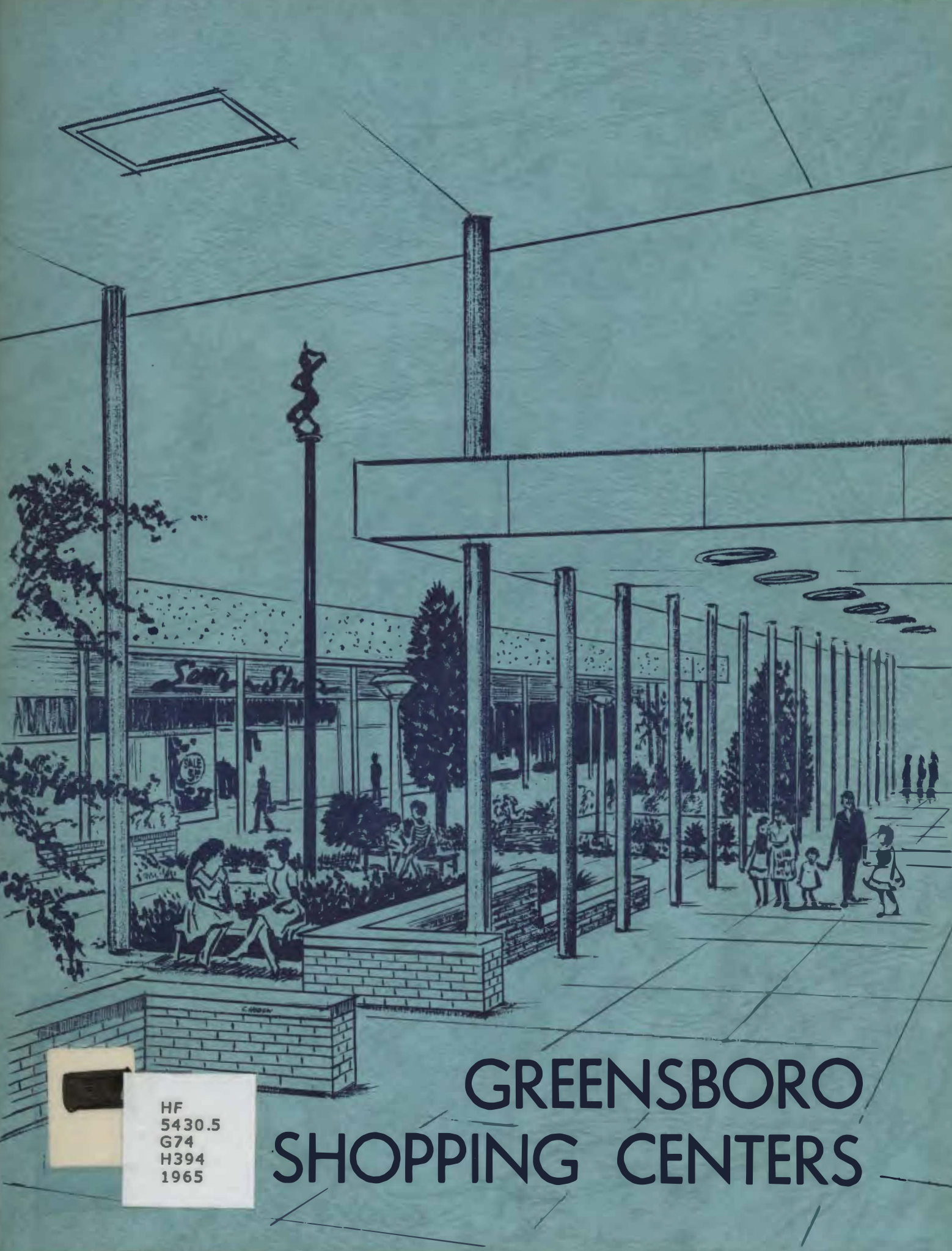

GREENSBORO SHOPPING CENTERS

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March 1965

I INTRODUCTION

II THE PATTERNS OF SHOPPING CENTERS

III THE SIZES OF SHOPPING CENTERS

IV SHOPPING CENTER CLASSIFICATIONS

V SHOPPING CENTER TRADE AREAS

VI SUMMARY

Charles R. Hayes
Assistant Director of Planning

I INTRODUCTION

Each year the Greensboro Planning Board hears some fifteen cases involving commercial zoning or commercial rezoning, and the Greensboro City Council reviews and makes final decisions on about half these cases.

Commercial land use in Greensboro occupies less than one percent of the total land area of the City, yet it furnishes employment to almost 10,000 people and produces some thirty million dollars annually in employee wages.

The importance of the commercial or retail segment of Greensboro's economy cannot be overstressed, and questions of "What?" "Where?" "Why?" and "How?" of commercial zones with respect to other urban phenomena are subjects for constant review and study.

This monograph is intended to revise and update the Greensboro Planning Department publication, Greensboro Neighborhood Shopping Centers, (November 1963), now out of print. Its purpose, then, is to describe some of the characteristics of Greensboro's shopping centers and to relate these characteristics to other pertinent urban phenomena.

II THE PATTERNS OF SHOPPING CENTERS

Students of commercial activity recognize shopping center differentiation with regard to size, function and form. Different classes of shopping centers are discernible in the Greensboro shopping center hierarchy and will be considered in Section IV of this monograph.

However, for the purpose of examining the patterns of Greensboro's shopping centers (akin to viewing them through the wrong end of a telescope), it is convenient to ignore classification schemes and proceed as if all centers were alike.

A minimum definition for a shopping center was devised which ignored size, function and form--

"...three retail uses in contiguous alignment (except highway uses, i.e., filling stations, motels, restaurants, and produce stands), one of which must be a two or more check-out counter food store (or two or more one check-out counter food stores), plus all associated retail and service uses. Where two or more shopping centers are in contiguity, they are regarded as one center."

--and Greensboro's twenty-five shopping centers were examined for discernible spatial patterns.

Richard Nelson suggested in 1958[1] that shopping centers formed "interceptor rings" around the central business districts of large cities. Map 1 indicates that shopping centers also form "interceptor rings" around the CBD's of smaller cities.

Two rings and one longitudinal axis are easily discernible on Map 1. From this information a third ring can be extrapolated as a predicted series of locations for future centers.

As the City grows, and as the population spills outward from the center, it is likely that this third ring of shopping centers will become a reality. When? This will happen when each potential trading area has gained enough population with enough income to support a shopping center of a given size and function. However, if trading area information is not readily available, a good "rule of thumb" is that a shopping center will not survive until at least 2500 people of city-wide median family income live within a one-mile radius of the proposed center. Each person within this one-mile radius will support about fifteen square feet of building, depending on median income.

However, as will be indicated in Section III of this monograph, something happens to a shopping center when it reaches a size of 50,000 square feet of building. At this size, sales success stabilizes, and the center becomes a more or less permanent adjunct to the urban scene. For this reason, then, the potential entrepreneur would be well advised to wait until at least 3500 people of at least average income reside in the afore-mentioned "mile circle" and then build a shopping center of 50,000 square feet.

The longitudinal axis (Map I) contains six shopping centers operating with small success and limited potential. The reason associated with this lack of success is poor access. In one case the shopping center was never on a major street. In two cases the major street was blocked at one point after the centers were built. In one case the major access street became limited access, and in two cases the Southern Railway right-of-way provides an effective barrier.

Shopping centers must be located on a major radial street at a crossroads situation in order to prosper.

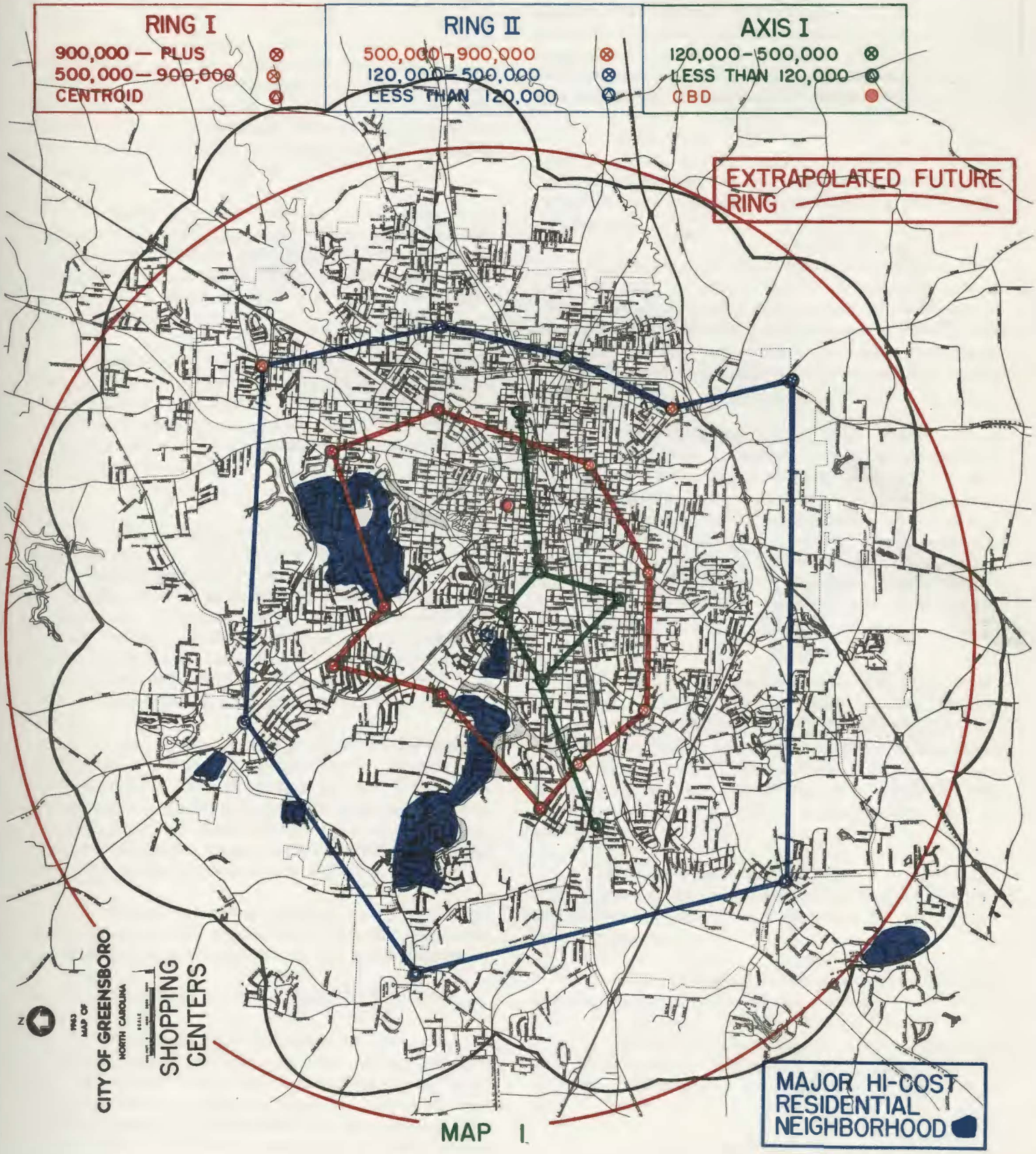
The centroid of Ring I (Map I) is more than a mile and a half northwest of the center of the City. Both interceptor rings of shopping centers have been pulled northwest by the high income families living in the northwest quadrant of the City. Income, then, exerts a locational pull on shopping center patterns; and that locational pull is toward the higher-income, residential areas of the City.

To this point, in our discussion of shopping center patterns, we have been concerned with the graphical, observable patterns, discernible on a small-scale map of the City. It is possible, however, to identify patterns according to grouping or clustering by using Poisson Statistics and Chi Square.

Poisson Statistics are normally used to predict isolated events in a continuum, such as breaks in a length of cable, or lightning flashes in a length of time. However, by considering the City of Greensboro as a space continuum and by viewing shopping centers as events in this continuum, Poisson Statistics can be used to predict the normal (i.e., random) locations of centers in such a space. By comparing the predicted locations with the actual locations (with the use of the Chi Square test) patterns that differ from the normal (random) can be noted.

The normal or random patterns imply the patterns or spacing of centers that would occur if a handful of coins were tossed onto a map of the City; each coin, of course, representing a shopping center.

GROCERY STORE SALES



MAP I

Patterns that could occur, differing from the expected or random, are patterns that approach agglomeration or patterns that approach evenness of spacing.

Agglomerated spacing or patterning means the grouping together or clumping of events (shopping centers) in the continuum (Greensboro). This phenomenon would occur in Greensboro if the City had five clumps containing five shopping centers each, or eight clumps containing three shopping centers each, and so on.

Even spacing implies the opposite of agglomerated spacing. Even spacing implies the spreading out of the events (shopping centers) in the continuum (Greensboro). Even spacing implies that there is more or less equal spacing between each shopping center.

It is not always possible to determine visually whether randomness, agglomeration, or evenness of spacing obtains. Therefore, these conditions are statistically determined with Poisson Statistics and tested for significant differences with the Chi Square test.

Map 2 indicates the "mile limit" or planning boundary of Greensboro and the area within this boundary devoted to residential land use. When the entire planning area is considered as the space in question, shopping centers are patterned in a random fashion. However, when just the residential areas are considered as the geographic space in question, shopping centers are patterned in a more evenly-spaced than random fashion.

The even spacing of shopping centers throughout the residential portion of Greensboro provides trading area room and lessens, somewhat, the intense competition that would otherwise occur. Further, this even spacing indicates that the presence of residential zones have exerted a locational influence on the placement of shopping centers.

Future shopping centers, then, should be more or less evenly spaced with regard to residential districts and located about two miles apart.

III THE SIZES OF SHOPPING CENTERS

It is difficult to consider shopping centers in terms of size without also considering function and the impact of the two on trading areas. Size, however, is a convenient measure and is the one used most often by developers for descriptive purposes. It is therefore pertinent to comment on shopping center size without referring to function or trading area.

Graph I shows the rank of Greensboro's twenty-five centers plotted against size (in number of square feet of buildings) on log, log coordinates. It is immediately evident that there are too few centers in the middle-size range (i.e., 40-100,000 square feet). If the dots on Graph I formed a straight line, the rank-size distribution would be exactly normal (random). Obviously, no one expects perfect alignment - only alignment within certain limits.

This rank - size distribution is, in fact, random. This was determined by categorizing the centers according to size, computing a priori expectation, and testing the observed distribution with Chi Square.

It is evident, then, that although the distribution by size of Greensboro's shopping centers is within statistical limits of normalcy or randomness that, nevertheless, the distribution would be better for the City if there were more shopping centers in the middle-size range and fewer in the smaller-size range.

This relationship is also evident from comparisons with standards set forth elsewhere. The National American Wholesale Grocers Association[2] suggests seventeen to twenty shopping centers for a city the size of Greensboro with a minimum of 1,500,000 square feet of shopping center buildings. Greensboro has twenty-five shopping centers with about 1,200,000 square feet of buildings. The obvious inference is that Greensboro needs fewer but larger shopping centers.

But further, and perhaps more important, something happens to a shopping center when it reaches a size of approximately 50,000 square feet. At this size, sales begin to normalize and become predictable; and the center itself takes on a more permanent character, shows fewer store vacancies, and assumes a tendency to grow steadily with its service area.

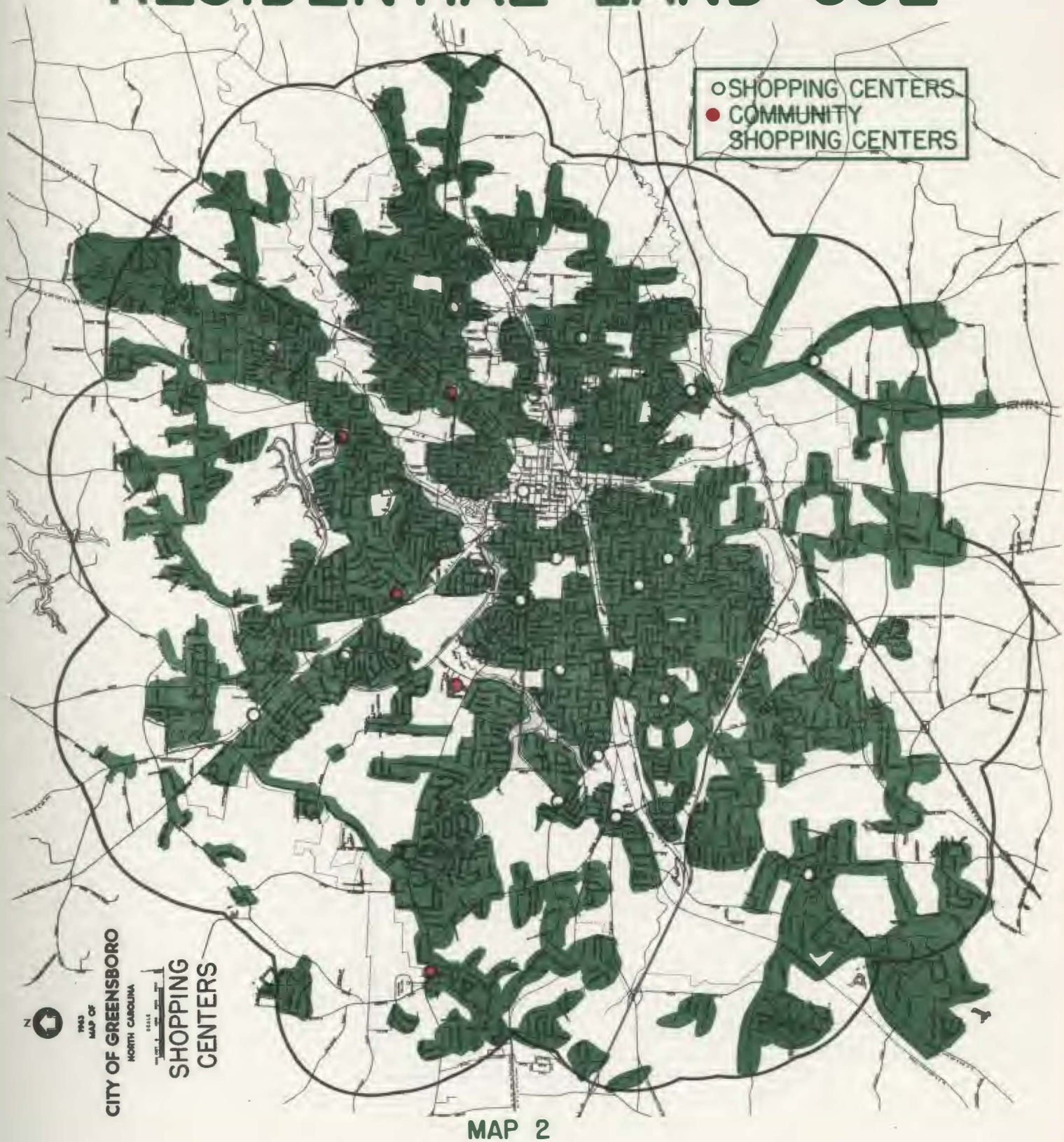
Graph 2 indicates the high linear correlation between grocery sales of the leading food stores and shopping center size for centers 50,000 square feet and larger.

Correlation between the two is .99 per cent and the standard error of the estimate is $95,000.

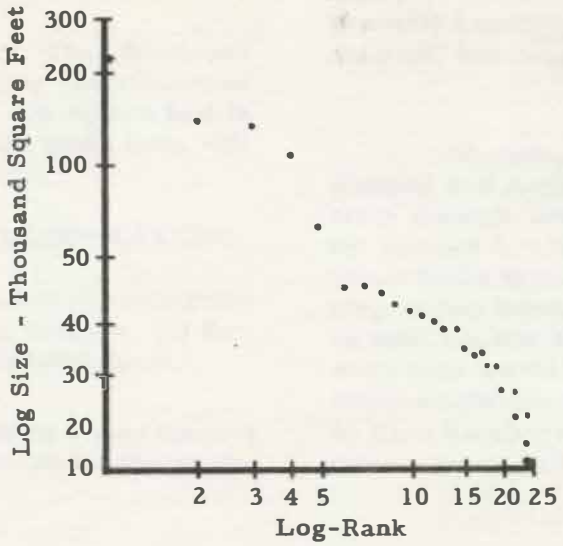
Graph 2 also indicates the almost complete lack of association between grocery sales and size of center for centers smaller than 50,000 square feet.

It is also a fact that individual purchases are larger at grocery stores located in a 50,000 square foot (or larger) center than those at grocery

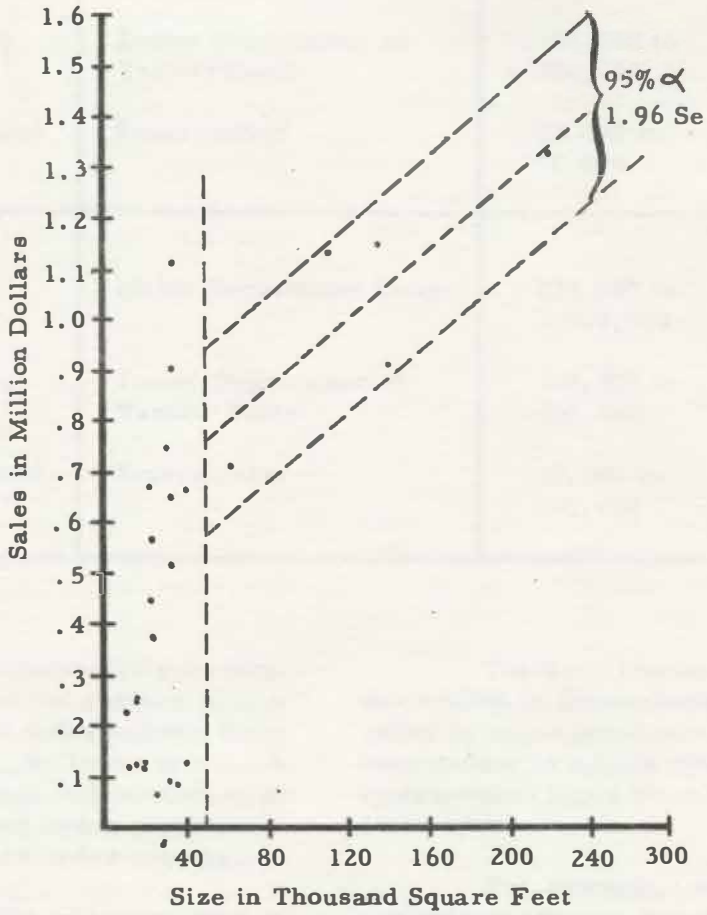
RESIDENTIAL LAND USE



MAP 2



Graph 1. Size - Rank Distribution



Graph 2. Shopping Center Size Verses Sales Success

stores located in centers smaller than 50,000 square feet.[3]

The inference is clear. The developer would be well advised to envision neighborhood shopping centers of at least 50,000 square feet in size but only, of course, when the trade area will support a center of this magnitude.

IV SHOPPING CENTER CLASSIFICATIONS

Students of commercial activity recognize three major classes of shopping centers: (1) Regional; (2) Community; and (3) Neighborhood.

These three major shopping center classes are often subdivided at the regional and at the neighborhood levels (i.e., major regional and shopping goods centers, and large and small neighborhood centers) and dichotomized into "planned" and "unplanned" and "agglomerated" and "strip."

Shopping centers are usually divided into planned and unplanned or into agglomerated and strip through observation or through reference to the manner in which the commercial area in question actually developed. Class limits for the shopping center triad, though, are usually predicated on total square footage of buildings and on major store type within the center. Two of these classification schemes follow. The first is from a study by Alan Voorhees and Associates,[4] and the second from a paper published by Homer Hoyt.[5]

Table

Type of Center	Major Store	Total Sq. Ft. of Buildings	Total Acres of Site
1. Regional	Major Department Store	350,000 to 700,000	40
2. Community	Junior Department or Variety Store	100,000 to 250,000	10
3. Neighborhood	Supermarket	25,000 to 70,000	4
1. Regional	Major Department Store	250,000 to 1,000,000	50
2. Community	Junior Department or Variety Store	100,000 to 400,000	20
3. Neighborhood	Supermarket	50,000 to 100,000	5

Centers of each group presumably perform all the functions of lower order centers plus a group of central functions that differentiates them from, and sets them above, the lower order. A consequence of this hierarchical differentiation is a "nesting" pattern of the lower order trade areas within the trade areas of higher order centers.

There is considerable evidence that a hierarchical class system does exist and that centers can be divided into three classes by function.[6]

The three classes of shopping centers are discernible in Greensboro on the basis of classification by major retail unit, but generally, Greensboro seems to exhibit differentiation along a continuum rather than a clear, three-part, hierarchical class system.

For example, when variance analysis is applied to the twenty-five Greensboro centers, (not including the Central Business District) it is discovered that the differences between classes (clas-

sified by total square feet) are not greater than the differences within classes. In Greensboro, then, a division of shopping centers into small neighborhood centers, less than 50,000 square feet, large neighborhood centers, 50,000 to 100,000 square feet, and community centers, over 100,000 square feet, apparently does not constitute a significant classification scheme.[7]

Graphs 3, 4, and 5 also suggest a shopping center continuum rather than a hierarchy.

Graphs 3, 4, and 5 rank Greensboro's shopping centers successively by: (1) square feet; (2) the 95 per cent confidence limits of trading area distance; and (3) the average time required to travel this 95 per cent confidence limit distance by automobile via the shortest and best routes.[8]

Graphs 3, 4, and 5 are cumulative frequencies plotted on arithmetic probability graph paper and tested by the Kolmogorov-Smirnov test for the normally distributed population. The graphs do show that each point (sample) of each cumulative frequency falls within the K-S limits indicating, of course, that each distribution was drawn from a normally distributed population. It should be noted here that the rank - order distributions of the three frequencies vary with each distribution. That is, the largest center does not necessarily boast the largest trade area; and the center with the largest trade area does not necessarily require the most time to travel its trade area distance.

However, the continuity of all three frequencies is evident.

If, however, Greensboro's shopping centers are categorized by major retail unit (i.e., neighborhood - supermarket; community - variety store; regional - department store), the centers do fit at least one identifiable pattern.

Brian J. L. Berry points out that community centers occur only in the higher income areas of a city.[9] If Greensboro's twenty-five shopping centers are categorized on the basis of a major tenant, the centers containing a variety or junior department store occur only in the higher income areas of Greensboro. These community shopping centers are identified by red symbols on Map II. Comparison of Map II with Map I indicates the association between the community centers and the higher income areas of the City.[10]

V SHOPPING CENTER TRADE AREAS

The Greensboro Planning Department publication, Greensboro Shopping Center Trade Areas, is available and need not be reviewed here. However, a few additional concepts are stated in the following paragraphs that were not completely covered in that publication.

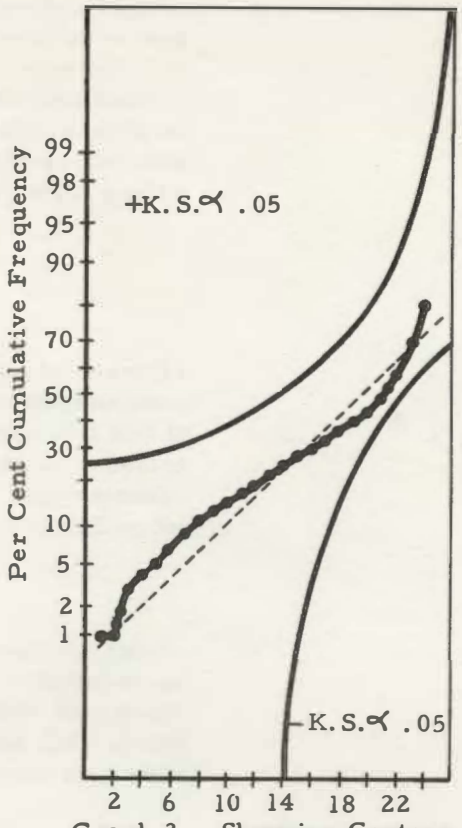
Community centers can be differentiated from neighborhood centers on the basis of trade area size, and the trade areas of the smaller centers do nest within the trade areas of the larger (or community) centers.

The community centers in Greensboro occupy the central location of a trade area comprised of approximately 20,000 people (or more) who can reach that center within about fifteen minutes (or less). The community centers purvey infrequently purchased but relatively expensive shopper's goods to this trade area and convenience goods to a more restricted trade area, thereby performing both the functions of community and neighborhood shopping centers.

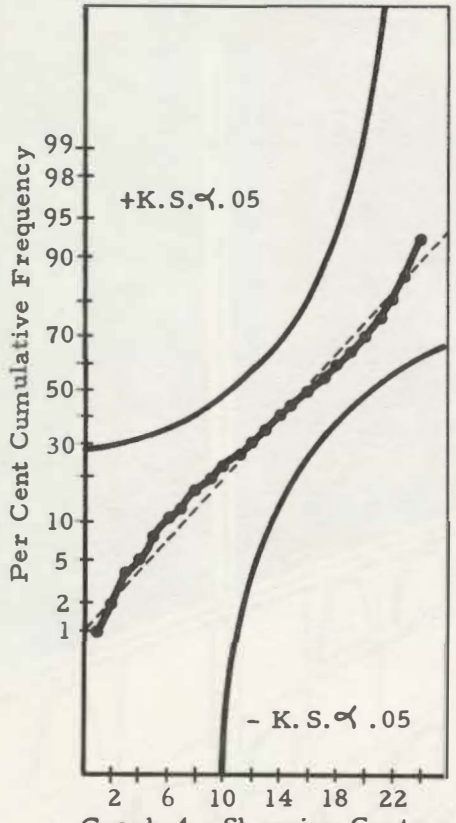
The neighborhood centers in Greensboro, whether a planned, nucleated center boasting a supermarket as its leading tenant, or a corner drug-store-grocer combination, serve a defined area of 2500 to 8500 people and offer inexpensive but frequently purchased convenience items.

In many cases, the Greensboro neighborhood shopping center is combined with a highway service, commercial ribbon, or a special purpose (i.e., automotive, printing, etc.) ribbon or ring. When this occurs, the total retail square footage usually exceeds the 50,000 square foot range, but the population served remains below the 8500 person level with the excess retail use being devoted to serving the highway traveler. A neighborhood shopping center rarely boasts a trade area larger than ten minutes travel time.

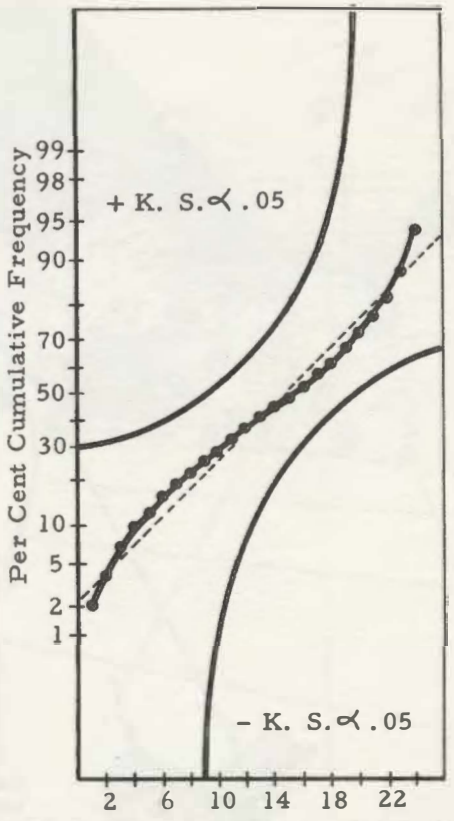
There is, however, no doubt that the combined highway ribbon-neighborhood center cannot tolerate the competition from the more agglomerated or nucleated neighborhood center whenever such competition occurs. The retail vacancy rate in ribbons or strips compared to the vacancy rates within nucleation indicates the trend toward nucleation[11], and studies from other cities[12], point up the apparent consumer preference for the nucleated shopping center.



Graph 3. Shopping Centers Ranked by Square Feet



Graph 4. Shopping Centers Ranked by Trade Area Size



Graph 5. Shopping Centers Ranked by Trade Area Travel Time

The traffic frictional problems engendered by the strip commercial district have long been recognized, but the consumer preference for shopping center nucleation provides further indication for the desirability of commercial zoning on only one side of a busy street or highway; or only one corner of a crossroads; or better still, zoning for shopping center nucleation only.

VI SUMMARY

This monograph has attempted to describe the pattern of commercial land use in Greensboro. Several conclusions are evident in the text and in the accompanying graphics and will not be repeated here. However, five concepts, or recommendations, do stand out and are briefly listed in the following paragraphs:

1. A ring around the City can be extrapolated from existing conditions as the most logical sites for future shopping centers as the City grows and spills outward from its center (Map 1).

2. Shopping centers should be located on a major radial street at a crossroads situation.

3. Shopping centers should be more or less evenly spaced with respect to residential districts and should be spaced about two miles apart on the average. Community centers should be located near the higher income areas of the City.

4. Shopping centers best serve the neighborhoods, the developers, and the tenants if they contain at least 50,000 square feet of buildings.

5. Shopping center zoning should, where possible, be confined to one side of the street or one corner of a crossroads. Shopping center zoning should favor agglomerated or nucleated centers rather than strip or ribbon areas.

FOOTNOTES

[1] Nelson, Richard L., The Selection of Retail Locations, F. W. Dodge, (New York) (1958), pp. 26-33.

[2] Store Location Research for the Food Industry, New York (undated) National American Wholesale Grocers Association.

[3] Hayes, Charles R., "Twenty Questions," Planning Notes, (March 1964).

[4] Voorhees, Alan M., and Associates, Analysis of Factors of Commercial Growth in the Baltimore Region, (1962).

[5] Hoyt, Homer, "Distortions of the Classical Models of Urban Structure," Land Econmics, (May 1964).

[6] Berry, Brian J. L., and Garrison, William L., "The Functional Basis of the Central-Place Hierarchy," Economic Geography XXXIV (April 1958) Worcester, Massachusetts, pp. 145-154.

[7] Hayes and Schul, Greensboro Shopping Center Trade Areas, Planning Department, Greensboro, North Carolina (May 1964).

[8] Ibid.

[9] Berry, Brian J. L., Commercial Structure and Commercial Blight, Department of Geography, University of Chicago (1963).

[10] Since these studies were conducted in 1963, a sixth community center has come into being at the corner of Market and Spring Garden Streets and certain neighborhood centers have dropped from the scene and others have emerged.

[11] Hayes, Charles R., "Commercial Land Use in Greensboro," Planning Notes, (25 September 1964) pp. 1-3.

[12] Berry, Brian J. L., Commercial Structure and Commercial Blight, op. cit.

(See also: Locational Tendencies and Space Requirements of Retail Business in Suburban King County, (1963) King County, Washington Planning Department, and see: Berry, Brian J. L., Ribbon Development in the Urban Business Pattern, "Annals of the Association of American Geographers," (June 1959) Volume 49, No. 2, Washington, D. C., pp. 145-155.