultural land uses

d. the presence of major hinterland cities

condition and limit the extent to which the rural-farm population is able to follow the concentrative pattern of the other hinterland populations. Only at distances of 115 miles from the metropolis does distance from the metropolis become positively associated with decreased settlement. This decline may be due to the decline in the fertility of

the land (if the metropolis is located toward the center of each area of arable land) or to some real change in the conditions under which agricultural activities can take place.

IV

The Intensity of Concentration of the Population in Excess of the Average Habitation Ratios. (Chart 6-2)

In the preceding section it has been demonstrated that the size of the metropolis is associated with the intensity with which the hinterland is occupied by the urban and the rural-nonfarm populations. The effect of differences in city size in concentrating population in each distance zone and sector type are shown in Chart 6-3.[5] This chart locates the areas of population concentration in hinterlands of each of the four sizes of metropolitan communities, and states the intensity of that concentration relative to the average intensity with which all hinterlands are inhabited by each population type. These charts present in one summary picture, the manner in which the entire population of the United States is distributed with respect to metropolitan centers, in terms of distance, direction, and size of metropolis. It is the uniformity, and the internal consistency within and between the distribution of the hinterland populations, as shown here, which have given rise to the thesis that the populations in broad areas of the hinterland are distributed in an orderly arrangement with respect to metropolitan centers.

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5 The data for these charts were obtained by subtracting from each value of Table 6-7 the average habitation ratio for the hinterland as a whole, as reported in Table 4-5, then expressing the resulting deviation as a ratio of the average habitation ratio.

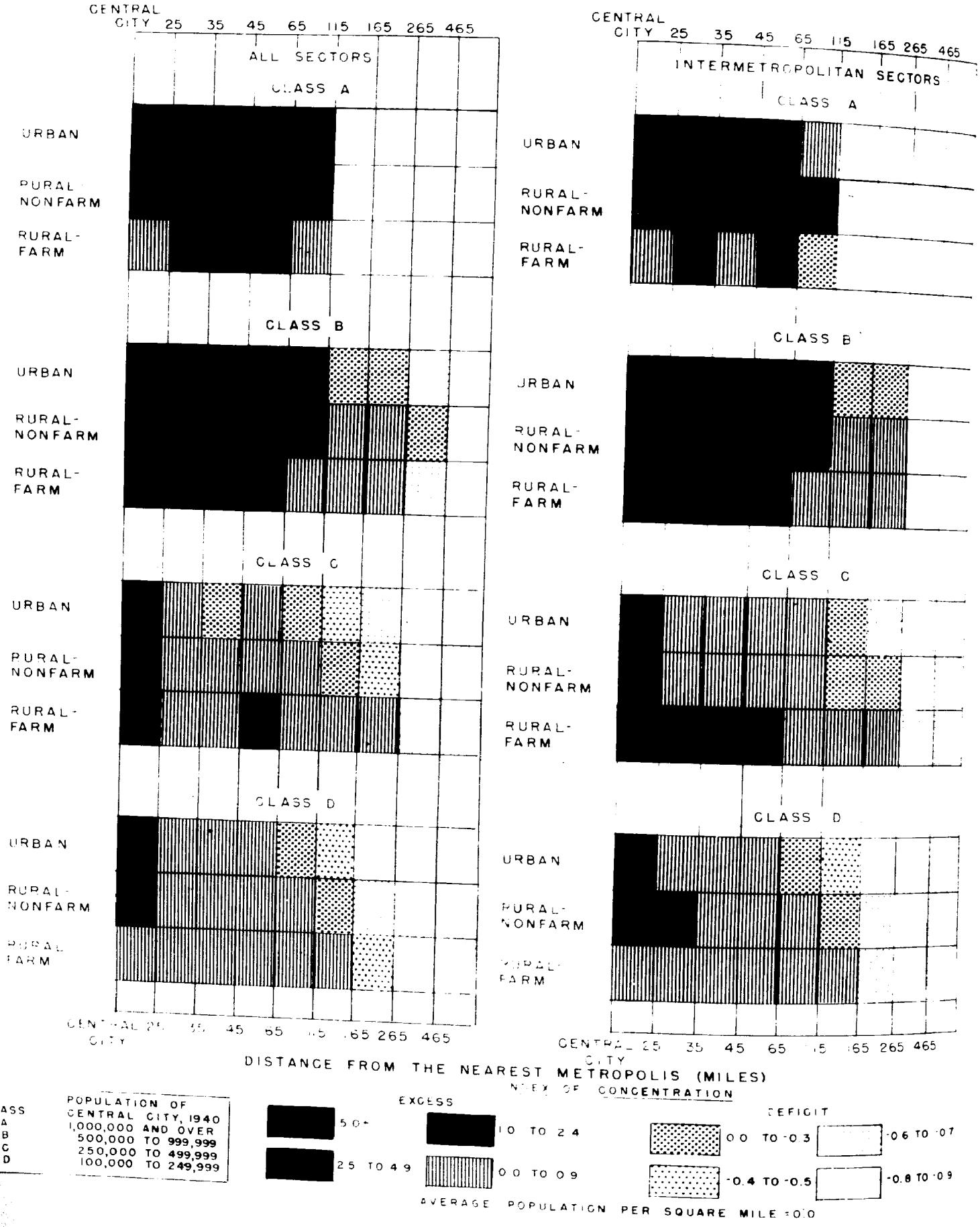
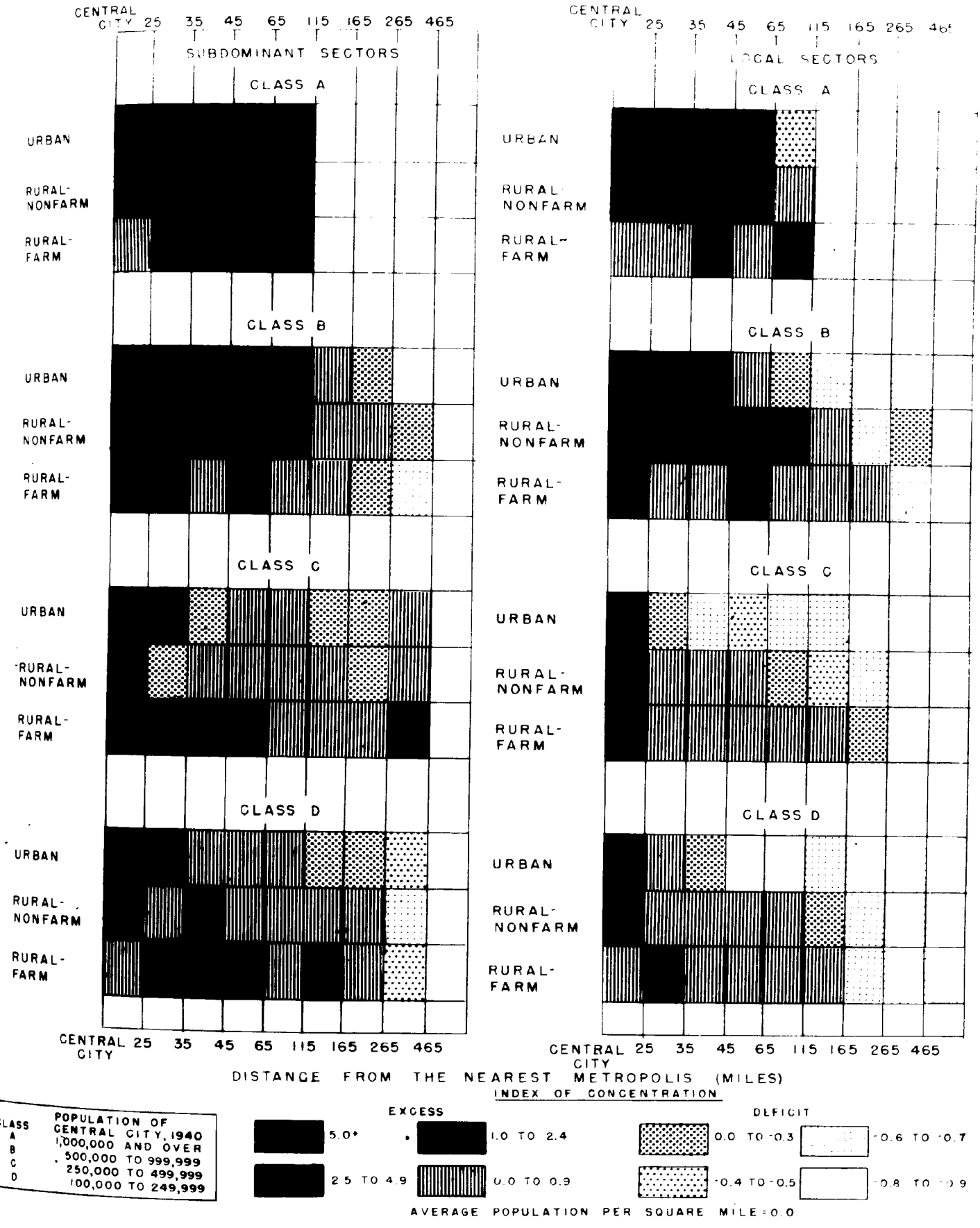


CHART 6-2 RELATIVE EXCESS OR DEFICIT OF POPULATION PER SQUARE SECTOR, AND DISTANCE FROM THE NEAREST METROPOLIS.



MILE, BY SIZE CLASS OF THE METROPOLITAN COMMUNITY, TYPE OF
UNITED STATES, 1940

V

The Amount of Concentration Relative to Land (Table 6-8)

Table 6-8 presents the coefficients of dissimilarity between the percentage distributions of land area and the hinterland populations, by distance, sector type, and size of metropolis. Because different county units have been used in obtaining the coefficients for each sector type and each size of metropolis, comparisons between adjacent columns (sizes of metropolitan communities) and between groups of rows (sector types) must be made with caution. The three types of population, within each sector type of each metropolitan community, are fully comparable with each other, however. The figure in each cell states the proportion of the total population which it would be necessary to redistribute among the various distance zones in order to obtain a condition of equal intensity of land occupancy at all distances in the sector.[6]

1. In every sector type of every size of metropolitan community the urban population is distributed more independently of land than are either of the other two populations.

2. In every case but five, the rural-farm population is distributed less independently with respect to land than are the other two. In these five cases in which the rural-nonfarm population shows the greatest correspondence between land and population, the differences are very small.

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[6] This was explained in conjunction with Table 5-5. These coefficients do not eliminate differences in land occupancy between sector types, and, in this case, between sizes of metropolitan communities.

Table 6-8

Coefficients of dissimilarity between the percentage distributions of land area and the hinterland populations, by size class of metropolitan community, sector type, and distance from the nearest metropolis. United States, 1940.

Population and sector type	Size class of metropolitan community			
	A	B	C	D
All Sectors				
Urban	66.6	46.2	33.9	41.1
Rural-nonfarm	54.4	26.6	21.8	31.3
Rural-farm	47.3	14.9	22.7	33.8
Intermetropolitan Sectors				
Urban	75.1	39.7	34.4	45.1
Rural-nonfarm	57.7	27.3	19.5	35.1
Rural-farm	48.5	7.7	22.2	36.8
Subdominant Sectors				
Urban	52.2	60.9	26.1	21.4
Rural-nonfarm	42.8	29.4	11.5	9.3
Rural-farm	35.6	22.1	2.7	8.2
Local Sectors				
Urban	69.0	55.4	39.7	39.8
Rural-nonfarm	56.6	19.0	32.3	29.5
Rural-farm	44.2	11.2	30.8	32.7

Source: Sixteenth Census of the United States. Derived from data compiled for Table 6-6 of this study.

3. It appears that the urban population becomes more independent of land as the size of the metropolis increases.

4. The tendency of the rural-nonfarm population to be distributed with respect to land at a point between the rural-farm and the urban populations is in evidence in the class A and class B metropolitan communities. In the class D metropolitan communities, where there are far fewer urban inhabitants per unit of area, the rural-nonfarm population appears to be only as concentrated with respect to land as is the rural-farm population.

VI

The Urban-Rural Composition of the Hinterland Population of Each Size of Metropolitan Community, by Sector Type. (Table 6-9, Chart 6-3)

1. In all sizes of metropolitan communities, and in all sector types, there is a tendency for the proportion of the urban population in the total hinterland population to decline with distance from the metropolis. In the larger (A and B) metropolitan communities the urban population constitutes a larger proportion of the whole population at all distances than in the smaller metropolitan communities. This tendency is present in all sector types. Even the local sectors, containing no major hinterland cities, are more urbanized in the larger metropolitan communities than in the smaller. The differences between the intermetropolitan and the subdominant sectors in ratio of urban to rural tend to be small, with no consistent change in this difference with change in size of metropolis.

2. The ratio of the urban to the rural population is not representative of the two rural populations separately. While the ratio of the urban

Table 6-9

Ratio of each type of hinterland population to each other type of hinterland population, by size class of metropolitan community, sector type, and distance from the nearest metropolis. United States, 1940.

Class of metropolitan community and distance from nearest metropolis (miles)	Ratio of urban to rural, Type of sector: All sectors	Intermetropolitan	Subdominant	Local	Ratio of urban to rural-nonfarm, Type of sector: All sectors	Intermetropolitan	Subdominant	Local	Ratio of urban to rural-farm, Type of sector: All sectors	Intermetropolitan	Subdominant	Local	Ratio of rural-nonfarm to rural-farm, Type of sector: All sectors	Intermetropolitan	Subdominant	Local
Class A					Class A Metropolitan communities											
0-24[a]	4.7	15.8	14.4	2.3	5.2	17.8	15.9	2.4	46.7	139.5	159.5	41.0	8.9	7.8	10.0	16.7
25-34	1.8	2.6	0.7	0.7	2.3	3.5	0.9	0.9	7.3	9.6	3.4	3.4	3.1	2.8	3.6	3.8
35-44	1.0	0.8	3.1	1.2	1.8	0.9	5.0	1.6	5.8	5.8	8.0	4.1	4.7	6.4	1.6	2.5
45-54	1.2	2.0	1.3	0.3	1.8	3.1	2.1	0.4	4.0	5.7	3.6	1.4	2.3	1.8	1.7	3.6
55-114	0.8	0.8	2.9	0.2	1.3	1.1	6.7	0.6	2.1	3.2	5.1	0.4	1.6	3.0	0.8	0.7
Total[b]	2.4	3.2	2.2	0.9	3.3	4.3	3.4	1.2	9.1	12.9	6.7	3.5	2.8	3.0	2.0	3.0
Class B					Class B Metropolitan communities											
0-24[a]	2.9	3.4	35.7	3.0	3.5	4.2	42.0	4.1	15.6	19.0	230.2	10.8	4.4	4.5	5.6	2.6
25-34	1.9	1.4	3.2	1.1	2.9	2.2	4.1	2.1	5.7	3.9	44.1	2.1	2.0	1.8	3.4	1.0
35-44	1.3	1.2	1.9	1.2	1.8	1.7	3.1	1.9	4.3	4.5	4.8	3.2	2.3	2.7	1.5	1.7
45-54	0.8	0.9	1.3	0.4	1.4	1.3	2.1	0.7	2.2	2.4	3.3	0.8	1.6	1.8	1.5	1.2
55-114	0.9	1.1	1.2	0.3	1.5	1.9	2.0	0.5	2.0	2.4	3.2	0.7	1.4	1.3	1.6	1.4
115-164	0.5	0.5	0.5	0.2	1.0	1.1	1.0	0.4	1.0	1.0	1.1	0.4	1.0	0.9	1.0	0.9
165-214	0.5	0.4	0.6	0.1	1.2	1.2	1.2	0.3	0.9	0.7	1.1	0.1	0.8	0.6	0.9	0.3
215-264	0.1	-	0.1	0.3	0.2	-	0.1	0.4	0.3	-	0.3	0.9	1.9	-	1.9	2.1
Total	1.3	1.3	1.5	0.7	2.1	2.2	2.0	1.3	3.2	3.6	3.5	1.7	1.5	1.7	1.4	1.4
Class C					Class C Metropolitan communities											
0-24[a]	0.8	2.8	2.0	1.7	1.3	6.1	3.1	2.8	2.6	5.1	5.3	4.5	2.0	0.8	1.7	1.6
25-34	0.7	0.6	4.4	0.3	1.6	1.4	15.1	0.6	1.2	1.1	6.2	0.5	0.8	0.7	0.4	1.0
35-44	0.4	0.5	0.3	0.2	0.9	1.3	0.8	0.4	0.6	0.7	0.5	0.4	0.7	0.6	0.6	0.8
45-54	0.5	0.7	0.5	0.3	1.5	2.0	1.2	0.8	0.8	1.0	0.8	0.5	0.6	0.5	0.6	0.7
55-114	0.5	0.5	0.6	0.3	1.3	1.4	1.7	0.8	0.7	0.8	1.0	0.4	0.5	0.5	0.6	0.5
115-164	0.4	0.4	0.4	0.2	1.2	1.3	1.4	0.7	0.5	0.6	0.6	0.3	0.4	0.4	0.5	0.4
165-214	0.3	0.3	0.4	0.2	0.8	0.8	1.1	0.7	0.5	0.5	0.5	0.3	0.6	0.6	0.5	0.5
215-264	0.4	0.4	0.6	0.4	1.0	1.0	1.8	0.8	0.7	0.7	0.8	0.8	0.8	0.7	0.5	1.0
265-over	0.1	0.2	-	0.1	0.5	0.6	-	0.2	0.2	0.3	-	0.1	0.5	0.5	-	0.5
Total	0.5	0.5	0.6	0.3	1.4	1.5	1.7	0.9	0.8	0.8	0.9	0.5	0.6	0.6	0.6	0.6
Class D					Class D Metropolitan communities											
0-24[a]	0.8	2.2	5.5	1.9	1.2	4.5	8.3	3.9	2.0	4.5	15.9	3.6	1.7	1.0	1.9	0.9
25-34	0.6	0.6	0.9	0.7	1.3	1.1	2.5	1.9	1.2	1.3	1.5	1.1	0.9	1.1	0.6	0.6
35-44	0.8	1.0	0.6	0.5	1.7	2.0	1.4	1.0	1.5	1.8	1.2	0.9	0.9	0.9	0.9	0.8
45-54	0.7	0.9	0.7	0.3	1.6	2.2	1.9	0.7	1.1	1.5	1.1	0.6	0.7	0.7	0.6	0.8
55-114	0.5	0.6	0.6	0.4	1.2	1.2	1.4	0.9	0.9	1.0	1.0	0.6	0.7	0.9	0.7	0.6
115-164	0.4	0.5	0.4	0.2	1.0	1.3	1.1	0.6	0.6	0.8	0.6	0.4	0.6	0.6	0.5	0.6
165-214	0.3	0.3	0.4	0.2	0.7	0.7	1.1	0.6	0.6	0.6	0.8	0.4	0.8	0.8	0.7	0.8
215-264	0.5	0.5	0.8	0.3	1.0	1.1	2.3	0.6	0.9	1.1	1.2	0.5	0.9	1.0	0.5	0.8
265-over	0.3	0.3	-	0.4	0.8	0.7	-	0.9	0.6	0.6	-	0.8	0.8	0.8	-	0.8
Total	0.5	0.6	0.6	0.4	1.3	1.4	1.6	0.9	1.0	1.2	1.0	0.6	0.7	0.8	0.6	0.7

a. Excludes population of counties containing the central cities.

b. Land area lying 115 miles or more, comprised entirely of area from the Los Angeles metropolitan community, included in the total for all zones.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27.

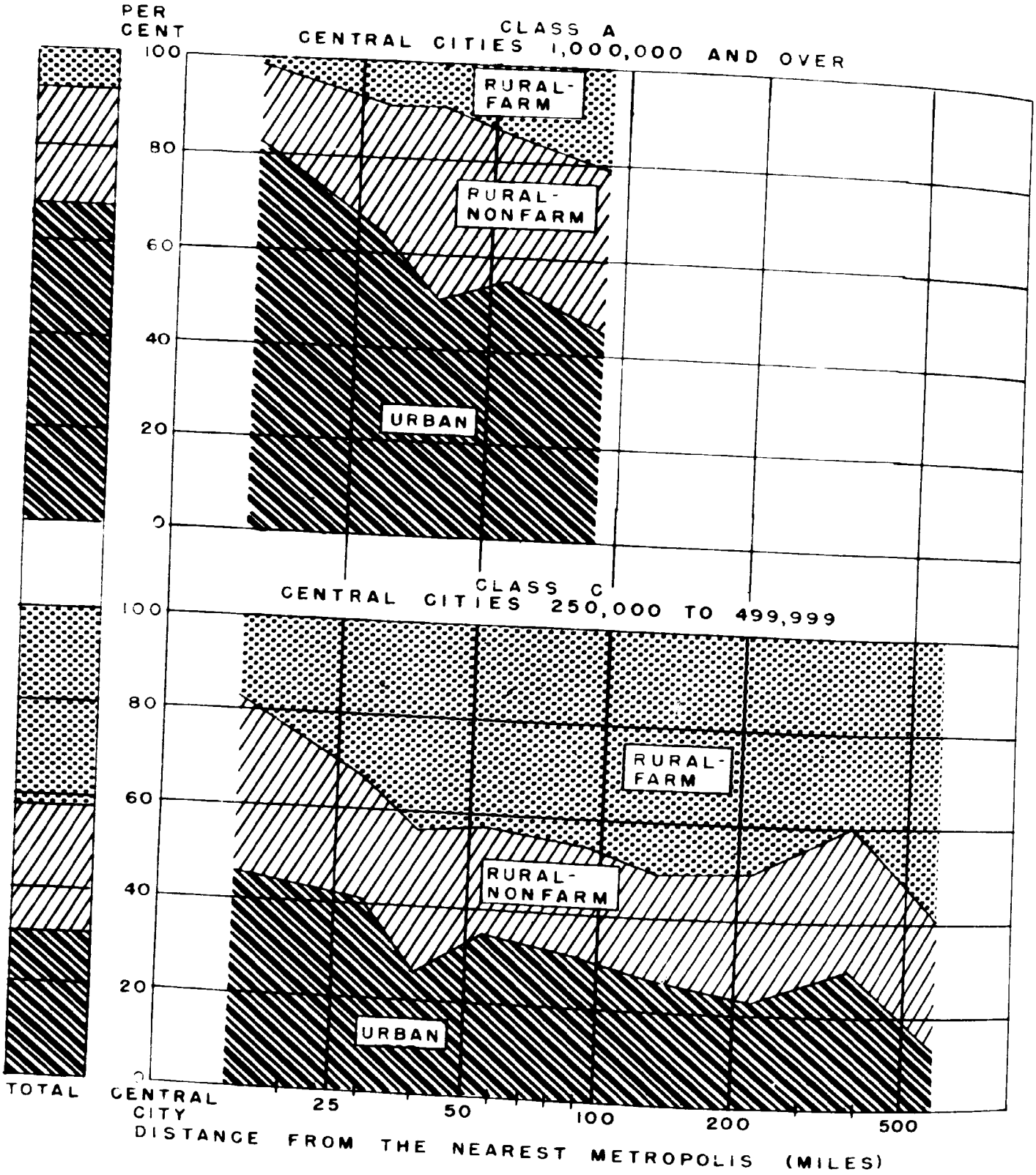
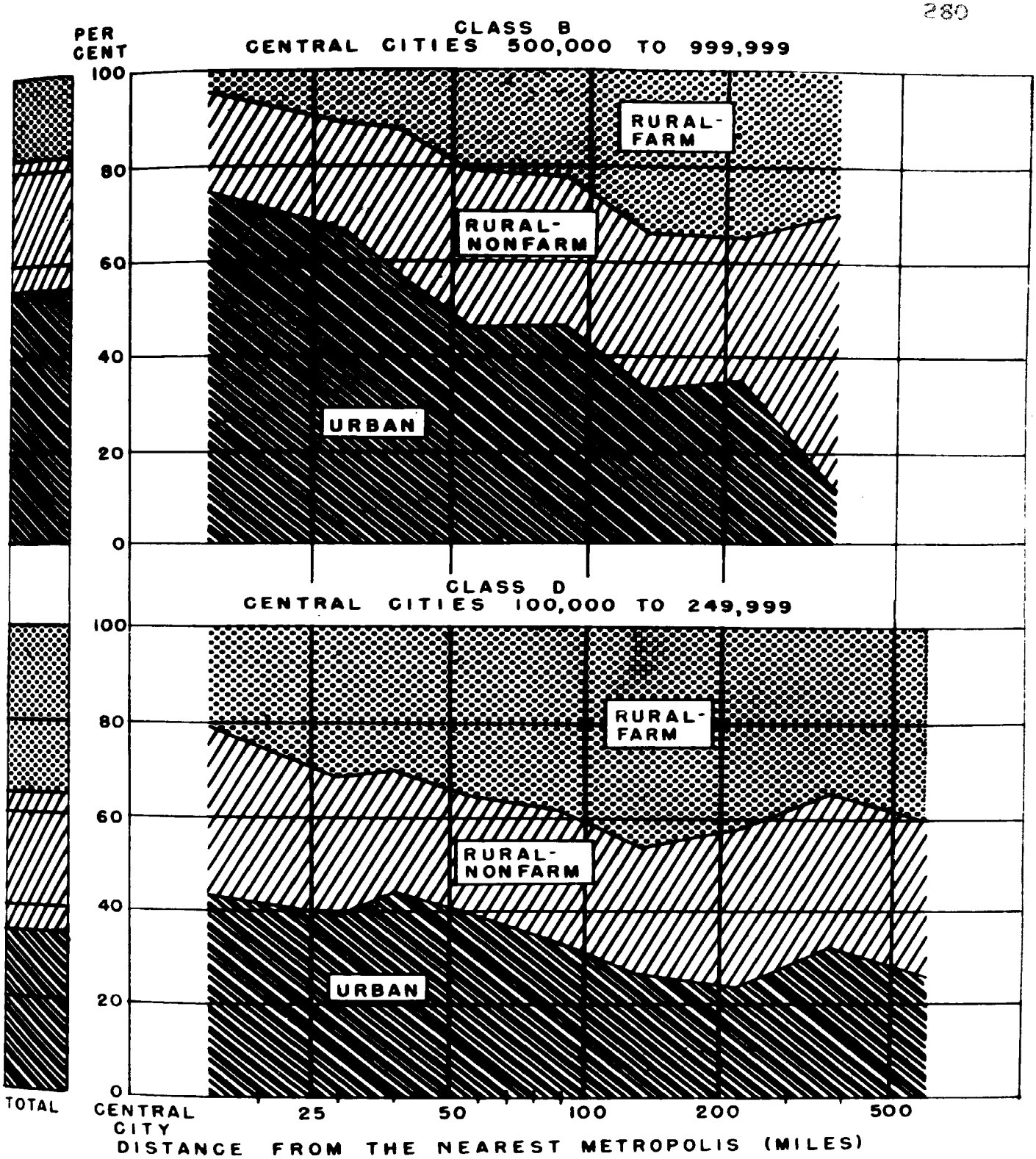


CHART 6-3 URBAN-RURAL COMPOSITION OF THE HINTER COMMUNITY AND DISTANCE FROM THE



LAND POPULATION, BY SIZE CLASS OF THE METROPOLITAN NEAREST METROPOLIS. UNITED STATES, 1940

to the rural-nonfarm population declines with distance, the rate of this decline is smaller than the decline in the ratio of urban to rural-farm populations. The urban population outnumbers the rural-nonfarm population out to about 165 miles from the metropolis in all sizes of metropolitan communities, but it outnumbers the rural-farm population only as far as 65 miles in the class C and D communities. In the more distant points in these two smaller sizes of metropolitan community, the rural-farm population outnumbers the rural-nonfarm population heavily. In the two larger sizes of metropolitan communities, where the urban population outnumbers both the rural-nonfarm and the rural-farm at all except the most extreme distance, the rural-farm population is outnumbered by the rural-nonfarm. Hence, the distant points in the smallest metropolitan communities are occupied primarily by rural-farm residents while the largest metropolitan communities are occupied predominantly by urban and rural-nonfarm residents at all distances. The comparative sparsity of settlement of the rural-farm population in the larger metropolitan communities is demonstrated by the tendency for the urban population to outnumber the rural-farm population, even in the local sectors, to considerable distances in the hinterland, and to maintain a high ratio to that population at all distances.

Throughout the analysis, the rural-farm population has been noted for its tendency to be distributed with respect to both urban and rural populations. This same tendency is manifest in the ratios of the rural-nonfarm to the rural-farm population by distance and sector type. In every category which can be associated with the concentrations of urban population: the shorter distance zones, the intermetropolitan sectors,

the larger metropolitan centers--the ratio of the rural-nonfarm to the rural-farm population is highest. Yet also there appears to be a tendency for the rural-nonfarm population to be distributed with respect to the rural-farm population in the local sectors and at the longer distances. In these areas devoid of large hinterland cities, and containing a predominance of rural-farm population, the ratio of the rural-nonfarm to the rural-farm population tends to reach a plateau, or even to rise slightly with distance. In the largest metropolitan communities the rural-nonfarm population tends to outnumber the rural-farm population in all sectors at all distances. In the smaller (C and D) metropolitan communities, where the rural-farm population outnumbers the rural-nonfarm, a ratio of about one villager to two farm residents appears to be the minimum proportions in which the rural-farm and rural-nonfarm are combined in any area of the hinterland.

VII

The Metropolitan Community and the Metropolitan District. (Table 6-10)

In Chapter Four it was shown that the boundaries of the metropolitan district encompass only the very densest portion of the metropolitan concentration. In Table 6-10 data are presented which show that this is true not only for the very largest metropolitan communities, but for all sizes of metropolitan communities. This fact may be verified in two ways: by comparing the percentages of land area and population which are distributed within the 0-44 mile zone outside the metropolitan district, and by comparing the habitation ratios for these same areas with the habitation ratios for the other distance zones shown in Table 6-7.

Table 6-10

Population and land area of the 0-44 mile zone classified by location inside or outside a metropolitan district, by size class of metropolitan community. United States, 1940.a)

Size class of metropolis and metropolitan district status	Land area (square miles)	Population: Total population	Population: Urban	Population: Rural
		Number		
A 0-44	17,578	9,500,919	7,174,500	2,326,419
Met. District b)	5,944	8,377,887	6,553,082	1,824,805
Remainder	11,634	1,123,032	621,418	501,614
B 0-44	25,083	7,966,217	5,5[illegible],100	2,40[illegible],117
Met. District b)	6,302	5,503,713	4,053,[illegible]29	1,450,084
Remainder	18,781	2,462,504	1,50[illegible],471	95[illegible],033
C 0-44	82,094	6,571,744	2,094,000	3,87[illegible],744
Met. District b)	6,614	2,720,485	1,456,258	1,262,227
Remainder	75,420	3,851,259	1,235,742	2,615,517
D 0-44	145,477	9,225,527	3,901,700	5,323,827
Met. District b)	14,516	2,823,610	1,562,490	1,261,120
Remainder	130,961	6,401,917	2,339,210	4,062,707
		Percentage of total population of hinterland		
A 0-44	14.3	70.1	78.4	53.0
Met. District	4.8	61.9	71.6	41.5
Remainder	9.4	8.2	6.8	11.5
B 0-44	12.5	44.9	57.8	29.7
Met. District	3.1	31.0	42.1	17.9
Remainder	9.4	13.9	15.7	11.8
C 0-44	8.3	22.8	29.7	19.6
Met. District	0.7	9.4	18.1	6.4
Remainder	7.6	13.4	13.6	13.2
D 0-44	8.8	24.4	30.6	21.3
Met. District	0.9	7.5	12.2	5.0
Remainder	7.9	16.9	18.4	16.3
		Population per square mile		
A 0-44		540.5	408.2	132.3
Met. District		1409.4	1102.5	307.0
Remainder		96.5	53.4	43.1
B 0-44		317.6	221.7	95.9
Met. District		873.3	643.2	230.1
Remainder		131.1	80.2	50.9
C 0-44		80.1	32.8	47.3
Met. District		411.3	220.5	190.8
Remainder		51.1	16.4	34.7
D 0-44		63.4	26.8	36.6
Met. District		194.5	107.6	86.9
Remainder		48.9	17.9	31.0

a) Central cities, as defined by this study, have been excluded from this tabulation. In all cases in which the census classifies two or more cities as central cities in the metropolitan district, the lesser central cities have been added to the urban population in order to make comparable distributions. Davenport, Rock Island, Moline considered as one central city in both tabulations.

b) Includes data for the metropolitan districts of the 67 metropolitan centers of this study only.

Source: Compiled from The Growth of Metropolitan Districts in the United States: 1900-1940 by Warren S. Thompson. (Washington: Bureau of the Census, 1947.) Tables 2 and 5; Sixteenth Census of the United States, Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 2[illegible] and 2[illegible]; Areas of the United States, 1940, Tables 2, 3, and 4.

1. In the class B, C, and D metropolitan communities there is a higher proportion of both urban and rural population than of land area in the "remainder" of the 0-44 mile zone which lies outside the metropolitan districts.

2. The habitation ratios for all sizes of metropolitan communities are much higher in this "remainder" zone than the mean habitation ratio for the hinterland as a whole. They are also higher than the habitation ratios for the subsequent distance zones.

3. Both of these measures indicate that the phenomenon of population aggregation extends much further into the hinterland than the boundaries of the metropolitan district. Although the level of land occupancy for the remaining portion of the 0-44 mile zone is only a fraction of that for the metropolitan district itself, these habitation ratios serve as a reminder that the suburban development about the metropolis has no clean-cut boundary, and that suburban land uses fade, not into open country or into an area of large-scale farming, but into other fairly intense types of land occupancy. In studying Table 6, the comparative size of the metropolitan district and of the remainder of the 0-44 mile zone should be kept in mind. In the class A and B metropolitan communities the remainder zone is two or three times the size of the metropolitan district area, and in the class C and D metropolitan communities it is more than ten times the size of the metropolitan districts. Thus, immediately beyond the metropolitan district and surrounding it is a zone of milder, but yet still relatively intense, concentration of population.

VIII

Summary

1. The bisection procedure of establishing metropolitan community boundaries gives the central cities of 500,000 or more inhabitants an average hinterland which is only about one-half the size, in land area, as it gave to the central cities of less than 500,000 inhabitants. In spite of this, these metropolitan communities with large central cities have a larger total, urban, and rural-nonfarm population than those with smaller central cities.

2. The hinterlands of metropolitan communities with large central cities (class A and B) tend to be more urban in character, and tend to have proportionally more of their area lying in intermetropolitan and subdominant sectors than the class C and D metropolitan communities.

3. The metropolitan communities of each size class conform to the general pattern of population distribution developed in the preceding two chapters. The intensity with which the land is occupied with increasing distance and with change in type of sector tends to vary by the same general pattern as that described for all 67 of the metropolitan communities considered as a group.

4. Yet the size of the central city appears to be a variable which is related to the intensity of land settlement under given conditions of distance and type of sector. Class A and B metropolitan communities have higher numbers of population per square mile at all distances than class C and D metropolitan communities. The class A metropolitan communities tend to be more intensively occupied than class B; classes C and D show only minor differences in this respect.

5. The greater intensity of land occupancy in all parts of the hinterlands of the class A and B communities is due almost entirely to the greater concentration of the urban and the rural-farm populations in these areas.

6. The instability in the ratio of population to land in the 35-64 mile zones leads to the hypothesis, to be examined in more detail later, that within easy commuting and transportation distance the influence of the metropolis is direct, but that beyond this distance the metropolis must act through major hinterland cities. The 45-64 mile zone, just outside the range of easy access to the metropolis, appears to be a favored location for subdominant hinterland population.

7. In the larger metropolitan communities (class A and B) there is a greater total concentration of the urban and rural-nonfarm populations toward the central zones than in the smaller metropolitan communities. In all sizes of metropolitan communities the urban population is distributed more independently of land than the rural-nonfarm, which in turn is more independently distributed with respect to land than the rural-farm.

8. The tendency for the populations near the metropolis to be predominantly urban, and for those at greater distances to be predominantly rural is modified by increasing size of metropolis as follows: The urban predominance tends to extend farther into the hinterland and the ratio of the urban to the rural population tends to be higher at all distances in the class A and B than in the class C and D metropolitan communities. The same tendency is manifest in the proportion of the rural population which is nonfarm. In those instances where the urban

population constitutes only a small proportion of the total population, the ratio of the rural-nonfarm to the rural-farm population tends to reach an equilibrium.

9. From the foregoing it must be concluded that although the populations of all metropolitan communities appear to be distributed by the same general pattern, there are many differences between individual metropolitan communities. Undoubtedly each of the 67 metropolitan communities has its own unique pattern of adjustment to its environmental conditions as well as to its position in the larger inter-metropolitan structure of the nation. Yet the fact that the distance and sector type differences emerge under varied conditions of geographic location, of urban-rural population composition, of average size of hinterland and of size of central city indicates that there are certain underlying relationships between the central city and the hinterland which are present in each case, and which the indexes of distance and sector type express.

CHAPTER SEVEN

THE DISTRIBUTION OF CITIES, BY SIZE, IN THE HINTERLAND

I

Introduction

From the foregoing analysis it is known that as aggregates the urban, the rural-nonfarm, and the rural-farm populations are distributed over the land in patterns which, in view of the many possible variations of the environment, are surprisingly regular and internally consistent. As yet each of these populations has been treated as if all of its units were alike. No recognition has been given that hinterland cities are of many different sizes, and no attempt has been made to determine whether the population of all hinterland cities, or of only some sizes of hinterland cities, follow the metropolitan pattern for hinterland urban populations. It is true that at some points in the preceding analysis evidence was presented which indicated that areas associated with major hinterland cities react differently to the variables of distance and size class of metropolitan community than areas not associated with such places. For example, those sectors which contain a major hinterland city have had higher average concentrations of rural population than sectors which have not contained such cities. This chapter attempts to give explicit recognition to the fact that hinterland cities vary greatly in size and complexity by studying the distribution of cities of each size in the hinterland. The following chapter will attempt to describe the effects which hinterland cities of each size appear to have upon the distribution of the rural-farm and the rural-nonfarm populations.

It would be difficult to over-emphasize the importance of attempting to understand the place of the hinterland cities in the framework of the metropolitan pattern. The very fact that hinterland cities exist is evidence in itself that the dispersed population cannot and does not depend upon the metropolis directly for all of its urban services. Some of the functions which only a city can perform seem to be needed so universally, so frequently, and in such quantities, that smaller centers spring up in the hinterland to satisfy those needs. The presence of hinterland cities would appear to be an inevitable and necessary accompaniment of an intensive level of land occupancy. Conversely, under present conditions of environment, resources, markets, and technology, urban units located in the hinterland appear to be more efficient locations for accomplishing some functions than is the metropolis.

Unfortunately, most writings on the metropolitan community have concerned themselves very little with the interrelationships between the hinterland city and the metropolis. The hinterland has been conceived as an amorphous territory lying beyond the "built up" portion of the metropolis from which the metropolis draws needed raw materials and manpower, and upon which the metropolis depends for a market for some of its products. In the effort to demonstrate that the metropolis dominates the hinterland city, and the territory tributary to it, the fact that outlying centers also have their spheres of influence and contribute to the well-being of the metropolis has not been regarded as a part of the problem, but has been taken as a matter of fact. In this attempt

to sketch a structure for the metropolitan community, the hinterland city cannot be given this matter-of-fact treatment; its functional position in the metropolitan framework must become a subject of major inquiry.

The hypothesis of subdominance developed in Chapter Two provides a starting point for examining the place of the hinterland city in the metropolitan structure. The metropolis was there characterized as a unit which dominates all of its hinterland directly. Rather it has been conceptualized as a unit which dominates by controlling some of the conditions of life of other communal units, which in themselves exercise a degree of control (subdominance) over still less dominant units. If this hypothesis is true, then any over all structure which is typical of the metropolitan community must consist of some pattern of arrangement and inter-functioning of hinterland communities with each other, as well as with the central city.

Perhaps the importance of this point can be further emphasized by reviewing a few of the facts about hinterland cities. In this study only 67 cities have been deemed to be of sufficient size and independence to be considered as metropolitan centers. Scattered throughout the hinterland are 3,395 other cities and urban places ranging in size from 2,500 to more than 100,000 inhabitants. While many of these places are mere extensions or appendages of the 67 metropolitan centers themselves, the majority of them are detached units lying outside the "built up" area of the metropolis. In addition to these numerous independent

communities there are many times as many villages, hamlets, and other agglomerations of urban-like populations. In 1940 the United States Census listed 13,288 incorporated places of less than 2,500 inhabitants. There are many more which have no such formal organization. The 67 metropolitan centers contain but 25.7 percent of the total population of the United States. The combined population of the hinterland cities is 30.8 percent of the national total. An additional 20.5 percent of the population resides in the many village and rural-nonfarm areas. Thus, 77 percent of the population of the United States is agglomerated, or nucleated, and the amount of agglomerated or nucleated population outside central cities is almost exactly twice the amount concentrated inside the central cities. No realistic hypothesis of metropolitan organization could fail to take note of the fact that the hinterland everywhere contains a multiplicity of local centers. Metropolitan organization can only be an organization of large numbers of such communities, and metropolitan structure can only be a general description of the arrangement of such communities with respect to the metropolis and to each other. While the data presented here will give only a very general picture of this local community organization, it is hoped that this analysis, together with the analysis of the functions performed in hinterland cities and their tributary areas (to be presented in Part III) will convincingly demonstrate that the hinterland is no less organized, no less patterned, than the metropolis itself, and that metropolitan dominance can and does exist only as an organization and integration of many local centers of subdominance and of the area over which these local centers exercise their control.

The superimposition of the additional classification of "size of hinterland city in 1940" upon the preceding tabulations for the urban population by distance, type of sector, and size class of central city, makes it possible to study the distribution in the hinterland of each size of subdominant center. As in the preceding chapters, the amount of land area varies considerably from zone to zone, sector type to sector type, and from one size of metropolis to another. In order to eliminate the effect of the differences in land area, the population data for each size of city have been reduced to the familiar habitation ratios--population per unit of land area. The land area which has been used as the base for these ratios is the number of square miles of land area in the sector type and distance zone in which the hinterland cities of the given size are located. Thus, if a given distance zone and sector type of a certain size of metropolitan community contains some cities of every size group, the same land area is used as a base in computing the habitation ratio for each size of hinterland city. In fact, the habitation ratios for each of the sizes of cities may be added together to obtain the total urban population per square mile in that zone and sector. This procedure not only eliminates differences in area between the various parts of the hinterland, but also serves to emphasize the fact that any one hinterland area is simultaneously occupied, or served, by more than one size of hinterland city, and that varying combinations of this service may be found in different parts of the hinterland. Thus, one distance-direction area of the hinterland may be occupied by cities of 50,000 or more inhabitants

to the intensity of five residents per square mile, and at the same time be occupied by cities of less than 5,000 inhabitants to the intensity of two persons per square mile. Implicit in this recognition of simultaneous occupancy is the hypothesis that both the large and the small hinterland cities may serve the same populations. To the extent that the larger hinterland cities provide this population with services which the smaller cities do not, the study of the hinterland cities by size groups is also an analysis of the pattern of the division of labor between the hinterland cities themselves, and of the pattern of subdominance.

In the tables which follow, the urban occupancy of the hinterland is measured in terms of two units: Number of cities of each size, and total population of cities of each size. The first conveys a clear idea of the actual physical arrangement of the units, whereas the second, by using actual populations of each size of city, more accurately measures the intensity of hinterland occupancy.

II

Description of the Location of Cities in the Hinterland, by Size

A. The Number of Hinterland Cities of Each Size in Each Size Class of Metropolitan Community (Table 7-1)

Of the 3395 hinterland cities and urban places of all sizes in the United States in 1940, at least one-seventh of the members of each size are present in the hinterland of each of the four classes of metropolitan communities. No one class of metropolitan community claims more than 41.7 percent or less than 14.1 percent of the members of any one size group of hinterland city. The larger hinter-

Table 7-1

Number of hinterland cities, distributed by size group of city and size class of metropolitan community in which located. United States, 1940.

Size of urban place	All metropolitan communities	Size class of metropolitan community			
		A	B	C	D
All urban places	3395	556	679½[a]	853	1306½
2,500 - 4,999	1422	201	242	385½	593½
5,000 - 9,999	965	153	183½	247½	381
10,000 - 14,999	374	69	92	84	129
15,000 - 24,999	291	43	82	63	103
25,000 - 49,999	211	51	46	46	68
50,000-over	132	39	34	27	32
	Percentage distribution				
All urban places	100.0	16.4	20.0	25.1	38.5
2,500 - 4,999	100.0	14.1	17.0	27.1	41.7
5,000 - 9,999	100.0	15.9	19.0	25.6	39.5
10,000 - 14,999	100.0	18.4	24.6	22.5	34.5
15,000 - 24,999	100.0	14.8	28.2	21.6	35.4
25,000 - 49,999	100.0	24.2	21.8	21.8	32.2
50,000 - over	100.0	29.5	25.8	20.5	24.2

a) Those cities which lie in two counties between which a metropolitan community boundary passes have been coded as one-half city in each metropolitan community.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5.

land cities tend to be more evenly distributed among the metropolitan communities of the four sizes than are the smaller ones.

B. The Average Number of Hinterland Cities of Each Size Class in Each Metropolitan Community (Table 7-2)

1. Although the average number of hinterland cities of each size contained in the metropolitan community will vary considerably from one metropolitan community to another, such an average for each size class of metropolitan community is indicative of the increasing complexity of metropolitan communities with increasing size of central city. Thus, a class D metropolitan community would, on the average, consist of a metropolis and 38 hinterland cities, of which only three would be as large as 25,000 inhabitants. An average class A metropolitan community, on the other hand, would consist of a metropolis and 111 hinterland cities, of which 18 would contain 25,000 or more inhabitants. On the whole, the larger the size-class of the central city, the larger the average number of hinterland cities of each size that are contained in it.

2. With increasing size of metropolis there is an important change in the size composition of the complement of hinterland cities. Not only are the larger hinterland cities more numerous in the larger metropolitan communities; they are also relatively more important, as indicated by the fact that they constitute a larger percentage of all cities than in the smaller size classes of metropolitan communities. Consequently, the smaller hinterland cities are a larger proportion of all cities in the smaller hinterland communities. The large metropolis not only has more cities

Table 7-2

Number of hinterland cities of each size group per metropolitan community of each size class, United States, 1940.

Size of urban place	All metropolitan communities	Size class of metropolitan community			
		A	B	C	D
All urban places	50.7	111.2	75.5	44.9	38.4
2,500 - 4,999	21.2	40.2	26.9	20.3	17.5
5,000 - 9,999	14.4	30.6	20.4	13.0	11.2
10,000 - 14,999	5.6	13.8	10.2	4.4	3.8
15,000 - 24,999	4.3	8.6	9.1	3.3	3.0
25,000 - 49,999	3.1	10.2	5.1	2.4	2.0
50,000 - over	2.0	7.8	3.8	1.4	0.9
		Percentage distribution			
All urban places	100.0	100.0	100.0	100.0	100.0
2,500 - 4,999	41.9	36.2	35.6	45.2	45.4
5,000 - 9,999	28.4	27.5	27.0	29.0	29.2
10,000 -14,999	11.0	12.4	13.5	9.8	9.9
15,000 -24,999	8.6	7.7	12.1	7.4	7.9
25,000 -49,999	6.2	9.2	6.8	5.4	5.2
50,000 -over	3.9	7.0	5.0	3.2	2.4

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5.

in its hinterland than does the small metropolis; it also has, on the average, larger hinterland cities than does the small metropolis.

3. The amount of change in the composition of the complement of hinterland cities is not constant from one size class of metropolis to another. This can most easily be demonstrated by means of a coefficient of dissimilarity (sum of percentage-point differences of like sign between the percentage distributions of size classes of metropolitan communities lying adjacent to each other in the size continuum). These coefficients of dissimilarity and of similarity are:

Comparison between	Coefficient of dissimilarity	Coefficient of similarity
A&B	5.5	94.5
B&C	11.6	88.4
C&D	1.0	99.0

The size of city composition of the hinterlands of class C and D metropolitan communities is almost identical, as indicated by the 99 percent correspondence between their distributions. There is a sharp change in composition between the class B and class C metropolitan communities, for the size composition of their hinterland cities has only 88.4 percent similarity. The difference in composition between the A and B cities is quite marked also, being about half that of the difference between the B and C cities. Thus, the change in the combination in which the various sizes of hinterland cities are found in the hinterlands of the various sizes of metropolitan communities varies considerably.

C. The Distribution of the Hinterland Urban Population Among the Various Sizes of Hinterland Cities, by Size of Metropolis (Table 7-3)

The large proportion which the small hinterland cities are of

Table 7-3

Number and percentage distribution of urban inhabitants living in central cities and in hinterland cities, by size class of metropolitan community. United States, 1940.

Size and type of urban place	All metropolitan communities	Size class of metropolitan community			
		A	B	C	D
	Number of inhabitants (thousands)				
All metropolitan communities	131,673.1	29,456.3	24,183.5	35,317.0	42,716.2
Central cities	33,825.8	15,910.9	6,456.9	6,506.7	4,951.3
Hinterland cities	40,601.7	9,145.4	9,622.4	9,064.9	12,768.0
2,500-4,999	5,027.3	726.6	854.2	1,358.9	2,077.5
5,000-9,999	6,684.4	1,092.9	1,290.4	1,685.1	2,615.9
10,000-14,999	4,505.2	849.6	1,128.6	1,004.0	1,523.0
15,000-24,999	5,462.1	816.9	1,574.3	1,182.7	1,888.2
25,000-49,999	7,339.4	1,800.8	1,608.1	1,577.8	2,352.7
50,000-99,999	7,083.8	1,696.5	1,835.5	1,502.2	2,049.6
100,000-over	4,499.8	2,163.1	1,331.3	744.3	261.1
	Percentage distribution - hinterland population				
Hinterland cities	100.0	100.0	100.0	100.0	100.0
2,500-4,999	12.4	7.9	8.9	15.1	16.3
5,000-9,999	16.5	11.9	13.4	18.6	20.5
10,000-14,999	11.1	9.3	11.7	11.1	11.9
15,000-24,999	13.5	8.9	16.4	13.0	14.8
25,000-49,999	18.1	19.7	16.7	17.4	18.4
50,000-99,999	17.4	18.5	19.1	16.6	16.1
100,000-over	11.1	23.6	13.8	8.2	2.0

Source: Sixteenth Census of the United States, compiled from Population, Vol.1, State tables 3 and 5.

all hinterland cities should not lead to the assumption that the populations of hinterland cities are preponderantly small-city dwellers. It takes, on the average, ten cities of the 2,500-4,999 class to equal one city of the 25,000-49,999 class. Table 7-3, showing the proportion of the total urban population of each class of metropolitan community which lives in each size group of hinterland city, indicates that large hinterland cities are a more important element of the hinterland than the number of such cities would indicate.

1. The proportion of the hinterland urban population living in cities of more than 50,000 inhabitants is more than twice as large in the class A as in the class D metropolitan communities. Between these extremes each smaller size of metropolis has a smaller proportion of its hinterland urban inhabitants living in cities of 50,000 or more inhabitants.

2. To compensate for the high proportion of this urban population living in the very large hinterland cities, the largest metropolitan communities have a relatively small proportion of their urban inhabitants living in smaller hinterland cities. Only in class D metropolitan communities is there a relatively uniform distribution of the urban population among the city size classes, there being no tendency for any one size of hinterland city to claim an unusually large or small share of the total hinterland urban population.

3. In the class A metropolitan communities the population of the central cities outnumbers the combined population of all hinterland cities. In the class B, C, and D metropolitan communities, this

situation is reversed; the population of the subdominant cities outnumbers that of central cities, and this by a ratio which becomes quite large in the smallest class of metropolitan community. The population of all class D central cities is only 39 percent as large as the combined population of their hinterland cities.

4. As the size of the metropolitan community decreases, the population of the major hinterland cities (cities of 25,000 or more) comes to almost equal the population of the central city itself. This is a fact of considerable significance. So long as the metropolis is overwhelmingly larger than all of its hinterland cities combined, one might well expect a high degree of dominance. When the major subdominant units together almost equal the total population of the metropolises themselves, as they do in the class D metropolitan communities, one might well expect a much looser type of metropolitan organization and a smaller degree of metropolitan dominance.

D. The Distribution of the Subdominant Cities Throughout the Hinterland (Table 7-4)

Table 7-4 presents the number of cities of each size group located in each sector type of each distance zone in each size class of metropolitan community. Just as the large and the small metropolitan communities differ in the number and proportion of hinterland cities of each size which they contain, they also differ in the manner in which the hinterland cities of each size are distributed throughout the hinterland.

The differences between the class A, B, C, and D metropolitan communities in number and size of subdominants can be fully appreciated only when the considerable differences in the number of cities

Table 7-4

Number of hinterland cities of each size group classified by size class of metropolitan community, sector type, and distance from the nearest metropolis, United States, 1940. a)

Distance zone (miles)	SIZE GROUP OF HINTERLAND CITY: 2,500 - 4,999					5,000-9,999					10,000 - 24,999					25,000 - over				
	All metropolitan communities	Size class of metropolitan community: A	B	C	D	All metropolitan communities	A	B	C	D	All metropolitan communities	A	B	C	D	All metropolitan communities	A	B	C	D
	All sectors					All sectors					All sectors					All sectors				
All distances	1422	201	242	385½	593½	965	153	183½	247½	381	665	112	174	147	232	343	90	80	73	100
0-24	206	67	45	36	57	229	85	57	37	50	196	73	68	24	31	125	55	37	15	18
25-44	222	62	43	46	72	133	36	30	24	43	109	21	27	16	45	51	15	12	7	17
45-64	109	36	25	17	31	73	21	13	15	24	65	11	18	9	25	27	9	7	5	6
65-84	113	26	18	28	41	60	15	17	9	19	44	6	9	7	22	24	6	5	2	11
85-104	189	36	37	43	73	131½	17	22	28½	64	86	11	24	22	29	51	14	11	10	16
105-124	376	27	75	97	177	218½	8	45½	73	92	133	7	32	36	58	65	6	14	21	24
125-144	200½	4	20	79	97½	117	-	16	39	62	74	-	14	22	38	26	-	3	10	13
145-164	165½	4	12	71	78½	68	6	11	35	46	46	-	9	17	19	17	-	3	9	5
165-over	57	1	3	14½	39½	38	1	2	11	24	22	-	-	10	12	8	-	-	1	7
	Intermetropolitan					Intermetropolitan					Intermetropolitan					Intermetropolitan				
All distances	812½	126	147½	216	323	550	99	109½	144½	202	389	69	93	91	136	226½	69	43	48	66½
0-24	126	41	35	22	28	140	51	33	22	34	109	45	35	10	19	79	43	21	7	8
25-44	133	44	25	21	43	83	27	18	15	23	68	13	15	12	28	35	12	6	4	13
45-64	64	28	13	7	15	44	17	6	11	10	42	11	11	6	14	18	8	3	2	5
65-84	69	15	12	14	28	39	10	12	4	13	26	2	4	6	14	17	4	3	2	8
85-104	211½	22	26	23	44	75½	9	13	17½	36	55	4	17	17	17	37	10	6	9	12
105-124	110	11	49½	56	95	123½	5	27½	45	46	72	7	15	21	29	47	4	10	17	16
125-144	88½	3	13	51	43	55	-	8	20	27	46	-	9	16	21	14½	-	-	5	9½
145-164	44½	4	3	37	44½	46	6	3	20	17	24	-	2	8	14	8	-	-	6	2
165-over	32½	1	-	6	25½	27	1	-	7	19	15	-	-	7	8	6	-	-	-	6
	Subdominant					Subdominant					Subdominant					Subdominant				
All distances	203½	28	40½	63	72	141	28	45	34	34	104	17	30	15	22	102	19	33	21	29
0-24	18	10	2	2	4	38	20	8	7	3	31	11	18	1	1	32	10	12	4	6
25-44	21	6	5	4	6	16	3	8	3	2	14	4	5	1	4	16	3	6	3	4
45-64	9	3	2	1	2	10	2	5	1	1	10	2	4	1	3	9	1	4	3	1
65-84	12	3	2	3	4	6	1	2	2	1	4	2	1	-	1	7	2	2	-	3
85-104	30	6	7	7	10	11	4	4	2	1	9	2	3	-	4	14	4	5	1	4
105-124	60½	6	8½	19	27	31	1	8	10	12	21	-	13	5	3	18	2	4	4	8
125-144	39	-	8	14	17	23	-	8	7	8	16	-	4	3	9	11	-	3	5	3
145-164	32	-	8	17	7	18	-	8	3	7	13	-	7	2	1	9	-	3	3	3
165-over	3	-	2	-	1	4	-	1	2	1	-	-	-	-	-	2	-	-	1	1
	Local					Local					Local					Local b)				
All distances	406	47	54	106½	198½	274	26	30	67	145	172	26	31	41	74	14½	2	4	4	4½
0-24	62	16	9	12	25	51	14	16	8	13	56	17	15	13	11	14	2	4	4	4
25-44	68	12	13	20	23	34	6	4	6	18	27	4	7	3	13					
45-64	36	4	9	9	14	19	2	1	3	13	13	2	3	2	6		-	-	-	-
65-84	32	8	4	11	9	15	4	3	3	5	14	2	4	1	7		-	-	-	-
85-104	48	8	8	13	19	45	4	5	9	27	22	5	4	5	8		-	-	-	-
105-124	104	16	17	22	55	64	2	10	18	34	40	-	4	10	26		-	-	-	-
125-144	57c	1	5	14	37½	39	-	-	12	27	12	-	1	3	8	½ c)	-	-	-	½ c)
145-164	45	-	1	17	27	34	-	-	12	22	8	-	-	4	4		-	-	-	-
165-over	21½	-	1	8½	12	7	-	1	2	4	7	-	-	3	4		-	-	-	-

a) Those cities which lie in two counties between which a metropolitan community boundary passes have been coded as one-half city in each metropolitan community.

b) By definition there are no cities of 25,000 or more inhabitants at distances greater than 10 miles from the metropolis in local sectors.

c) One-half of Rocky Mount, North Carolina.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Areas of the United States, 1940, tables, 2, 3, and 4.

lying in each portion of the hinterland are observed.

1. In addition to containing 1,000,000 or more inhabitants, located within 25 miles of its business center the class A metropolitan community has an average of 11 cities of 25,000 or more inhabitants, 15 cities of 10,000 to 25,000 inhabitants, and 30 cities of less than 10,000 inhabitants. This is a total of 56 cities, all within very easy commuting distance of the metropolis. By way of contrast, the average class D metropolis contains only 4.6 subdominant cities within 25 miles of its center. Only about one class D metropolitan community in two has a city as large as 25,000 inhabitants within 25 miles of the center. Of the other four cities which lie within this zone in the average class D metropolitan community, one contains between 10,000 and 25,000 inhabitants, and three contain less than 10,000 inhabitants.

2. The class A cities contain an average of at least one hinterland city of each size group in almost every distance zone out to 115 miles. The class C and D cities, on the other hand, fall far short of averaging a subdominant city of every size in every zone. In the 25-34 mile zone the class D communities do not even quite average an urban place of any size. These same class D communities have, on the average, one city of 25,000 or more inhabitants somewhere between the metropolis and 45 miles from the metropolis, and two more cities of this size beyond this point. When it is remembered that the class C and D metropolitan communities encompass twice the area which the class A and B metropolitan communities do, and that the number of hinterland cities is reduced to an "average per zone" basis, the relative sparsity of urban places in the hinter-

lands of the smaller metropolitan communities becomes readily apparent.

3. From the fact that there are only 29 major hinterland cities (25,000 or more inhabitants) lying in the subdominant sectors of the 34 class D metropolitan communities, it is evident that not every metropolitan community of this size has a subdominant sector; in such instances the hinterland consists entirely of local and intermetropolitan sectors. There is an average of at least one city of 25,000 or more inhabitants for each central city of the three larger sizes of metropolitan communities, and this number increases with increasing size. This is the reason for the greater percentage of the land area lying in subdominant sectors in the larger metropolitan communities, a tendency noted in the preceding chapter.[1]

4. The reader who intends to make a careful study of the habitation ratios which follow will find Table 7-4 of assistance in determining the relative weight to give to any one ratio of population to land. The number of cities is very small in some cells of these tables, whereas in other cells there are many cities represented. By referring to Table 7-4 it is possible to determine, in each case, the number of cities upon which a given habitation ratio is based.

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1 In class A metropolitan communities, 69 out of a total of 90 major hinterland cities lie in intermetropolitan sectors, whereas in class B metropolitan communities, 43 out of 80 major hinterland cities lie in intermetropolitan sectors. It is for this reason that the class B metropolitan communities have a much higher than average proportion of their land area classified as lying in subdominant sectors, whereas the class A hinterland is classified as being predominantly intermetropolitan.

III

The Intensity with which the Hinterland is Occupied by Residents of Various Sizes of Cities

A. Number of Cities per 1000 Square Miles of Hinterland Area, by Size of City. (Table 7-5)

By eliminating differences in the amounts of land area between the various parts of the hinterland, Table 7-5 constitutes a more precise statement of the relative frequency with which cities of each size occur in each part of the hinterland.

1. The over-all pattern of distribution of each size of city is the one which has become familiar in the preceding chapters--decreasing frequency with increasing distance.

2. It is now possible to locate some of the sources of the temporary suspension or even reversal of the general distance trend which has been noted as a characteristic of the 25-34 or the 35-44 mile zones.

a. In the 25-44 mile zone of class C and class D metropolitan communities the frequency of occurrence of every size of hinterland city tends to level off or to decrease. In class C metropolitan communities the 45-64 mile zone exhibits a rise from the 35-44 mile zone (rather than the expected decline) in the intensity of urban land settlement by cities of all sizes except residents of cities of 2,500-4,999. Thus, either the 25-34 mile zone fails to support the full complement of cities which the general trend would lead one to anticipate, or the 45-64 mile zone produces more cities than would be expected. This phenomenon is not due to fluctuations in the area base from which the ratios have been computed, but is due to a very real scarcity of cities at these distances, as can be verified by referring back to

Table 7-5

...ber of historic cities of each size group per 1000 square miles, classified by size class of metropolitan community, sector type, and distance ...m the nearest metropolis, United States, 1940.

Distance zone miles.	SIZE GROUP OF HISTORIC CITY: 2500 - 4999 — All metropolitan communities	Size class of metropolitan community: A	B	C	D
	All sectors				
All distances	0.48	1.63	1.20	0.39	0.36
0-24 a)	2.20	9.55	4.78	1.36	1.13
25-[illegible]	1.26	5.87	2.78	0.81	0.76
25-34	1.41	6.06	2.99	0.67	0.83
35-44	1.14	5.63	2.54	0.93	0.71
45-54	0.91	2.26	1.39	0.67	0.72
55-114	0.69	1.46	1.39	0.49	0.66
115-164	0.44	b)	0.65	0.46	0.39
165-264	0.23	b)	0.33	0.28	0.20
265-over	0.08	b)	0.15	0.07	0.08
	Intermetropolitan				
All distances	0.50	1.56	1.84	0.41	0.33
0-24 a)	2.20	9.55	4.78	1.36	1.13
25-44	1.29	6.96	2.87	0.72	0.74
25-34	1.29	8.56	2.96	0.45	0.57
35-44	1.30	5.12	2.77	1.01	0.87
45-64	1.04	3.01	1.52	0.66	0.87
65-114	0.70	0.91	1.67	0.48	0.66
115-164	0.45	b)	0.71	0.54	0.33
165-264	0.23	b)	0.75	0.28	0.21
265-over	0.07	b)	-	0.06	0.07
	Subdominant				
All distances	0.68	1.85	0.53	0.01	0.66
0-24 a)	2.20	9.55	4.78	1.36	1.13
25-44	1.33	2.83	1.75	1.12	0.83
25-34	1.37	2.26	1.83	0.68	0.56
35-44	1.31	3.97	1.63	1.45	0.78
45-64	1.12	1.52	1.34	1.11	0.89
65-114	1.02	5.27	1.17	0.88	0.92
115-164	0.46	-	0.52	0.43	0.57
165-264	0.36	-	0.28	0.19	0.28
265-over	0.12	-	0.12	-	0.19
	Local				
All distances	0.43	2.05	1.26	0.30	0.36
0-24 a)	2.20	9.55	4.78	1.36	1.13
25-[illegible]	1.17	5.67	3.35	0.88	0.78
25-34	1.73	5.38	3.84	1.06	1.58
35-44	0.86	8.56	2.60	0.77	0.44
45-64	0.65	1.72	1.16	0.57	0.48
65-114	0.57	2.09	1.00	0.36	0.56
115-164	0.40	-	0.77	0.30	0.42
165-264	0.18	-	0.28	0.21	0.17
265-over	0.09	-	0.39	0.08	0.09

Distance zone miles.	SIZE GROUP OF HISTORIC CITY: 5,000 - 9,999 — All metropolitan communities	Size class of metropolitan community: A	B	C	D
	All sectors				
All distances	0.32	1.24	0.91	0.25	0.23
0-24 a)	2.45	12.11	5.92	1.40	0.99
25-[illegible]	0.75	3.41	1.94	0.43	0.46
25-34	0.95	3.54	1.55	0.59	0.64
35-44	0.60	3.25	2.40	0.30	0.33
45-64	0.43	1.07	0.83	0.45	0.63
65-114	0.40	0.43	0.84	0.37	0.34
115-164	-	b)	0.40	0.22	0.25
165-264	-	b)	0.31	0.14	0.12
265-over	0.05	b)	0.10	0.05	0.05
	Intermetropolitan				
All distances	0.34	1.23	1.28	0.28	0.21
0-24 a)	2.45	12.11	5.92	1.40	0.99
25-44	0.81	4.27	2.06	0.51	0.39
25-34	0.89	5.02	1.37	0.71	0.38
35-44	0.73	3.41	2.77	0.29	0.41
45-64	0.71	1.23	0.90	0.51	0.71
65-114	0.41	0.41	0.93	0.39	0.32
115-164	0.23	-	0.41	0.21	0.21
165-264	0.12	b)	0.75	0.15	0.08
265-over	0.06	b)	-	0.07	0.05
	Subdominant				
All distances	0.47	1.85	0.59	0.33	0.31
0-24 a)	2.45	12.11	5.92	1.40	0.99
25-44	1.02	1.41	2.80	0.84	0.28
25-34	1.52	1.18	3.67	0.66	0.15
35-44	0.65	1.32	1.63	0.97	0.20
45-64	0.41	1.01	0.76	0.32	0.39
65-114	0.52	0.88	1.10	0.46	0.41
115-164	0.27	-	0.52	0.22	0.27
165-264	0.20	-	0.28	0.09	0.26
265-over	0.14	-	0.08	0.77	0.19
	Local				
All distances	0.29	1.14	0.84	0.19	0.26
0-24 a)	2.45	12.11	5.92	1.40	0.99
25-[illegible]	0.99	2.83	1.03	0.26	0.41
25-34	0.91	1.69	0.43	0.35	1.47
35-44	0.40	4.28	1.95	0.21	0.24
45-64	0.61	0.86	0.72	0.39	0.68
65-114	0.35	0.58	0.59	0.29	0.35
115-164	0.27	-	-	0.15	0.30
165-264	0.14	-	-	0.15	0.14
265-over	0.03	-	0.39	0.02	0.03

Distance zone miles.	SIZE GROUP OF HISTORIC CITY: 10,000 - 24,999 — All metropolitan communities	Size class of metropolitan community: A	B	C	D
	All sectors				
All distances	0.22	0.91	0.86	0.15	0.14
0-24 a)	2.09	10.40	7.07	0.91	0.61
25-[illegible]	0.62	1.99	1.75	0.29	0.47
25-34	0.84	2.53	2.15	0.35	0.62
35-44	0.44	1.30	1.27	0.23	0.38
45-64	0.41	0.69	0.90	0.34	0.28
65-114	0.24	0.38	0.59	0.18	0.21
115-164	0.16	-	0.35	0.13	0.15
165-264	0.06	-	0.25	0.07	0.05
265-over	0.03	-	-	0.05	0.02
	Intermetropolitan				
All distances	0.24	0.85	1.16	0.17	0.14
0-24 a)	2.09	10.40	7.07	0.91	0.61
25-44	0.66	2.06	1.72	0.41	0.48
25-34	0.85	3.25	2.51	0.39	0.53
35-44	0.49	0.68	0.92	0.43	0.44
45-64	0.51	0.55	1.17	0.49	0.34
65-114	0.24	0.58	0.50	0.15	0.20
115-164	0.19	-	0.49	0.17	0.15
165-264	0.06	-	0.50	0.06	0.05
265-over	0.03	-	-	0.07	0.02
	Subdominant				
All distances	0.45	1.12	0.65	0.15	0.20
0-24 a)	2.09	10.40	7.07	0.91	0.61
25-44	0.89	1.80	1.75	0.28	0.56
25-34	1.51	1.40	2.44	0.66	1.45
35-44	0.41	2.65	0.82	-	0.20
45-64	0.34	0.51	0.57	-	0.36
65-114	0.35	-	1.78	0.25	0.10
115-164	0.19	-	0.25	0.09	0.30
165-264	0.15	-	0.25	0.14	0.04
265-over	-	-	-	-	-
	Local				
All distances	0.18	1.14	0.73	0.12	0.13
0-24 a)	2.09	10.40	7.07	0.91	0.61
25-[illegible]	0.41	1.89	1.80	0.13	0.44
25-34	0.62	1.69	1.28	0.24	0.68
35-44	0.38	2.14	2.60	0.07	0.34
45-64	0.30	1.07	0.58	0.22	0.20
65-114	0.22	-	0.23	0.12	0.27
115-164	0.08	-	0.15	0.07	0.09
165-264	0.03	-	-	0.05	0.03
265-over	0.03	-	-	0.07	0.03

Distance zone miles.	SIZE GROUP OF HISTORIC CITY: 25,000 - over — All metropolitan communities	Size class of metropolitan community: A	B	C	D
	All sectors				
All distances	0.12	0.73	0.40	0.07	0.06
0-24 a)	1.34	7.84	3.85	0.57	0.36
25-[illegible]	0.29	1.42	0.78	0.13	0.18
25-34	0.35	1.52	0.84	0.20	0.16
35-44	0.24	1.30	0.70	0.07	0.19
45-64	0.25	0.88	0.41	0.16	0.16
65-114	0.12	0.32	0.26	0.11	0.09
115-164	0.06	-	0.07	0.06	0.05
165-264	0.02	-	0.08	0.04	0.01
265-over	0.01	-	-	0.00	0.01
	Intermetropolitan				
All distances	0.14	0.85	0.54	0.09	0.07
0-24 a)	1.34	7.84	3.85	0.57	0.36
25-44	0.34	1.90	0.69	0.14	0.22
25-34	0.36	2.36	0.88	0.13	0.19
35-44	0.32	1.56	0.69	0.14	0.25
45-64	0.35	1.37	0.41	0.26	0.24
65-114	0.16	0.33	0.44	0.15	0.11
115-164	0.06	-	-	0.05	0.07
165-264	0.02	-	-	0.04	0.01
265-over	0.01	-	-	-	0.02
	Subdominant				
All distances	0.34	1.25	0.43	0.20	0.27
0-24 a)	1.34	7.84	3.85	0.57	0.36
25-44	1.02	1.41	2.10	0.84	0.56
25-34	1.37	0.73	2.44	1.09	0.48
35-44	0.76	2.65	1.63	-	0.59
45-64	0.52	1.41	0.36	0.16	0.36
65-114	0.30	1.76	0.55	0.18	0.27
115-164	0.13	-	0.20	0.15	0.10
165-264	0.10	-	0.11	0.09	0.12
265-over	0.08	-	-	0.39	0.19
	Local b)				
All distances	-	-	-	-	-
0-24 a)	-	-	-	-	-
25-44	-	-	-	-	-
25-34	-	-	-	-	-
35-44	-	-	-	-	-
45-64	-	-	-	-	-
65-114	-	-	-	-	-
115-164	-	-	-	-	-
165-264	-	-	-	-	-
265-over	-	-	-	-	-

a) Six sector types shown separately for distances of less than 25 miles. A combined value for all sectors is reported for each sector type at this distance zone for purposes of comparison with other zones. Zone 0-24 miles includes land area and cities of counties containing central cities.

b) Area in eastern California and western Nevada and Arizona arbitrarily excluded as being unrepresentative of average hinterland area.

c) By definition there are no cities of 25,000 or more inhabitants at distances greater than 10 miles from the metropolis in local sectors.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 7 and 8; Areas of the United States, 1940, tables 1, 2, 3, and 4.

Table 7-4. While this phenomenon is more acute in the class C than in the class D metropolitan communities, it is present in both. In the class A and class B metropolitan communities there is a tendency for the habitation ratios to "level off" between 25 and 45 miles and then to decline. At these distances one or more sector types for every size group of metropolitan community exhibits this pattern.

While it is not possible to verify a hypothesis in explanation of these sudden decreases and subsequent increases in the intensity of land occupancy with the data of this study, the data behave as if the 35-44 mile zone is a preferred location for cities in class A and B metropolitan communities and that the 45-64 mile zone is a preferred location for hinterland cities in classes C and D, and that in these zones cities have multiplied and grown more rapidly than one would expect from the over all trend.

In the preceding sections a distance of 25 miles from the metropolis has been taken as being within easy commuting distance, and 35 miles as the outer limits of easy commuting to the central city from a point in the hinterland. Sixty-five miles is within a distance which permits rapid and frequent trucking service from the metropolis. Within this latter radius the metropolis should therefore be able to provide the residents with many goods and services on a daily basis, although at greater distances this becomes increasingly difficult. One may postulate, therefore, two major types of interaction between the metropolis and its hinterland on the basis of the predominant characteristic of the division of labor. Within a point between 35 and 45 miles one may postulate an area of "primary" or direct metropolitan dominance in which cities located within the primary zone may grow and expand as a

result of the overflow of the metropolis and by virtue of being able to share in some of the locational advantages which the metropolis possesses. The populations residing within this zone are able to participate directly in the activities of the central city. Activities carried on within these near cities may reflect the locational assets which accrue from the presence of the metropolis itself, such as the convergence of rail and highway routes, nearness to a huge market, or plentiful supply of power and skilled manpower. Therefore, much of the settlement within the zone of primary dominance, or direct participation, may appear to be a direct product of the rise and growth of the metropolis. Growth of this type has been frequently termed "suburban" or "satellite" growth.

Outside the primary zone the hinterland populations must depend upon hinterland cities for many services, even though those services may be produced in the metropolis, or accumulated in the metropolis and distributed through the hinterland city. Such cities must then stand between the metropolis and the remainder of the hinterland. To the extent that there is this change from primary to secondary division of labor in the 35-64 mile zone, it is not surprising to find there a concentration of urban populations. Such cities could be regarded as "access cities", providing access to the hinterland from the metropolis. From each hinterland city a small "fan" of highway routes spreads out to provide access to all

land areas. As each of these radiating routes contacts other hinterland cities, other routes of access are added. While there is no absolute necessity that all such access cities be located at any one given distance from the metropolis, it could reasonably be anticipated that cities located just outside the ring of direct metropolitan influence, yet sufficiently close to the metropolis to benefit from its facilities, would prove to be favorable points for the distribution of needed services to the hinterland, for collecting the products of the hinterland, and for engaging in a division of labor with the metropolis. The exact location of such cities could depend upon several factors. The transportation era in which the central city rose to dominance may be one explanation of why these access cities lie closer to class A and B centers than to class C and D centers.

If the mapsfor any of the metropolitan communities as delimited here are examined carefully, it will be observed that evidence for the hypothesis of a functional differentiation of the hinterland in terms of primary and secondary accessiblity to the metropolis, and for the hypothesis of the hinterland access-city, does seem to exist. It almost appears as if certain of the hinterland cities have sprung up solely for the purpose of acting as <u>intermediaries</u>, or interchangers, between the metropolis and the most distant parts of the hinterland, leaving the suburbanization movement to spread out from the metropolis later and fill in the vacancies between these outposts and the metropolis.

Only a very detailed study of the growth and functioning of cities in the metropolitan area over the period covering the rise and expansion of the metropolis could submit this hypothesis of dominance by participation and by interchange to rigorous test. Inasmuch as such an analysis is beyond the scope of this study, it is only possible to observe the pattern as it appears to exist at present, and to point out that the hinterland is occupied by cities as if the growth of the metropolitan community, and the division of labor between the metropolis and its outlying sub-centers, has followed the course described. From the data available here it appears as if the hinterland has been urbanized in two stages: (a) the emergence of major outlying cities to organize the hinterland and to enter into a division of labor with the growing metropolis and (b) the outward spread from the metropolis of communities directly participating in the activities of the central city. Since each would involve very different types of functional interdependence, the decline or leveling off in the number of cities per 1,000 square miles in the 25-44 mile zone may be interpreted as marking the outer limits of primary or direct dominance and the beginning of the secondary, or indirect dominance of the metropolis. The relatively smaller extend of this leveling off in the larger metropolitan communities may be due to the fact that the outward flow of population from these centers has not only reached the hinterland access cities, but has engulfed and passed beyond them. Cities which were, in the railway era, outposts of the metropolis may now be integrated with the central

city on a direct basis.

If this hypothesis is true, within the zone of direct influence of the metropolis one would expect population to be patterned much more definitely by the metropolitan variables than the population outside it. Stated differently, one could expect the metropolis to have altered the environment inside the zone of direct participation to such an extent that physical environmental conditions are much less limiting than outside. Conversely, outside this zone we would find population patterned relative not only with regard to the physical environment but also with regard to the relative opportunity to enter into a division of labor with the nearest major hinterland city. The study of the distribution of retail trade, wholesale trade, services, and manufacturing in Part III will provide an opportunity to examine the division of labor between the metropolis and the zones of primary and secondary dominance, and to show that in this area, too, the hinterland cities in the 25-64 mile zones act as if the hypothesis of participation and interchange were true. There it will be pointed out that the area beyond the 65 mile zone is primarily an area of exchange, and that the cities between 25 and 65 miles perform an interchange function.

B. The Distribution of the Urban Population in the Hinterland, by Size of Urban Place, and Size of Metropolitan Community and Sector Type (Tables 7-6 and 7-7, Chart 7-1)

In the preceding section, no attempt was made to compare the intensities with which the various sizes of hinterland cities occupy the hinterland, for the actual populations resident in cities of each size are a much more accurate measure of the intensity of

Table 7-6

Population of hinterland cities of each size group per 100 square miles, classified by distance from the nearest metropolis. United States, 1940.

Distance zone (miles)	Size group of hinterland city			
	2500-4999	5000-9999	10,000-24,999	25,000-over
All distances	169	225	335	637
0-24	796	1742	3175	8169
25-44	453	525	914	1699
25-34	507	678	1258	2346
35-44	410	406	648	1199
45-64	328	435	622	1314
65-114	243	277	371	592
115-164	152	165	233	249
165-264	79	94	88	119
265-over	25	34	45	38

Source: Sixteenth Census of the United States. Population, Vol.I, State tables 3 and 5; Areas of the United States, 1940, tables 2, 3, and 4.

land occupancy than is the number of cities. Tables 7-6 and 7-7 report the population of each size group of hinterland city per 100 square miles of total hinterland, by distance, sector type, and by size of metropolis.[2] In view of the hypothetical distinction which has been made between the direct, or primary, dominance and the indirect, or secondary, dominance, the data for the 25-34 and the 35-44 mile zones have been presented separately and have also been grouped into one zone. This enables the reader to observe both the deviations from the over all pattern which occur at this distance and also the general conformity to the general pattern which results when the variations are removed by combining these two adjacent distance categories.

1. From the tables and the chart it is apparent that the populations of all four sizes of hinterland cities occupy the hinterland with a pattern of decreasing intensity with increasing distance. For all metropolitan communities and all types of sectors combined this trend is a most marked and steady one (Table 7-6).

2. At any given distance, the larger the metropolis the higher the habitation ratio for any one size class of hinterland city tends to be (Table 7-7). This comparison follows the "A is greater than B is greater than either C or D" pattern noted for all hinterland urban population in Chapter Six.

3. The smaller cities are more evenly spread throughout the hinter-

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[2] Table 7-6 presents totals for all metropolitan communities combined, and serves as an introduction to Table 7-7, which contains the complete cross-classification of all four variables.

Table 7-7

Population of hinterland cities of each size group per 100 square miles, classified by size class of metropolitan community, sector type and distance from the nearest metropolis. United States, 1940.

Distance zone (miles)	Size group of hinterland city by size class of metropolitan community															
	2,500 - 4,999				5,000 - 9,999				10,000 - 24,999				25,000 - over			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
	All sectors				All sectors				All sectors				All sectors			
All distances	590	424	138	125	888	640	170	158	1353	1342	221	206	4597	2370	386	281
0-24[a]	3456	1689	498	412	8647	4280	979	698	15173	11256	1300	949	51651	22323	3871	1677
25-44	2166	1012	292	266	2339	1360	310	313	3025	2814	392	676	7950	6164	692	868
45-64	2137	1063	256	296	2489	1185	415	436	3869	3650	526	814	10099	7089	1221	813
65-114	2203	951	323	246	2146	1567	196	234	1941	1851	283	587	5188	5073	242	903
115-164	818	501	254	251	785	566	310	425	1103	1377	484	430	5860	2269	646	776
165-264	500	477	172	232	307	598	247	234	577	887	276	323	1423	1557	498	412
265-over	b)	223	155	138	b)	269	149	167	-	528	210	210	-	288	292	223
	b)	124	98	67	b)	203	92	82	-	353	98	67	-	327	190	67
	b)	53	25	25	b)	67	34	33	-	-	67	38	-	-	13	53
	Intermetropolitan				Intermetropolitan				Intermetropolitan				Intermetropolitan			
0-24[a]	3456	1689	498	412	8647	4280	979	698	15173	11256	1300	949	51651	22323	3871	1677
25-44	2564	1047	254	257	2956	1426	381	276	2790	2717	587	640	11150	4776	789	1216
45-64	3037	1055	156	193	3508	1057	542	256	4463	4046	691	890	15732	5108	909	1028
65-114	2019	1039	352	309	2271	1800	200	292	836	1371	537	598	5856	4467	528	1353
115-164	1105	533	253	303	873	623	357	480	1023	1822	685	515	8885	2198	1016	1278
165-264	337	571	169	235	314	664	254	218	884	737	274	502	1094	2267	685	561
265-over	b)	241	179	117	-	297	138	138	-	800	297	234	-	-	299	331
	b)	263	94	69	b)	398	98	52	-	540	80	94	-	-	234	43
	b)	-	23	23	b)	-	44	36	-	-	91	32	-	-	-	64
	Subdominant				Subdominant				Subdominant				Subdominant			
0-24[a]	3456	1689	498	412	8647	4280	979	698	15173	11256	1300	949	51651	22323	3871	1677
25-44	1033	566	408	257	886	2094	562	204	3300	3056	305	817	6551	18755	4779	1584
45-64	732	523	259	308	944	2775	597	323	2606	4695	723	1769	4876	27975	11547	1301
65-114	1576	490	517	237	781	1185	536	156	4556	1136	-	432	9020	6511	-	1699
115-164	845	506	442	307	856	480	226	60	640	919	-	638	8130	3359	969	1266
165-264	c)	381	305	324	c)	746	334	256	-	2674	370	192	a)	2347	899	1053
265-over	-	180	158	197	-	350	163	196	-	342	150	401	-	756	729	425
	-	106	160	104	-	202	89	203	-	371	265	65	-	414	517	693
	-	42	-	54	-	46	c)	120	-	-	-	-	-	-	c)	615
	Local				Local				Local				Local[d]			
0-24[a]	3456	1689	498	412	8647	4280	979	698	15173	11256	1300	949	51651	22323	3871	1677
25-44	2110	1261	322	286	1955	670	179	434	3480	2851	154	714	-	-	-	-
45-64	1183	1581	416	599	1243	312	240	997	5226	2247	261	957	-	-	-	-
65-114	3283	1073	266	150	2856	1216	142	162	3294	3771	79	608	-	-	-	-
115-164	565	430	204	171	550	511	261	457	1620	790	342	204	-	-	-	-
165-264	603	353	129	199	203	420	203	250	-	383	247	393	-	-	-	-
265-over	-	272	107	148	-	-	162	199	-	201	77	112	-	-	-	-
	-	117	78	59	-	-	99	103	-	-	58	29	-	-	-	-
	-	c)	28	29	-	204	12	20	-	-	46	55	-	-	-	-

a) No sector types shown separately for distances less than 25 miles. A combined value for all sectors is reported for each sector type at this distance zone for purposes of comparison with other zones. Zone includes land area and population of counties containing central cities.

b) Area in eastern California and western Nevada and Arizona arbitrarily excluded as being unrepresentative of average hinterland area.

c) Combined with category immediately above because of small amount of land area at these distances.

d) By definition there are no cities of 25,000 or more inhabitants at distances greater than 10 miles from the metropolis in local sectors.

Source: Sixteenth Census of the United States, Population, Vol.I, State tables 3 and 5; Areas of the United States, 1940, tables 2, 3, and 4.

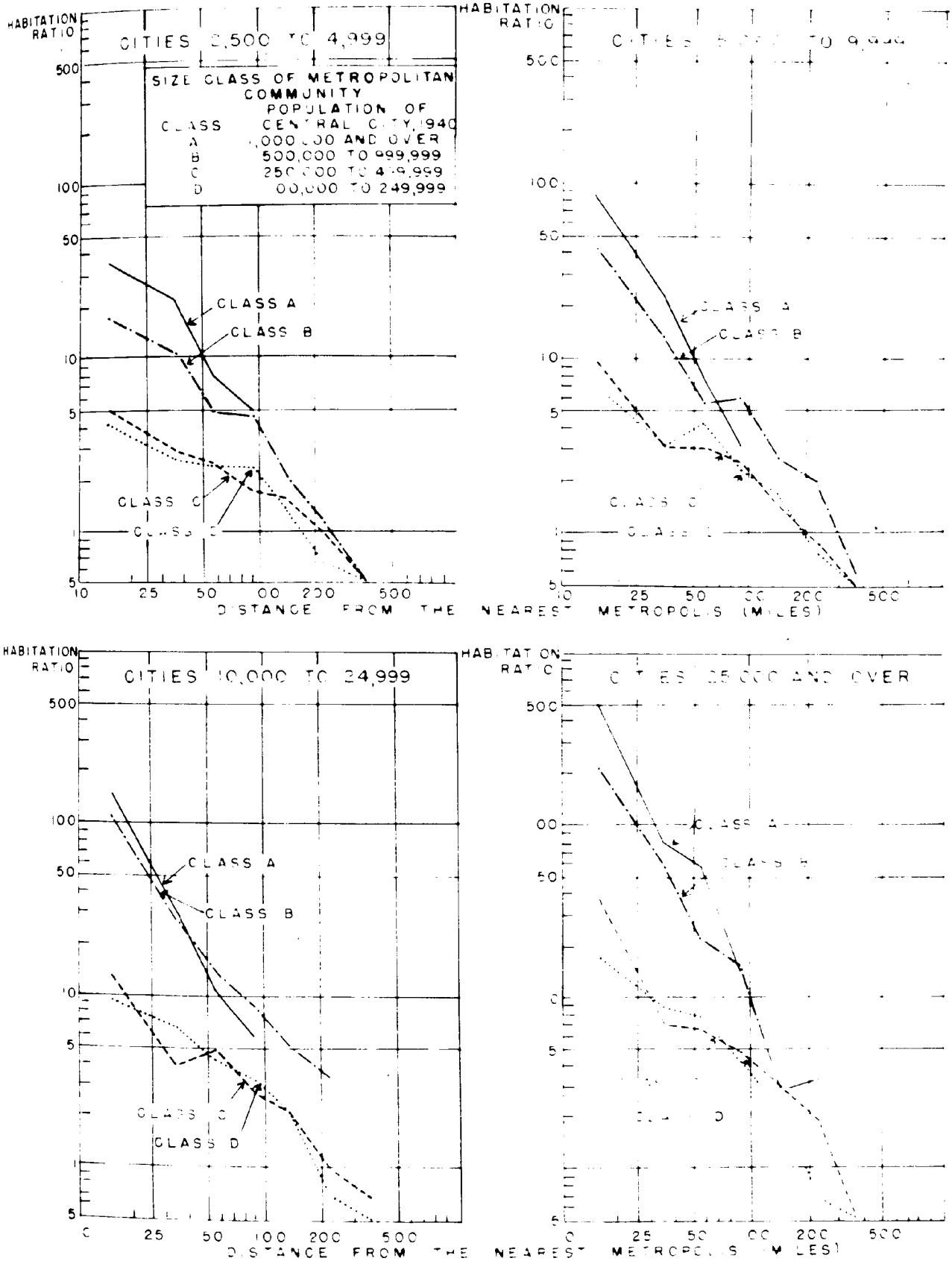


CHART 7-1 HABITATION RATIOS POPULATION PER SQUARE MILE OF HINTERLAND, BY SIZE OF HINTERLAND CITY SIZE CLASS OF THE METROPOLITAN COMMUNITY, AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1940

lands of all classes of metropolitan communities than are the larger cities, as is shown by the more gentle slope of their graph.

4. The class A and B metropolitan communities tend to have similar patterns as shown by the height and shape of their lines. The C and D classes are also generally alike.

5. The larger the size of the hinterland city, the higher its average habitation ratio tends to be. Thus, even though the small hinterland cities are much more numerous than the larger ones, a larger number of urban people per unit of area gain a livelihood by residing in larger centers of subdominance than in smaller ones. This situation exists at all distances in all sizes of metropolitan communities. The widespread distribution of the major hinterland cities throughout the hinterlands of all sizes of metropolitan communities, and the preponderance of their population numbers over those of the smaller centers of subdominance at each distance is further evidence that the major subdominant center plays a very significant role in the distribution of population.

6. When the various distance zones are broken into sector types, the general pattern of decline with distance remains, although with several deviations from the trend.[3] The following conclusions seem to be warranted:

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[3] Some of these deviations appear to arise from the small numbers of counties used to determine the area base. Except for unavoidable "tapering off" of the land area with distance, the areas used in these tables are quite stable. Aside from the end values, the ratios for class D are based upon 35 or more counties, those for class C upon 47 or more, class B upon 11 or more, and class A upon 6 or more counties. Distances greater than 115 miles have been excluded for the class A metropolitan communities as being unrepresentative of the class as a whole.

a. Those differences in accessibility which are associated with the growth of hinterland cities to a specific size seem to differentiate the hinterlands of the class C and D metropolitan communities more clearly than they do the hinterlands of the class A and B metropolitan communities. In class C and D metropolitan communities there are fairly consistent differences between the sectors in the intensities with which the inhabitants of a given size group of city inhabit the hinterland. In general, the subdominant sectors are more intensively occupied by all sizes of cities than are the intermetropolitan or local sectors. Thus, the higher degree of urbanization of subdominant sectors is not due to the presence of large cities alone (the basis for their classification as subdominant), but to high habitation r_tios for urban populations of all sizes of cities as well. Therefore, the subdominant sector appears to have fostered the growth of smaller hinterland cities of all sizes. Moreover, in sectors of this type the populations of all sizes of cities are distributed more evenly throughout the distance zones than the populations of the other sector types, for the habitation ratios of all sizes of cities tend to be higher in the distant zones of subdominant sectors than in the distant zones of sectors of other types.

b. From 45 to 65 miles the intermetropolitan sectors of class B and C metropolitan communities are more intensively occupied by all sizes of cities than the local sectors are. At distances smaller or greater than this there appears to be no consistent differences in favor of either sector type. In the near areas, where accessibility is high, the intensity with which the inhabitants of a given size of

city inhabit the land is also high in all sectors, and variations in the intensity of this land occupancy are not associated in any simple way with the types of accessibility measured by the classification of sectors according to type. One can only generalize and say that when accessibility is very high there is an intense settlement of all city-size populations in all types of sectors, but as the distance increases the greater accessibility of the intermetropolitan sectors fosters a greater urban development than the local sectors attain. Beyond 165 miles, access to the central city does not seem to greatly encourage or discourage the intensity with which the hinterland is inhabited by the population of a given size class of city of less than 10,000 inhabitants.

c. In the class A and B metropolitan communities the individual sizes of cities present habitation ratios which resemble those of the near zones for all metropolitan communities. Although the intersector differences which have been noted above for class C and D metropolitan communities have a tendency to be present in class A and B metropolitan communities, the patterns are less clean-cut and are not without exceptions. To the extent that the areas in the hinterlands of the larger metropolitan communities are more accessible than the hinterlands of the smaller metropolitan communities by having a more highly developed system of highways and railroads it may be that intermetropolitan routes and large hinterland cities are less essential to a high occupancy of the hinterland by residents of the smaller sizes of cities. The subdominant sectors in particular do not exhibit their customary trait of fostering urbanism of all sizes of cities at all distances.

d. Table 7-7 indicates also that there may be an element of

displacement of one size of hinterland city by another size of hinterland city, not only within the sectors, but also between the sectors as well. Two given cities cannot occupy the same space, and each city can be of only one size at a given moment. If the conditions which measure accessibility promote urban growth, one effect may be to cause the cities present to grow to a greater than average size. As a consequence, the habitation ratios for the smaller sizes of cities will be low, unless other processes such as suburbanization about the larger cities enter to make up for the deficit caused by growth into other categories. Thus, environmental conditions fostering the growth of cities do not necessarily foster an intense occupancy of the hinterland by urban residents of cities of all sizes. For example, the habitation ratio of 27975 residents per square mile for cities of 25,000 or more inhabitants in the 25-34 mile zone of the subdominant sectors of class B metropolitan communities may explain why the habitation ratio for this size of city at the same distance in the intermetropolitan sector is only 3108, and why the habitation ratios for other sizes of cities at this distance are not higher. Obviously it is the total structure of city sizes, not the pattern for each individual size group of hinterland city, which is fostered or left undeveloped by accessibility.

7. These findings are not merely bits of interesting information about cities; together they enable one to reach a most important conclusion about the metropolitan community. <u>Those areas which are most accessible to the metropolis have fostered the greatest urban growth in the hinterland.</u> Those areas which are least accessible to the metropolis tend to be the least urbanized. The larger the metropolis, the more urban the hinterland tends to be, and the larger individual hinterland cities become. Thus, the urban center

appears to regulate or control urban growth and development in the hinterland. There is no scarcity of <u>potential</u> urban communities, for there are thousands of villages and hamlets. There is no scarcity of potential major hinterland cities, for there are hundreds of small cities located at all distances in the hinterland. Yet those hinterland cities which have attained the greatest size have tended to be located in a position which would enable them to enter into some functional relationship with the central city.

8. The reader has undoubtedly made note of the fact that to this point very little has been said in this chapter about the size of the hinterland city as a <u>variable</u> in metropolitan structure. The fact that the habitation ratios for the relatively few large hinterland cities of 10,000 or more inhabitants are higher than those for the more numerous smaller hinterland cities has led to the conclusion that the large hinterland cities play a more important role in the total structure. Yet within the framework of Table 7-6 and Table 7-7 relatively little can be said about patterns of city size. This arises from the fact that these tables do not take account of the fact that cities are interrelated. One of the basic principles of city study which was established in Chapter One was that studies of urbanism must recognize that cities are not isolated events of nature. Yet in this section each size group of cities has been examined as an independent set of observations. The next section will attempt to establish a research frame of reference for dealing with hinterland cities as interrelated events. There the size of the hinterland city will be

treated as a new variable measuring metropolitan structure. This problem is attacked by making use of the ecological theory of subdominance developed in Chapter Two. The basic postulate is that the more subdominant units should exert their influence over a wider area and over more types of activities than the less subdominant units.

IV

The Scope of Subdominance of Hinterland Cities (Tables 7-8, 7-9)

As an aid to understanding the nucleation of the hinterland population about hinterland cities, and the part which size of a hinterland city plays in organizing the activities of the population within the metropolitan milieu, this section undertakes to measure the average amount of land area and population over which hinterland cities of each size exercise their subdominance, and to show how distance from the metropolis, sector type, and the size of the metropolis alters the scope of this subdominance. Approximate answers to two sets of questions will be developed:

a. Over how many square miles of land area is a city of a given size subdominant? Does this amount vary with distance from the metropolis, sector type, and size of the metropolis?

b. Over how much population is a city of a given size subdominant? Does this amount vary with distance from the metropolis, sector type, and size of the metropolis?

These questions will be asked for each of four size groups of hinterland cities.

A precise solution to these problems is beyond the scope of this study, for it would require that the functional boundaries between all hinterland cities be established, the land area and

population within those boundaries measured, and an average taken for each size group of hinterland cities. Many indexes for areas about each individual city would necessarily be employed in arriving at a precise determination of the boundaries of the area over which each city is the principal center for shopping, recreation, marketing, employment, education, finance, news, and other services and activities.

If such a precise study were undertaken, however, it would be found very quickly that no one center dominated all activities. Village centers would supply a principal share of standard sustenance items to the residents about themselves, but would be found to provide a relatively small proportion of specialized goods and services. Larger hinterland cities, or even the metropolis, are the principal or only sources of more specialized goods and services. Thus, with increasing size of hinterland city an increasing variety of services are rendered. Many market studies of consumer buying habits and of the trade structure of shopping centers and of suburban centers have demonstrated this fact.[4] Stated in another way, each hinterland city may be expected to have not one area of subdominance, but several areas of subdominance, depending upon the type of function under examination. A small community could provide the residents in its immediate vicinity with groceries and work clothing, a larger place could provide

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For example, see Richard P. Doherty, Trends in Retail Trade and Consumer Buying Habits in the Metropolitan Boston Retail Area, Boston University Bureau of Business Research (Boston College of Business Administration, 1941) and T. Lynn Smith, Farm Trade Centers in Louisiana 1901 to 1931, Louisiana State University Agricultural Experiment Station, Bulletin No. 234, 1933. See also the publications to which reference was made in Chapter Two.

the residents in its immediate vicinity with groceries and work clothing and also furnish style clothing and household furnishings to residents of a much wider area. In this case the larger center would have two areas of subdominance; one corresponding to that of the smaller center and another for the specialized services which the smaller center cannot provide. An even larger place may have a third, a fourth, or even more areas of subdominance for functions which centers smaller than itself also provide, and yet an added area for which it is the sole or principal source in the area. Thus, two hinterland centers of unequal size compete with each other for the privilege of serving the hinterland with services which they both provide. For services which only one of them provides, the smaller is dependent upon the larger and lies within its area of subdominance.

If it is assumed that the over all size of the city, broadly construed, is an index of the number and degree of specialization of functions performed by it, and consequently that the entire hinterland area is blanketed with the subdominance of cities of each size class independently of those of other size classes, by dividing the total hinterland area by the total number of cities of each size, an approximate average area of subdominance may be computed for each size group of hinterland city. Thus, if one metropolitan community contains 1,000 square miles of land area, and if there are 10 cities of a given size located within it, the above assumptions would lead to an estimate that each hinterland city claims one-tenth, or 100 square miles, of land area as its area of subdominance. A similar

procedure using the total population rather than the land area, will yield an estimate of the average number of people under the subdominance of the hinterland city of a given size.[5]

In making such estimates for the average land area and population included in the area of subdominance of each size of hinterland city, recognition must be given to the phenomenon described earlier, that larger cities are subdominant over smaller ones only for the services which the smaller centers cannot provide. The average hinterland for the very largest cities will be the total area (or population) divided by the total number of cities of that class. The average for the next smaller class will be the total area (or population) minus the area (or population) of the largest cities, divided by the sum of both groups of cities. This procedure removes the area and population of the larger cities from potential subdominance by the smaller cities and recognizes that the larger city provides, to a more restricted area, the same services which the smaller city provides. The estimated area of subdominance for the very smallest size of city would therefore consist of all of the land area lying outside cities larger than itself divided by all of the cities of all sizes in the hinterland. An estimate on any other basis would implicitly assume that cities of various sizes perform no duplicate functions and are completely independent of each other.

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[5] As indicated above, such a procedure yields only an estimate of the "true" average size of hinterland which one would obtain if he actually divided the total hinterland into areas of subdominance of each of the 10 hinterland cities and had taken an average of the actual areas. Either the estimated average or the true average is reliable only to the extent that thevariation of the individual areas is relatively small. In the absence of better information, the estimates which are made here are useful chiefly for their ability to show the magnitude of the values which would be expected if the more refined process were carried out. The term "quasi-average" will be used in referring to the estimates of the true averages.

The following charts and tables present the quasi-average land area and population under the influence of hinterland cities by size classes. To facilitate an understanding of the magnitude of the area of subdominance of cities of each size, the land area in square miles is also expressed as an estimated radius of influence which would be found if the area of subdominance of each hinterland city were completely circular.

A. The Land Area Under the Subdominance of Hinterland Cities of Each Size Group, by Distance from the Metropolis and Size of Metropolitan Center (Tables 7-8 and 7-9, Chart 7-2)

Table 7-8 reports the estimated radius, in miles, of influence of hinterland cities by size for each distance zone for each size of metropolitan center. Table 7-9 reports this same information in units of square miles of land area.[6] Chart 7-2 illustrates the data of Table 7-9 graphically as a series of concentric squares.

1. The radius of influence of a hinterland city increases steadily with: (a) its own size, (b) its distance from the metropolis, and (c) the size of the metropolis. The minimum radius of influence for each size group of hinterland cities is invariably found in the 0-24 mile zone of the class A metropolitan communities. The maximum radii are found, in every case, in the outermost zone of the class D metropolitan communities. The following minimum and maximum values for hinterland cities of each size emphasize that the hinterland city 's scope of influence over its surrounding area

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[6] The "radius of influence" is obtained by expressing the area of subdominance, computed as described above, in the following form: Radius $= \sqrt{\frac{\text{Area}}{\pi}}$.

Table 7-8

Estimated radius of subdominance of hinterland cities of each size, classified by size class of metropolitan community and distance from nearest metropolis. United States, 1940.

Size class and distance zone (miles)	Size of hinterland city				
	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000-49,999
	Estimated radius in miles[a]				
Class A					
0-24	3	3	4	5	6
25-34	5	6	9	11	14
35-64	7	10	13	15	18
65-114	11	17	21	26	31
115-164	b)	-	-	-	-
165-over	b)	b)	-	-	-
Class B					
0-24	4	4	5	6	9
25-34	6	8	10	12	19
35-64	9	11	15	20	26
65-114	10	14	19	26	35
115-164	15	20	27	38	65
165-over	21	27	38	54	77
Class C					
0-24	9	10	15	19	24
25-34	13	17	24	32	40
35-64	11	19	27	38	50
65-114	17	22	33	40	55
115-164	19	28	42	51	74
165-over	30	43	64	83	123
Class D					
0-24	10	13	18	21	30
25-34	12	15	20	31	44
35-64	14	18	25	31	43
65-114	16	22	32	42	60
115-164	19	26	39	54	78
165-over	35	50	81	102	154

a) Radius = $\sqrt{\frac{\text{Area}}{\pi}}$, area being as estimated in Table 7-9 of this study.

b) Area in eastern California and western Arizona and Nevada arbitrarily excluded as being unrepresentative of average hinterland area.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Areas of the United States, 1940, tables 2, 3, and 4.

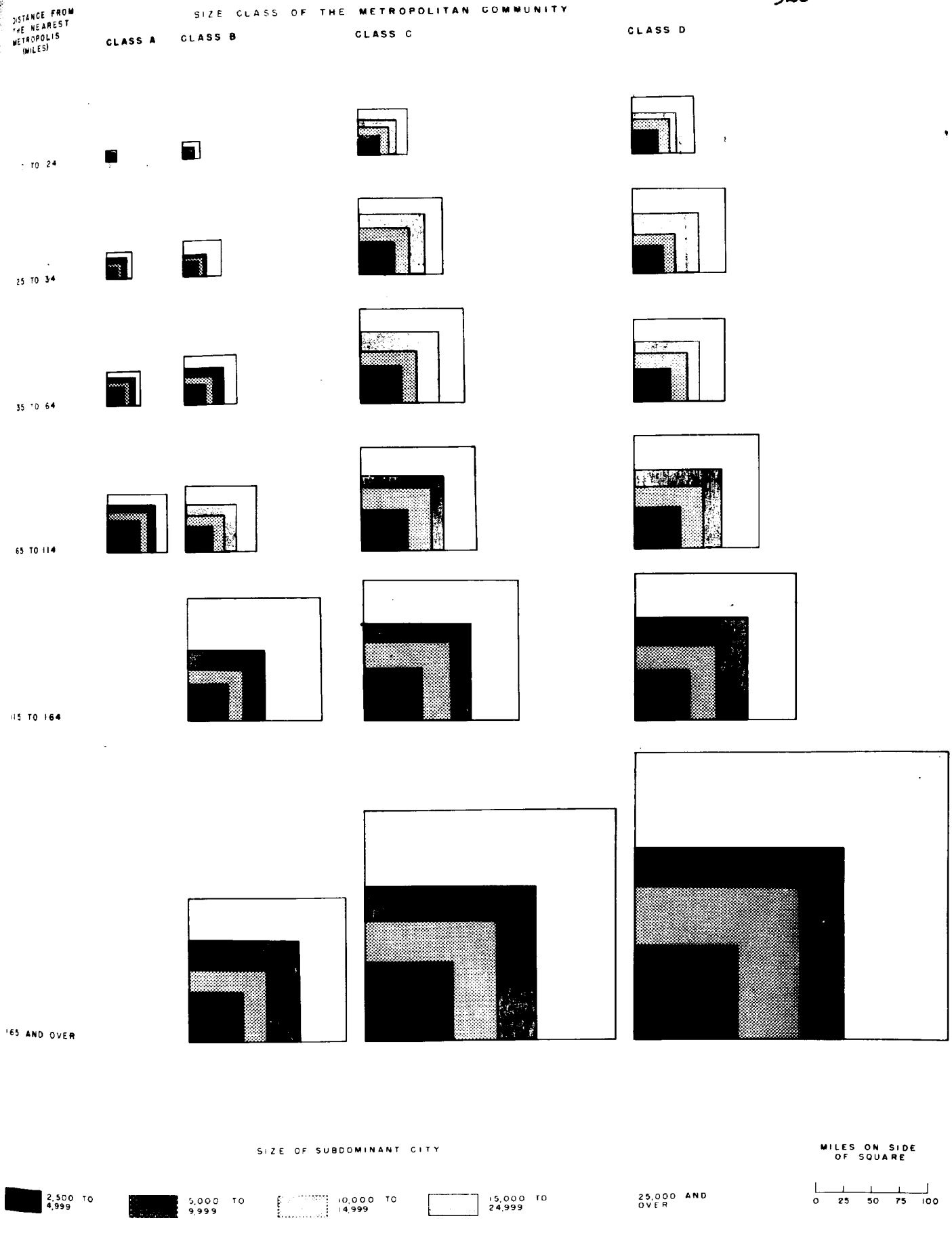


CHART 7-2 ESTIMATED LAND AREA UNDER THE SUBDOMINANCE OF HINTERLAND CITIES OF EACH SIZE BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS

varies greatly with its metropolitan location:

Size of hinterland city	Minimum radius (miles)	Maximum radius (miles)
2,500 - 4,999	3	35
5,000 - 9,999	3	50
10,000 - 14,999	4	81
15,000 - 24,999	5	102
25,000 - 49,999	6	154

In the inner zones of class A metropolitan communities all hinterland cities of all sizes are almost devoid of an area of subdominance. In the class D communities all hinterland cities at all distances have considerable radii of influence.

2. The functional position of the rural population with respect to their hinterland cities may also be inferred from Table 7-8. In a class A metropolitan community even the areas which are most inaccessible to the large hinterland cities are only an average of about 30 minutes travel via automobile from such centers, and a city of at least 2,500 population may be reached in less than half that time. In a class B metropolitan community the points which are most remote from urban influence are still only about 45 minutes journey from a hinterland city, and a city of 25,000 inhabitants may be reached within two hours. By way of contrast, in the most inaccessible areas in the class D metropolitan communities a journey of more than an hour is required to reach any urban place and 4½ hours are required to reach a city of 25,000 or more inhabitants. Thus, the pattern with which the hinterland is nucleated is far from being identical in all parts of the hinterland. The closer one approaches a central city, the more plentiful

Table 7-9

Estimated land area under the subdominance of hinterland cities of each size, classified by size class of metropolitan community and distance from the nearest metropolis. United States, 1940.

Size class and distance zone (miles)	Size of hinterland city				
	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000-49,999
	Estimated land area in square miles				
Class A					
0-24[a]	21	28	49	78	119
25-34	68	125	239	386	647
35-64	152	291	545	750	1015
65-114	381	874	1413	2045	3069
115-164	b)	-	-	-	-
165-over	b)	b)	-	-	-
Class B					
0-24[a]	41	53	84	120	251
25-34	126	210	325	429	1180
35-64	229	374	677	1236	2092
65-114	319	582	1165	2068	3847
115-164	673	1204	2342	4432	13324
165-over	1376	2208	4620	9247	18535
Class C					
0-24[a]	229	339	665	1087	1744
25-34	548	870	1810	3171	5077
35-64	410	1193	2286	4468	7823
65-114	873	1526	3483	4965	9463
115-164	1153	2439	5414	8251	17334
165-over	2803	5692	12773	21484	47272
Class D					
0-24[a]	317	501	1013	1427	2786
25-34	439	697	1279	3098	6200
35-64	575	984	2036	3115	5893
65-114	772	1559	3311	5432	11322
115-165	1176	2193	4862	9187	19085
165-over	3864	7866	20677	32932	74106

a) Includes counties containing central cities.
b) Area in eastern California and western Arizona and Nevada arbitrarily excluded as being unrepresentative of average hinterland area.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Areas of the United States, 1940, tables 2, 3, and 4.

and easily accessible subdominant cities become. The farther from the metropolis one departs, the more difficult it becomes to reach a hinterland city of any size, and access to a hinterland city of 25,000 or more inhabitants begins to assume the proportions of a full day's undertaking. It will be observed, however, that at no zone in the hinterland is the average distance to a major hinterland city greater than one day's travel (round trip), and to a city of any size greater than one hour's travel. With present modes of transportation the population of the United States can live at almost any point in the hinterland and commute to a city to work, or to obtain needed services from a city on almost a casual basis. The specialized services which are limited to the larger hinterland cities may be enjoyed on the same basis by residents of all except a very few areas. The number and distribution of hinterland cities is such that almost the entire population of the United States is able to reach and be reached by large urban centers on a daily basis.

3. From this evidence it may be inferred that the functioning of hinterland cities, and of the rural population, will unavoidably be influenced by their metropolitan location. A city of 25,000 inhabitants lying within 25 miles of a class A metropolitan center and dominating the area within 6 miles of itself may be expected to differ both in internal organization and functioning from a city of the same size lying 400 miles from a class D metropolis and being the closest source of specialized goods and services for the population within a radius of 145 miles. In the first instance, we have a compact unit organized within confined and therefore probably more homogeneous circumstances. In the second, the hinter-

land unit is large and will almost necessarily involve a variety of external circumstances. Similarly the integration of the activities of the dispersed rural populations with their nearest hinterland cities cannot be expected to be all of one pattern, but to vary considerably with the degree of access and with the characteristics of those hinterland cities. The manner in which the individual hinterland areas, urban and rural, are organized and distributed to obtain a livelihood undoubtedly varies from one part of the metropolitan community to another on the basis of the area which must be organized and integrated to support a hinterland city of a given size. A detailed description of some of these functional variations will constitute the subject matter of Part III of this study.

B. The Population Under the Subdominance of Hinterland Cities of Each Size Group, by Distance from the Metropolis and Size of Metropolitan Center (Table 7-10)

1. Equally as important as the land area lying within the area of subdominance of a hinterland city is the number of inhabitants to be found there. From Table 7-10 it is evident that the average number of people served by a given hinterland city is dependent upon the position of the city in the metropolitan community. A city of 2,500 - 4,999 inhabitants lying within 25 miles of a class A metropolis is in a position to serve only an estimated 4,200 people residing outside its borders, whereas the same size city, when located in a class D metropolitan community 165 or more miles from a metropolis, is able to serve an average of 22,200, or more than five times as many, people. In the 0-24 mile zone

Table 7-10

Estimated population under the subdominance of hinterland cities of each size, classified by size class of metropolitan community and distance from the nearest metropolis. United States, 1940.

Size class and distance zone (miles)	Size of hinterland city				
	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000-49,999
	Estimated population in thousands of inhabitants				
Class A					
0-24[a]	4.2	6.7	15.8	31.6	56.2
25-34	7.7	16.8	37.6	67.4	125.7
35-64	12.5	27.1	56.6	82.3	118.0
65-114	13.4	34.9	60.8	93.3	149.4
115-164	b)	-	-	-	-
165-over	b)	b)	-	-	-
Class B					
0-24[a]	6.3	9.2	18.0	30.2	80.5
25-34	8.9	17.2	30.0	43.5	150.7
35-64	14.1	25.1	50.5	101.6	185.8
65-114	13.3	27.1	60.9	117.5	234.5
115-164	18.4	35.5	75.3	152.6	497.5
165-over	22.3	37.9	86.1	184.3	387.0
Class C					
0-24[a]	18.6	29.1	63.3	110.1	187.6
25-34	19.4	33.0	76.5	143.2	240.8
35-64	12.7	40.3	83.5	174.6	318.6
65-114	22.8	42.5	105.5	155.2	312.4
115-164	25.9	58.4	137.7	216.6	477.1
165-over	28.4	61.2	145.6	252.9	578.4
Class D					
0-24[a]	15.0	27.4	62.5	92.0	196.7
25-34	16.2	27.8	56.4	152.7	323.1
35-64	15.9	29.7	68.5	111.1	226.8
65-114	19.0	41.9	96.6	166.4	386.7
115-164	23.5	46.9	111.9	221.3	479.3
165-over	22.2	48.6	139.1	228.4	536.0

a) Includes population residing outside of metropolis in counties containing central cities.

b) Area in eastern California and western Nevada and Arizona arbitrarily excluded as being unrepresentative of average hinterland area.

Source: Sixteenth census of the United States. Compiled from Population, Vol.I, State tables 3 and 5.

of class A and B metropolitan communities the hinterland city is subdominant over a population outside its own borders which is only its own size or slightly larger. With decreasing size of metropolis, and increasing distance, the hinterland city serves an increasingly large population which is 4, 8, and in some instances 10 or 11 times the population of the city itself.

2. Table 7-10 may be interpreted as a series of estimates of the actual size of the functional units of which the hinterland is composed. The presence of a city of 10,000 inhabitants appears to be much less of an "uncaused cause" when it is regarded as the focal point and source of services for an estimated 15,000-145,000 inhabitants in its immediate environs, and when it is recognized that the number of inhabitants potentially integrated with the activities of the city varies with the distance from a metropolis of a given size.

3. If the tabulations of Table 7-8 and Table 7-10 are examined together, the distribution of the hinterland population can be much more clearly envisaged. Thus, cities of 10,000-14,999 inhabitants lying 35-64 miles from a class A metropolitan center have, on the average, 56,600 hinterland inhabitants living within a radius of 13 miles, whereas the same city-size unit located at the same distance from a class C metropolitan community has an average of 83,500 inhabitants lying within 27 miles of itself. Together, the two types of information characterize the functional base of hinterland cities in terms of the estimated radius of their influence and the estimated population under that influence. This

description may be carried even further by noting, for example, that within the 27 mile radius of the above city of the class C metropolitan communities there are, on the average, two cities of 5,000 - 9,999 inhabitants, each serving an estimated 40,300 inhabitants, and about six cities of 2,500 - 4,999 inhabitants, each serving an estimated 12,700 inhabitants. The populations living in this area are simultaneously within the radius of three hinterland cities which are, respectively, 27,19, and 11 miles distant at an average maximum.

C. Sector Type and the Scope of Subdominance in Hinterland Cities (Tables 7-11 and 7-12)

In Tables 7-11 and 7-12 the estimates of the radius of influence of hinterland cities of each size, and the population lying within that radius are reported for each type of sector. The procedure followed in computing these values is the same as that for Tables 7-8, 7-9, and 7-10. These tables serve two useful functions: (a) They show that the previous estimates are fairly stable, in that estimates of the same general magnitude result when the data are submitted to this further subdivision; (b) They show a consistent set of differences between sector types. It will be remembered that in Section IV, dealing with the habitation ratios, it was difficult to discern any consistent set of differences between the intermetropolitan and the local sectors in the intensity with which the hinterland was occupied by the smaller sizes of cities. It was noted there that such differences as existed tended to be hidden by the substitution of smaller for larger cities in the local sectors, and the apparent

mutual influence of cities. Since the present tabulations eliminate all places smaller than the one under consideration, the functional position of hinterland cities in each type of sector may now be compared. It should also be noted that this tabulation also eliminates the a priori element which has given subdominant sectors a higher habitation ratio for major hinterland populations. These tables permit a more exact comparison of the urban structure of each of the types of sectors.

1. Radius of Influence

a. Because of the greater frequency of their occurrence, the average radius of influence of all sizes of cities in the subdominant sectors is shorter than in either of the other sector types. The exceptions to this general rule occur at those points which have been described as the zone of transition from direct to indirect metropolitan influence and at the near areas in the metropolitan sectors which have been noted for their intense concentration.

b. While it is true that some local sectors have equally high or even higher concentrations of very small cities than the corresponding intermetropolitan sectors (evidenced here by a smaller quasi-average radius), the cumulative effect, with increasing size of city, is to over-balance this concentration in favor of intermetropolitan sectors. Thus, although intermetropolitan sectors may not have a consistently higher habitation ratio in every size group of smaller hinterland cities taken independently, the fact that these sectors contain major hinterland cities in addition to an equal or sometimes greater complement of smaller cities, requires that the smaller hinterland city in the intermetropolitan sectors be dominant

Table 7-11

Estimated radius of subdominance of hinterland cities of each size, classified by type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1940. (Radius in miles)

Distance zone (miles)	SIZE CLASS OF METROPOLITAN COMMUNITY AND SIZE OF HINTERLAND CITY																			
	Class A[a]					Class B					Class C					Class D				
	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over
	Intermetropolitan					Intermetropolitan					Intermetropolitan					Intermetropolitan				
25-34	4	5	7	10	11	6	8	10	12	22	14	16	25	31	50	14	17	21	30	41
35-64	6	9	13	14	15	8	10	14	19	26	13	17	21	30	37	12	16	23	28	36
65-114	12	15	19	23	31	10	13	19	25	31	16	21	31	36	47	16	22	32	41	54
115-164	a)	a)	a)	a)	a)	14	18	25	34	-	18	27	38	45	77	20	27	37	45	66
165-over	a)	a)	a)	a)	a)	13	16	25	-	-	29	40	60	83	113	37	53	78	101	151
	Subdominant					Subdominant					Subdominant					Subdominant				
25-34	7	9	12	15	21	5	6	8	8	11	9	9	11	12	12	10	11	13	25	25
35-64	8	10	12	14	16	9	11	13	16	17	13	23	52	52	52	14	19	21	22	27
65-114	6	11	13	13	13	8	9	11	16	24	13	19	28	29	41	14	20	29	29	34
115-164	a)	a)	a)	a)	a)	14	18	26	35	40	19	26	36	41	45	16	22	28	40	56
165-over	a)	a)	a)	a)	a)	22	27	38	49	69	20	29	36	36	54	21	27	44	44	49
	Local[b]					Local[b]					Local[b]					Local[b]				
25-34	7	10	14	14	-	7	13	16	19	-	14	23	37	-	-	9	12	22	38	-
35-64	7	11	16	24	-	10	13	18	37	-	17	26	44	63	-	16	20	36	57	-
65-114	12	29	-	-	-	13	20	37	52	-	20	26	44	70	-	16	23	35	53	-
115-164	a)	a)	a)	a)	-	18	45	45	-	-	23	32	71	-	-	20	28	58	138	-
165-over	a)	a)	a)	a)	-	25	44	-	-	-	37	54	94	176	-	35	52	107	151	-

a) Area in eastern California and western Arizona and Nevada arbitrarily excluded as being unrepresentative of average hinterland area.

b) By definition there are no cities of 25,000 or more inhabitants at distances greater than 10 miles from the metropolis in local sectors.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Areas of the United States, 1940, tables 2, 3, and 4.

Table 7-12

Estimated population under the subdominance of cities of each size, classified by type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1940. (Population in thousands)

Distance zone (miles)	SIZE CLASS OF METROPOLITAN COMMUNITY AND SIZE OF HINTERLAND CITY																			
	Class A [a]					Class B					Class C					Class D				
	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over	2,500-4,999	5,000-9,999	10,000-14,999	15,000-24,999	25,000 over
	Intermetropolitan					Intermetropolitan					Intermetropolitan					Intermetropolitan				
25-34	5.5	12.7	30.5	61.4	91.2	8.9	17.0	27.6	43.7	187.9	21.7	31.0	84.1	142.5	385.4	21.6	34.6	56.3	131.1	250.3
35-64	11.0	25.0	55.4	67.3	86.2	14.1	25.0	51.4	99.9	207.2	18.1	32.6	57.7	127.7	206.7	13.3	25.4	56.4	90.4	166.5
65-114	14.6	27.1	42.9	74.6	144.7	11.0	25.8	62.1	112.2	177.0	23.0	40.9	97.2	136.0	236.0	18.5	41.6	91.1	153.9	283.6
115-164	a)	a)	a)	a)	a)	15.7	30.3	63.2	123.3	-	24.0	58.0	119.4	172.4	557.5	21.8	40.6	82.4	128.2	296.5
165-over	a)	a)	a)	a)	a)	13.8	24.1	68.2	-	-	29.7	59.4	144.4	286.1	539.3	20.8	46.4	110.0	191.2	452.4
	Subdominant					Subdominant					Subdominant					Subdominant				
25-34	21.3	36.1	64.4	102.6	228.8	10.8	13.8	29.8	35.6	78.0	7.4	9.7	14.4	22.8	22.8	11.7	17.7	23.8	132.0	132.0
35-64	13.2	23.5	39.3	61.8	75.5	13.7	22.9	38.9	58.5	70.0	19.6	66.6	358.3	358.3	358.3	20.2	43.8	52.3	58.3	103.0
65-114	6.1	24.9	41.4	41.4	41.4	10.8	15.6	26.2	60.0	160.0	16.9	37.2	86.6	99.9	214.9	18.6	44.6	100.2	100.2	144.8
115-164	a)	a)	a)	a)	a)	20.3	32.9	78.2	145.0	199.9	30.4	62.2	123.2	168.8	206.7	24.4	48.1	85.1	182.0	380.4
165-over	a)	a)	a)	a)	a)	24.1	39.8	80.2	142.1	302.6	31.1	72.7	116.8	116.8	285.8	30.8	52.0	146.6	146.6	187.4
	Local [b]					Local [b]					Local [b]					Local [b]				
25-34	12.6	26.8	64.9	64.9	-	6.6	29.7	42.0	69.6	-	20.4	64.1	170.5	-	-	10.0	20.1	78.4	260.0	-
35-64	15.7	36.2	85.0	215.2	-	14.4	28.2	63.1	288.3	-	22.3	56.7	183.6	379.5	-	20.4	34.6	122.8	325.2	-
65-114	16.1	112.2	-	-	-	21.8	52.5	201.8	416.6	-	26.7	50.5	153.9	402.0	-	19.8	41.3	104.6	264.3	-
115-164	a)	a)	a)	a)	a)	24.4	164.3	164.3	-	-	27.1	55.8	304.6	-	-	25.6	56.2	255.6	-	-
165-over	a)	a)	a)	a)	a)	27.5	89.9	-	-	-	24.0	57.6	186.4	683.1	-	22.4	51.8	243.4	497.8	-

a) Area in eastern California and western Arizona and Nevada arbitrarily excluded as being unrepresentative of average hinterland area.

b) By definition there are no cities of 25,000 or more inhabitants at distances greater than 10 miles from the metropolis in local sectors.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5.

over a much smaller area than the same size city in the local sector. In other words, the larger cities in the intermetropolitan sectors appropriate within their spheres of influence land area which in a local sector would be under the influence of a smaller size city. The net effect, of course, is to limit the scope of influence of the smaller size city in the intermetropolitan sector.

c. While the actual values reported in these tables for each size of city will not necessarily be an estimate for any single community, and since they implicitly assume that the distances and areas apply only within the sector type and distance zone (whereas in actual fact they would frequently cut across both) they must nevertheless of necessity approach the average values which would be obtained for a number of cities of equal size if functional boundaries were drawn between them, and hence also change with sector type in the same direction in which the averages obtained by actual functional delimitation would change. For this reason, the actual values of the tables may be of guidance to rural sociologists, market analysts, and others interested in trading and shopping areas and other aspects of urban influence. Their meaningfulness is also enhanced when it is remembered that they measure the average maximum distance which must be traveled along a given sector type to reach a town of the specified size or larger.

2. Population

The estimated average population lying within the radius of subdominance of each size of hinterland city follows the same general sector type pattern as does the land area.

a. The greater the frequency of occurrence of cities the

smaller the average population which lies within the scope of influence of each. Thus, the cities in subdominant sectors have a smaller quasi-average population lying in their area of subdominance than cities in the other two sectors.

b. The total urban hierarchy in the intermetropolitan sectors permits a smaller-size city to have fewer inhabitants in its area of subdominance than occurs in the urban structure of local sectors. As with land area, the presence and functioning of the larger hinterland cities in the intermetropolitan sectors tend to overweigh the occasional higher habitation ratios for cities of 2,500-4,999 in the local than in the intermetropolitan sectors. Hence, the city of 5,000 to 25,000 inhabitants in the intermetropolitan sector not only has a smaller average radius of influence; it also is subdominant over a smaller hinterland population than cities of the same size in local sectors. A functional interpretation of this phenomenon could be that a larger population is required to support a city of this size in a local sector than in an intermetropolitan sector.

c. The individual population values reported in these tables are, like the land area (radius) values, only an estimated average, and give at times numbers which seem impossibly high (particularly for the larger hinterland cities). If the precise meaning of these values is kept in mind, that one city of a stated size or larger is present in the indicated portion of the hinterland for each quantity of population stated, the inference that each and every hinterland city will approximate this "quasi-average" will be avoided. Of course there are many hinterland areas that contain no cities of the size at all, and others which contain more than one such city. The judgement that these statements of probability are an estimate of the

average amount of population contiguous to the hinterland city and within its sphere of influence is much more justified for the smaller sizes of hinterland cities, because one or more cities of this size is present in every distance zone and sector type of each metropolitan community, than for the larger hinterland cities where land area containing no city of that size is combined with land area which does contain such a city.

V

The Size-of-City Composition of the Hinterland Urban Population (Chart 7-3)

The pattern of habitation ratios and radii of influence of hinterland cities of each size which have been described above produces in the hinterland a definite pattern of size-of-city composition of the urban population. This composition, by distance and size class of metropolitan community, is presented in Chart 7-3. All of its principal features have been noted in the preceding pages; the chart merely makes this compositional pattern explicit. Hence, Chart 7-3 needs no further elaboration.

VI

Summary

1. The metropolitan communities with central cities of 500,000 or more inhabitants have more hinterland cities and relatively larger hinterland cities in all zones and sector types than the metropolitan communities with central cities of less than 500,000 inhabitants. Since these metropolitan communities with smaller central cities contain, on an average, more land area than those with larger central cities, there is a much more sparse distribu-

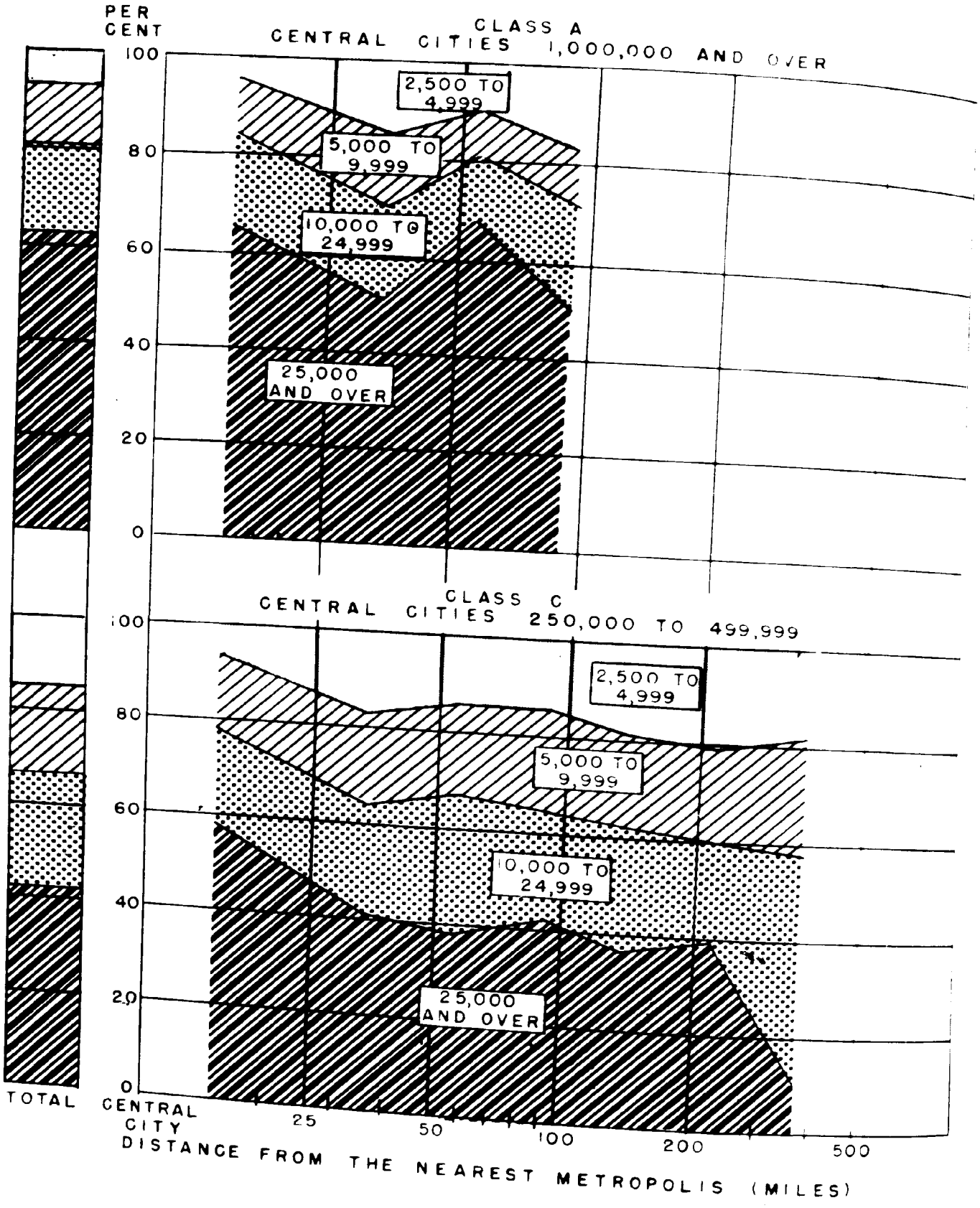
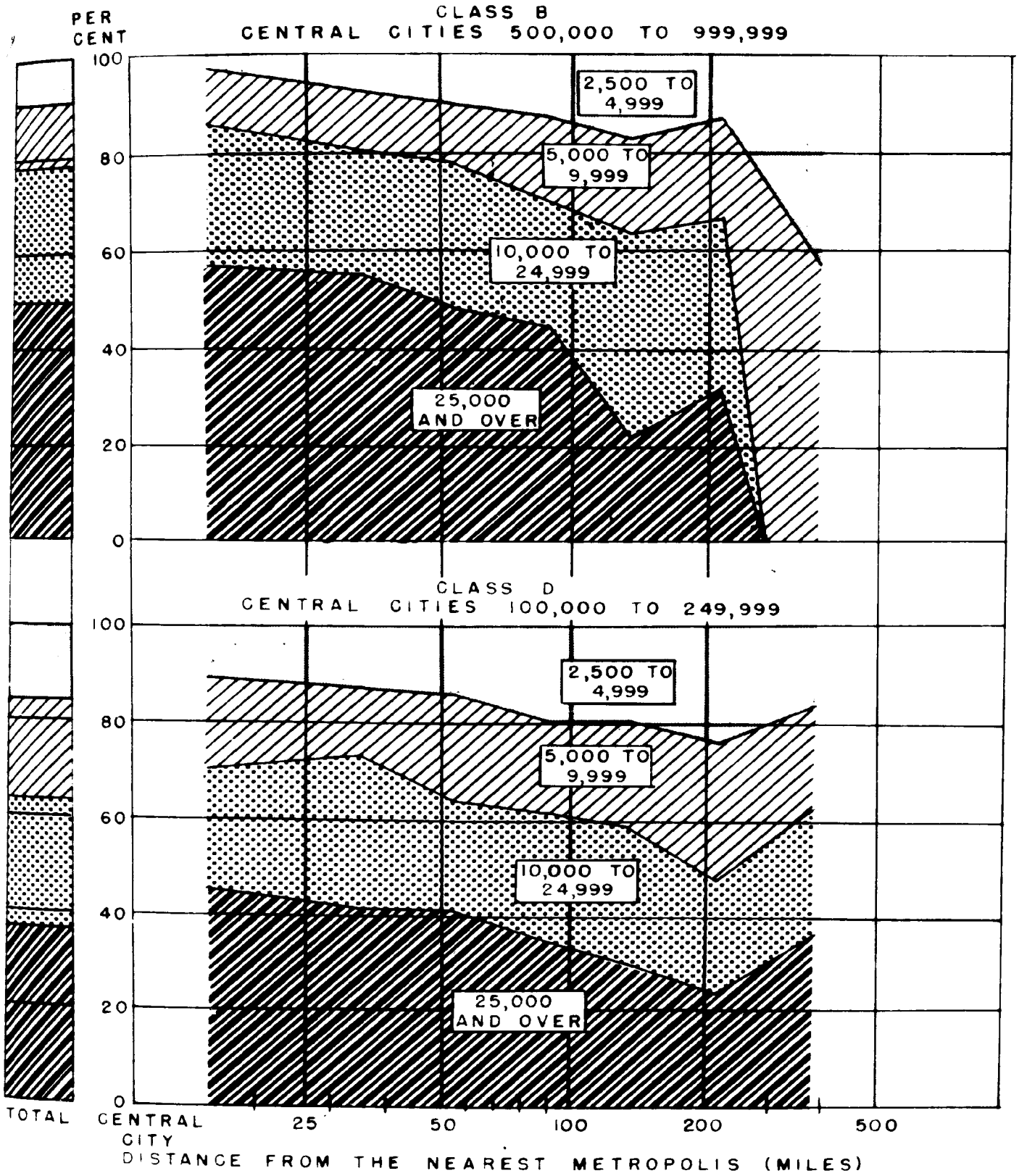


CHART 7-3 SIZE COMPOSITION OF THE HINTERLAND CITIES. DISTANCE FROM THE NEAREST METROPOLIS



BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND UNITED STATES, 1940

tion of cities in the metropolitan communities with small central cities than in those with large central cities.

2. The larger metropolises outnumber the combined populations of their hinterland cities, but the smaller metropolises are not only heavily outnumbered by their hinterland cities; they are almost equalled by the combined population of their major hinterland cities of 25,000 or more inhabitants.

3. While the general pattern of decreasing intensity of land occupancy holds true for each size group of hinterland city independently, certain uniform changes in the habitation ratios in the areas between 35 and 65 miles from the metropolis lead to a hypothesis that at distances shorter than about 35 miles the hinterland cities tend to be integrated directly with the metropolis on a basis of participation, while at distances greater than 65 miles they tend to be integrated indirectly through a geographic division of labor. Consequently, the mixed zone, lying between the inner and outer zones, and just outside the radius of direct integration, is a favorable locus for the rise and growth of cities which provide access to the more distant portions of the hinterland. Such cities are regarded as performing an interchange function. While this hypothesis "explains" the pattern by which the hinterland is found to be occupied by urban places and urban populations, it cannot be submitted to complete test within the framework of this study, and is left as a problem for future research. The analysis of certain urban functions in Part III will lend additional plausibility to the hypothesis.

4. A comparison of the frequencies with which the various sizes of hinterland cities inhabit the various parts of the hinterland shows that while the smaller cities are more numerous, they have fewer inhabitants per 100 square miles of hinterland than the larger sizes of hinterland cities. This tends to be true for all distances and for all sizes of metropolitan centers. It is interpreted as indicating the major importance of the larger of the outlying centers in organizing the hinterland.

5. With increasing distance from the metropolis, the smaller sizes of cities assume a greater importance relative to the larger hinterland cities, for their habitation ratios decrease at a smaller rate with distance. In spite of this fact, hinterland cities of all sizes are found at all distances and the city of 25,000 or more inhabitants tends to occupy all parts of the hinterland, except the local sectors, more intensively than any other size group of city.

6. The subdominant sectors tend to be more intensively occupied by cities of all sizes than are the other two types of sectors. Local sectors have a high concentration of population from the smaller cities in the 25-34 mile zone. Intermetropolitan sectors are occupied slightly more intensively by residents of cities of 2,500 - 4,999 inhabitants than are the local sectors, but show no uniform tendency in this direction for cities of 5,000 -24,999 inhabitants. It appears that the local sectors, in the absence of major hinterland cities, are occupied by small and medium-size hinterland cities at about the same rate as the intermetropolitan sectors,

with the great difference between the two being that in the inter-metropolitan sectors a heavy concentration of large hinterland cities is superimposed upon the distribution of smaller cities.

7. The smaller cities are more evenly spread throughout the hinterland area than are the larger ones. The latter tend to be more heavily concentrated toward the metropolis, or to be located in either the 35-44 or 45-64 mile zones, depending upon the size of the metropolis.

8. The potential nucleation and organization of the hinterland with respect to hinterland cities assumes a definite pattern when an estimate is made of the average amount of land area and population which must lie closer to a hinterland city, and hence assumed to be within its radius of influence, than to the neighboring cities of equal size or larger. Such estimates show that in all sizes of metropolitan communities the average land area and population lying within the estimated radius of influence of the hinterland city varies consistently with change in the size of the hinterland city itself, the size of the metropolis, and the distance from the metropolis by sector type. When these last three variables named are held constant, with each increase in size of hinterland city a larger land area and population is found to lie within the estimated radius of subdominance. For any given size of hinterland city the area of subdominance tends to decrease and the population in that area tends to be smaller as the size of the metropolis increases.

For any given size of hinterland city, both the land area and the population within the estimated radius of subdominance tend to increase with increasing distance from all sizes of metropolises.

9. Similar estimates by sector type permit a comparison of the functional position of the various sizes of cities by direction from the metropolis. A hinterland city of less than 25,000 has a greater radius of subdominance and embraces more population within that radius in a local sector than in an intermetropolitan or a subdominant one. In these latter two types of sectors the urban hierarchy is such that the minor hinterland city is a subdominant over a much smaller area and population.

10. The endeavor of this chapter has been, not only to show that each size group of hinterland cities has a definite pattern of arrangement with respect to the metropolis, but also to provide a basis for the later development of the hypothesis that this arrangement has a functional basis in the division of labor between the metropolis and the hinterland, and that the metropolitan community functions as a series of interdependent subdominant centers and of their surrounding areas.

CHAPTER EIGHT

THE STRUCTURE OF THE RURAL-NONFARM AND OF THE RURAL-FARM POPULATION IN THE UNITED STATES

I

Introduction

The hinterland has been characterized in the preceding chapter as being multi-nucleated. The thousands of cities which are scattered throughout its area appear to be distributed in a pattern not only with respect to the metropolis, but also with respect to each other. The entire arrangement of cities is such that all parts of the hinterland are enabled to have ready access to urban services, and the more complex urban services are made available through major hinterland cities. The entire pattern of nucleation has the central city as its point of symmetry. The hypothesis was also developed that each of these outlying cities is a subdominant center, or a focal point about which other smaller units of the hinterland are organized.

Were one able to command sufficient data and to expend sufficient energy, a similar analysis could be performed for the tens of thousands of rural-nonfarm communities and for the millions of rural-farm units in the hinterland, attempting to show in each case that various subtypes of units form a definite pattern about the metropolis even while exercising an organizing and integrating function in a limited area adjacent to themselves. Such a task is very obviously beyond the scope of this study. Hence no attempt is made to study the scope of influence which rural centers exercise. The studies of others have shown that such areas of local influence certainly exist, and that such centers serve a wide variety of functions. This chapter aims to determine:

a. The effect which the hinterland city of each size appears to have upon the distribution of the rural populations. Hence, the size of the subdominant unit becomes a major variable in the analysis of this chapter, supplementing the findings in Section IV of the preceding chapter.

b. Whether the metropolitan pattern, which has already been established for each of the rural populations, is due entirely to the effect of hinterland cities of varying sizes upon the rural populations, or whether the metropolitan pattern persists even when the effect of the hinterland cities is eliminated.

Since it is impossible to treat the aggregates of the rural-nonfarm and rural-farm population in the same manner as cities were treated, that is, as individual units, the expedient of dealing with each of these types of rural population in terms of county units has been adopted. The effect of the hinterland city upon these county units is studied by classifying each county on the basis of the size of the largest city contained in it.[1] Once the county units of rural-nonfarm and of rural-farm populations have been classified on this basis, they may be further classified by size of metropolis, distance from metropolis, and sector type. If the rural area of the county units is also computed, and similarly classified by size of metropolis, it is possible to perform an analysis similar to that which has just been completed for cities of each size. In short, the apparent effect of the metropolis and of the hinterland cities upon the rural populations is to be studied in this chapter by examining population data for county units which have been simultaneously cross-classified by size of largest city contained in the county, size of metropolis, sector type, and distance.

Since the majority of the central cities are themselves located within county units which also contain rural-nonfarm and rural-farm populations, one category of the "largest city contained" continuum will be

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[1] For a description of the procedure, see Chapter Two, Section V.

"central counties," or counties containing central cities. Such a unit cannot have a distance value or a sector type, and hence must be reported separately for comparison with all of the other variables. Except for this peculiarity of the data, the procedure is essentially the same as that which has been followed previously.

II

Description of the Land Area and Rural Population of the Hinterland. County Units Classified by Size of Largest City Contained.

A. The Number of County Units Containing Cities of Each Size and Their Distribution Among the Sizes of Metropolitan Communities. (Table 8-1)

1. Of the 3,098 units of area in the United States which were defined as counties in 1940, only 3,061 contain rural populations. The remaining 37 units are considered to be completely urban, and have been included with the urban population. Of the units which contain rural population, 61 are counties which also contain central cities (central counties) and 3,000 are counties which do not contain a central city (hinterland counties).

2. By far the majority of the counties of the United States which contain rural population do not contain sizeable hinterland cities:

41.0	percent contain no city or urban place
20.7	percent contain a largest city of 2,500 to 4,999
16.6	percent contain a largest city of 5,000 to 9,999
12.1	percent contain a largest city of 10,000 to 24,999
4.4	percent contain a largest city of 25,000 to 49,999
3.2	percent contain a largest city of 50,000 or over
2.0	percent contain a central city[2]
100.0	percent

Thus, more than two-fifths of the hinterland county units are completely rural, and an additional one-fifth contain only cities of less than 5,000 inhabitants. Only about one county in 13 contains a major hinterland city of 25,000 or more inhabitants, and one in 50 contains a central city.

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[2] In making the classification of counties by size of largest city contained, the 24 independent cities of Virginia were considered to lie in no county.

Table 8-1

Number of county units, classified by size of largest city contained and size class of metropolitan community, United States, 1940.[a]

Size of largest city contained (thousand inhabitants)	All metropolitan communities	Size class of metropolitan community			
		A	B	C	D
Central counties	61	3	4	18	36
Hinterland counties:					
Less than 2.5	1255	7	73	504	671
2.5 - 4.9	634	7	47	245	335
5.0 - 9.9	509	17	52	187	253
10.0-24.9	370	14	62	121	173
25.0-49.9	135	18	23	38	56
50.0- over	97	19	24	26	28
All counties	3061	85	285	1139	1552
Percentage distribution of hinterland counties					
Less than 2.5	100.0	0.6	5.8	40.2	53.5
2.5 - 4.9	100.0	1.1	7.4	38.6	52.8
5.0 - 9.9	100.0	3.3	10.2	36.7	49.7
10.0-24.9	100.0	3.8	16.8	32.7	46.8
25.0-49.9	100.0	13.3	17.0	28.1	41.5
50.0- over	100.0	19.6	24.7	26.8	28.9
All hinterland counties	100.0	2.7	9.4	37.4	50.5

a) Counties containing no rural population have been excluded. The independent cities of Virginia were classified as lying in no county.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5.

3. The counties containing large cities and those containing small cities are not evenly distributed among the four size classes of metropolitan communities. Using the proportion of all counties which lie in a given class of metropolitan community as a basis for comparison:

   a. The class A and B metropolitan communities have a considerable deficit, and the class C and D metropolitan communities have a corresponding excess, of completely rural county units and counties containing cities of less than 5,000 inhabitants.

   b. Counties whose largest city is between 5,000 and 9,999 inhabitants are distributed among the various sizes of metropolitan communities in almost the same proportions as the total number of counties.

   c. Class A and B metropolitan communities have an excess and class C and D have a deficit of counties whose largest city contains 10,000 or more inhabitants.

B. The Distribution of Land Area and Rural Population by Size of Largest City Contained and Size Class of Metropolitan Community (Table 8-2)

1. The class A and B metropolitan communites have a much smaller proportion of their land area classified as containing no city, or a very small city, than the class C and D metropolitan communities. Almost two-thirds of the land area in the class C and D metropolitan communities falls in one or the other of these classifications. On the other hand, the proportion of the land area classified as containing a city of 10,000 or more inhabitants is much larger in the class A and B metropolitan communities than in the class C and D.

2. In all metropolitan communities, the areas which contain no cities also contain very small proportions of the rural-nonfarm and the rural-farm populations. That both of the populations seem to shun the county units which contain no cities or very small cities can be verified by comparing the percentage distributions of land and population of counties

Table 8-2

Percentage distribution of the rural land area and rural populations of counties classified by size of largest city contained and size class of metropolitan community. United States, 1940.[a]

Size of largest city contained (Thousand inhabitants)	All metropolitan communities	Size class of metropolitan community A	B	C	D
		Land Area			
Central counties	1.7	3.6	1.0	1.2	2.0
Hinterland counties					
No city	41.3	21.5	20.8	43.8	43.6
2.5-4.9	20.5	4.4	15.1	20.6	22.3
5.0-9.9	17.5	19.5	22.1	16.1	17.6
10.0-24.9	11.6	6.8	23.1	3.1	9.8
25.0-49.9	5.0	37.9	7.9	3.5	3.1
50.0-over	2.4	6.3	10.0	1.7	1.7
Total	100.0	100.0	100.0	100.0	100.0
		Rural-nonfarm population			
Central counties	11.3	16.1	7.8	12.8	10.4
Hinterland counties					
No city	19.6	2.5	8.9	26.7	24.6
2.5-4.9	12.9	2.5	8.4	15.6	16.3
5.0-9.9	16.0	11.9	16.0	16.2	17.2
10.0-24.9	18.5	20.5	27.4	14.2	16.8
25.0-49.9	10.2	19.8	13.1	7.5	8.0
50.0-over	11.5	26.7	18.5	7.1	6.8
Total	100.0	100.0	100.0	100.0	100.0
		Rural-farm population			
Central counties	3.3	6.4	2.1	2.7	3.9
Hinterland counties					
No city	29.0	3.6	18.2	32.9	30.0
2.5-4.9	22.0	10.4	13.4	24.0	23.0
5.0-9.9	19.6	17.6	18.8	19.8	19.8
10.0-24.9	15.6	17.1	24.8	13.7	15.0
25.0-49.9	6.0	23.2	10.3	4.1	5.3
50.0-over	4.6	21.7	12.4	2.8	3.0
Total	100.0	100.0	100.0	100.0	100.0

a) Counties containing no rural populations have been excluded. Independent cities of Virginia were classified as lying in no county.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

classified by size of largest city contained. The extent of this preference for a location in counties containing the larger centers can be summarized by a coefficient of dissimilarity between land area and each of the populations.

Population	Coefficient of Dissimilarity A	B	C	D
Rural-nonfarm	46.6	24.7	22.1	25.4
Rural-farm	34.5	7.6	10.9	13.5

In all sizes of metropolitan communities, the rural-nonfarm population shows a tendency to concentrate in counties containing cities of 10,000 or more inhabitants, and to avoid location in counties containing only cities of smaller size. In all sizes of metropolitan communities there is a deficit of rural-farm population in counties which contain no city. Rural-farm population is concentrated in county areas which contain cities of 25,000 or more inhabitants. Here is preliminary evidence that both of the rural populations are distributed with respect to hinterland cities, and that the size of the hinterland city is related to the degree of concentration of these populations. From the above coefficients of dissimilarity it may be inferred that the rural-nonfarm and the rural-farm populations do not occupy the hinterland without reference to near-by hinterland cities, and to the size of those cities.

C. Distance from the Metropolis and Size of Largest City Contained (Table 8-3)

1. The county areas containing no hinterland cities tend to be located in the most remote portions of the hinterland. Only 6.9 perdent of the land area of all such counties lies within 65 miles of a metropolis, and 63.6 percent of this type of area lies more than 165 miles from a metropolis.

2. As the size of the largest city contained increases, an increasing proportion of the land area lies within 65 miles of the metropolis, and a smaller proportion lies more than 165 miles from the metropolis. Hence,

Table 8-3

Percentage distribution of the rural land area and rural populations of hinterland counties classified by size of largest city contained and distance from the nearest metropolis. United States, 1940.[a]

Distance zone (miles)	Size of largest city contained (thousand inhabitants)					
	No City	2.5-4.9	5.0-9.9	10.0-24.9	25.0-49.9	50.0-over
			Land area			
0-24	0.5	1.5	1.5	2.5	1.7	6.5
25-34	1.1	2.0	3.1	6.9	4.7	4.4
35-44	1.5	4.4	4.1	4.8	7.2	5.7
45-64	3.8	6.8	9.0	12.5	10.9	19.0
65-114	14.4	21.0	21.4	22.0	22.9	25.3
115-164	15.1	18.1	15.1	18.3	20.2	8.4
165-264	20.9	26.0	24.2	19.5	21.2	16.5
265-464	29.3	16.1	18.5	12.2	11.1	14.0
465-over	7.4	4.2	3.2	1.4	-	-
All zones	100.0	100.0	100.0	100.0	100.0	100.0
			Rural-nonfarm population			
0-24	2.0	6.1	6.4	11.9	12.3	16.8
25-34	4.0	5.4	5.0	13.7	9.9	10.6
35-44	3.7	7.6	5.9	8.7	12.6	10.9
45-64	9.3	11.9	18.2	17.4	13.8	22.3
65-114	26.2	26.0	28.2	25.4	28.4	23.8
115-164	20.8	20.7	14.7	12.2	12.7	8.1
165-264	23.1	17.7	16.7	8.2	6.6	7.5
265-464	9.0	4.1	4.5	2.2	3.8	2.1
465-over	2.0	0.6	0.4	0.2	-	-
All zones	100.0	100.0	100.0	100.0	100.0	100.0
			Rural-farm population			
0-24	1.6	3.1	3.5	5.0	4.1	8.6
25-34	2.5	4.2	5.8	10.1	7.7	5.8
35-44	4.0	5.9	3.9	6.8	10.6	5.6
45-64	8.5	12.9	14.6	16.2	18.4	26.0
65-114	29.7	25.6	32.1	27.3	29.7	27.4
115-164	23.4	25.4	20.4	21.3	19.3	9.1
165-264	22.0	19.3	15.8	10.4	7.0	14.4
265-464	6.4	3.0	3.2	2.4	3.1	3.1
465-over	1.7	0.5	0.8	0.4	-	-
All zones	100.0	100.0	100.0	100.0	100.0	100.0

a) Counties containing central cities and counties containing no rural population have been excluded. The independent cities of Virginia were classified as lying in no county.

Source: Sixteenth Census of the United States, compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 2o and 27; Areas of the United States, 1940, tables 2, 3, and 4.

the smaller the size of the largest city contained in a county, the greater the tendency for that county to be located at a considerable distance from the metropolis. The larger the size of the largest city contained, the greater the tendency becomes for the county to be located at a relative short distance from the metropolis. Compare, for example, the distance distributions of the land area of counties which contain no city, with those whose counties largest city is only 2,500 to 4,999 inhabitants, and both with the distance distributions of counties whose largest city is 50,000 or more inhabitants:

Distance	Size of Largest City		
	No city	2,500-4,999	50,000 & over
0 - 65	6.9	14.7	35.6
65 -164	29.5	39.1	33.7
165 -over	63.6	46.3	30.5
Total	100.0	100.0	100.0

3. In no one of the size groups of county units is the rural-nonfarm or the rural-farm population distributed in the same proportions as the land area. In each case, the counties within 65 miles of the metropolis contain a disproportionately large share of the rural populations, while the counties 165 miles or more from the metropolis contain a disproportionately small share of the population. Therefore, the tandency of rural-nonfarm and rural-farm populations to be concentrated in the vicinity of the metropolis, and to be sparsely distributed at greater distances from the metropolis, persists regardless of the size of the hinterland city. Even the hinterland city of 50,000 or more inhabitants, which approaches the metropolis itself in size, appears to be unable to distribute rural populations about itself independently of its metropolitan location.

4. The tendency for population to concentrate within the inner distance zones and to avoid the outer zones is greater among the rural-nonfarm than among the rural-farm population. For each size group of counties the latter population tends to have a much smaller proportion of its numbers concentrated in the inner zones and to extend the radius of its positive concentration farther into the hinterland. The coefficients of dissimilarity between the distance disbribution of the land area and the distance distribution of rural-nonfarm and rural-farm population for each size group of counties is as follows:

	Size of largest City Contained in the County(in Thousands)					
	No City	2.5-4.9	5.0-9.9	10.0-24.9	25.0-49.9	50.0-over
A. Rural-nonfarm	29.5	23.9	24.6	28.5	29.5	24.8
B. Rural-farm	33.4	23.4	26.4	19.8	23.1	13.2
Difference (A-B)	-3.9	0.5	-1.8	8.7	6.4	11.6

The two categories in which the rural-farm population shows a greater dissimilarity of distribution to land than the rural-farm population do not constitute a disproof of the above generalization. In each case an unusually heavy concentration of rural-farm population in the 45-64 mile zone, rather than in one of the inner zones, causes the greater coefficient of dissimilarity.

D. Type of Sector and Size of Largest City Contained (Table 8-4)

1. A higher proportion of the land area of those counties which contain no urban place is located in local sectors than of counties which contain a city. With increasing size of largest city contained there is a decreasing proportion of land area lying in local sectors. Thus, the land areas of the United States which contain no city whatever tend to be located at great distances from metropolitan centers in sectors which

Table 8-4

Percentage distributions of the rural land area and rural populations of hinterland counties classified by size of largest city contained and type of sector. United States, 1940.[a]

Type of sector	All sizes	Size of largest city contained (thousand inhabitants)					
		No city	2.5-4.9	5.0-9.9	10.0-24.9	25.0-49.9	50.0-over
		Land area					
Internetropolitan	56.5	53.3	54.4	59.4	59.7	67.8	66.5
Subdominant	10.3	8.1	9.5	9.0	10.5	27.9	27.6
Local	33.2	38.5	36.1	31.6	29.8	4.3	5.9
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		Rural-nonfarm population					
Internetropolitan	55.5	46.8	51.9	50.8	57.4	65.0	69.6
Subdominant	16.5	15.9	13.5	11.3	12.0	28.5	24.8
Local	28.0	37.3	34.6	37.9	30.6	6.4	5.7
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0
		Rural-farm population					
Internetropolitan	53.4	47.0	52.2	54.0	59.6	61.4	66.4
Subdominant	17.1	17.6	16.4	12.7	14.4	31.1	27.0
Local	29.5	35.4	31.4	33.3	26.0	7.6	6.6
All sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a) Counties containing central cities and counties containing no rural populations have been excluded. The independent cities of Virginia were classified as lying in no county.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

contain neither a major hinterland city nor an intermetropolitan thoroughfare. Conversely, the larger the size of the city which a county unit supports, the greater the tendency for that county unit to be located near to the metropolis, or at an intermediate distance, and to be either in an intermetropolitan or a subdominant sector.[3]

2. The tendency for rural-nonfarm and for rural-farm populations to concentrate in subdominant sectors is present among county units of all sizes except the very largest. Thus, a subdominant sector appears to be able to attract rural populations regardless of the size of the largest local city. This indicates that the entire area between the major hinterland city and the metropolis provides conditions favorable to the concentration of rural populations. The rural-farm populations are even more concentrated in each size group of counties lying in the subdominant sectors than are the rural-nonfarm populations.

III

The Intensity with which the Rural-Nonfarm Population Occupies the Land by Subdominance Groups

A. Rural-nonfarm Population per 100 Square Miles of Land Area, by Size of Largest City Contained, Size of Metropolis, and Distance from the Nearest Metropolis (Table 8-5, Chart 8-1)

Table 8-5 presents the rural-nonfarm habitation ratios for counties classified by the size of the largest city which they contain as well as by distance and size of metropolitan community. As in previous chapters,

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[3] It will be noted that a small percentage of the land area of counties containing a city of 25,000 or more inhabitants lies in a local sector, even though local sectors are defined as containing no city of this size. The appearance of areas of this type in local sectors arises from the independent coding of county units by the location of their geographic center. Thus, a few hinterland cities of 25,000 or more inhabitants lay sufficiently far from the geographic center of the county containing them to be coded as lying in a different sector than their county. In the tables which follow, this small group of counties will be included in the "all sector" totals, but will not be analyzed as a separate sector type.

Table 8-5

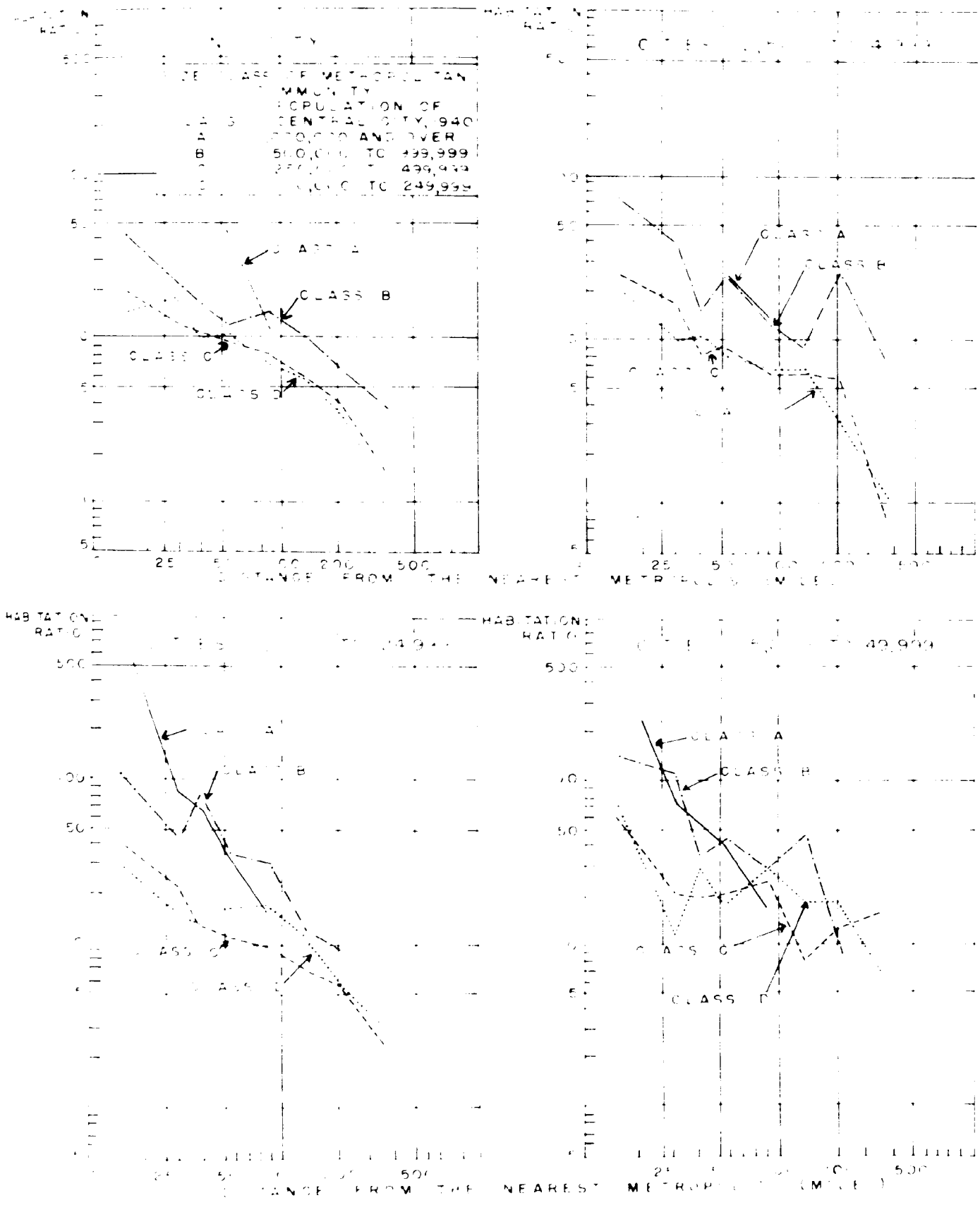
Habitation ratios: Rural-nonfarm population per 100 square miles of rural land area. County units classified by size of largest city contained, size class of metropolitan community, and distance from nearest metropolis. United States, 1940.[a]

Class of metropolitan community and distance zone (miles)	Size of largest city contained (thousand inhabitants)					
	No city	2.5-4.9	5.0-9.9	10.0-24.9	25.0-49.9	50.0 - over
Class D, total	379	491	657	1,152	1,734	2,749
0-24	1,443	1,964	1,852	2,882	7,192	5,977
25-34	1,683	1,029	1,115	1,530	1,102	11,353
35-44	980	1,068	504	1,351	3,062	3,405
45-64	976	789	1,202	1,602	1,698	2,474
65-114	721	659	1,206	1,644	2,796	3,302
115-164	568	650	757	1,107	1,791	3,179
165-264	345	295	516	572	1,788	2,014
265-over	121	114	126	302	600	658
Class C, total	470	584	779	838	1,643	3,136
0-24	1,993	2,445	2,153	4,040	6,152	8,195
25-34	1,231	1,596	876	2,275	2,143	-
35-44	1,026	832	1,707	1,284	1,977	2,562
45-64	921	888	1,365	1,104	1,955	2,622
65-114	780	617	810	975	2,352	2,109
115-164	574	629	705	715	812	3,059
165-264	411	577	643	567	1,265	3,695
265-over	150	81	203	230	1,540	-
Class B, total	1,079	1,402	1,833	3,012	4,227	4,670
0-24	4,192	7,214	12,215	10,788	14,172	9,490
25-34	2,180	3,823	2,775	4,320	11,240	6,788
35-44	1,667	1,561	6,409	8,335	3,437	6,072
45-64	1,203	2,418	2,919	3,651	4,371	5,543
65-114	1,451	1,242	1,919	3,145	2,778	6,485
115-164	1,040	867	1,422	1,179	4,679	3,132
165-264	661	2,584	942	913	1,041	758
265-over	359	706	783	-	-	-
Class A,[b] total	321	1,549	1,673	8,310	1,434	11,614
0-24	-	-	10,380	82,872	22,722	40,371
25-34	-	-	5,513	8,652	7,527	11,030
35-44	-	-	28,798	6,391	5,614	14,661
45-64	4,542	2,458	4,904	3,847	3,943	7,649
65-114	1,071	1,335	1,811	1,595	1,641	10,377
115-164	-	-	-	-	-	-
165-264	70	-	-	-	-	-
265-over	54	-	-	-	-	-

a) Counties containing central cities and counties containing no rural population have been excluded. The independent cities of Virginia were classified as lying in no county.

b) Distances of 115 miles or more have been excluded as being unrepresentative of the average hinterland of this class of metropolitan community.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 2; Areas of the United States, 1940, tables 2, 3, and 4.



HABITATION RATIO: RURAL NONFARM POPULATION PER SQUARE MILE OF HINTERLAND, BY SIZE OF LARGEST HINTERLAND CITY CONTAINED IN THE COUNTY, SIZE CLASS OF THE METROPOLITAN COMMUNITY, AND DISTANCE FROM THE NEAREST METROPOLITAN COMMUNITY, UNITED STATES, 1940

these ratios are computed by dividing the actual nonfarm population residing in the counties of each type by the land area in square miles (in hundreds) of those counties.

1. From the total columns for the class A, B, C, and D metropolitan communities it is immediately apparent that "size of largest city contained" is a variable which is definitely associated with the intensity with which the land is occupied by the rural-nonfarm population. With each increase in size of largest city contained there is a consistently higher ratio of this population to land. The lowest intensities of land occupancy are found in those counties which contain no city whatsoever, the highest intensities are found in those counties which contain the largest hinterland cities. This is true for all sizes of metropolitan communities. Thus, the degree to which the rural-nonfarm population inhabits the land is associated with the size of the urban center in the immediate area. It appears that either the same set of circumstances which is conducive to the presence of larger hinterland cities is also conducive to the presence of rural-nonfarm populations, or else the presence of the hinterland city itself is conducive to the settlement of the land by this type of population. Whichever view is taken, it is apparent that the two populations are not distributed independently of each other. An increase in the size of the local hinterland city is associated with an increase in the intensity of rural-nonfarm land occupancy.

2. Nevertheless, the presence of the hinterland city does not "explain" all of the pattern of the distribution of the rural-nonfarm population.

Even though the habitation ratios increase with increasing size of hinterland cities, the variables which have been used to study metropolitan patterns still persist. As the size of the metropolitan community changes from class D through classes C, B, and A, each "size of largest city" group shows a rising average level of land occupancy. In a class D metropolitan community, an area whose largest city is 2,500 to 4,999 inhabitants has a habitation ratio which is less than one-third as large as the same type of area in a class A metropolitan community. Similar relationships hold for all of the other classes of counties and sizes of metropolitan communities. Thus, in spite of the fact that the local hinterland city appears to exercise an influence over the settlement of the land, the influence of the metropolis appears to be superimposed upon it.

3. The influence of the metropolis upon the pattern of hinterland settlement by rural-nonfarm populations is also manifest in the habitation ratios for the various distance zones about the metropolis. The same pattern of declining ratios of people to land with increasing distance is present for each of the subdominance groups individually. Thus, the ability of a hinterland city of a given size to aggregate rural-nonfarm population about itself tends to wane with increasing distance from the metropolis. Even the areas containing the very largest sizes of hinterland cities, which presumably could most effectively throw off the influence of the metropolis, follow the same general pattern as the areas containing smaller hinterland cities.

4. When each distance zone is examined, by class of county groups, it is found that although there are fluctuations, many of which are associated with the small number of counties which are contained in some cells, the general pattern of increasing level of land settlement with increasing size of largest city contained, and with increasing size of metropolis, is the over-all trend within each distance zone.

5. The group of counties which contain no city whatsoever provides some interesting exceptions to the general pattern of distribution of the rural-nonfarm population. Except for the zone immediately surrounding the metropolis, the habitation ratio of the rural-nonfarm population tends to be almost equal to or higher in those counties which contain no city than in counties which contain a city of the smallest size. This situation is present in B, C, and D class metropolitan communities. (In the class A metropolitan communities there are too few counties which contain no city to permit a similar comparison for this size of metropolitan community). It appears that village populations compensate for the lack of a city by being present in greater quantity. This phenomenon can be visualized by reflecting upon the process by which an individual county area passes from one subdominance classification to another. If the sole village lying in a county which contains no cities begins to grow and passes the 2,500 inhabitants requirement, the county passes from the lowest to the second subdominance category. But in so doing it loses its sole aggregation of rural-nonfarm population, for it must lose its unit of rural-nonfarm population in order to obtain a city. Unless a

new village is formed to replace the one which has been lost, the rural-nonfarm population will be less than it was formerly. Thus, embryonic cities (large villages) in counties which contain no city can, by standing in place of the city, effectively raise the habitation ratio above that of the group above it, for the group above has lost one or more units of village population in the process of obtaining a city. Stated in another way, the "no city" category is not, strictly speaking, a continuation of the "size of largest city contained" continuum.

B. Sector Type and the Distribution of the Rural-nonfarm Population by Subdominance Groups (Table 8-6) (Chart 8-2)

In Table 8-6 the rural-nonfarm habitation ratios have been computed from data cross-classified by all four variables of distance, sector type, size of metropolis, and size of largest city contained. Although the number of county units contained in some cells, particularly in the large city sections and at the greatest distances, is extremely small, the general metropolitan pattern of distribution remains. The full detail of this table is reported, and grouping is purposely avoided, in order to show the marked stability of the values when broken by the full dominance-subdominance scales. By referring to Appendix Table II the reader may determine just how many county units are contained within each cell of this table.

1. When the county units are given the full four-way classification of sector type, distance, size of metropolis, and size of largest city contained, all of the elements of the structure of the metropolitan community are found to be present. Present are:

Table K-6

Habitation ratios: Rural-nonfarm population per 100 square miles of rural land area. County units classified by size of largest city contained, size class of metropolitan community, type of sector, and distance from the nearest metropolis. United States, 1940.[a]

Size of largest city contained and type of sector	No city			2,500 - 4,999			5,000 - 9,999			10,000 - 24,999			25,000 - 49,999		50,000 - over	
Class of metropolitan community and distance zone miles	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Inter-metropolitan	Subdominant
Class A		Class C			Class A			Class D				Class D		Class D		Class D
0-24[b]	1003	1163	1043	1471	1474	1471	1852	1852	1852	2882	2882	2882	7182	7182	5977	5977
25-49	1009	282	949	1157	1230	807	915	1225	503	1332	1684	1735	1459	5845	9167	-
50-74	2103	454	1118	1029	927	1055	1073	-	12.2	1469	1010	1067	707	2303	11353	-
75-99	1183	230	870	1138	1272	7.0	744	1225	502	1195	2038	1879	2107	3203	3405	-
100-124	979	783	1010	781	621	849	1072	1422	1278	1480	1302	1758	1745	1724	2474	-
125-149	651	408	759	568	829	810	1502	1215	1227	1991	1796	1285	4273	1714	5471	1413
150-174	430	1002	467	5	595	757	488	1061	1417	1053	1359	1005	1713	2167	3179	-
175-199	307	680	335	363	850	230	449	1555	536	902	1734	374	774	6351	320	4002
200-over	115	518	129	104	243	144	112	267	160	240	-	405	603	561	658	-
Class B		Class C			Class C			Class				Class C		Class C		Class C
0-24[b]	1895	1923	1903	2447	2446	2446	2143	2143	2143	4440	4440	4440	6152	6152	8195	8195
25-49	1206	929	921	1162	1961	1026	986	-	1885	1964	-	2133	2902	-	-	2562
50-74	1467	887	854	1406	1074	1856	731	-	2207	2195	-	2118	2143	-	-	-
75-99	1062	971	903	983	1053	724	1461	-	1848	1432	-	621	4077	-	-	2562
100-124	920	1570	805	815	1171	740	1083	-	1717	1744	-	676	1955	-	2122	-
125-149	822	700	705	866	703	481	775	1098	787	1101	1222	680	2483	7239	1653	6824
150-174	554	471	470	495	623	462	819	681	513	724	985	522	895	735	3387	3721
175-199	420	716	298	538	583	445	962	572	248	454	1294	497	786	4632	4208	2044
200-over	175	517	121	116	1600	47	166	543	316	215	-	261	-	1540	-	-
Class B		Class B			Class B			Class B				Class B		Class B		Class B
0-24[b]	7214	7192	7142	7214	7214	7214	12715	12715	12715	10788	10788	10788	14172	14172	9690	9690
25-49	1203	-	2140	5550	5330	1203	5408	1527	1627	7045	-	-	5461	12142	3582	6368
50-74	-	-	2140	5550	5330	-	5408	-	1627	4427	-	-	9098	12142	3582	9954
75-99	1203	-	-	-	-	1203	1203	-	-	8435	-	-	3437	-	-	4544
100-124	1203	-	1203	4348	4348	1203	1203	-	5041	4143	3430	1944	8450	1814	7055	4160
125-149	1203	2872	1203	1203	2348	1203	1203	4344	2348	2348	4724	3442	3192	2354	6485	-
150-174	-	1203	1203	1203	1203	781	1203	1203	1015	-	1620	703	7225	6884	-	4172
175-199	-	781	781	2348	-	-	87	1160	-	1160	1442	-	-	1041	-	758
200-over	-	781	-	-	703	-	-	781	781	-	-	-	-	-	-	-
Class A		Class A			Class A			Class A				Class A		Class A		Class A
0-24[b]	-	-	-	-	-	-	10340	10340	10340	22772	22772	22772	22772	22772	10371	10371
25-49	-	-	-	-	-	-	28738	-	5513	8973	9141	9225	9425	3379	14261	11356
50-74	-	-	-	-	-	-	-	-	5513	8469	9141	7532	7527	-	-	11030
75-99	-	-	-	-	-	-	28738	-	-	9056	-	4721	5348	3379	14261	-
100-124	1203	-	5698	1198	-	4171	2144	1149	7447	1772	-	7918	5475	2925	8719	4772
125-149	1203	-	988	1203	-	1203	-	1203	2344	1945	-	-	1441	-	21711	2704

[a] [illegible] with no central cities, cities and counties containing no rural population have been excluded. The independent cities of Virginia were classified as [illegible] county.

[b] [illegible] sectors have been combined. The combined value is shown for each type of sector in this zone for purposes of [illegible] with values for other zones.

[c] [illegible] have been excluded as being unrepresentative of the average hinterland of this class of metropolitan community.

[illegible] Census, Sixteenth Census of the United States, 1940, Vol.I, State Tables 5 and 6; Population, Vol.II, State Table 20; Areas of the [illegible]

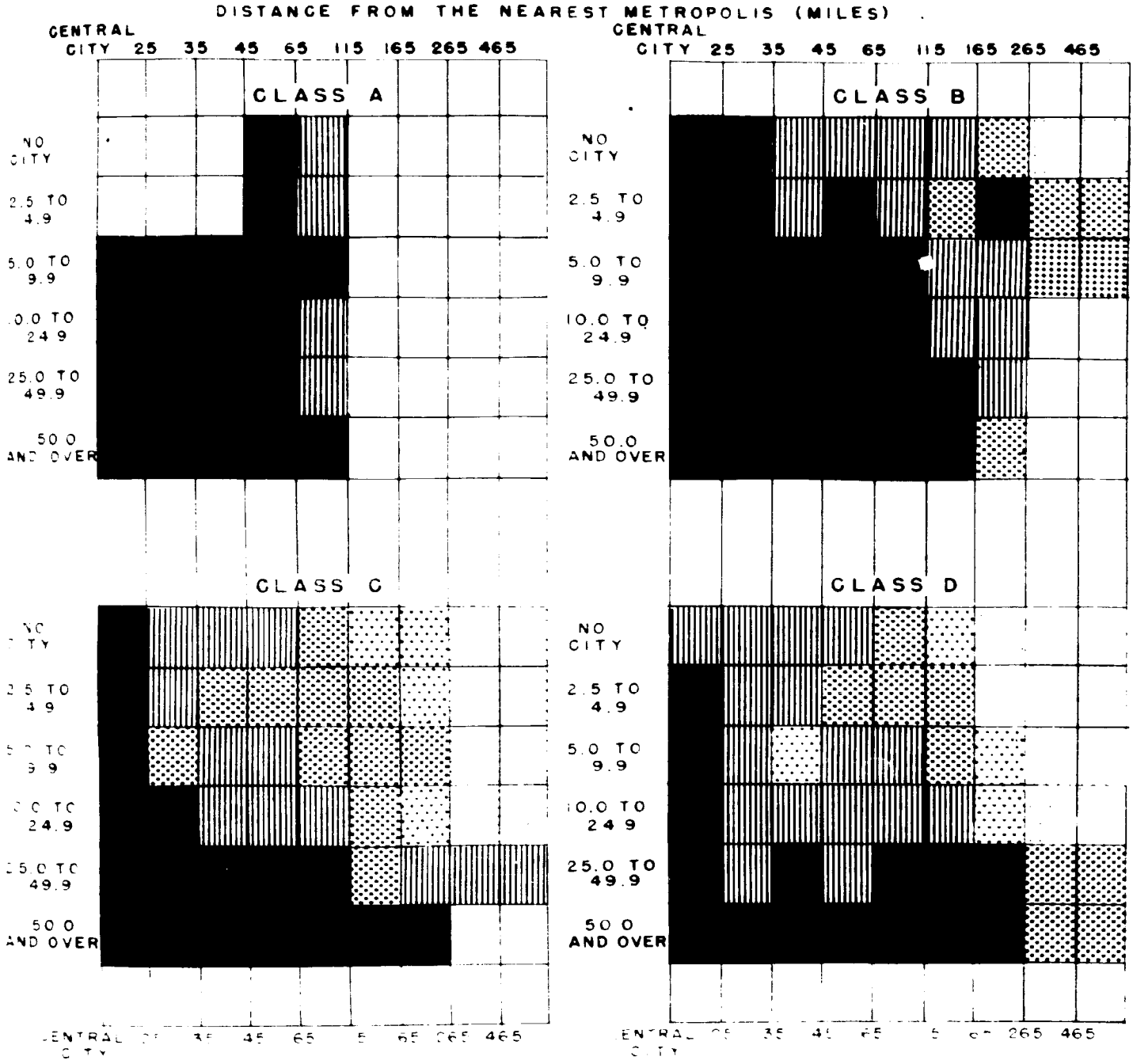


CHART B-2 RELATIVE EXCESS OR DEFICIT OF RURAL-NONFARM POPULATION PER SQUARE MILE, COUNTIES CLASSIFIED BY SIZE OF LARGEST CITY CONTAINED, SIZE CLASS OF THE METROPOLITAN COMMUNITY, AND DISTANCE FROM THE NEAREST METROPOLIS.- UNITED STATES, 1940

a. The tendency for habitation ratios to rise with increasing size of metropolis.

b. The tendency for the intermetropolitan and the local sectors to follow a trend of gradual decrease in the intensity of land settlement with increasing distance from the metropolis.

c. The tendency for subdominant sectors to foster a more intense land settlement, and to maintain a high habitation ratio far into the hinterland.

d. The tendency for the intensity of land settlement to be higher with each increase in the size of the largest city contained, regardless of type of sector. Thus, the characteristics of each variable remain, in modified form, in the presence of each of the other variables. Since three of these variables measure position with respect to the metropolis and the fourth measures the degree of immediate subdominance of the hinterland city, it must be concluded that the rural-nonfarm population is distributed, and presumably organized, with respect to both the metropolis and to the hinterland city. The phenomona of dominance and of subdominance appear to coexist throughout the hinterland. Once it was demonstrated that the hinterland cities were distributed in a definite pattern about the metropolis, by distance, sector type, and size of metropolis, it could have been anticipated that the entire structure of the rural-nonfarm population would be comprised entirely of combinations of local communal units of population consisting of a hinterland city and a standard complement of rural-nonfarm and rural-farm populations. In such a case, the differences between distance zones, sector types, and sizes of metropolises would disappear completely when the rural-nonfarm population is classified by size of largest subdominant. That the variables which have been used to isolate the patterns of dominance and of subdominance both show their characteristic pattern is evidence that the distribution of population cannot be explained solely by relative location with respect to a central city, nor by location near a hinterland city. Both types of information are required.

2. The rural-nonfarm population consits of at least two types of people: the "fringe dwellers", clustered outside the corporate limits of cities, and village dwellers living in small communities (either incorporated or unincorporated) and having an existence quite independent of the hinterland

city. While it is impossible to separate the two types in fact, using everyday knowledge of population movement, it is possible to formulate some interesting hypotheses about the distribution of fringe, or suburban, dwellers and about village dwellers. It is known that a high proportion of fringe dwellers regularly work in cities and commute to and from their rural residence, while a high proportion of the residents of the independent rural village find their source of employment in the village or its environs. Since 35 miles is, under present modes of transportation, within commuting distance, and since the average county in the United States is only about 25 miles square, a rural-nonfarm resident can live at almost any place in the county and commute to a city located at any other point in the county. Under such circumstances, the differences between the "size of largest city contained" units can be interpreted as a rough measure of the intensity of commuting and of fringe or suburban residence.

a. In counties which contain no city, commuting is limited, on the average, to the 0-34 mile zone, that is, to the metropolis itself. Note the sharp drop in the habitation ratios in all sectors of the 25-44 mile zone from the higher ratios of the 0-25 mile zone. This may be characterized as a phenomenon of direct metropolitan dominance, for the population appears to be oriented toward a direct participation in the activities of the metropolis rather than toward an indirect participation through exchange. The same phenomenon, in a modified form, exists for the county units containing small hinterland cities. As the size of the hinterland city becomes larger, and the possibilities of commuting to work in the hinterland city as well as in the metropolis

become greater, the effect of the two cities seems to merge. The ring of hinterland access, which was postulated in Chapter Seven, seems to produce a secondary area of commuting either in the 35-44 or the 45-64 mile zones or both.

b. Suburban or fringe dwelling seems to be a phenomenon which assumes larger proportions when a city attains a size of approximately 10,000 inhabitants. Note the sudden rise in class D metropolitan communities in the habitation ratios between counties whose largest city is less than 10,000 and those whose largest city is larger than this. The class D metropolitan community is a very good area in which to examine this phenomenon, for a much higher proportion of the county units in this class have only one city--the largest one--and hence present a picture less confused with the presence of other cities of varying size in the county. Here, in every distance zone there is a sizeable rise in the habitation ratio which, in most cases, represents an increase of 50 percent or more. Within the 0-34 mile zone particularly, where there is accessibility to both a hinterland city of 10,000 or more inhabitants and a metropolis, the increase is large.

c. The intermetropolitan sector appears to extend the distance of commuting to the metropolis. A comparison between sectors, by sub-dominance groups, shows that on the average the habitation ratios are higher in the intermetropolitan sectors in the 35-44 mile zone than in the local zone. In the inner zones there tends to be little difference between intermetropolitan and local sectors in the intensity of settlement.

d. The only areas in which the independent hamlet and village population can be surmised to constitute a sizeable proportion of the total rural-nonfarm population are counties containing cities of less than 5,000 inhabitants and located 45 miles or more from a central city

of size C or D in local sectors. Even in such areas the possibility of commuting to a large city in a neighboring sector is present. But if there are any areas in the United States which may be said to be almost completely small city and village areas, they must lie in counties which occupy these positions. The maximum number of villagers in these counties is about 8 per square mile. If one were to accept this value as an approximate upper limit of the frequency of dwellers in independent villages who do not commute to urban centers one can gain a rough idea of the extent of suburban and commuter rural-nonfarm residence in the United States. By this measure, almost all counties containing cities of 25,000 or more inhabitants are areas of very intense suburban residence, and almost all counties containing a city of 5,000 or more inhabitants and lying within 115 miles of a metropolis are also areas of considerable suburban residence. Stated in another way, the suburban type of rural residence is a phenomenon which is not confined to the environs of large cities. It appears to be associated with cities of 5,000 inhabitants or more if they lie within 115 miles of a metropolis and with all cities of 25,000 inhabitants. If these basic assumptions are true, the commuter, or suburban element in the rural-nonfarm population is a very high percentage of the total rural-nonfarm population. In Section V a rough estimate is made of the proportion of the rural-nonfarm population which is suburban.

3. The ability of subdominant sectors to foster a more intense settlement of rural-nonfarm population than the intermetropolitan or the local sectors is evidenced in all counties containing a city. It is not confined

solely to those counties which contain the major hinterland city from which the sector derives its classification. This constitutes further evidence that the presence of the major hinterland city is associated with a more intense land settlement at all points between it and the metropolis, and in this sense is a definite radial development similar to the intermetropolitan sectors.

4. The local sectors tend to have exceedingly high rural-nonfarm habitation ratios in the 25-34 mile zone; at this distance they are frequently more intensively settled than either the intermetropolitan or the subdominant sectors. This is an indication that in the congested vicinity of the metropolis a most preferred location for commuting and suburban residence may be in areas which are away from the principal avenues of traffic between the metropolis and other metropolitan centers or hinterland cities.

5. As the size of the metropolis increases, the importance of the intermetropolitan sector seems to increase also. In the class A metropolitan communities, the level of land settlement tends to be highest in the intermetropolitan rather than in the subdominant sectors. This tends to be consistent with previous findings which indicate that central cities of 1,000,000 or more inhabitants place greater reliance upon connections with other central cities than upon connections to major hinterland cities.

IV

The Intensity with which the Rural-Farm Population Occupies the Land, by Subdominance Groups

A. Rural-farm Population per 100 Square Miles of Land Area, by Size of Largest City Contained, Size of Metropolis, and Distance from the Nearest Metropolis (Table 8-7, Chart 8-3)

The rural-farm habitation ratios for each distance zone of each

Table 8-7

Habitation ratios: Rural-farm population per 100 square miles of rural land area. Counties classified by size of largest city contained, size class of metropolitan community, and distance from nearest metropolis, United States, 1940.[a]

Size of metropolis and distance zone (miles)	Size of largest city contained (thousand inhabitants)					
	No city	2.5 - 4.9	5.0 - 9.9	10.0 - 24.9	25.0 - 49.9	50.0 - over
Class D total	579	870	947	1295	1439	1508
0-24	2502	2226	2578	2848	1705	1771
25-34	1682	2331	2124	1744	1833	2166
35-44	1456	1461	763	1746	1764	1761
45-64	1566	1893	1598	1754	1627	2174
65-114	1264	1113	1953	1466	2061	2501
115-164	970	1274	1423	1760	2647	2395
165-264	463	518	512	539	1380	918
265-over	139	199	134	399	280	417
Class C total	920	1436	1511	1286	1436	1492
0-24	2625	2694	2776	2313	3066	1361
25-34	1437	2252	2367	2086	2342	-
35-44	2232	1484	1764	1972	1463	913
45-64	1689	2335	2622	1672	2376	1485
65-114	1772	1751	1576	1847	1525	1310
115-164	1318	1895	1859	1581	858	1447
165-264	752	1454	1176	953	885	4000
265-over	220	154	407	196	2005	-
Class B total	1382	1393	1347	1698	2076	1948
0-24	2651	2050	3044	3432	2655	2264
25-34	2062	3191	2049	1689	2630	3703
35-44	2120	1793	2903	2362	3114	2174
45-64	1812	1967	2083	2181	2682	2487
65-114	1724	1428	1602	1915	2321	2308
115-164	1328	1569	1319	1204	2346	1505
165-264	1229	1796	1197	840	1035	950
265-over	109	347	466	-	-	-
Class A[b] total	152	2139	805	2244	547	3058
0-24	-	-	3385	1528	4179	3126
25-34	-	-	2339	2979	2521	2323
35-44	-	-	1926	2785	1916	2010
45-64	933	2223	1861	1336	2421	3765
65-114	1905	2119	2097	2835	584	2610

a) Counties containing central cities and counties containing no rural population have been excluded. The independent cities of Virginia were classified as lying in no county.

b) Distances of 115 miles or more have been excluded as being unrepresentative of the average hinterland of this class of metropolitan community.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State table 27; Areas of the United States, 1940, tables 2, 3 and 4.

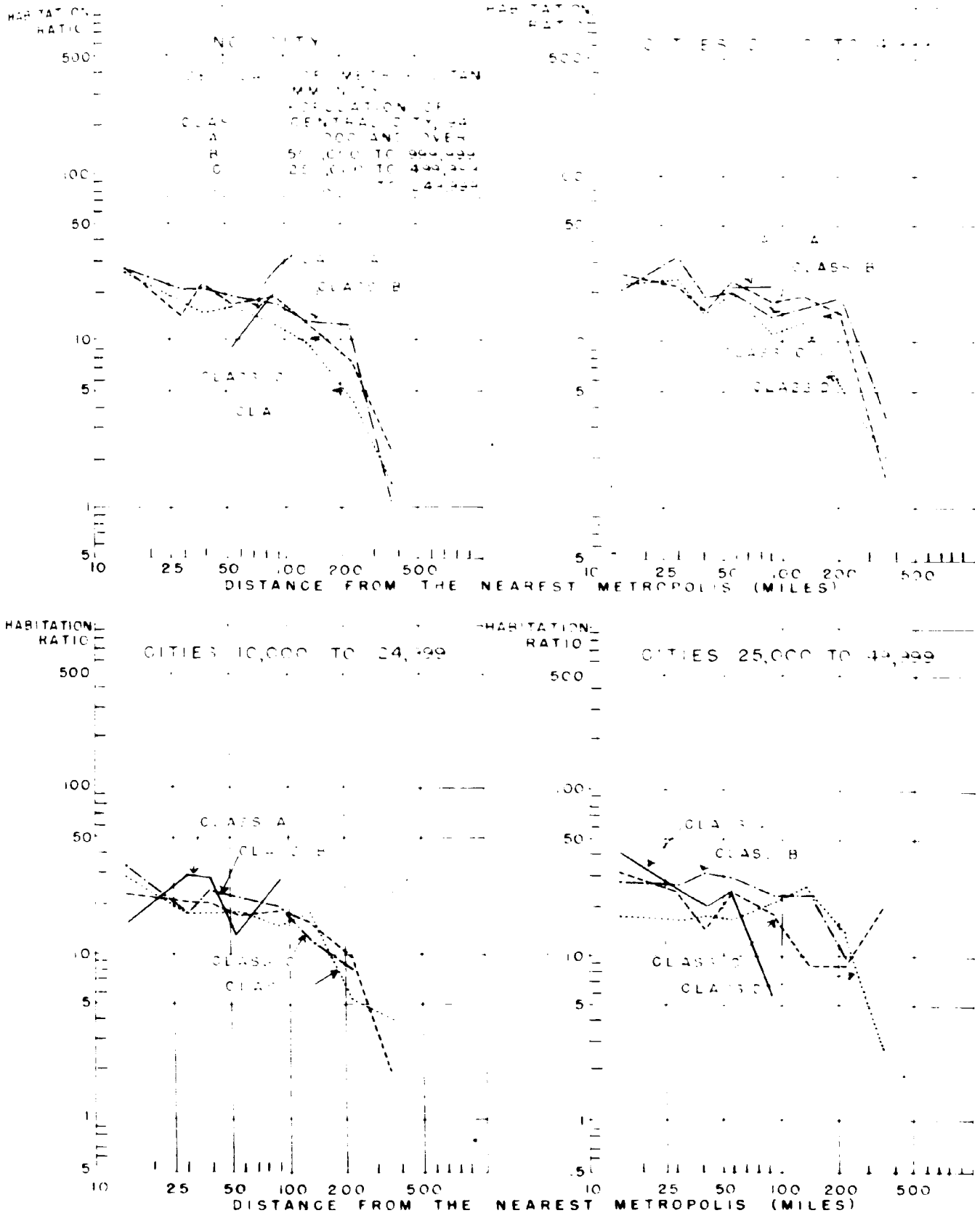


CHART B-3 HABITATION RATIOS RURAL-FARM POPULATION PER SQUARE MILE OF HINTERLAND, BY SIZE OF LARGEST HINTERLAND CITY CONTAINED IN THE COUNTY, SIZE CLASS OF THE METROPOLITAN COMMUNITY, AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1940

size of metropolitan community for counties classified by size of largest city contained are presented in Table 8-7.

1. In class B, C, and D metropolitan communities the units containing the larger hinterland cities in general also have higher ratios of rural-farm population to land. Very intense urban and metropolitan influence appears to discourage the settlement of the rural-farm population as is indicated by the absence of this tendency in class A metropolitan communities and for counties containing cities of 50,000 or more inhabitants when located in class B metropolitan communities.

2. The apparent tendency for rural-farm population to be discouraged by intense urban and metropolitan influence is further indicated by the tendency for the habitation ratios to level off or even decline in the 0-24 mile zone as the size of the largest city contained becomes larger than 25,000 inhabitants. Cities of 50,000 or more inhabitants seem to foster only a very little more intense rural-farm settlement at any distance, in any size of metropolitan community, than cities of 25,000 to 50,000 inhabitants. There is a persistent rise in the average number of rural-farm population per 100 square miles as the size of the city contained in the county rises from 2,500 to 50,000 inhabitants.

3. Containing a city of 2,500, or containing no city at all, appears to be almost a matter of indifference at distances of less than 115 miles from the metropolis. It is only at distances greater than this that the habitation ratio in counties containing a small city are consistently higher than in those which contain no city.

4. Thus, the size of the local hinterland city, within the limits prescribed, is associated with the settlement of the land by the rural-farm population. The phenomenon of subdominance appears to be present no less clearly, even if less intensively, for the rural-farm than for the rural-nonfarm population. Yet through this pattern of local aggregation the variables measuring metropolitan pattern still exhibit their influence.

a. The effect of the size of the metropolis is in evidence, as witnessed by a steadily rising habitation ratio with increasing size of metropolises in the B, C, and D groups. The class A metropolitan community shows tendencies both to attract rural-farm population very intensively and also to repulse it. The general pattern in most distance zones is one of intense attraction which is equal to or higher than that of the class B metropolitan communities. It will be remembered that the greater distances in metropolitan communities of this size are composed primarily of wasteland.

b. The influence of the metropolis is further evidenced by the declining of the rural-farm habitation ratios with increasing distance. This decline is more sharp in the class C and D communities than in the class A and B and among the counties containing small cities than among those containing cities of 10,000 or more inhabitants. The combined effect of metropolitan and of subdominant influence upon the rural-farm population appears to be, then, to sustain an intense settlement of rural-farm population far into the hinterland, and to

crowd out, either with rural-nonfarm residence or other activities, the rural-farm population from those areas of the maximum metropolitan and urban settlement.

5. There is a tendency for the rural-farm population to concentrate in the 45-64 mile zone, or, at least to fail to decline in this zone from the preceding one. Thus, the zone which has been postulated as a point of transition from direct to indirect metropolitan dominance again exhibits the characteristics of population concentration. It has now been observed that at this point in the hinterland there is a concentration of urban, rural-nonfarm and rural-farm populations not of one city or county size, but of many.

If the hypothesis of the transition from primary to secondary dominance, and of an associated concentration of urban places to act as focal points for the coverage of the hinterland, is a valid one, it appears that this transition area is also a very favorable locus for the concentration of rural-farm population.

B. Sector Type and the Distribution of the Rural-farm Population by Subdominance Groups (Table 8-8, Chart 8-4)

Habitation ratios based upon simultaneous cross-classifications of sector type, distance, size of metropolis, and size of largest city contained are presented in Table 8-8. This table contains, therefore, the pattern of rural-farm settlement by all of the metropolitan variables of this study.

1. As has been shown to be the case for the urban and for the rural-nonfarm populations, all elements of the metropolitan structure coexist

Habitation ratios: Rural-farm population per 100 square miles of rural land area. County units classified by size of largest city contained, size class of metropolitan community, type of sector, and distance from the nearest metropolis. United States, 1940.[a]

Class of metropolitan community and distance zone (miles)	SIZE OF LARGEST CITY CONTAINED AND TYPE OF SECTOR																	
	No city			2,500 - 4,999			5,000 - 9,999			10,000 - 24,999			25,000 - 49,999			50,000 - over		
	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant		Inter-metropolitan	Subdominant	
Class D		Class D			Class D			Class D			Class D			Class D			Class D	
0-24[b]	2502	2502	2502	2226	2226	2226	2578	2578	2578	2848	2848	2848	1705	1705		1771	1771	
25-44	1435	1362	1593	1583	2233	1527	1443	4851	1034	1641	1867	2119	1387	2430		2005	-	
25-34	1937	1762	1187	2026	4150	2530	1771	-	3208	1585	2060	2313	1224	3159		2169	-	
35-44	1009	2091	1719	1438	1970	1254	1092	4951	426	1756	1697	1710	1528	2187		1761	-	
45-64	1510	1709	1566	1581	2592	2177	1812	1507	1415	1712	2199	1602	1488	1834		2174	-	
65-114	1143	1804	1264	939	1598	1304	1591	2611	2150	1341	2394	1422	2960	1535		2544	2021	
115-164	671	2416	1042	1133	1763	1281	1046	1796	1804	1710	1997	1662	2583	1253		2395	-	
165-214	399	1050	415	506	2507	368	411	1518	541	513	1385	509	1371	1418		152	1699	
215-over	121	525	167	142	540	330	132	537	121	449	-	315	220	1290		416	-	
Class C		Class C			Class C			Class C			Class C			Class C			Class C	
0-24[b]	2625	2625	2625	2494	2494	2494	2776	2776	2776	2313	2313	2313	3068	3068		3397	3397	
25-44	2017	2358	1420	2174	2566	1409	2084	-	1933	2252	-	1558	2651	-		-	913	
25-34	1500	2033	1138	2077	3132	2357	2390	-	2132	2306	-	1617	2392	-		-	-	
35-44	2321	2675	1791	2257	2218	955	1513	-	1708	2129	-	1276	3051	-		-	913	
45-64	1740	2313	1078	2865	2029	1807	2604	-	2646	2033	-	1021	2376	-		2513	-	
65-114	1980	1588	1516	1806	1894	1615	1549	2001	1494	2148	3287	1209	1759	3552		1198	2371	
115-164	1322	1715	1056	2073	2233	1214	2100	2096	1312	1333	3294	1319	1088	647		3325	909	
165-214	729	1366	547	1260	2183	1283	1591	2055	536	795	2094	815	862	1050		3141	2582	
215-over	279	1794	147	227	1411	102	342	3278	297	230	-	126	-	2005		-	-	
Class B		Class B			Class B			Class B			Class B			Class B			Class B	
0-24[b]	2651	2651	2651	2050	2050	2050	3044	3044	3044	3432	3432	3432	2655	2655		2264	2264	
25-44	2120	-	2062	3219	3082	1793	2318	2962	1589	2145	-	-	3040	2486		3301	3519	
25-34	-	-	2062	3219	3082	-	2264	-	1589	1689	-	-	2912	2486		3301	4097	
35-44	2120	-	-	-	-	1793	2784	2949	-	2362	-	-	3114	-		-	1716	
45-64	1586	-	2266	1874	2408	1885	1738	-	2668	2319	1747	1876	2906	2867		2696	2182	
65-114	1581	2426	1731	1254	2583	1572	1612	2926	1536	2065	1843	1747	2643	1990		2308	-	
115-164	1187	1463	1365	1671	2476	845	1475	1223	-	1234	1064	1429	1493	2597		-	1505	
165-214	1869	1201	1148	1796	-	-	1659	1030	-	1758	734	-	-	1035		-	950	
215-over	-	109	-	-	347	-	-	500	378	-	-	-	-	-		-	-	
Class A[c]		Class A			Class A			Class A			Class A			Class A			Class A	
0-24[b]	-	-	-	-	-	-	3365	3365	3365	1528	1528	1528	4179	4179		3126	3126	
25-44	-	-	-	-	-	-	1926	-	2339	2227	2253	2051	2117	2128		2010	2323	
25-34	-	-	-	-	-	-	-	-	2339	3309	3953	1583	2521	-		-	2323	
35-44	-	-	-	-	-	-	1926	-	-	2620	-	2889	1669	2128		2010	-	
45-64	1474	-	463	1827	-	2744	1608	1673	2091	941	-	2112	2274	2519		4507	3156	
65-114	1223	-	2138	1481	-	2215	-	1897	2192	2835	-	-	584	-		2181	3233	

a) Counties containing central cities and counties containing no rural population have been excluded. The independent cities of Virginia were classified as lying in no county. No counties with largest cities of 25,000 inhabitants were classified as local.

b) At distances of less than 25 miles all sectors have been combined. The combined value is shown for each type of sector in this zone for purposes of comparison with values for other zones.

c) Distances of 115 miles or more have been excluded as being unrepresentative of the average hinterland of this class of metropolitan community.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State table 26; Areas of the United States, 1940, tables 2, 3, and 4.

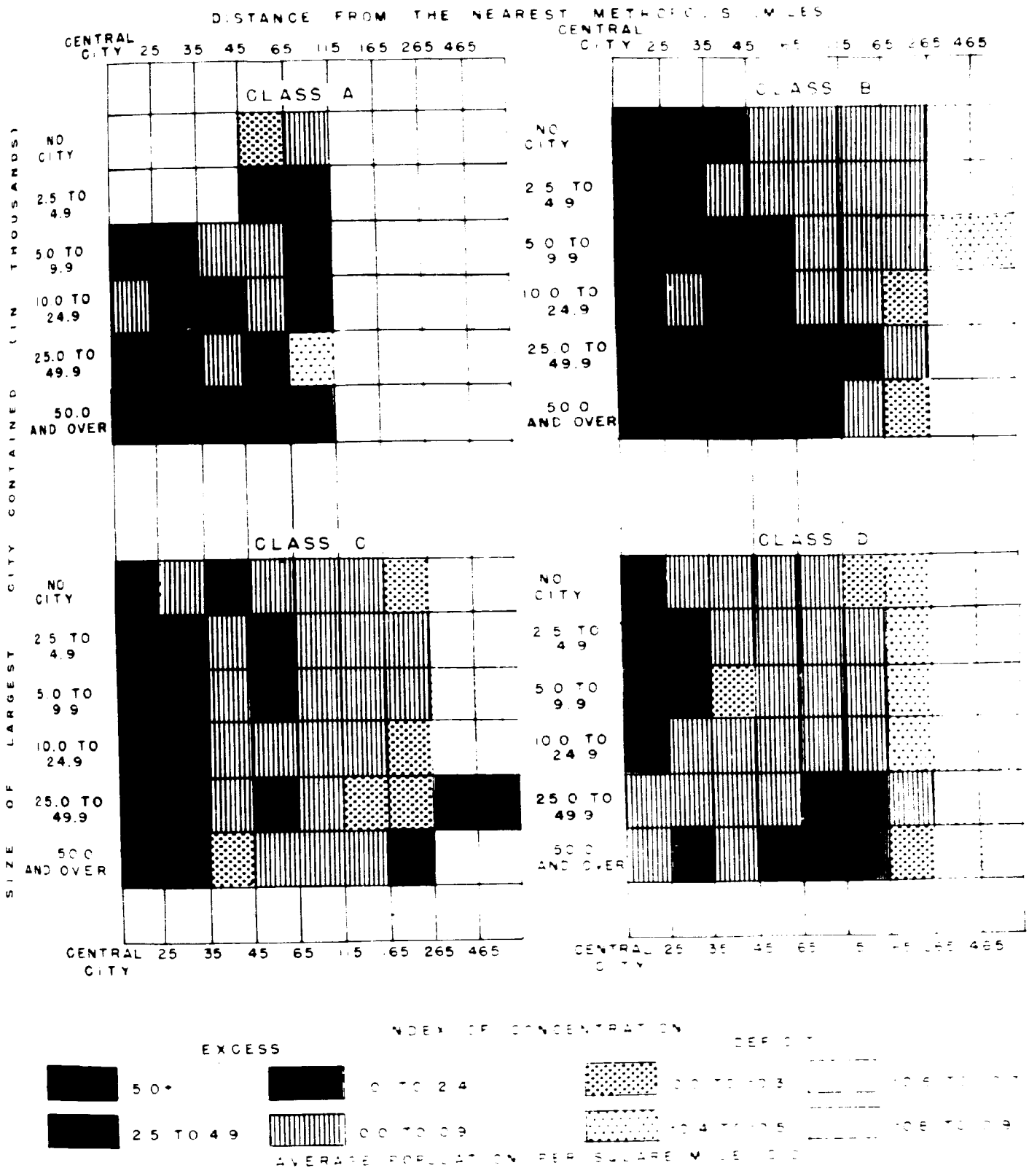


CHART 8-4 RELATIVE EXCESS OR DEFICIT OF RURAL-FARM POPULATION PER SQUARE MILE OF COUNTIES CLASSIFIED BY SIZE OF LARGEST CITY CONTAINED, BY CLASS OF COUNTY, AND DISTANCE FROM THE NEAREST METROPOLIS—UNITED STATES, 1940

The characteristic patterns associated with distance, size of metropolis, sector type, and size of largest city contained are present. It must be concluded that the rural-farm population is distributed, and presumably organized, with respect to both the metropolis and to the hinterland city. Thus, the elements of dominance and of subdominance appear to be present together in all parts of the hinterland. Just as no single variable was able to account completely for the distribution of the other hinterland populations, so now all four variables are necessary to obtain the present pattern. From the variations present in these data it must be readily admitted that still other factors--perhaps the quality of the land, rainfall, climate, and other variables are also operative. Yet the conclusion that the distribution of the rural population is related to its position with respect both to the metropolis and to the hinterland city is almost inescapable.

2. The ability of the subdominant sectors to foster an intense settlement of rural-farm population at all distances is in evidence in all of the locations except those involving the most intense concentration of urban populations. In counties whose largest city is less than 25,000 inhabitants and lie in class B, C, and D metropolitan communities this tendency is unmistakably present. In class A metropolitan communities, and in all counties containing a city of 25,000 or more inhabitants, the habitation ratios are very high, but appear to be limited (as has been noted in other instances) by the intense

urbanization and suburbanization in these areas. Thus, the major hinterland city appears to foster a very intense rural-farm occupancy of the land in the entire distance between itself and the central city.

3. The local sectors appear to promote very intense settlements of the rural-farm population at shorter distances, but they seem to be more affected by distance from the metropolis than the intermetropolitan sector. Their habitation ratios decline more rapidly outside the 45 mile zone than in the intermetropolitan sectors. This tendency is much more marked in the class B and C metropolitan communities than in the class A. It has been observed before that in the class D metropolitan communities sector differences are smaller than in the larger classes and hence exhibit little of this tendency here.

V

The Relationship of Rural-nonfarm to Rural-farm Population(Table 8-9)

The rural-nonfarm population occupies a unique position in the total population structure of the metropolitan community in that at some points it tends to conform to the pattern of the urban populations and at other points to the pattern of the rural-farm population. It has already been seen that in the vicinity of the metropolis and of large hinterland cities the rural-nonfarm residents are highly concentrated, yet in the remote areas they tend to follow the distributional pattern of the rural-farm population. The rural-nonfarm population is less independent of the land than the urban population but more independent of the land than the rural-farm population, lying almost midway between these extremes in this respect. In Section III, above, it was surmised that this bipartite

Table 8-9

Ratio of rural -nonfarm to rural-farm population. County units classified by size of largest city contained, size class of metropolitan community, type of sector, and distance from the nearest metropolis. United States, 1940.a)

Size of central city and distance zone (miles)	SIZE OF LARGEST CITY CONTAINED: No city			2,500 - 4,999			5,000 - 9,999			10,000 - 24,999			25,000 - over	
	Inter-metro-politan	Subdom-inant	Local	Inter-metro-politan	Subdom-inant	Local	Inter-metro-politan	Subdom-inant	Local	Inter-metro-politan	Subdom-inant	Local	Inter-metro-politan	Subdom-inant
Class D		**Class D**			**Class D**			**Class D**			**Class D**			**Class D**
0-24[b]	0.57	-	0.59	0.84	0.89	0.93	0.74	-	0.60	1.18	-	0.86	3.06	4.21
25-44	1.12	0.14	0.59	0.73	0.55	0.53	0.63	0.25	0.49	0.81	1.00	0.82	2.25	1.25
45-64	0.64	0.46	0.65	0.47	0.24	0.40	0.59	1.28	0.90	0.90	0.59	1.10	1.16	0.94
65-114	0.56	0.49	0.60	0.60	0.52	0.59	0.77	0.47	0.57	1.41	0.75	0.86	1.40	1.19
115-164	0.64	0.41	0.63	0.53	0.34	0.58	0.47	0.59	0.56	0.62	0.68	0.60	0.87	1.75
165-264	0.77	0.57	0.81	0.60	0.36	0.64	1.02	1.01	0.99	1.17	1.25	0.73	0.71	2.46
265-over	0.95	0.61	0.77	0.64	0.49	0.64	0.85	0.50	1.57	0.53	-	1.28	2.09	0.43
Total	0.71	0.48	0.66	0.59	0.41	0.58	0.70	0.63	0.70	0.95	0.74	0.87	1.48	1.31
Class C		**Class C**			**Class C**			**Class C**			**Class C**			**Class C**
0-24[b]	0.35	1.21	1.00	0.66	-	1.99	0.81	0.78	0.52	1.16	-	2.05	2.66	2.42
25-44	0.63	0.39	0.65	0.54	0.41	0.77	0.47	-	0.98	0.87	-	1.37	1.09	2.81
45-64	0.47	0.68	0.56	0.29	0.58	0.64	0.42	-	0.66	0.66	-	0.66	0.82	-
65-114	0.42	0.68	0.47	0.38	0.37	0.30	0.50	0.54	0.53	0.53	0.37	0.57	1.32	2.69
115-164	0.42	0.46	0.44	0.34	0.29	0.38	0.39	0.33	0.39	0.54	0.30	0.40	0.89	1.81
165-264	0.58	0.52	0.51	0.51	0.27	0.34	0.60	0.28	0.50	0.57	0.62	0.61	1.22	1.57
265-over	0.63	0.29	0.84	0.49	0.85	0.46	0.48	0.16	1.04	0.93	-	2.05	-	0.77
Total	0.49	0.52	0.54	0.41	0.33	0.46	0.51	0.41	0.58	0.63	0.42	0.81	1.16	1.91
Class B		**Class B**			**Class B**			**Class B**			**Class B**			**Class B**
0-24[b]	-	-	1.58	-	-	3.52	4.41	-	3.65	2.99	-	3.67	5.68	5.62
25-44	0.79	-	1.06	1.23	1.08	0.87	2.20	0.52	0.79	3.28	-	-	1.68	3.60
45-64	0.81	-	0.57	1.39	1.87	0.75	0.96	-	1.89	1.81	2.00	1.04	2.70	1.43
65-114	0.70	1.06	0.92	0.80	1.02	0.93	0.96	1.48	1.58	1.07	2.10	2.26	2.24	1.18
115-164	0.53	1.19	0.64	0.51	0.42	0.92	1.34	0.88	-	0.83	0.93	5.42	4.84	1.66
165-264	0.41	0.68	0.33	1.44	-	-	0.23	1.11	-	0.63	1.22	-	-	0.90
265-over	-	3.29	-	-	2.04	-	-	1.57	2.08	-	-	-	-	-
Total	0.66	0.99	0.75	0.92	1.12	1.05	1.29	1.07	1.86	1.74	1.62	2.10	2.92	1.62
Class A		**Class A**			**Class A**			**Class A**			**Class A**			**Class A**
0-24[b]	-	-	-	-	-	-	-	-	3.08	-	-	54.25	7.84	10.04
25-44	-	-	-	-	-	-	14.95	-	2.36	2.78	2.33	3.16	5.07	3.37
45-64	2.38	-	11.74	0.65	-	1.51	1.33	0.70	3.56	1.88	-	3.75	2.03	1.82
65-114	1.15	-	0.43	0.35	-	0.66	-	0.34	1.08	0.56	-	-	4.01	0.86
Total	2.22	-	2.06	0.52	-	0.77	1.52	0.58	2.99	2.32	2.33	7.09	3.92	2.68

a) Counties containing central cities and counties containing no rural populations have been excluded. The independent cities of Virginia were classified as lying in no county.

b) At distances of less than 25 miles sector types have been reported because both populations were drawn from the same areas. However, values for sector types at this distance are not reliable, and are presented here for comparison with other distance zones rather than with each other.

c) Distances of 115 miles or more have been excluded as being unrepresentative of the average hinterland of this class of metropolitan community.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27.

tendency arises from the fact that suburban residence, classified as rural-nonfarm, is very widespread in the hinterland. Apparently populations of this type are expressive of not one, but of two, functional positions in the metropolitan organization: that of acting as a local trade center for other rural populations and that of suburban residence of groups who gain their livelihood in cities.

In the first type of function were the sole one which rural-nonfarm populations exercise, one would expect to find a fairly constant ratio between the numbers of rural-nonfarm and rural-farm populations. For each 100 farm residents, a given number of village residents would be required to provide needed goods and services, and to participate in the collection, processing, and marketing of rural products. Given the pattern of city distribution which has been found for the hinterland, and still assuming that rural-nonfarm populations function only as local service populations, as one approaches the central city he would expect a decrease in the number of rural-nonfarm residents per 100 rural-farm residents, for the greater accessibility of hinterland cities and of the metropolis itself would make the presence of village service centers less necessary. As the number of hinterland cities per 1000 square miles increases, an increasing proportion of the rural-farm population would reside in the immediate vicinity of a city and would make use of city services rather than of village services. For this reason, one would expect the ratio of village service center population to rural-nonfarm population to be highest in the most distant and least

urbanized parts of the metropolitan community and to be lowest in those areas where the metropolis and hinterland cities are most accessible. Particularly at the shorter distances and in the subdominant sectors one would anticipate a very low ratio of rural-nonfarm to rural-farm population.

On the other hand, if suburban residence were the sole criterion in classifying residents as being rural-nonfarm, an entirely different type of distribution would be expected. In county areas containing no cities, one would expect almost no rural-nonfarm population. With increasing size of the largest city contained in the county area, a higher level of rural-nonfarm land occupancy would be expected. Since suburban residence is completely associated with the presence and size of cities, and since many other factors must operate to promote farm residence, one would anticipate a consistent rise in the ratio of rural-nonfarm to rural-farm population with increasing size of largest city contained or decreasing distance from the metropolis. For the same reason one would anticipate that in subdominant sectors the number of rural-nonfarm residents per 100 rural-farm residents would be greater than in local sectors, for the relative absence of large cities would render them unlikely places of residence. Because of their ready access to the metropolis, intermetropolitan sectors should be favored places for the location of urban populations. Obviously, all of the shorter distance zones would also be so favored.

Depending upon which of the two functional roles of the rural-nonfarm population one considers, therefore, two separate and opposing patterns of population distribution can be expected. The village service center function calls for high ratios of rural-nonfarm to rural-farm populations at the points most remote from the metropolis and from hinterland cities. The suburban residence function calls for high ratios of rural-nonfarm populations to rural-farm populations at points most accessible to the metropolis and hinterland cities. By cross-classifying the county units by the dominance-subdominance variables, and examining the ratios of the rural-nonfarm to the rural-farm population in each of the resulting accessibility areas, the bivariate distribution, and the dual functional position of the rural-nonfarm population, can be more clearly understood. Table 8-9 presents these ratios for county areas classified by size of largest city contained, sector type, size class of metropolitan community, and distance from the nearest metropolis.

Every element of the anticipated relationship of rural-nonfarm to rural-farm population, under both sets of assumptions concerning the functional role of the rural-nonfarm population can be verified from Table 8-9.

1. In the counties in class D metropolitan communities which contain no cities, and hence where suburban residence is at a minimum, the highest ratios of rural-nonfarm to rural-farm populations are found in the most distant zones and the lowest ratios at the inner zones,

indicating the greater dependency of the rural-farm population upon village service centers in those areas where cities are least frequent, and lesser dependency upon such centers in inner zones where there is a greater likelihood of a city being present in an adjacent county. In the local sectors of such areas the rural-farm population outnumbers the rural-nonfarm population in the ratio of about 3 to 2 at all distances, and in the ratio of almost 4 to 3 in the zone beyond 165 miles from the central city.

2. At the other extreme, in counties whose largest city contains 25,000 or more inhabitants and is located within 25 miles of a class A central city, the rural-nonfarm population outnumbers the rural-farm populations by ratios which are as high as 10 to 1. In all areas in which large cities are known to be present, or very near, the rural-nonfarm population tends to be present in great numbers in comparison with the rural-farm population. At short distances, in metropolitan communities with large central cities, in intermetropolitan sectors, and in all county areas whose largest city is 10,000 or more inhabitants, this situation tends to be present. The ratios of rural-nonfarm to rural-farm population are raised to values well in excess of those which would be required by the hypothesis of village service centers. Yet it is these very areas which would necessitate the very lowest concentrations of rural-nonfarm populations as service centers because of the greater accessibility and frequency per 100 square miles of urban centers. Clearly, the functional position of the rural-nonfarm population is a dual one.

3. Returning to the counties containing no city or a city of less than 5,000 inhabitants, the fact that in the relative absence of suburban residence the ratio of village service population to farm population declines as quickly as a city of some size is available may be inferred by comparing sector types. In the completely rural counties, with a minimum of suburban residence, the ratio of rural-nonfarm to rural-farm residents is lower in the subdominant sector, at all distances, than in the local or the intermetropolitan sectors. The single distinguishing trait of the subdominant sectors is, of course, the presence of the major hinterland city. Thus a loss of about 18 villagers per 100 farm residents is occasioned by the proximity of a major hinterland city.

Additional evidence that, in the absence of suburban residence, the ratio of village to farm population declines when urban services are available may be drawn from the counties whose largest city is less than 5,000 inhabitants. Here the city is not large enough to promote extensive suburban residence but its presence in the county can effectively replace a certain portion of the village service centers. In the zones beyond 115 miles from the metropolis, the ratio of rural-nonfarm to rural-farm population is lower in the counties containing such a small city than in counties which contain no city. This is true distance zone by distance zone, sector type by sector type, and is also present in the class C as well as the class D metropolitan communities. The presence of a single city reduces the number of rural-nonfarm per 100 rural-farm residents by about 8 per 100.

4. From the above, it can be concluded that the "normal" village service center population is present in the ratio of about 66 to 75 villagers for every 100 farm residents when cities are completely absent from the immediate locality. As the accessibility of cities increases, the relative importance of the village as a service center declines rapidly. The presence of a single small city in the county area reduces the number of village residents by about 8 per 100 farm residents, and the presence of a major hinterland city in a nearby county reduces the number of villagers by about 18 per 100 farm residents. As quickly as the county contains a city of 5,000 or more inhabitants, the suburbanization phenomenon enters, for in these areas the ratios rise above the values found for areas with no cities, and this in spite of the fact that the probability of there being two or more cities in the county has increased and hence the necessity for village service population has decreased. In areas where the size of the hinterland city is even larger than 5,000 the suburbanization phenomenon becomes increasingly intense. There is no way of tracing further the decline in the relative importance of village service populations in the areas of greater urban concentration, but it must be well above the 18 per hundred which was noted for the presence of a major hinterland city in a nearby county. With large cities actually present in the county, and numerous smaller cities likely to be also present, the ratio of village service population to farm population may be expected to decline to a very low value,

and to become almost zero in counties containing major hinterland cities and lying within 25 miles of the metropolis.

5. While no very precise estimate can be made of the proportion of the rural-nonfarm population which is engaged in providing local services to rural-farm populations in the hinterland, and what proportion are suburban residents, a very rough estimate can be made, using the pattern of ratios from Table 8-9.

The following table of the estimated number of rural-nonfarm residents required to provide services to 100 rural-farm residents, given the existing pattern of city distribution in the hinterland, was derived in the following manner.

a. It was assumed that if no cities are present, 73 village inhabitants are required to maintain 100 rural-farm residents in a class C or D metropolitan community at distances of 165 or more miles.

b. It was assumed that if a drop of about 18 per 100 rural-farm residents could occur between intermetropolitan and local sectors at this distance as a result of a major hinterland city being present in a near-by county, an equal or greater drop should occur if a city of 10,000-24,999 inhabitants were actually present in the county. A drop of 20 per 100 was arbitrarily set for counties whose largest city was of this size.

c. It was assumed that an even further decrease in service populations would occur as the size of the largest city contained became larger. A value of 10 per hundred was arbitrarily selected.

d. An average value for counties whose largest city is 2,500 to 4,999 was estimated from the value for class D metropolitan communities.

e. Ratios for other sizes of counties in the 145 mile and over zone of class C and D metropolitan communities were fixed midway between those for which values had been established.

f. Because of the greater intensity of urban settlement at greater distances in class A and B metropolitan communities a reduction of 5 points was allowed for metropolitan communities of these size classes for the 165 mile and over zone.

g. The ratios for the 25-164 mile zone were arrived at by multiplying the ratios for the outer zones by a fixed factor representing the increase in frequency of cities per 1,000 square miles as one approached the metropolis. A value of five-sixths for the class C and D and a value of two-thirds was used for the class A and B metropolitan communities.

h. For the inner zone, within 25 miles of the central city, the values which were set for the 25-164 mile zone were arbitrarily halved. The sharp increase in the frequency of cities in this zone would indicate a greater drop than this, but it was preferred to err on the side of underestimating rather than overestimating the suburban populations, and hence a factor of one-half was used.

Estimated number of rural-nonfarm population required to provide local services to 100 rural-farm residents, by size of largest city contained, distance from the nearest metropolis, and size class of metropolitan community

Class of metropolitan community and distance zone (miles)	Size of largest city contained in county					
	No City	2,500-4,999	5,000-9,999	10,000-24,999	25,000-49,999	50,000-over
Class C and D						
0 - 24	31	26	25	22	20	18
25 -164	61	51	50	44	40	36
165 -over	73	61	59	53	48	43
Class A and B						
0 - 24	23	19	18	16	15	13
25 -164	45	37	36	32	29	25
165 -over	68	56	54	48	43	38

The values of the above table were multiplied by the rural-farm population residing in counties at each distance from the central city, classified by size class of metropolis and size of largest city contained. The total of all of the products of this multiplication yields a very crude estimate of the number of rural-nonfarm residents required to serve rural-farm residents under the present distribution of rural-farm populatinn and of cities in the hinterland. By this procedure it is estimated that of the 27,029,000 rural-nonfarm inhabitants in 1940, 15,115,000 were required to provide local services in the hinterland, and that the residual 11,914,000 or 44.1 percent, of the rural-honfarm population, reside in the hinterland for other reasons, presumably suburban residence.

While the above estimate can in no way be taken as an exact estimate of the number of suburban residents in the United States, it does serve to demonstrate the dual orientation of the rural-nonfarm

population, and contributes to an understanding of the distributional pattern which this population has exhibited. If the procedure of using the ratio of rural-nonfarm to rural-farm population is accepted as a reasonable measure of the local service support required in the hinterland, and if the residual rural-nonfarm population remaining when the service population has been estimated is accepted as an estimate of the suburban population, then one can reasonably conclude that almost one-half of the rural-nonfarm population is composed of suburban residents oriented to a city rather than to the local rural population.

It will be noted that in the above computation no allowance was made for the effect of sector type upon the rural service population. The same factors which were used for estimating the rural service population for counties of the metropolis lying within 25 miles of the metropolis and containing a city of 50,000 or more inhabitants were also applied to the rural-farm populations of the counties containing the central cities. It is entirely possible, therefore, that the suburban element of the rural-nonfarm population is more numerous than the local service element.

VI

Summary

1. The principal goal of this chapter was to determine whether the rural-populations appeared to be influenced in their distributions by the presence or absence of hinterland cities. It was found that both the rural-nonfarm and the rural-farm populations occupy those counties which contain a large hinterland city more intensively than counties which contain a small city, and that with each increase in

the size of the largest city contained the average level of land occupancy tended to rise. Extremely urbanized areas, such as those within 25 miles of a metropolis, counties containing a city of 50,000 or more inhabitants, and counties in class A metropolitan communities, tend to support a high ratio of both rural-nonfarm and of rural-farm population to land, but are not necessarily associated with an even higher concentration than the group next lower in the dominance or the subdominance scale.

2. In spite of these marked and uniform differences, which are attributable only to the influence of the local hinterland cities, the elements of the metropolitan population pattern remained in each of the distributions by size of largest hinterland city. Thus, the differences which have been found to exist for distance zones, sector types, and size of metropolis were still present when the data were further classified by size of largest city. It can only be concluded that to the extent that population distribution is related to population organization, the rural-nonfarm and the rural-farm populations are organized both with respect to the metropolis and to the hinterland city. The metropolis appears to be able to aggregate directly some of these populations about itself and also to modify the ability of the hinterland cities to aggregate rural populations around themselves.

3. The very large metropolitan communities and the very large hinterland cities tend to reduce or eliminate the pattern of decline in land occupancy with distance and the differences between sector types.

Thus, the occupancy of the land tends to reach a climax at those points where the greatest amounts of dominance and of subdominance converge, and further increases in either fail to produce the expected greater concentration of population.

4. The rural-nonfarm population contains two major types of population: suburban, or "fringe", dwellers clustered about cities, and residents of villages whose primary function is to provide services to the local population in their environs. Using the habitation ratios which are common to those remote areas of the hinterland containing no cities or very small cities, and hence contain few if any fringe dwellers, as an index of the maximum level of land occupancy by rural-nonfarm population of the local service type, it is estimated that not less than nine million (one-third) and possibly as much as 14 million (more than one-half) of the rural-nonfarm population of the United States are fringe dwellers or suburbanites.

5. The total pattern of population distribution is such that it appears that the phenomenon of urban aggregation is not confined to the large cities, or to the inhabitants of cities and suburbs, but that in the process of being organized with respect to the metropolis and to the hinterland city, aggregation takes place on several levels of dominance, and that the metropolitan community is an organization of such aggregates patterned about a dominant central city.

CHAPTER NINE

THE PHYSICAL ENVIRONMENT AND THE METROPOLITAN COMMUNITY

I

Introduction

The preceding four chapters have analyzed in detail evidence that the metropolitan hypothesis, as defined in Chapter One and expanded in Chapter Two, is a valid characterization of the distribution of population. From that evidence it does appear that certain major cities act as focal points about which all populations are distributed. Yet one cannot make the quick and easy inference that the metropolis "causes" this distribution. The theory of dominance assumes some set of relations to the physical environment and that the pattern of community organization does not arise independently of the environment, but as a response to it. This chapter attempts to study the metropolitan community in its environmental setting. Following the conceptual framework laid down in Chapter Two, it adopts the view that the metropolitan community and the distribution of population in it have developed as one form or organization to conditions which exist in the natural environment. Data showing the relation of population distribution to various measures of environmental conditions will be presented, and by way of summary a few tentative conclusions about the relationship between the metropolitan community and the physical environment will be mentioned.

II

Natural Resources and Environment

It is well known that not all parts of the surface of the earth, or even of one nation, are equally endowed with all of the resources which are used to support life and to maintain human communities. In fact, resources are very unequally distributed, and each has its own characteristic pattern. Conceivably, every element of the population patterns which have been characterized could arise solely from the pattern of resource distribution, on the assumption that populations most intensively inhabit those areas with the richest and most varied resources for sustaining life. That the present distribution of population in the United States does not arise solely from such resource patterns may easily be shown by pointing to the fact that many small areas have much richer combinations of natural resources than New York, Chicago, or Detroit and other areas of intense settlement and yet have only a very small fraction of the population concentration that is present in these cities. On the other hand, one cannot categorically deny the influence of the physical environment in population distribution, for it can just as easily be demonstrated that in the deserts, in the mountainous waste lands, and on eroded prairies not only is there a relative scarcity of rural-farm population, but also of urban population, and even of metropolitan centers. Between the facts of the physical environment and the abilities of man to make use of that environment and to alter it lies an explanation of the distribution of population. To interpret the structure of the

metropolitan community in terms of either extreme is to fail to use all of the facts.

In this study the position has been taken that population distribution can be understood only through a knowledge of population organization. The distribution of the population in the environment is a product of the manner in which the population is organized with respect to the environment. Since a large share of all communal activities is directed toward sustenance, this view is extended even further to the corollary that the pattern of population distribution reflects human organization to utilize those resources which are required for sustaining the population. This view neither denies nor places undue emphasis upon the way resources are distributed in space. It merely states that under any distribution of resources the population must be organized in some fashion in order to utilize those resources. The hypothesis for study has been that this organization is a metropolitan one, that is, that population is organized with respect to resources through the medium of the great city, and under its dominance, through the subdominant hinterland city.

Regardless of whether or not the metropolitan hypothesis is regarded as valid, under modern conditions of technology some hypothesis of population organization which presupposes the existence of some system of widespread division of labor over great distances is necessary, for any hypothesis of population self-support from the immediate environment is patently false. Whatever the distribution of population under present modes of technology may be, it certainly must be

one which recognizes the utilization of many diverse physical resources from widely separated areas. If that organization is not a metropolitan one, it must at least be one equally as inclusive in terms of land area, the number of people involved, and in complexity. While the metropolitan hypothesis is a simple and plausible explanation of the population patterns which have been found to exist, yet a review of those patterns in terms of resource distribution can not only clarify the specific problem of whether the metropolis or resources creates population patterns, but can also serve to deepen our understanding of the metropolitan community and its relation to the environment in general.

Throughout the preceding analysis the standard unit for measuring the environment was simply "land area," with no implication as to the quality of resources present in any particular unit. No particular bias concerning resource distribution could have been introduced into the study by delimiting the boundaries of the metropolitan community by bisection, by measuring distance and direction in terms of man-made units as major highway routes, and cities of a given size, or by selecting county units as the units of area. If there were no such thing as metropolitan dominance, or local subdominance, and if the population pattern were due entirely or largely to the quality of resources present, then the process of adding together areas of like metropolitan accessibility from many widely scattered metropolitan communities could be expected to show only a random

pattern of distribution in space. The demonstration that a pattern of population distribution exists with respect to the metropolitan variables can lead only to the inference that either:

a.. Natural resources are distributed by a metropolitan pattern

b. The combining procedure has tended to eliminate differences in resources by averaging, leaving a residue which may be called metropolitan dominance, or

c. Population is distributed as it is by factors of both types (a) and (b).

This chapter will attempt to examine these three alternatives and to arrive at a conclusion as to which most adequately summarizes the known facts.

A. The Pattern of Distribution of Natural Resources

The studies of the students of industrial location and of natural resources provide many worth-while clues for interpreting the distribution of population over the land. That the resources of the physical environment are useful at the present stage of technological development only if there is a complex organization of population is freely acknowledged. These patterns and specialized areas must arise of necessity in the process of extracting, transporting, and assembling useful resources, and in producing and marketing goods and services from those resources.

> "...Even in the absence of any geographic differentiation at all (that is, if natural resources were distributed in a perfectly uniform fashion over the globe) certain patterns of specialization and concentration of activities would have to arise in accordance with economic, social, and political principles. There would be cities, towns, trade routes, specialized areas, and doubtless many of the problems of 'locational pathology' even if we removed altogether from the picture the factor of differences in distribution of natural resources..."[1]

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1 E.M. Hoover, Introduction to Geographic Economics, Manuscript prepared for Fondo de Cultura Economics, Mexico City, 1942, p.2.

Hence, in organizing itself for self-sustenance, the population must become concentrated, specialized, and diversified, in order to effectively employ modern technological methods. It may be inferred that the patterns of population distribution must reflect this necessity for organization.

Yet in the process of utilizing the resources of the environment, and of specializing and concentrating in certain areas in order to produce useful syntheses of these resources, there is great latitude for human preference. The resources of the environment which are required to sustain life are not all equally permanent and incapable of human manipulation. A large class of resources are permanent only insofar as they are sustained or replaced as they are used. Among such resources are forests, topsoil, pasturage, fisheries, and, to a small extent, water supply. Only the irrecoverable resources such as the minerals and the ubiquitous resources, such as air, are fixed and not subject to having their pattern of distribution altered by being replaced through human activity.[2] In fact, the major man-made modifications of the environment are almost as permanent and immovable in their distribution as are the replaceable resources.

> "The sustainable type of semi-natural resources then, appears to be in about the same category of mobility, as the bulkier sort of capital goods: that is, unlikely to be bodily transferred, but capable of gradual change in geographic distribution through allocation of replacements".[3]

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[2] Ibid, p. 7

[3] Ibid, p. 12

By exercising choice as to whether or not to replace or where to locate replacements, the resource pattern of any area may be altered.

It can easily be shown that under present ponditions only a very small portion of the total population is forced to live at the point of extraction of those natural resources, for only a small proportion of the total population is engaged in the extractive processes. In 1940, only 2.0 percent of the employed population of the United States was engaged in extracting nonreplaceable resources, and an additional 18.8 percent were engaged in extracting agricultural and forest products from sustainable resources. The remaining 79.2 percent of the employed population was engaged at tasks which permitted a greater latitude of choice in location.[4] Hence, in the distribution and organization of the population, actual resource extraction requires a fixed location for about one-fiftieth of the working popplation and a semifixed location for an additional 18.8 percent. About four-fifths of the working population is free to be located completely independently of the use of raw materials, except as considerations of cost, economy, and efficiency enter as organizational factors in resource use. Apparently the pattern by which the 98.0 percent of the population which is free to organize itself with at least partial independence from the direct obtaining of resources is the metropolitan pattern which has been described in the preceding four chapters.

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[4] National Resources Planning Board. Industrial Location and National Resources. Chapter 3 "Major Groups of Economic Activity", by Sargent Florence and Ruth Friedson, (Washington, United States Government Printing Office, 1942) p.66

While the above evidence does not effectively prove that population is not distributed with respect to resources, it does disprove any theory of population distribution which relates population solely and directly to resources, omitting the element of population organization in order to utilize resources.

Thus, at the present level of technology, the problem of the distribution of population to resources is not one of how resources organize population. Rather it is one of how effectively a given population can make use of resources as they are now distributed. With such a large proportion of the employed population engaged in nonextractive processes, it is readily apparent that irreplaceable resources are not necessarily distributed by a metropolitan pattern and that the physical environment does not require the same distribution for population as for resources. While it may be true that certain distributions of population may more economically utilize resources as they are distributed than do other arrangements of population, this is a matter of social organization. Coupled with the fact that those resources which occupy the largest proportion of the extractive population (agricultural resources) must be constantly sustained in order to be productive, the organizational aspect of population distribution takes on even greater additional importance. If there is a metropolitan pattern to resources, it is partially a matter of where man sustains resources by replacing them. This is merely restating a conclusion using data for recent years which N.S.B. Gras

found to be true for the entire history of civilized man: Each technological age has its characteristic organization for gaining a livelihood from the environment.[5]

B. The Distribution of Population and Agricultural Resources (Table 9-1)

The second inference, that the population patterns which have been found by this study are to be interpreted as being completely the result of control emanating from metropolitan and other urban centers, is also false, as may readily be seen in Tables 9-1. Here, the coefficients of dissimilarity between the distribution of the hinterland population and the quality of the land for agricultural purposes have been computed.

In this table the land areas of the United States have been classified according to their agricultural productivity without benefit of irrigation, additional drainage, or the use of chemical fertilizers.

> "Grade 1, roughly, is excellent for staple crops climatically adapted to the region; grade 2 is good; grade 3 is fair; grade 4 is poor; and grade 5 is essentially incapable of tillage. Grade 4...is distinctly low in physical productivity and is undesirable for standard arable farming except where uncommonly favored by compensating economic advantages such as nearness to urban markets".[6]

The series of coefficients of dissimilarity which have been computed compare the percentage distributions among the 48 states and the District of Columbia for population, quality of agricultural land, available and harvestable crop land, number of farms and

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5 See Chapter One, Section III

6 Ibid, p. 39

Table 9-1

Coefficients of dissimilarity between the distributions of land, agricultural activities, and population, United States, 1940.[a]

	Measures of agricultural activity			Population, 1940		
	Land suitable for agriculture[b]	Number of farms	Cash farm income	Urban	Rural-nonfarm	Rural-farm
Land:						
Total land area	35.9	37.7	32.6	51.3	34.5	34.5
Available for crops	12.9	25.5	23.9	48.2	36.0	29.6
Suitable for agriculture[b]	-	22.7	24.7	49.4	35.4	26.3
Quality of land:						
Excellent (grade 1)	48.4	57.9	46.0	64.8	52.7	41.5
Good (grade 2)	15.2	29.4	32.8	51.2	36.4	31.0
Fair (grade 3)	18.0	23.9	33.7	50.1	36.4	44.7
Poor (grade 4)	30.8	31.4	30.0	54.4	41.1	33.0
Nontillable (grade 5)	67.8	64.8	50.0	66.4	51.2	56.9
Agricultural Activity:						
Harvested land	13.4	25.3	22.1	48.2	37.2	27.8
Number of farms	22.7	-	24.6	44.2	24.6	5.3
Cash farm income	24.7	24.8	-	33.7	24.8	28.8
Population, 1940:						
Urban	49.0	44.2	33.7	-	24.9	45.5
Rural-nonfarm	35.4	24.8	24.8	24.9	-	26.3
Rural-farm	25.9	5.3	28.8	45.5	26.3	-

a) Coefficients of dissimilarity were computed from percentage distributions of the various items by states.

b) Land suitable for agriculture consists of grades 1, 2, and 3.

Source: Population information compiled from Sixteenth Census of the United States, Population, Vol.II, Table 21. Information for land and agricultural activities compiled from data reported in National Resources Planning Board, Industrial Location and National Resources, Chapter 2, tables 3 and 4, p. 37-38, 1942.

amount of cash farm income.[7]

The percentage distribution of the land area among the productivity classes is as follows:

Grade 1	5.3 percent
Grade 2	11.1 percent
Grade 3	18.2 percent
Grade 4	19.1 percent
Grade 5	46.4 percent
Total	100.0

Thus, a very high proportion of the land area of the United States is ill-suited for agriculture, 65.5 percent being either untillable or of low grade. Only 34.6 percent is of standard or better quality. Land suitable for agriculture is not distributed evenly among the states, as is indicated by the coefficient of dissimilarity of 35.8 between total land area and land suitable for agriculture. The proportion of land classified as "excellent" is not only small, but it is also very localized. The West North Central States contain 61.0 percent and the East North Central States contain 29.0 percent of this land.[8]

Table 9-1 should be read as follows: Each cell represents the total amount of difference between the percentage distribution by states of the item heading the column and a similar distribution of the item heading that row of the stub. Each column or row reports

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[7] All of the data pertaining to farm land and farming activities were taken from tables 3 and 4, Chapter Two, "Non-mineral Resources" in Industrial Location and National Resources, National Resources Planning Board, 1942, p. 37 and 38.

[8] Ibid.

the amount of dissimilarity between one measure and several other measures. By ranking the coefficients of any row or column in ascending order one can determine the factors with which each is most closely and least closely associated.

1. All populations show a marked degree of association with the quality of the land. The distributions of the urban, the rural-nonfarm and the rural-farm population show much higher coefficients of dissimilarity with the distribution of non-tillable land than with the distribution of land suitable for agriculture. The coefficients decline consistently for the comparisons with each grade of land better than nontillable through grade 3. Seemingly the very best grades of land are too small in area to contain even the farm population, for the coefficients of dissimilarity between population and "excellent" land are almost as high or higher than those for the "nontillable" land. Note also the high coefficient of dissimilarity 48.4 between "excellent" land and the land suitable for agriculture. Similarly, the coefficients between population and "good" land are only slightly lower than those for "poor" land. That all populations are attracted to the better land can be most clearly seen by comparing their distribution with grades 1 to 3 combined ("excellent," "good," "fair") with their distribution with grade "nontillable." For the urban population there is a drop of 17.6 percentage-points in the coefficient of dissimilarity, and even larger drops for the

rural populations (25.8 percentage-points for the rural-nonfarm and 40.0 percentage-points for the rural-farm). Hence the inference that the process of combining land areas by the metropolitan variables tends to "average out" differences in the quality of land, leaving a residue which may be called metropolitan dominance is untenable, since the distribution of all populations is unmistakably related to the quality of land. Even the urban population, of which only a very small fraction is engaged in resource extraction, is positively associated in its distribution with the better quality of land.

2. Even though it is positively associated with the quality of land, the distribution of the urban population shows the greatest total amount of independence from the quality of land, while the rural-farm population shows the least degree of independence. The rural-nonfarm population exemplifies its dual nature by lying almost midway between the two. Thus it would be necessary to move 49.0 percent of the urban, 35.4 percent of the rural-nonfarm, and 25.9 percent of the rural-farm population across state boundaries if these populations were to be redistributed in the pattern of distribution of land suitable for agriculture.

3. Even though the rural-farm population has the lowest coefficient of dissimilarity with the quality of land, the very fact that it is only 23 percentage-points lower than the urban population indicates

that factors other than quality of resources are operative in its distribution. Other of the coefficients also strongly indicate that this is the case:

a. The large difference between the coefficients of dissimilarity for grades 4 and 5 indicates that there is considerable concentration of the rural-farm population on poor and submarginal land.

b. Cash farm income is distributed more after the pattern of the urban population than is the rural-farm population. Likewise, the distribution of the number of farms more nearly approaches that of the urban population rather than does the distribution of the rural-farm population, which in turn follows the urban pattern more closely than the distribution of the fair or better land. By noting similar combinations of the coefficients for other variables it is evident that the tendency of the indexes relating to agriculture have a pattern of increasing similarity to the distribution of urban population as their logical relation to urban markets becomes more direct.

	Coefficient of dissimilarity with urban population
Suitable for agriculture	49.0
Harvested crop land	48.2
Rural-farm population	45.5
Number of farms	44.2
Cash farm income	33.7

From this it would appear that in areas with urban concentrations one will find concentrations of rural-farm populations, more numerous farms, and greater farm income than would be expected if the quality of the farm land alone were the criteria.[9]

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[9] The direction of these differences (concentration or deficit) was observed from the actual percentage-point differences, comparing states with known urban concentrations with those known to have predominantly rural populations, taking an excess of population over land as an index of concentration, particularly when the excess occurred in grades 3 and 4.

c. The absolute size of the coefficients of dissimilarity between the indexes of farm activity and the quality of the land is itself evidence that factors other than quality of land are operative in the distribution of farming activities. The low coefficient of dissimilarity between the number of farms and the size of the farm population shows that these two indexes measure almost the same thing: many farms mean many farm people. That high quality farm land is not synonymous with intensive farm operations is shown by coefficients of dissimilarity between the distribution of rural-farm population and the measures of land quality and farm activity, which are four or more times as great as the amount of dissimilarity between the distribution of farms and farm population.

Therefore, the variables of this study, distance from the metropolis, sector type, size of metropolis, and size of city, cannot be declared to be independent of the quality of agricultural resources. Even though it has been shown that there is no necessary direct relationship between resources and metropolitan pattern, they appear to be linked in actual life. Land suitable for agriculture is conducive to the presence of cities; the presence of cities is conducive to more intensive agricultural operations. Since the resources of soil fertility and other elements of land quality must be constantly sustained by replacement, in areas of intensive farming, it can only be inferred that location with respect to cities is one element in the pattern of land maintenance for agricultural purposes. One can only conclude that the third inference made above, that the population patterns which have been described in this dtudy are an expression <u>both</u> of metropolitan organization and of the distribution of resources, is the proper view of the metropolitan community in its natural setting. The metropolitan community does not directly create the patterns of

population distribution which have been described. It has already been shown that resources do not directly create the metropolitan patterns either. Since the pattern of population distribution is related to both the metropolis and to the physical environment, and yet neither of these factors compel that pattern, one is led to conclude that the metropolitan community is a pattern of population organization, an adaptation, to the physical environment. This view is amplified in the next section by comparing the metropolitan community with the geographic region.

III

Geographic Regions and Metropolitan Dominance

The fact that not all areas are alike in resources and in activity has led to the delimiting and study of geographic regions. Within recent years it has been shown that there are not only differences between broad geographic areas in soil, climate, minerals, and other resources, but also in population composition, level of technological development, employment opportunities, levels of living, and many other elements of social organization.[10]

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National Resources Committee. "Regional Distribution of Economic Opportunity". Ch. 2 in Problems of a Changing Population. (Washington: Government Printing Office, 1938).

A.R. Mangus. Rural Regions of the United States. (Washington: United States Government Printing Office, 1940).

Warren S. Thompson and P.K. Whelpton. Population Trends in the United States (New York: McGraw-Hill Book Company, 1933) Regional tables presented in the chapter for each population characteristic.

Howard W. Odum. American Regionalism. (Chapel Hill. University of North Carolina Press, 1940).

National Resources Committee. Regional Factors in National Planning and Development (Washington: United States Government Printing Office, 1935).

National Resources Planning Board. "Natural Resources and Location" Chapters 1 and 2 in Industrial Location and National Resources. (Washington: United States Government Printing Office, 1942).

The region is commonly regarded as an area of alikeness or of unity based upon conditions common to the constituent parts.

> "A region...is a territory which possesses enough of the measure of sameness to distinguish it fundamentally from its neighbors".[11]

Thus there may be many types of regions--climatic, economic, demographic, ethnic, racial, or even ideological, depending upon the particular element under consideration. That such geographic differentials are not isolated events is also evident. Areas of poor soil, subsistence farming, low level of living, and absence of industrial cities tend to coincide. The net effect is to give to vast areas of land and of people a similar level of life.

> "The American picture abounds in the evidences of regional diversity, basic to the understanding of the nation and to the direction of its future. Certainly within the sweep of its physical resources no two of the great regions are alike. Consider the soil, the climate, the forests, the minerals, the rivers and lakes, and the consequent crops and industries, work and manners that grow out of them. The Southeast is different from the Northeast, the Southwest is different from the Northwest, the rural Midwest is different from the rural Southeast. The industrial Northeast is different from the industrial middle states. The far West is different from any other region."[12]

Because of these observable differences in groups of traits, the United States has been divided up into various divisions or major regions. Implicit in this procedure is the assumption that life

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[11] N.S.B. Gras."Regionalism and Nationalism." Foreign Affairs, April 1929, p.465.

[12] Howard W. Odum. American Social Problems (New York: Hentry Holt and Company, 1945) p. 120-121.

within each region is fairly homogeneous and different from that in other regions. Howard W. Odum explains his six-fold regional division of the United States as follows:

> "These are major regions approximating a greater degree of homogeneity measured by a larger number of indices for a larger number of purposes and classifications than any other regional framework that has been utilized or than any other that, on the basis of our data and premises, would appear possible."[13]

The problem of geographic division is of particular importance for this study for two reasons:

a. To the extent that regional distributions of populations imply regional differences in resources and a regional organization of population, the regional hypothesis becomes either an alternative or a supplementary hypothesis of population distribution to the metropolitan hypothesis.

b. To the extent that metropolitan communities, as here defined, do not coincide with geographic regions, the differences which have been found to be associated with locations from the metropolis may, in reality, be reflections of regional differences.

While the evidence which can be presented here is brief, and admittedly incomplete, it does throw considerable light on both the metropolitan and the regional view of population distribution.

The simplest test, and of course the most direct, which could be performed upon the data of this study in order to learn the relationships between the metropolitan and the regional interpretation of population distribution would be to tabulate further the data by geographic regions. Unfortunately, such a tabulation cannot be

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[13] Ibid, p. 122. (Italics are mine.)

performed in full. As was observed in Chapters Seven and Eight, the four-fold classification of cities and counties created so many different categories that there were too few cities and counties to obtain sufficient cases for precise statistical analysis. A further subdivision would yield only very untrustworthy results. Accidental variations created by political boundaries and the peculiarities of individual areas, would tend to hide any general conclusions which could be drawn for metropolitan communities or for regions in general. A next best procedure, and the one which has been adopted, is to cross-classify the data for population and land area by only a few of the variables. Distance from the nearest metropolis has been selected as the variable for cross-classification with the geographic regions. This variable has shown consistent differences under all other conditions of metropolitan position and hence is fundamental to the metropolitan patterns of population distribution. Moreover, distance from metropolitan centers has not been used as an index in any of the attempts to delimit empirically regions of geographic homogeneity. The regional classification which has been used is the standard "geographic division" as used by the United States Census.

A. The Regional Composition of Land Area and Population, by Distance from the Nearest Metropolis (Table 9-2, Chart 9-1)

1. There is a very strong regional bias in the distribution of population and land area by distance from metropolitan centers.

   a. With increasing distance, the proportion of land area which each of the following geographic divisions is of the land area in the zone decreases:
      New England states
      Middle Atlantic states
      East North Central states

Table C-2

Percentage distribution of land area, urban population, and rural population, by geographic division and distance from the nearest metropolis. United States, 1940.

Geographic Division	All Distances	DISTANCE FROM THE NEAREST METROPOLIS (miles)							
		Less than 25[a]	25 - 34	35 - 44	45 - 64	65-114	115 - 164	165 - 264	265-over
Land Area (square miles)									
New England	2.1	9.6	2.3	3.4	2.1	1.2	1.8	2.0	2.5
Middle Atlantic	3.3	9.1	10.0	11.3	9.1	6.3	2.5	0.4	-
East North Central	8.1	33.0	23.2	19.4	24.2	13.4	6.2	4.1	0.6
West North Central	17.1	8.2	13.1	10.1	12.8	16.8	18.3	15.9	20.9
South Atlantic	9.0	15.2	12.1	12.0	13.0	14.6	15.5	7.4	0.2
East South Central	6.0	13.3	5.8	9.3	10.2	11.2	9.2	4.4	-
West South Central	14.5	3.8	17.9	10.4	13.1	18.6	18.9	19.4	5.2
Mountain	29.3	1.9	6.2	13.5	5.1	8.7	14.8	32.7	62.7
Pacific	10.5	5.9	5.3	10.7	10.3	9.2	12.9	13.7	7.9
United States	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Urban Population									
New England	12.5	18.9	17.3	29.1	10.2	3.8	4.4	5.8	1.8
Middle Atlantic	23.6	39.1	28.4	16.3	27.7	16.2	3.8	1.1	-
East North Central	21.3	17.8	31.2	30.6	32.2	24.4	8.9	8.2	4.4
West North Central	8.9	5.7	2.4	3.8	7.6	13.2	17.7	12.4	17.9
South Atlantic	10.4	4.1	6.8	7.4	5.3	15.5	26.2	24.6	1.1
East South Central	4.6	1.7	1.4	3.2	3.7	8.5	11.5	7.4	-
West South Central	7.8	0.8	2.6	3.2	5.6	11.7	20.6	24.2	15.5
Mountain	3.2	0.3	1.2	2.9	0.8	2.5	2.0	9.2	52.5
Pacific	7.7	11.7	8.6	3.6	7.0	4.2	4.9	7.1	6.9
United States	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Rural-Nonfarm Population									
New England	5.6	11.0	6.7	7.6	4.2	4.1	4.0	4.9	10.2
Middle Atlantic	17.3	28.8	34.8	31.4	29.5	16.3	4.8	0.9	-
East North Central	16.4	16.6	25.5	21.3	28.1	18.7	7.4	6.0	1.2
West North Central	11.2	10.5	6.3	4.5	6.4	10.7	17.2	12.6	25.8
South Atlantic	18.9	21.3	9.5	13.4	10.4	19.4	28.8	30.2	1.1
East South Central	8.4	4.7	3.3	5.7	7.2	11.8	11.9	9.4	-
West South Central	10.5	2.2	6.2	5.0	6.5	11.9	14.8	19.2	7.8
Mountain	5.2	0.9	1.8	2.6	0.6	1.9	3.3	8.7	47.1
Pacific	6.4	2.0	5.8	8.4	7.2	5.2	7.7	8.2	6.8
United States	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Rural-Farm Population									
New England	1.7	5.6	1.6	2.8	1.4	0.8	1.4	2.1	4.8
Middle Atlantic	5.6	8.4	17.6	13.6	10.8	6.0	1.5	0.5	-
East North Central	15.0	35.7	26.8	26.1	28.7	16.6	6.5	5.0	0.9
West North Central	15.6	7.4	10.6	9.0	10.6	14.4	18.1	17.2	39.1
South Atlantic	20.3	17.1	15.5	15.4	15.3	19.4	30.6	21.8	0.5
East South Central	17.5	16.8	8.3	18.2	15.4	21.2	20.9	16.5	-
West South Central	15.8	4.5	15.0	6.9	12.5	17.5	16.3	26.8	13.2
Mountain	3.7	0.8	2.0	2.5	0.9	1.1	1.4	5.5	37.0
Pacific	3.8	3.6	2.6	5.5	4.5	3.0	3.3	4.6	4.5
United States	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

a) Includes land area and population of counties containing the central cities but excludes the land area and population of central cities.

Sources: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 20 and 27; Areas of the United States, 1940, Tables 2, 3, and 4.

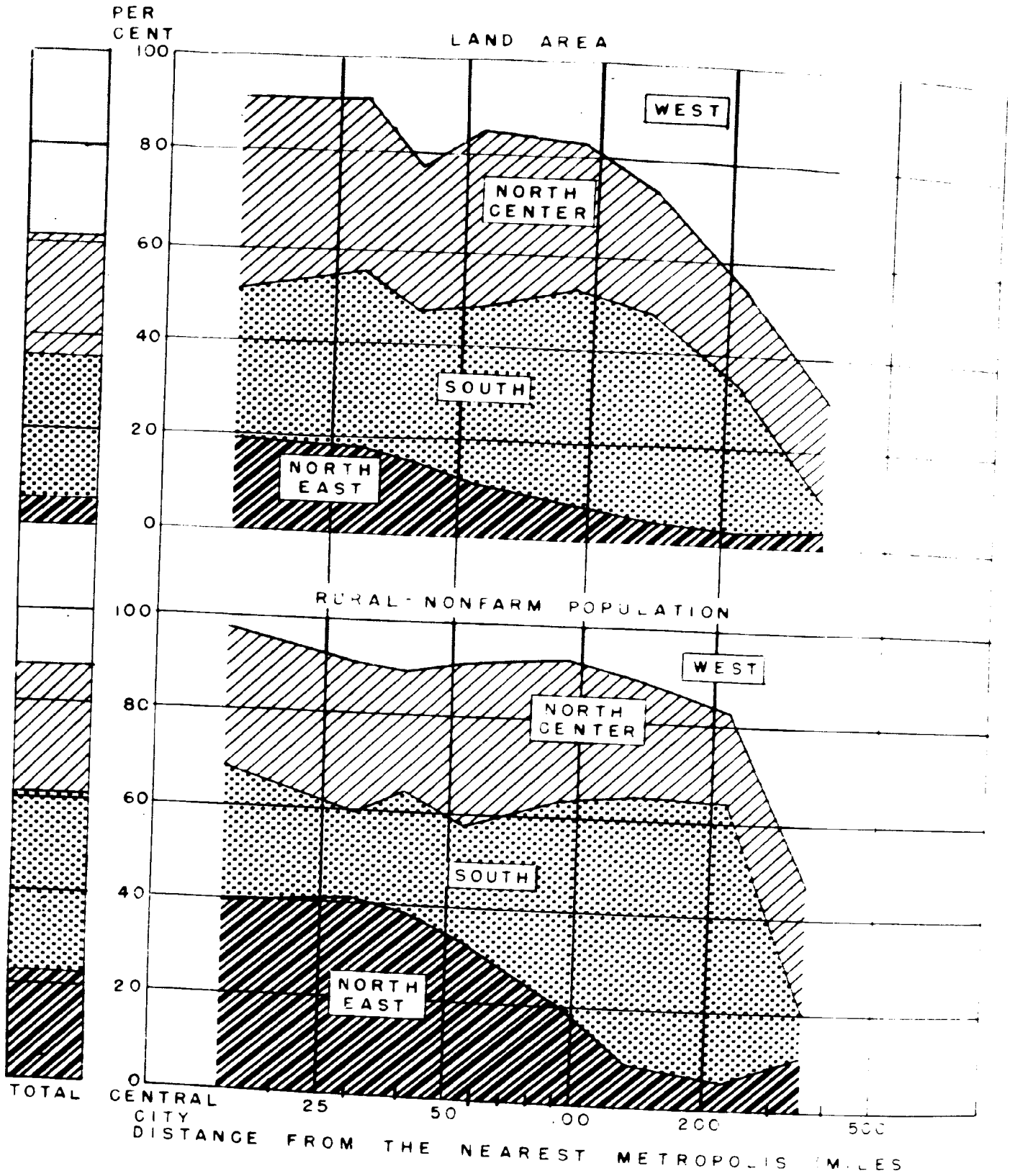
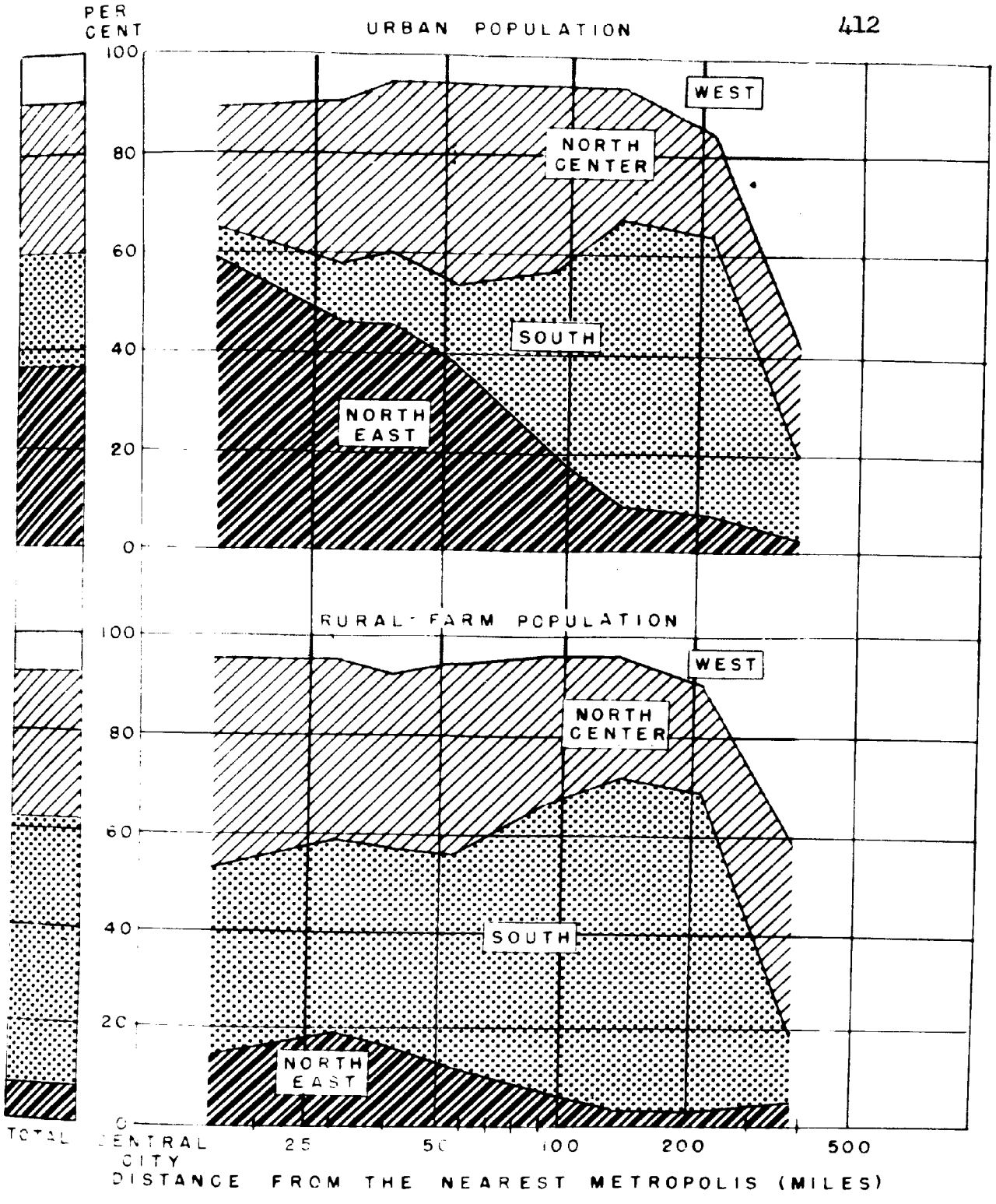


CHART 9-1 REGIONAL COMPOSITION OF THE LAND DISTANCE FROM THE NEAREST METROPOLIS



AREA AND POPULATION OF THE HINTERLAND, BY
UNITED STATES, 1940

b. With increasing distance, the proportion of the land area which each of the following geographic divisions is of the land area in the zone increases:
West North Central states
Mountain states
Pacific states

c. With increasing distance there is considerable fluctuation among the proportions which the following geographic divisions are of each zone:
West North Central states
South Atlantic States
East South Central states

Thus, a higher than average proportion of the industrial East is contained in the short distance zones and a higher than average proportion of the Central and Mountain states is contained in the more distant zones. Almost two-thirds of the land area 265 or more miles from the metropolis, for example, is contributed by the Mountain states. Chart 9-1 illustrates the change in regional composition of each zone, using four broad regions.

3. The regional compositions of the urban, the rural-nonfarm, and the rural-farm populations also vary greatly with distance from the metropolis. In general, the Northeast is predominant in the shorter zones and the Mountain and West Central divisions constitute an unduly large share of the more distant zones. Since it is a matter of common knowledge that the Northeast is more densely inhabited than the Western and Central states, and that the latter contain less varied resources, at least some of the metropolitan pattern may be attributable to changes in regional composition with increasing distance from the metropolis.

B. Habitation Ratios for Geographic Divisions, by Distance from the Nearest Metropolis (Table 9-3, Chart 9-2)

The proportion of the distance pattern of land occupancy which may be attributed to regional differences can be visualized by computing habitation ratios for each distance zone, by geographic divisions. Such computations are reported in Table 9-3 and illustrated, for four broad regional groupings, in Chart 9-2. In studying these tabulations it must be remembered that the marked differences which have been found to exist between sector types, size of metropolis, and size of local community are not held constant here, but appear as a part of the regional variations. To the extent that regions differ in their sector type, size composition of their metropolitan centers, and size composition of their hinterland cities, the regional differences shown represent both regional and metropolitan differences. Thus, the high values for the Middle Atlantic States may be due largely to the great size of metropolitan centers located there, rather than to differences in natural resources or other elements of the physical environment.

1. For every geographic division there are at least some evidences of a declining habitation ratio with increasing distance from the metropolis. The urban population in particular exhibits this pattern, but it is unmistakably present for all populations.

2. The geographic divisions which show the smallest change per unit of distance, and also exhibit the most variation, are primarily

Table 9-3

Urban and rural population per square mile of hinterland, by geographic division and distance from the nearest metropolis. United States, 1940.

Geographic Division	All distances	DISTANCE FROM THE NEAREST METROPOLIS (miles)							
		Less than 25[a]	25 - 34	35 - 44	45 - 64	65 - 114	115 - 164	165 - [illegible]	265 and over
		Urban population per total square mile							
New England	82.2	609.3	364.6	235.3	125.9	45.1	19.6	11.2	1.0
Middle Atlantic	100.8	1335.1	84.5	40.0	80.6	37.9	12.3	10.9	-
East North Central	36.4	168.0	63.8	43.7	35.3	26.9	11.5	7.7	10.2
West North Central	7.2	216.3	8.7	10.6	15.8	11.6	7.[illegible]	3.[illegible]	[illegible]
South Atlantic	16.1	84.3	26.6	17.0	10.7	15.8	13.5	16.[illegible]	[illegible]
East South Central	10.6	38.6	11.7	9.5	9.6	11.2	10.[illegible]	[illegible]	-
West South Central	7.5	64.5	6.9	8.5	11.4	9.4	8.7	[illegible]	[illegible]
Mountain	1.5	47.0	9.3	6.0	4.0	4.3	1.1	1.1	1.2
Pacific	10.1	616.2	124.9	9.3	17.9	6.8	3.0	2.0	1.3
United States	13.9	310.6	47.5	27.7	26.5	14.8	8.0	5.8	1.4
		Rural-nonfarm population per rural square mile							
New England	23.4	85.6	97.7	51.6	38.2	42.7	17.9	11.9	6.9
Middle Atlantic	44.6	207.2	55.4	54.7	56.7	30.2	14.[illegible]	11.1	-
East North Central	16.8	29.0	27.7	21.3	20.1	16.3	9.2	6.9	3.2
West North Central	5.4	67.0	11.9	3.6	8.7	7.4	7.2	3.7	2.0
South Atlantic	17.4	71.6	19.5	21.6	13.7	15.6	14.3	19.1	10.4
East South Central	11.4	17.3	14.1	11.8	12.0	12.2	10.0	10.0	-
West South Central	6.0	29.1	8.6	9.2	8.5	7.5	6.0	4.6	2.5
Mountain	1.5	24.7	7.1	3.7	2.0	2.5	1.7	1.2	1.2
Pacific	5.0	19.8	40.6	15.1	12.0	6.6	4.6	2.8	1.4
United States	8.3	54.2	25.2	19.4	17.3	11.7	7.7	4.7	1.7
		Rural-farm population per rural square mile							
New England	8.8	21.0	19.3	16.3	13.6	10.7	10.7	7.5	3.6
Middle Atlantic	17.5	29.0	22.8	20.3	22.4	14.8	8.2	10.0	-
East North Central	18.6	26.8	23.6	22.3	22.1	19.3	14.5	8.5	2.6
West North Central	9.1	22.7	16.2	14.6	15.4	13.3	13.5	7.4	3.5
South Atlantic	22.8	27.7	25.8	21.2	21.9	20.7	27.0	20.2	5.6
East South Central	29.1	30.0	26.4	32.0	27.8	29.4	31.1	25.8	-
West South Central	11.6	26.3	16.8	10.8	17.6	14.6	11.8	9.5	4.7
Mountain	1.3	10.4	6.6	3.1	3.2	2.0	1.3	1.2	1.1
Pacific	3.6	17.4	17.1	8.4	8.1	5.1	3.5	2.3	1.1
United States	10.1	26.0	20.5	16.6	18.7	15.6	13.7	6.9	1.9

a) Includes land area and population of counties containing central cities, but excludes the land area and population of central cities.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 26 and 27; Areas of the United States, 1940, tables 2, 3, and 4.

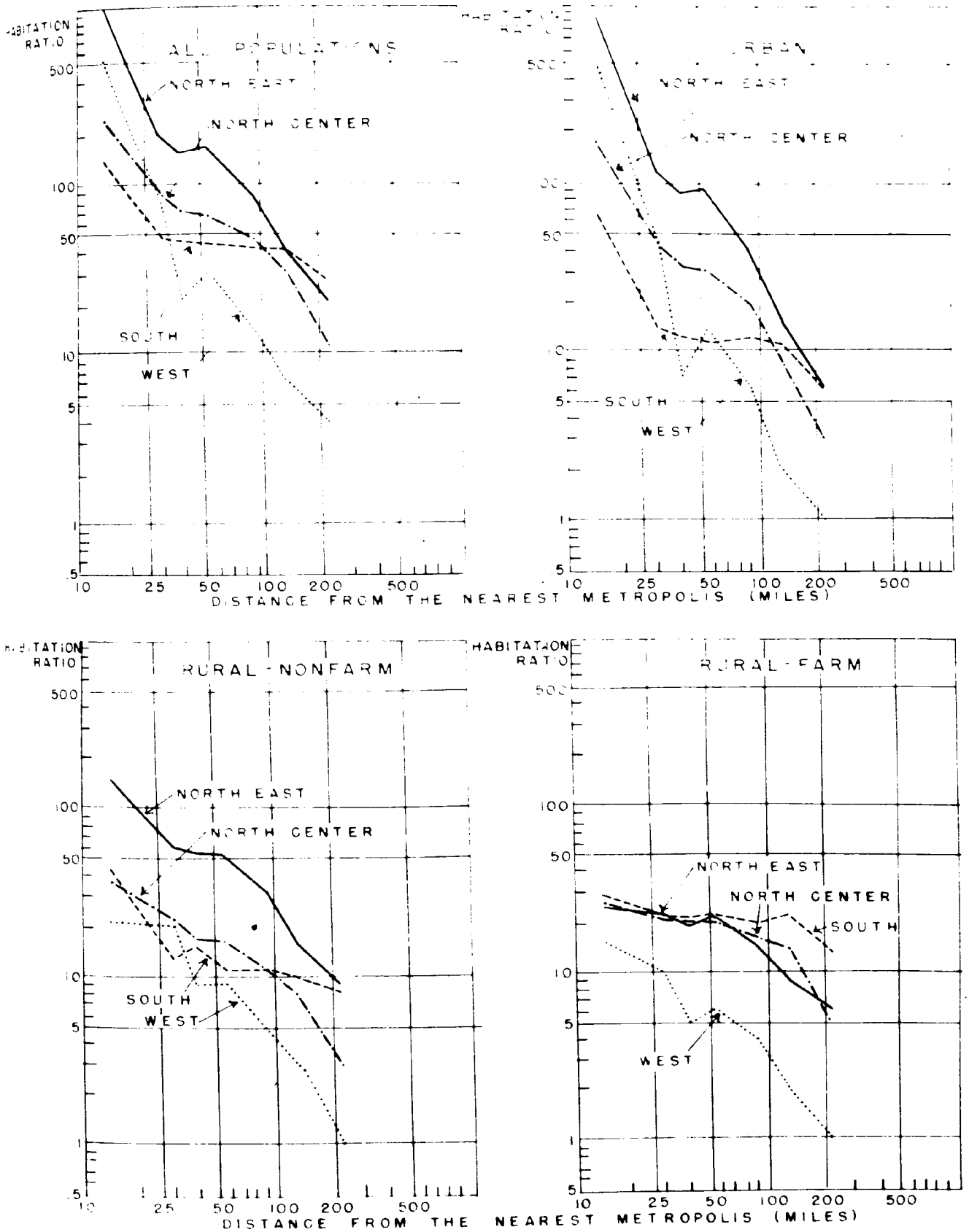


CHART 9-2 HABITATION RATIOS: POPULATION PER SQUARE MILE OF HINTERLAND, BY GEOGRAPHIC REGION AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1940

southern areas which have only recently begun to experience the rise of metropolitan centers. It may well be that a process of population redistribution to a more metropolitan pattern is now under way in these areas as they pass from a rural-agricultural type of organization to a more commercial-industrial form. In a study such as this, which is concerned only with structure at a particular instant of time, the presence of such a change over time cannot be determined.

3. Except for the extreme values at the innermost and outermost zones, each geographic division seems to have a general rank of habitation intensity which, relative to the other divisions, it maintains throughout a greater portion of the distance distribution. Although there is a pattern of distribution within each division, each division appears to have its own level of land occupancy.

4. Within any one geographic division the range of differences with distance is greater, on the whole, than the level of differences between geographic divisions. The differentiation of land area according to its metropolitan position appears to be more pronounced than the differentiation of areas into geographic divisions. Thus, even though there may be major differences in land resourdes between geographic regions, within each region there are even greater differences which are associated with metropolitan organization. Had the size of the central cities been held constant the differences between regions would have tended to become even smaller. Such a procedure would transfer the concentration effects of huge centers of 500,000 or more inhabitants from the category of regional differences to

that of metropolitan pattern, and would undoubtedly make the above generalization even more apparent. It can be stated almost categorically that regardless of region, all areas which are 265 miles or more distant from a metropolis are very sparsely settled, and that as this distance is decreased the intensity of land occupancy tends to rise. The major exceptions occur among the rural farm population in southern regions, where metropolitan growth is of recent origin.

IV

Geographic Regions and Subdominance(Tables 9-4, 9-5, 9-6)

Just as it has been demonstrated that population within each geographic division and region tends to be distributed by the metropolitan pattern, so it may be shown that the metropolitan pattern of city distribution tends to be present in each of the geographic division. In other words, the subdominance of the local city in each geographic division is influenced by metropolitan location. Table 9-4 presents, for each geographic division, the habitation ratios for each size group of hinterland cities by distance from the nearest metropolis. Table 9-5 and 9-6 present the same information for the rural-nonfarm and the rural-farm popultions, respectively, by size of largest city contained. Two of the metropolitan variables, size class of the central city and type of sector, are not held constant. The effects which they have upon the distribution of population are allowed to appear as regional differences.

Table 9.4

Habitation ratios: Urban population per square mile of land area, by geographic division, size of hinterland city and distance from the nearest metropolis. United States, 1940.

Geographic Division	DISTANCE FROM THE NEAREST METROPOLIS (miles)							
	0-24 [a]	25 - 34	35 - 44	45 - 64	65 - 114	115 - 164	165 - 204	205 - over
	Cities of 2500 - 4999 inhabitants							
New England	1	6	6	4	1	1	2	0
Middle Atlantic	76	11	9	9	8	3	2	-
East North Central	16	6	5	4	3	2	1	2
West North Central	18	3	2	2	2	2	1	0
South Atlantic [b]	8	4	6	2	2	2	2	-
East South Central	3	4	3	3	2	2	1	-
West South Central	14	1	3	2	2	2	1	1
Mountain	21	2	1	1	1	0	0	0
Pacific	25	11	5	1	1	1	0	0
	Cities of 5000 - 9999 inhabitants							
New England	36	47	14	6	8	4	4	1
Middle Atlantic	150	15	11	9	8	5	3	-
East North Central	28	7	6	6	5	2	2	1
West North Central	17	2	2	3	2	2	1	0
South Atlantic [b]	13	2	3	2	2	2	2	-
East South Central	9	5	1	3	2	2	1	-
West South Central	13	3	3	3	2	2	1	1
Mountain	25	3	1	1	0	0	0	0
Pacific	73	9	2	3	2	0	1	0
	Cities of 10,000 - 24,999 inhabitants							
New England	136	49	35	48	21	6	4	-
Middle Atlantic	334	29	16	18	9	4	6	-
East North Central	38	14	7	7	6	3	3	7
West North Central	40	4	4	4	3	3	0	1
South Atlantic [b]	23	4	8	3	4	3	2	9
East South Central	11	3	3	1	3	3	2	-
West South Central	37	3	3	3	2	2	1	1
Mountain	-	5	1	1	1	0	0	0
Pacific	100	37	2	2	2	2	0	1
	Cities of 25,000 - 49,999 inhabitants							
New England	198	32	73	18	4	8	2	-
Middle Atlantic	159	20	3	12	6	-	-	-
East North Central	36	6	25	10	5	4	1	-
West North Central	22	-	3	1	1	1	1	-
South Atlantic [b]	14	4	-	1	4	2	1	-
East South Central	5	-	3	3	2	2	-	-
West South Central	-	-	-	1	1	2	0	2
Mountain	-	-	3	-	1	-	-	0
Pacific	105	25	-	5	2	0	-	-
	Cities of 50,000 - over inhabitants							
New England	237	221	108	49	11	-	-	-
Middle Atlantic	585	10	-	32	7	-	-	-
East North Central	50	31	-	8	8	-	-	-
West North Central	120	-	-	6	3	-	1	-
South Atlantic [b]	26	12	-	2	4	4	5	-
East South Central	11	-	-	-	1	2	2	-
West South Central	-	-	-	2	2	2	1	-
Mountain	-	-	-	-	1	-	-	0
Pacific	513	43	-	6	-	-	1	-

a) Includes land area and population of counties containing the central cities, but excludes the land area and population of central cities.

b) Independent cities of Virginia were classified as lying in no county.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, state tables 5 and 7; Population, Vol.II, State tables 2 and 7; Areas of the United States, 1940, tables 2, 3, and 4.

Table 9-5

Habitation ratios: Rural-nonfarm population per square mile of rural area, by geographic division, size of largest city contained, and distance from the nearest metropolis. United States, 1940.

Geographic Division	DISTANCE FROM THE NEAREST METROPOLIS (miles)							
	0 - 24[a]	25 - 34	35 - 44	45 - 64	65 - 114	115 -164	165 - 264	265 - over
	Largest place less than 2500 inhabitants							
New England	-	-	-	47	-	13	9	4
Middle Atlantic	-	23	10	56	8	22	-	-
East North Central	34	18	15	15	11	9	6	-
West North Central	19	22	12	11	8	7	4	2
South Atlantic[b]	22	15	10	11	10	11	11	9
East South Central	13	24	8	11	9	9	10	-
West South Central	-	12	9	6	6	4	4	2
Mountain	-	4	4	1	2	2	1	1
Pacific	-	-	13	4	3	3	2	1
	Largest city 2500 - 4999 inhabitants							
New England	-	-	-	-	-	-	10	8
Middle Atlantic	-	29	16	43	18	11	-	-
East North Central	18	21	12	13	12	7	7	4
West North Central	25	7	6	8	6	7	3	2
South Atlantic[b]	45	25	20	14	12	11	15	-
East South Central	14	14	16	8	10	7	10	-
West South Central	10	8	8	6	5	6	3	2
Mountain	25	9	2	1	2	2	1	1
Pacific	11	25	4	7	4	3	2	0
	Largest city 5000 - 9999 inhabitants							
New England	27	-	-	16	26	16	14	8
Middle Atlantic	104	31	45	57	23	17	7	-
East North Central	19	18	13	15	14	8	9	2
West North Central	7	11	12	8	7	7	3	2
South Atlantic[b]	94	8	35	13	18	12	33	-
East South Central	21	8	18	19	17	13	10	-
West South Central	-	6	-	8	7	7	7	3
Mountain	-	-	2	-	5	2	1	1
Pacific	-	53	16	9	6	-	4	2
	Largest city 10,000 - 24,999 inhabitants							
New England	19	50	-	26	27	18	13	-
Middle Atlantic	829	46	64	53	35	15	17	-
East North Central	33	34	17	21	19	13	6	3
West North Central	-	13	8	7	8	8	5	2
South Atlantic[b]	128	25	29	18	21	21	31	11
East South Central	9	20	11	26	19	8	9	-
West South Central	42	8	9	14	11	10	8	-
Mountain	-	7	5	5	3	1	2	2
Pacific	28	67	54	15	13	5	1	4
	Largest city 25,000 - 49,999 inhabitants							
New England	80	-	46	-	22	24	11	-
Middle Atlantic	227	87	31	43	34	-	-	-
East North Central	40	12	39	28	25	19	9	-
West North Central	296	10	-	8	11	13	5	-
South Atlantic[b]	-	-	-	13	54	41	50	-
East South Central	52	-	12	15	34	15	-	-
West South Central	-	-	-	17	25	8	10	10
Mountain	-	-	9	-	6	-	-	6
Pacific	-	51	15	-	10	6	2	-
	Largest city 50,000 - over inhabitants							
New England	129	174	86	53	217	31	-	-
Middle Atlantic	131	115	108	73	82	-	-	-
East North Central	61	80	48	71	38	-	-	-
West North Central	125	-	-	13	17	10	17	-
South Atlantic[b]	75	-	100	98	53	43	52	-
East South Central	101	-	-	-	15	37	14	-
West South Central	-	-	26	-	20	25	15	0
Mountain	-	-	-	-	4	-	-	7
Pacific	-	-	46	27	-	-	8	-

a) Includes land area and population of counties containing the central cities, but excludes the land area and population of central cities.

b) Independent cities of Virginia were classified as lying in no county.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 25 and 27; Areas of the United States, 1940, tables 2, 3, and 4.

Table 9-6

Habitation ratios: Rural-farm population per square mile of rural area, by geographic division, size of largest city contained, and distance from the nearest metropolis. United States, 1940.

Geographic Division	DISTANCE FROM THE NEAREST METROPOLIS (miles)							
	0 - 24[a]	25 - 34	35 - 44	45 - 64	65 - 114	115 - 164	165 - 204	205 - over
Largest place less than 2500 inhabitants								
New England	-	-	-	7	-	10	5	1
Middle Atlantic	-	19	4	6	6	18	-	-
East North Central	28	20	20	20	17	11	6	-
West North Central	20	25	19	15	11	12	6	3
South Atlantic[b]	24	21	18	21	18	23	17	11
East South Central	27	19	34	25	27	28	22	-
West South Central	-	9	8	11	11	7	7	3
Mountain	-	2	2	2	2	1	1	1
Pacific	-	-	2	2	3	1	1	1
Largest city 2500 - 4999 inhabitants								
New England	-	-	-	-	-	-	14	4
Middle Atlantic	-	18	18	26	13	8	-	-
East North Central	25	24	24	20	18	14	9	2
West North Central	18	16	13	17	12	14	8	3
South Atlantic[b]	18	36	23	32	19	25	23	-
East South Central	35	30	28	30	31	37	31	-
West South Central	53	21	9	19	14	13	9	5
Mountain	10	10	1	1	1	1	1	1
Pacific	9	25	4	7	4	2	2	1
Largest city 5000 - 9999 inhabitants								
New England	24	-	-	6	10	8	10	5
Middle Atlantic	34	15	24	18	17	7	8	-
East North Central	26	26	25	21	20	15	9	2
West North Central	17	14	17	15	16	15	8	4
South Atlantic[b]	35	43	17	23	27	29	22	-
East South Central	31	31	35	33	30	32	30	-
West South Central	-	21	-	15	15	15	18	8
Mountain	-	-	2	-	4	2	1	1
Pacific	-	6	11	4	5	-	5	2
Largest city 10,000 - 24,999 inhabitants								
New England	22	16	-	16	9	12	7	-
Middle Atlantic	15	24	23	17	15	9	14	-
East North Central	30	25	18	23	20	17	8	4
West North Central	-	17	13	15	15	16	14	4
South Atlantic[b]	38	20	32	19	16	35	29	1
East South Central	23	31	31	31	35	36	26	-
West South Central	12	17	20	23	22	23	11	-
Mountain	-	7	4	7	4	2	2	3
Pacific	26	21	15	9	12	5	1	2
Largest city 25,000 - 49,999 inhabitants								
New England	17	-	14	-	10	17	5	-
Middle Atlantic	42	26	21	24	17	-	-	-
East North Central	24	16	22	24	22	28	21	-
West North Central	36	17	-	12	19	21	9	-
South Atlantic[b]	-	-	-	8	31	40	11	-
East South Central	42	-	36	25	37	25	-	-
West South Central	-	-	-	25	21	6	10	16
Mountain	-	-	15	-	2	-	-	2
Pacific	-	23	11	-	5	5	1	-
Largest city 50,000 - over inhabitants								
New England	22	24	29	15	22	15	-	-
Middle Atlantic	28	16	18	38	22	-	-	-
East North Central	23	29	22	34	24	-	-	-
West North Central	45	-	-	17	19	16	27	-
South Atlantic[b]	15	-	23	26	32	32	23	-
East South Central	39	-	-	-	32	9	38	-
West South Central	-	-	9	-	17	23	17	3
Mountain	-	-	-	-	3	-	-	4
Pacific	-	-	17	19	-	-	10	-

a/ Includes land area and population of counties containing the central cities, but excludes the land area and population of central cities.

b/ Independent cities of Virginia were classified as lying in no county.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Population, Vol.II, State tables 25 and 27; Areas of the United States, 1940, tables 2, 3, and 4.

1. In each geographic division the level of land occupancy tends to decline with distance from the metropolis, even with size of city or size of largest city contained held constant. The major deviations occur in the South, and for the larger rather than the smaller sizes of cities. In all geographic divisions the areas which are most remote from the metropolis have very low habitation ratios or else a complete absence of cities of a given size.

2. For both of the rural populations, as the size of the largest city contained increases, the level of land occupancy also increases. The phenomenon of subdominance is present in each geographic division, and, together with metropolitan dominance, gives to each region a metropolitan structure.

3. Even though the patterns of dominance and subdominance are present, nevertheless there are characteristic differences between regions in these patterns. The South particularly exhibits such divergent patterns as higher concentrations of rural-farm and rural-nonfarm populations in remote areas than in near areas, high rural-farm habitation ratios at all distances, and a relative scarcity of urban centers of the larger sizes. In the Northeast, the North Center, and the West it appears that the ability of a hinterland city to aggregate rural populations in its immediate vicinity is conditioned by its metropolitan position. In the South, however, the hinterland city shows much more independence in its ability to aggregate population. Even though the cities are distributed with

a decreasing frequency with distance from the metropolitan center, within that distribution the level of aggregation of rural populations tends to be independent of distance from the metropolis. It cannot be argued that this difference between the South and other regions results from the fact that size of metropolis is uncontrolled. Only the large metropolitan communities have average rural habitation ratios at the greater distances. Since metropolitan communities in the South are, in general, in the class C and D groupings, these high habitation ratios for rural populations are attained in spite of, not because of, the size of the metropolis. Southern metropolitan centers appear, on all counts, to modify the activities of their hinterland cities to a much smaller degree than in the remainder of the United States.

V

Summary

1. Since only a very small proportion of the labor force of the United States is actively engaged in extractive industries, the metropolitan patterns of population distribution which have been found in the preceding chapters are not directly a result of the pattern of resource distribution.

2. Yet it can be demonstrated that some areas with rich resources contain a higher proportion of population, both rural and urban, than equal areas with poor resources. The distribution of the urban and rural populations, for example, is unmistakably related to the suitability of the land for agriculture. This relationship, even though it is expressive of human organization rather than of resource patterns

directly, does imply that to some undetermined extent the structure of the metropolitan community is conditioned by the distribution of natural resources.

3. Because the great bulk of natural resources are subject to some human manipulation through the allocation of replacements for sustaining them, and because there is a choice of which resources to exploit, the element of human organization can modify the resource pattern. Thus, urban factors appear to influence the distribution of the rural-farm population as well as does the quality of land for agricultural purposes.

4. Therefore, there appears to be a direct urban influence upon population distribution even though that distribution is an adjustment to make use of natural resources.

5. The metropolitan patterns of this study cannot be interpreted as being the product solely of metropolitan location, nor of resource location. Metropolitan dominance is not a pattern arbitrarily imposed by great cities, nor is it a pattern imposed by the physical environment. Rather it appears to be a working arrangement and organization of population over the land to make use of the environment. The metropolitan structure of population in the United States can be most simply and consistently characterized as a pattern of human adaptation to the physical environment using modern commercial and industrial techniques.

6. That this form of adaptation is well-nigh universal in the United States, and is employed to adapt to a wide variety of environmental conditions is demonstrated by tabulations revealing that the patterns of dominance and of subdominance are present in each of the major geographic regions of the United States. In general, the various metropolitan accessibility areas within each region differ among themselves more than the regions differ with each other. The regions differ in the degree to which their populations are distributed by the metropolitan pattern. Whether or not these differences are due to the present stage of metropolitan development within some regions, and to the fact that some regions have only recently begun the process of redistributing their populations to a metropolitan pattern, cannot be determined within the framework of this study.

PART III

THE STRUCTURE OF SUSTENANCE ACTIVITIES IN THE METROPOLITAN COMMUNITY

Introduction[1]

After having observed the tendency for the intensity of land settlement to vary with the variables which indicate position with respect to the metropolis and to hinterland cities, it is pertinent to ask:

> Is this metropolis-centered pattern related to the activities by which the individual local communities sustain themselves?

It has been demonstrated in Chapter Nine that the population is not fixed in space by the physical environment, yet there has been no planned or supervised settlement of land in the United States to account for the average patterns which have been found. Although the average pattern which has emerged is a fortuitous one, in terms of intent, it is certainly not a random one. Just as it was impossible to account for the pattern of population distribution

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1 In this section of the study considerable reliance is placed upon the use of data for wholesale trade and manufacture. I am greatly indebted to the United States Bureau of the Census for providing tabulations of the total number of wage earners and the dollar value of these activities for groups of counties and cities for which it had been necessary for the Census to withhold the information in published reports. These group totals were provided for units combined in accordance with the variables of the study. Sufficient numbers of places were combined to avoid violating the rules concerning disclosure.

in the region without referring to human organization, so it seems to be necessary to employ that same concept here, and to explore it, in order to understand why people are distributed as they are. From other studies of communal organization it has been found that some of the most powerful forces which make for structure within the individual community are those which are related to gaining a livelihood, or the activities which sustain the population and consequently the community. It is for this reason that attention is now turned to sustenance activities in an attempt to find why this apparent metropolitan dominance exists and how it operates.

Within each local community the individual inhabitant must find sustenance or perish. The total activities which the individuals of each community perform in their efforts to gain sustenance for themselves tend to take on a collective aspect. Individuals do not seek a livelihood without regard to their fellows, but by participating in an established system of production and exchange. This system antedates each person, and presumably will live long after he has ceased to participate. In any community the total sustenance activities (the composite of the established system) must be such that either the community is completely self-sufficient or else such that goods and services which cannot be provided locally will be caused to flow into the community from outside areas. The latter alternative, which is the only course which the great majority of communities can follow in the modern commercial-industrial society, can be accomplished only by locally producing surpluses of some commodities for exchange for those items which cannot be

obtained locally. Thus, there must be an intercommunity division of labor and intercommunity exchange. Radios, wearing apparel, or mechanical farming equipment cannot flow into an agricultural community which has no surplus agricultural products for exchange. Surplus farm products cannot flow into nonagricultural channels which cannot return to the farm community, directly or indirectly, some surplus nonagricultural product. Such exchanges are not made directly, or by barter, but through the market. The market relates intercommunity needs to each other. Because of this fact the producers and consumers of each good or service may orient themselves to the market rather than to the direct consumer.

It is well known that great cities are the principal market centers of the nation. While the marketing system is a complex mechanism composed of many scattered units, most marketing activities are regulated by key units located in metropolitan centers. Also it is well known that the great industrial system of the nation is metropolis oriented. This tendency may arise partially to be near markets, to enjoy greater access to a variety of raw materials assembled there, to employ a varied labor force, or to benefit from the productive efforts of other industries.

The hypothesis of this section of the study is that the population patterns are accompanied by definite sustenance patterns, that in each portion of the hinterland populations have adapted themselves to the metropolitan market and to metropolitan industries, even while adapting to their own local environment, and have thereby established a pattern of sustenance activities which is related to,

and helps to explain, the total population pattern. The subject matter therefore is community specialization and apparent territorial division of labor.

Just as the pattern of population distribution could be studied only by eliminating differences in land area, so community specialization can be studied only by eliminating differences in population. A community which is highly specialized in one activity is one which performs a large amount of that activity per unit of population. By expressing the sustenance activities as a ratio of the population, it is possible to compare the specialization of all parts of the hinterland with each other regardless of their size.

As was stated in Chapter Two, four broad categories of sustenance activity have been taken for study. They are retail trade, services, wholesale trade, and manufactures, as defined by the United States Bureau of the Census. Each is measured by three indexes: "number of establishments per 1,000 inhabitants", "number of wage earners per 1,000 inhabitants", and "dollar value per inhabitant". Each of these three indexes has a slightly different meaning, and no attempt is made to combine them into one index.[2]

The chapters of this section are arranged as follows: Chapter Ten briefly describes the general pattern of concentration of all four activities. This chapter corresponds to the descriptive section (Section II) in each chapter of Part II. It describes the

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2 See Chapter Eleven, Section II. There the meaning of each index is fully explained, using retail trade as an example.

general distribution of all four sustenance activities together in order that the reader may get a broad and unified picture of the distribution of these activities in the hinterland. Chapters Eleven, Twelve, Thirteen, and Fourteen each take up one of the sustenance activities and analyzes it in terms of specialization and exchange. In these chapters all data are expressed in terms of amounts per unit of population. The pattern of specialization in each activity is outlined, and its general relation to the population pattern is indicated.

The reader is asked to return to Chapter Three after completing this section. In that chapter the findings of Parts II and III are brought together in summary form and woven into a discussion of dominance, of subdominance, and of the place of the metropolis in population distribution and in the social and economic life of the nation.

PART III

THE STRUCTURE OF SUSTENANCE ACTIVITIES IN METROPOLITAN COMMUNITIES

CHAPTER TEN

A DESCRIPTION OF HOW FOUR OF THE MAJOR SUSTENANCE ACTIVITIES ARE DISTRIBUTED IN THE METROPOLITAN COMMUNITY

I

How Are the Sustenance Activities Distributed by Size Class of Metropolitan Community? (Table 10-1)

With a few exceptions, the four size classes of metropolitan communities contain proportions of retail trade, services, wholesale trade, and manufactures which are roughly proportional to their populations. This means that although there are undoubtedly a great many interdependencies between the various size classes of metropolitan communities, there is no great deficit of any one type of activity. Compare the percentages of the population resident in each class with the percentage of each activity performed in that class. The largest differences are in manufactures and wholesale trade; the smallest differences are in retail trade and services. But in no class of metropolitan community is there a great lack of one activity which would require an almost complete dependence upon other sizes of metropolitan communities for these activities. As will be discussed later, a portion of these differences between size classes of metropolitan communities result from differences in urban-rural composition. Farming constitutes a much larger proportion of the total sustenance activities of the smaller metropolitan communities, yet farm populations are known to consume a smaller amount of goods and services which are retailed, wholesaled, or obtained from service establishments than do nonfarm

Table 10-1

Distribution of land area, population, and selected sustenance activities, by size class of metropolitan community. United States, 1939-40.

Size class of metropolitan community[a]	NUMBER							PERCENT					
	Land Area (thousand square miles)	Population	Sustenance activities: Retail trade	Services	Wholesale trade	Manufacture	Land area	Population	Sustenance activities: Retail trade	Services	Wholesale trade	Manufacture
			Number of establishments (thousands)						Number of establishments			
Class A	124	29,456	444	190	56	65	4.2	22.4	25.1	29.4	27.9	35.3
Class B	202	24,171	330	122	34	38	6.8	18.4	18.6	18.9	16.9	20.7
Class C	992	35,314	433	150	50	38	33.3	26.8	24.5	23.2	24.9	20.7
Class D	1,658	47,727	563	184	61	43	55.7	32.5	31.8	28.4	30.3	23.4
All classes	2,976	131,668	1,770	646	201	184	100.0	100.0	100.0	100.0	100.0	100.0
			Number of wage earners (thousands)						Number of wage earners			
Class A	-	-	1,278	386	560	2,512	4.2	22.4	27.8	35.0	35.9	31.8
Class B	-	-	956	202	303	1,976	6.8	18.4	20.8	18.3	19.4	23.8
Class C	-	-	1,080	263	345	1,496	33.3	26.8	23.5	23.9	22.1	19.0
Class D	-	-	1,286	251	354	2,002	55.7	32.5	28.0	22.8	22.7	25.4
All classes	-	-	4,600	1,102	1,562	7,987	100.0	100.0	100.0	100.0	100.0	100.0
			Dollar value (millions of dollars)[b]						Dollar value			
Class A	-	-	12,011	1,393	24,083	8,864	4.2	22.4	28.6	39.6	43.6	35.9
Class B	-	-	8,697	664	10,401	5,981	6.8	18.4	20.7	19.4	18.8	24.2
Class C	-	-	9,543	682	11,216	4,335	33.3	26.8	22.7	19.9	20.3	17.6
Class D	-	-	11,791	722	9,566	5,503	55.7	32.5	28.0	21.1	17.3	22.3
All classes	-	-	42,042	3,420	55,266	24,683	100.0	100.0	100.0	100.0	100.0	100.0

a) Includes central cities and counties containing central cities.

b) Dollar value for manufacturing is "value added by manufacture". Dollar value of other activities is total sales or receipts.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.I, table 16; Service Establishments, 1939, table 2; Wholesale Trade, 1939, Vol.II, table 15; Manufactures, 1939, Vol.III, State table 2.

populations. Farm populations likewise produce very little manufactured goods and services. Table 10-1 indicates, therefore, that each size class of metropolitan community provides its own inhabitants with approximately the proportions of all retail and service activities which they require, although the class C and D metropolitan communities are dependent to some extent upon the class A and B metropolitan communities for wholesale and manufacturing activities. Stated in another way, each size class of metropolitan community appears to specialize in retail trade and service activities only intensively enough to satisfy the needs of its own populations, either directly or through retail and service exchange with other classes of metropolitan communities. Class A and B metropolitan communities specialize in wholesale trade and manufacturing activities to a degree which appears to be more than sufficient for their own populations. Undoubtedly the surplus of wholesaling and manufacturing activities of these metropolitan communities is exchanged with the class C and D metropolitan communities for a portion of the agricultural surpluses of the latter.

It should be noted that the greatest deficits of the class C and D metropolitan communities are in dollar value of sustenance activities and in wage earners employed, rather than in number of establishments. The class C and D metropolitan communities possess a proportion of the total establishments which is near their proportion of the total population. This indicates that the establishments in class C and D metropolitan communities are smaller, on the average, than similar establishments in class A and B metropolitan communities.

II

How Are the Sustenance Activities Distributed by Distance from the Nearest Metropolis? (Table 10-2)

All four of the sustenance activities tend to be heavily concentrated in the central cities. Whereas central cities contain only 25.7 percent of the population they contain:

37.9 percent of the retail sales
54.8 percent of the receipts from services
71.8 percent of the wholesale sales
39.0 percent of the value added by manufacture

The other indexes of the sustenance activities show similar concentrations in central cities.

That there is a definite concentration of sustenance activities at the inner distances can be verified by comparing their percentage distributions with those for land and with population, presented in Chapter Four. The total amount of difference between these distributions is indicated by the coefficients of dissimilarity reported in Table 10-2. It may be readily seen that the general nature of this distance pattern will consist of relative concentration in the inner distance zones, and relative deficit in the outer zones, both with respect to land area and to population. Thus, although the sustenance activities are patterned with respect to land in the same general manner as population, yet they are sufficiently different in their distribution to indicate definitely that differences in specialization with distance from the metropolis exist. The details of this distance specialization will be studied in the chapters which follow. It is evident that the most marked differences in specialization with distance will be found for wholesale trade and for manufacture, with smaller differences for retail trade and services.

Table 14-2

Percentage distributions of measures of retail trade, services, wholesale trade, and manufacturing activities for central cities and hinterland areas classified by distance from the nearest metropolis. United States, 1939

Distance zone (miles)	SUSTENANCE ACTIVITIES MEASURED IN TERMS OF DOLLAR VOLUME							
	DOLLAR VOLUME				WAGE EARNERS			
	Retail trade	Services	Wholesale trade	Manufacture	Retail trade	Services	Wholesale trade	Manufacture
Central city	37.9	54.8	71.8	39.0	41.5	54.7	62.0	33.6
0-14	9.4	8.4	4.2	14.7	8.8	7.6	5.4	13.1
15-24	4.9	3.9	2.0	7.3	4.4	3.3	2.1	7.0
25-34	5.2	3.7	1.9	6.7	4.9	3.2	2.5	7.2
35-44	4.3	2.9	1.6	5.4	4.0	2.7	2.1	5.7
45-64	9.3	6.5	3.9	9.6	8.8	6.4	5.6	11.4
65-114	13.5	9.3	6.4	10.0	13.2	9.8	8.7	12.4
115-164	6.9	4.9	4.0	4.0	6.8	6.1	5.7	5.5
165-264	5.8	3.8	3.0	2.6	5.4	4.6	4.2	3.5
265-464	2.4	1.5	1.1	0.8	2.1	1.5	1.4	0.7
465-over	0.3	0.2	0.2	0.1	0.3	0.1	0.2	-
All distances	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Coefficient of dissimilarity with land area	55.0	65.1	74.8	66.5	56.2	63.0	68.4	61.9
Coefficient of dissimilarity with population	12.3	24.2	46.1	22.1	14.7	29.0	36.4	17.0

Distance zone (miles)	NUMBER OF ESTABLISHMENTS			
	Retail	Services	Wholesale	Manufacture
Central city	28.2	39.8	44.8	44.6
0-14	9.3	6.7	4.5	8.7
15-24	5.1	4.4	2.5	4.4
25-34	5.7	4.9	3.4	4.5
35-44	4.8	4.0	3.1	4.3
45-64	10.7	9.3	7.8	9.7
65-114	16.4	14.1	13.8	12.0
115-164	9.5	8.1	8.6	6.7
165-264	7.5	6.2	7.2	4.8
265-464	2.6	2.2	3.4	1.5
465-over	0.4	0.3	0.8	0.2
All distances	100.0	100.0	100.0	100.0
Coefficient of dissimilarity with land area	47.6	53.0	50.3	58.8
Coefficient of dissimilarity with population	3.5	14.1	20.5	18.9

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.I, table 16; Service Establishments, 1939, table 2; Wholesale Trade, 1939, Vol.II, table 14; Manufactures, 1939, Vol.III, state table 2.

The percentages of Table 10-2 indicate that the central city produces a considerable surplus of all four of the goods and services which result from these sustenance activities and that at least some portion of the hinterland is deficient, or dependent, to some extent upon the metropolis for the satisfaction of some of its needs. The extent of this excess at the center and deficit in the hinterland is much greater, in every case, than that found for the excesses and deficits between the various size classes of metropolitan communities. Thus, there is evidence that within the metropolitan community there is extensive interdependency among the composite communities, and that there is a definite locational pattern to the areas of surplus and of deficit of each activity. However, it should be particularly noted that in no instance is any distance zone completely devoid of any one of the four sustenance activities. In other words, at no distance is an area completely dependent upon the metropolis for the performance of one type of function. On the other hand, no area appears to be completely self-sufficient in all activities at any distance, although this situation is very nearly approached, if not actually attained, by retail trade alone in the outer distance zones. The dependencies appear to be selective. Reliance upon the metropolis is greater for some types of sustenance activities than for others, and within each type it would appear that some items are provided locally while other commodities are obtained from the central city. (While data in support of this latter point have not been marshalled here, it is generally assumed that it is the most specialized types

of retailing, services, wholesaling, and manufacture which are located in or very near the metropolis. Those items for which there is a small per capita demand, for which many different components and many skills are required, or which must be brought from great distances are the ones which are presumed to be centered in the metropolis.[1])

Another significant fact which is indicated by Table 10-2 is that all of these activities have very high coefficients of dissimilarity of distribution with respect to land. Such indexes indicate most clearly that while these activities may be influenced in their distribution by resources and the elements of the physical environment, many other factors also enter into that distribution.

Again it should be noted that the number of establishments in each zone more nearly approaches the proportion of the population residing there than the number of wage earners or the dollar value of the activity. A larger proportion of the large, and presumably the most influential, units of each activity are located at the center and in the inner zones. A larger than proportional share of the smaller units are located in the more distant zones. It appears that those activities which are performed in large

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1 See R. D. McKenzie, The Metropolitan Community, pp. 73-74 and 323-324, for data in support of this hypothesis.

establishments seek a central to a peripheral location.[2]

III

How Are the Sustenance Activities Distributed Between the Types of Sectors? (Table 10-3)

The intermetropolitan and the subdominant sectors contain definite concentrations of all four sustenance activities. The local sectors have a deficit of all sustenance activities, both with respect to land area and to population. Thus, those sectors which contain an intermetropolitan thoroughfare or a major hinterland city tend to be more specialized in retail trade, services, wholesale trade, and manufacture than the local sectors. Since a surplus of these sustenance activities is provided by the high mobility sectors, it can only be inferred that the local sectors satisfy a considerable proportion of their needs through these other types of sectors. Not only does it appear that the hinterland as a whole is dependent upon the specialized metropolis, and that some zones of the hinterland are more dependent than other zones, but also that within each zone the local sectors are dependent upon the more specialized intermetropolitan and subdominant sectors. This dependence of the local sectors, while not as marked as that between the metropolis and its zones, is of such consistency that it indicates a functional integration of parts in the hinterland. It can arise from two sources: the greater accessibility to the

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2

In 1939 the Census of Manufactures did not obtain reports for establishments whose product was valued at less than $5,000. Other very small business units frequently cannot be identified. For these reasons the data of this study may underestimate the specialization of small communities and remote areas. The amount of this underestimation could not be of sufficient size to alter the conclusions.

Table 10-3

Percentage distributions of land area, population, and selected sustenance activities by type of sector. United States, 1939-40.

Type of sector[a]	Land area	Population	SUSTENANCE ACTIVITIES			
			Retail trade	Services	Wholesale trade	Manufacture
			Number of establishments			
Intermetropolitan	56.4	58.0	58.2	59.4	60.7	59.5
Subdominant	10.4	18.5	18.0	18.1	15.9	19.4
Local	33.2	23.5	23.8	22.4	23.4	21.1
All sectors	100.0	100.0	100.0	100.0	100.0	100.0
			Number of wage earners			
Intermetropolitan	56.4	58.0	61.2	61.9	64.2	59.5
Subdominant	10.4	18.5	19.5	21.3	18.9	23.4
Local	33.2	23.5	19.3	16.9	17.1	17.8
All sectors	100.0	100.0	100.0	100.0	100.0	100.0
			Dollar value[b]			
Intermetropolitan	56.4	58.0	60.1	63.6	65.2	60.1
Subdominant	10.4	18.5	18.7	18.9	18.8	24.4
Local	33.2	23.5	20.7	17.6	16.0	15.5
All sectors	100.0	100.0	100.0	100.0	100.0	100.0

a) Data for central cities and counties containing central cities have been excluded.

b) Dollar value for manufacturing is "value added by manufacture". Dollar value for other activities is total sales or receipts.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.I, table 1c; Service establishments, 1939, table 2; Wholesale trade, 1939, table 1b; Manufactures, 1939, Vol.III, State table 2.

metropolitan center provided by major highways may make it easier for a given establishment to serve the hinterland while integrated with the central city, and the presence of large cities which are located in the intermetropolitan and subdominant sectors which, by definition, do not occur in local sectors may contain the only sources of highly specialized activities available in the hinterland. Both of these sources of difference will be explored in the following chapters.

The local sectors are not greatly deficient in number of establishments. As was true for the differences in specialization between the four classes of metropolitan communities, and between the metropolis and its zones, the differences between the sectors is primarily a matter of average size of individual establishments rather than of number of enterprises as such.

IV

How Are the Sustenance Activities Distributed Between the Metropolis, the Principal Hinterland Cities, and the Other Hinterland Areas? (Table 10-4)

The preceding tables have dealt with distance zones and sector types as such, without attempting to distinguish between hinterland cities and other areas. An analysis of the specialization of smaller hinterland cities of less than 10,000 inhabitants, by size, has not been made in this study because of certain limitations of the available data. The United States Census of Manufactures does not publish data for cities which are smaller than 10,000 inhabitants in size. Although data for wholesale trade are available for cities as small as 5,000 inhabitants, and for retail trade and services for

Table 10-4

Percentage distributions of land area, population, and the dollar value of selected sustenance activities. Hinterland units classified by size. United States, 1937-40.

Type of unit	Land area	Population	Retail sales	Services	Wholesale sales	Value added by manufacture
Central cities	0.1	25.7	37.9	34.8	71.8	39.0
Hinterland cities	0.3	21.9	32.0	27.4	17.3	34.8
25,000 and over	0.1	14.4	21.3	19.5	12.8	25.2
10,000 to 24,999	0.1	7.5	10.8	8.0	4.5	9.6
Other hinterland areas	99.6	52.4	30.0	17.8	10.9	26.3
Central counties[a]	1.7	3.9	2.2	1.4	0.9	4.2
50,000 - over	2.4	4.3	2.4	1.5	0.9	4.4
25,000 - 49,999	5.0	4.2	2.3	1.3	0.9	3.6
10,000 - 24,999	11.6	8.6	4.3	2.5	1.3	5.3
5,000 - 9,999	17.4	11.1	8.2	5.1	3.1	5.0
2,500 - 4,999	20.4	9.6	5.7	3.4	2.2	2.4
No city	41.1	10.7	4.8	2.6	1.6	1.4
All units	100.0	100.0	100.0	100.0	100.0	100.0

a) Counties containing central cities. Other counties classified by size of largest city contained.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.I, table 16; Service Establishments, 1939, table 2; Wholesale Trade, 1939, Vol.II, table 13; Manufactures, 1939, Vol.III, State table 2.

all cities,[3] to obtain full comparability between the four types of functions it is necessary to restrict the analysis to cities for which manufacture data are available.[4] The hinterland areas which are considered for the study of sustenance patterns are not urban and rural areas, therefore, but cities of 10,000 inhabitants or more and "other areas", comprising the rural area and all cities of less than 10,000 inhabitants. In the chapters which follow, hinterland cities of 10,000 or more inhabitants are termed "principal hinterland cities",[5] and the remainder of each county left after these cities have been deducted from the total of the county are termed "other areas". This limitation upon the sizes of hinterland cities which can be studied places no restriction upon the classification of other areas by "size of largest city contained". Since the "other areas" are county units in each case, the same classification of "size of largest city contained" which was employed in the population analysis can be used to study the concentration of sustenance activities in the "other areas" whose largest city is of a known size.

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[3] With the occasional exception of some places classified as "urban under special rule".

[4] Since the tabulating procedure involves subtracting data for cities from data for counties in order to obtain a figure for rural areas, the same cities must be subtracted from a given county in each case to obtain comparable figures for rural areas. Had the available data for cities of less than 10,000 inhabitants been tabulated, where available, it would have been necessary to abandon the "size of largest city contained" tabulations, or else to be content with tabulations for rural areas and small cities which were not comparable to each other.

[5] It will be recalled that the term "major hinterland city" was employed to designate hinterland cities of 25,000 or more inhabitants in determining whether or not a given sector were to be classified as subdominant.

Excepting wholesale trade, which is so heavily concentrated in central cities that only a small proportion is available for distribution throughout the hinterland, the principal hinterland cities are areas of considerable total concentration of the sustenance activities. While the "other area" of the hinterland contains more than half of the total population, it contains only:

30.0 percent of the retail sales
17.8 percent of the receipts from services
10.9 percent of the wholesale trade
26.3 percent of the value added by manufacture

The principal hinterland cities contain a higher proportion of that amount of each sustenance activity which is performed in the hinterland than their share of the population would indicate. The small cities and rural areas are much less specialized. The relative specialization of the principal hinterland cities is particularly greater than the other areas in wholesale trade, manufacture, and services; it is least in retail trade. The hinterland cities of 25,000 or more inhabitants are more specialized than those containing 10,000 to 24,999 inhabitants. The "other areas" containing no cities are the least specialized in the four sustenance activities. Although these latter areas constitute 41.1 percent of the total land area and contain 10.7 percent of the population, they contain only between 1.4 to 4.8 percent of the sustenance activities. The presence of a city of any size is conducive to specialization in one or all of the four activities. Apparently the larger the size of the city the greater the degree of specialization, for with increasing size of largest city contained up to 10,000 inhabitants the disparity between the percentage of population and the percentage of sustenance activities gradually decreases.

V

Summary

1. Sustenance activities, as well as populations, are distributed in the metropolitan community by a definite pattern of which the elements are distance from the nearest metropolis, size class of metropolitan community, type of sector, and size of hinterland city.

2. The patterns of these distributions are not identical to those for population. When the effects of differences in population are eliminated, a pattern of territorial and community specialization emerges which appears to be of such consistency and magnitude that it is worthy of study in its own right as one possible explanation for the population pattern and for explaining how metropolitan dominance operates.

3. Each of the four size classes of metropolitan communities is roughly self-sustaining in the four sustenance activities selected.

4. Within the metropolitan community, however, the hinterland areas appear to be dependent upon the metropolis for some of their retail trade, services, wholesale trade, and manufacture. In the hinterland the local sectors are dependent upon the intermetropolitan and the subdominant sectors as well as upon the metropolis. Small cities and rural areas are dependent upon the principal hinterland cities. The smaller the size of the city contained in a county area, the more dependent upon the metropolis and upon the principal hinterland cities it tends to become.

5. The extent of this territorial specialization and its exact pattern cannot be determined by the method of percentage distributions employed in this chapter, which is intended merely to describe the general

distribution of the activities. In the four chapters which follow, the pattern of specialization will be outlined in detail, using the same technique of analysis which was followed in Part II. Due to limitations of the available data, the hinterland city analysis must be confined to cities of 10,000 or more inhabitants. The sustenance activities of hinterland cities smaller than this are combined with the data for the rural areas.

CHAPTER ELEVEN

THE STRUCTURE OF RETAIL TRADE IN THE METROPOLITAN COMMUNITY

I

Introduction

From Chapter Ten it is known that of all the sustenance activities, the function of retail trade is patterned more nearly like the population as a whole than like any other function. Yet the location of retail activities and of the consuming population do not coincide exactly. The objective of this chapter is to show that there is a metropolitan pattern of retail activity with respect to the population, and that it is logically related to the pattern of population distribution. Are the residents of some parts of the hinterland more specialized in retail trade than the residents of other parts? If so, is there any relationship between the degree of this specialization and metropolitan location? Providing such a relationship is found to exist, what plausible hypotheses can be developed concerning the reasons for it? Such are the questions which will be asked.

The goal, therefore, is to find out whether or not there is, within the metropolitan community, a division of labor to accomplish retail distribution and, if so, the pattern of this division of labor in terms of distance from the metropolis and of the other three variables which have been used to study population distribution. In other words, the analysis of retail trade begins a study of how the population maintains itself while being distributed over the land as it is.

The measure of specialization which will be used is the ratio of retail activity to population. If one of two neighboring areas has a ratio of retail activity to population which is so low that it cannot possibly meet the needs of the population residing there, and another area has a ratio which is so high that it is obviously in excess of the needs of the resident population, then it is presumed that the two areas are participating in a division of labor, the first depending upon the second for the performance of a considerable share of its retail functions. Since it is the division of labor, the degree of specialization, that is being measured, the units of measurement must be expressed in terms of both population and retail activity: " x retail trade per unit of population." Such measures will be called "indexes of retail specialization", or merely, "per capita retail indexes."

II

Standards for Measuring Retail Specialization (Regions)

In 1940 the indexes of retail specialization for the nation as a whole, and for each geographic division, were as follows:

Geographic division	Establishments per thousand population	Wage earners per thousand population	Retail sales per inhabitant
New England	14.4	34.5	$393
Middle Atlantic	15.0	32.3	374
East North Central	13.7	30.7	347
West North Central	14.6	27.0	306
South Atlantic	11.2	23.8	245
East South Central	9.4	16.0	171
West South Central	12.2	23.4	237
Mountain	13.8	28.4	344
Pacific	16.0	35.9	442
United States	13.4	28.3	319

It is evident that there are considerable geographic differences in retail activity. A portion of this undoubtedly represents regional

differences in volume of consumption, in degree of family self-sufficiency, and in level of living. A portion of it may also be associated with the metropolitan communities themselves, and is due to regional differences in size of metropolitan centers, distance, sector type, and number and size of hinterland cities per unit of area. Unfortunately, it is impossible to separate the regional differences in level of retail consumption from the regional level of metropolitan development. We can only use the differences between regions as a reference point in making comparisons between various parts of the metropolitan community or between size classes of metropolitan community. From one point of view, a low level of consumption, as in the South, is as indicative of metropolitan status as it is of level of wealth in resources or in other environmental factors, for it betokens an absence of the cash-economy type of sustenance which occurs in highly developed metropolitan areas. In any event, it is not difficult to show that differences in retail consumption are as great or greater within metropolitan communities as between geographic regions, and that it is impossible for regional differences to account for the apparent specialization within the metropolitan community.

Each of the three indexes of retail specialization has a tendency to emphasize a different aspect of community organization and specialization.

a. The "number of establishments per 1000 inhabitants" measures the relative number of retail units which a given population supports, without specifying the size of the units. This index states the frequency with which enterprises of the retail type are undertaken in a given area relative to the population. That is, it indicates whether the existence of an establishment itself is a common or an uncommon type of specialization in a given area, relative to its commonness in the entire economy.

b. "Number of employees per 1000 inhabitants" is primarily a measure of employment specialization, although it is also a measure of the volume of activity. An area with a high ratio of retail workers to total population gains its livelihood through serving other populations by retailing. In this sense the index is a measure of community employment or of the type of activity by which the community sustains itself. In rural-farm areas the index will, of course, be low, and in those cities which are primarily shopping centers it will be high. While it might appear more desirable to express this index as a ratio to the total employed population rather than to total population, it has been considered preferable to state all indexes in terms of consuming units. Students, children, housewives, the aged, and those in poor health are consuming units each of which creates a demand for retail services not too unequal from that of an employed adult. By using the consuming population as a base, intercommunity differences in the proportion of the population which is in the labor force are eliminated. The "number of employees per 1000 inhabitants" index, computed from Census data, does not include the self-employment of proprietors in their own establishments or the replacement of wage earners with unpaid workers from the proprietor's family. Both of these factors can vary consistently from one part of the metropolitan community to another, as can the proportion of the wage earners which are part-time employees. It is for these reasons that the index is used to measure the degree of community employment in retail trade rather than as a measure of the volume of retail activity.

c. "Receipts per person" is a more suitable measure of the volume of retail activity than is either of the other two indexes. It is

stated in the units in which the volume of business is usually measured, and is not subject to some of the deficiencies of the other indexes as measures of volume. The volume of sales is not an exact measure of the total size of retail establishments nor of the physical volume of goods retailed. Yet in one respect this improves its utility as an index of specialization. Costly items tend to be specialized items. Those areas which attain high indexes of dollar receipts per person by retailing costly items must necessarily be those areas which retail specialized items. Thus, although greater emphasis is placed in this study upon the dollar value index as a measure of community specialization, the other two indexes of retail activity emphasize other aspects of intercommunity division of labor which are important. Data for all three indexes are reported for all except the most detailed tabulations.

In examining the tables which follow, it should be borne in mind that retail activity is not one kind of activity, but many kinds. The items offered for retail vary greatly in complexity, cost, quantity normally consumed, and the degree to which they are consumed by various segments of the population. The United States Census of Business classified retail activities into the following 11 major business groups in 1939:[1]

Food	Filling stations
General stores (with food)	Lumber-building-hardware
General merchandise	Eating and drinking places
Apparel	Drug stores
Furniture-household-radio	Other stores
Automotive	

[1] Sixteenth Census of the United States. Retail Trade, 1939, Vol.1, Part III, pp. 1-5.

these major groups are further subdivided into 99 kinds of business, such as grocery stores, infants wear shops, floor covering stores, electrical supply stores, men's wear dealers. The data presented below combine all of these many diverse types of businesses into one total for each city or each county. Nothing can be said concerning the specialization of any part of the metropolitan community in one general type of retail activity. It should be kept in mind, however, that low values of the indexes of retail specialization denote the absence of some types of retail activity rather than a smaller amount of each type of activity. Just which types of activity are most highly developed and which are absent from each type of sector, distance zone, and size of hinterland city cannot be determined by this study. It is generally assumed that those commodities which constitute the most constant and frequently purchased necessities of life, such as food, are the most widely distributed, and that those purchases involving major outlays of income for specialized and durable goods are the most concentrated. Hence, it is assumed that low indexes of retail specialization indicate the presence of establishments retailing relatively unspecialized and frequently purchased items and the absence of establishments retailing costly, specialized, infrequently purchased items.

Another factor to be kept in mind is that the rural-farm, rural-nonfarm, and the urban populations differ in the average amount of their expenditures. It has been shown that the proportions of these three types of populations in the total hinterland population changes considerably with distance from the metropolis, size of metropolis, sector type, and size of hinterland city or size of largest city contained in counties. Some of the differences between areas may therefore be presumed to arise from differences in the volume of cash expenditure of each of these groups.

In 1935-36 the National Resources Planning Board estimated the average per capita expenditures of members of farm, rural-nonfarm, and urban families in the United States to be as follows:[2]

Urban	$477
Rural-nonfarm	338
Farm	175
All types	$371

(In estimating the expenditures of farm and rural-nonfarm families, a money value was imputed to home-produced food, rented farm homes, rent-free homes, and to farm-produced fuel and ice. A value was imputed for owned homes of all types of families. These imputed values are excluded from the above totals.) While the level of expenditures for all types of families may have risen or declined between 1935 and 1940, the probability that these sharp differences between the expenditures and population type were erased is very small.[3] Differences in urban-rural composition may therefore be expected to be one element in the pattern of retail specialization in various parts of the metropolitan community.

III

Retail Specialization and Distance from the Metropolitan Centers of Each Size Class (Table 11-1 and Chart 11-1)

1. Central cities are more specialized in retail trade than any one of the distance zones taken as a whole.

2. In the hinterland, retail trade tends to be widely dispersed among the populations of the various distance zones. In the inner zones,

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[2] National Resources Planning Board. Family Expenditures in the United States (Washington: U. S. Government Printing Office, 1941) Table 40, p. 13.

[3] That differences of this type were present in 1939-40 has been demonstrated in a recent study by the Bureau of Agricultural Economics of the United States Department of Agriculture: "Differences Between Rural and Urban Levels of Living", prepared by Walter C. McKain and Grace L. Flagg, January, 1948 (mimeographed).

Table 11-1

Specialization in retail trade - distance: Number of retail establishments, number of retail employees, and retail sales, per unit of population, of metropolitan community areas classified by size class of metropolitan community and distance from the nearest metropolis. United States, 1939-40.

Distance from the nearest metropolis (miles	SIZE CLASS OF METROPOLITAN COMMUNITY				
	All metropolitan communities	Class A [a]	Class B	Class C	Class D
	Retail sales per person (dollars)				
Central city	471	435	512	408	500
0-14 [b]	294	369	304	241	214
15-24	322	387	312	237	293
25-34	307	382	340	270	249
35-44	294	356	318	232	286
45-54	293	392	305	231	272
55-114	251	368	308	223	237
115-164	210	280	262	191	212
165-264	219	320	284	188	233
265-464	304	546	254	275	320
465-over	279	-	-	217	327
All hinterland areas	272	385	309	222	251
All metropolitan communities	319	408	360	270	276
	Number of employees per thousand inhabitants				
Central city	56.4	49.3	62.6	62.2	62.6
0-14 [b]	29.9	37.0	31.5	25.2	21.1
15-24	31.4	35.2	31.7	23.6	31.0
25-34	31.2	37.3	35.4	27.8	25.8
35-44	29.9	34.8	31.6	24.1	29.7
45-54	30.6	39.0	31.4	25.1	29.0
55-114	27.9	38.5	32.1	24.3	25.7
115-164	22.5	-	26.4	20.6	23.0
165-264	22.3	-	28.8	20.3	23.2
265-464	29.4	-	22.2	27.2	31.0
465-over	25.0	-	-	19.5	29.3
All hinterland areas	29.1	37.4	31.8	23.8	26.4
All metropolitan communities	34.9	43.4	39.6	30.6	30.1
	Number of establishments per thousand inhabitants				
Central city	14.7	14.9	15.0	14.1	14.7
0-14 [b]	12.2	14.1	11.1	11.1	11.7
15-24	14.1	15.2	13.4	13.2	13.7
25-34	14.0	15.1	13.4	13.9	13.7
35-44	13.7	14.4	13.5	12.9	13.9
45-54	14.2	17.5	13.8	12.4	13.8
55-114	12.8	14.9	13.7	12.0	12.8
115-164	12.2	-	14.1	11.4	12.3
165-264	11.9	-	13.9	10.7	12.6
265-464	14.2	-	15.6	13.8	14.1
465-over	14.1	-	-	12.8	15.0
All hinterland areas	13.1	15.4	13.3	12.0	13.1
All metropolitan communities	13.4	15.1	13.7	12.3	13.2

a) In Class A metropolitan communities, places lying at distances greater than 115 miles have been excluded from the distance breakdown, but are included in the totals.

b) Includes counties containing the central cities.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.II, Table 16.

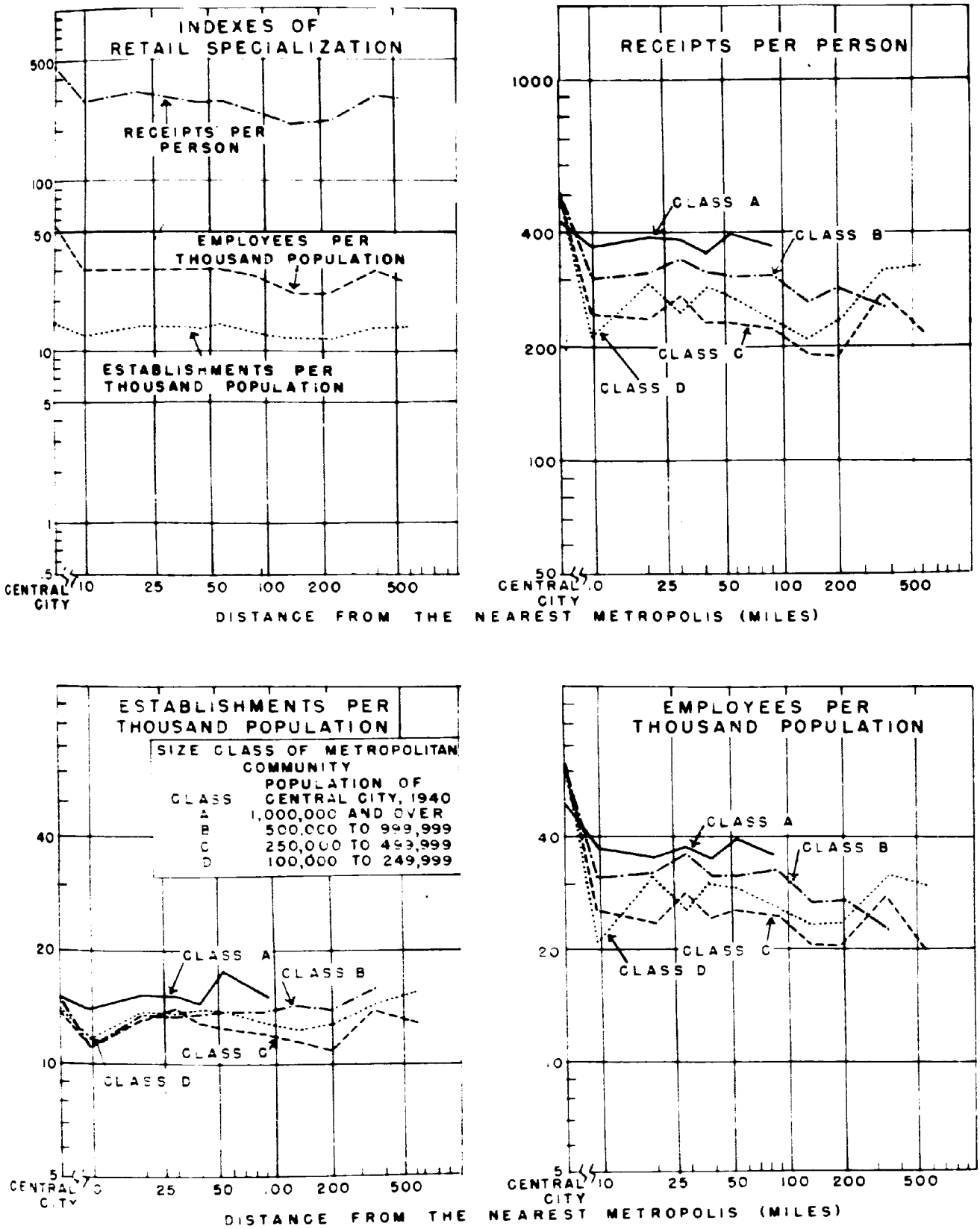


CHART 11-1 SPECIALIZATION IN RETAIL TRADE——DISTANCE. RETAIL ESTABLISHMENTS, RETAIL EMPLOYEES, AND RETAIL SALES PER UNIT OF POPULATION. ALL AREAS OF THE UNITED STATES CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

embracing the suburbs of the city, retail trade declines to a relatively low point, indicating that suburban residents depend upon the specialized establishments of the central city for many purchases. Beyond the 45 mile zone there is little indication that the metropolis functions directly as a retail center for the hinterland for any significant proportion of its purchases. At the intermediate distances (65-114 miles) the indexes of specialization gradually decrease. This may be explained as being due to the gradual increase in total self-sufficiency caused by the increasing proportion of the rural population to the total at these distances (see Chart 6-3). It is very easy to overestimate the influence of the central city as a retail center for the general populatinn of the hinterland. The metropolis undoubtedly does serve as a source of supply for residents within about 45 miles. Beyond this distance it serves only as a source of infrequently purchased and highly specialized goods for that small percentage of the total population which can afford such items. The total amount of such purchases is not enough to make any marked trend in the overall pattern of retail distribution. In other words, the function of retailing is so intimately tied to the daily needs of the population that it follows residence closely, showing no great deviation from the hinterland average with increasing distance.

3. The general level of consumption is higher in metropolitan communities presided over by large central cities (500,000 or more habitants) than in those with small central cities. This again seems to be a function of the high percentage of the hinterland population which is classed as urban in the hinterlands of these larger metropolitan centers. The pattern of differences between the various sizes of metropolitan communities is very

similar to that noted in Chapter Six for differences in urban-rural composition.

IV

Retail Specialization in Each Type of Sector and Size Class of Metropolitan Community (Table 11-2)

1. Intermetropolitan sectors are more specialized in retailing than are the subdominant and local sectors. The subdominant are more specialized than are the local sectors. This is true in spite of the fact that the urban-rural ratio has been found to be higher in subdominant than in intermetropolitan sectors. The retail specialization of intermetropolitan sectors may be explained as a logical result of their location between two central cities, and as arising from a superior ability to obtain merchandise from the metropolitan centers more easily with minimum delay and transportation cost.

2. The number of retail establishments per 1000 residents reflects none of the above differences. This index of the presence or absence of retail establishments indicates that even in local sectors, with few cities, the frequency of occurrence of retailing enterprises is as high as among the other types of sectors. Seemingly, the smaller cities of the local sectors supply the standard needs of the local population with numerous stores which are smaller, on the average, than stores in other sectors.

3. A portion of the relatively high per capita receipts for intermetropolitan sectors could also arise from services to the transient population which flows along major intermetropolitan thoroughfares. Such populations would not be included in the base used in computing the per capita retail indexes. The lower than average values for local sectors, however, would indicate that the population of such sectors make some use of the shopping

Table 11-2

Specialization in retail trade - sector type: Number of retail establishments, number of retail employees, and retail sales per unit of population, by type of sector and size class of metropolitan community. United States, 1939-40.[a]

Type of sector	SIZE CLASS OF METROPOLITAN COMMUNITY				
	All metropolitan communities	Class A	Class B	Class C	Class D
	Retail sales per person (dollars)				
Intermetropolitan	283	391	319	234	261
Subdominant	276	372	319	209	253
Local	239	372	258	203	231
	Number of employees per thousand inhabitants				
Intermetropolitan	29.7	38.3	33.0	25.2	28.0
Subdominant	29.7	38.1	33.1	24.1	28.0
Local	23.1	32.7	25.3	19.8	22.8
	Number of establishments per thousand inhabitants				
Intermetropolitan	13.2	15.4	13.2	12.0	13.1
Subdominant	12.8	14.0	13.8	11.6	12.4
Local	13.3	16.7	12.7	12.3	13.5

a) Excludes central cities and counties containing central cities

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 4 and 5; Retail Trade, 1939, Vol.II, table 16.

centers in intermetropolitan sectors.

V

The Retail Specialization of Principal Hinterland Cities and of Other Hinterland Areas (Table 11-3)

From the foregoing it must not be inferred that all hinterland areas outside the 45 mile zone are about equally specialized in retail trade, and that retail establishments are completely dispersed over the land. Such is certainly not the case. As is true for the central city itself, each principal hinterland city (city of 10,000 or more inhabitants) appears to have its surrounding trade territory. Within this territory the residents depend upon the principal city for much of their retail service. In other words, the retail structure of the hinterland is one of local trade territories.

1. All hinterland cities, in all sizes of metropolitan communities, at all distances greater than 25 miles from the metropolis, are highly specialized in retail trade. This is shown by their higher than average indexes of retail activity. Conversely, the remaining portion of the hinterland (the rural areas and cities of less than 10,000 considered together) have a considerable deficit of retail trade. Thus, cities of 10,000 or more inhabitants appear to be highly specialized sub-centers of retail activity in the hinterland. Rural areas and minor communities are dependent upon them for a considerable proportion of their consumption needs.

2. The farther one progresses from the metropolis, the more specialized in retail trade the principal cities become. At distances of 65 miles or more from the metropolis the principal hinterland cities enjoy a degree of retail specialization equal to that of the central city itself. Beyond 65 miles the principal cities become even more intensively specialized in

Specialization in retail trade - principal cities and other areas: Number of retail establishments, number of retail employees, and retail sales, per unit of population, of cities of 10,000 or more inhabitants and of other hinterland areas, by size class of metropolitan community, type of sector, and distance from the nearest metropolis. United States, 1939-40.a)

Type of sector and distance zone (miles)	RETAIL SALES PER PERSON (DOLLARS)								NUMBER OF WAGE EARNERS PER THOUSAND INHABITANTS								NUMBER OF ESTABLISHMENTS PER THOUSAND INHABITANTS							
	Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas			
	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D
	All sectors								All sectors								All sectors							
All sectors	466	440	464	493	270	205	154	180	47.5	48.6	55.4	58.4	23.6	18.4	14.8	17.0	16.0	14.1	15.7	16.4	14.2	12.5	10.9	12.1
0-9	431	301	309	341	246	195	154	168	44.6	32.8	32.5	37.2	23.7	16.8	14.0	15.0	16.0	10.2	13.2	14.4	12.6	10.5	9.6	10.8
10-14	393	444	485	393	195	197	123	151	38.0	46.8	56.2	43.6	19.0	18.3	10.9	17.9	13.1	13.7	13.4	15.4	9.6	10.4	10.6	8.5
15-24	442	422	401	435	284	210	189	198	41.0	44.1	42.4	49.6	24.2	20.3	18.2	18.5	15.8	14.6	15.6	16.2	14.0	12.3	12.6	12.0
25-34	543	443	456	457	233	219	192	175	55.5	48.9	50.5	51.6	20.4	19.5	18.3	16.5	17.5	14.6	16.6	17.0	12.9	12.0	12.8	12.5
35-44	550	456	498	488	273	221	192	188	60.5	50.0	58.5	55.5	23.9	18.7	18.9	17.2	16.7	14.6	17.3	16.9	13.4	12.7	12.2	12.5
45-64	526	507	485	515	293	199	152	190	58.2	57.6	58.5	60.2	24.7	17.7	14.6	18.4	18.0	16.5	16.7	16.6	17.2	12.4	11.1	12.8
65-114	561	519	493	513	266	208	154	167	60.2	59.5	60.2	64.0	22.5	19.0	15.1	16.0	17.6	15.3	16.0	16.5	13.5	12.9	11.0	11.9
115-164	-	515	459	487	-	198	138	160	-	59.1	57.1	62.2	-	18.2	13.4	15.6	-	16.8	16.0	16.5	-	13.5	10.5	11.5
165-264	-	596	498	545	-	189	137	193	-	63.3	63.9	64.1	-	15.7	13.1	18.0	-	17.3	15.6	16.1	-	12.8	9.8	12.1
265-over	-	-	619	650	-	254	200	242	-	-	68.8	69.9	-	22.2	18.0	21.5	-	-	17.8	16.7	-	15.6	12.8	13.6
	Intermetropolitan sectors								Intermetropolitan sectors								Intermetropolitan sectors							
Intermetropolitan	462	462	485	492	284	202	154	177	40.9	50.7	58.0	58.6	23.0	18.4	14.8	16.8	16.4	14.4	15.6	16.3	13.8	12.3	10.9	11.9
0-9	428	318	339	363	269	-	-	-	44.4	33.4	36.6	39.1	20.1	-	-	-	16.6	10.6	13.9	14.6	17.9	-	-	-
10-14	406	469	595	386	195	188	119	151	39.4	49.4	60.0	41.9	19.0	17.5	10.5	17.9	13.9	14.1	13.1	15.1	9.6	11.2	10.7	8.5
15-24	423	426	496	423	265	225	188	182	39.7	42.6	48.3	48.5	23.8	21.8	18.5	17.6	15.7	14.6	16.7	16.3	13.9	12.3	12.6	11.2
25-34	550	508	486	440	235	249	173	174	56.4	53.2	52.6	50.7	21.2	22.2	17.5	16.7	17.9	15.7	17.1	16.2	13.2	12.8	12.4	12.5
35-44	552	482	489	485	277	184	166	180	60.7	53.0	58.3	55.5	24.0	15.3	15.7	17.0	16.4	14.0	17.1	16.5	13.3	11.1	11.3	12.2
45-64	508	531	485	508	262	187	146	191	56.1	60.4	58.1	58.7	22.0	16.6	14.2	18.7	18.0	17.1	16.5	16.6	16.3	12.1	10.8	12.7
65-114	628	523	497	488	261	205	155	161	65.4	60.7	60.9	62.6	21.2	18.9	15.2	15.6	19.7	15.3	15.7	16.0	12.3	12.6	11.0	11.7
115-164	-	491	471	483	-	185	144	149	-	58.3	57.2	62.4	-	17.9	14.0	14.7	-	17.4	16.1	16.5	-	12.8	10.5	11.3
165-264	-	558	534	596	-	197	142	187	-	50.6	67.9	67.2	-	19.2	13.4	16.9	-	15.5	15.1	17.0	-	14.3	9.8	11.6
265-over	-	-	612	656	-	-	197	239	-	-	66.2	71.2	-	-	17.7	21.2	-	-	17.1	16.5	-	-	13.1	13.0
	Subdominant sectors								Subdominant sectors								Subdominant sectors							
Subdominant	486	424	420	498	218	208	126	155	51.8	47.6	52.5	60.6	19.4	17.8	12.9	15.0	14.4	14.1	15.6	15.9	13.4	13.4	10.0	11.0
0-9	526	286	263	293	-	-	-	-	55.0	32.8	25.6	33.2	-	-	-	-	12.5	10.6	10.9	11.4	-	-	-	-
10-14	384	296	210	-	-	-	160	-	37.0	30.0	18.9	-	-	-	14.8	-	11.1	12.2	15.7	-	-	-	11.1	-
15-24	492	419	368	489	233	279	191	219	48.2	45.6	40.3	57.4	21.6	30.2	17.5	18.1	16.9	15.1	15.0	15.1	12.0	20.2	12.7	12.2
25-34	503	420	405	481	198	166	128	160	53.2	48.2	45.4	50.1	16.3	14.1	14.9	12.6	14.5	14.2	15.6	19.2	10.8	10.0	10.7	11.3
35-44	566	413	-	500	161	293	202	200	63.4	47.0	-	56.8	13.9	21.9	20.9	18.9	17.0	15.7	-	18.0	10.3	15.2	14.3	11.2
45-64	524	470	407	565	225	215	152	145	58.9	53.7	54.3	68.4	20.0	18.4	15.5	13.5	16.8	15.4	17.3	16.6	15.5	12.9	12.0	10.9
65-114	441	497	477	543	206	186	136	157	50.8	59.2	60.1	67.3	23.5	16.3	14.3	15.3	13.8	15.1	16.2	16.7	11.0	13.6	10.3	11.4
115-164	-	523	423	492	-	216	117	149	-	58.1	55.4	65.0	-	19.2	11.9	14.6	-	15.8	15.4	15.9	-	14.1	9.7	10.6
165-264	-	509	419	471	-	195	102	142	-	64.5	57.1	61.2	-	15.6	10.4	14.3	-	17.5	15.7	14.5	-	12.7	8.7	10.5
265-over	-	-	601	662	-	257	124	198	-	-	79.4	72.9	-	22.5	12.4	20.1	-	-	17.1	18.1	-	15.1	7.6	13.1
	Local sectors								Local sectors								Local sectors							
Local	462	377	433	491	333	213	172	196	44.1	40.6	46.8	55.2	27.7	19.6	16.2	18.4	15.1	12.1	16.1	17.4	17.0	12.9	11.7	13.0
0-9	363	285	259	357	-	-	-	-	36.6	30.6	25.4	38.4	-	-	-	-	15.4	8.0	12.3	16.0	-	-	-	-
10-14	204	397	309	407	-	225	48	-	19.1	42.2	31.8	47.6	-	21.0	3.2	-	8.4	12.3	14.1	17.9	-	7.9	8.2	-
15-24	564	421	663	422	319	139	190	216	47.1	43.3	56.1	44.1	25.5	12.2	18.1	14.4	17.4	12.8	20.9	17.2	14.8	10.1	12.5	13.0
25-34	517	287	553	529	278	200	231	179	46.0	30.6	67.9	57.2	23.5	18.9	20.4	16.4	14.1	12.6	18.2	19.4	14.8	12.6	13.9	12.5
35-44	478	375	618	494	294	304	223	200	49.2	37.3	61.0	54.3	27.2	28.7	24.4	16.7	16.4	14.2	19.0	15.1	15.2	14.4	12.9	13.7
45-64	707	478	538	475	378	216	162	202	75.6	51.9	64.5	56.3	31.2	19.8	15.1	19.6	21.4	16.8	17.7	17.0	19.5	12.9	11.4	13.5
65-114	-	572	497	563	291	223	161	181	-	66.6	55.3	65.4	24.8	20.7	15.3	17.0	-	17.0	18.1	17.7	16.6	13.1	11.3	12.4
115-164	-	673	572	502	-	177	144	177	-	81.8	67.5	59.0	-	15.6	13.6	17.2	-	23.5	18.7	18.1	-	13.7	11.2	12.2
165-264	-	-	610	516	-	103	159	226	-	-	65.2	55.2	-	8.0	15.3	21.1	-	-	19.4	17.4	-	11.0	11.1	13.7
265-over	-	-	640	615	-	239	228	254	-	-	67.7	62.5	-	20.6	19.9	22.2	-	-	18.3	17.7	-	18.5	13.8	15.4

a) Excludes central cities. Counties containing central cities appear in all sectors total but are excluded from the individual sector types.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.I, table 1c.

retail trade than the central city. All indexes show this to be the case. It is the most outstanding characteristic of the retail structure of hinterland cities.

3. While the principal cities become even more specialized at greater distances, the remaining area of the hinterland tends to remain relatively unchanged or to have an even greater deficit of retail trade, with increasing distance. (The single exception is in the 265 mile zone, where outlying "other areas" have a higher index of retail specialization than elsewhere. Perhaps at these distances the sparsity of cities requires smaller cities to take over a major share of retailing.) From this fact it is evident that the high indexes of specialization for principal hinterland cities is due in part to a low level of specialization among the population in the rural areas and the minor cities. The increasing specialization of such cities with increasing distance is not due so much to the greater dependence of the "other areas" upon the principal cities as to the fact that the radius of influence of hinterland cities increases with distances and their trade territories are therefore larger and include more people. This enlarging trade territory is created by a decreasing frequency of cities of all sizes as the distance from the metropolis increases. (See Chapter Seven for proof of this generalization.) This fact alone probably accounts for almost all of the increase in retail specialization of hinterland cities with distance. <u>There is no reason whatsoever to infer that at distances greater than 45 miles this increased retail specialization is related to any great extent to the retail activities of the metropolis</u>. It is incorrect to infer that the pattern is due to an increasing independence from the specialized institutions of the central city, for that independence appears to be already achieved at about 45

miles. The retail pattern beyond 45 miles may, for all practical purposes, be regarded as an adjustment of hinterland cities to the size and urban-rural composition of their trade territories. The fact that beyond 65 miles the hinterland cities are as specialized in retail trade as their central cities, and that the sales per capita to the total population change very little from zone to zone (Table 11-1 and Chart 11-1), indicate that factors other than competition with the metropolis have entered.[4] It must be concluded that the retail sales of central cities are confined to a relatively small area in their immediate environs. Beyond this zone the principal hinterland cities are the specialized retail centers of the hinterland. The continued rise in the indexes of specialization with increasing distance is probably due to the increasing radius of influence, and the increasing number of people under the subdominance of each hinterland city. Thus, as one progresses outward from the metropolis, the principal hinterland cities become more intensively specialized in retail trade, because cities of their size occur more infrequently and the average size of their trade territory is larger. Moreover, a larger number of people reside within this larger trade area than in the trade areas of cities nearer the metropolis. Therefore, one corollary of the tendency of retail trade to follow population is that central cities have a retail specialization only great enough to satisfy the needs of their own residents and some of the needs of the residents of their suburbs and other areas within 45 miles. Undoubtedly, they also retail highly specialized items to residents lying at greater distances. The proportion of the outlying population which affords such specialties is so small that the volume of sales is

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[4] For further proof see the comparison of estimated retail needs with actual retail sales, Chapter Three, Section II.

almost insignificant in the total purchases of these zones. Only minor traces of such extended buying appear in the 35-44 mile zone, and then only in the vicinity of the larger centers where the suburban areas may extend this far into the hinterland.

4. The greater retail specialization of intermetropolitan sectors appears to arise both from a greater specialization of cities and of the other areas located in sectors of this type. Thus, casual highway trade in open country areas does not account for all of the slightly more intense specialization of the intermetropolitan sectors.

5. Some of the most specialized retail cities in the United States occur in local sectors at the greatest distances, although on the whole, cities in this sector tend to be less specialized than cities in other sectors. Local sectors in class A and B metropolitan communities tend to contain particularly specialized cities at the greater distances.

VI

Size of Hinterland City and Retail Specialization (Table 11-4)

Because retail data were tabulated only for principal cities, those with 10,000 or more inhabitants, the degree of retail specialization of hinterland cities of all sizes cannot be compared. The various sizes of principal cities which can be studied have only relatively small differences in the degree of their retail specialization.

1. Cities of 10,000-24,999 tend to be slightly less specialized than cities of 25,000-49,999. This is particularly true in intermetropolitan sectors and at distances greater than 65 miles. Cities of 50,000 or more inhabitants tend to be no more specialized than cities of 25,000-49,999 inhabitants.

Table 11-4

Specialization in retail trade - principal hinterland cities classified by size: Per capita retail sales of hinterland cities of 10,000 or more inhabitants, classified by size, type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1939-40.

Size class of metropolitan community and distance (miles)	PER CAPITA RETAIL SALES (DOLLARS) BY SIZE OF HINTERLAND CITY AND TYPE OF SECTOR									
	10,000-24,999				25,000 - 49,999 a)			50,000 - over a)		
	All sectors	Inter-metropolitan	Subdominant	Local	All sectors	Inter-metropolitan	Subdominant	All sectors	Inter-metropolitan	Subdominant
Class D										
0-14	300	368	235	221	359	378	286	405	381	325
15-34	424	388	534	478	443	445	431	478	467	537
35-64	493	471	615	485	479	462	514	548	548	-
65-114	518	478	516	563	528	510	548	491	485	549
115-164	510	520	478	517	498	500	506	411	411	-
165-264	603	623	599	516	512	571	440	477	512	464
265-over	581	559	-	615	688	693	662	733	733	-
All distances	491	480	518	503	496	499	500	493	500	470
Class C										
0-14	271	279	210	270	299	341	263	476	476	-
15-34	483	478	135	595	464	466	463	406	503	368
35-64	526	519	-	548	479	479	-	393	382	407
65-114	473	501	314	497	556	543	619	458	448	484
115-164	479	474	437	572	445	522	363	446	433	461
165-264	508	530	429	610	529	562	453	481	525	402
265-over	622	612	-	640	601	-	601	-	-	-
All distances	472	491	369	471	471	502	462	452	469	415
Class B										
0-14	280	300	261	260	303	309	242	416	468	325
15-34	431	508	203	369	443	417	486	435	401	439
35-64	494	516	503	425	461	482	434	507	528	463
65-114	499	527	444	572	521	533	506	532	520	624
115-164	504	491	499	673	534	-	534	-	-	-
165-264	455	558	434	-	608	-	608	879	-	879
265-over	-	-	-	-	-	-	-	-	-	-
All distances	420	459	375	377	420	403	441	468	495	446
Class A										
0-14	296	328	267	233	383	353	481	461	460	499
15-34	437	383	478	554	538	538	-	484	481	514
35-64	551	504	468	641	553	553	555	508	494	540
65-114	473	473	-	-	673	753	452	434	-	434
All distances	415	387	403	487	490	491	505	476	473	508

a) By definition local sectors can contain cities of 25,000 or more inhabitants only at distances of less than 10 miles. Cities of this size lying in local sectors are included in the "all sectors" total

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.II, table 16.

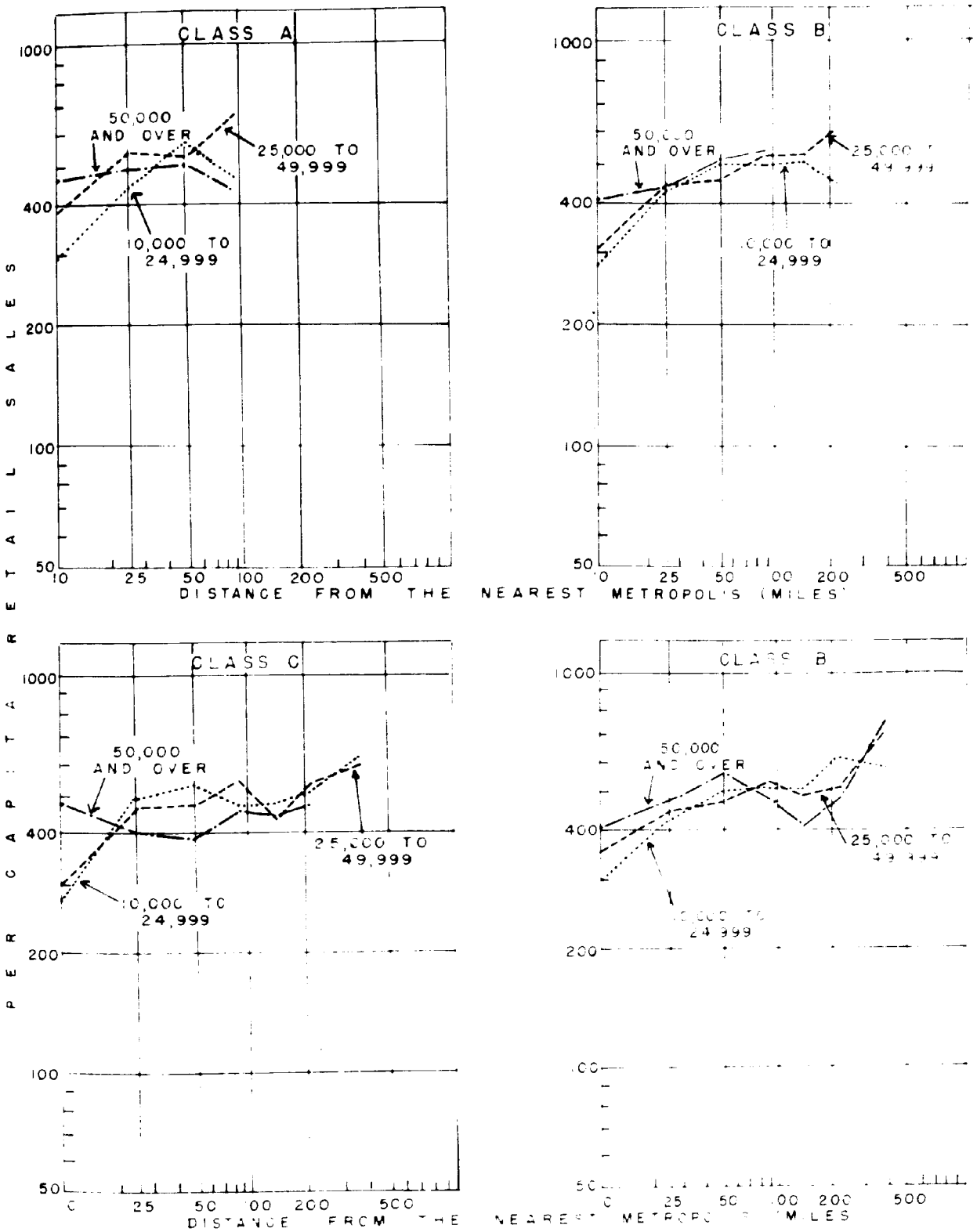


CHART 2 SPECIALIZATION IN RETAIL TRADE——PRINCIPAL HINTERLAND CITIES CLASSIFIED BY SIZE PER CAPITA RETAIL SALES OF THREE SIZES OF HINTERLAND CITIES CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1939-40

2. The somewhat greater specialization of cities lying in intermetropolitan over those located in the local sectors cannot be traced to any one particular size of hinterland city. It tends to arise primarily as a result of the greater specialization at the greater distances of the cities of all sizes lying in intermetropolitan sectors.

3. Thus, among cities above 10,000 inhabitants, size alone appears to be only one of several factors which tend to be associated with the degree of a city's retail specialization. Metropolitan position, distance from the metropolis, and (to a smaller extend) available means of access to the metropolis tend to be of equal or greater importance. This is as one would expect, since hinterland cities of all sizes are more specialized in retail trade than metropolitan centers themselves at distances greater than 65 miles. Such differences as do exist as a result of the increased size of the hinterland city can be explained as being due to the greater radius of influence of such cities than of the smaller cities.

VII

Size of Largest City Contained and Retail Specialization in Small Cities and Rural Areas (Table 11-5)

An examination of the degree of retail specialization of county units, classified by size of largest city contained, gives two useful insights into the retail structure of the metropolitan community. First, it permits some understanding of how completely the function of retailing is diffused over the countryside. Secondly, it permits some insight into the part which small cities play in retailing activity.

1. County areas containing no city and located in a local sector 265 miles or more from a central city have a level of retail activity which

...rban in retail trade - rural areas and cities of less than 10,000 inhabitants: Per capita retail sales of counties, with cities of 10,000 or more inhabitants excluded, classified ... type of metropolitan community, and distance from the nearest metropolis, United States, 1939-40.

Size class of metropolitan community and distance from city	SUMMARY--ALL [illegible]						PER CAPITA RETAIL SALES BY SIZE OF LARGEST CITY CONTAINED AND TYPE OF SECTOR a) (DOLLARS)													
							NO CITY			2,500 - 4,999			5,000 - 9,999			10,000 - 24,999			25,000-49,999		50,000-over	
	No city	2,500-5,000	5,000-10,000	10,000-25,000	25,000-50,000	50,000-over	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Inter-metropolitan	Subdominant
Class C																						
0-14	126	90	740	63	-	-	126	-	-	90	-	-	740	-	-	63	-	-	-	-	-	-
15-34	134	172	228	175	219	143	141	89	121	156	110	204	228	-	211	160	196	202	188	251	162	-
35-64	140	201	248	143	145	161	148	105	138	209	156	206	232	227	256	127	128	167	187	200	161	-
65-114	124	204	211	133	151	114	129	118	132	193	201	222	208	193	221	133	60	159	135	167	107	237
115-144	139	192	213	117	122	80	138	100	151	178	170	189	207	223	215	107	124	134	111	200	89	-
145-204	146	148	240	121	130	76	155	127	162	210	129	207	248	204	307	107	151	149	167	87	92	75
205-over	223	242	355	148	110	159	244	171	227	283	190	299	351	413	464	148	-	202	112	102	159	-
All distances	140	148	237	140	142	136	154	114	155	199	142	210	235	211	246	129	117	168	147	184	137	133
Class C																						
0-14	107	-	60	242	48	121	106	-	-	-	-	-	-	60	-	-	242	-	-	-	121	-
15-34	145	246	220	198	191	176	138	171	133	175	160	248	212	-	270	174	-	201	144	250	-	171
35-64	144	124	208	112	116	178	145	157	129	162	157	229	223	-	194	110	-	122	101	-	90	286
65-114	119	147	210	123	112	68	117	114	127	178	171	144	213	183	215	132	70	111	114	36	65	78
115-144	110	124	152	84	129	92	127	82	104	160	151	197	189	167	177	91	66	84	142	111	60	93
145-204	129	145	180	104	82	96	140	100	135	157	120	148	149	133	239	89	51	148	93	57	99	84
205-over	167	279	283	133	109	-	162	90	181	288	163	302	281	142	364	124	-	154	-	109	-	-
All distances	128	171	203	123	118	110	133	112	131	168	143	198	204	166	213	121	71	143	113	101	86	129
Class B																						
0-14	-	-	225	188	189	-	-	-	-	-	-	-	-	-	225	188	-	-	189	-	-	-
15-34	211	212	292	208	177	204	-	-	211	237	327	115	306	-	199	244	-	105	194	155	209	204
35-64	171	233	221	195	173	219	170	-	171	198	173	285	223	284	204	186	275	237	149	226	187	229
65-114	144	203	274	205	205	175	127	159	154	207	152	207	250	164	316	233	185	190	198	215	175	-
115-144	163	223	216	149	154	270	155	192	134	196	216	276	245	254	-	143	206	103	140	160	-	270
145-204	125	244	243	175	178	213	151	131	103	244	-	-	217	253	-	105	187	-	-	178	-	213
205-over	232	277	243	-	-	-	-	232	-	-	277	-	-	244	239	-	-	-	-	-	-	-
All distances	156	223	256	193	180	205	146	164	158	211	231	233	256	249	262	195	196	184	179	181	188	224
Class A b)																						
0-14	-	-	-	-	-	201	-	-	-	-	-	-	-	-	-	-	-	-	-	-	201	-
15-34	-	-	272	271	257	207	-	-	-	-	-	-	-	-	272	237	219	319	257	-	221	205
35-64	443	299	393	286	230	243	361	-	504	290	-	305	324	372	430	306	-	270	222	206	256	205
65-114	241	288	336	166	222	303	283	-	227	262	-	291	-	318	348	166	-	-	222	-	353	170
115-144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
145-204	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
205-over	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
All distances	385	291	370	273	243	238	367	-	397	279	-	294	356	355	383	253	219	302	244	225	256	202

a) The independent cities of Virginia were considered as lying in no county. Counties containing central cities have been excluded.

b) In Class A metropolitan communities counties lying at distances greater than 115 miles have been excluded from the distance breakdown, but are included in the totals.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Retail Trade, 1939, Vol.II, table 16.

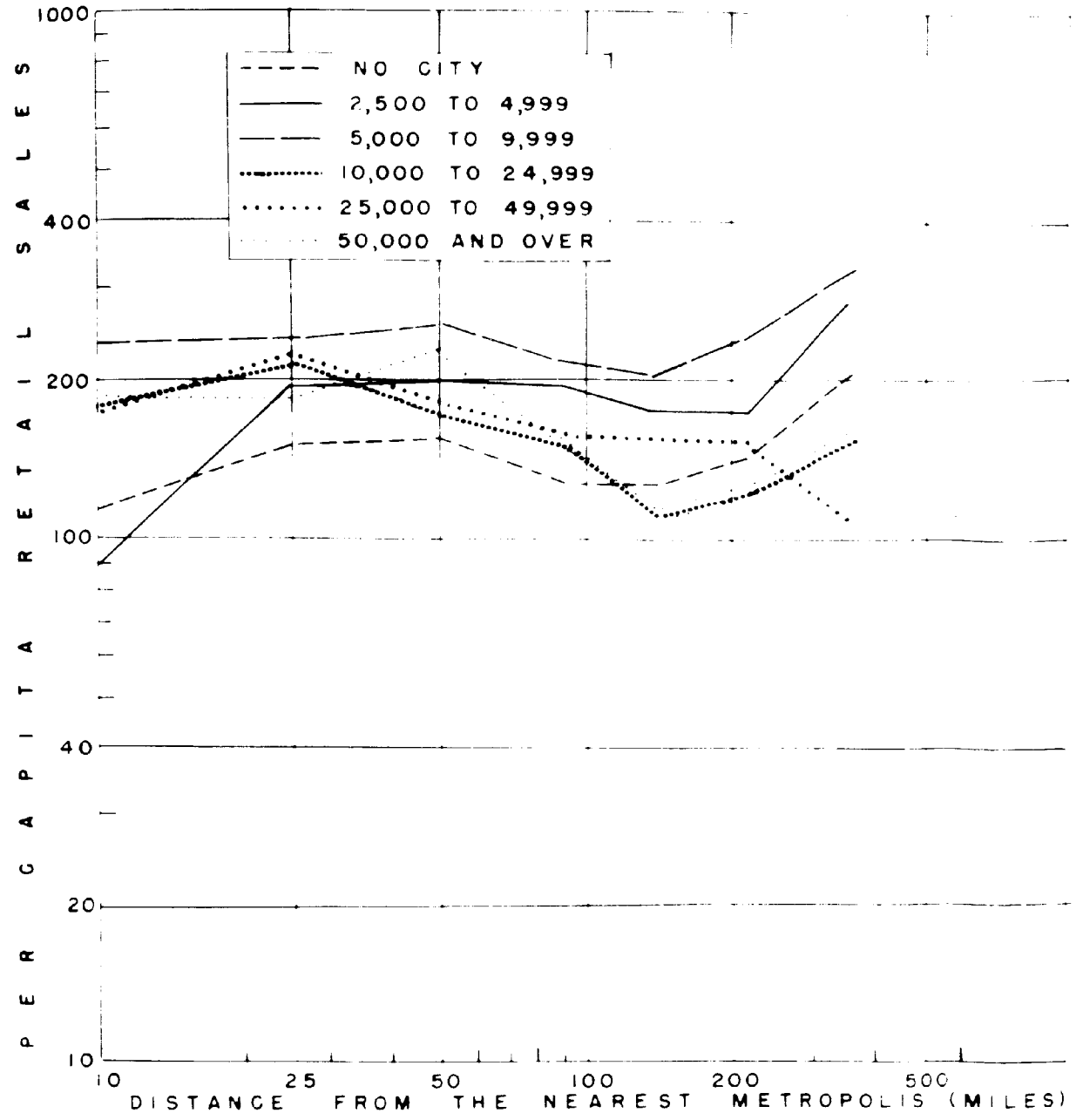


CHART 11-3 SPECIALIZATION IN RETAIL TRADE—RURAL AREAS AND CITIES OF LESS THAN 10,000 INHABITANTS. PER CAPITA RETAIL SALES OF COUNTIES, WITH CITIES OF 10,000 OR MORE INHABITANTS EXCLUDED, CLASSIFIED BY SIZE OF LARGEST CITY CONTAINED AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

is about $227 per capita per year. This is well below the national average of $319 per year. Because at this distance the nearest urban place is, on the average, a maximum of 35 miles away (Table 7-10), it may be presumed that a large proportion of the total shopping is done locally, and that the average level of consumption of this completely rural population is well below the national average. In any event, the need of the population for retail service appears to be so constant and so frequent that, in the complete absence of cities, retail establishments follow the population into village and other rural areas. Not less than two-thirds, and perhaps as much as three-fourths or more of the retail needs of such relatively isolated populations are satisfied locally by hamlet and village shopping centers.

2. Counties which do contain a city, no matter how small, have a higher index of retail specialization than counties containing no city. This indicates that hinterland cities of all sizes are, to some degree at least, specialized centers of retailing. Counties containing a city of 5,000-9,999 inhabitants have higher indexes of specialization than counties containing a city of 2,500-4,999 inhabitants. This would lead to the inference that as the city grows to contain 5,000 or more inhabitants it draws trade from areas outside the county which contains it. The entire counties containing a city of 5,000 inhabitants have a higher index of specialization, in local sectors, than the national average, rendering additional plausibility to the inference made above.

3. The "other areas" portion of the local sectors tends to have a higher per capita index of retail specialization, size for size, than either the intermetropolitan or the subdominant sectors. From this it

would appear that in the absence of principal highway routes or major hinterland cities, the rural areas and counties containing small cities tend to provide their own retail functions rather than to travel longer distances to shop. The indexes for the subdominant sectors are so much lower than either of the other two sector types that it can only be inferred that people living in such sectors travel to the major hinterland city to shop. It appears to be also true that people living in intermetropolitan sectors make considerable use of intermetropolitan highways to make purchases in larger cities located along such routes.

4. The concentration of retail activity in larger cities, where such cities are present in the county, is manifest by the sharp drop in the index of specialization for small cities and rural areas in the counties which contain a city of 10,000 or more inhabitants. In fact, the indexes are lower than for rural areas containing no city. Plainly, the outlying residents of counties containing principal cities depend upon such centers as shopping centers when they are available.

5. In spite of the presence of principal hinterland cities, however, more than half of the retail needs of the rural and small city populations continue to be satisfied by outlying establishments. This is another indication that the tendency for retail activity to be located as near as possible to the ultimate consumer is a very pervasive one.

6. Sector differences persist, even when each county involved in the comparison contains a city of 10,000-24,999 inhabitants. In class C and D metropolitan communities the outlying areas of intermetropolitan sectors are persistently more specialized than subdominant sectors, indicating either more intensive service to the local population or

service to transient populations. The local sectors are more specialized than either of the other two types, indicating greater retail self-sufficiency under conditions of less accessibility to major hinterland cities.

7. The differences between large (class A and B) and small (class C and D) metropolitan centers persist among the small cities and rural areas. The ratio of sales to resident population is higher for the larger than for the smaller size classes of metropolitan communities. This is probably due, in large part, to the higher proportion of urban and rural-nonfarm populations residing in the class A and B metropolitan communities. It may also indicate a higher level of expenditure in the larger metropolitan communities, arising from the tendency for a higher proportion of the rural populations, including the farm, to participate in the cash-economy which is usually associated with metropolitan and urban life.

VIII

Summary

1. The function of retailing is widely dispersed throughout the hinterland. Each distance zone and sector type contains the bulk of those retail establishments which are required to sustain its population in their given type of residence, urban or rural. The central city functions primarily as a major shopping center for its own population, its suburbs, and a limited trade territory for specialized goods. There is evidence that out to about 45 miles the retail establishments of the central city are used as sources of supply to satisfy at least some portion of the total needs of the population. Beyond this point

the hinterland appears to be largely independent of the retail activities of the central city. In these more distant areas the principal hinterland cities of 10,000 or more inhabitants replace the metropolis as a shopping center. The location of these shopping centers (that is, their relative frequency at any distance), however, does tend to be a part of the basic metropolitan pattern.

2. Intermetropolitan sectors tend to be more specialized, at all distances, than other sectors. This specialization may be due partially to retail service to transient populations traveling along intermetropolitan routes. It may also result from a retailer preference for locations which provide ready access to two or more central cities. The principal cities (10,000 or more inhabitants) which lie in this type of sector also tend to be more specialized in retail trade than the cities of other sectors, indicating that locational preference may be of considerable importance in explaining the greater specialization of intermetropolitan sectors.

3. The metropolitan position of a hinterland city seems to be a more important factor in determining the intensity of retail specialization than its size. Those minor increases in the degree of specialization of hinterland cities of 25,000 or more inhabitants over cities of 10,000-24,999 inhabitants may be explained as being due to the larger size of the trade territories of the larger cities.

4. Rural areas and minor cities provide the bulk of their retail requirements locally. The degree to which such areas are self-sufficient is determined largely by access to an urban place. Whenever a city of 10,000 or more inhabitants is present, there is evidence that

it is widely used as a shopping center by the surrounding population. The retail specialization of the rural area and small city portions of counties lying in subdominant sectors is consistently lower than the size of their largest city would indicate, implying that the nearby major hinterland city (which gives the sector its classification) is used as a shopping center. The rural and small city portions of the local sectors, having no such centers available, are consistently more specialized in retail trade than the size of their largest city would indicate, implying greater self-sufficiency. Counties containing no city are less specialized than counties containing cities of less than 10,000 inhabitants, indicating that even small cities become shopping centers for outlying populations. The rural and small city portions of counties containing a city of 10,000 or more inhabitants have very low indexes of retail specialization, showing a great dependence upon the large city as a shopping center.

5. On the whole, the function of retailing is widely dispersed. In no instance, except in the suburbs of large cities, do the rural area and small city populations fail to provide at least two-thirds of their own retail requirements. When allowance is made for the lower cash expenditure of rural populations for retail needs, the proportion of retail self-sufficiency is probably even greater.

6. From whatever angle the retail structure of the metropolitan community is viewed, the metropolis plays only an indirect role by being a factor in the distribution of principal hinterland cities. It retails directly in a very limited zone only, and with increasing distance the

principal hinterland cities quickly replace it as a source of supply. The indirect influence of the metropolis seems to lie in those factors which make for decreasing frequency of urban places with increasing distance, in the presence or absence of a major intermetropolitan route, and in the general accessibility of one part of the hinterland to another. In other words, the function of retailing follows the pattern of residence very closely, and locates itself nearby the residence of the consumer. Those metropolitan forces which aid in determining the distribution of consumers also determine the distribution of retail activities, within the limits imposed of maintaining some central location where the individual establishment is locally available to the maximum number of residents.

CHAPTER TWELVE

THE STRUCTURE OF SERVICES IN THE METROPOLITAN COMMUNITY

I

Introduction

Like retail trade, service institutions exist primarily for the purpose of serving consumers. Aside from the obvious differences in type of commodity offered for exchange, service establishments differ from retail establishments in two principal ways. First, services embrace a great many activities which are consumed primarily by other business organizations, whereas retail trade does not. The United States Census of Business classifies services into seven major groups:[1]

> Personal services--bakeshops, laundries, etc.
> Business services--advertising agencies, etc.
> Services allied to transportation--warehousing, etc.
> Automotive repair services--repair shops, parking lots, etc.
> Other repair services--radio, typewriter, electrical, etc.
> Custom industries--welding, cabinetmaking, bookbinding, etc.
> Miscellaneous services--interior decorating, etc.

These major groupings are subdivided into 71 kinds of business.

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[1] Sixteenth Census of the United States, Service Establishments, 1939, pp. 1-3. The Census of Service Establishments does not include the activities of doctors, lawyers, dentists and others engaged in professional or scientific service. Enterprises in the fields of education, real estate, insurance, transportation and finance are not included. Also excluded are religious and charitable institutions, hospitals, sanitariums, public utilities, and government-operated enterprises.

The services which fall in the first group are similar to retail trade establishments in their primary orientation toward individual consumers. Those in the second group represent a marked departure from this orientation, for other businesses, rather than individuals, are the consumers. The remaining services are required by both individual consumers and business units.

A second difference between the service and retail activities lies in the behavior of consumers. The services which are purchased by some consumers may be delayed by other consumers, or patronage of service establishments may be avoided altogether by performing them themselves. The individual consumer may, if he desires, redecorate his own home, do hiw own laundry, provide his own beauty care, and make his own repairs. Some of these services may be postponed indefinitely. The business establishment may provide many of its needed services as a minor part of its operations. While the rural population, and to some extent the urban population also, is able to avoid retail purchases by producing some of its own food, clothing, and shelter, in our present exchange economy there are definite limits to such self-sufficiency. The latitude for self-sufficiency, postponement, or abstinence from consuming commercially provided services is greater than for items provided by retail trade. One may expect service establishments to be located in those areas in which services are regularly consumed as a normal part of the culture of the population. With these differences in mind, the service structure of the metropolitan community will now be examined.

II

Standards for Measuring Service Specialization

In 1940 the indexes of specialization in services for the United States and for each geographic division were as follows:

Geographic division	Establishments per thousand population	Wage earners per thousand population	Recipts per person
New England	5.4	8.2	$27.9
Middle Atlantic	5.8	10.1	36.4
East North Central	4.9	8.0	27.4
West North Central	5.3	6.6	20.9
South Atlantic	3.5	7.7	17.3
East South Central	3.2	5.9	12.1
West South Central	4.3	7.8	17.8
Mountain	4.5	6.2	20.0
Pacific	7.0	12.9	42.7
United States	4.9	8.4	$26.0

Only $26 per person was expended for services in the United States as a whole in 1939. There were only 8.4 workers and 4.9 establishments per thousand residents. Establishments of the service type occur, therefore, only about one-third as frequently as retail sales; they provide employment only one-third as frequently and involve only one-twelfth the expenditure.

There are also greater regional differences in the consumption of services than of retail sales. Whereas the range of retail sales, from the geographic division with the highest to the division with the lowest per capita index, is about two-thirds of the national average, for services the range of receipts is 118 percent of the national average. This greater deviation is not only caused by a low index for southern areas, as might be expected, but also by an extremely high index for the industrialized Middle Atlantic

states and for the Pacific states.

III

Service Specialization: Distance from the Metropolis and Size of the Metropolis (Table 12-1, Chart 12-1)

1. The population of central cities is far more specialized in services than is any single distance zone. All central cities considered together have an index of specialization which is more than three times that of the index for all hinterland areas on the basis of employment and receipts, and almost twice that of the hinterland on the basis of number of establishments.

2. The larger the size of the metropolis, the higher its index of service specialization. Class A metropolises are almost 50 percent more specialized than class D metropolitan centers, with class B and C centers occupying intermediate positions in order of their size.

3. Unlike retail trade, specialization in services tends to decline fairly uniformly with increasing distance from the metropolis. This is true for all classes of metropolitan communities, and for all indexes of service specialization. The differences which exist between large and small metropolitan centers (those of 500,000 or more inhabitants as compared with those having fewer inhabitants) tend to be carried over into the hinterland and to be present in each distance zone. Distance zones of the class A metropolitan communities tend to be more specialized than the distance zones of the class B metropolitan communities, both of which are more specialized than either class C or D. Size of

Table 12-1

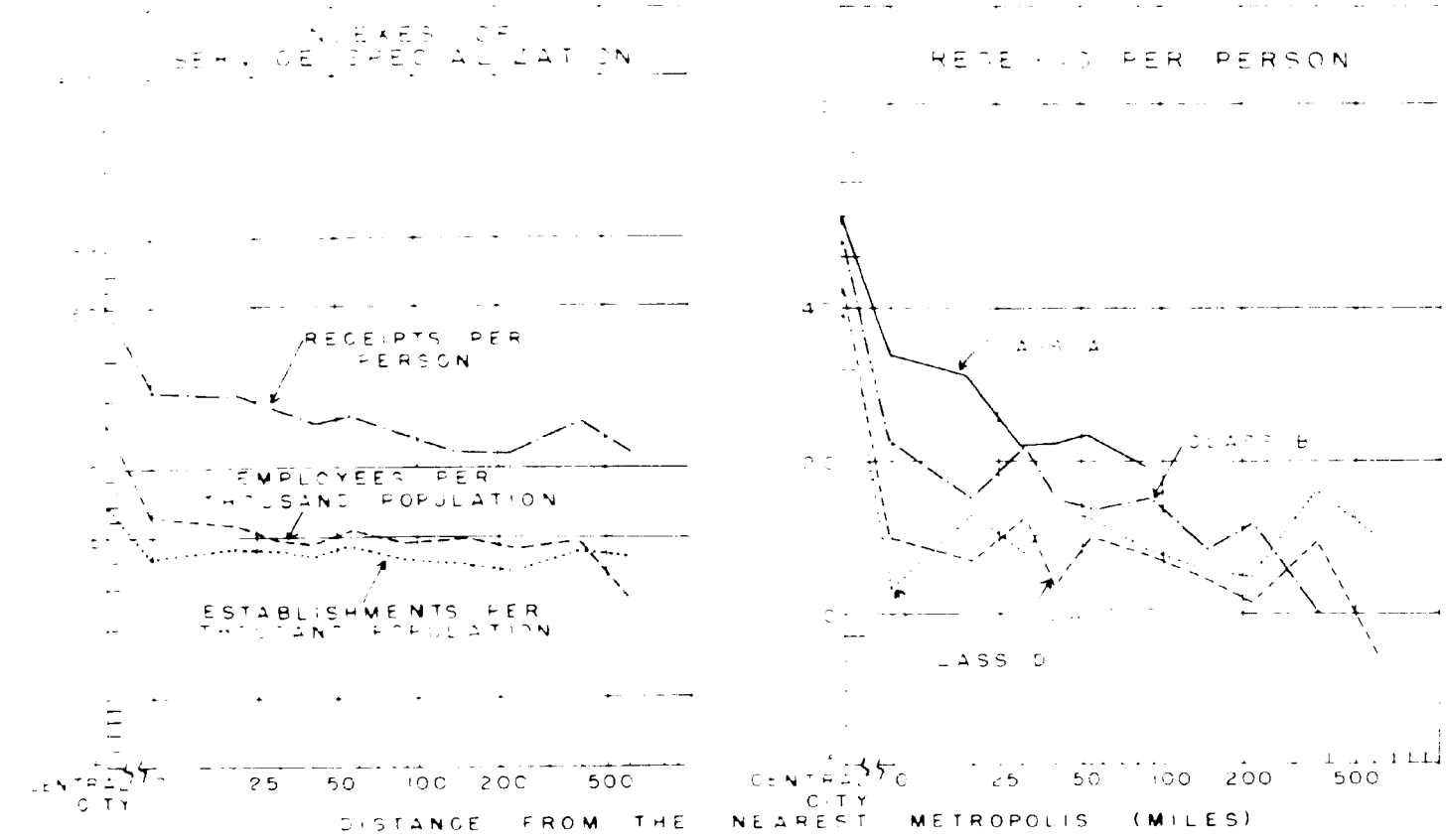
Service specialisation - distance: Number of service establishments, number of service employees, and receipts from services, per unit of population, of metropolitan community areas classified by size class of metropolitan community and distance from the nearest metropolis. United States, 1939-40.

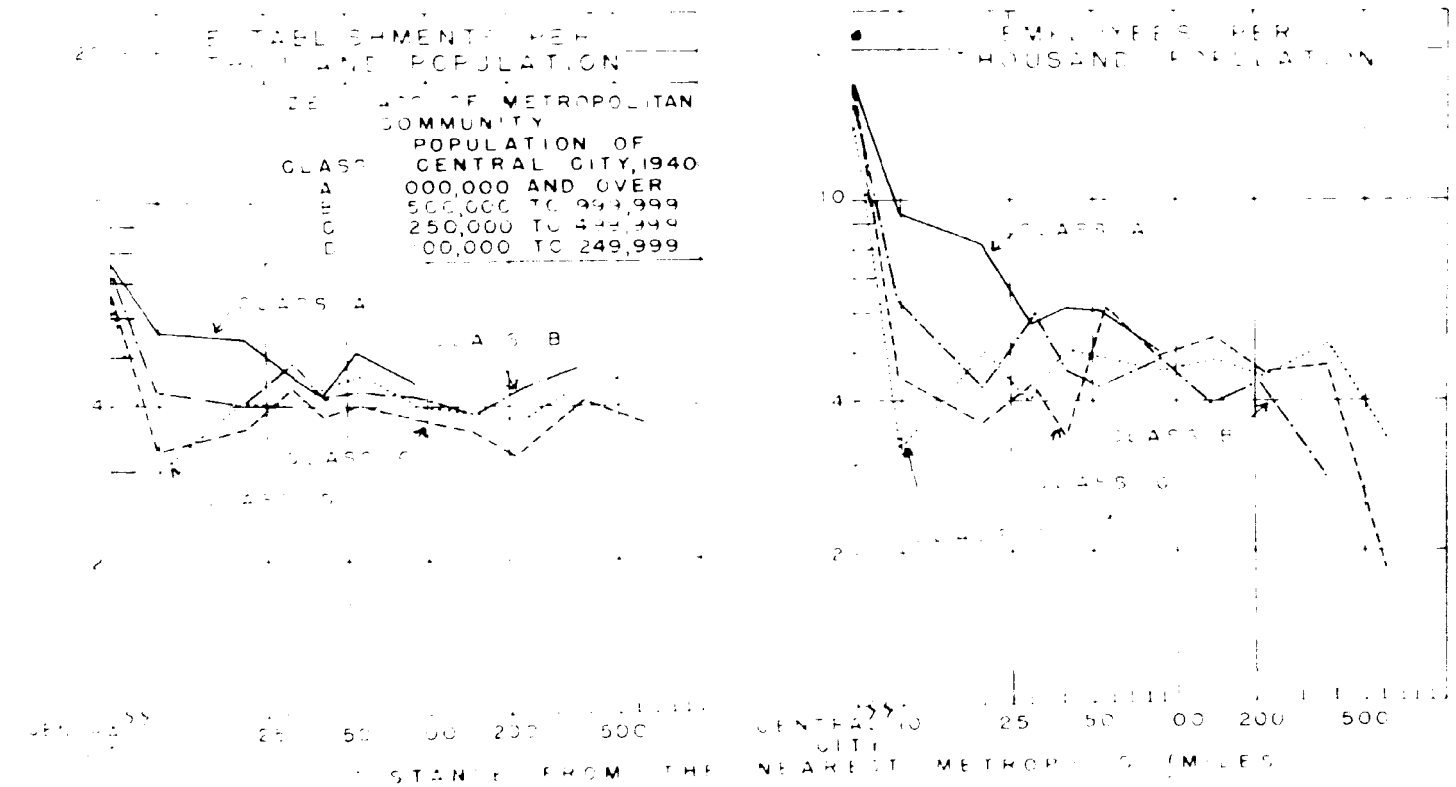
Distance from the nearest metropolis (miles)	SIZE CLASS OF METROPOLITAN COMMUNITY				
	All metropolitan communities	Class A[a]	Class B	Class C	Class D
			Receipts per person (dollars)		
Central city	55.4	62.7	54.1	48.8	42.3
0-14[b]	21.5	32.4	22.0	14.2	11.3
15-24	20.7	29.7	17.0	12.9	15.8
25-34	17.5	21.4	21.5	15.5	13.0
35-44	16.4	21.9	16.9	11.2	16.1
45-64	16.7	22.4	16.0	14.1	15.6
65-114	14.1	19.4	16.9	13.0	13.2
115-164	12.2	-	13.5	11.9	12.1
165-264	11.8	-	15.2	10.6	11.9
265-464	16.0	-	10.1	13.8	17.5
465-over	11.7	-	-	8.3	14.3
All hinterland areas	16.2	26.8	18.2	12.9	13.9
All metropolitan communities	26.0	45.9	27.5	19.3	16.9
			Number of employees per thousand inhabitants		
Central City	17.8	18.1	17.7	19.0	15.5
0-14[b]	6.3	9.4	6.3	4.5	3.2
15-24	5.8	8.1	4.3	3.6	5.0
25-34	4.9	5.7	5.9	4.3	4.0
35-44	4.8	6.1	4.6	3.4	5.0
45-64	5.3	6.0	4.3	6.1	4.9
65-114	4.8	5.0	4.8	4.9	4.6
115-164	4.9	-	4.0	5.3	4.8
165-264	4.5	-	4.4	4.6	4.5
265-464	4.9	-	2.8	4.7	5.2
465-over	2.8	-	-	1.9	3.4
All hinterland areas	5.3	7.5	5.1	5.0	4.8
All metropolitan communities	8.4	13.1	8.4	7.5	5.9
			Number of establishments per thousand inhabitants		
Central City	7.2	7.6	7.2	6.7	6.4
0-14[b]	4.2	5.5	4.3	3.3	3.0
15-24	4.5	5.4	4.0	3.6	4.1
25-34	4.4	4.6	4.9	4.4	4.0
35-44	4.2	4.3	4.2	3.9	4.4
45-64	4.5	5.1	4.3	4.0	4.6
65-114	4.0	4.4	4.2	3.8	4.1
115-164	3.8	-	3.9	3.6	3.9
165-264	3.6	-	4.3	3.2	3.8
265-464	4.4	-	4.8	4.1	4.4
465-over	4.2	-	-	3.7	4.6
All hinterland areas	4.2	5.1	4.4	3.8	4.1
All metropolitan communities	4.9	6.5	5.0	4.2	4.3

a) In Class A metropolitan communities places lying at distances greater than 115 miles have been excluded from the distance breakdown, but are included in the totals.

b) Includes counties containing the central cities.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Service establishments, 1939, table 2.





ESTABLISHMENTS, SERVICE EMPLOYEES, AND RECEIPTS FROM SERVICES PER UNIT OF POPULATION, ALL AREAS OF THE UNITED STATES, CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS, UNITED STATES, 1939-40

metropolis appears to have but little effect upon the degree of specialization of class C as compared with class D hinterland cities.

4. For retail trade it was noted that the 0-14 mile suburban zone was a zone of deficiency, and that the residents of this zone appeared to make extensive use of the retail establishments in the central city. This inference was made from the observation that the population of the 0-14 mile zone was less specialized in retailing than the population of the 15-24 mile zone. A similar phenomenon does not occur for services. The index of service specialization in the 0-14 mile zone is second only to the central city itself, and is higher, on the average, than that of any other distance zone. Only in the class D metropolitan communities does the pattern of suburban deficiency appear. Thus, suburban populations are, on the whole, more specialized in services than the remainder of the hinterland. If they are dependent upon the metropolis for services, it appears that they are much less dependent, rather than more (as for retail trade) than other areas of the hinterland. The fact that the 0-14 mile zone is below the national per capita service index suggests that this highly urbanized zone is dependent to some extent upon the central city.

5. The pattern of distribution of specialization in service functions leads to the conclusion either that the central cities and their immediate environs consume services in large quantities while the remainder of the hinterland areas forego, postpone, or perform these same services for themselves, or else that the entire hinterland is quite dependent upon the metropolis as a source of supply for those

activities performed by service establishments.

IV

Change in Degree of Service Specialization with Type of Sector and Size Class of Metropolitan Community (Table 12-2)

1. The intermetropolitan sectors are, on the whole, slightly more specialized in services than are the subdominant sectors. These sectors are, in turn, considerably more specialized than the local sectors. This tendency is manifest in all three indexes of service specialization. This pattern tends to be true for all classes of metropolitan communities considered together, although in the B and C classes there appear to be no differences between the intermetropolitan and subdominant sectors.
2. The number of establishments per thousand residents is about the same for all sector types. Sector differences are due primarily, therefore, to differences in the average size of establishment, as measured by average receipts and average number of employees per establishment.

V

The Service Specialization of Principal Hinterland Cities and Other Hinterland Areas (Table 12-3)

When a division is made between the principal hinterland cities and other hinterland areas, the over all pattern of service specialization becomes much clearer.

1. With increasing distance from the metropolis there is a gradual rise in the service specialization of principal hinterland cities, as was true for retail trade.

Service specialization - sector type: Number of service establishments, number of service employees, and receipts from services, per unit of population, by type of sector and size class of metropolitan community, United States, 1939-40.a)

Type of sector	SIZE CLASS OF METROPOLITAN COMMUNITY				
	All metropolitan communities	Class A	Class B	Class C	Class D
	Receipts per person (dollars)				
Intermetropolitan	17.7	20.5	18.1	13.7	15.2
Subdominant	16.5	21.6	19.2	13.8	14.2
Local	12.1	20.1	13.1	10.3	11.5
	Number of employees per thousand inhabitants				
Intermetropolitan	5.6	8.3	5.3	4.9	5.2
Subdominant	6.1	6.0	5.6	7.1	5.4
Local	3.8	5.4	3.5	3.5	3.7
	Number of establishments per thousand inhabitants				
Intermetropolitan	4.3	5.4	4.4	3.8	4.2
Subdominant	4.1	4.6	4.7	3.6	3.9
Local	4.0	4.7	3.7	3.8	4.1

a) Excludes central cities and counties containing central cities.

Source: Sixteenth Census of the United States. Population, Vol.I, State tables 3 and 5; Service establishments, 1939, table 2.

Table 12-3

Service specialization - principal cities and other areas: Number of service establishments, number of service employees, and receipts from services, per unit of population, of cities of 10,000 or more inhabitants and of other metropolitan and rural areas, by size class of metropolitan community, type of sector, and distance from the nearest metropolis. United States, 1963-64[a]

Type of sector and distance zone in miles	Number of establishments per 1,000 inhabitants								Number of employees per 100 inhabitants								Receipts per inhabitant (dollars)							
	Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas			
	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D
	All sectors								All sectors								All sectors							
All sectors	9.1	20.4	8.3	42.3	1.4	4.0	7.8	4.9	10.5	9.7	13.2	11.9	3.4	2.2	2.6	2.7	4.65	5.72	5.97	6.14	3.68	3.23	3.11	3.45
0-4	4.1	15.3	20.0	34.1	1.7	4.0	7.1	3.1	15.1	8.0	7.0	5.3	4.1	1.7	2.1	1.8	4.67	4.51	4.79	4.57	3.40	2.52	2.15	2.40
5-14	5.1	15.3	31.0	34.1	11.	4.0	6.7	3.1	9.7	11.3	7.4	2.7	2.7	1.9	3.6	1.9	5.20	6.11	5.57	5.34	3.29	2.74	2.43	1.99
15-24	4.1	20.4	37.0	42.3	14.7	4.0	9.2	3.1	1.1	7.7	9.4	7.4	4.4	2.5	2.1	2.7	4.00	5.31	5.74	5.71	4.09	2.71	3.04	2.97
25-34	5.1	20.4	30.0	42.3	9.5	13.1	4.9	4.	4.6	4.4	9.8	8.9	2.0	3.0	2.4	2.3	4.52	4.46	4.49	6.13	2.84	3.09	3.56	3.26
35-44	5.1	20.4	30.0	42.3	14.7	4.0	4.1	3.1	10.4	8.3	8.7	10.9	4.4	2.0	2.6	2.3	6.51	5.01	6.57	6.43	3.47	3.23	3.52	3.45
45-54	5.	20.4	33.0	33.1	13.1	8.5	8.1	4.7	9.9	8.9	17.4	11.7	3.1	1.9	2.5	3.0	6.69	6.95	6.30	6.68	4.90	3.12	3.33	3.87
55-64	9.5	35.5	33.0	33.1	14.0	9.4	7.9	9.1	9.5	10.2	13.4	12.4	2.8	2.2	2.8	2.7	6.28	5.80	5.88	6.16	3.47	3.46	3.27	3.52
65-74	-	35.5	33.0	33.	-	8.4	6.3	9.1	-	10.5	17.2	14.5	-	2.2	2.9	3.0	-	6.17	5.25	6.17	-	3.32	3.15	3.44
75 and over	-	35.5	33.0	42.8	-	8.4	4.4	4.7	-	10.5	16.9	15.1	-	2.6	2.6	3.1	-	6.84	5.79	5.91	-	3.50	2.82	3.53
Unknown	-	-	33.0	42.1	-	10.1	8.5	10.3	-	-	18.0	18.0	-	2.8	2.3	2.7	-	-	6.80	6.95	-	4.82	3.53	3.87
	Intermetropolitan sectors								Intermetropolitan sectors								Intermetropolitan sectors							
Community - sector	38.3	38.4	33.3	33.3	14.0	9.7	7.5	9.1	11.1	9.1	12.2	12.0	3.5	2.3	2.6	2.7	6.45	5.78	6.00	6.17	3.52	3.23	3.15	3.43
0-4	4.1	15.3	20.0	34.1	3.5	-	-	-	14.7	9.4	7.5	8.0	7.7	-	-	-	6.86	4.53	5.20	4.70	5.41	-	-	-
5-14	33.4	38.4	33.3	33.1	11.5	8.4	6.5	9.1	9.2	9.4	14.7	7.2	2.7	2.5	2.7	3.0	5.73	6.41	6.00	5.89	3.28	2.73	1.82	1.96
15-24	9.1	20.4	20.0	25.5	13.4	10.3	7.2	9.1	10.3	9.6	17.5	8.3	3.1	2.5	2.4	2.2	6.04	5.38	5.44	5.83	3.75	2.95	3.36	2.95
25-34	9.1	20.4	33.3	42.3	11.5	13.2	6.9	7.2	10.0	7.7	9.8	7.4	2.4	4.5	2.5	2.1	6.75	5.66	6.83	6.03	3.05	3.47	3.57	3.17
35-44	9.1	20.4	33.3	33.1	17.5	7.7	7.1	9.1	10.7	7.1	9.8	11.0	4.7	1.9	2.2	2.4	6.16	5.66	6.51	6.44	3.42	2.78	3.39	3.39
45-54	5.1	35.5	33.3	33.	14.8	9.4	7.2	10.	9.	9.1	10.1	11.0	4.6	1.9	2.5	3.1	6.70	6.26	6.29	6.83	3.86	3.06	3.26	3.34
55-64	9.5	35.5	33.	33.	14.	9.4	7.2	10.	11.0	10.	14.	12.6	4.3	2.3	2.7	2.7	7.48	5.95	5.92	5.84	3.17	3.47	3.36	3.42
65-74	-	35.	33.	33.	-	11.3	7.0	9.1	-	11.1	14.8	14.7	-	2.1	2.7	3.0	-	6.18	6.04	6.08	-	3.4.	4.06	3.54
75 and over	-	-	33.	33.	-	9.4	7.2	9.1	-	-	14.	14.7	-	2.5	2.9	3.2	-	4.54	6.66	6.63	-	3.79	3.80	3.45
Unknown	-	-	33.	33.	-	-	7.	9.1	-	-	14.	14.7	-	-	1.9	2.4	-	-	7.04	7.01	-	-	3.41	3.54
	Suburban sectors								Suburban sectors								Suburban sectors							
0-4	9.1	20.4	33.	33.	14.	9.	7.	9.	9.9	9.4	20.5	11.7	4.0	2.4	2.9	2.8	6.47	5.96	5.94	6.06	3.58	3.20	2.78	3.01
5-14	-	20.4	33.	33.	1.	4.0	-	-	11.4	7.7	8.1	5.7	-	-	-	-	6.75	6.48	6.79	5.48	-	-	-	-
15-24	9.1	20.4	33.	33.	11.5	13.1	5.1	1.2	7.8	10.0	5.8	4.4	1.7	2.5	2.7	2.5	7.55	5.80	5.96	5.44	3.11	4.07	2.77	2.73
25-34	9.1	20.4	33.	33.1	.1	9.2	6.7	9.	9.5	9.7	6.8	6.7	3.1	1.6	2.4	2.3	6.93	7.11	5.33	6.56	2.00	2.10	3.02	2.83
35-44	9.1	20.4	-	33.3	1.4	9.	7.1	11.	1.1	-	10.7	1.2	5.3	3.1	2.4	2.4	7.42	5.89	-	6.85	2.80	3.82	3.16	2.94
45-54	9.1	20.4	33.	33.1	14.1	9.	-	9.	10.	9.1	10.	2.1	4.5	2.5	2.7	2.6	6.08	5.73	6.17	6.19	3.21	3.17	3.43	3.15
55-64	9.1	20.4	33.	33.	14.	9.	-	9.	9.7	9.1	14.8	14.4	4.4	1.7	2.5	2.5	6.16	5.47	5.81	6.05	2.59	2.89	2.66	3.25
65-74	-	20.4	33.	33.	-	9.	-	9.	10.4	11.	-	11.1	-	2.1	3.1	3.1	-	5.82	5.89	6.51	-	3.12	3.01	3.09
75 and over	-	20.4	33.	33.	-	4.	-	9.	11.	10.	14.	14.4	-	2.3	2.8	3.1	-	7.07	5.31	6.12	-	3.56	2.41	2.82
Unknown	-	-	33.	33.	-	10.1	9.	13.	-	-	20.	21.	-	2.5	2.6	4.	-	-	6.47	8.0	-	4.79	1.86	4.58
	Local sectors								Local sectors								Local sectors							
All	9.	20.	33.	33.	14.	9.5	8.	4.	9.1	9.	9.1	8.0	4.2	2.5	2.9	3.0	5.91	4.58	5.76	6.03	3.42	3.02	3.91	3.94
0-4	9.	20.	33.	33.	1.	4.	-	-	7.	7.	9.0	7.0	-	-	-	-	5.24	3.51	4.13	5.04	-	-	-	-
5-14	9.	20.	33.	33.	11.	4.	-	4.	9.1	9.	9.9	7.1	-	3.4	3.1	-	5.12	4.42	4.42	5.95	-	2.22	1.95	-
15-24	9.	20.	33.	33.	14.	9.	7.	10.	9.	9.	9.9	6.4	4.7	1.9	2.9	3.1	5.34	4.50	6.49	5.41	4.23	1.81	2.90	3.02
25-34	9.	20.	33.	33.	14.	9.	8.	4.	9.	9.	10.	8.9	2.	1.7	2.2	3.0	5.28	3.65	7.35	7.38	3.33	2.69	3.23	3.49
35-44	9.	20.	33.	33.	14.	9.	11.	4.	9.	9.	9.1	7.8	3.7	2.9	3.1	1.9	5.90	4.83	7.17	6.88	3.95	4.36	3.77	3.47
45-54	9.	20.	33.	33.	14.	9.	17.	4.	9.	11.1	9.6	9.3	2.0	2.6	2.9	3.0	5.91	6.47	6.44	6.36	4.47	3.29	3.51	4.13
55-64	-	20.	33.	33.	14.	9.	-	4.	9.	11.0	9.9	9.6	4.3	2.8	-	3.0	-	5.10	6.44	6.66	4.29	3.69	3.63	3.78
65-74	-	20.	33.	33.	-	9.	-	4.	-	11.	10.	9.7	-	3.0	3.2	3.1	-	5.36	6.81	6.22	-	3.70	4.01	3.71
75 and over	-	-	33.	33.	-	9.	11.	4.	-	-	10.	11.1	-	4.1	2.9	3.1	-	-	7.42	5.85	-	3.46	3.28	3.77
Unknown	-	-	33.	33.1	-	9.	11.	13.	-	-	14.	14.1	-	4.1	2.9	3.1	-	-	6.79	6.13	-	3.77	3.85	4.24

[a] Data for the principal sector types.

[b] For definitions of service establishments, see, table 2.

2. There is evidence that cities within the suburban zone of the direct influence of the metropolis depend upon the metropolis for a share of their services. Cities in the innermost zone tend to be less specialized than the zone surrounding them. But this direct dependence appears to be relatively slight, for the hinterland cities quickly rise above the national average of service specialization, indicating that even at the very near zones they are themselves centers of service to their trade territories.

3. The rural areas have a very low index of service specialization. Whereas at no point outside the suburban zone does the ratio of retail trade in the dispersed areas sink to a ratio of less than one-third the index of the principal cities, for services the outlying areas frequently have only one-fourth or even one-sixth the degree of specialization of the principal hinterland cities. Moreover, with increasing distance the index for the outlying areas tends to decline slowly. With increasing distance the outlying areas tend to become more dependent upon the principal cities, or else they forego a great many services. It is this tendency which gives to the distribution of services among the total population the pattern of gradual decline with distance.

4. Unlike retail trade, there is considerable reason to believe that the metropolis performs services which are consumed by hinterland populations lying at great distances. Only in the outer zones do the hinterland cities even approach the intensity of specialization attained by the center. The fact that this is true, in spite of the fact that the dispersed population appear to be more dependent upon the hinterland city for services than for retail trade, and that

the deficit of the suburbs is relatively smaller for services than for retail trade, can mean that some services needed by the populations lying even at considerable distances are obtained directly from the central city. An alternative point of view may be taken, of course, that services to businesses in central cities require a high degree of development for consumption by the central city itself. This hypothesis will be examined in the next section, where the service specialization of the various sizes of hinterland cities is studied in comparison with the central city.

5. The lack of service specialization in local sectors applies to the cities but not to the other areas of such sectors. Whereas principal cities in local sectors are much less specialized than the principal cities of the subdominant sectors, their other areas tend to compensate to some extent by exhibiting a slightly greater degree of specialization than that found in the same parts of the other sector types at the same distances.

6. In local sectors, service establishments occur as frequently per 1,000 residents at all distances, in all size classes of metropolitan communities, and in both principal cities and in other areas as frequently as they do at these locations in other types of sectors. There is not an insufficiency of service enterprises in local sectors, but merely a smaller average size. The marked differences in service specialization between large and small metropolitan communities at all distances and for all sector types is also primarily a matter of average size. It might be supposed that wherever the number of establishments per thousand remains almost unchanged while the per capita value is very low the most specialized of the

services are relatively absent, and that standardized services to individual consumers constitute a larger than proportionate share of all services.

7. Employment from service enterprises tends to rise in the principal hinterland cities with increasing distance. It remains almost constant in other areas under these conditions. The level of employment in cities varies between 8 and 13 per thousand at the inner zones to 10 and 16 at the outer zones. In no area is service a frequent source of employment. In rural areas and minor cities it is a very infrequent source of employment indeed, for it averages only about 2.5 per thousand residents.

VI

Size of Hinterland City and Service Specialization
(Table 12-4, Chart 12-2)

1. Unlike retail trade, there is a marked defference between the degree of service specialization of large and of small hinterland cities: the larger the city the more specialized it tends to be. Many service activities seem to be of such a nature that they cling to the large cities. Not only are they concentrated in the central cities, but in the hinterland they tend to remain in the largest cities.

2. The pattern of increasing specialization with increasing distance tends to be present within each size group of cities. It is most clearly manifest in the intermetropolitan and local sectors, and to a lesser extent in the subdominant sectors.

3. The cities in the intermetropolitan sectors are more specialized than those in subdominant or local sectors; this is true for

Table 12-4

Service specialization - principal hinterland cities classified by size: per capita receipts from services of hinterland cities of 10,000 or more inhabitants classified by size, type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1963-40.

Size of metropolitan community and distance (miles)	PER CAPITA RECEIPTS FROM SERVICES (DOLLARS) BY SIZE OF HINTERLAND CITY AND TYPE OF SECTOR: 10,000 - 24,999				25,000 - 49,999[a]			50,000 - over[a]		
	All sectors	Inter-metropolitan	Subdominant	Local	All sectors	Inter-metropolitan	Subdominant	All sectors	Inter-metropolitan	Subdominant
Class C										
0-14	21.0	24.2	29.6	14.5	26.6	31.4	14.4	25.2	23.7	17.6
15-34	23.5	21.7	29.6	25.9	26.4	28.1	22.5	30.4	29.7	34.3
35-64	27.2	27.3	30.6	25.7	30.2	30.2	30.0	43.3	43.3	-
65-114	28.8	27.3	30.2	30.4	34.5	33.1	36.0	38.1	38.5	34.2
115-164	30.8	34.7	23.8	27.2	36.5	38.3	34.3	37.0	37.0	-
165-264	35.4	38.3	27.8	24.8	40.6	37.6	44.2	37.3	42.5	35.5
265-over	32.9	30.3	-	37.1	48.6	47.8	52.7	76.6	76.6	-
All distances	28.1	28.5	27.9	27.3	33.2	34.0	32.0	37.7	39.2	32.0
Class C										
0-14	16.1	21.7	7.7	13.4	17.0	20.1	11.0	33.3	33.3	-
15-34	33.7	36.0	9.9	32.8	29.4	24.3	31.0	29.8	41.0	23.9
35-64	29.5	29.1	-	30.6	27.3	27.3	-	51.0	30.1	77.0
65-114	31.1	31.3	32.0	30.3	36.3	35.1	42.5	35.1	33.9	30.1
115-164	33.0	32.6	32.3	37.4	30.4	41.6	18.4	49.5	37.6	5.3
165-264	34.0	36.5	30.7	35.0	37.8	42.1	31.5	38.2	43.1	29.5
265-over	35.8	35.9	-	35.7	42.0	-	42.0	-	-	-
All distances	30.0	31.5	29.4	26.8	29.8	32.1	29.5	34.0	35.8	32.4
Class B										
0-14	17.5	15.9	19.5	18.3	27.4	25.2	23.6	34.4	40.7	21.9
15-34	25.1	30.9	17.9	17.9	25.0	22.3	29.5	29.5	20.5	30.6
35-64	24.8	21.4	27.4	18.9	25.2	25.0	25.5	34.9	35.6	33.5
65-114	28.5	32.9	23.5	24.5	29.4	24.2	30.9	37.3	39.7	42.6
115-164	33.7	33.0	34.8	37.0	34.4	-	34.4	-	-	-
165-264	22.0	20.0	22.4	-	34.1	-	34.1	48.3	-	48.3
265-over	-	-	-	-	-	-	-	-	-	-
All distances	24.2	25.7	22.3	20.2	27.5	25.0	29.6	34.7	37.2	33.1
Class A										
0-14	20.4	24.1	17.1	12.9	31.5	33.1	30.7	45.0	47.5	42.1
15-34	31.2	30.3	31.4	33.2	32.3	32.3	-	39.5	39.8	34.4
35-64	35.2	31.4	32.3	40.3	41.3	43.1	37.4	35.4	36.8	32.4
65-114	26.4	26.4	-	-	41.2	56.3	15.9	25.9	-	25.9
All distances	28.2	28.1	24.7	29.4	34.4	36.5	31.2	41.1	43.4	38.2

a) By definition local sectors can contain cities of 25,000 or more inhabitants only at distances of less than 10 miles. Cities of this size class in local sectors are included in the "all sectors" total.

Source: Sixteenth Census of the United States, compiled from Supplement No. 1 [illegible] tape to [illegible] Census of Service establishments, 1963, table 2.

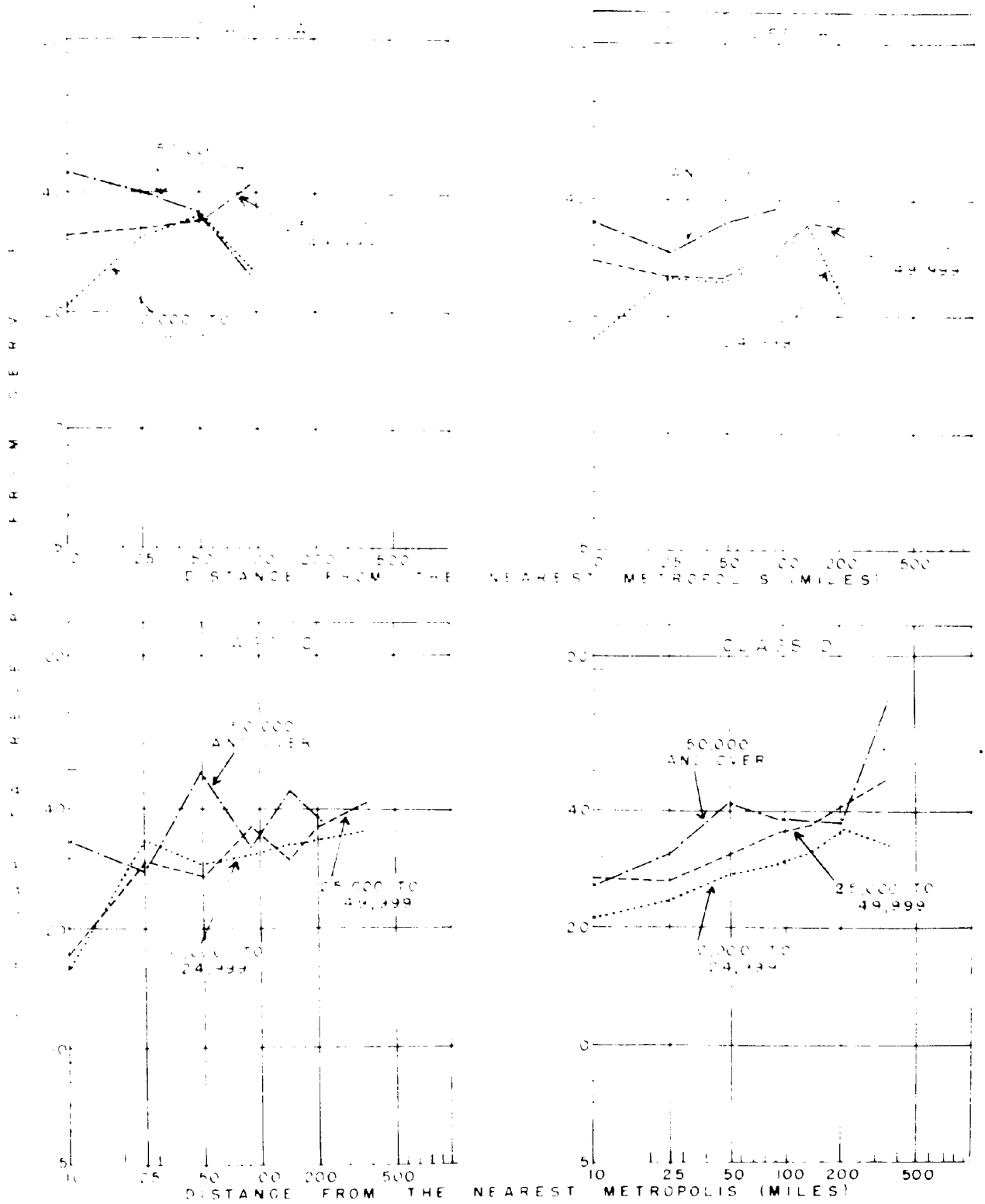


CHART [illegible] SERVICES—PRINCIPAL HINTERLAND CITIES CLASSIFIED BY SIZE—PER CAPITA RECEIPTS FROM SERVICES OF THREE SIZES OF HINTERLAND CITIES CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1939-40

each size of metropolitan community. Superior access to the central city appears to be positively associated with the specialization in service functions of a hinterland city.

4. The degree of specialization which a hinterland city attains is not related in any uniform way to the size of the metropolitan center. Cities of each size in class A and class B metropolitan communities have about the same service specialization index. The B and C metropolitan communities have both higher and lower indexes than the metropolitan communities at each end of the size range.

VII

Size of Largest City Contained and the Service Specialization of Small Cities and Rural Areas (Table 12-5, Chart 12-3)

1. County areas containing no city and located in local sectors of class D metropolitan communities have a level of service activity which is $6.90 per capita per year. This is about one-fourth the specialization index for the nation as a whole. In this same type of area, the index of retail specialization was found to be more than two-thirds of the national index. Even at the most remote portions of the metropolitan community, where urban centers are most sparsely distributed, the rural areas provide only a small amount of service. It has been found that in these areas there is considerable specialization in retail trade and an apparent effort to compensate for a lack of larger urban retail centers. By way of contrast, instead of providing needed services locally these isolated areas appear either to forego services or else to rely upon the service establishments of the larger hinterland cities. County units which contain a city have a considerably

Table 12-5

...ropolitan districts - rural areas and cities of less than 10,000 inhabitants. Per capita receipts from services of counties, with cities of 10,000 or more inhabitants excluded, classified ... size of largest city contained, type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1939-40.

Size class of metropolitan community and distance (miles)	PER CAPITA RECEIPTS FROM SERVICES [illegible] ALL CITY						PER CAPITA RECEIPTS FROM SERVICES BY SIZE OF LARGEST CITY CONTAINED AND TYPE OF SECTOR[a] (DOLLARS)													
							No city			2,500 - 4,999			5,000-9,999			10,000-24,999			25,000-49,999		50,000 - over	
	No city	2,500 - 4,999	5,000 - 9,999	10,000 - 24,999	25,000 - 49,999	50,000 - over	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Inter-metropolitan	Subdominant
Class D																				
0-14	3.9	4.8	4.7	0.9	-	-	3.8	-	-	4.8	-	-	34.7	-	-	0.9	-	-	-	-	-	-
15-34	5.0	9.7	10.4	7.7	7.9	7.0	5.0	6.5	4.8	8.1	6.4	12.2	10.3	-	11.5	7.3	7.1	8.4	6.4	9.7	6.8	-
35-64	6.9	9.7	11.9	7.1	8.9	6.6	6.8	7.9	6.6	10.6	6.8	9.4	11.7	10.9	12.1	6.4	6.8	8.0	10.1	7.0	6.6	-
65-114	7.3	9.7	10.9	6.5	6.9	4.8	7.3	5.9	6.3	9.7	8.3	9.9	11.2	9.3	11.1	6.1	5.0	7.6	5.9	9.0	4.4	9.3
115-164	7.3	9.7	10.9	5.6	6.1	6.4	6.8	4.4	6.9	9.3	9.2	10.0	11.5	12.9	9.9	5.6	4.9	6.4	5.7	9.9	6.4	-
165-264	7.1	9.2	12.3	4.8	5.7	3.3	7.0	5.7	7.8	9.4	5.6	10.4	10.7	12.0	14.0	4.1	4.5	6.6	8.6	2.3	11.9	2.6
265-over	.2	12.2	10.9	6.7	4.3	8.6	7.8	14.6	8.5	10.7	6.9	10.3	16.3	22.7	18.6	6.5	-	7.1	3.4	9.5	8.6	-
All distances	6.7	9.7	11.7	5.5	7.3	6.2	6.8	5.6	6.9	9.7	7.6	10.4	11.6	11.4	11.8	6.0	5.6	7.6	7.0	7.9	6.2	5.0
Class C																						
0-14	4.6	-	2.6	12.4	1.4	3.3	4.6	-	-	-	-	-	-	2.6	-	-	12.4	-	-	-	3.3	-
15-34	6.3	10.3	11.1	7.7	8.7	6.1	6.1	7.2	5.7	9.6	8.0	11.2	10.9	-	12.2	7.9	-	7.5	5.3	3.6	-	6.6
35-64	6.6	8.7	12.2	5.4	5.3	11.9	6.7	6.7	6.3	7.9	7.6	10.5	11.3	-	13.1	5.6	-	4.4	4.6	-	31.7	7.1
65-114	5.9	9.1	10.7	5.9	6.0	2.8	6.0	4.9	6.4	9.3	10.5	8.3	10.8	9.1	11.2	6.6	1.6	5.3	6.3	1.6	2.6	3.3
115-164	5.7	8.2	9.5	3.8	6.0	3.1	6.0	5.0	5.8	7.9	8.6	9.0	9.7	9.1	9.3	3.3	3.0	7.2	7.7	3.8	1.5	2.8
165-264	5.5	7.0	9.2	5.0	3.8	2.7	5.9	4.8	5.5	6.8	7.2	7.5	9.2	7.4	10.1	4.5	2.4	6.9	4.1	3.1	2.6	3.4
265-over	5.7	13.6	14.2	6.0	3.5	-	5.6	3.7	5.9	13.8	6.8	15.0	12.4	9.6	21.4	5.8	-	6.6	-	3.5	-	-
All distances	5.9	8.6	10.6	5.6	5.6	4.3	6.0	5.3	6.0	8.2	8.1	9.6	10.4	8.8	11.6	5.7	3.0	6.4	5.8	3.3	3.5	4.6
Class B																						
0-14	-	-	11.3	8.0	9.6	-	-	-	-	-	-	-	-	-	11.3	8.0	-	-	9.6	-	-	-
15-34	7.0	10.2	24.4	10.2	6.7	10.0	-	-	7.0	14.2	9.3	3.4	26.8	-	8.4	12.1	-	5.0	8.2	4.9	9.6	9.6
35-64	7.6	10.9	8.9	8.5	7.5	10.1	7.8	-	7.4	10.7	6.9	12.6	9.7	10.1	7.5	8.2	14.0	9.1	6.2	10.5	7.6	11.9
65-114	7.0	8.4	13.9	8.8	9.2	6.4	6.3	7.0	7.5	9.7	7.1	8.1	12.7	9.1	15.8	11.5	6.5	7.9	8.1	10.8	6.4	-
115-164	8.2	9.0	10.5	6.8	4.8	10.0	7.4	9.0	8.0	8.7	8.0	11.1	10.7	10.4	-	6.8	8.2	4.4	4.5	4.9	-	10.0
165-264	5.3	9.7	10.8	6.1	6.7	16.6	4.9	5.4	5.1	9.7	-	-	8.2	11.7	-	3.2	6.6	-	-	6.7	-	16.6
265-over	10.6	10.5	9.7	-	-	-	-	10.6	-	-	10.5	-	-	9.7	9.7	-	-	-	-	-	-	-
All distances	7.1	9.7	13.1	8.4	7.5	9.6	6.9	7.3	7.2	10.5	8.6	9.5	14.8	10.6	12.3	9.0	7.4	7.6	7.8	7.0	7.7	12.4
Class A[b]																						
0-14	-	-	-	-	-	12.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.9	-
15-34	-	-	12.6	14.4	13.4	8.1	-	-	-	-	-	-	-	-	12.6	10.4	5.7	20.7	13.4	-	10.5	7.8
35-64	14.7	6.8	18.5	13.2	9.9	14.5	7.9	-	19.8	11.1	-	4.3	14.6	17.5	20.6	14.6	-	12.1	8.6	9.7	16.6	8.8
65-114	9.0	10.9	16.6	6.5	10.2	15.7	12.0	-	7.9	8.5	-	11.1	-	16.3	16.7	6.5	-	-	10.2	-	19.6	5.2
All distances	12.8	9.8	18.3	13.9	11.9	13.4	10.5	-	14.3	10.1	-	9.8	18.6	17.2	18.2	11.4	5.7	17.7	12.0	11.0	16.0	8.1

a) The independent cities of Virginia were considered to lie in no county. Counties containing central cities have been excluded.

b) In Class A metropolitan communities counties lying at distances greater than 115 miles have been excluded from the distance breakdown but are included in the totals.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.1, State tables 3 and 5; Service establishments, 1939, table 2.

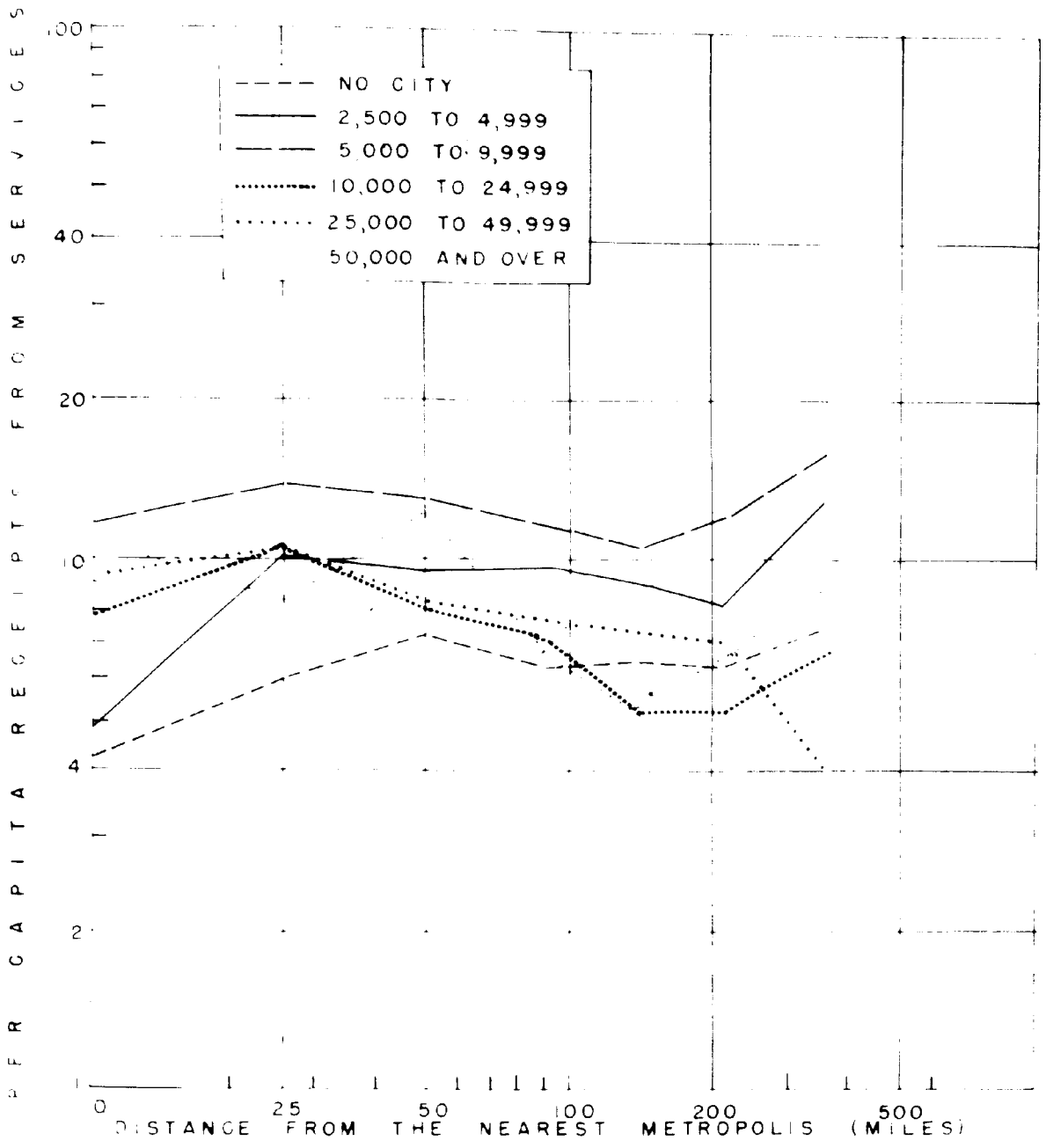


CHART 2-3 SERVICE SPECIALIZATION——RURAL AREAS AND CITIES OF LESS THAN 10,000 INHABITANTS. PER CAPITA RECEIPTS FROM SERVICES OF COUNTIES, WITH CITIES OF 10,000 OR MORE INHABITANTS EXCLUDED, CLASSIFIED BY SIZE OF LARGEST CITY CONTAINED AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

higher ratio of receipts from services to population than completely rural counties. Counties which contain a city of 5,000 to 9,999 inhabitants have a service specialization index which is almost twice that of the completely rural counties. The service index of subdominant sectors is below that of the other two sector types.

2. The local sectors tend to make up for their inaccessibility to the service institutions of major hinterland cities with a higher degree of local specialization. As for retail trade, at greater distances the local sectors tend to be more specialized than the other sectors.

3. The dependence of the small cities and rural areas upon the principal cities is also indicated by the low degree of specialization in such areas when the county in which they lie contains a city of 10,000 or more inhabitants. With increasing size of hinterland city contained, the index of specialization tends to decline to a value equal to or below the completely rural areas.

Rural areas and small cities in the vicinity of larger hinterland cities therefore have a less developed service structure than similar areas located at a distance from large hinterland cities.

4. This phenomenon of subdominance is accompanied by, or takes place within the presence of, metropolitan dominance. Those rural areas and small cities which lie in class A and B metropolitan communities tend to be more specialized than these same types of areas lying in the smaller metropolitan communities. This is particularly evident in the county areas containing a city of 10,000 or more inhabitants. A portion of this difference may be due to a greater outward diffusion of establishments from the larger cities

lying in the hinterlans of class A and B metropolises. The presence of this same tendency in areas containing no city or only a small city indicates that the general environmental conditions in the large metropolitan communities are more favorable to a more dispersed distribution of service establishments than conditions in smaller metropolitan communities.

5. The degree of specialization of rural areas of each size group tends to remain relatively unchanged or even to increase slightly with increasing distance from the metropolis. Since cities of all sizes tend to become more specialized with distance, and hinterland areas of all sizes tend to remain at about the same level of specialization or even to increase with distance, the findings from Table 12-1 that there is a gradual decrease in over all service specialization may appear to be an inconsistency between the whole and its parts. This difference arises from the fact that smaller hinterland cities and rural areas occur much more frequently in outlying areas, and hence tend to lower the total level of specialization with distance.

VIII

Summary

1. Service establishments tend to cling to urban centers to a much greater degree than retail trade. The central cities themselves are much more specialized in service activities, relative to their hinterland, than in retail trade. The principal hinterland cities are more specialized in services, relative to their trade territories, than in retail trade. The degree of specialization is directly related to the size of the hinterland city and to the size of the central city.

2. With increasing distance from the metropolis there is a gradual decrease in service specialization in each zone as a whole. The suburban areas have a relatively high degree of service specialization relative to the remainder of the hinterland. It appears that with increasing distance from the metropolis a larger proportion of the population either foregoes or performs its own service functions, or else is very heavily dependent upon the metropolis. Probably both elements would be required to explain fully the pattern of service distribution. With increasing distance from the metropolis, the hinterland cities tend to become more specialized in service functions. In this respect, the pattern is similar to retail trade. Under the same conditions of increasing distance, rural areas tend to maintain or increase slightly the degree of their service specialization. The cities and rural areas which are most specialized are those largest units which lie the greatest distance from metropolitan centers.

4. Cities lying in intermetropolitan sectors tend to be more specialized in services than cities lying in other types of sectors. Contrary to the pattern for retail trade, the cities of the local sectors are less specialized, rather than more specialized, as a correlate of their more isolated position.

5. Rural areas and small cities are heavily dependent upon the principal hinterland cities for a large proportion of their services, or else consume far fewer services per capita than do residents of larger cities. While failure to require some services is undoubtedly a partial explanation of the low degree of service specialization,

the dependence of the outlying areas upon urban places is confirmed by the steady increase in service specialization with increasing size of largest city contained, and the rising per capita values for cities with increasing distance as the radius of their trade territory becomes larger.

6. While it cannot be proved or disproved within the framework of this study, the pattern of service specialization in the metropolitan community behaves as if the following conditions were true:

Services consumed by individuals, that is, personal services (the activities performed by barber shops, beauty parlors, laundries, funeral parlors, cleaning establishments) are distributed after much the same pattern as retail trade, following the population closely and locating near the place of consumption. As the rural element of the population increases, the per capita needs for such services will decline somewhat. Business services, on the other hand, may be highly specialized institutions, and may offer their services over a very wide area. For example, adjustment and credit bureaus, collection agencies, blue printing and photostating laboratories, dental laboratories, duplicating, addressing, mailing, and mailing list services, employment agencies, freight forwarders, travel bureaus, title and abstract companies, business brokers, and many other types of service-to-business agencies may be, and usually are, highly specialized units which are able to serve a very wide area. Not only may small cities depend upon larger hinterland cities for such services almost completely; the larger hinterland cities may themselves be dependent upon the metropolis for many such services.

Specialized service establishments in the hinterland may be required to be in frequent communication with similar establishments located elsewhere. In other words, for each of the more specialized types of service, the entire metropolitan community may be served, not by independent and isolated establishments, but by an integrated and inter-functioning system, or by units sufficiently large to satisfy the requirements of many communities. The largest and most specialized units of such a system must naturally be located at a point of great accessibility. The central city, as such a point, may derive its high specialization index from this fact. The largest hinterland cities, as other highly accessible points with large trade territories, may derive their higher degree of specialization from the same conditions. Cities located on intermetropolitan routes may be more specialized than cities in subdominant sectors because of their superior means of participating in an integrated system or of serving a large area. Cities located in local sectors may be less specialized, rather than more specialized, because of the difficulty of participating in such a system or because of such lack of accessibility. As the distance from the metropolis increases, the hinterland cities may become more specialized in performing some services because of the inconvenience and cost of depending upon the metropolis, as well as because of their larger trade territories. Rural areas may have a low index of specialization because of their need for such services is not sufficiently large to warrant a local establishment, and hence they depend upon a larger center.

The metropolitan pattern of services, therefore, appears to be a dual one. To the extent that services are performed for consumption by individuals, the pattern tends to be the same as for retail trade: widely dispersed. To the extent that services are performed for consumption by other businesses, the central city appears as the focal point in a metropolitan community-wide organization, in which the principal hinterland cities are subdominant focal points for their immediate trade territories. The actual functioning of the hinterland city then appears to be a combination of metropolitan and local factors. Time, cost, and ease of access tend to limit the extent to which the hinterland can enter into a division of labor with the metropolis, and also the ability to compete and to cooperate with the metropolis. The size of the local trade territory, the complement of other enterprises which are also present in the hinterland city and which must be served by the service establishments, and the needs of the individuals and businesses lying in the local trade territory are local factors which will limit the degree of specialization in the hinterland city. The structure of the service activities in the hinterland appears to be a compromise between conditions arising from the presence of the metropolis and conditions in the local environment.

CHAPTER THIRTEEN

THE STRUCTURE OF WHOLESALE TRADE IN THE METROPOLITAN COMMUNITY

I

Introduction

As defined by the United States Census, wholesale establishments are those enterprises engaged primarily in selling merchandise to distributors for resale or to purchasers who buy for business use. Whereas the activities of retail trade are completely oriented toward, and culminate in, sales to the individual consumer, the activities of wholesale trade enterprises are oriented completely toward other businesses. As has been seen, service enterprises as a group lie between the extremes of retail and wholesale trade; services are performed for individual and commercial consumers. Wholesale trade embraces many more different types of commodities than does retail trade. Almost all products which are retailed are also wholesaled. In addition, many materials which are required in a raw or semi-finished form for the fabrication of finished products are also wholesaled. The United States Census has divided wholesale activities into 28 major business groups and 172 different types of b usiness. The 28 major groups are as follows:[1]

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[1] Included in the category of wholesale trade enterprises are manufacturer-owned sales outlets, petroleum bulk stations, agents, brokers, and assemblers of farm products. Sixteenth Census of the United States, Wholesale Trade, 1939, Vol. II, pp. 1-52

Amusements and sporting goods	Furniture and house furnishings
Automotive	Groceries (general line)
Beer, wines and liquors	Groceries and foods (specialty lines)
Chemicals and paints	Hardware
Clothing and furnishings	Jewelry
Coal and coke	Lumber and construction materials
Drugs (general line)	Machinery-equipment-supplies
Drugs and drug sundries	Metals and metal work (except scrap)
Dry goods (general lines)	Paper and its products
Dry goods (specialty lines)	Petroleum and its products
Electrical goods	Plumbing and heating equipment
Farm products--raw materials	Tobacco and products (except leaf)
Farm products--consumer goods	Waste materials
Farm supplies	All other products

II

Standards for Measuring Wholesale Specialization

In 1940, the indexes of wholesale specialization for the nation as a whole, and for each of the principal geographic divisions were as follows:

Geographic division	Establishments per thousand population	Wage earners per thousand population	Wholesale sales per person
New England	1.2	11.2	$376
Middle Atlantic	1.6	15.6	687
East North Central	1.5	11.5	422
West North Central	2.5	12.3	430
South Atlantic	1.0	9.7	256
East South Central	0.8	5.9	182
West South Central	1.4	8.6	265
Mountain	1.8	9.0	262
Pacific	2.0	18.6	519
United States	1.5	11.9	420

Although the number of wholesale establishments per 1,000 inhabitants is much lower than for either retail trade or services, the dollar value of sales per capita is about 16 times that for services and about one and one-third times that for retail trade. There are

more retail workers, but fewer service workers, per thousand inhabitants than for wholesale trade. Wholesale establishments are large on the average and have higher dollar receipts per wage earner than the other two types of commercial activities. There are great regional differences in wholesale specialization. As for retail trade and services, the lowest dollar values per capita are found in the South and the higher values in the Northeast and West. The range of these differences is greater than for either retail trade or services, being more than 120 percent of the national average per capita sales. Wholesale trade is, therefore, distributed even more unevenly between regions than is retail trade or services. The large variation arises both from relatively lower values for the South and from higher specialization of the Northeast and the West.

III

Wholesale Specialization by Distance from the Metropolis, and Size Class of Metropolitan Community (Table 13-1)

1. Central cities are extremely specialized centers of wholesale trade, compared to the remainder of the metropolitan community. The metropolis has 7 times the per capita sales, $4\frac{1}{2}$ times the employment per thousand residents, and $2\frac{1}{2}$ times the number of wholesale establishments per thousand residents that the hinterland has.

2. The general distance pattern of wholesale specialization among the hinterland populations is for a fairly constant per capita dollar value throughout all distances, tending to decline somewhat between 35 and 165 miles and to increase to its former level at more distant areas.

Table 13-1

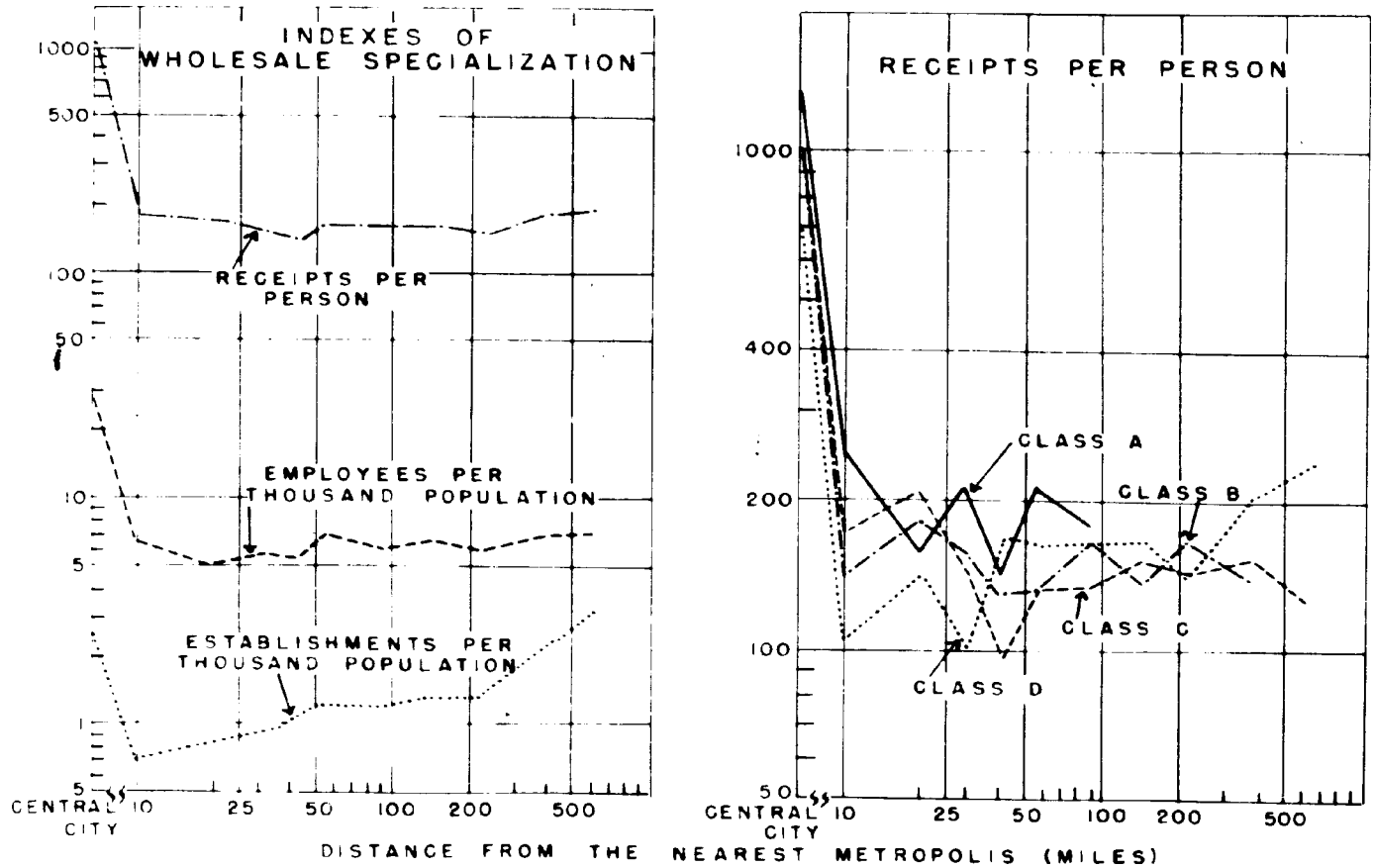
Specialisation in wholesale trade - distance: Number of wholesale establishments, number of wholesale employees, wholesale sales per unit of population, of metropolitan community areas classified by size class of metropolitan community and distance from the nearest metropolis. United States, 1939-40.

Distance from the nearest metropolis (miles)	SIZE CLASS OF METROPOLITAN COMMUNITY				
	All metropolitan communities	Class A[a]	Class B	Class C	Class D
	Wholesale sales per person (dollars)				
Central city	1172	1375	1196	1079	741
0-14[b]	177	257	143	171	107
15-24	169	159	183	211	112
25-34	149	215	155	145	100
35-44	143	143	131	95	170
45-64	161	217	135	134	163
65-114	156	180	165	136	165
115-164	158	-	138	151	168
165-264	147	-	169	145	141
265-464	183	-	139	154	208
465-over	188	-	-	127	234
All hinterland areas	160	209	151	146	156
All metropolitan communities	420	818	430	318	224
	Number of employees per 1000 inhabitants				
Central city	28.6	28.2	31.1	30.1	24.9
0-14[b]	6.3	9.0	5.1	5.4	4.7
15-24	5.1	5.5	3.5	4.3	6.2
25-34	5.5	8.4	5.2	5.4	3.6
35-44	5.4	5.1	5.0	3.7	6.4
45-64	6.6	9.7	5.7	4.5	6.8
65-114	6.0	7.6	7.0	5.1	6.2
115-164	6.4	-	5.9	5.5	7.0
165-264	5.9	-	7.9	5.5	5.2
265-464	5.2	-	5.7	6.3	7.2
465-over	7.0	-	-	4.9	8.6
All hinterland areas	6.1	8.3	5.8	5.2	6.1
All metropolitan communities	11.9	19.0	12.5	9.8	8.3
	Number of establishments per 1000 inhabitants				
Central city	2.7	2.7	2.8	2.6	2.3
0-14[b]	0.7	0.8	0.5	0.6	0.7
15-24	0.8	0.7	0.6	0.9	0.9
25-34	0.9	0.8	0.8	1.1	1.0
35-44	1.0	0.7	0.8	1.1	1.2
45-64	1.2	1.1	0.9	1.1	1.4
65-114	1.2	1.3	1.1	1.2	1.3
115-164	1.3	-	1.1	1.2	1.3
165-264	1.3	-	1.3	1.2	1.4
265-464	2.1	-	1.6	2.1	2.1
465-over	3.3	-	-	3.1	3.4
All hinterland areas	1.1	0.9	0.9	1.1	1.3
All metropolitan communities	1.5	1.9	1.4	1.4	1.4

a) In Class A metropolitan communities places lying at distances greater than 115 miles have been excluded from the distance break down, but are included in the totals.

b) Includes counties containing the central cities.

Source: Sixteenth Census of the United States. Compiled from Population, Vol I, State tables 3 and 5; Wholesale Trade, 1939, Vol.II, table 13.



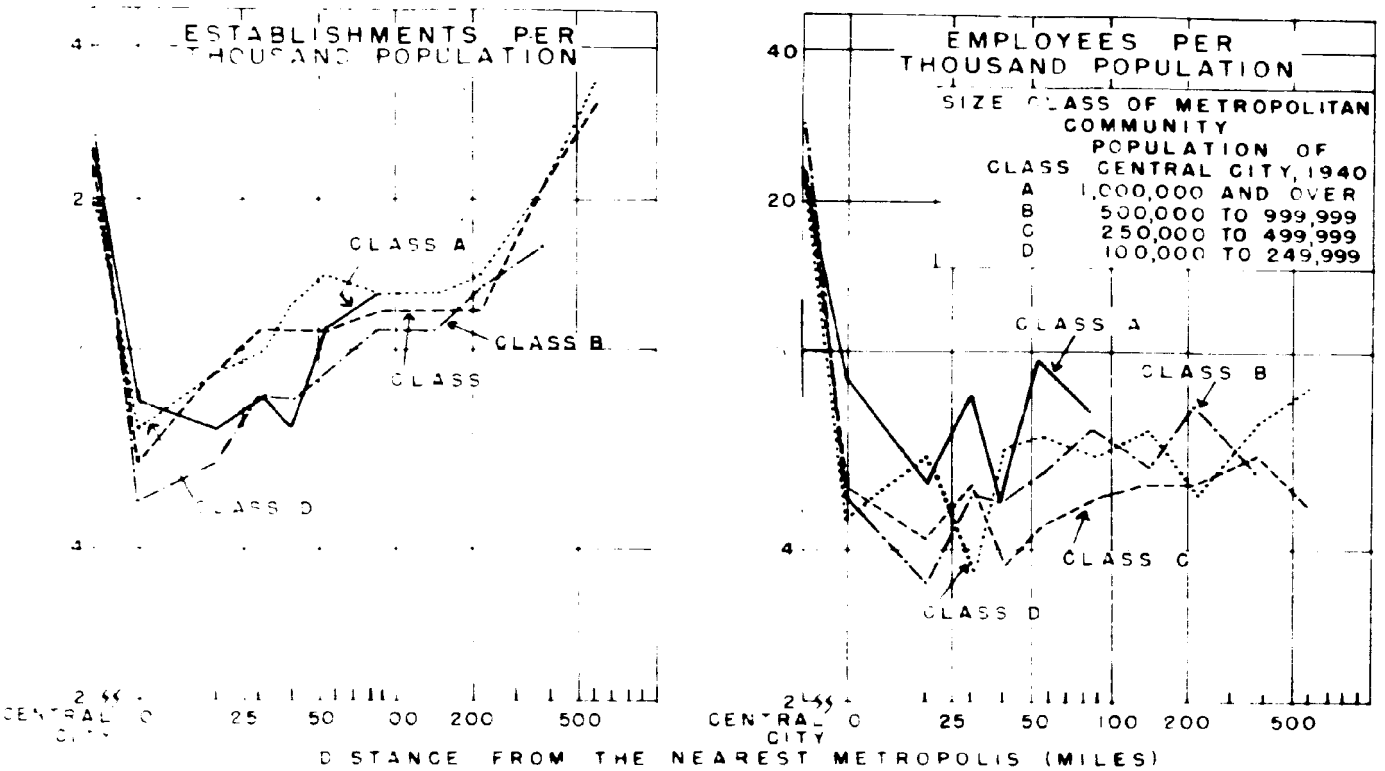


CHART 3.— SPECIALIZATION IN WHOLESALE TRADE——DISTANCE, WHOLESALE ESTABLISHMENTS, WHOLESALE EMPLOYEES, AND WHOLESALE SALES PER UNIT OF POPULATION ALL AREAS OF THE UNITED STATES CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

The number of employees per thousand tends to remain fairly steady or to increase slightly with distance. The number of establishments per thousand inhabitants rises steadily from the 0-14 mile zone to the periphery. This phenomenon is unique to wholesale trade, not being found in any of the other three functions studied. Although the frequency of the occurrence of wholesale establishments actually increases among the hinterland population with greater distance, specialization in terms of wage earners and dollar value remains comparatively unchanged, as for services. Because of these two tendencies, from the central city to the periphery there is a gradual decrease in the average number of people employed per establishment.

3. The larger the central city, the more specialized it is in wholesale trade. Class A central cities have an index of wholesale specialization which, by all standards, is much greater than that of the smaller central cities.

4. In the hinterland, the size of the central city is only slightly related to the degree of wholesale specialization. Other than the central city differences, there is no uniform difference in the degree of specialization between size classes of metropolitan communities. Throughout most distances beyond 45 miles, the class D metropolitan communities are more specialized then the class B. The hinterlands of the class A metropolitan communities tend to show a greater degree of specialization than the other three size classes at distances beyond 45 miles.

5. The tendency for wage earners per thousand to increase slightly with greater distance is manifest by all four classes of metropolitan communities. The number of establishments per thousand inhabitants also increases steadily with increasing distance. The gradual decrease in average size of wholesale establishments with increasing distance from the metropolis is a part of the pattern for each of the four sizes of metropolitan communities.

6. There is evidence that retail establishments in the suburban zone behave toward their wholesale sources of materials in the same fashion as individual consumers do: they make use of the institutions of the central city. The suburban zones of all four metropolitan communities contains a deficit of wholesale trade, relative to the zone immediately surrounding it. This deficit is of restricted scope, for in the outward zones the index of wholesale specialization is frequently smaller than the index for the inner suburban zone.

7. The distance pattern of wholesale trade in all four size classes of metropolitan communities is one of a very great specialization at the center, of a slight deficit of wholesale trade in the suburban zones, and of a fairly constant low level of specialization for the vast outlying territory. There is some evidence of a concentration of wholesale specialization in the 35-64 mile area, where the direct dominance of the central city changes to indirect dominance. The specialization at the center is so much greater than that for retail trade that it is inconceivable that the wholesale activities of metropolitan centers exist solely for supplying the metropolis and its suburbs. In fact, the degree of specialization is so great that it must be presumed that the dependence of the hinterland upon the metropolis for wholesale activities is much greater than for services. As will be shown later, the data

suggest that this scope is as broad as the metropolitan community itself, and of considerable magnitude at all distances.

IV

Wholesale Specialization by Type of Sector (Table 13-2)

1. Except for the class B metropolitan communities, the intermetropolitan sectors are considerably more specialized than the subdominant sectors. Both are much more specialized in wholesale trade than the local sectors. The seeming tendency for the class B metropolitan communities to place greater emphasis upon their subdominant connections rather than upon their intermetropolitan ones, and for the extremely great dependence of the class A metropolitan communities upon intermetropolitan sectors, has been noted before. The greater specialization of the intermetropolitan sectors in the A, C, and D metropolitan communities is indicated by all of the indexes of specialization. Not only are there higher per capita sales in such areas, but also wholesale establishments occur more frequently and employ a larger share of the resident population than in the local sectors.

2. While the higher per capita retail sales of the intermetropolitan sectors may be interpreted as being due, in part, to serving transient population, no such explanation is warranted in the case of wholesale trade. A position along a major highway appears to constitute a superior location for the distribution of commodities to other establishments. Sectors containing no major hinterland cities appear to be the least desirable location for a wholesale enterprise.

Table 13-2

Specialization in wholesale trade - sector type: Number of wholesale establishments, number of wholesale employees, and wholesale sales, per unit of population, by type of sector and size class of metropolitan community. United States, 1939-40.[a]

Type of sector	SIZE CLASS OF METROPOLITAN COMMUNITY				
	All metropolitan communities	Class A	Class B	Class C	Class D
	Wholesale sales per person (dollars)				
Intermetropolitan	183	229	167	168	183
Subdominant	166	173	172	157	163
Local	111	144	84	102	117
	Number of employees per thousand inhabitants				
Intermetropolitan	6.7	8.9	6.3	5.7	6.9
Subdominant	6.6	7.5	6.8	5.8	6.9
Local	4.5	5.5	3.4	4.1	4.8
	Number of establishments per thousand inhabitants				
Intermetropolitan	1.2	0.9	1.0	1.3	1.4
Subdominant	1.0	0.8	1.0	1.0	1.1
Local	1.2	0.9	0.7	1.1	1.4

a) Excludes central cities and counties containing central cities.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Wholesale Trade, 1939, Vol.II, Table 13.

V

The Wholesale Specialization of Hinterland Cities and of Other Areas (Table 13-3)

1. Wholesale trade in the hinterland tends to be highly centralized in the cities of 10,000 or more inhabitants rather than in rural areas and cities of less than 10,000 inhabitants. The principal cities of all zones beyond 25 miles from the metropolis are more specialized in wholesale trade than the hinterland as a whole. The degree of this specialization is much greater than that for retail trade. Rural areas and small centers are very dependent upon hinterland cities.

2. The relationship of the wholesale specialization of hinterland cities to distance is a very consistent one. As one progresses from the central city into the hinterland, the hinterland cities become progressively more specialized, until at the periphery their index of specialization is more than double that of the inner zones, and well above the hinterland average. Yet in no case does the index of specialization of any single group of hinterland cities attain the level of the central city.

3. While the principal hinterland cities become even more specialized, the remaining area of the hinterland tends to remain relatively unchanged with distance. The 265 mile and over zone constitutes an outstanding exception; here the "other areas" attain a very high index of wholesale trade. At these remote areas, where principal cities are far apart, wholesale enterprises tend to locate in smaller communities .

4. The rising level of specialization in wholesale trade is undoubtedly due in part to the familiar fact that the trade territories of distant

Specialization and wholesale trade - principal cities and other areas: Number of wholesale establishments, number of wholesale employees, and wholesale sales, per unit of population, of cities of 10,000 or more inhabitants and of other hinterland areas, by size class of metropolitan community, type of sector, and distance from the nearest metropolis. United States, 1939-40.

Type of sector and distance zone (miles)	WHOLESALES SALES PER PERSON (DOLLARS)								NUMBER OF WAGE EARNERS PER THOUSAND INHABITANTS								NUMBER OF ESTABLISHMENTS PER THOUSAND INHABITANTS							
	Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas			
	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D
All sectors																								
All sectors	278	250	405	400	128	79	77	90	10.1	9.8	14.5	15.6	6.1	2.8	2.7	3.5	1.06	1.19	1.80	1.89	0.70	0.70	0.96	1.16
0-9	386	167	182	175	237	55	59	84	13.0	5.8	5.6	7.7	9.7	1.9	1.7	3.4	1.07	0.53	0.69	0.80	0.76	0.29	0.35	0.57
10-14	113	216	553	195	38	35	115	55	3.7	8.1	18.3	8.8	1.3	1.5	2.8	8.6	0.49	0.90	1.62	1.11	0.20	0.29	0.34	0.54
15-24	185	128	691	252	111	235	72	68	6.9	4.4	10.2	11.4	3.0	2.7	2.6	2.7	0.91	0.79	1.49	1.20	0.37	0.50	0.71	0.72
25-34	369	225	256	177	71	72	98	72	12.2	8.2	9.9	7.0	4.9	1.8	3.5	2.3	1.21	1.09	1.38	1.35	0.40	0.56	0.99	0.92
35-44	249	228	210	355	98	64	78	80	10.1	8.9	7.9	13.3	3.0	2.3	3.1	3.0	1.43	1.17	1.37	1.78	0.45	0.50	1.02	0.99
45-64	340	292	301	352	126	53	82	99	14.6	12.6	11.7	13.8	6.1	2.1	2.2	4.5	1.48	1.58	1.77	1.92	0.81	0.60	0.91	1.23
65-114	325	353	373	486	104	76	76	84	13.1	15.2	14.7	17.0	4.7	3.1	2.7	3.4	1.70	1.73	1.88	2.11	1.11	0.86	0.98	1.09
115-164	-	384	534	556	-	76	75	95	-	15.4	19.6	25.1	-	3.5	2.7	3.6	-	2.07	2.33	2.32	-	0.88	0.94	1.16
165-264	-	484	568	546	-	74	76	89	-	18.3	21.7	19.6	-	4.7	2.8	3.4	-	2.50	2.49	2.50	-	0.92	0.96	1.30
265-over	-	-	423	535	-	139	100	127	-	-	19.0	20.1	-	5.7	3.7	4.3	-	-	2.42	2.46	-	1.55	2.31	2.22
Intermetropolitan sectors																								
Intermetropolitan	294	262	437	434	114	90	82	90	10.5	10.4	15.3	16.4	6.1	2.8	2.7	3.3	1.09	1.29	1.86	1.93	0.62	0.74	1.10	1.21
0-9	449	132	192	299	96	-	-	-	15.0	6.5	6.2	10.4	3.2	-	-	-	1.17	0.60	0.77	1.11	0.44	-	-	-
10-14	117	256	712	158	38	39	156	55	4.2	9.6	24.0	7.6	1.3	1.7	2.7	8.6	0.56	1.07	2.02	1.07	0.20	0.31	0.31	0.54
15-24	193	123	4180	297	128	293	68	83	7.0	3.4	26.0	13.0	2.7	2.6	2.6	2.2	0.91	0.79	3.17	1.31	0.41	0.59	0.96	0.68
25-34	396	180	327	168	87	91	74	69	12.7	7.0	11.9	6.9	7.1	2.1	2.6	2.3	1.24	1.14	1.68	1.27	0.42	0.61	1.01	0.90
35-44	278	275	224	401	100	37	72	91	10.2	10.4	8.4	14.0	2.4	1.2	2.6	3.6	1.40	1.34	1.44	1.77	0.36	0.38	1.10	1.10
45-64	309	309	288	355	158	43	98	108	13.8	13.5	11.7	14.5	8.3	1.9	2.5	4.0	1.53	1.72	1.76	1.90	0.86	0.62	0.94	1.31
65-114	284	360	345	557	60	85	77	81	10.8	15.6	13.8	18.3	2.6	3.4	2.6	2.9	1.75	1.80	1.82	2.09	0.68	0.91	1.02	1.07
115-164	-	279	546	579	-	89	79	91	-	13.3	19.1	25.0	-	4.3	2.8	3.3	-	2.22	2.32	2.39	-	0.99	1.01	1.13
165-264	-	247	656	599	-	111	79	89	-	8.5	24.5	21.3	-	10.6	2.4	3.5	-	2.06	2.54	2.64	-	1.86	1.03	1.31
265-over	-	-	425	501	-	-	107	126	-	-	18.7	20.1	-	-	4.3	4.5	-	-	2.55	2.33	-	-	3.02	2.11
Subdominant sectors																								
Subdominant	246	269	408	371	75	70	58	81	9.[illegible]	10.4	15.4	15.2	4.4	2.9	2.0	3.6	0.97	1.19	1.78	1.80	0.41	0.72	0.67	0.88
0-9	107	165	537	80	-	-	-	-	4.3	6.0	12.2	3.9	-	-	-	-	0.60	0.56	0.43	0.50	-	-	-	-
10-14	119	43	8	-	-	-	40	-	2.4	1.8	0.4	-	-	-	3.8	-	0.29	0.21	0.27	-	-	-	0.27	-
15-24	123	147	208	150	35	35	52	57	4.8	5.6	8.0	7.4	1.2	3.6	1.6	1.7	0.89	0.86	1.22	0.94	0.18	0.43	0.48	0.30
25-34	281	267	181	153	21	44	38	40	11.9	9.3	7.8	5.1	1.0	1.3	2.0	1.2	1.09	1.11	0.96	1.22	0.28	0.38	0.78	0.49
35-44	208	152	-	216	62	220	55	55	10.5	6.9	-	12.4	2.4	8.7	2.0	2.0	1.59	0.97	-	1.54	0.69	1.03	1.09	0.68
45-64	419	293	546	360	100	70	48	66	16.9	12.2	14.2	12.0	5.5	1.9	1.4	2.5	1.26	1.37	1.90	1.90	0.67	0.47	0.73	0.87
65-114	398	339	514	402	73	38	76	92	17.3	14.9	20.0	16.[illegible]	4.4	1.3	2.5	5.2	1.61	1.54	1.97	2.13	1.00	0.51	0.85	0.91
115-164	-	490	496	535	-	58	60	87	-	17.8	19.3	26.7	-	2.3	2.1	3.9	-	1.91	2.20	2.21	-	0.80	0.70	0.85
165-264	-	507	461	519	-	70	48	76	-	19.2	17.2	18.8	-	3.8	1.[illegible]	2.5	-	2.54	2.30	2.01	-	0.76	0.51	0.91
265-over	-	-	613	1026	-	140	65	108	-	-	28.1	20.8	-	6.3	2.[illegible]	3.9	-	-	2.26	3.57	-	1.62	0.34	2.64
Local sectors																								
Local	196	115	227	291	121	72	85	94	7.5	4.5	9.1	12.4	4.7	3.[illegible]	[illegible]	[illegible]	0.94	[illegible]	1.51	1.74	0.89	0.74	1.02	1.31
0-9	226	93	110	156	-	-	-	-	7.7	3.0	3.3	8.2	-	-	-	-	0.85	0.25	0.57	0.77	-	-	-	-
10-14	20	109	147	284	-	22	42	-	0.5	4.1	3.4	11.7	-	0.9	1.6	-	0.11	[illegible]	0.61	1.21	-	0.21	0.72	-
15-24	162	76	196	153	112	112	87	77	7.2	3.3	8.2	8.6	3.7	2.9	3.0	3.[illegible]	0.85	[illegible]	1.79	1.00	0.36	0.25	0.52	0.84
25-34	149	66	129	241	82	48	155	89	5.8	3.2	5.3	9.1	2.1	1.7	[illegible]	2.[illegible]	1.05	[illegible]	1.51	1.88	0.49	0.74	0.98	1.07
35-44	204	76	30	249	101	53	88	67	8.6	3.1	1.6	10.9	6.2	2.2	3.9	[illegible]	[illegible]	[illegible]	[illegible]	1.96	0.84	0.53	0.91	0.89
45-64	322	117	206	306	107	62	63	97	13.2	5.7	9.3	10.8	3.9	2.8	2.0	[illegible]	[illegible]	[illegible]	1.23	1.90	0.86	0.67	0.91	1.25
65-114	-	326	323	333	198	77	73	83	-	13.0	11.8	13.1	8.7	3.4	2.9	[illegible]	-	[illegible]	[illegible]	2.15	1.97	0.94	0.94	1.21
115-164	-	199	646	455	-	91	79	105	-	9.5	29.8	22.3	-	4.7	[illegible]	3.8	-	[illegible]	[illegible]	2.08	-	0.82	1.00	1.34
165-264	-	-	360	306	-	25	95	94	-	-	21.7	12.1	-	0.7	[illegible]	[illegible]	-	-	[illegible]	2.38	-	0.43	1.20	1.47
265-over	-	-	316	480	-	133	98	131	-	-	14.7	20.0	-	2.7	[illegible]	4.0	-	-	[illegible]	2.58	-	1.22	1.72	2.46

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Wholesale Trade, 1[illegible], Vol.[illegible], Table 13.

cities are larger than those of cities nearer the metropolis, and also contain more population. As for retail trade, this rising index is not an indication that the distant areas are less dependent upon the metropolis. The level of wholesale specialization of the central city is so great that if the hinterland areas were to become entirely self-sufficient, and required wholesale trade at the average rate of the metropolitan community, it would be necessary to raise their per capita sales by $260, or 162 percent. Expressed in another way, if $420 is the average per capita requirement for central cities, as well as for the entire metropolitan community, then central cities perform wholesale activities in excess of their own requirements to the extent of $712 for every man, woman, and child resident in central cities. By this measure, the central city performs sufficient wholesaling in excess of its own requirements to support 2.8 times its own population. From this there can be little doubt that the wholesale enterprises of the central cities serve an extremely broad expanse of hinterland. Their activities are one of the most important elements for which outlying areas are dependent upon the metropolis.

5. The lower rate of specialization of local sectors applies to both principal cities and to other areas, but primarily to the cities. The rural and small city areas of class C and D local sectors tend to be more specialized in wholesale trade than the intermetropolitan and subdominant sectors. Outlying areas in class A and B local sectors tend to be less specialized than the other types of sectors. Lack of access to the metropolis is apparently associated with a low rate of wholesale special-

ization; high accessibility is associated with a higher rate of specialization.

6. The dependence of the outlying areas upon wholesale institutions of the principal cities is demonstrated by the subdominant sectors, where the index of specialization is lower than any other type of sector.

7. From the foregoing it must not be concluded that small cities and other areas do not play a sizeable part in the wholesale servicing of the hinterland population. Between one-fifth and one-fourth of the per capita requirements of the class A, B, C, and D metropolitan communities are provided by such areas. Since wholesale establishments serve business enterprises primarily, and since it has been shown that the rate of retail and service specialization is lower in these areas than in the principal hinterland cities, small cities and outlying areas may be expected to have a lower rate of wholesale specialization. This may be stated in another way by saying that there is no need for a wholesale establishment to locate nearer to the ultimate consumer than the retail or service establishments which it serves. Although it is evident that by remaining in the central city and in the largest hinterland cities the wholesale function as a whole is much more removed from the consumer than is retail trade, wholesale establishments are not as far removed from their customers as the per capita indexes might lead one to believe. Consequently, the dependence of business establishments in small cities and outlying areas upon the wholesale establishments of the principal hinterland cities is undoubtedly not as great as one could conclude from the direct comparison of wholesale trade with population.

8. Although the per capita dollar value of wholesale activity attains the level of the central city in no group of hinterland cities, the number of wholesale establishments per 1,000 residents in distant cities of class C and D metropolitan communities is even higher, in some instances, than in the central city. This denotes a much smaller average size of establishment in the outlying areas. In local areas also the number of establishments per thousand inhabitants t ends to increase with distance, whereas the volume of sales remains about constant. Hence, wholesale enterprises do not decrease in frequency, either in hinterland cities or in outlying areas, as the distance from the metropolis increases. They merely become smaller in average volume of sales.

VI

Wholesale Specialization and Size of Hinterland City (Table 13-4)

1. The larger the size of the hinterland city, the greater the degree of wholesale specialization becomes. This tendency is most noticeably present at distances of more than 65 miles in all classes of metropolitan communities.

2. The wholesale specialization of some of the largest hinterland cities is as high or higher than that of the central city itself in the class D metropolitan communities. A city of 50,000 or more inhabitants lying 65 miles or more from the central city, tends to be highly specialized. Undoubtedly, there are many individual hinterland cities of 25,000 or more inhabitants which are as specialized as their central city.

3. The wholesale specialization of all sizes of hinterland cities

Table 13.4

Specialization in wholesale trade - principal hinterland cities classified by size: Per capita wholesale sales of hinterland cities of 10,000 or more inhabitants, classified by size, type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1939-40.

Size of metropolitan community and distance (miles)	PER CAPITA WHOLESALE SALES (DOLLARS) BY SIZE OF HINTERLAND CITY AND TYPE OF SECTOR									
	10,000-24,999				25,000-49,999[a]			50,000-over[a]		
	All sectors	Inter-metropolitan	Subdominant	Local	All sectors	Inter-metropolitan	Subdominant	All sectors	Inter-metropolitan	Subdominant
Class D										
0-14	141	139	98	85	137	418	65	203	96	89
15-34	198	200	175	200	176	181	162	268	294	121
35-64	238	211	272	275	329	329	328	529	529	-
65-114	304	277	281	333	498	599	429	748	783	389
115-164	497	503	661	285	625	673	403	591	591	-
165-264	491	489	374	306	896	1045	714	540	679	444
265-over	371	304	-	480	617	538	1026	757	757	-
All distances	305	301	393	285	421	452	374	518	562	332
Class C										
0-14	88	87	8	110	216	232	537	516	516	-
15-34	825	1048	10	155	155	122	166	309	449	213
35-64	236	250	-	184	225	225	-	580	607	544
65-114	343	295	411	323	385	314	743	415	417	406
115-164	498	497	386	64	393	443	318	672	679	643
165-264	341	319	493	360	670	823	328	655	753	479
265-over	387	425	-	314	613	-	613	-	-	-
All distances	357	394	411	250	329	328	409	504	550	405
Class B										
0-14	60	78	29	61	216	151	396	242	324	122
15-34	129	143	102	72	140	115	182	258	200	245
35-64	178	203	124	96	203	204	202	399	424	349
65-114	287	354	204	324	246	248	238	433	372	535
115-164	246	278	192	190	620	-	620	-	-	-
165-264	237	247	235	-	556	-	556	933	-	933
265-over	-	-	-	-	-	-	-	-	-	-
All distances	141	134	136	110	250	177	345	324	358	308
Class A										
0-14	100	104	131	68	110	92	37	393	436	122
15-34	136	125	155	159	218	218	-	329	340	230
35-64	251	127	391	288	257	261	244	357	369	433
65-114	214	214	-	-	330	341	300	456	-	456
All distances	149	129	205	167	194	192	181	378	392	302

a. By definition local sectors contain cities of 25,000 or more inhabitants only at distances of less than 10 miles. Cities of this size in local sectors are included in the "all sectors" total.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Wholesale Trade, 1939, Vol.II, table 13.

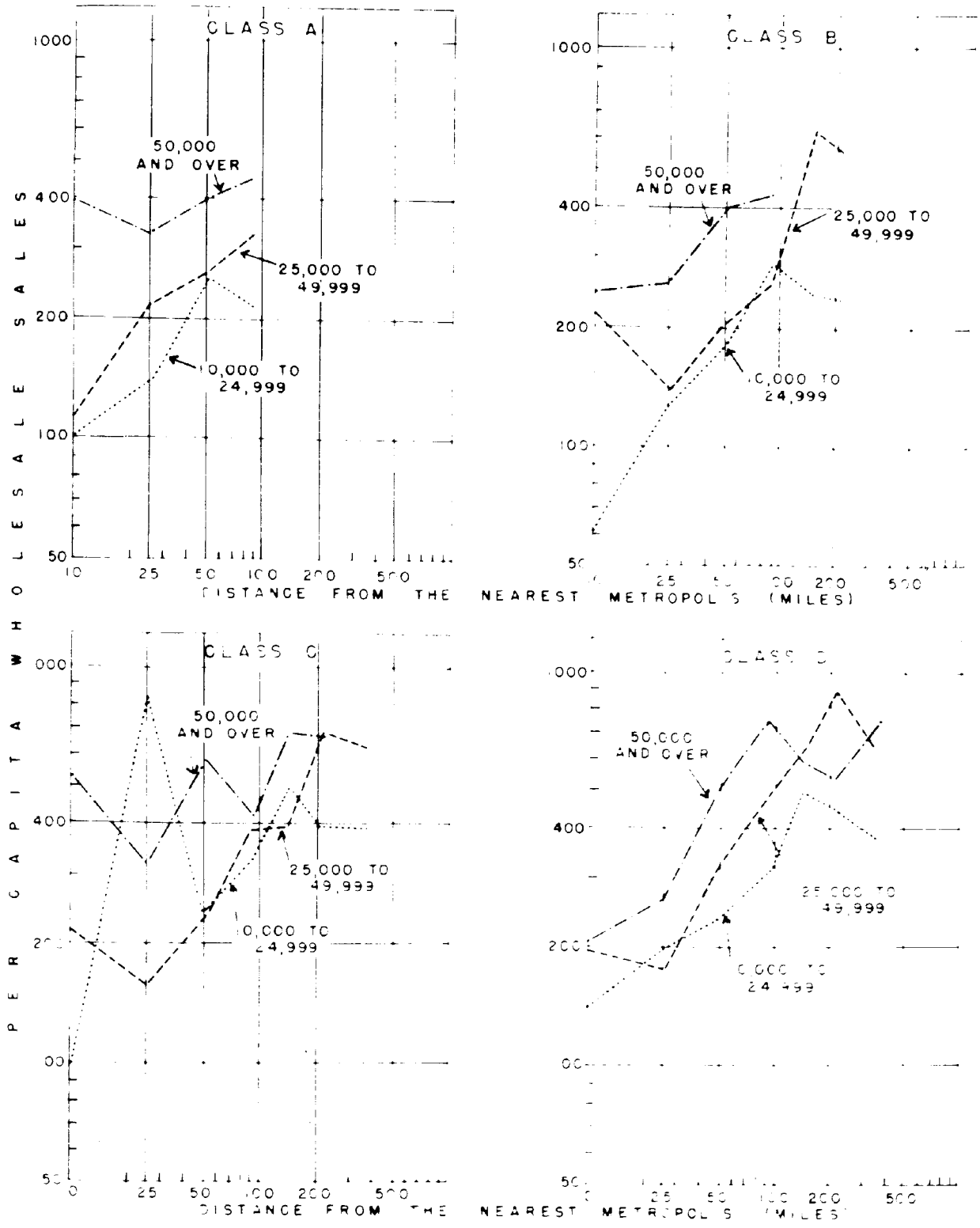


CHART 13-2 SPECIALIZATION IN WHOLESALE TRADE——PRINCIPAL HINTERLAND CITIES CLASSIFIED BY SIZE PER CAPITA WHOLESALE SALES OF THREE SIZES OF HINTERLAND CITIES CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS, UNITED STATES 1939-40

tends to increase with distance. Those cities lying within the suburban area of central cities tend to have very low indexes of specialization. At about 35 miles the index tends to rise rapidly, indicating that the area of direct dominance of the central city ends at about this point. In the 35-64 mile zone the increased wholesale specialization of the principal cities indicates a definite change in the pattern of wholesale distribution.

4. Since the hinterland cities lying at a distance have a larger trade territory than those lying within 65 miles of the metropolis, a portion of the rising level of specialization with increasing distance represents a wider area of service rather than increasing independence of the central city. The fact that some individual hinterland cities attain a level of specialization in wholesale trade which is even greater than that of their central cities indicates that at the most distant areas the principal cities perform a very high proportion of all of the wholesale functions. Because the wholesale requirements of the central city, and of various enterprises in principal hinterland cities and other areas are unknown, it cannot be determined whether or not the metropolis performs a considerable volume of services at this distance. Some indication can be obtained from Table 13-1. The "all metropolitan community" average of $420 per capita is $232 greater than the specialization index of the most distant and specialized zone. If this comparison is a valid measure, then all parts of all metropolitan communities are dependent, to some extent, upon their central cities, with the possible exception of the small area which lies 465

miles or more from a class D metropolis.[2]

VII

Wholesale Specialization in "Other Areas", Classified by Size of Largest City Contained (Table 13-5)

1. As has been found to be true for retail trade and services, the presence of a hinterland city, and the size of that city, modifies considerably the extent of wholesaling in rural areas. Counties which contain no city have very low indexes of wholesale specialization, compared to counties which do contain cities, and to cities themselves. The indexes of specialization of counties containing a city of 2,500 - 4,999 is about 60 percent higher than the index of counties with no city. A similar, but smaller, difference exists between counties containing a city of 5,000 - 9,999 and those containing a city of less than 5,000 inhabitants. The increase in specialization with increasing size of city occurs at all distances, in all sizes of metropolitan communities. Thus, wholesaling tends to be concentrated in hinterland cities rather than in hinterland rural areas. The general level of wholesaling in a given area tends to rise with each increase in the size of the largest city located there.

2. There can be little doubt that when wholesale establishments are present in the hinterland cities, great dependence is placed upon them. The outlying areas in counties containing cities of 10,000 or more inhabitants are no more specialized in wholesale trade than areas containing no cities, although these areas contain smaller cities and

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[2] The comparison of estimated wholesale requirements with actual wholesale sales, made in Chapter Three, indicates that this is the case.

Table [illegible]

[illegible] wholesale trade — area of 48 cities (cities with less than 10,000 inhabitants) [illegible] wholesale sales of counties, with cities [illegible] counties as exclusive, classified by size of [illegible] metropolitan, type of sector, size class of metropolitan community, and [illegible] — preliminary data, 1939.

[illegible] PER CAPITA WHOLESALE SALES BY SIZE OF NEAREST CITY DISTANCE AND TYPE OF SECTOR[a] (DOLLARS

Nearest city and distance	Number of counties	No city	2,500 - 5,000	5,000 - 10,000	10,000 - 25,000	25,000 - 50,000	50,000 over	No city Inter-metropolitan	No city Subdominant	No city Local	2,500 - 4,999 Inter-metropolitan	2,500 - 4,999 Subdominant	2,500 - 4,999 Local	5,000 - 9,999 Inter-metropolitan	5,000 - 9,999 Subdominant	5,000 - 9,999 Local	10,000 - 24,999 Inter-metropolitan	10,000 - 24,999 Subdominant	10,000 - 24,999 Local	25,000-49,999 Inter-metropolitan	25,000-49,999 Subdominant	50,000-over Inter-metropolitan	50,000-over Subdominant
Class B																							
0-14	8	42	244	22	-	-	4	-	-	42	-	-	244	-	-	28	-	-	-	-	-	-
15-34	71	47	124	42	61	49	64	-	66	56	24	67	102	-	107	54	44	69	57	54	43	-
35-64	74	93	128	61	45	42	92	22	59	101	63	40	144	97	114	48	66	47	105	60	82	-
65-114	664	108	121	96	80	86	69	47	56	106	137	110	94	110	105	68	45	77	56	110	45	63
115-164	64	134	142	72	77	70	59	31	57	107	92	129	137	134	114	45	64	98	74	124	80	-
165-214	54	93	127	74	72	141	74	59	46	107	84	73	112	84	140	61	97	103	85	58	64	98
215-over	120	125	127	113	98	96	115	121	132	120	89	139	182	221	150	131	-	96	73	39	95	-
All distances	98	102	124	70	77	70	78	40	65	101	90	106	123	128	123	64	63	83	74	87	67	86
Class C																						
0-14	12	-	15	50	42	144	12	-	-	-	-	-	-	16	-	-	60	-	-	-	154	-
15-34	107	114	96	64	32	68	39	36	269	67	52	173	97	-	74	63	-	43	52	60	-	57
35-64	63	75	120	51	45	197	60	49	41	76	52	84	107	-	94	50	-	52	50	-	2205	31
65-114	40	82	126	46	54	27	93	37	46	95	76	57	118	142	115	52	16	34	52	24	24	35
115-164	63	101	97	65	32	31	42	36	45	37	96	119	100	88	48	31	36	57	122	31	9	18
165-264	50	77	94	95	171	56	69	40	63	82	58	89	92	80	109	65	29	141	226	52	34	30
265-over	77	118	147	76	61	-	84	79	67	143	13	123	165	108	204	73	-	82	-	51	-	-
All distances	59	88	108	66	67	87	69	40	65	90	70	100	109	112	107	51	31	70	74	39	114	39
Class B																						
0-14	-	-	20	11	59	-	-	-	-	-	-	-	-	-	22	11	-	-	59	-	-	-
15-34	32	81	75	133	78	303	-	-	32	120	61	19	72	-	72	90	-	257	99	53	430	23
35-64	58	95	65	37	65	59	75	-	36	83	29	130	66	83	59	36	60	34	18	171	32	101
65-114	49	71	113	59	58	70	34	61	58	84	53	81	106	47	124	124	25	40	63	51	70	-
115-164	75	85	91	75	32	22	132	37	100	97	96	92	105	77	-	77	78	67	45	26	-	22
165-264	32	152	95	57	41	44	96	25	25	152	-	-	121	86	-	24	55	-	-	41	-	144
265-over	54	51	201	-	-	-	-	84	-	-	53	-	-	203	135	-	-	-	-	-	-	-
All distances	52	85	96	59	50	126	64	38	53	92	64	91	93	110	90	61	43	69	60	60	164	90
Class A[b]																						
0-14	-	-	-	-	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43	-
15-34	-	-	91	56	159	26	-	-	-	-	-	-	-	-	91	34	28	108	159	-	35	24
35-64	97	135	121	150	117	102	90	-	101	76	-	168	112	201	109	212	-	99	106	154	122	46
65-114	122	219	125	52	61	49	137	-	117	180	-	223	-	49	159	62	-	-	61	-	37	81
All distances	109	178	134	90	136	76	101	-	113	118	-	212	158	196	109	84	28	105	138	147	94	40

a) The independent cities of Virginia were considered to lie in no county. Counties containing central cities have been excluded.

b) In Class A metropolitan communities counties lying at distances greater than 115 miles have been excluded from the distance breakdown, but are included in the totals.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Wholesale Trade, 1939, Vol.II, Table 13.

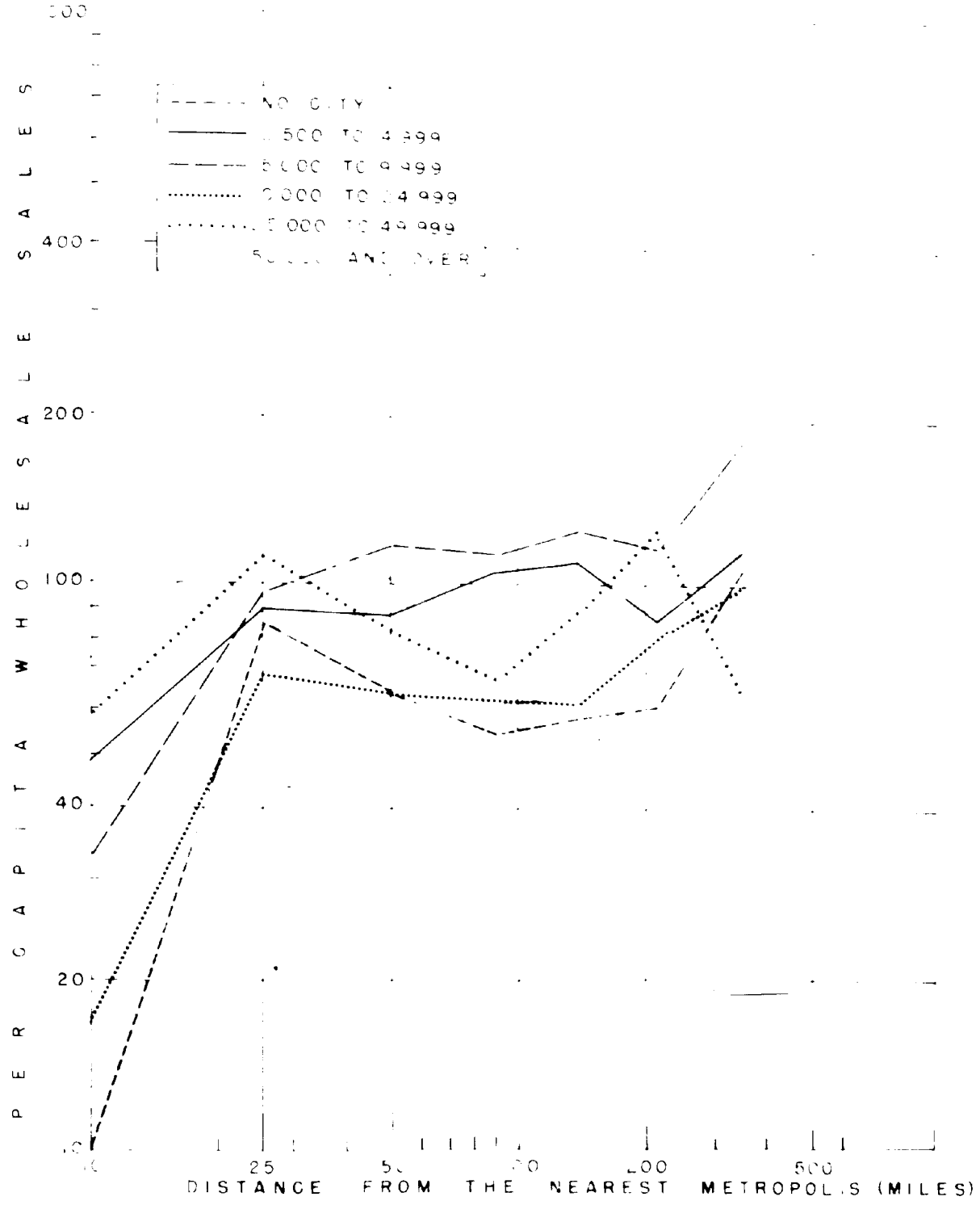


CHART 13-3 SPECIALIZATION IN WHOLESALE TRADE——— RURAL AREAS AND CITIES OF LESS THAN 10,000 INHABITANTS. PER CAPITA WHOLESALE SALES OF COUNTIES, WITH CITIES OF 10,000 OR MORE INHABITANTS EXCLUDED, CLASSIFIED BY SIZE OF LARGEST CITY CONTAINED AND DISTANCE FROM THE NEAREST METROPOLIS. UNITED STATES, 1939-40

considerably greater concentrations of population. The subdominant sectors have a much lower index of specialization than the intermetropolitan and local sectors in those counties lacking a city of 5,000 or more inhabitants.

3. In the absence of major hinterland cities and of intermetropolitan transportation routes, "other areas" of the local sectors tend to develop their own wholesale structure. In such locations the index of wholesale specialization is higher than for other sector types. This same tendency is present in all sectors at all distances of greater than 115 miles from the metropolis. At this distance, the sparsity of the principal hinterland cities, and the inaccessibility of the metropolis itself, seems to foster such a development.

4. Since wholesale enterprises serve other businesses primarily, it is not surprising that they are not as widely dispersed in the hinterland as retail trade. The locations chosen will be near their consumers--other businesses. Hence, the principal hinterland city is the logical location. Where large hinterland cities are far apart, the small hinterland city must be chosen. If the smaller hinterland cities are sparsely distributed, a village or other rural area is the only choice. In addition, it appears that a certain proportion of the wholesale establishments, perhaps because of the type of merchandise which they handle and because of the pattern of distribution of retail trade and service institutions, must locate in rural areas. From Table 13-5 a dispersal of wholesale sales to the extent of about $50-$60 per person, or 12 to 15 percent of the national average, appears to require such a location. While the activities of such establishments are not

known, it can be surmised that they deal in wholesale groceries and other non-specialized commodities handled by the most widely dispersed retail establishments, in farm-consumed commodities, and in the purchasing and collection of farm products or other locally produced commodities.

VIII

Summary

1. The central city is several times more specialized in wholesale trade than any hinterland area. It is also more specialized than most hinterland cities. In fact, a very high degree of specialization in wholesale activities, when accompanied by greater than average specialization in the other activities, appears to be one mark of the metropolis.

2. The larger central cities are more specialized than the smaller classes of central cities. Large hinterland cities are more specialized than smaller ones. Counties containing cities are more specialized than counties containing no cities. From all angles, there is evidence of a great preference for an urban location. The dispersing of wholesale trade into small cities and rural areas seems to be practiced only when service to the more dispersed retail and service establishments appears to require it.

3. With increasing distance from the metropolis, the principal hinterland cities become progressively more specialized. At the greatest distances the other areas are also more specialized. Undoubtedly some of this specialization is due to the larger average trade area of hinterland cities with increasing distance. Yet the extreme specialization of the central city indicates that the metropolis performs wholesale functions for a wide area. Retail and service establishments over a

very wide area appear to be dependent upon the wholesale establishments of the metropolis as a source of supply. The scope of this dependence appears to decrease with distance. For some wholesale activities, however, there is probably almost complete dependence in the entire metropolitan community upon the wholesale establishments of the metropolis.

4. Cities in intermetropolitan sectors tend to be more specialized in wholesale trade than cities in other types of sectors. Local sectors are much less specialized than other types of sectors.

5. When one considers the fact that the Census classifies wholesale trade into 172 different types of business, and that the entire hinterland as a whole is dependent upon the metropolis for a large share of so many different types of activity, that small hinterland cities are heavily dependent upon large hinterland cities, and that rural areas are dependent upon all cities for many, if not most, of these activities, it becomes evident that a vast and complex system of interdependencies between the various parts of the metropolitan community exists for wholesale trade alone. The most specialized units of this system occupy positions of dominance and subdominance, positions which will permit them maximum access to other elements of the system and to the maximum number of their consumers. The variables of distance from the metropolis and type of sector show differences which refer to the dominance of the metropolis. Size of hinterland city and of largest city contained show differences which refer to the subdominance of hinterland cities. These differences assume a pattern which indicates a very extensive system of intercommunity interdependency and exchange.

CHAPTER FOURTEEN

THE STRUCTURE OF MANUFACTURES IN THE METROPOLITAN COMMUNITY

I

Introduction

Considerable attention has been given in recent years to the problem of the economic factors of industrial location.[1] From these studies it has been demonstrated that the functioning and survival of industry at any given location is influenced by many variables, among which are sources of materials, power and fuel, water, transportation, markets, labor supply, capital, and management. Because the problem of industrial location does contain so many different variables, there is a surprisingly wide latitude for choice. There are many combinations of circumstances under which industry can prosper and thrive. The possible combinations also vary with the type of industry. Since most manufactured products contain not one, but several, different types of raw materials or other components, the location must be one which will permit their economical assemblage, and need not necessarily be at the actual source of supply for any one raw material. Hence, although the manufacturing industry, like agriculture, cannot

[1] Outstanding examples are: E. M. Hoover, Location Theory and the Shoe and Leather Industries, (Cambridge: Harvard University Press, 1939); Daniel Creamer, Is Industry Decentralizing, (Philadelphia: University of Pennsylvania Press, 1935); National Resources Planning Board, Industrial Location and National Resources, (Washington, D. C.: Government Printing Office, 1942)

ignore resource patterns completely, its distribution is not determined solely by resource considerations. The other factors are of such importance that:

> There are relatively few industries in which one location factor far outweighs any other. More commonly, several factors play an important part in the determination of a location.[2]

Because the functions whose distribution has been studied thus far are primarily consumer oriented, one may anticipate that the pattern of manufacturing specialization will differ from them considerably through the operation of other factors which are unique to manufacturing enterprises.

The United States Census of Manufactures classified all manufacturing activities into 20 major industry groups in 1939:[3]

Food and kindred products
Tobacco manufactures
Textile-mill products and other fiber manufactures
Apparel and other finished products made from fabrics and similar materials
Lumber and timber basic products
Furniture and finished lumber products
Paper and allied products
Printing, publishing, and allied industries
Chemicals and allied products
Products of petroleum and coal
Rubber products
Leather and leather products
Stone, clay, and glass products
Iron and steel and their products, except machinery
Nonferrous metals and their products
Electrical machinery
Machinery (except electrical)
Automobiles and automobile equipment
Transportation equipment except automobiles
Miscellaneous industries

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[2]National Resources Planning Board, op. cit., p.3

[3]Sixteenth Census of the United States. Manufactures, 1939, Vol. IV,p.2.

These major categories are subdivided into 446 different types of manufacturing industries. From the point of view of the variety of products and the processes of work involved, the operation of a manufacturing industry is a much more specialized task than the operation of a retail, wholesale, or service business. The greater number of categories which the Census has found it necessary to use in classifying industries by type is indicative of this fact.

II

Standards for Measuring Manufacturing Specialization

The indexes of manufacturing specialization for the United States and for each geographic division in 1940 were:

Geographic division	Establishments per thousand population	Wage earners per thousand population	Value added by manufacture per resident	Value of products per resident
New England	1.9	113.0	$288	$580
Middle Atlantic	2.0	81.7	267	582
E. N. Central	1.5	82.5	292	660
W. N. Central	1.1	28.3	101	282
South Atlantic	1.0	55.4	125	302
E. S. Central	0.7	33.2	77	182
W. S. Central	0.8	20.1	63	196
Mountain	1.0	16.7	66	198
Pacific	1.8	44.1	164	390
United States	1.4	59.9	$188	$432

For each person in the nation an average of $188 was added to the value of products through manufacture. The total value of manufactured products was $432 per person, or about midway between the per capita value index for retail and that for wholesale trade. The number of manufacturing establishments per 1,000 inhabitants is 1.4 This is a

frequency of occurrence which is about equal to that of wholesale establishments, less than one-third that of service establishments, and less than one-ninth that of retail establishments. These comparisons do not show completely the relative importance of manufacturing as one of the sustenance activities. Since the basic process is not one of transferring ownership, but one of transforming materials, the number of people employed is necessarily high in relation to the value of the product. Although the value of manufactured products per person is roughly equal to the average of wholesale and retail trade, the number of people employed in manufacturing in the United States is 60 per thousand—more than twice that of retailing, seven times that of services, and five times that of wholesale trade. Manufacturing provides employment more frequently than all of these other activities combined.

Manufacturing specialization varies among regions by about the same amount as wholesale trade. The range in per capita value added between the most concentrated region and the least concentrated one is about 122 percent of the national average. The great variation is created by the very low degree of specialization of the South Central and Mountain divisions and the very high degree of specialization of the northeastern divisions.

III

Manufacturing Specialization and Distance from Metropolitan Centers of Each Size Class (Table 14-1 and Chart 14-1)

1. The population of central cities is no more specialized in manufacturing, on the whole, than the residents of the areas lying within

Table 134

Specialization in manufacturing - distance: Number of manufacturing establishments, number of manufacturing wage earners, and dollar value added by manufacture, per unit of population, of metropolitan community areas classified by size class of metropolitan community and distance from the nearest metropolis, United States, 1935-40.

Distance from the nearest metropolis (miles)	SIZE CLASS OF METROPOLITAN COMMUNITY: All metropolitan communities	Class A[a]	Class B	Class C	Class D
Value added by manufacture per person (dollars)					
Central city	284	301	304	251	246
0-14[b]	269	373	257	204	189
15-24	261	297	341	183	272
25-34	232	305	306	152	180
35-44	215	280	364	134	158
45-54	178	275	226	112	140
55-114	109	156	163	84	97
115-164	72	-	127	58	75
165-214	57	-	127	47	51
215-264	57	-	97	51	52
265-over	30	-	-	17	40
All hinterland areas	154	301	227	94	113
All metropolitan communities	187	301	247	123	120
Number of wage earners per 1000 inhabitants					
Central city	78.4	83.0	81.6	70.2	70.1
0-14[b]	77.3	102.8	73.0	65.5	58.6
15-24	85.4	81.0	102.5	71.7	87.7
25-34	79.0	89.1	88.0	61.6	68.9
35-44	73.0	77.1	111.3	50.1	54.1
45-54	62.5	99.3	54.7	45.1	54.7
55-114	43.2	60.5	60.7	32.6	42.1
115-164	31.5	-	55.9	22.8	32.6
165-214	23.2	-	52.4	20.7	19.9
215-264	18.1	-	49.1	19.8	11.6
265-over	5.5	-	-	3.4	7.6
All hinterland areas	53.5	58.0	76.2	36.1	43.8
All metropolitan communities	59.9	85.3	77.6	42.4	46.9
Number of establishments per 1000 inhabitants					
Central city	2.43	2.89	2.36	1.96	1.94
0-14	1.20	1.61	1.11	1.03	0.81
15-24	1.25	1.35	1.35	1.07	1.13
25-34	1.14	1.15	1.25	1.15	1.03
35-44	1.21	1.10	1.52	1.02	1.15
45-54	1.21	1.44	1.43	0.91	1.10
55-114	0.95	1.25	1.24	0.86	0.82
115-164	0.80	-	1.34	0.80	0.80
165-214	0.79	-	1.32	0.68	0.78
215-264	0.84	-	1.30	0.98	0.80
265-over	0.73	-	-	0.59	0.83
All hinterland areas	1.04	1.35	1.30	0.87	0.94
All metropolitan communities	1.40	2.20	1.58	1.07	1.02

a. In Class A metropolitan communities places 1,000 or at distances greater than 115 miles have been excluded from the distance breakdown, but are included in the totals.

b. Includes counties touching the central cities.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State ta les 4 and 5; Manufactures, 1939, Vol.II, State table 2.

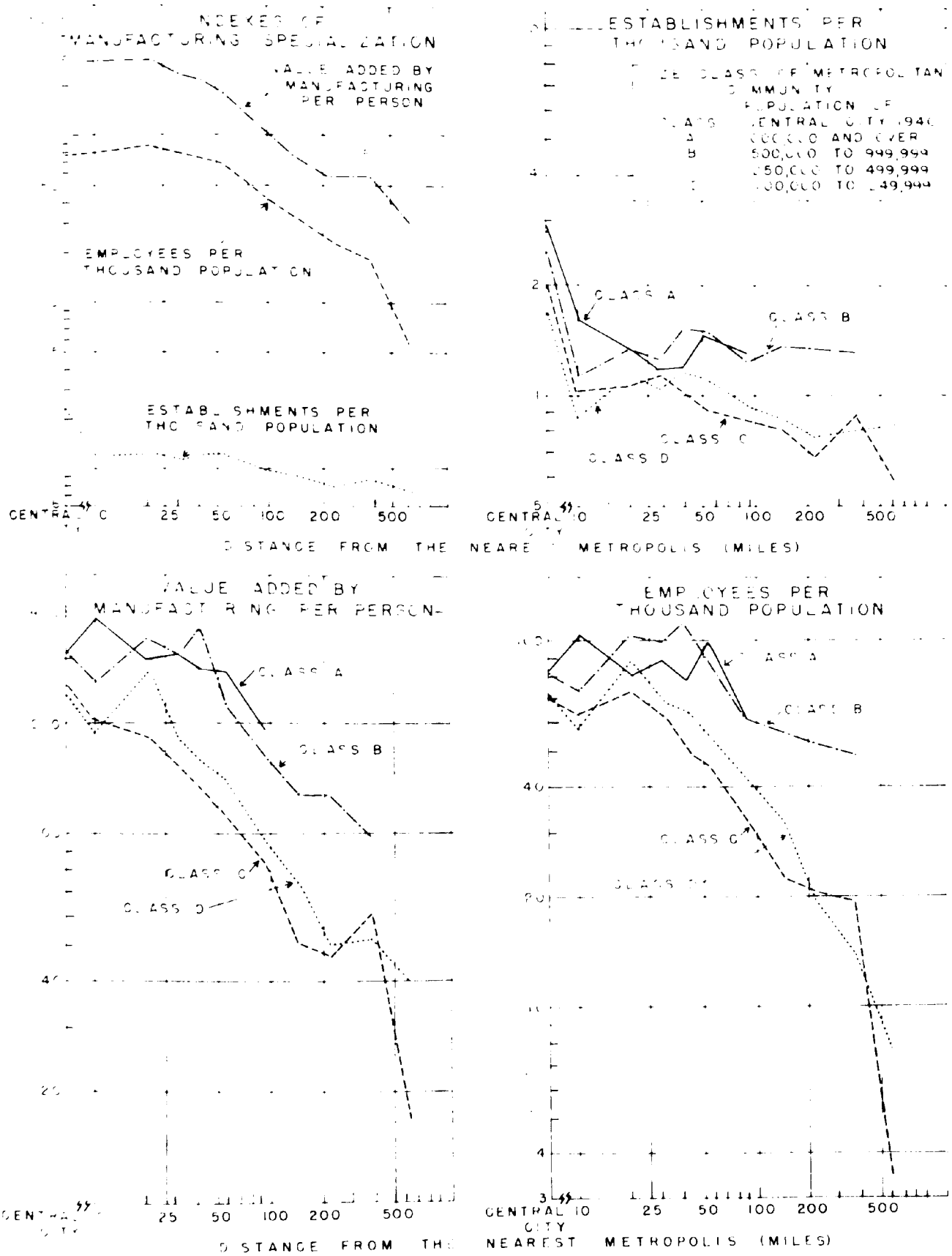


CHART 14-1 SPECIALIZATION IN MANUFACTURING——DISTANCE MANUFACTURING ESTABLISHMENTS, MANUFACTURING EMPLOYEES, AND VALUE ADDED BY MANUFACTURING PER UNIT OF POPULATION ALL AREAS OF THE UNITED STATES CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1939-40

25 to 35 miles of the central city. In fact, the class A, B, and D central cities are less specialized than the residents of one or more of these inner zones. This differs greatly from the situation for retail trade, services, and wholesale trade, in which the central city is more specialized than any one of the outlying zones. Although manufacturing establishments occur more frequently in central cities than in any zone of the hinterland (as indicated by the number of establishments per thousand residents), these establishments provide employment to the resident population no more frequently, and create no more value by manufacture per person, than one or more of the broad zones within 35 miles of the class A and B central cities or the zone within 25 miles of the class D central cities. Class C metropolises are more specialized than any zone of their hinterland.

2. Nevertheless, a high degree of specialization in manufacturing is most definitely associated with <u>proximity</u> to, or location in, the central city. Beyond a given distance from the metropolis the level of manufacturing activity per unit of population tends to decline very rapidly, and to reach a relatively low point at greater distances. For class A and B metropolitan communities this point appears to be as distant as 65 miles from the central city. For class C and D metropolitan communities it appears to be between 25 and 35 miles from the central city. Out to these points the index of manufacturing may fluctuate at a high level or decrease gradually; beyond these points it declines at a very rapid rate with relative increase in distance. At the greatest distances the index is only a small fraction of its value in the inner zones. While the entire hinterland does not appear to be dependent upon the central

cities for manufactures, as is the case for wholesale trade, the outer portions of the metropolitan community must rely upon the inner portion, including the central cities, for manufactured products.

3. Class A and B central cities are about equal to each other in manufacturing specialization. Likewise, class C and D central cities are about equally specialized. They are on a lower level of specialization than class A and B centers. Thus, the degree to which a central city is specialized in manufacturing varies with size; those larger than 500,000 inhabitants tend to be more specialized than those smaller than this in size.

4. A similar difference exists between the hinterlands of metropolitan communities with large and those with smaller central cities. The value added by manufacture, the number of wage earners, and the number of establishments per unit of population are all larger in class A and B metropolitan communities, at all distances from the central city, than in class C and D metropolitan communities.

5. The area of positive concentration, or of specialization in manufacturing in excess of the index for the metropolitan community as a whole lies entirely within 45 miles of the central city. Hinterland areas lying at greater distances than this tend to add less value, to employ fewer people, and to contain fewer establishments per unit of population than the average for metropolitan communities. Thus, greater than average specialization in manufacturing is not confined solely to the central city, or to the central city and its suburbs. Ostensibly, there is a broad zone of about 45 miles depth about the metropolitan centers in which the level of manufacturing is greater

than for the metropolitan community as a whole. This zone includes only about 9 percent of the total land area of the United States.

6. Seemingly, any distance zone as a whole can achieve a level of manufacturing which is greater than the national average of $187 value added per person if it lies within 115 miles of a class A central city, 65 miles of a class B metropolitan community, and about 25 miles of a class C or D metropolitan community.

7. From the foregoing it must not be concluded that there is a great dearth of manufacturing enterprises in the outer zones. Whereas the indexes for value added and employment sink to very low levels in the outer zones, the number of establishments does not undergo a corresponding sharp decline. The relative decrease in the number of establishments with increase in relative distance is much more gradual. From this it must be concluded that with increasing distance the average size of the individual establishment decreases at a faster rate than the decrease in the number of establishments. It will be remembered that this same phenomenon is present for all of the other three sustenance activities. It fits very neatly into our ecological definition of dominance. In the natural community of plants and animals one will find units of every species attempting to survive under every type of condition, for new members are reproduced in excess of the ability of the habitat to support them, and are located quite randomly by the parent. Those which can satisfy their needs for survival within the conditions imposed by the dominant species thrive; those which cannot fully satisfy their needs within those conditions either die or lead a precarious existence of undernourishment. It appears that there has

been no lack of attempts on the part of retail, wholesale, service, and manufacturing establishments to invade every part of the hinterland. On the other hand, it does appear that the dominant units exercise such universal control over the conditions necessary to the survival of new units that they are capable of only a very modest growth, and in time of economic hardship may have a very high rate of mortality.

IV

Manufacturing Specialization in Each Type of Sector of Each Size Class of Metropolitan Community (Table 14-2)

1. As has tended to be true for the other sustenance activities, the intermetropolitan and the subdominant sectors tend to be more specialized in manufacturing than the local sectors, whether measured in terms of number of establishments, employment, or dollar value. Those sectors which possess no intermetropolitan routes nor a principal hinterland city are deficient in manufacturing specialization.

2. Contrary to the tendencies for the other functions, manufacturing is somewhat more concentrated in subdominant sectors than in intermetropolitan sectors. In terms of value added and number of establishments, the intermetropolitan sectors are more specialized than the subdominant sectors in only two of the four classes of metropolitan communities. In terms of wage earners, the subdominant sectors of all size classes of metropolitan communities are more specialized than the intermetropolitan sectors. Since this is the only one of the sustenance functions which has shown this tendency to concentrate in subdominant sectors it may be concluded that specialization in manufacturing must be one of the principal factors in the development of

Table [illegible]

Specialization in manufacturing - sector type: Number of manufacturing establishments, number of manufacturing wage earners, and value added by manufacture, per unit of population, by type of sector and size class of metropolitan community. United States, 1939-40.[a]

Type of sector	SIZE CLASS OF METROPOLITAN COMMUNITY				
	All metropolitan communities	Class A	Class B	Class C	Class D
	Value added per person (dollars)				
Intermetropolitan	104	313	241	94	121
Subdominant	171	359	225	87	125
Local	107	242	158	80	86
	Number of employees per thousand inhabitants				
Intermetropolitan	55.0	91.6	78.0	33.5	46.0
Subdominant	85.0	107.2	82.6	42.9	50.6
Local	40.7	70.0	55.5	33.5	36.0
	Number of establishments per thousand inhabitants				
Intermetropolitan	1.08	1.59	1.29	0.87	0.95
Subdominant	1.12	1.02	1.54	0.86	0.96
Local	0.96	1.08	1.04	0.92	0.94

a) Excludes central cities and counties containing central cities

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Manufactures, 1939, Vol.II, State table 2.

hinterland cities which are "off the beaten path" between metropolitan centers.[4] As was indicated in the introduction, many considerations other than access to markets enter into the location of manufacturing activities. Undoubtedly many of the large cities which lie in the subdominant sectors are located at or near a fortunate combination of natural resources which make it possible to produce goods cheaply at that point. In the consumer-oriented activities, where frequent collection and exchange of a large volume of goods are an essential part of operation, it is understandable that intermetropolitan routes, with their superior access to two or more central cities, would be preferred locations. Manufacturing specialization may be quite highly developed in sectors which are not so fully endowed with transportation facilities and access to metropolitan markets if other important production factors are present. One can only assume that the forces making for this specialization are of a type which outweigh the access factors, rather than nullify them. Under such circumstances special means of access are undoubtedly constructed in response to the other factors.

V

The Manufacturing Specialization of Principal Hinterland Cities and of Other Hinterland Areas (Table 14-3)

It has been found in the three preceding chapters that outside of the immediate suburban zone the structure of the hinterland is one of trade areas, or the subdivision of the total hinterland into smaller

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[4] Main highway routes were used as a criterion of intermetropolitan sectors. It was presumed that intermetropolitan railway lines would fall within these same areas as a matter of economy in distance. To the extent that some "subdominant" cities of 25,000 inhabitants or more are located on intermetropolitan rail routes, but not on intermetropolitan highway routes, some of the sectors may have been incorrectly

Specialization in manufacturing - principal cities and other areas: Number of manufacturing establishments, number of manufacturing wage earners, and value added by manufacture per unit of population, of cities of 10,000 or more inhabitants and of other hinterland areas, by size class of metropolitan community, type of sector, and distance from the nearest metropolis. United States, 1934-40.

Type of sector and distance zone (miles)	VALUE ADDED BY MANUFACTURING (DOLLARS)								NUMBER OF WAGE EARNERS PER THOUSAND INHABITANTS								NUMBER OF ESTABLISHMENTS PER THOUSAND INHABITANTS							
	Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas				Cities of 10,000 or more inhabitants				Cities of less than 10,000 and rural areas			
	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D	Class A	Class B	Class C	Class D
	All sectors								All sectors								All sectors							
All sectors	412	331	202	260	186	152	66	73	121.1	106.2	73.1	99.5	53.8	53.2	26.4	31.4	1.71	1.60	1.50	1.56	1.08	1.08	0.70	0.77
0-9	472	241	289	265	210	301	175	157	122.4	67.7	76.5	88.1	55.0	83.8	52.2	45.4	2.29	1.23	1.29	1.16	1.25	0.74	0.68	0.71
10-14	445	236	295	387	173	279	88	9	129.0	69.7	90.0	138.5	49.7	84.8	39.8	2.9	1.17	1.50	2.00	1.82	0.61	0.55	0.55	0.41
15-24	303	302	362	352	204	192	131	220	98.5	143.2	176.6	115.3	55.4	64.7	41.3	70.2	1.51	1.75	1.86	1.43	1.11	0.99	0.84	0.94
25-34	375	444	258	456	232	172	108	84	126.6	137.0	112.3	156.7	55.3	54.0	40.3	37.3	1.48	1.49	1.86	1.79	0.92	0.98	0.85	0.77
35-44	353	448	530	284	250	280	74	96	113.2	158.7	166.8	103.5	62.6	78.4	32.4	44.9	1.83	2.15	1.69	1.81	0.92	1.04	0.92	0.83
45-54	428	360	-	321	166	155	67	79	141.7	132.5	91.9	101.8	68.9	54.6	30.4	36.1	1.75	2.02	1.49	1.81	1.22	1.21	0.72	0.87
55-114	326	336	168	243	118	81	63	60	116.0	115.0	59.7	87.0	32.3	34.3	25.7	30.5	1.77	1.57	1.44	1.52	1.03	1.09	0.71	0.77
115-164	-	251	129	176	92	96	35	56	-	113.6	46.4	64.4	18.3	41.3	18.2	28.5	-	1.71	1.35	1.49	0.85	1.25	0.70	0.74
165-264	-	196	99	105	68	106	39	44	-	78.3	32.7	33.0	14.5	44.5	17.8	14.2	-	1.76	1.30	1.23	0.86	1.14	0.58	0.72
265-over	-	-	75	68	22	97	49	46	-	-	23.8	18.8	7.1	49.1	15.9	11.8	-	-	1.47	1.38	0.56	1.30	0.72	0.67
	Intermetropolitan sectors								Intermetropolitan sectors								Intermetropolitan sectors							
Intermetropolitan	348	344	218	273	201	159	54	45	113.1	107.4	70.5	92.5	60.0	54.3	21.8	29.2	1.90	1.58	1.53	1.55	1.12	1.05	0.66	0.73
0-9	450	299	266	314	421	-	-	-	111.1	83.7	85.4	70.2	144.8	-	-	-	2.64	1.24	1.37	1.22	4.20	-	-	-
10-14	310	259	276	384	173	353	64	9	90.5	76.3	53.2	130.2	44.7	107.0	19.3	2.9	1.29	1.52	1.92	1.40	0.61	0.61	0.40	0.41
15-24	401	523	831	419	247	245	84	249	110.2	145.1	256.3	135.7	51.4	80.7	26.3	85.5	1.66	1.46	1.55	1.43	1.46	1.18	0.75	0.87
25-34	357	432	264	455	168	220	100	80	122.2	110.4	96.1	152.9	56.1	67.6	36.6	36.0	1.54	1.58	2.02	1.58	1.08	1.22	0.79	0.74
35-44	353	474	557	320	253	257	46	94	107.8	144.9	171.9	116.1	61.0	79.5	25.0	41.3	1.74	2.14	1.71	1.88	0.86	0.75	0.70	0.82
45-54	433	339	240	319	148	130	74	73	138.7	123.3	104.4	111.2	81.3	55.9	31.3	33.5	2.11	2.06	1.55	1.70	1.32	1.14	0.88	0.87
55-114	364	359	175	252	149	90	63	51	109.3	122.0	54.3	42.3	34.4	29.0	22.0	29.1	1.90	1.42	1.44	1.54	0.91	1.03	0.65	0.73
115-164	-	137	132	167	92	107	31	55	-	90.5	44.5	44.7	14.6	40.0	16.8	28.4	-	1.70	1.48	1.34	1.07	0.99	0.72	0.68
165-264	-	324	108	94	69	58	43	31	-	109.1	27.9	26.2	14.5	29.1	18.9	12.7	-	1.97	1.31	1.20	0.84	1.36	0.56	0.68
265-over	-	-	97	54	28	-	26	43	-	-	14.0	12.2	7.1	-	7.5	11.3	-	-	1.44	1.32	0.56	-	0.61	0.64
	Subdominant sectors								Subdominant sectors								Subdominant sectors							
Subdominant	440	317	173	253	174	128	53	73	145.9	113.0	80.7	83.6	56.3	50.5	26.0	37.5	1.07	1.73	1.38	1.52	0.94	1.34	0.66	0.74
0-9	173	189	56	222	-	-	-	-	51.4	57.5	21.0	80.4	-	-	-	-	1.10	1.56	0.93	0.98	-	-	-	-
10-14	1270	106	333	-	-	-	178	-	351.0	39.5	177.6	-	-	-	106.5	-	0.71	1.45	1.79	-	-	-	1.00	-
15-24	259	458	317	250	100	118	78	146	64.1	144.0	177.2	76.9	23.5	59.3	37.7	102.3	0.35	2.13	1.98	1.47	0.44	0.95	0.90	1.21
25-34	450	424	276	476	179	103	67	56	166.1	153.1	141.4	159.9	21.7	33.0	59.5	23.5	0.99	1.41	1.66	1.74	0.41	0.64	0.56	0.92
35-44	333	369	-	166	53	449	99	64	104.1	144.9	-	62.2	20.0	95.4	22.9	54.3	1.68	2.81	-	1.53	0.35	2.50	0.52	0.76
45-54	469	374	121	466	234	191	41	98	116.2	131.3	30.3	104.5	101.9	66.0	22.5	43.9	0.90	1.34	0.99	1.96	1.38	1.09	0.67	0.74
55-114	366	252	143	241	99	109	56	75	128.2	106.5	63.5	46.5	27.0	59.6	31.3	34.5	1.54	1.37	1.26	1.52	0.81	1.45	0.66	0.79
115-164	-	315	130	150	96	76	52	68	-	141.5	40.1	77.5	14.5	34.2	20.1	35.0	-	1.79	1.08	1.73	0.77	1.47	0.67	0.66
165-264	-	143	96	126	-	124	35	52	-	75.3	44.8	41.0	-	50.9	22.3	29.7	-	1.74	1.30	1.67	-	1.20	0.63	0.71
265-over	-	-	75	92	-	94	106	15	-	-	35.9	18.3	-	49.7	38.4	4.4	-	-	1.45	1.72	-	1.18	0.61	0.61
	Local sectors								Local sectors								Local sectors							
Local	493	309	171	214	145	104	68	96	144.8	95.0	72.8	84.2	40.1	41.3	24.5	20.4	1.28	1.22	1.55	1.67	1.00	0.97	0.73	0.84
0-9	365	184	171	240	-	-	-	-	253.1	41.6	60.4	91.4	-	-	-	-	1.35	0.42	1.17	1.28	-	-	-	-
10-14	8	274	348	343	-	11	5	-	1.3	87.8	158.7	158.7	-	3.1	7.4	-	0.20	1.42	2.24	2.84	-	0.35	0.41	-
15-24	143	451	18	154	95	47	217	152	33.6	127.7	4.2	64.9	20.8	15.4	61.8	44.3	0.74	1.35	0.09	1.42	0.56	0.39	0.98	0.97
25-34	397	144	107	435	556	184	132	73	102.5	84.6	53.2	134.1	107.0	39.5	44.8	37.9	1.16	1.33	1.76	2.94	1.02	0.65	1.03	0.93
35-44	411	715	175	205	301	143	109	106	150.3	149.5	91.9	78.4	65.4	53.3	43.6	44.6	2.21	1.17	1.43	1.71	1.25	1.34	1.27	0.89
45-54	174	430	107	142	40	122	60	80	77.0	232.5	45.5	97.4	31.3	63.7	31.5	35.2	1.80	2.46	1.47	1.67	1.01	1.00	0.82	0.90
55-114	-	320	132	169	41	96	44	67	-	92.9	70.5	63.9	29.4	31.1	31.7	31.1	-	1.98	1.71	1.46	1.33	1.01	0.98	0.92
115-164	-	33	75	219	-	124	28	52	-	14.5	43.3	47.0	-	59.8	13.4	25.6	-	1.00	1.59	1.93	-	1.36	0.66	0.95
165-264	-	-	37	129	50	13	31	57	-	-	11.6	51.2	13.4	9.1	14.8	20.4	-	-	1.15	1.50	1.58	0.64	0.54	0.77
265-over	-	-	41	143	-	117	69	58	-	-	35.3	51.2	-	46.6	22.2	14.3	-	-	1.53	1.50	-	1.96	0.72	0.79

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Manufactures, 1939, Vol.II, State table 2.

areas in which the hinterland city provides the great bulk of goods and services consumed. Does this same pattern extend to manufacturing? The data indicate that it does not. There is very little evidence to indicate that as the distance from the central city increases, and consequently as competition with the central city decreases, local manufacturing springs up to replace the activities of the metropolis. 1. Manufacturing which occurs in the hinterland tends to be centralized in the principal hinterland cities of 10,000 or more inhabitants rather than in the small towns and open country. Yet in this respect it is considerably less concentrated than hinterland services and wholesale trade. In fact, a comparison of Tables 11-3, 12-3, 13-3, and 14-3 will show that the extent of this concentration is almost midway between the extensive dispersion of retail trade and the market concentration of wholesale establishments. For each dollar's worth of value added by manufacture in the small city and open country areas, between 2.2 and 3.6 dollars are added by manufacture in the principal cities, depending upon the size class of the metropolitan community. Thus, manufacturing activities are much more widely dispersed than is generally recognized. Not only are they distributed over a fairly extensive zone surrounding the central city, but compared to wholesale

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4 (continued)
classified as subdominant rather than correctly as intermetropolitan. Manufacturing is more dependent upon rail transportation than the other three functions. If there were a definite tendency for manufacturing to be concentrated in intermetropolitan sectors, the effects of misclassification would show up in the manufacturing data if not in the data for the other activities. Although many of the major hinterland cities lying in subdominant sectors do have rail connections to two or more central cities, in most instances these connections are not "intermetropolitan" in the sense used in selecting intermetropolitan highways--most frequently traveled from one central city to another. For this reason, the interpretation which has been placed upon the data for subdominant sectors seems warranted.

trade and services they are also much more prone to be located in small cities and the open country.

2. The pattern of manufacturing specialization for hinterland cities of 10,000 or more inhabitants is essentially the same as that for the hinterland as a whole. In other words, the general pattern is about the same for the principal hinterland cities and the "other areas." Immediately surrounding the metropolis there is, as has been seen, a broad zone several miles deep which appears to favor manufacturing. Cities which lie inside this zone may become quite specialized in manufactures; the group of cities which lie outside it have a very low degree of specialization. For cities, the outer limits of this zone are somewhat broader than that indicated for hinterland areas as a whole. Cities located at any one distance in a class A metropolitan community can become about as specialized as at any other distance. In other words, distance from the metropolis does not seem to act as a brake upon manufacturing specialization within the radius of 115 miles over which class A central cities are supposed to be dominant. In the other size classes of metropolitan communities the zone of hinterland city specialization in manufacturing does not extend beyond 65 miles. At distances greater than those named, the specialization of hinterland cities of all sizes decreases consistently with increasing distance from the central city. It will be remembered that in these outer zones cities are more sparsely distributed over the land and that the populations are more rural in character. It will also be remembered that the wholesale facilities through which the majority of manufactured products are marketed are concentrated in the

central city. Because a location in the vicinity of a large city provides the accessibility to many diverse sources of materials and to employment of the varied skills required to fabricate complex products, and because such a location also provides easy access to the primary wholesale customers, it is to be expected that few hinterland cities would attain a high level of manufacturing specialization.

In this connection, it should be noted that the manufacturer need not be located right at the doorstep of his customers, even in those cases in which his market is entirely local. Since his customers are numerous, and are themselves distributed throughout a given area, the locational pull of any one customer is relatively small. The total size of the market within an area may be a very effective force in drawing a manufacturer into an area, but the particular pattern by which that market is distributed within the area is of lesser importance.[5] It is possibly because of this fact that specialization is not confined to the central city proper, but may be diffused over the broader inner zone in response to other factors.

3. The pattern of manufacturing activities of small cities and hinterland areas also does not appear to deviate greatly from that for the hinterland as a whole. Small cities and rural areas are able to enjoy a high degree of manufacturing specialization out to about 45 miles from the class A and B central cities. These areas are more specialized in manufacturing than is the total population of all metropolitan

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[5] National Resources Planning Board, Industrial Location and National Resources, p. 204

communities. Even in the small cities and rural areas of one or more inner zones of class C and D metropolitan communities there is a level of specialization which approaches that of the nation. Outside the inner zone which has been found to favor manufacturing activities, specialization of rural areas and small cities in manufacturing declines swiftly with increasing distance. At the outer zones of such areas manufacturing reaches its lowest level. With indexes of specialization which are as low as one-fourth of the national average, and one-sixth of the level at the center or one or more of the intermediate zones, it is very evident that these peripheral areas are extremely dependent upon the core of the metropolitan community. There is no evidence of any attempt by the small towns and rural areas to compensate for the relative scarcity of manufacturing in larger cities at these distances. All evidence points to the conclusion that hinterland conditions beyond 35-64 miles from the metropolis become increasingly discouraging to specialization in manufacture, with increasing distance. The exact distance at which the point of diminishing specialization begins varies with the size class of the metropolitan community. Metropolitan centers of more than 500,000 inhabitants appear to be able to encourage small-city and open-country manufacturing at much greater distances into the hinterland than central cities of smaller size.

4. These differences in specialization among the three types of sectors which have been noted above cannot be attributed solely to the principal hinterland cities or to the other hinterland areas. The greater specialization of the subdominant sectors over intermetropolitan sectors seems to arise from two sources: the specialization of principal hinterland cities in subdominant sectors of class A and B metropolitan communities, and the

specialization of small hinterland cities and rural areas in class C and D metropolitan communities. The lower index of specialization in local sectors must be attributed to both the principal hinterland cities and to the other areas. Within the zone of manufacturing which has been described above there tends to be little difference between one sector type and another. But outside this zone the principal cities and rural areas show unusually low indexes compared to other sectors, and those indexes decline at a more rapid rate with increasing distance.

V

Manufacturing Specialization and Size of Hinterland City (Table 14-4 and Chart 14-2)

1. In general, the larger the hinterland city the greater its degree of manufacturing specialization. While this tendency is present for the cities of all classes of metropolitan communities considered together, there are important major exceptions in individual classes of metropolitan communities. It does not hold at all for distances greater than 165 miles from the metropolis. The class C metropolitan communities as a whole constitute an exception by virtue of the fact that here cities of 50,000 or more inhabitants are the least specialized class of cities.

2. The principal cities of subdominant sectors tend to follow this pattern more consistently than cities of the intermetropolitan sectors. But even here there are major exceptions. It should be remembered that here we are dealing with a characteristic of cities that is subject to great variation. "Manufacturing satellites" can be of all sizes. At the same time that we are pointing out that on the whole the larger

Table 14.4

Manufacturing specialization - principal hinterland cities classified by size: Per capita value added by manufacture, of hinterland cities of 10,000 or more inhabitants classified by size, type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1939-40.

Size of metropolitan community and distance (miles)	PER CAPITA RECEIPTS FROM MANUFACTURING (DOLLARS) BY SIZE OF HINTERLAND CITY AND TYPE OF SECTOR									
	10,000 - 24,999				25,000 - 49,999 [a]			50,000 - over [a]		
	All Sectors	Inter-metro-politan	Subdom-inant	Local	All Sectors	Inter-metro-politan	Subdom-inant	All sectors	Inter-metro-politan	Subdom-inant
Class D										
0-14	341	435	316	216	209	49	314	332	527	70
15-34	282	270	293	303	568	577	547	439	510	55
35-64	253	304	175	185	312	275	388	365	365	-
65-114	168	162	211	169	222	225	219	374	339	734
115-164	177	142	203	250	136	131	155	239	239	-
165-264	84	65	192	129	173	236	97	106	48	128
265-over	83	45	-	143	53	51	62	74	74	-
All distances	207	210	213	200	263	249	289	336	357	203
Class C										
0-14	192	134	333	220	285	422	58	272	272	-
15-34	322	411	166	72	231	303	208	304	237	331
35-64	227	259	-	116	456	456	-	149	168	127
65-114	177	201	56	192	196	222	71	131	97	252
115-164	102	103	118	75	167	186	148	136	146	123
165-264	114	171	86	37	76	70	90	97	92	102
265-over	75	67	-	91	75	-	75	-	-	-
All distances	173	197	98	149	257	303	128	192	178	221
Class B										
0-14	290	365	71	389	179	196	187	240	267	243
15-34	360	368	348	353	545	690	302	503	529	504
35-64	390	334	285	606	383	424	332	426	415	450
65-114	406	479	354	320	301	353	234	294	313	154
115-164	227	197	358	33	296	-	296	-	-	-
165-264	208	324	184	-	193	-	193	174	-	174
265-over	-	-	-	-	-	-	-	-	-	-
All distances	338	358	253	412	311	363	265	336	323	387
Class A										
0-14	231	224	91	405	421	395	155	529	417	1234
15-34	272	319	204	199	313	313	-	439	433	498
35-64	292	399	219	251	291	316	228	533	491	626
65-114	403	403	-	-	237	224	273	420	-	420
All distances	274	311	169	255	339	333	203	496	434	755

a) By definition local sectors can contain cities of 25,000 or more inhabitants only at distances of less than 10 miles. Cities of this size lying in local sectors are included in the "all sectors" total.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State Tables 3 and 5; Manufactures, 1939, Vol.II, State table 2.

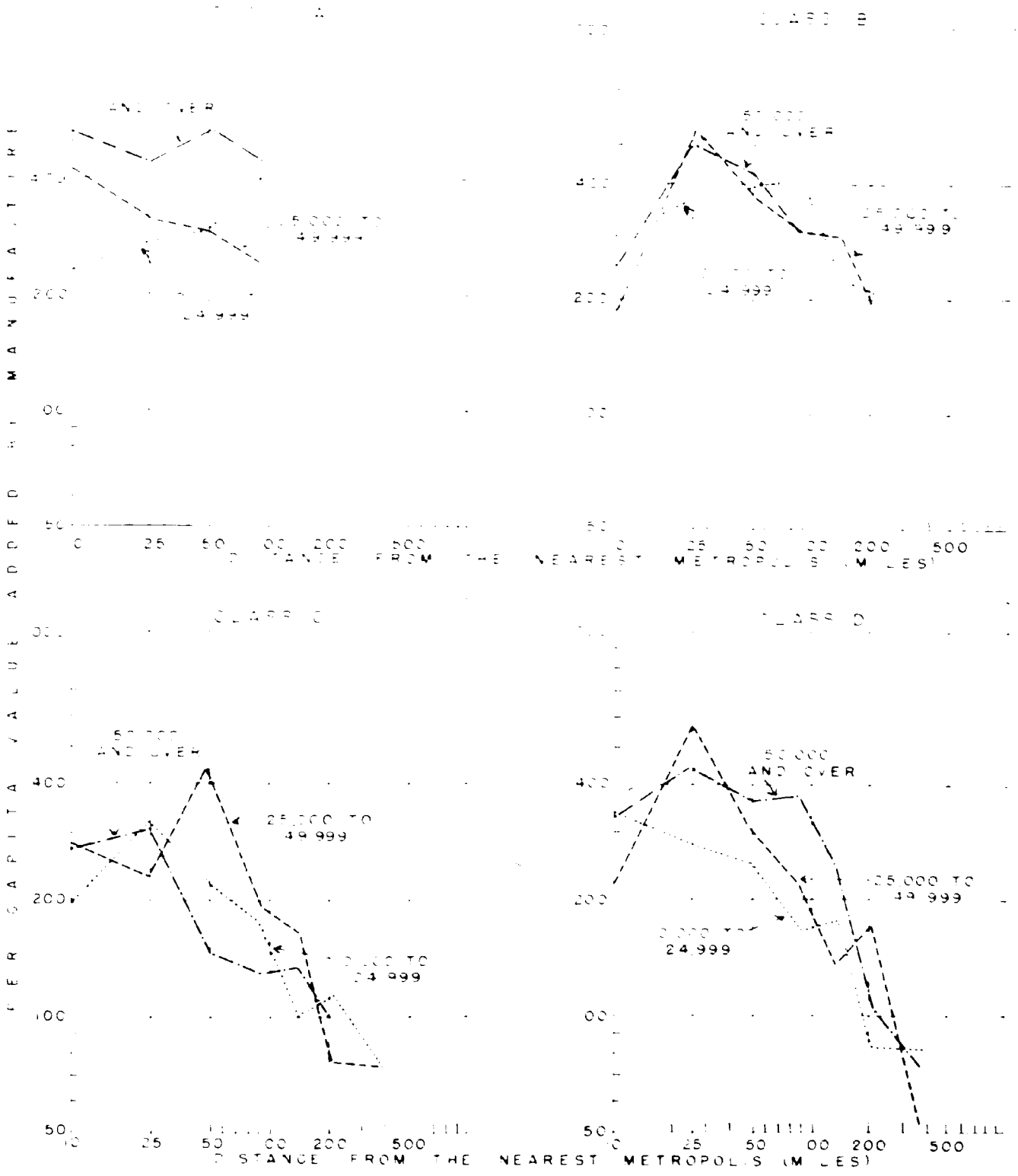


CHART 42 SPECIALIZATION IN MANUFACTURING——PER CAPITA VALUE ADDED BY MANUFACTURE OF HINTERLAND CITIES CLASSIFIED BY SIZE, PER CAPITA VALUE ADDED BY MANUFACTURING OF THREE SIZES OF HINTERLAND CITIES CLASSIFIED BY SIZE CLASS OF THE METROPOLITAN COMMUNITY AND DISTANCE FROM THE NEAREST METROPOLIS UNITED STATES, 1939-40

hinterland cities are more likely to be one of these manufacturing centers than are small cities, a great many large hinterland cities have very low manufacturing indexes and a great many small cities have high manufacturing indexes. There is no simple and consistent relationship between size of hinterland city and degree of specialization in manufacturing analogous to that found for wholesale trade, services, and (to a lesser extent) for retail trade. This reemphasizes the fact that market factors, or the trade territory, are of less importance in the distribution of manufacturing activities than in the distribution of these other activities. It is only when all hinterland cities of each size, regardless of the size of the metropolitan community from which they come, are considered together that the very general relationship between size of city and specialization in manufacturing emerges with any clarity. Only in the class A metropolitan communities does the principle seem to operate with any great consistency.

3. All sizes of principal hinterland cities are subject to the apparent effect of distance upon manufacturing specialization. Although there are fluctuations with distance in the inner zones, the general level of specialization remains high. Beyond 65 miles each size class of hinterland city participates in the general pattern of a rapid decrease in specialization with increasing distance, save in class A metropolitan communities, where distance does not appear to be a very significant factor in the degree of specialization of principal hinterland cities.

4. It has already been noted that in the metropolitan communities whose central city is large (class A and B) the principal hinterland cities tend to be more specialized in manufacturing than in metropolitan

communities with smaller central cities (class C and D). This differential exists for each size of hinterland city in each sector type. However, the effect of the larger central cities upon manufacturing specialization seems to increase the specialization of the cities of 10,000-24,999 inhabitants more than it does the two larger sizes of hinterland cities. This size of city enjoys a greater relative specialization in the larger metropolitan communities than do cities of more than 25,000 inhabitants. Apparently, if being smaller than 25,000 inhabitants is somewhat of a handicap in specializing in manufacturing, being located in a metropolitan community whose central city contains 500,000 inhabitants aids in removing the handicap.

5. The lower manufacturing specialization of the local sectors is not due only to their containing no major cities. By comparing the sector differences for the 10,000 - 24,999 class of hinterland cities it may be seen that beyond 65 miles from the metropolis the cities of the local sectors have a considerably lower index of specialization than the cities of the same size in other sectors. Once again it appears that isolation from the metropolis, and absence of near major hinterland cities, is an effective deterrent to manufacturing, even in sizeable hinterland cities which, in other locations, would exhibit a high index of industrial specialization.

VI

Manufacturing Specialization in "Other Areas", Classified by Size of Largest City Contained (Table 14-5)

By examining the manufacturing specialization of county units after cities of 10,000 or more have been subtracted, and with the counties classified by size of largest city contained, it is possible to gain a

Table 14-5

Specialization in manufacturing - Rural areas and cities of less than 10,000 inhabitants: Per capita value added by manufacture of counties, with cities of 10,000 or more inhabitants excluded, classified by size of largest city contained, type of sector, size class of metropolitan community, and distance from the nearest metropolis. United States, 1939-40.

Size class of metropolitan community and distance (miles)	SUMMARY-ALL SECTORS BY SIZE OF LARGEST CITY CONTAINED						PER CAPITA VALUE ADDED BY MANUFACTURING BY SIZE OF LARGEST CITY CONTAINED AND TYPE OF SECTOR[a] (DOLLARS)											
		CITY CONTAINED					No City			2,500-4,999			5,000-9,999			10,000-24,999			25,000-49,999		50,000 - over	
	No City	2,500-4,999	5,000-9,999	10,000-24,999	25,000-49,999	50,000-over	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Local	Inter-metropolitan	Subdominant	Inter-metropolitan	Subdominant
Class D																						
0-14	6	8	-	11	-	-	6	-	-	8	-	-	-	-	-	11	-	-	-	-	-	-
15-34	101	79	125	238	66	55	124	21	46	44	124	107	149	-	62	315	84	144	9	135	57	-
35-64	29	55	92	93	153	181	35	49	21	49	69	60	80	105	103	85	71	110	134	148	181	-
65-114	18	41	81	94	127	40	16	14	21	39	57	38	64	75	106	54	135	157	140	112	38	61
115-164	33	46	68	77	40	263	18	83	23	48	49	44	47	33	94	80	94	52	33	76	263	-
165-264	30	30	67	47	193	127	29	27	32	21	21	48	33	84	96	50	24	48	10	407	536	106
265-over	20	28	74	127	81	28	21	2	20	35	21	14	56	19	157	85	-	196	91	23	28	-
All distances	29	45	82	111	114	87	28	45	24	39	54	50	71	67	99	111	91	121	98	127	88	90
Class C																						
0-14	2	-	10	315	8	76	2	-	-	-	-	-	-	10	-	-	315	-	-	-	76	-
15-34	60	117	107	167	135	115	76	23	68	67	147	167	99	-	156	122	-	224	56	24	-	118
35-64	23	44	88	95	110	233	25	26	16	29	56	63	87	-	88	106	-	51	88	-	403	297
65-114	15	35	65	48	143	413	14	25	13	27	16	59	44	74	99	39	14	83	156	89	479	227
115-164	16	28	33	40	120	130	14	17	19	29	24	27	32	48	22	50	17	32	34	231	94	154
165-264	18	31	47	49	50	135	18	20	17	30	35	26	51	45	32	18	68	66	48	56	149	57
265-over	15	67	20	189	148	-	6	13	30	13	262	65	20	21	20	118	-	358	-	148	-	-
All distances	20	42	61	81	120	204	19	22	21	32	39	66	54	58	76	70	49	119	106	148	248	152
Class B																						
0-14	-	-	11	592	135	-	-	-	-	-	-	-	-	-	11	592	-	-	135	-	-	-
15-34	38	73	130	160	292	211	-	-	38	75	173	24	82	-	451	202	-	40	436	109	272	86
35-64	12	53	280	157	154	280	17	-	5	34	6	86	363	229	183	162	150	121	109	250	250	298
65-114	36	59	58	92	108	127	42	56	26	57	62	61	57	28	62	59	125	100	97	124	127	-
115-164	29	57	69	119	284	75	18	27	40	30	59	97	71	66	-	79	88	401	624	141	-	75
165-264	51	45	99	171	176	71	9	75	13	45	-	-	22	126	-	198	166	-	-	176	-	71
265-over	111	139	70	-	-	-	-	111	-	-	139	-	-	51	117	-	-	-	-	-	-	-
All distances	35	64	107	159	200	208	28	57	26	49	85	70	115	89	109	178	136	116	238	151	202	189
Class A[b]																						
0-14	-	-	-	-	-	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	220	-
15-34	-	-	729	106	259	232	-	-	-	-	-	-	-	-	729	136	179	57	259	-	369	100
35-64	39	152	117	182	240	234	28	-	47	71	-	197	212	227	56	258	-	123	173	253	246	201
65-114	19	60	128	33	65	261	13	-	21	6	-	65	-	240	79	33	-	-	65	-	327	54
All distances	31	83	184	127	200	234	21	-	37	45	-	90	116	231	231	164	179	81	193	184	256	160

a) The independent cities of Virginia were considered to lie in no county. Counties containing central cities have been excluded.

b) In Class A metropolitan communities counties lying at distances greater than 115 miles have been excluded from the distance breakdown, but are included in the totals.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 5; Manufactures, 1939, Vol.II, State table 2.

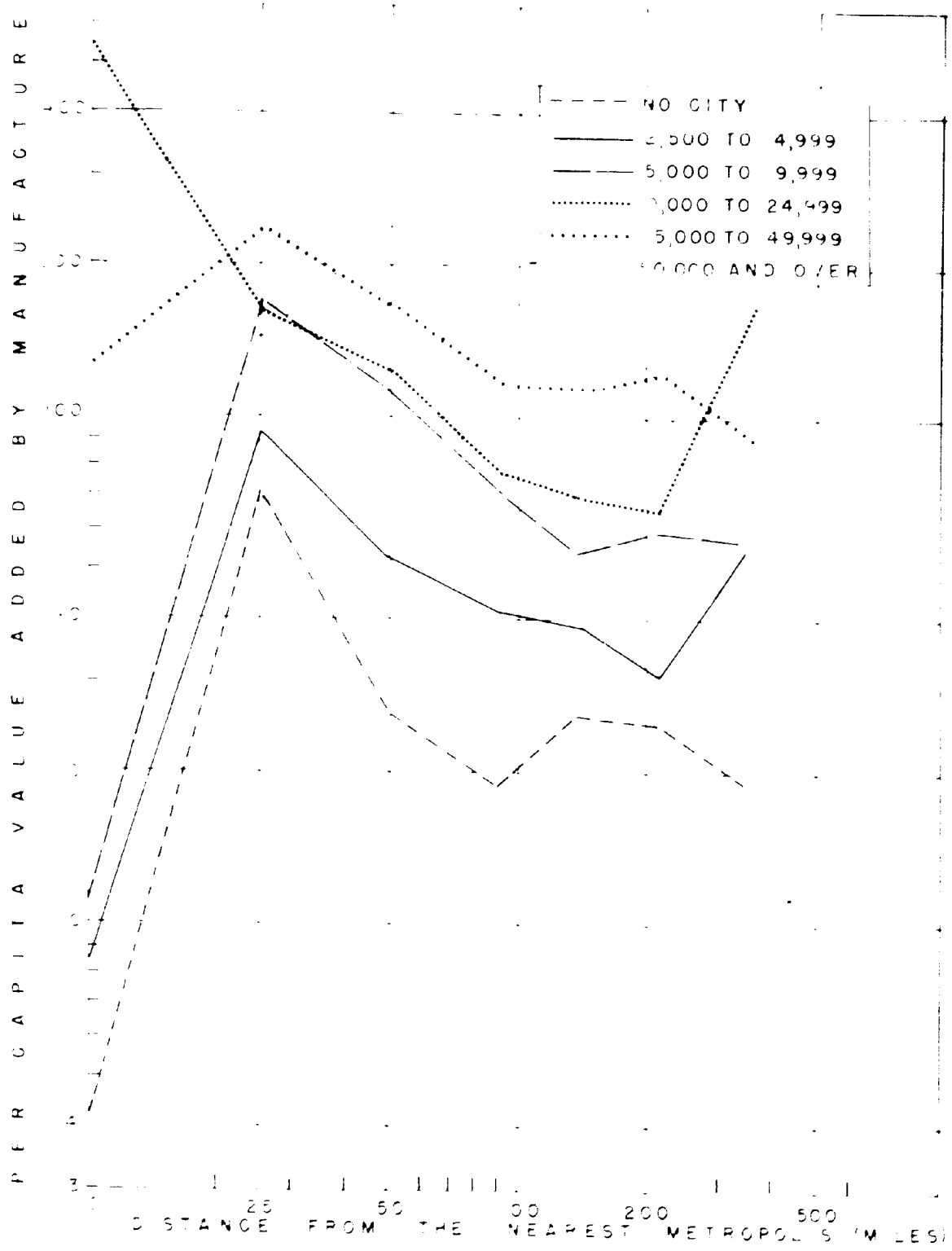


CHART 4-3 SPECIALIZATION IN MANUFACTURING—RURAL AREAS AND CITIES OF LESS THAN 50,000 INHABITANTS PER CAPITA VALUE ADDED BY MANUFACTURING OF COUNTIES, WITH CITIES OF 50,000 OR MORE INHABITANTS EXCLUDED, CLASSIFIED BY SIZE OF LARGEST CITY CONTAINED AND DISTANCE FROM THE NEAREST METROPOLIS, UNITED STATES, 939-40

great deal of information about the circumstances under which manufacturing "disperses" into the countryside.

1. Those counties which contain no city are exceedingly bereft of manufacturing activity. Such areas produce, on the average, only $25 value added by manufacture per resident. This is only 13 percent of the national per capita level of manufacturing.[6] In the area immediately surrounding the central city (0-14 miles) manufacturing in counties containing no cities is almost non-existent. Such areas seem to be set aside for residential purposes only or to be of such unusual topographic characteristics that no intensive manufacturing use is feasible. Between 15 and 34 miles from the central city these completely rural areas enjoy some of the manufacturing specialization which is characteristic of the zone, but only to a very modest degree ($38-$101). At distances greater than this, manufacturing activities drop to an index level of about $20 per capita and remain at about this point for all distances. No area attains great specialization in manufacturing in the absence of an urban center, regardless of its metropolitan position. Stated in another way, intensive manufacturing tends to produce urban populations. Only in the vicinity of the metropolis can this requirement be lifted, and then only partially. To those extreme decentralists who wish to make of industry a completely rural phenomenon, this evidence must appear very discouraging. It would seem that those factors upon which manufacturing activities must depend—access to sources of supply, labor force, markets, and transportation—are not present in sufficient quantities in rural areas to warrant any extensive manufacturing specialization.

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[6] To the extent that the small establishments, manufacturing products

2. Not only some city, but a fairly sizeable city, is necessary to encourage intensive specialization in manufacture. While the presence of a hinterland city of 2,500 - 4,999 inhabitants almost doubles the intensity of manufacturing activity, the level of specialization still remains low. The greatest gains are, as would be expected, at the greatest distances. At distances greater than 265 miles, the level of manufacturing trebles in the presence of a city of the smallest class. Yet the level of specialization remains well below the national average and the average for all small city and hinterland areas.

3. The presence of a city of 5,000 - 9,999 also brings a large increase in the level of manufacturing specialization. Although counties containing such a city make gains over counties containing only smaller cities at the greater distances, their greatest gains are made in the areas within 65 miles of the metropolis. Within this zone of manufacturing specialization, the small cities and rural areas of class A and B metropolitan communities become specialized to a degree equal to or greater than the national average. In the class C and D metropolitan communities, the greatest gains are made in the hinterland at distances greater than 165 miles.

4. Principal hinterland cities greatly encourage manufacturing activities in small cities and rural areas. For all of the other sustenance activities it has been observed that if a city of 10,000 or more inhabitants is present in a county, the other areas do not develop in these activities, but depend upon the larger city for a large proportion of goods and

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5 (continued)
valued at less than $5,000 per year are located disproportionately in areas of this type, the per capita figures for comparison with other county units are too low. According to Census estimates of the total amount of manufacturing in such small units, the amount of underestimate per capita would be negligible.

services. The specialization index for the "other area" for these functions is well below that for counties containing cities of 5,000 - 9,999 inhabitants or even cities of 2,500 - 4,999. Such is not the case with manufacturing. The presence of a principal hinterland city is conducive to manufacturing activities in the small cities and rural areas. The larger the hinterland city contained, the greater the specialization of the outlying communities tends to be. Viewed in another way, the diffusion of manufacturing into the countryside appears to be possible only when there is a nearby city of 10,000 or more inhabitants. The relative gain for the countryside increases with distance from the metropolis. For those who hope for some decentralization of industry, the greatest expectations for the future should be placed not upon the industrial development of completely rural areas, but upon the growth of smaller hinterland cities to a size which will permit them to support manufacturing activities themselves, and to foster its spread into smaller communities in their immediate vicinity. If the number of cities of 10,000 - 24,999 inhabitants were doubled by promoting the growth of about 600 cities from the 5,000 - 9,999 group into the larger size classification, the dispersive and diffusive effect of decentralization would be potentially much greater than attempting to "seed" completely rural areas with manufacturing establishments which could survive only with difficulty.

5. In all of the above distributions the influence of the metropolis is greatly in evidence. Regardless of the size of the largest city contained, as the distance from the metropolitan center increases, the level of

specialization in manufacturing tends to decline. The decline is most precipitous for those areas which contain no city, and is most gradual for those areas which contain a city of 50,000 or more inhabitants. In all cases, the combined effect of distance from the metropolis, and of the presence of a local center, is observable.

6. At distances greater than 165 miles, small cities and rural areas of counties containing cities of less than 25,000 inhabitants show evidences of attempting to cast off the influence of the central city and to develop a level of specialization comparable to that of the inner manufacturing zone about the metropolis. The fact that the rate of decline with distance gradually decreases and is eventually reversed, may constitute evidence that those cities which lie at the greatest distances from the metropolitan center, and therefore most able to exploit local resources in competition with the metropolis, are fostering small local centers of industrial development through the use of the motor truck, electrical energy, and a local market. It is interesting to note that the greatest specialization is in the local and subdominant sectors, rather than in the intermetropolitan sectors with their direct connections to the central cities. Evidence for this manufacturing specialization about large and distant hinterland cities is present in all four size classes of metropolitan communities.

VII

Summary

Although manufacturing specialization is no less patterned with respect to the metropolis than retail trade, wholesale trade, and services, the elements of this pattern differ considerably from those of the

other sustenance activities.

1. At the core of the metropolitan community there is a zone which is 25-64 miles in radius within which high levels of manufacturing specialization can be attained by individual principal hinterland cities and even small cities of less than 10,000 inhabitants and rural areas. Outside this zone, specialization in manufacturing decreases very rapidly with increasing distance. At the greatest distances the principal cities of all sizes, and also the small cities and rural areas, have very little manufacturing specialization. The radius of this zone which favors manufacturing varies with the size of the metropolis. It is 45-64 miles in class A and B metropolitan communities and 25-34 miles in class C and D metropolitan communities.

2. Although the metropolis itself is highly specialized in manufacturing, it is little if any more specialized than individual city and county units within the inner zones. This is true in spite of the fact that these zones include large concentrations of rural-farm populations which are combined with the other populations for computing many of the per capita indexes. A location in, or general proximity to, a metropolis seems to be one requirement for intensive specialization in manufacturing. Outer distance zones must depend upon the metropolis and the inner zones for the great bulk of their manufactured products.

3. The level of manufacturing specialization is higher in class A and B metropolitan centers, and at all distances into their hinterlands, than the level in class C and D central cities and their hinterlands. Great metropolitan centers appear to have the effect of raising the

level of manufacturing to a high level within a very broad area, or (to state the reverse) a high level of manufacturing in a broad area appears to have, as one effect, the creation of a large metropolis.

4. Intermetropolitan sectors are no more specialized than subdominant sectors, and in fact, appear to be the less specialized of the two. Both are much more specialized than local sectors. The specialization of the subdominant sectors appears to arise from unusually high indexes of specialization for the major cities (25,000 or more inhabitants) in those sectors. It is postulated that the rise of such major cities away from intermetropolitan routes of travel may be due, in many cases, to the occurrence of natural resources in a combination which favors local manufacturing.

5. The larger hinterland city tends to be more specialized in manufacturing than smaller hinterland cities, but there is no great consistency in this tendency. A location inside or outside the inner zone of manufacturing specialization and within a large rather than a small metropolitan community seems to be of much greater relative importance. Presence in a class A or B metropolitan community appears to be especially conducive to the greater specialization of cities of 10,000 - 24,999 inhabitants than cities of equal size in class C and D metropolitan communities.

6. County areas which contain no city or a city of less than 10,000 inhabitants tend to have a very low degree of manufacturing specialization. The level of specialization rises steadily with increasing size of largest city contained, responding at the same time to presence inside or outside the zone of manufacturing and to increasing distance from the metropolis.

7. Manufacturing in small cities and rural areas occurs on an extensive scale only in the vicinity of cities of 10,000 or more inhabitants. Counties which contain a city of this size do not "depend" upon the city for manufacturing in the same sense that such areas depend upon the retail, wholesale, and service establishments of outlying areas. The larger hinterland city seems to provide local conditions which encourages manufacturing in the surrounding smaller cities and towns. As the size of the hinterland city increases, the neighboring smaller cities and rural areas likewise become more specialized in manufacturing. Thus, there is a diffusive aspect for manufacturing which is not present for the other functions.

8. Perhaps the most important single observation which can be made for manufacturing, within the problem of this study, is that unlike any of the other patterns studied, the pattern of manufacturing specialization resembles the population pattern of land occupancy. Whatever the factors are which favor manufacturing specialization--access to other manufacturers, to sources of raw materials, to labor supply, or to markets--the pattern which they assume in the areas beyond 65 miles from the metropolis is the same as that for human residence. While a direct relationship between the two cannot be claimed, it does appear that the following generalization is true: Specialization in manufacturing is closely related to population density and aggregation. When the size of the local community drops below 10,000 inhabitants, the total population drops below about 50 persons per square mile, and no metropolitan center is present within a radius of 65 miles, then specialization in manufacturing is low, and declines rapidly with increasing distance from the metropolis. The presence of

a metropolitan center removes a part of these density restrictions upon manufacturing, but not all of them. Manufacturing is most specialized in and about large hinterland cities which lie within 65 miles of a large metropolitan center under conditions of high land occupancy.

9. There is some evidence that large hinterland cities lying at the greatest distances from metropolitan centers, and therefore least able to benefit from the production of the metropolitan center and most able to exploit local resources in competition with the metropolitan center, have begun to generate those conditions which are conducive to at least a modest level of manufacturing specialization.

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APPENDIX TABLES

Table I

Total number of sectors of each type in each metropolitan community.

Metropolitan community	Total number of sectors	Number of sectors of each type (1) Inter-metropolitan	(2-3) Sub-dominant	(4) Local
New York	9	7	0	2
Chicago	8	5	1	2
Philadelphia	11	5	2	4
Detroit	5	1	3	1
Los Angeles	8	6	1	1
Total	41	24	7	10
Percentage distribution	100.0	58.5	17.1	24.4
Cleveland	7	4	1	2
Baltimore	10	5	0	5
St. Louis	12	8	0	4
Boston	7	2	3	2
Pittsburgh	12	8	2	2
Washington, D.C.	8	3	0	5
San Francisco	6	4	1	1
Milwaukee	7	4	2	1
Buffalo	4	0	0	4
Total	73	38	9	26
Percentage distribution	100.0	52.1	12.3	35.6
New Orleans	10	4	2	4
Minneapolis	12	9	0	3
Cincinnati	10	4	2	4
Kansas City, Mo.	12	7	2	3
Indianapolis	12	9	1	2
Houston	11	4	2	5
Seattle	11	3	1	7
Rochester	6	2	0	4
Denver	12	7	0	5
Louisville	12	5	1	6
Columbus	11	9	1	1
Portland	11	3	0	8
Atlanta	12	6	3	3
Dallas	8	6	0	2
Memphis	12	7	1	4
Toledo	9	7	0	2
Birmingham	12	6	1	5
San Antonio	12	5	2	5
Providence	5	1	2	2
Total	200	104	21	75
Percentage distribution	100.0	52.0	10.5	37.5

(continued)

Table I(continued)

Total number of sectors of each type in each metropolitan community.

Metropolitan community	Total number of sectors	Number of sectors of each type (1) Inter-metropolitan	(2-3) Sub-dominant	(4) Local
Omaha	12	5	0	7
Dayton	8	4	0	4
Syracuse	8	3	2	3
Oklahoma City	12	4	2	6
San Diego	2	1	0	1
Richmond	11	5	1	5
Fort Worth	7	5	2	0
Jacksonville	8	5	0	3
Miami	3	2	0	1
Nashville	12	6	0	6
Hartford	5	2	2	1
Grand Rapids	11	3	1	7
Des Moines	12	5	1	6
Salt Lake City	12	8	0	4
Springfield	2	0	0	2
Tulsa	10	7	0	3
Scranton	10	6	1	3
Albany	11	5	1	5
Chattanooga	12	5	1	6
Spokane	12	5	0	7
Fort Wayne	11	6	0	5
Erie	4	1	1	2
Wichita	11	4	1	6
Knoxville	12	6	1	5
Tampa	8	3	1	4
Sacramento	9	4	0	5
Peoria	9	4	1	4
South Bend	8	2	1	5
Duluth	9	5	0	4
Charlotte	12	6	3	3
Norfolk	10	4	1	5
Davenport, Moline, Rock Island	11	5	1	5
El Paso	8	7	0	1
Evansville	12	7	1	4
Total	314	150	26	138
Percentage distribution	100.0	47.8	8.3	43.9
Grand total	628	316	63	249
Percentage distribution	100.0	50.3	10.0	39.7

Table II

Number of hinterland counties, classified by size class of metropolitan community, type of sector, distance from the nearest metropolis, and size of largest city contained. United States, 1940.

Size class of metropolitan community and distance (miles)	SUMMARY-BY SECTOR TYPE				TYPE OF SECTOR BY SIZE OF LARGEST CITY CONTAINED[a]																	
					Intermetropolitan						Subdominant						Local					
	All Sectors	Inter-metropolitan	Subdominant	Local	No City	2,500-4,999	5,000-9,999	10,000-24,999	25,000-49,999	50,000-over	No City	2,500-4,999	5,000-9,999	10,000-24,999	25,000-49,999	50,000-over	No City	2,500-4,999	5,000-9,999	10,000-24,999	25,000-49,999	50,000-over
Class D																						
0-14	3	3	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-34	101	62	6	33	11	11	16	16	3	5	1	2	-	1	2	-	7	9	6	9	1	1
35-64	251	129	27	95	32	34	29	19	11	4	6	8	2	6	5	-	38	15	26	14	2	-
65-114	385	185	47	153	62	52	32	24	6	9	16	9	8	6	8	1	82	32	24	15	-	-
115-164	297	130	40	127	54	30	18	17	7	4	17	10	5	6	2	-	64	29	24	9	1	-
165-264	282	146	35	101	77	37	17	13	1	1	21	5	6	1	1	1	55	21	19	6	-	-
265-over	197	124	6	67	73	30	16	8	5	2	3	1	1	-	1	-	51	9	4	3	-	-
All distances	1616	779	161	576	310	185	128	98	33	25	64	35	22	19	19	3	297	115	103	56	4	1
Class C																						
0-14	5	3	1	1	1	-	-	-	-	2	-	-	1	-	-	-	-	-	-	-	1	-
15-34	79	43	9	27	12	9	12	9	1	-	5	1	-	-	1	2	7	7	2	8	2	1
35-64	168	94	21	48	30	22	14	19	8	1	13	7	-	-	-	1	16	14	11	5	1	1
65-114	297	179	41	77	66	34	43	30	10	6	20	7	9	2	1	2	31	14	21	10	1	-
115-164	221	115	50	56	40	38	18	14	3	2	23	12	6	4	4	1	30	12	9	4	-	1
165-264	244	129	52	63	69	27	19	7	3	4	26	15	3	5	1	2	38	12	6	5	-	-
265-over	118	61	6	47	41	8	7	7	-	-	1	1	1	-	1	-	35	7	5	2	-	-
All distances	1131	624	178	319	259	136	113	76	25	15	88	43	20	11	8	8	157	66	54	34	5	3
Class B																						
0-14	4	3	-	1	-	-	-	1	2	-	-	-	-	-	-	-	-	-	1	-	-	-
15-34	29	16	4	9	-	2	4	4	2	4	-	1	-	-	1	2	5	1	1	1	-	1
35-64	89	34	9	16	6	3	5	13	4	3	-	1	1	1	2	4	5	5	2	2	-	2
65-114	90	45	15	30	10	8	10	8	3	6	2	1	1	3	3	-	11	7	7	5	-	-
115-164	61	27	23	11	7	5	5	9	1	-	7	4	6	2	3	1	6	4	-	1	-	-
165-264	32	6	22	4	1	2	2	1	-	-	3	-	5	3	2	1	4	-	-	-	-	-
265-over	6	-	5	1	-	-	-	-	-	-	1	3	1	-	-	-	-	-	1	-	-	-
All distances	261	131	78	72	24	20	26	36	12	13	18	10	14	17	11	8	31	17	12	9	-	3
Class A																						
0-14	3	3	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
15-34	16	9	3	4	-	-	-	4	4	1	-	-	-	1	-	2	-	-	2	2	-	-
35-64	37	20	7	10	2	1	4	3	2	8	-	-	1	-	3	3	1	1	4	3	1	-
65-114	16	8	2	6	1	1	-	1	4	1	-	-	1	-	-	1	1	4	1	-	-	-
115-264	3	3	2	1	-	-	3	-	2	-	-	-	-	-	2	-	1	-	-	-	-	-
265-over	2	2	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
All distances	82	47	14	21	4	2	8	8	12	13	-	-	2	1	5	6	3	5	7	5	1	-
All Classes																						
0-14	15	12	1	2	2	1	-	2	2	5	-	-	1	-	-	-	-	-	1	-	1	-
15-34	225	130	22	73	23	22	32	33	10	10	6	4	-	2	4	6	19	17	11	20	3	3
35-64	510	277	64	169	70	60	52	54	25	16	19	16	4	7	10	8	60	35	43	24	3	3
65-114	788	417	105	266	139	93	85	53	23	22	38	17	19	15	12	4	125	57	53	30	1	-
115-164	602	273	115	194	101	73	41	40	12	6	47	28	17	12	11	2	100	46	33	14	1	1
165-264	563	285	109	169	147	66	41	21	5	5	55	20	14	12	4	4	98	33	27	11	-	-
265-over	317	187	15	115	115	26	24	15	5	2	5	5	3	-	2	-	36	16	6	5	-	-
All distances	3000	1681	451	868	497	343	275	218	82	66	170	98	58	48	43	24	488	208	176	104	10	7

a) The independent cities of Virginia were considered to lie in no county. Counties containing central cities have been excluded.

Source: Sixteenth Census of the United States. Compiled from Population, Vol.I, State tables 3 and 6.

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