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A STUDY OF THE RETAIL TRADING AREA
OF DENTON, TEXAS

THESIS

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CHAPTER I

INTRODUCTION

Statement of the Problem

The problem is to determine the retail trading area of Denton, Texas, from secondary sources and to study the characteristics of this area to determine what part they play in the economy of the area.

Purpose of the Study

The purpose of this study is to find what information is available from secondary sources on retail trade areas and to assemble and analyze it so that the information will be of value to those interested in the economy of the area.

Delimiting the Study

This study will be limited to the retail trading area of Denton, Texas, as determined by the Law of Retail Gravitation. It is realized that each city will have its particular problems, but the over-all conditions in each are so comparable as to permit the application of this law in determining the trading areas of other cities.

Definition of Terms

Concept of a retail trade area.--A retail trade area is usually referred to as a retailing center and that geographical area immediately surrounding this retailing center. The extent of this area, however, varies with the type of goods. Bulk, convenience, and service goods tend to be bought near the home of the buyer. Customers, on the other hand, will travel several miles for fashion goods in order to compare prices and quality or to purchase a particular item that they want. The trade areas of primary trading centers are most often thought of in terms of fashion goods so as to get a better picture of trade drawn from outlying districts. A primary trading center is a town that draws considerable trade from the surrounding territory. Usually it is larger than other towns within the surrounding area, and ordinarily it has at least three stores selling fashion goods.¹

The difference between a secondary and a primary trading center is the type of trade attracted by the primary center from the territory that borders the trading center. The total area from which the center draws an appreciable percentage of the trade might logically be considered the trade area. Under this concept, the trade areas of competing centers overlap and considerable territory is claimed

¹Paul D. Converse, Retail Trade Areas in Illinois, p. 9.

by two or more centers. The trade area may also be thought of as that area from which a center draws 50 per cent or more of the trade. In this way boundaries of the areas do not overlap, and a sharp division line may be drawn between adjacent trade areas. The theory is that the loss from the enclosed area to competing centers will be balanced by gains from the adjacent areas.

In this study a retail area is defined as a retailing center and the surrounding area from which the center draws 50 per cent or more of the fashion goods trade.

Methods of delineating retail trade areas.--The only accurate method of determining where a consumer makes his purchases is by a consumer survey. It would be expensive to contact personally an adequate sampling of the consumers from the area and such detailed knowledge is not necessary. Fortunately, other methods are accurate enough for delineating trade areas although such methods do not reveal specific purchases. The consumer survey method is a primary source method of gathering information; that is, the person making the survey actually gathers the data himself as distinguished from assembling and analyzing the data that have already been gathered.

An analysis of highway traffic counts and flow charts, local newspaper circulations, out-of-town bank checks payable to retail stores, store deliveries, consumer panels, and

the results of consumer questionnaires are some other methods of determining trade areas.

A mathematical method may also be used in delineating a trade area. The breaking point between two competing retail trading centers can be mathematically determined through the application of the Law of Retail Gravitation, which states: "Two cities attract retail trade from an intermediate city or town in the vicinity of the breaking point, approximately in direct proportion to the population of the two cities and in inverse proportion to the square of the distance from these two cities to the intermediate town."² This law considers two factors, the attracting factor of larger population and the repelling factor of distance. Obviously, the application of this law does not set up a wall across which no trade moves. For various reasons, people from one area will trade in other centers; but, theoretically, this crisscrossing will balance out. There are other factors that might affect the validity of this law. A study of the topography of an area might give some light as to the limits in using the Law of Retail Gravitation in determining retail trade areas. High mountain ranges, toll bridges, or ferries would tend to limit the area and seriously affect what would otherwise be normal

²William J. Reilly, The Law of Retail Gravitation, p. 9.

trade movements. Reilly lists thirteen other factors that affect the validity of the law. These are as follows:

1. Lines of transportation
 - a. Public highways
 - b. Railroads and railroad rates
 - c. Electric lines
 - d. Bus lines
 - e. Waterways
 - f. Express and parcel post rates
 - g. Air lines
2. Lines of communication
 - a. Circulation of the daily newspaper
 - (1) Number of papers distributed
 - (2) Geographical territory covered
 - (3) Classes of people reached
 - b. Telephone and telegraph lines and rates
 - c. Local radio stations
3. The class of consumer in the territory surrounding the market
4. Density of population in the territory surrounding the market
5. Proximity of the market to a larger-city market
6. The business attraction of the city
 - a. The nature of the leading stores of the city
 - (1) The kinds of goods and selections of goods offered
 - (2) The delivery, credit, and other services offered by these stores
 - (3) The general reputation of these stores as style goods centers
 - b. The extent to which the city offers storage for, and a market for the sale and redistribution of, goods produced in the surrounding territory
 - c. The banking facilities of the city
7. The social and amusement attractions of the city
 - a. Theaters
 - b. Educational institutions and facilities
 - c. Musical attractions
 - d. Athletic events
 - e. Church, society, or fraternal gatherings
 - f. Fairs and expositions
8. The location of parking facilities and railway stations in relation to business and amusement centers

9. The nature of the competition offered by smaller cities and towns in the surrounding territory
 - a. The kinds of goods and selections of goods offered
 - b. The general attitude of these surrounding cities and towns toward the larger city
10. The population of the city
11. The distance which prospective customers must travel in order to reach the city and the psychology of distance prevailing in that part of the country
12. The topographical and climatic conditions peculiar to the city and its surrounding territory
13. The kind of leadership offered by the owners or managers of various business interests of the city³

To this list two other factors should be mentioned. These are

14. Consumers travel farther to buy high-priced than low-priced goods.
15. Upper-income families travel farther to shop than low-income families.⁴

Because of the above mentioned factors, can the Law of Retail Gravitation be of any practical value? In answering this question, one must realize that the factors of distance and population are beyond the direct control of a city; however, an effective Chamber of Commerce and other civic organizations can help overcome the other factors listed.

Several different formulas are used in applying the Law of Retail Gravitation. The first and original formula is used to determine what proportion of the trade goes

³Ibid., p. 73.

⁴Paul D. Converse, Study of Retail Trade Areas, p. 13.

from an intermediate town to two competing towns.⁵ The formula is stated as follows:

$$\frac{Ba}{Bb} = \frac{(Pa)(Db)^2}{(Pb)(Da)}$$

Ba is the proportion of trade attracted by city A
 Bb is the proportion of trade attracted by city B
 Pa is the population of city A
 Pb is the population of city B
 Da is the distance from intermediate town to city A
 Db is the distance from intermediate town to city B

The second formula, derived from the first by assuming that Ba is equal to Bb, is used to determine the breaking point between the trade areas of two towns.⁶ It is stated as follows:

$$B = \frac{\text{Distance from A to B}}{1 + \sqrt{\frac{\text{Population of A}}{\text{Population of B}}}}$$

The breaking point, or boundary, is the point at which the trade moving in opposite directions is equal--half going to city A and half going to city B.⁷ The distance used in the second formula is the distance on improved highways between the competing trading centers.⁸

The third formula is used to determine the division of trade between two towns.⁹ This formula is stated as follows:

⁵Reilly, op. cit., p. 70.

⁶Ibid., p. 72.

⁷Converse, Study of Retail Trade Areas, p. 14.

⁸Ibid., p. 15.

⁹Paul D. Converse, "New Laws of Retail Gravitation," The Journal of Marketing, LXII (October, 1949), 384.

$$\frac{B_a}{B_b} = \frac{(P_a)(\lambda)^2}{(H_b)(d)}$$

B_a is the proportion of trade going to the outside town
 B_b is the proportion of trade retained by the home town
 P_a is the population of the outside town
 H_b is the population of the home town
 d is the distance to the outside town
 λ is the inertia factor

The fourth formula is used to determine the proportion of trade which goes from an intermediate town to two competing towns when one of the competing towns is a large metropolitan center. The substitutions for this formula are the same as used in the first formula (see page 7).¹⁰ The fourth formula is stated as follows:

$$\frac{B_a}{B_b} = \frac{(P_a)(D_b)^3}{(P_b)(D_a)}$$

The fifth formula is used very much like the second formula except that this formula is used to determine the breaking point between the trade areas of two competing towns when one of the competing towns is a large metropolitan center.¹¹ This formula is stated as follows:

Distance from B =

$$\frac{\text{Distance between towns A and B}}{1/\sqrt[3]{\frac{\text{Population of A}}{\text{Population of B}}}}$$

The sixth formula is an outgrowth of formula three and is used to determine the division of trade between two towns when one town is a large metropolitan center.¹² The formula is stated as follows:

¹⁰ Ibid.

¹¹ Ibid.

¹² Ibid.

$$\frac{Ba}{Bb} = \frac{(Pa)(1.5)^2}{(Pb)(d)}$$

Ba is the proportion of trade going to the outside town
 Bb is the proportion of trade retained by the home town
 Pa is the population of the outside town
 Pb is the population of the home town
 d is the distance to the outside town
 1.5 is the inertia factor

Sources of Data

Data for this study have been gathered from secondary sources. First, the data have been gathered from articles and books concerning the delineating of retail trade areas. Second, the data have been gathered from articles, books, reports, and records concerning the characteristics of the Denton retail trade area. The latter data have been used mainly in Chapter III of this study.

Survey of Related Literature

For the purpose of this study, two general sources of related materials were used. First, William J. Reilly, The Law of Retail Gravitation, was used to apply the law to the Denton retail trade area. Second, the studies of other retail trading areas were used for further guidance in determining the Denton retail trading area from secondary sources.

For the purpose of this thesis, two studies which deal directly with the delineating of retail trade areas will be used.

A Study of Retail Trade Areas, Business Studies Number 2, by Paul D. Converse reveals many facts worthy of mention in this study.

Population and distance are the principal factors in determining where customers buy. The towns that are located at a considerable distance from any primary trading center will trade in secondary trading centers. The proportion of trade that goes to these secondary trading centers depends to a great extent upon the relative distances between the primary and secondary trading centers.¹³ As a result of his study in Illinois, Converse states:

The law of retail gravitation is the easiest method known to the author of determining the boundaries of retail trade areas and predicting the movement of shopping-goods trade from points near their boundaries to competing trading centers. When there are great differences in size, it is difficult, without field work, to determine which towns are the competing trading centers. It may happen that a large primary trading center is surrounded by large adjoining territories that contain no towns of anywhere near comparable size. Even in such cases, it is possible to determine the trade area with some accuracy without field work by comparing the sales of the trading center with those of the areas computed by using different competing towns until the area that the trading center appears to dominate is determined

.....
 If a large town is adjacent to the trade areas of towns that are considerably smaller, the larger town may be expected to attract some business from the upper-income families in the trade area of the smaller town.¹⁴

¹³Converse, A Study of Retail Trade Areas, p. 44.

¹⁴Ibid., p. 65.

A further study by Converse, Retail Trade Areas in Illinois, Business Studies Number 4, reveals other information pertinent to this study.

Persons who make occasional shopping trips to trading centers at a distance from their homes or persons who are vacationing or on business trips and who make purchases outside their normal trading area are commonly referred to as transient trade. Purchases made by transient trade may be important to the sellers located on main highways, in important commercial cities, and in resort towns. Even though the total amount of purchases made by transients may be large, it is only a relatively small proportion of the retail sales in the trading area.¹⁵

Concerning primary trade centers and secondary trade centers, Converse states:

A primary trading center usually has at least three stores which sell various kinds of women's apparel, furniture, and home furnishings. It is said that women like to look at goods in three stores before making important purchases of fashion goods. Therefore, a good primary shopping center should have at least three stores selling the various types of shopping goods purchased by women.

Most secondary trading centers are smaller than the neighboring primary trading centers. Their sales of fashion goods are relatively less important, and their sales of service and convenience goods relatively more important, than those of primary shopping centers. Low-income families usually buy their clothing, furniture, and home furnishings nearer home than do upper-income families. Upper-income families

¹⁵Converse, Retail Trade Areas in Illinois, p. 9.

make more and longer trips and do a larger part of their shopping in larger towns.¹⁶

Converse predicted the trade movement of eleven towns to primary trading centers by the use of the Law of Retail Gravitation.¹⁷ The actual trade movement was determined by a questionnaire filled out by an interviewer during a house-to-house survey. The coefficient of correlation was found to be .88.¹⁸ The same study revealed that a trading center draws very little trade from the territory more than five miles beyond the mathematically computed boundaries of the trading area.¹⁹

Edna Douglas, in making a study of the retail trading area of Charlotte, North Carolina, used five methods in delineating the city's general trading area. The following methods were used: (1) the records of the Credit Bureau of the Charlotte Merchants' Association to determine customers' addresses; (2) checks deposited during one week by several Charlotte stores to determine the location of the banks against which they were drawn; (3) an analysis of the traffic flow; (4) Reilly's Law of Retail Gravitation; (5) population and its distribution in the Charlotte area.²⁰

¹⁶Ibid., p. 10.

¹⁷Converse, Study of Retail Trade Areas, p. 64.

¹⁸Ibid.

¹⁹Ibid., p. 66.

²⁰Edna Douglas, Measuring the General Retail Trading Area, p. 488.

Concerning the application of Reilly's Law of Retail Gravitation, Douglas stated:

Reilly's law of retail gravitation, based upon population and distance as trading area determinants, has been applied to the Charlotte area. . . . The cities used in setting the limits of this area were Wilmington, Raleigh, Greensboro, Winston-Salem, Asheville, Spartanburg, Columbia, and Florence. This area varies little from the general Charlotte trading area determined by other means. Its chief difference is its extension into southeastern North Carolina and northeastern South Carolina.²¹

From a survey of related literature it seems that the Law of Retail Gravitation is as accurate as well as a practical method of delineating the trade area of a trading center and therefore sufficiently valid for use in this study.

²¹Ibid., p. 56.

CHAPTER II

THE DENTON RETAIL TRADING AREA DELINEATED

Delineation of the Denton Retail Trading Area

Through the use of two of the Laws of Retail Gravitation (see pages 7 and 8), the breaking points of the Denton retail trading area were determined. The breaking points, how they were determined, and the formulas used are discussed later in this chapter.

The size or population of a town does not ordinarily call for a rating as a primary trading center. This rating is based on those towns that have at least three stores which handle goods of the fashion type. The populations of Denton and adjacent primary trading centers are given in Table 1.

The populations of the trading centers adjacent to Denton vary from that of a large metropolitan center to that of a small town. The characteristics of all these centers are similar with the exception of Dallas and Fort Worth which are much larger and will have a much wider selection from which the shopper may choose.

TABLE 1

POPULATION OF DENTON AND ADJACENT PRIMARY TRADING CENTERS, 1950*

Town	Population
Denton	21,345
Dallas	432,927
Fort Worth	277,047
Sherman	20,073
Gainesville	11,219
McKinney	10,525
Decatur	2,925

*Source: Rand McNally, Commercial Atlas and Marketing Guide, Eighty-second Edition, quoting U. S. Bureau of Census, 17th Census of Population, p. 405.

The distance as referred to in the Law of Retail Gravitation is measured along improved highways. Highway mileage from Denton to adjacent primary trading centers along these improved highways is given in Table 2.

TABLE 2

HIGHWAY MILEAGE FROM DENTON TO ADJACENT PRIMARY TRADING CENTERS*

Town	Miles from Denton
Dallas	38
Fort Worth	35
Sherman	56
Gainesville	30
McKinney	26
Decatur	26

*Source: Texas Highway Commission, "Official Highway Map," 1950.

It should be noted here that the mileage from Denton to McKinney is measured along the new State Highway Number 24.

This route is now under construction but will be completed on or about September 1, 1951.¹

By using the distance and population figures, as given in Tables 1 and 2, and applying the Law of Retail Gravitation, the distance on improved highways to the breaking point between Denton and each of the competing trading centers may be computed. The results are presented in Table 3.

TABLE 3
HIGHWAY MILEAGE FROM DENTON TO BREAKING POINTS
WITH ADJACENT PRIMARY TRADING CENTERS

Trade Area	Route Number	Miles to Breaking Point
Dallas	National 77	10.20
Fort Worth	National 377	10.45
Sherman	State 10	
	National 82	28.43
Gainesville	National 77	17.39
McKinney	State 24	15.70
Decatur	State 24	18.98

The mileage given along the highways indicates the distance from which Denton draws 50 per cent or more of the retail trade. Converse states, "When one town is 15 or 20 times as large as the other, the law as stated appears to

¹As told by J. R. Kirkpatrick, Senior Resident Engineer, Texas Highway Department, during a telephone conversation with the author, April 16, 1951.

give too much weight to population." For this reason, formula five, page 8, was used to determine the breaking point between Denton and Dallas and between Denton and Fort Worth. The breaking points between each of the adjacent trade areas and how they were mathematically determined are as follows:

The breaking point between Dallas and Denton was determined by using formula five, page 8, as shown below.

$$B = \frac{38}{1 \sqrt[3]{\frac{432,927}{21,345}}} = B = \frac{38}{1 \sqrt[3]{20.2823}}$$

$$B = \frac{38}{1 \sqrt[3]{2.72713}} = B = \frac{38}{3.72713}$$

$$B = 10.20 \text{ miles}$$

The breaking point between Fort Worth and Denton was determined by using the same formula as was used to find the breaking point between Dallas and Denton. Mathematically the breaking point is found as follows:

$$B = \frac{35}{1 \sqrt[3]{\frac{277,047}{21,345}}} = B = \frac{35}{1 \sqrt[3]{12.9795}}$$

²Paul D. Converse, Retail Trade Areas in Illinois, p. 13.

$$B = \frac{35}{1 \neq 2.3501} = B = \frac{35}{3.3501}$$

$$B = 10.45 \text{ miles}$$

The breaking point between Sherman and Denton was determined by using formula two, page 7, as illustrated below.

$$B = \frac{56}{1 \neq \sqrt{\frac{20,073}{21,345}}} = B = \frac{56}{1 \neq \sqrt{.94040750}}$$

$$B = \frac{56}{1 \neq 969746} = B = \frac{56}{1.969746}$$

$$B = 28.43 \text{ miles}$$

Formula two, page 7, was used to determine the breaking point between Gainesville and Denton as shown below.

$$B = \frac{30}{1 \neq \sqrt{\frac{11,219}{21,345}}} = B = \frac{30}{1 \neq \sqrt{.5256031}}$$

$$B = \frac{30}{1 \neq .724986} = B = \frac{30}{1.724986}$$

$$B = 17.39$$

To find the breaking point between McKinney and Denton formula two was again used, and mathematically it is shown below.

$$B = \frac{26}{1 \neq \sqrt{\frac{10,525}{21,345}}} = B = \frac{26}{1 \neq \sqrt{.49308970}}$$

$$B = \frac{26}{1 \neq .7022} = B = \frac{26}{1.7022}$$

$$B = 15.27 \text{ miles}$$

The breaking point between Decatur and Denton was determined by using formula two as shown below.

$$B = \frac{26}{1 \neq \sqrt{\frac{2,925}{21,345}}} = B = \frac{26}{1 \neq \sqrt{.13703443}}$$

$$B = \frac{26}{1 \neq .370180} = B = \frac{26}{1.370180}$$

$$B = 18.98 \text{ miles}$$

From the foregoing, it is seen that the Denton retail trade area stretches its farthest distance, 28.43 miles, toward the northeast, and its shortest distance, 10.20 miles, toward the southeast. Distances east and west are practically equal, 15.7 miles and 18.98 miles, respectively. The distances to the north extend 17.39 miles and to the southwest only 10.45 miles. In spatial and quantitative terms, the bulk of the trade area is to the north and

northeast of the trading center of Denton. The Denton retail trade area, as defined and delineated, is pictorially presented in Figure 1.

Moving from Denton eastward on Route 24 for the computed 15.7 miles, the breaking point falls just a fraction of a mile short of the Denton County line. The first community along this route is in Collin County and no towns or communities fall into the Denton trade area going eastward. Moving clockwise, the boundary line falls just east of the community of Little Elm, Denton County, and connects with the breaking point on Route 77. This point, 10.20 miles southeast of Denton is approximately 8 miles from Lewisville. Lake Dallas, Denton County, is about 2 miles within the trade area. The line connecting this point with the breaking point on Route 377 neither includes nor excludes any towns or communities until the breaking point on Route 377 is reached. The breaking point on Route 377 is 10.45 miles southwest of the city of Denton. At this point, the boundary line falls northeast of the town of Roanoke approximately 7 miles. Argyle is within the Denton retail trading area by about 3 miles.

Continuing the boundary line towards the breaking point on Route 24, the town of Justin, Denton County, is outside the trade area by approximately 2 miles and the town of Ponder, Denton County, is well within the area. The line

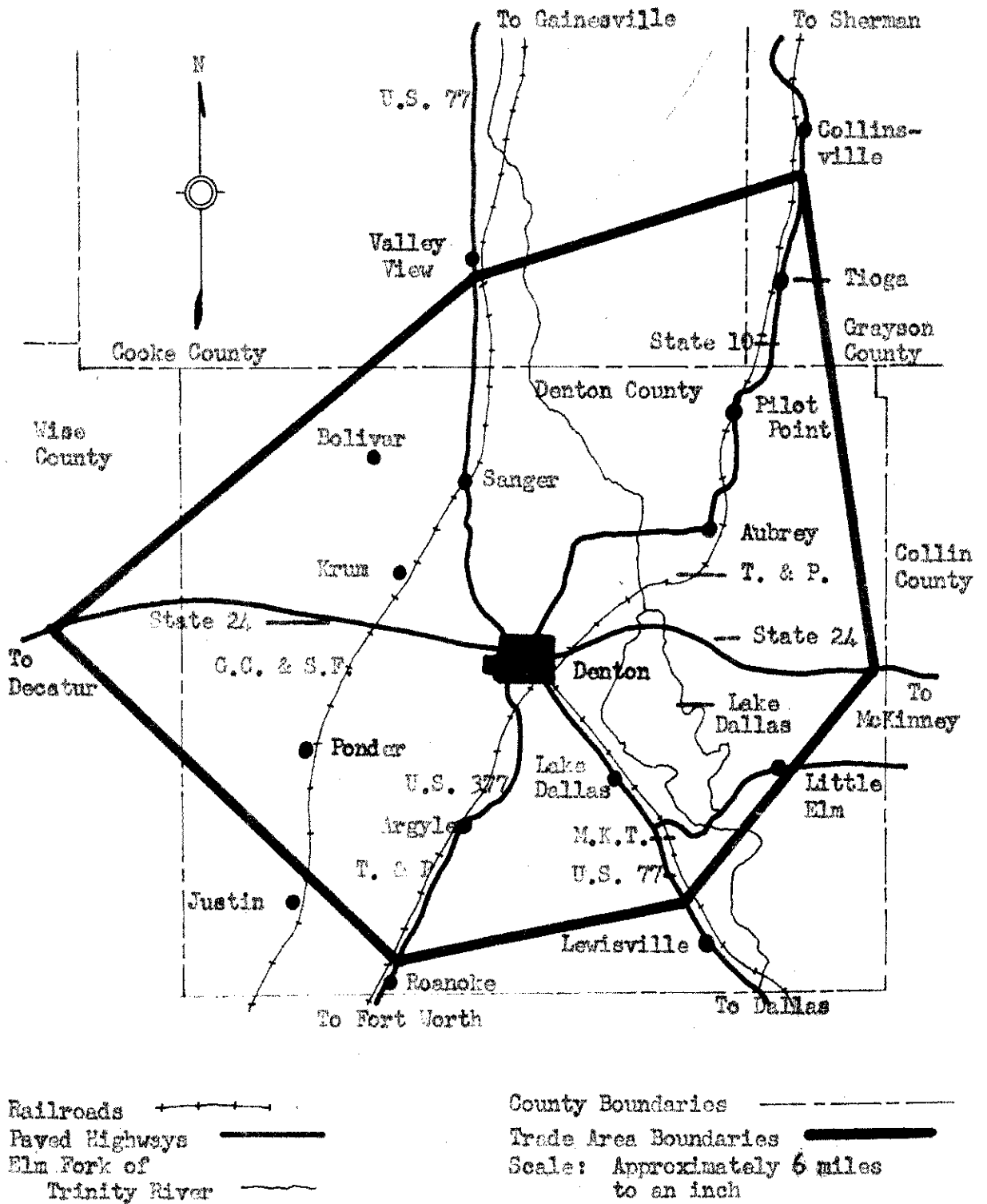


Fig. 1.—A map of the Retail Trading Area of Denton, Texas

now enters Wise County and penetrates that county by some 3 miles. From the deepest point in Wise County the line cuts to the right towards the breaking point on Route 77. In doing this, it includes the towns of Krum, Denton County, and Bolivar, Denton County, within the Denton retail trade area. The boundary line as it connects Route 77 is now in Cooke County and is about 4 miles south of the community of Valley View, Cooke County, and approximately 5 miles north of Sanger, Denton County. From this point, the boundary line goes northeast to meet the breaking point on Route 10. At this point, the Denton retail trade area extends its farthest point, 28.43 miles, northeast of the city of Denton. Here the breaking point is in Grayson County and is about 2 miles south of Collinsville and approximately 5 miles north of Tioga. From this point on Route 10, the boundary line closes the area by going in a direct line to the starting point just a fraction of a mile inside the Denton County line on Route 24.

Thus, the Denton retail trading area includes parts of four counties; namely, Denton, Wise, Cooke, and Grayson. It includes most of Denton County, but it includes only a small area of Wise and Grayson Counties. The area of Cooke County included within the Denton retail trading area is the largest of any of the counties except that of Denton County.

The Denton Retail Trade Area as Delineated
by the Denton Chamber of Commerce

The Denton Chamber of Commerce has determined the retail trade area of Denton by asking the merchants of the city to keep a list of the out-of-town checks that they receive and by counting the out-of-county cars parked in the business district of the city. This was done over a period of time using a different day of the week each time in order to get a better sample.³

The Chamber of Commerce studied and analyzed this material and determined approximately the trading area of Denton. No definite miles to breaking points were determined, but an approximation of the distance was made. Through this method, the approximate distance going east on Route 24 to McKinney was found to be 16 miles. Going to the southeast toward Dallas on Route 77, the Chamber of Commerce found the approximate distance to the breaking point to be 12 miles. Traveling Route 377 to Fort Worth, the distance to the breaking point was approximately 11 miles. Going due west from Denton to Decatur on Route 24, the breaking point was estimated to be 19 miles. Leaving Denton going north on Route 77 toward Gainesville, the breaking point was approximately 18 miles. On Route 10

³As told by O. L. Fowler, Manager of the Chamber of Commerce, Denton, Texas, during a conversation with the author, April 10, 1951.

towards Sherman, the Chamber of Commerce found the breaking point to be about 28 miles.⁴

The breaking points that the Chamber of Commerce found from their study differ very little from those determined in this study by the Law of Retail Gravitation. The greatest difference, approximately 2 miles, in the breaking points is the distance to the boundary line along Route 77 to Dallas. The other five breaking points determined varied from .2 of a mile to .6 of a mile.

⁴Ibid.

CHAPTER III

CHARACTERISTICS OF THE AREA

Introduction

The characteristics of Denton County are described throughout this chapter to indicate the characteristics of the Denton trading area. As shown in Figure 1, page 21, the area of the Denton retail trade area agrees quite closely with that of Denton County. Since census data and other pertinent information are readily available by counties, this substitution seems expedient.

Historical Notes of the Area

When Texas was under the Mexican regime, the Mexican government created a few counties in what is now Texas. Red River County in northeastern Texas was created by Mexico, and the Denton retail trade area was a part of this county. In 1837 Fannin County was created by the second Congress of the Republic of Texas, and at that time Denton County was a part of Fannin County. During the period of 1839, 1840, and 1841, the Texas Congress had to post three companies of Rangers in this area to protect the residents of Fannin

County from the Indians. Orders to patrol this area came directly from the President of the Republic of Texas.¹

In 1846 Denton County was organized. At this time two famous east-west trails, the "Indian Trail" and the "Ranger Trail," crossed Denton County. These two trails were used constantly by Indians, rangers, and pioneers. The trail that exerted much influence on life in the Denton territory was the Butterfield Trail. This was the first trans-continental mail route established by the Federal Government. The Butterfield Trail crossed Denton County about three miles northwest of the Bolivar community. Although this trail was built primarily to be a mail carrying route, it also greatly encouraged the settlement of the Southwest.²

The area which now comprises the Denton retail trade area is almost as old as the State of Texas. Today the population of the county is 41,243, with an average density of 43.78 people per square mile for the 942 square miles that comprise the area.³

Denton County is located in the north-central part of Texas, approximately thirty-five miles south of the Texas-Oklahoma boundary. The only county between Denton County and the Oklahoma state boundary is Cooke County. On the

¹Mary Jo Cowling, Geography of Denton County, p. 4.

²Ibid., pp. 4-8.

³Rand-McNally, Commercial Atlas and Marketing Guide, Eighty-second edition, p. 405.

south, Denton County joins Dallas and Tarrant Counties. The northeast corner of Denton County joins Grayson County and the eastern and western boundary borders Collin and Wise Counties, respectively.⁴

Population

The primary factor in the analysis of a trade area is that of its population. "A market consists of people with money and the inclination to buy."⁵ There are three factors to be considered here--people, money, and the inclination to buy. The factor of people will be covered by number of population, the factor of money by income analysis, and a large part of the factor of inclination to buy will be examined by a study of retail sales and population characteristics.

Number.--"Other things being equal, two similar areas, with one population double that of the other, will have double the sales potential."⁶ The total population of the Denton County numbered 41,243 in 1950 (see Table 4). This population is the potential market for a product that is used universally. Few products, however, have a market that is dependent entirely upon total population. Other factors

⁴Cowling, op. cit., p. 1.

⁵Paul D. Converse and H. W. Huegy, Elements of Marketing, Third Edition, p. 21.

⁶Myron S. Heidingsfield and Albert B. Blankenship, Market and Marketing Analysis, p. 223.

such as income, racial characteristics, climate, size of town, and concentration of population must also be considered.

Table 4 gives the classification of the 1940 and the 1950 populations as to urban and rural population. The 1950 population of Denton County was estimated according to the definition used by the United States Bureau of Census, which states: "Urban population, as defined by the Bureau of Census, is in general that residing in cities and other incorporated places having 2,500 inhabitants or more."⁷

TABLE 4
URBAN AND RURAL POPULATION OF DENTON COUNTY
AND TEXAS, 1940 AND 1950

Type of Population	Denton County	Texas
Urban, 1940	11,192 ^a	2,911,389 ^b
Rural, 1940	22,466 ^a	3,503,435 ^b
Total population, 1940	33,658 ^a	6,414,824 ^b
Urban, 1950	21,345 ^d	4,839,266 ^d
Rural, 1950	19,898 ^d	2,871,928 ^d
Total population, 1950	41,243 ^d	7,711,194 ^d

Sources: ^aU. S. Bureau of the Census, Census of Population, Sixteenth Census, IV, Part 4, 509. ^bBureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 3.0102, derived from U. S. Bureau of Census figures. ^cRand-McNally, Commercial Atlas and Marketing Guide, Eighty-second Edition, p. 405, derived from U. S. Bureau of Census figures.

⁷U. S. Bureau of the Census, Census of Population, Sixteenth Census, IV, Part 4, p. 1.

The city of Denton with its population of 21,345 is the only town in Denton County that can be classified as an urban area. The remaining 19,898 persons of Denton County are classed as rural population. The increase in urban population for the city of Denton can partially be attributed to the college students, numbering approximately 7,000, who were included in the 1950 census of Denton but not in the 1940 census. The increase of urban population from 1940 to 1950 was 3,153, or approximately 28 per cent, not including the college students.

The population of the Denton retail trade area has fluctuated between census years. Table 5 shows that the total population of Denton County dropped between 1920 and 1930, and not until sometime between 1940 and 1950 did the population increase enough to surpass the 1920 figure. During the thirty-year period, the population increased approximately 16 per cent in Denton County, 179 per cent in the city of Denton, and 53 per cent in Texas. The increase in Denton County is not a large population growth, but, as this area is primarily an agricultural area, perhaps the farm depression years of the 1930's are being reflected here.

The city of Denton is the only breakdown within the trade that has an uninterrupted increase in population. Denton County, excluding the city of Denton, has had a

TABLE 5

POPULATION OF TEXAS, DENTON COUNTY, AND CITY OF DENTON,
1920, 1930, 1940, AND 1950

Area	1920	1930	1940	1950
Texas	4,633,228 ^a	5,824,715 ^a	6,414,824 ^a	7,711,194 ^d
Denton County (excluding the city of Denton)	27,355 ^c	23,235 ^c	22,466 ^c	19,898 ^d
City of Denton	7,626 ^c	9,587 ^c	11,192 ^c	21,345 ^d
Total Denton County	35,355 ^c	32,822 ^c	33,658 ^c	41,243 ^d

Sources: ^aThe Dallas Morning News, Texas Almanac, 1945-1946, p. 101, derived from U. S. Bureau of Census figures. ^cBureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 3.0101, derived from U. S. Bureau of Census figures. ^dRand-McNally, Commercial Atlas and Marketing Guide, Eighty-second Edition, p. 405, derived from U. S. Bureau of Census figures.

gradual decrease in population from 1920 to 1950; however, the total population of Denton County has increased approximately 16 per cent. In comparing the population of the one urban district with the rural population, it is clear that the rural area contributes the major reason for the slow growth of the population in the Denton retail trade area.

Characteristics of the population.---The inclination to buy is governed by various factors that are too numerous to analyze in great detail. A study of certain characteristics of the population, however, will give a general picture of the area as to the opportunities that are presented for the

sale of various products. It has been shown that older people tend to resist new products, women make up the chief market for fashion items, and men buy the bulk of life insurance.⁸ Among the most important factors are race, nativity, age, sex, educational level, and social level.

The percentage distributions by nativity and sex for the city of Denton, Denton County, and Texas are given in Table 6. In the city of Denton, females comprise the

TABLE 6

SEX AND NATIVITY OF POPULATION, CITY OF DENTON,
DENTON COUNTY, AND TEXAS, 1950*

Classification	City of Denton	Denton County	Texas
Sex			
Male	44.73%	48.19%	50.2%
Female	55.27	51.81	49.8
Total	100.00%	100.00%	100.00%
Nativity			
Native-born	99.0%	99.1%	96.3%
Foreign-born	1.0%	.9	3.7
Total	100.00%	100.00%	100.00%

*Source: Estimated by sex and nativity trends for the past thirty years. Corrected by the actual number of male and female students above the number of local students who would have been included in the trend. Percentage of total population is given.

greater percentage of the population, or 55.27 per cent as compared with 44.73 per cent for males. The greater

⁸Heidingsfield and Blankenship, op. cit., p. 233.

proportion of female students in the local colleges causes the percentage of females to be rather high. The college population is still reflected in the Denton County figures as 48.19 per cent of the population being male and 51.81 per cent female. The proportion of males in the Denton retail trade area is approximately 2 per cent lower than the average for Texas as a whole.

In the area, 99.1 per cent of the population in 1950 was native-born as compared to 96.3 per cent for the state. The Denton retail trade area has approximately 6.5 per cent negro population.

The Denton retail trade area has a rather low concentration of youth as compared with the state (see Table 7). The area has 21.31 per cent of its population under 15 years of age whereas in the state there are 28.9 per cent under 15 years. The area has a heavy concentration of people under 24 years of age, the city of Denton having 60.4 per cent of its population within this group, Denton County having 54.24 per cent, and Texas having only 47.2 per cent within this group. Again, the college population within the area is reflected in this 24 years and under group.

The area has a low percentage of people who are between the ages of 35 and 55. The percentages for this group for the area and for the state are 20.18 per cent and 24.4

TABLE 7

POPULATION CLASSIFIED BY AGE, CITY OF DENTON,
DENTON COUNTY, AND TEXAS, 1950*

Age	City of Denton	Denton County	Texas
Under 5 years	4.2%	6.37%	11.5%
5 to 14 years	10.0	14.94	17.4
15 to 24 years	46.2	32.93	18.3
25 to 34 years	11.1	12.58	16.0
35 to 44 years	9.2	10.51	14.6
45 to 54 years	8.2	9.67	9.8
55 to 64 years	6.0	6.92	7.0
65 years and over	5.1	6.08	5.4
Total	100.0%	100.00%	100.0%

*Source: Estimated. Trend was projected and corrected for the large number of people in the 15 to 24 year class. This condition was created by the changing of the census compilations to include college students in the population of the college towns in which they reside. Percentage of total population is given.

per cent, respectively. The age of the population over 65 for the Denton retail trade area is only slightly higher than that of the state.

Social level can be indicated roughly through the educational level of the area.⁹ Different types of reading material, amusements, and advertising will appeal to more highly educated groups than will appeal to those with less formal education. The years of school completed by persons 25 years of age or older are given in Table 8.

As shown by Table 8, the Denton retail trade area has a relatively high educational level. The city of Denton

⁹Ibid., p. 224.

TABLE 8

PERCENTAGE DISTRIBUTION OF POPULATION ACCORDING TO
YEARS OF SCHOOLE COMPLETED BY PERSONS 25 YEARS
OF AGE AND OVER, CITY OF DENTON, DENTON
COUNTY, AND TEXAS, 1950*

Years Completed	City of Denton	Denton County	Texas
No school completed	1.42%	1.75%	5.30%
Grade school			
1 to 4 years	6.62	10.27	13.67
5 to 7 years	9.64	14.90	14.75
7 or more years	14.88	21.0	21.07
High school			
1 to 3 years	19.61	22.76	20.53
4 or more years	16.21	11.96	13.31
College			
1 to 3 years	16.19	9.74	6.92
4 or more years	15.43	7.62	4.45
Total	100.00%	100.00%	100.00%

*Source: Estimated by establishing a trend for the past thirty years and this trend applied to the 1940 census figures. Percentage of total population is shown.

enjoys a very high percentage of people, 67.44 per cent, who have completed from one year of high school to 4 or more years of college. The trade area rates above the state in this same category with 52.08 per cent as compared to 45.21 per cent for the state. The area ranks on equal terms or higher for all educational levels except for those persons who have completed from 1 to 4 years of grade school and 4 or more years of high school. The city of Denton does not rank above the state except in 4 or more years of high school and for both of the college categories.

An occupational picture gives more light on the inclination to buy factor, both as to luxury items and as to the items used by those in specific occupations. The employment status and occupational classification of persons 14 years old and over are presented in Table 9.

TABLE 9

EMPLOYMENT STATUS AND OCCUPATIONAL CLASSIFICATION
OF PERSONS 14 YEARS OLD AND OVER, CITY OF
DENTON, DENTON COUNTY, AND TEXAS, 1950

Occupation	City of Denton ^a	Denton County ^a	Texas ^b
Professional workers	663	926	224,000
Farmers and farm managers	37	3,605	266,000
Proprietors, managers, and officials, except farm	621	1,005	286,000
Clerical, sales, and kindred workers	1,116	1,452	508,000
Operatives and kindred workers	626	1,020	450,000
Domestic service workers	321	468	83,000
Service workers, except domestic	635	764	228,000
Farm wage laborers and farm foremen	52	1,063	144,000
Farm laborers and unpaid family workers	4	370	55,000
Laborers, except farm	244	530	195,000
Craftsmen, foremen, and kindred workers	430	793	366,000
Occupations not reported	11	30	34,000
Total employed	4,760	13,478	2,840,000

Sources: ^aEstimated by establishing a percentage increase for each occupational classification and correcting this percentage by the trend for the state. ^bBureau of the Census, Census of Population, Series PC-6, No. 10, 1950, p. 14.

In the Denton retail trade area, there are 13,478 persons employed. Of the total employed, 3,605, or 26.75 per cent, are farmers or farm managers. An additional 1,433, or 10.63 per cent, are other farm workers, making a total of 4,038 (37.38 per cent) working on the farms. Comparing this with the 16.37 per cent for the same group in the state, emphasis is placed on the predominance of agriculture in the Denton retail trade area. In the trade area, clerical, sales, and kindred workers, 1,452, rank second, and operatives and kindred workers rank third with 1,020. In the city of Denton, clerical, sales, and kindred workers rank first, with professional workers ranking second, and service workers, except domestic, ranking a close third. The total number of employed people within the area is only 32.68 per cent of the total population whereas the total number of employed people in the state is 36.83 per cent of the total population. This condition can partially be attributed to the college students in the area. Although cities tend to draw people who are in their most productive years, it still seems that the area contains a reservoir of unused and part-time labor that might be tapped for new industries.

Transportation Facilities

The industries of an area, whether they be farming, manufacturing, mining, wholesaling, or retailing, will

flourish or decline in direct relationship with the transportation available in the area. In this day of specialization, surplus goods must be distributed to several parts of the nation and other finished products must be gathered from all points and transported to the area. Users of the industrial products have been trained to want and demand quick and dependable service at low prices; therefore, the transportation must not only be available, but it must be quick, efficient, and reasonable. There are four main classes of transportation that are of general importance to industry. The railroads which furthered and made possible the settlement of the West, and upon which the lifeblood of many industries is dependent, are the first of these classes of transportation. The second are the highways, which have served to make it possible to take people to more distant retail markets. The third and latest means of transportation, the airways, have revolutionized many industries with its practical shrinkage of geographic area and have affected all industries to some degree. The final classification, the "old reliable" for those industries and areas that are situated near the ocean or on inland waterways, is that of water transportation.

Rail transportation.--There are three railways in the Denton retail trade area. The Missouri-Kansas-Texas and the Texas and Pacific operate over the same route through

Denton County, touching the cities of Denton, Aubrey, and Pilot Point. The Santa Fe operates a main line running from Fort Worth north through Denton County, serving the towns of Krum and Sanger. The St. Louis, San Francisco, and Texas operates through the southeast corner of the county, touching the community of Hebron. This is outside the Denton retail trade area but it could be used by those towns in the southeastern part of the area.¹⁰

There are six scheduled stops for passenger service in the city of Denton. The other towns throughout the area that are along these routes are also served by these trains but are on flag stops. The Santa Fe, which serves the western part of the area, has flag stops at Krum and Sanger.¹¹

The Denton retail trade area has approximately eighty-eight miles of track. The area has rail facilities available to the north and south, but no facilities are available to the east and west.¹²

Freight service is offered to the cities on the passenger service schedules. The Missouri-Kansas-Texas Railroad operates a branch line for freight only from Denton to Dallas, which also serves the towns of Lake Dallas and Lewisville.¹³

¹⁰ Bureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 4.1001.

¹¹ Ibid.

¹² Ibid., pp. 4.1001-02.

¹³ Ibid.

Highway transportation.--An excellent network of highways covers the trade area. Two Federal highways, four state highways, and seven farm-to-market roads serve the Denton retail trade area. U. S. 77 connects Denton with Dallas on the south and Gainesville on the north. U. S. 377 joins Denton with Fort Worth to the southwest. State 24 handles traffic from Denton west to Decatur, and east to McKinney. State 10 carries the traffic from Denton to Sherman.¹⁴

Denton is well supplied with passenger bus service in all directions. The bus companies that operate routes through the city are American, Continental, Dixie, Greyhound, and Mooney. The companies operate approximately twenty-two daily trips from Denton.¹⁵

The city of Denton is also served with motor truck transportation as the State Railroad Commission has authorized seven companies to operate in Denton. All these motor freight carriers have separate terminals and offer pick-up and delivery service in all directions. All shipments are insured and bonded and overnight service is offered by all carriers to points served directly.¹⁶

Air and water transportation.--There are no commercial air line facilities in the trade area. However, five air lines operate in Fort Worth, located thirty-five miles south

¹⁴Ibid.

¹⁵Ibid., p. 4.100202.

¹⁶Ibid., p. 4.100201.

of Denton. There are two airports located outside the city of Denton, but they can handle only small aircraft.¹⁷

Being an inland area, with no inland waterways available, there is no water transportation available to the trade area.

Industrial Status

Agriculture

Soil.--There are three major soil areas in Denton County, the Blackland Prairie, the Grand Prairie, and the Forested Coastal Plain. The soils in these areas are of a variety of types. The Blackland Prairie is a north-south belt on the eastern edge of Denton County and includes 20 per cent of the county. The Grand Prairie comprises the western half of the county. The Forested Coastal Plain is a north-south belt several miles wide which lies between the Blackland Prairie and the Grand Prairie sections and comprises 30 per cent of the county.¹⁸

Climate.--The climate of the Denton retail trade area is generally not too extreme in winter or summer, and the average temperature was 64.9 degrees in 1950.¹⁹ Table 10 gives the normal monthly and annual mean temperature for Denton County for the past five years.

¹⁷Ibid., p. 4.1003.

¹⁸Ibid., p. 2.03.

¹⁹Denton Chamber of Commerce, Facts about Denton, Denton County, Texas.

TABLE 10
 NORMAL MONTHLY AND ANNUAL MEAN TEMPERATURE
 DENTON COUNTY*

Month	1946	1947	1948	1949	1950
January	45.0	44.2	48.7	44.1	48.9
February	52.1	44.1	45.5	48.6	53.2
March	60.1	50.5	53.2	55.8	55.5
April	67.6	64.8	70.4	64.3	63.4
May	69.7	71.3	73.1	71.4	72.9
June	77.4	80.4	82.0	80.1	78.5
July	84.4	83.6	84.5	83.9	79.9
August	84.7	86.4	85.4	84.1	80.5
September	75.2	79.1	77.5	77.5	74.4
October	69.2	72.4	65.9	67.0	70.5
November	56.6	50.9	55.2	64.8	54.8
December	52.9	47.2	51.3	46.5	45.9
Annual average	66.2	64.6	65.2	64.8	64.9

*Source: Denton Chamber of Commerce, Facts about Denton, Denton County, Texas.

Mean temperatures do not tell the whole story. Short cold waves often cause the mercury to drop to below zero; for example, three below in January, 1930. On the other hand, heat waves in the summer often cause the temperature to hover around 100 degrees and higher; for example, 113 degrees above zero in August, 1936.²⁰

The average length of the growing season gives ample time to mature the crops commonly grown in this area. The average date of the first frost is November 13 and the average date of the last frost is March 25, thus giving an average growing season of 233 days.²¹

²⁰Ibid.

²¹Ibid.

Denton County enjoys an average of 197 days of sunshine each year. The average number of cloudy and partly cloudy days average 81 and 87, respectively. The average annual rainfall for the area is 33 inches.²²

Farm and farm production.--The number of farms in the Denton retail trade area stood at 3,963 in 1930. By 1935 the number had decreased to 3,796, a decrease of 167 farms (see Table 11). The number of farms continued to decrease and in 1945 had decreased a total of 844 farms. During the period 1935 to 1945, the total acres in farms increased by 28,261 acres, whereas the acres per farm increased 45.2 acres. The farms in Denton County follow the same general trend as the farms in the state. Two things, both probably caused by the depression, seem to have happened here. First, a drastic decline in income causes some farmers to sell part of their holdings in order to get cash with which to meet heavy mortgage payments. Second, during periods of depressions, there is a general trend for more acres to be put into cultivation, partly because of unemployed urban dwellers who move to the country in quest of a few acres that will provide existence for their families and partly because of farmers who seek a few acres extra so that their total income will not drop below an existence level.

²²Bureau of Business Research, op. cit., p. 2.0101.

TABLE 11

NUMBER OF FARMS, FARM ACREAGE, AND AVERAGE ACRES PER FARM,
DENTON COUNTY AND TEXAS, 1930, 1935, 1940, AND 1945

Number of Farms	Denton County ^a	Texas ^b
1930	3,963	495,489
1935	3,796	501,017
1940	3,340	418,002
1945	3,119	384,977
Total farm acreage		
1930	529,254	124,707,130
1935	533,750	137,597,389
1940	539,630	137,683,372
1945	557,515	141,337,744
Average number of acres per farm		
1930	133.5	251.7
1935	140.6	274.6
1940	161.6	329.4
1945	178.7	367.1

Sources: ^aBureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 4.0101. ^bU. S. Bureau of Census, Census of Agriculture, I, Part 26 (1945), p. 2.

The acres per farm in Denton County are well below the acres per farm for the state. The trend definitely reflects a consistent movement toward less farms, more total acres, and more acres per farm.

One writer has said, "A farming community of owners is generally more prosperous than one made up of renters."²³ Table 12 shows the proportion of farm tenancy in Denton County. During the twenty-five year period, Denton County has been above the proportion of farm tenancy for the state.

²³James H. Greene, Principles of Retailing, p. 34.

TABLE 12

NUMBER OF TENANT FARMS BY PERCENTAGE IN
DENTON COUNTY AND TEXAS, CENSUS
YEARS 1930 THROUGH 1945

Year	Denton County ^a	Texas ^b
1930	63.57%	60.88%
1935	60.09	57.10
1940	51.90	48.91
1945	42.51	37.61

Sources: ^aBureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 4.0101-03. ^bU. S. Bureau of Census, Census of Agriculture, 1945, I, Part 26, p. 2.

During this same period the proportion of farm tenancy in Denton County decreased to 42.51 per cent, a decrease of approximately 33 per cent.

The total value of farm property in Denton County in 1940 was \$25,449,954.²⁴ By 1945, it had increased approximately 45 per cent to \$37,073,942 (see Table 13). Land and buildings made up over 75 per cent of the total. The value per acre in 1940 was \$40.27.²⁵ The wartime increase in farm values is shown by the 34.71 per cent increase in per acre value of land and buildings during the war years when very

²⁴Bureau of Business Research, op. cit., p. 4.0102.

²⁵Ibid.

little building was going on. The greatest percentage increase in farm property values between 1940 and 1945 came in the value of implements and machinery. The value of implements and machinery in 1940 was \$1,532,192.²⁶ With the

TABLE 13
VALUE OF FARM PROPERTY, DENTON COUNTY
AND TEXAS, 1945

Type of Property	Denton County ^a	Texas ^b
Value of land and buildings	\$30,244,752	\$3,574,997,897
Value of land and buildings		
Per farm	10,761	9,286
Per acre	54.25	25.29
Value of implements and machinery	2,924,961	277,046,169
Value of livestock on farms	3,904,229	624,322,018
Total value of farm property	\$37,073,942	\$4,476,366,084

Source: ^aBureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 4.0102. ^bU. S. Bureau of the Census, Census of Agriculture, 1945, I, Part 26, p. 2.

movement toward mechanized farming and the curtailment in the manufacture of farm machinery, the seller was placed in a favorable position and used farm implements and machinery were at premium values. The value of livestock in 1940 was \$2,174,951.²⁷ During the five-year period from 1940 to 1945, the value of livestock on farms increased 79.51 per

²⁶Ibid.

²⁷Ibid.

cent which was due almost entirely to increased prices and very little to increased numbers on the farms.

Another method of obtaining a picture of the general economic conditions on the farms of the Denton retail trade area might be to look at the number of farms having running water, electricity, radios, and telephones, and to look at the number of trucks, tractors, and automobiles on the farms. In 1945, the trade area had 3,119 farms but only 1,768 of them had running water, and only 1,906 had electricity (see Table 14).

There are 374 farm dwellings within one fourth of a mile of an electric distribution line that are without electricity. The number of farms with radios, however, far surpasses the number of farms with telephones. Allowing for the few farms that have two or more tractors, it may be assumed that approximately 62 per cent of the farms used tractor power. More automobiles than tractors are found on the farms of the area. The number of trucks amounts to approximately 26 per cent of the number of farms. This seems low, but it should be remembered that automobiles commonly serve double duty by being used to provide passenger transportation and to transport small produce to market and prepared feeds and farm supplies from the towns.

The number of farms decreased between 1940 and 1945; yet, the number of each item (see Table 14), except automobiles, increased during the same period. The greatest

TABLE 14

FACILITIES, MOTOR TRUCKS, TRACTORS, AND AUTOMOBILES
IN DENTON COUNTY, 1940 AND 1945*

Item	1940	1945
Number of farms, total	3,340	3,119
Number of farms with specified facilities		
Running water	a	1,768
Electricity	1,274	1,906
Telephones	457	530
Radios	a	2,636
Electric distribution line within 1/4 mile of farm dwelling	1,927	2,280
Number on farms		
Motor trucks	442	807
Tractors	1,120	1,944
Automobiles	2,766	2,541

*Source: Bureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 4.0102. ^aAvailable data not comparable.

percentage increase showed up in the item of trucks. The next greatest percentage increase was in tractors, reflecting a general trend toward power farming.

Table 15 shows the value of farm products sold and used in Denton County. The value of farm property in an agricultural community is important and will certainly reflect the economic conditions of the area, but a true measure of farm wealth can come only from a look at what is produced. The total value of farm products sold and used on the farms in Denton County was \$4,153,951 in 1940 and this amount increased to \$7,942,403 in 1945. This was an

increase of 91 per cent. Such an increase reflects both greater production and higher prices. The most important classification, in terms of dollars and cents, was livestock.

TABLE 15

VALUE OF FARM PRODUCTS SOLD AND USED,
DENTON COUNTY, 1940 AND 1945*

Farm Product	1940	1945
Crops sold		
Fruits and nuts sold	\$28,425	\$45,075
Vegetables sold	14,640	28,558
Horticultural specialities sold	31,405	74,572
Other crops sold	2,059,108	3,374,567
Total crops sold	\$2,133,578	\$3,522,772
Livestock and livestock products sold	\$1,514,926	\$3,666,539
Total farm products sold	\$3,653,720	\$7,206,433
Farm products used by farm households	500,231	735,970
Total value of farm products sold and used	\$4,153,951	\$7,942,403

*Source: Bureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 4.0107.

Cattle raising is engaged in quite extensively within the area. Much raw milk and cream are produced within the area. All in all, the total value of livestock and livestock products sold in the area was \$1,514,926 in 1940 and \$3,666,539 in 1945, an increase of approximately 142 per

cent. This increase reflects the increase of production and also the rise in prices during the war years.

Table 16 lists the principal crops harvested and their values for the years 1940 and 1945.

TABLE 16
VALUE OF PRINCIPAL CROPS HARVESTED,
DENTON COUNTY, 1940 AND 1945*

Crop	1940	1945
Cotton	\$853,492	\$1,511,560
Wheat	643,881	1,331,956
Oats	721,840	1,016,347
Corn	487,413	804,157
Peanuts	126,546	428,873
Sorghums	153,947	416,412
Barley	95,326	214,303
Hay	31,837	110,880

*Source: Bureau of Business Research, The University of Texas, An Economic Survey of Denton County, June, 1949, p. 4.0107.

The difference in the total value of the crops listed in Table 16 and the total crops sold and used as listed in Table 15 is interesting. Although all of the farm crops are not listed in Table 16, the total value of the ones listed is well above the total farm crops sold and used as listed in Table 15. This may be accounted for by the fact that large amounts of crops harvested are not sold but are instead fed to livestock on the farm.

As might be expected, the crop with the highest dollar value is cotton. The total value of cotton gathered increased by 77 per cent from 1940 to 1945. During the same five-year period all the crops listed in Table 16 increased in value, which reflects the increase of production during the war years and also the rise in prices during the period.

Mining and extraction.--An almost inexhaustible supply of buff-burning and semi-refractory clay and pottery clay is found near the city of Denton. The Acme Brick Works utilizes these clay resources in the manufacture of bricks and tile.²⁸

Large deposits of gravel are found in the central section of the county. The gravel found in the area is mostly soft gravel and is not recommended for highway use except for those highways carrying light to medium traffic. Along Denton creek, thirteen miles south of Denton, are found large quantities of good road gravel. North and east of the city good concrete gravel is found.²⁹

Approximately three miles northwest of the city of Denton there are several deposits of hard limestone. The cost of mining in the county is too great to make the mining of limestone profitable.³⁰

In 1937 the county produced 665 barrels of oil and by 1947 the production had increased 82 per cent to 1,209

²⁸Bureau of Business Research, op. cit., p. 4.05.

²⁹Ibid., p. 2.05.

³⁰Ibid.

barrels.³¹ In 1948 there were 14 producing wells near the community of Bolivar, seven miles west of Sanger. These wells were producing 280 barrels of 32 to 45 gravity oil each day.³² By 1950 Denton County had 33 leases and 154 producing wells which were producing approximately 2,605 barrels of oil daily.³³ These 154 wells produced a total of 487,470 barrels of oil. In the oil industry, prices are quoted to the producer at the top of the well, and in 1950 the average price per barrel of oil was \$2.42; thus the total value of the oil produced within the area was \$1,179,677.40.³⁴

Manufacturing.--In 1947 there was a total of 40 manufacturing establishments in Denton County.³⁵ There were 16 establishments in the food and kindred products group; 6 in printing, publishing, and allied industries; 1 in ladies' apparel; 1 in lumber and timber basic products; 4 in stone, clay, and glass products; 7 in furniture and finished lumber products; 1 in leather and leather products; 1 in iron and

³¹Ibid., p. 4.05.

³²Ibid., p. 2.05.

³³As told by G. L. Fowler, Manager of the Chamber of Commerce, Denton, Texas, during a conversation with the author, May 1, 1951.

³⁴As told by Bill Parker, from the records of the County Tax Assessor, County Tax Assessor's Office, Denton, Texas, during a conversation with the author, May 1, 1951.

³⁵Bureau of Business Research, op. cit., p. 4.06.

steel products; 1 in machinery; and 2 miscellaneous industries. Table 17 gives the value added by manufacturing for the trade area as \$6,085,000 in 1947. Comparing this

TABLE 17
CHARACTERISTICS OF MANUFACTURING CONCERNS,
DENTON COUNTY, 1940 AND 1947*

Characteristics	1940	1947
Number of manufacturing establishments	18	40
Number employed	181	1,147
Value of product	\$1,798,543	\$16,400,000
Value added by manufacturing	668,218	6,085,000
Monthly payroll	12,173	208,000
Average monthly wage ^a	67.25	181.34

*Source: Denton Record-Chronicle, Standard Market Data for Denton, Texas, 1948. ^aDerived by dividing monthly payroll by number employed.

figure with the amount of farm products sold in 1945, \$7,206,433, it is seen that in terms of cash value farming is only 18.43 per cent higher than manufacturing. This is not surprising because of the agricultural nature of the area. If adequate information were available for the years since 1947, it would probably be found that more industries have moved into the area.

Wholesaling.--According to the 1948 census there were 46 wholesale establishments in Denton County, 22 of these establishments being located in the city of Denton and the remainder distributed throughout the county. From Table 18

it can be seen that the city of Denton did 62 per cent of the wholesale business within the county. The average annual

TABLE 18

CHARACTERISTICS OF WHOLESALE ESTABLISHMENTS,
CITY OF DENTON AND DENTON COUNTY, 1948*

Area	Number of Establishments	Number of Employees	Payroll Excluding Proprietor	Sales
Denton County	46	164	\$355,000	\$9,064,000
City of Denton	22	110	288,000	5,600,000
Remainder of county	24	54	67,000	3,464,000

*Source: U. S. Bureau of Census, Census of Business, 1948, Bulletin No. 1-W-42, p. 42.13.

wage for the employees of these wholesale establishments was \$2,164.63 for Denton County and \$2,618.18 for the city of Denton.

Retailing.--Denton County had a total volume of retail sales of \$29,948,000 in 1948. Table 19 shows the number of stores, sales, payroll, and number of employees as reported by the U. S. Bureau of the Census. Of the total sales in the county the automotive group accounted for 24.14 per cent. The grocery stores selling fresh meats ranked second with

TABLE 19

 RETAILING BY TYPE OF STORE, SALES, PAYROLL,
 AND NUMBER EMPLOYED, DENTON COUNTY, 1948*

Type of Store	Number of Stores	Sales	Payroll Excluding Proprietor	Number Employed
Grocery stores without fresh meats	39	817,000	27,000	22
Grocery stores with fresh meats	85	5,670,000	224,000	160
Meat and fish markets	3	174,000	17,000	5
All other food stores	8	175,000	25,000	19
Eating places	68	1,157,000	218,000	218
General merchandise	24	1,929,000	207,000	144
Variety stores	7	475,000	67,000	71
Men's, boys' clothing furnishing stores	5	319,000	13,000	13
Family clothing stores	4	1,241,000	114,000	97
Women's ready-to-wear	6	389,000	43,000	30
Other apparel stores	6	224,000	26,000	17
Furniture and home furnishing stores	20	546,000	41,000	23
Household appliances	14	592,000	56,000	34
Automotive group	40	7,230,000	560,000	239
Gasoline service stations	92	2,433,000	141,000	118
Lumber and building group	21	1,445,000	100,000	47
Hardware and farm equipment dealers	17	1,456,000	90,000	54
Drug stores	14	1,014,000	136,000	113
Proprietary stores	6	190,000	34,000	48
Fuel, fuel oil, and ice dealers	11	376,000	49,000	27
Jewelry stores	5	137,000	5,000	3
Book and stationery store	4	215,000	22,000	30
Second-hand store	3	13,000	a	1
All other retail stores	17	490,000	52,000	46
Total	532	\$29,948,000	\$2,308,000	1,615

*Source: U. S. Bureau of Census, Census of Business, 1948, Bulletin No. 1-R-42, p. 42.32. ^aLess than \$500.

18.93 per cent of the total sales for the county. It is interesting to note that the general merchandise stores in Denton County did 6.4 per cent of the total retail sales. This might be an indication that the general merchandise store is still a common sight in agricultural areas.

Retail sales in 1948 from 90,777 stores for the state of Texas were \$6,518,877,000. Denton County and the city of Denton contributed .46 and .32 per cent, respectively of these sales.³⁶

Service establishments.--"Service establishments, hotels, tourist courts, and places of amusement are defined as places of business for which services provide the primary source of receipts."³⁷ Service establishments in Denton had receipts of \$1,448,000 (see Table 20). Of this

TABLE 20

CHARACTERISTICS OF SERVICE ESTABLISHMENTS, CITY OF DENTON AND DENTON COUNTY, 1948*

Location	Number of Establishments	Receipts	Payroll Excluding Proprietor	Number Employed
City of Denton	118	\$1,035,000	\$311,000	220
Remainder of county	84	413,000	67,000	46
Total	202	\$1,448,000	\$378,000	266

*Source: U. S. Bureau of Census, Census of Business, 1948, Bulletin No. 1-S-42, p. 42.25.

³⁶U. S. Bureau of Census, Census of Business, 1948, Bulletin No. 1-R-42.

³⁷Ibid., Bulletin No. 1-S-42.

amount the city of Denton provided 71.5 per cent of the receipts. Approximately 59 per cent of the service establishments were located in the city of Denton and 97 per cent of those employed were in the city.

Income

Estimate of the income.--Several methods have been used to determine the income of areas. Among these have been the number of income tax returns, telephones, automobiles, magazine and newspaper subscriptions, retail sales, and value of property. The "rents paid" method, the "value added" method, and Sales Management's "Survey of Buying Power"³⁸ have also been used. The data gathered for this study are the most recent available and in some cases do not lend themselves to using the "rents paid" or the "value added" methods because the data are for different years. For the purpose of this study the income will be estimated by using Sales Management's "Survey of Buying Power."

Survey of buying power.--Annually, one issue of the Sales Management magazine contains estimates of the effective buying income of counties and other areas. The total national income is proportioned to each state on a basis of retail sales, bank debits, agricultural marketing, and other items. The state income is then distributed among

³⁸ Issued annually by Sales Management magazine.

the counties in accordance with income tax returns and agricultural marketings in each county. Table 21 shows the annual estimated effective buying income for Denton and Denton County for the years 1946 through 1950.

TABLE 21

ESTIMATE OF EFFECTIVE BUYING INCOME, DENTON COUNTY
AND CITY OF DENTON, 1946 THROUGH 1950*

Year	Income	Income per Family
1946		
Denton County	\$26,033,000	\$2,712
City of Denton ^a		
1947		
Denton County	24,752,000	2,335
City of Denton	11,208,000	2,607
1948		
Denton County	30,904,000	3,000
City of Denton	13,969,000	3,407
1949		
Denton County	33,833,000	3,133
City of Denton	15,293,000	2,999
1950		
Denton County	37,270,000	3,419
City of Denton	15,276,000	2,829

*Source: Sales Management magazine, "Effective Buying Income," May 10 issue for the years 1946-1950. ^aInformation not available.

The estimated income increased 43.16 per cent for Denton County and 4.31 per cent for each family living in the county between the years of 1946 and 1950. The income per family for those families living in Denton was slightly higher than the income for those families living in the

county until 1949. The reverse situation of 1949 and 1950 is probably caused by the increase of prices for farm products of those years.

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary

From an area that was once patrolled by rangers to protect the residents from Indians, the city of Denton has grown until its retail trading area, as determined by the Law of Retail Gravitation, extends over approximately 758 square miles and includes almost all of Denton County and parts of three other counties, Grayson, Cooke, and Wise.

The 1950 population of Denton County was 41,243, of which only 21,345 in the city of Denton were classed as urban. The general decline in farm population held the trade area to a population increase of only 16 per cent in ten years, 1940 to 1950. The predominance of agriculture is emphasized by the 37.38 per cent of the labor force who were working on the farms as compared with 16.37 per cent for the state. An untouched supply of labor, particularly part-time labor, is indicated by the fact that only 32.68 per cent of the total population for the area are employed.

The youth of the population is indicated by the 54.24 per cent under 25 years of age as compared to 44 per cent for this age group of the state. The college population of the area is reflected in these figures. Comparing the sex of the population of the area with that of the state, it is seen that the area has a greater percentage of females, a situation which is caused by the high percentage of female students attending colleges in the area. When a comparison of the educational qualifications of the population of the area is made with those of the state, it is found that the qualifications are about equal until the college level is reached. The area ranks higher than the state for those persons who have completed one to four or more years of college; this is also a reflection of the college population of the area.

The proportion of farm tenancy in the area is higher than that of the state. This could be an indicator of the fact that many of the people of the area work at different occupations but own land and rent this property for additional income. The proportion of farm tenancy within the area has decreased some 49 per cent from 1930 to 1945.

In 1945, the value of farm property was \$37,073,942, and the land value was \$54.25 per acre. The value of farm products sold and used by farm households amounted to \$7,942,403 in that same year. Cotton, oats, and wheat are

the main crops grown in the area. The farmers' largest source of cash income was from the sales of livestock with a little over three and one-half million dollars worth being sold in 1945. The only mineral extraction of any consequence in the area is the crude oil industry. In 1937 the county produced its first appreciable amount of oil, but by 1950 the production was worth over one and one-half million dollars.

Manufacturing in the area in 1947 added over six million dollars in value to the manufactured products of the area. The 46 wholesaling establishments of the area did a total business of over nine million dollars, with a little more than half of the business being done by wholesale houses located in the trading center.

The retail trade of the area totaled almost thirty million dollars in 1948. The automotive group and the grocery stores selling fresh meats accounted for approximately 42 per cent of the sales. The general merchandise store contributed 6.4 per cent of the total sales for the area, indicating the agricultural nature of the area. Service establishments had receipts of almost one and one-half million dollars, and of those receipts the trading center accounted for 75 per cent.

The "Survey of Buying Power"¹ was used for estimating the income for the area. From 1946 to 1950 the trading area income increased 43.16 per cent. The income per family for those families living in the city of Denton was higher than the income per family for those families living throughout the county until 1949. The reverse situation in 1949 and 1950 is probably caused by the increase of prices paid for farm products and the fact that urban families' incomes do not increase at the same rate as do the prices paid for farm products.

Conclusions

With this brief summary of conditions in the Denton retail trade area and as a final result of this study, the following general conclusions are drawn:

1. The Denton retail trade area is primarily agricultural. Indicators of this fact are so many and so definite that there is little doubt but that agriculture and the rural population of the area will affect, to a considerable extent, all business activity of the area.
2. In 1947, the Denton retail trade area was not highly industrialized. The trading center is not centrally located within the state of Texas, but several markets are only a

¹"Survey of Buying Power," Sales Management, LVI, LVIII, LX, LXII, LXIV (May 10, 1946, 1947, 1948, 1949, and 1950), pp. 381, 386, 428, 500, and 520.

few miles away. The excellent highway facilities put these markets within easy reach as well as affording the facilities for bringing raw materials to the area. A good supply of labor is available within the area. With the present trend toward decentralization of industry, these facts point toward an expansion of manufacturing in the trade area.

3. In 1948, retailing in the trade center and in the trade area as a whole indicates a strong retail trade center comparing the retail sales to the income.

4. The fact that the retail trade center would be a good sampling area for companies introducing new products is indicated by the youth of the population of the center.

5. A good market for fashion goods is revealed by the large population of females in the area.

6. In 1948, wholesaling in the area had doubled in number and tripled its sales in the past ten years, and with the trend toward decentralization of industry the wholesale trade of the area should continue to increase.

Recommendations for Further Research

For those interested in retailing and retail trade centers, the following recommendations for further research are suggested:

1. It would be of interest to those interested in the economy of the Denton retail trade area to continue this

study by making a consumer survey to determine the exact breaking points of the Denton area.

2. To further prove the validation of the Laws of Retail Gravitation, it would be of great value if these laws could be applied to a number of trading centers, and then by consumer survey determine the reliability of these laws.

3. It would be of great value to determine the shopping habits of the residents of the area by making a consumer survey as to how, why, when, and where they make their purchases.

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