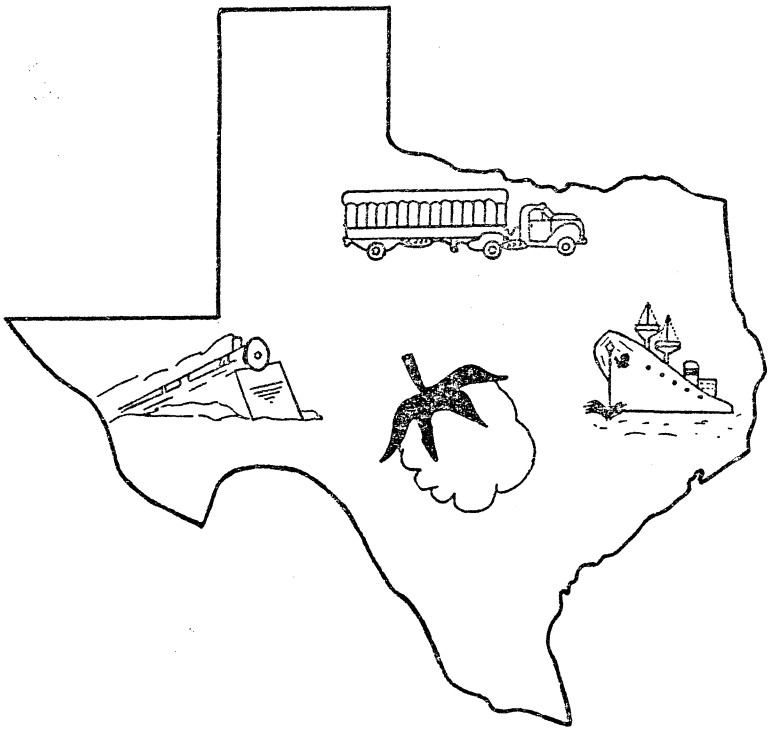
The Traffic Pattern of Ginned Cotton, Cottonseed, and Cottonseed Products Transported in Texas by Railway, Highway, and Waterway for 1952 - 1953

By
DAN R. DAVIS



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Texas Highway Department
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TEXAS TRANSPORTATION INSTITUTE
College Station, Texas

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THE TRAFFIC PATTERN OF GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS

DIGEST

Economically, cotton is the most significant crop grown in Texas. The cotton and cottonseed harvested from 10,300,000 acres during the 1952-53 season had a farm value of $778,741,000. Almost 88 percent of this production was concentrated in six rather well-defined areas of the state, each with its own production problems and transportation patterns. A tremendous volume of transportation was required to move these products from the production areas to the point of final processing or consumption.

Railroads are still the most important method of moving the ginned cotton and cottonseed products for long distances. Eighty-eight percent of all shipments out of the areas of production were made by rail.

Since rail shipments are considerably heavier than truck shipments, the actual tonnage movement of cotton and cottonseed products was probably considerably higher than that. Rail transportation has declined in importance as a means of shipping cotton and its products for short distances, however, and now is of only minor importance in that respect.

In the six major cotton producing areas, about 97 percent of all intra-area shipments of ginned cotton and cottonseed products were handled by trucks. In addition it is estimated that almost 100 percent of all the unginned cotton is moved from the farm to the gin by some form of highway transportation. In the six areas covered in this report, there were 369,788 truck shipments and 42,596 rail shipments of cotton, cottonseed, and cottonseed products. Although they were not covered in this report, there were probably several times this number of shipments of unginned cotton from the farm to the gin.

Each step in the processing of cotton and cottonseed has generally well defined transportation characteristics. Some form of highway transportation is used almost exclusively in bringing the unginned cotton from the farm to the gin. Almost 93 per cent of all ginned cotton and cottonseed is transported from the gins to compresses and oil mills by highway.

Compressed cotton is usually sent either to the Gulf ports for export or eastward to the Southeastern cotton mills. All movements to the Southeastern mills are handled by rail as are most of the longer shipments to the Gulf ports.

Because of the heavy livestock demand, a large part of all the cottonseed products except oil are consumed locally and are generally shipped by truck. There is also a noticeable trend toward increased tank-truck shipments of cottonseed oil for longer distances. Long-distance hauls of cottonseed products, however, are still primarily by railway.

Increased use of the "compress-gin" is likely to alter traditional transportation patterns. The development of extensive systems of rural highways and farm-to-market roads should add impetus to this trend.

As the transportation industry becomes more and more competitive, both the railroads and the trucking industry will need to improve their services to maintain their business. Each has several inherent advantages to protect as well as disadvantages to correct and improve.

INTRODUCTION

Cotton is the most important row-crop grown in the state. Texas has frequently produced 30 percent of the

nation's cotton crop and it has led all states in the production of this important agricultural commodity for many years.

The cotton crop in 1952 of 3,808,000 bales was used as the basis for this transportation survey since it represented the average number of bales produced in a recent five year period (1948 to 1953). The 1952 crop was recognized as the 1952 - 1953 cotton season by the cotton industry and was largely harvested during the late summer and fall of 1952.

There are six major cotton producing areas in Texas. While some cotton is grown in most of the counties in the state, the 76 counties included in these six areas are by far the most important. Over three and a third million bales or almost 88 percent of the total cotton crop of 1952 -53 was produced in these six areas. (Figure 1)

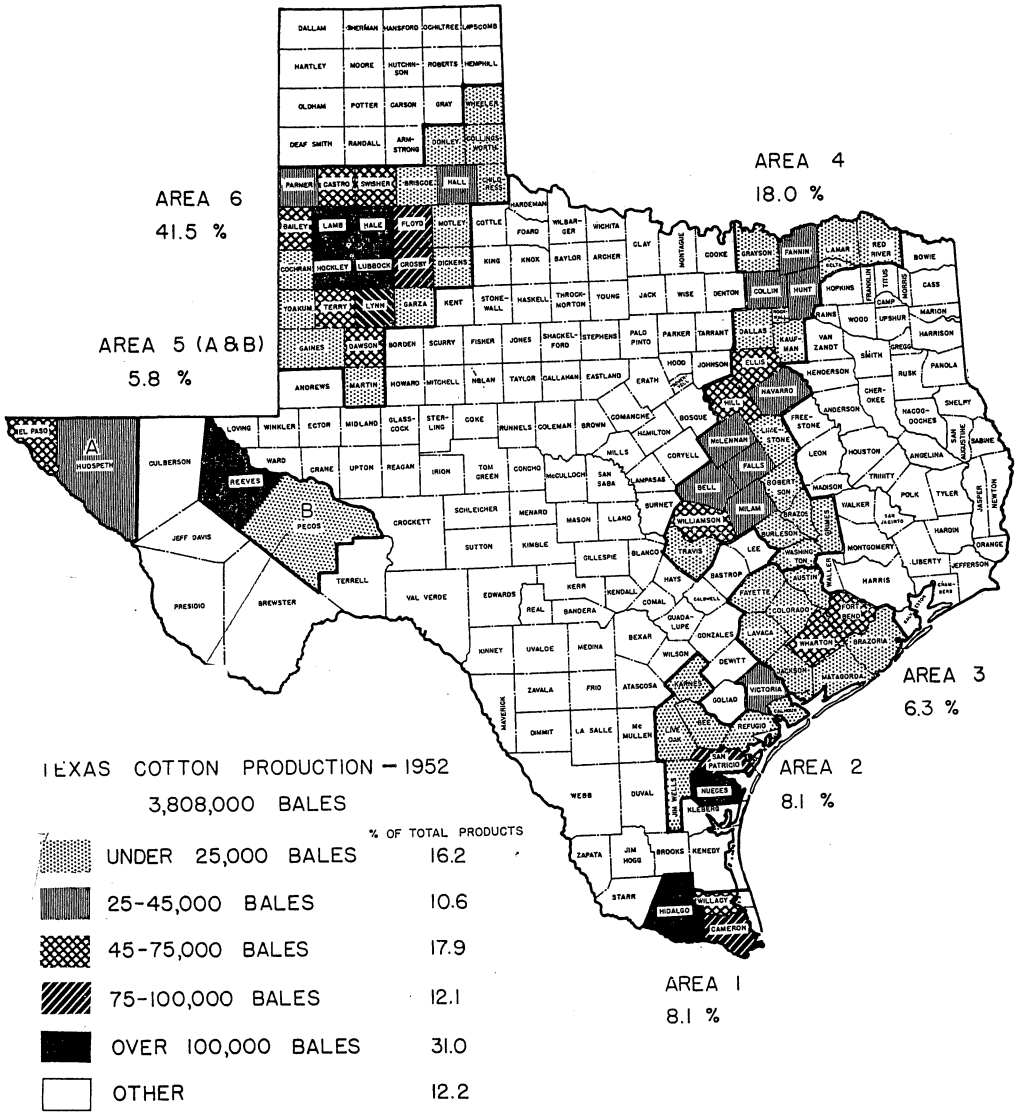


Figure 1.

The use of highway, railway and waterway transportation for the movement of cotton within each area and between the different areas was considered in this study. The information gathered was then used to establish transportation patterns and measure the flow and amount of transportation generated by the production of cotton in each area. The transportation required to grow the crop and the movement of the seed cotton from the farm to the gin are not considered in this report. Records of these movements are not sufficiently concentrated to permit inclusion in a study of this scope.

Each of the areas was visited during the June 1 to September 1, 1954 period of study. The managers of 49 cotton compresses and cotton oil mills were interviewed to obtain the basic information that was necessary for the expansion of sample data in each area. In addition similar information was secured for 19 compresses, 6 oil mills, and 13 compress-gins by contacting the central offices of these companies. The traffic managers of area ports were interviewed for the purpose of obtaining information on the exportation of cotton and cottonseed products.

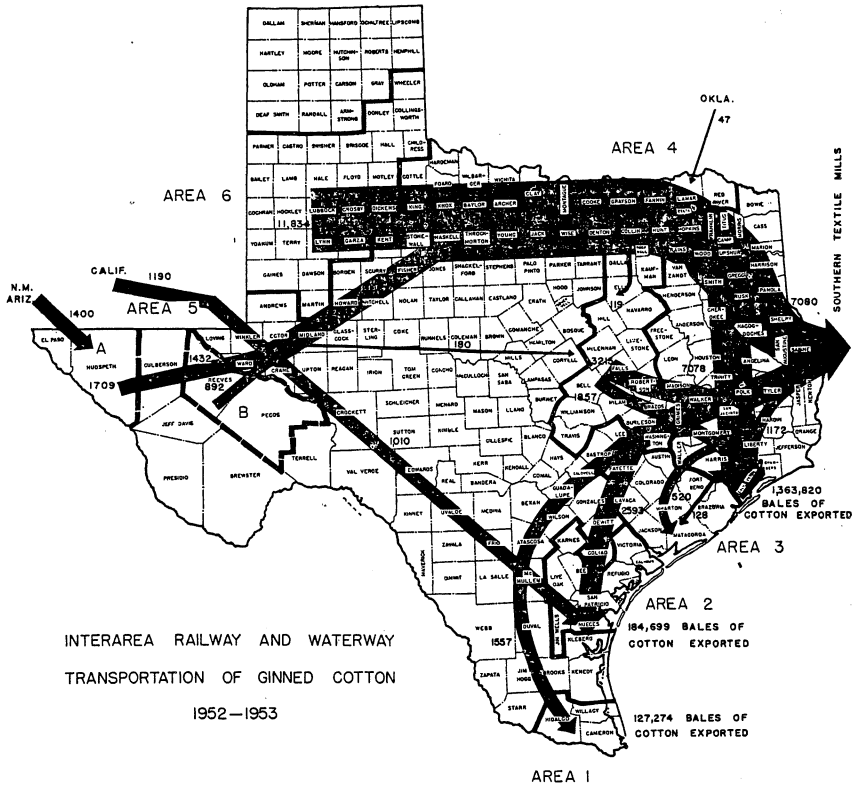


Figure 2.

This study was made to show the amounts of various kinds of transportation that are required to process and market the Texas cotton crop. It is also intended to point up the great dependence of even a basic industry such as cotton upon a well developed and intergrated transportation system. This is the first report of a continuing study of the transportation uses and preferences of Texas industries.

AREA I

Area 1, the Valley Area, includes the three counties of Cameron, Hidalgo and Willacy in the extreme southern tip of Texas. The southern bounds of this area extend from the southernmost tip of Texas at Brownsville to a point some 90 miles up the Rio Grande River. The eastern boundary extends about 60 miles northward from Brownsville along the Gulf of Mexico to a point just north of Port Mansfield. The area then extends westward for a distance of some 60 miles and then southward to the Rio Grande. There is a total of 3019 square miles included within this area.

The soils of this area range from delta clays to clay loams, sandy loams and sands and are generally among the most productive in the state. Hidalgo County, the most western of the three counties in this area, is the richest agricultural county in Texas both from a standpoint of cash farm income and in variety of crops raised. Cotton, vegetable and citrus production dominate the wealth of this fertile, semi-tropical irrigated area.

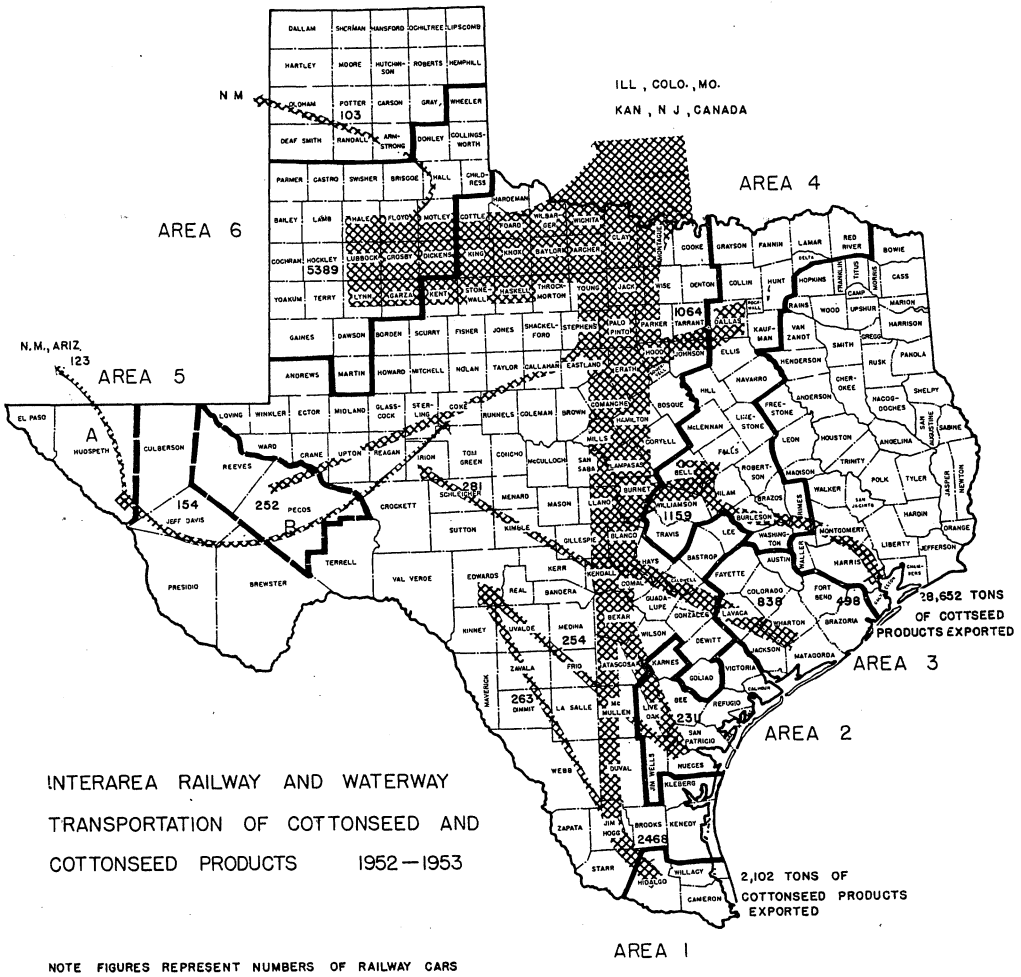


Figure 3.

The three counties of this area produced 309,500 bales or 8.1 percent of the total 1952 - 1953 Texas cotton crop (Figure 1). In addition to the cotton produced in this area, 70 percent of the cotton grown in Mexico is exported through the area port at Brownsville, Texas. This cotton is moved over approximately nine miles of Texas highways between the International Bridge in Brownsville and the Brownsville port. However, since this is not Texas produced cotton it is not covered in this report.

The major surface transportation facilities of Area 1 are shown in Figure 6. There are three major U.S. highways, U.S. 77, 83, and 281 serving this area. In addition there is a good network of state and local roads serving the rural areas and smaller towns. Rail facilities are furnished by several railroads which serve the area in

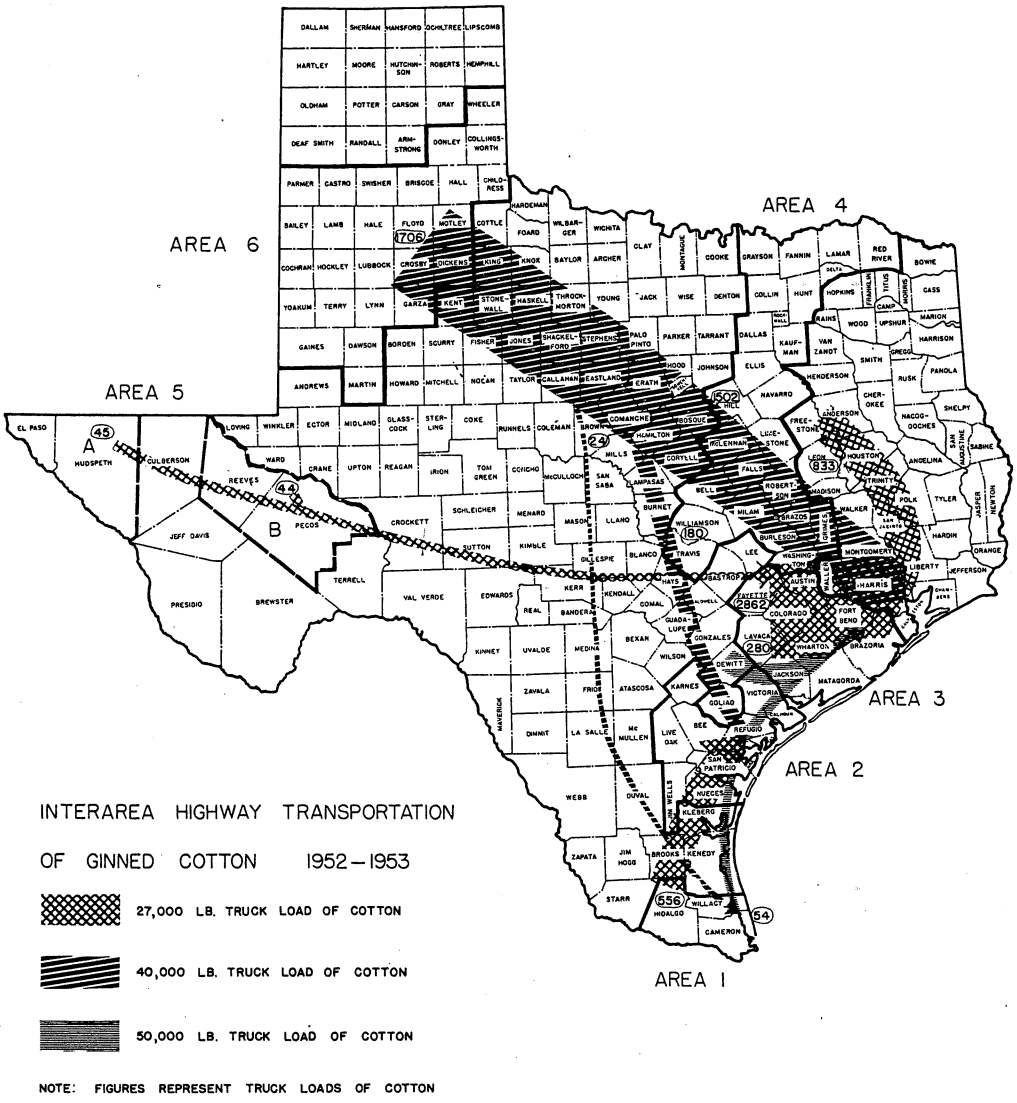


Figure 4.

almost all directions. The water movement of cotton is handled by the Brownsville port. In addition to the Brownsville port, which is one of the major cotton exporting ports of the state, Area 1 also has two other although considerably smaller ports located within its boundary. They are Port Isabel which is just north of Brownsville, and Port Mansfield at the northeast corner of the area. There was no record of cotton being exported through either of these ports during the period studied.

Figure 2 indicates the amount and direction of the inter-area rail and water movement of ginned cotton produced in this area. The rail movement of cotton involving 1557 cars is all toward the southern textile mills. The rail movement of cottonseed products, shown in Figure 3, involving

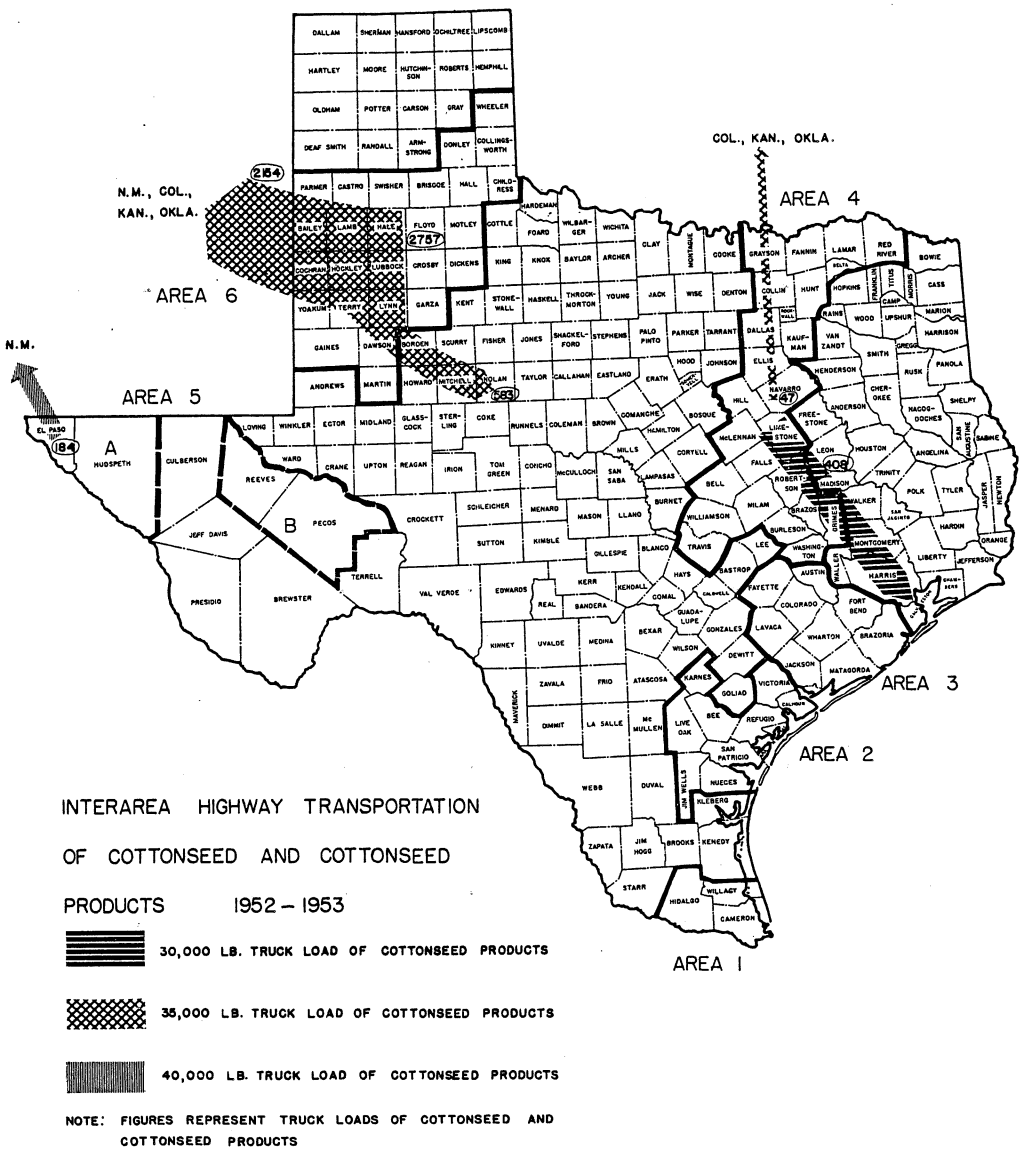


Figure 5.

some 2468 cars is spread in a northerly direction. Some of the cottonseed products shipped by rail from this area are destined for Central and West Texas cattlemen, although the major part is shipped out of state. All shipments of cottonseed oil were by railway to points outside the area.

The Area 1 export figures of 127,274 bales of cotton and 2102 tons of cottonseed products shown in Figure 2 are partly estimated. The Brownsville port authorities did not distinguish between area and Mexican cotton.

The inter-area highway movement of ginned cotton and cottonseed products is shown in Figures 4 and 5 respectively. There were no truck shipments of cottonseed products made out of the area during the period studied. All truck movements of cottonseed and cottonseed products were short-haul shipments to processing plants within the area and to the port for export by waterway.

The inter-area highway movement from Area 1 of ginned cotton resulted from farmer participation in cooperatively owned compresses located in Area 2 and the exchange movement of cotton between the ports of Brownsville, Corpus Christi, Houston and Galveston, Texas. This latter movement involves a common exchange of cotton between ports to

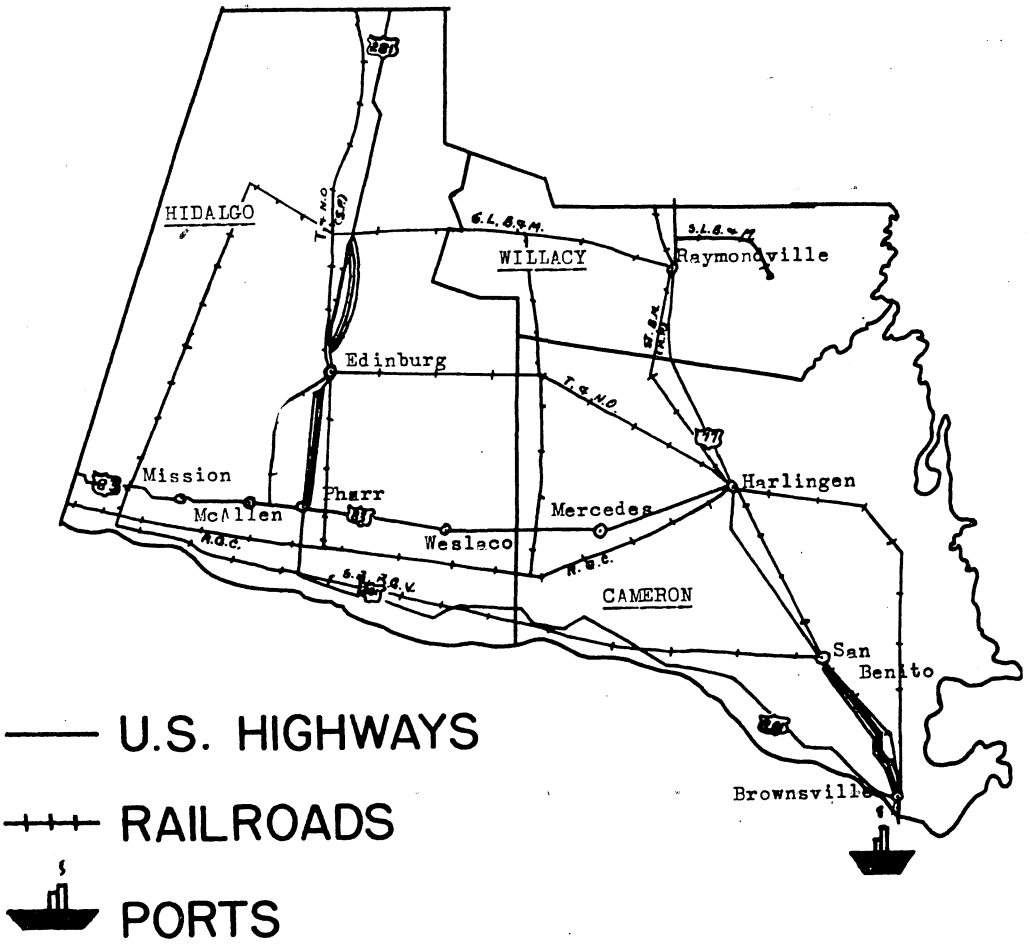


Figure 6. Major surface transportation facilities—Area 1.

"make up" ship loadings. A ship will not enter a port for a loading of fewer than 500 bales; consequently, compress managers cooperate in loading a ship bound for a particular foreign port. This requirement for a hurried exchange of cotton between coastal ports is met by the use of rapid truck movements rather than by the slower rail movements. There were 610 truckloads comprising over 35,000 bales of ginned cotton shipped from Area 1 to the other Texas ports during the period studied.

Other than the transportation requirements in growing and harvesting the crop, the most significant requirements generated by the production of cotton within an area are the local movements required in preliminary processing. This intra-area movement includes the movement of ginned cotton from gins to compresses, the movement of cottonseed from gins to crushing mills, the local dispersing of the cottonseed by-products, and in the case of Area 1 the movement of both cotton and cottonseed products to the port for exporting.

Figure 7 shows the amount of local or intra-area transportation generated by the cotton industry in Area 1. The figures inside the area map outline show the number of loads of cotton, cottonseed and cottonseed products that began and terminated within the area. The lower group of figures show the corresponding sizes of these shipments. There were 22,374 truck loads and 1216 rail cars of intra-area transportation generated by the cotton industry in Area 1.

The three counties in Area 1 produced 309,500 bales of ginned cotton during the 1952 - 1953 cotton year. As a by-product of the production of this cotton, approximately 128,440 tons[1] of cottonseed were produced. The cottonseed was then delinted, crushed and converted into meal, oil and hulls. Each product had its own distribution pattern but still remained a product of and closely related to the basic cotton production industry.

Total truck and rail traffic generation in Area 1 due to the ginned cotton and cottonseed products industry, and excluding the transporting of unginned cotton from the farm to the gin, are shown in the following table.

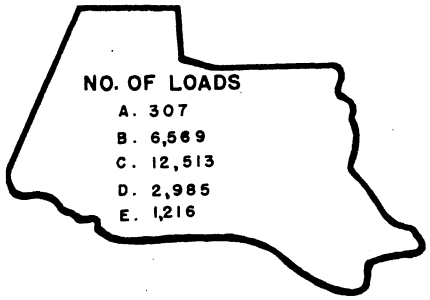
In addition to this truck and rail traffic generation, there were 127,274

[1]Cottonseed production was estimated on the basis of 880 pounds of seed per bale of lint cotton.

TABLE 1

HIGHWAY AND RAILWAY TRAFFIC GENERATION OF THE GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS INDUSTRIES IN AREA 1 (1952-1953)

	Average Size of Loads, Pounds	Number of Shipments		
		Intra-Area	Inter-Area	Total
T	4,000	307		307
R	6,000	6,569		6,569
U	20,000	12,513		12,513
C	27,000	2,985	556	3,541
K	50,000		54	54
S				
	Total Truck	22,374	610	22,984
	Percent of Total Truck	97%	3%	100%
RAIL				
	Rail Car	1,216	4,025	5,241
	Percent of Total Rail	23%	77%	100%



SIZE OF LOADS

A. 4,000 LB. TRUCK UNIT

B. 6,000 LB. TRUCK UNIT

C. 20,000 LB. TRUCK UNIT

D. 27,000 LB. TRUCK UNIT

E. 50,000 LB. RAIL UNIT

SEASONAL PEAK - JULY 20 TO SEPT. 20

Figure 7. Intra-area transportation of ginned cotton, cottonseed, and cottonseed products—Area 1.

bales of ginned cotton and 2102 tons of cottonseed products exported through the area port at Brownsville.

AREA II

Area 2, known as the Corpus Christi Area, includes the nine counties of Bee, Calhoun, Jim Wells, Karnes, Live Oak, Nueces, Refugio, San Patricio and Victoria. This area extends from a point about 20 miles south of Corpus Christi up the coast for a distance of some 70 miles to where the Victoria County line joins the Gulf of Mexico near Port Lavaca. The western boundary is some 120 miles in length and extends from near Falfurrias at the southwest corner to Karnes City on the northwest corner. The counties of Dewitt and Goliad, which extend into this area from the north, are excluded from this area because of limited cotton production. Aransas County, a small coastal county in the center of the area, is also excluded for the same reason.

This area contains 7246 square miles of coastal plains with soils ranging from heavy clays to black and sandy loams. Due to the variations in soil and annual rainfall, which varies from 25 to 37 inches per year, a variety of agricultural enterprises are carried on in this area. Livestock production, grain sorghums and other row crops are the principal sources of agricultural income in addition to cotton.

Transportation-wise the area is furnished access to water transportation by the deep sea port of Corpus Christi. Highway traffic is carried by U. S. Highways 77, 77A, 281, 183, 87, 59, and 181 as well as numerous state highways, while railway transportation is offered by numerous rail lines and feeder line spurs. Railroads serving this area include the St.LB&M, PC&N, TM, T&NO, and SAU&G (Figure 8).

During the 1952-1953 cotton year Area 2 produced 309,000 bales of lint cotton or about 8.1 percent of the total state production (Figure 1). In addition to local production there were 1010 cars or 101,000 bales of ginned cotton shipped into the area by rail from California. There were also 180 truck loads or about 14,400 bales trucked in from Area 6 and 556 truck loads or 30,024 bales trucked in from Area 1 (Figures 2 and 4). Cotton is frequently shipped to Texas from California, Arizona and New Mexico for storage and for a convenient forwarding "on order" arrangement to the southern textile mills. The cotton is also shipped to Texas to avoid payment of an ad valorem tax in those states and to gain bale weight by moisture absorption along the humid coastal region.

Both this area and Area 1 receive rail shipments of cotton from the western states. However, neither area receives cotton by railway from our own western production areas, although some is moved in by truck. One explanation commonly given is that railway officials recognize that any shipments made from Area 6 to

Areas 1 and 2 would result in the development of "back-hauls" on that portion of cotton which may eventually move eastward to the southern textile mills. Consequently, the ports at Houston and Galveston are favored by railway officials in the movement of cotton from Area 6.

Local production plus rail and truck inshipments from both out-of-state and other Texas areas gave a total supply of over 454,000 bales of ginned cotton in Area 2. In addition some 128,235 tons of cottonseed were produced in the area to give a total tonnage of both lint cotton and cot-

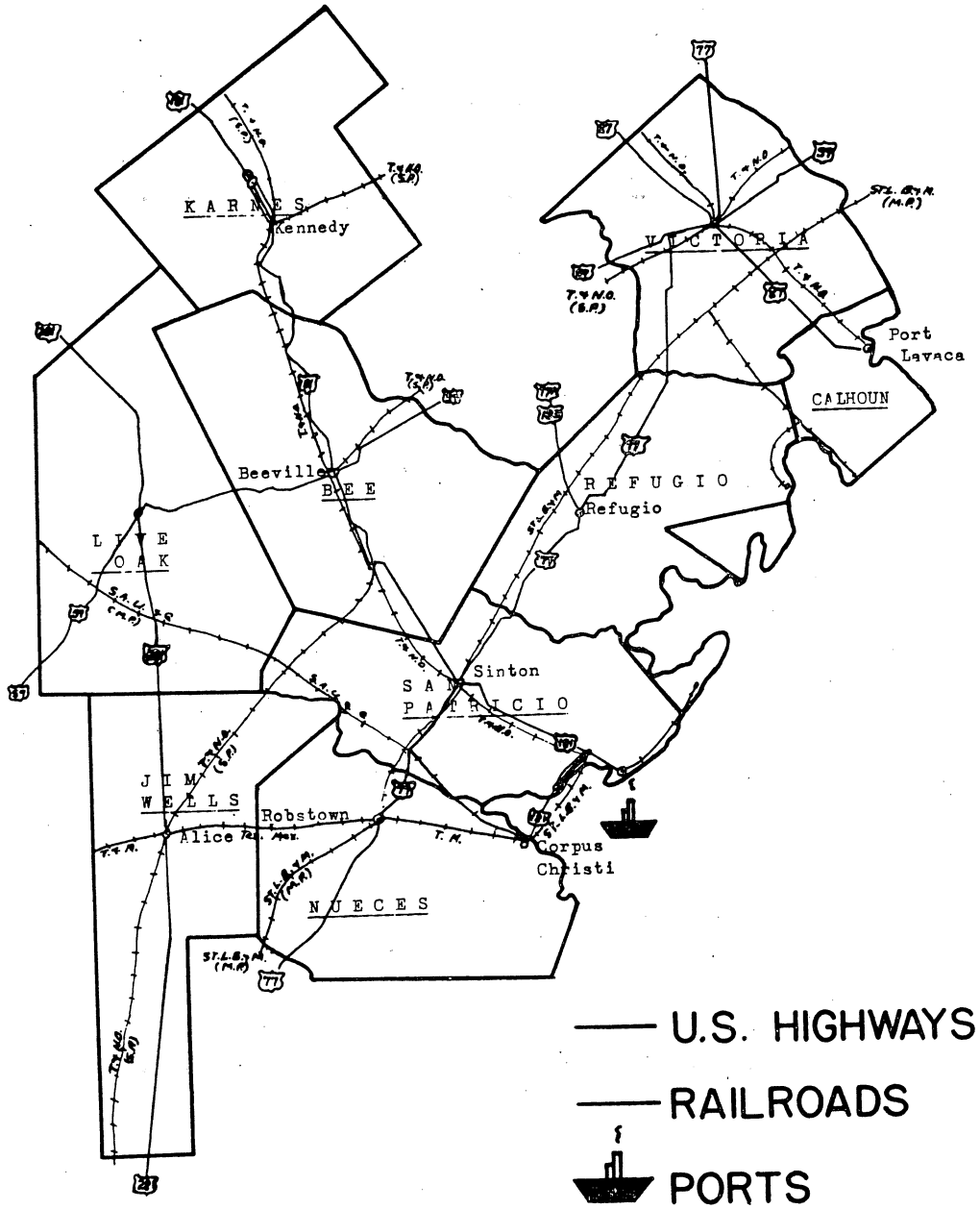


Figure 8. Major surface transportation facilities—Area 2.

tonseed of 241,840 tons to be handled by the transportation facilities of the area.

Figure 2 shows the rail and water movement of ginned cotton out of Area 2. This rail movement of cotton involving 2593 cars follows the same pattern as in Area 1 with all of the movement toward the southeastern cotton mills. There is no rail movement of cotton to other Texas ports. Water shipments from the area port at Corpus Christi included 184,699 bales of ginned cotton. This included both locally produced cotton and cotton shipped in by rail from outside the area.

The movement of cottonseed products out of the area by rail is shown in Figure 3. There were a total of 2565 cars of cottonseed products shipped out by rail. About 90 percent or 2311 cars of this total were shipped out to northern markets while the remaining 254 cars, consisting of cottonseed cake, meal and hulls, were sent to West Texas livestock producers. Although some cottonseed products were shipped out by water in previous years, the Corpus Christi port did not handle any cottonseed products during the 1952-1953 cotton year.

There were no truck movements of either cotton or cottonseed products recorded out of Area 2 during the period studied. All truck movements were confined to short-haul loadings which remained within the area.

The intra-area transportation requirements generated by the cotton industry of this area are shown in Figure 9. Since this area is fairly compact and small in size, there were no local movements by rail. All of the local transportation was furnished by trucks with loadings ranging from 4000 to 27,000 pounds per loading.

The total transportation requirements generated by the cotton industry in Area 2 are shown in Table 2. This generation of traffic is, of course, in addition to the movement of the seed cotton from the farm to the gin. Neither does it include the water transportation that was required to move the 184,699 bales of cotton that were exported through the Corpus Christi port.

AREA III

Area 3 is known as the Wharton Area and includes the nine counties of Austin, Brazoria, Colorado, Fayette, Fort Bend, Jackson, Lavaca, Mata-

TABLE 2

HIGHWAY AND RAILWAY TRAFFIC GENERATION OF THE GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS INDUSTRIES IN AREA 2 (1952-1953)

	Average Size of Loads, Pounds	Number of Shipments		
		Intra-Area	Inter-Area	Total
	4,000	289		289
T	6,000	6,195		6,195
R	20,000	12,119		12,119
U	27,000	5,611		5,611
C				
K				
S	Total Truck	24,214	0	24,214
	Percent of Total Truck	100%	0%	100%
RAIL	Rail Car	0	5,158	5,158
	Percent of Total Rail	0%	100%	100%

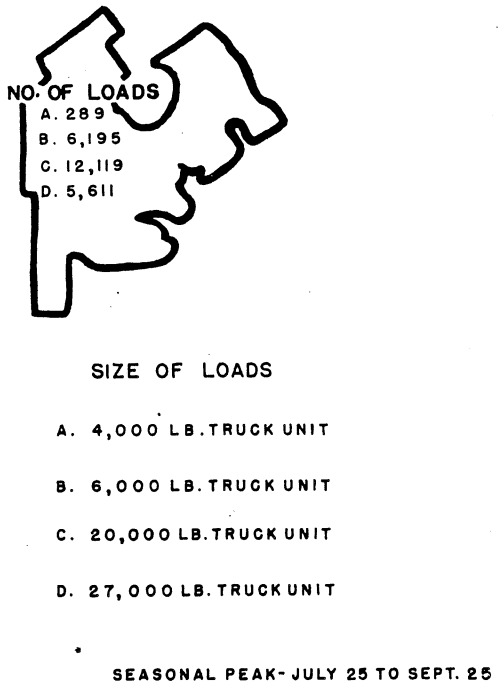


Figure 9. Intra-area transportation of ginned cotton, cottonseed, and cottonseed products—Area 2.

gorda and Wharton. As can be seen in Figure 1, this area joins Area 2 on the northeast and extends up the coast a distance of about 110 miles to within 15 miles of the city of Galveston. The area extends inland about 125 miles at its widest point and includes a total of about 8900 square miles in area.

The land in this area is largely composed of extensions of the Coastal Prairies found in Area 2. The soils range from sand and sandy loams in the uplands through black and waxy black loams, clays and deep alluvial soils in the lowlands. Much of the land is rich and productive farmland which is well watered by from 35 to 48 inches of rainfall per year. Both soil and climate are favorable for a variety of agricultural enterprises including the production of livestock, rice, sorghum, and hay in addition to the production of cotton.

Although Area 3 has over a hundred airline miles of coastline, there are no major commercial deep seaports located within the area through which cotton is exported. Cotton destined for export is transported to the Houston and Galveston ports from this area. Five U. S. Highways, U. S. 59, 77, 77A, 90, and 90A, serve this area. These highways are connected and served by a series of state and farm roads that carry much of the local traffic. Rail transportation is furnished by the GC&SF, T&NO, MKT, IGN, SLB&M and PC&N railroads (Figure 10).

During the 1952-1953 cotton year Area 3 produced 241,800 bales of lint cotton or 6.3 percent of the state total. Over 30 percent of this production was concentrated in Wharton County which is the largest producer of non-irrigated cotton in the state. Since Area 3 has no water export facilities for cotton and no large cotton milling industry, there was no cotton moved into the area from other parts of the state during the period studied. The transportation facilities of the area are, therefore, required to handle only local production.

In some years, however, Area 3 receives cotton by highway transportation for storage and compressing from Areas 6 and 4 when "blocks" (unusual congestion at compresses) develop in those areas. In years of extremely high cotton production in those areas "blocks" are not uncommon occurrences.

Since the peak of the cotton season is over in Area 3 before the upper areas in the state have reached their peaks, Area 3 also frequently provides storage and compressing facilities for overflows from Areas 6 and 4. For example, in 1949 one cotton compress in Area 3 handled 60,000 bales of cotton from Area 6. This cotton was transported by truck from the Lubbock Area during a year of extremely high production in that area.

The inter-area rail movement of cotton is shown in Figure 2. There were a total of 520 cars, or about 52,-

000 bales of cotton moved out of the area by rail. Unlike Areas 1 and 2 all of this movement is to Houston and Galveston with no rail movement toward the eastern mills.

In addition to the rail movement of cotton there were 966 cars of cottonseed products shipped out of the area by rail during the period (Figure 3). Most of the shipments, 838 carloads, were made in a generally northern direction to join the flow moving from other Texas points to out-of-state areas for consumption or further processing. The remainder or 128 cars were shipped to Houston and Galveston for export.

The highway movement of cotton from Area 3 is shown in Figure 4. Here again the movement is entirely toward Houston and Galveston with no movement to other areas or out-of-state points. A total of 3142 truck loads of ginned cotton were shipped from Area 3 to Houston-Galveston during the period studied. These trucks carried a total of more than 182,500 bales of cotton over the highways in Area 3.

Only 80,000 of the 241,800 bales of cotton produced in the area were compressed locally, and 75 percent of this cotton was received at the compresses by rail. The major portion of the cotton produced in Area 3 was moved out of the area as flat cotton by trucks directly from the gins to Houston and Galveston for compressing. It was shipped from these port cities to the southern textile mills and to foreign ports. Approximately one half of the cotton produced in Area 3 was moved to southern textile mills; the remainder was exported.

There was no truck movement of cottonseed products out of Area 3 during the period studied. This seems unusual until one considers the large livestock population of the area. The local transportation of both cotton and cottonseed products is shown in Figure 11. The area's high livestock

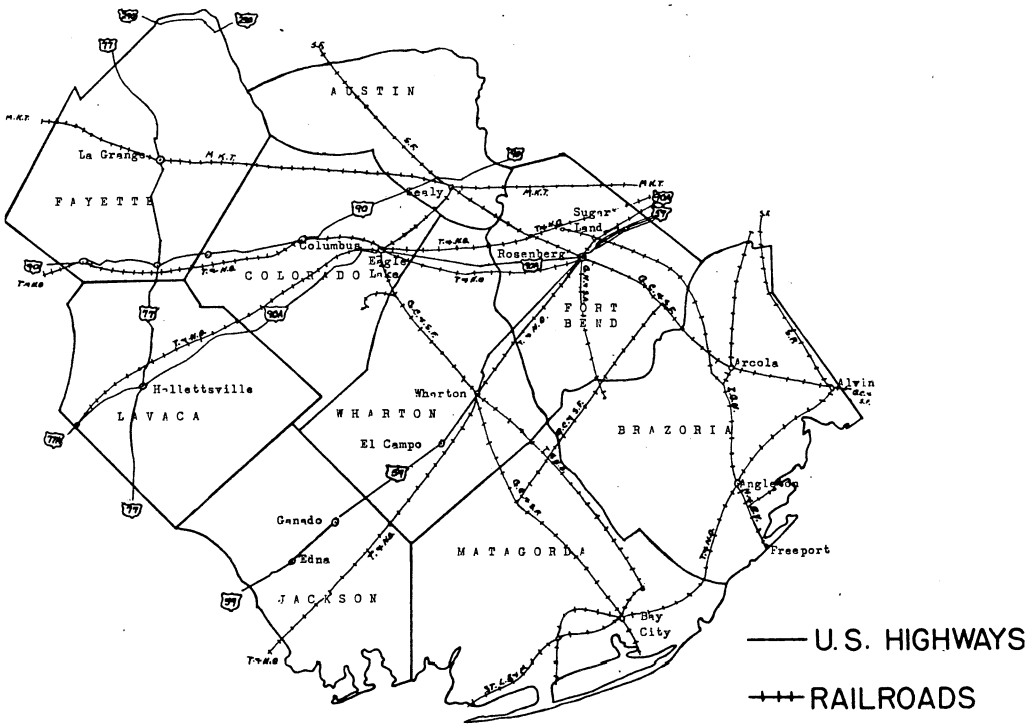


Figure 10. Major surface transportation facilities—Area 3.

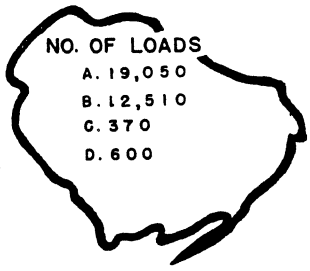


Figure 11. Intra-area transportation of ginned cotton, cottonseed, and cottonseed products—Area 3.

population accounted for a heavy consumption of cottonseed products within the area and the resulting large number of low weight truck movements from oil mills to farms.

The total transportation requirements generated by the cotton industry of Area 3 are shown in Table 3.

The extremely large number of light weight local truck hauls are largely due to the movement of cottonseed meal, cake and hulls to farms and ranches within the area. These figures do not include export shipments out of the Houston and Galveston ports since they are not a part of the area. Exports from these ports totaled 1,363,820 bales of cotton and 28,652 tons of cottonseed products. However, most of this volume was supplied by other cotton producing areas of the state.

AREA IV

Area 4, the "Blacklands" Area, was the principal cotton producing area of Texas for half a century following the Civil War. However, cotton production began moving westward shortly after the turn of the century, and the Blacklands began losing its dominate position. More recently the advent of large scale irrigation in the high plains region further diminished the importance of the Blacklands. During the 1952-1953 cotton year only 18 percent of the Texas cotton crop was produced in this area.

There are 25 counties included in the Blacklands Area which stretches from the Texas-Oklahoma border to within 50 miles of Houston near the Gulf Coast. The area is about 300

TABLE 3

HIGHWAY AND RAILWAY TRAFFIC GENERATION OF THE GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS INDUSTRIES IN AREA 3 (1952-1953)

	Average Size of Loads, Pounds	Number of Shipments		
		Intra-Area	Inter-Area	Total
TRUCKS	4,800	19,050		19,050
	15,000	12,510		12,510
	27,000	370	2,862	3,232
	50,000		280	280
	Total Truck	31,930	3,142	35,072
	Percent of Total Truck	91%	9%	100%
RAIL	Rail Car	600	1,486	2,086
	Percent of Total Rail	29%	71%	100%

miles long and varies in width from over 140 miles at each end to less than 50 miles at the center. In all the area contains some 21,288 square miles.

The Blacklands Area gets its name from the Blackland Farming Area in which it is located. Much of the land of this area is of the Blackland type, although some of the southern counties are extensions of the Coastal Plains, while the Grand Prairies and Post Oaks extend into the central part of the area. The soils are the most varied of any area studied and range from deep black waxy soils through clays, alluvials, loams, sands and limestones. Because the area is so spread out annual rainfall is also quite variable. It ranges from a low of less than 33 inches in McLennan and Williamson Counties in the west to almost 48 inches in Red River County in the northeast. The preponderance of good productive soils and generally good rainfall makes this area a heavy producer of many crops including cotton, grain sorghums, corn, small grains and truck crops. In addition it also supports a large livestock industry.

Since this area is completely inland and has no access to water transportation, all movement of cotton and cottonseed products out of the area is by either truck or rail. The highway traffic is carried by some 15 U. S. highways and numerous state, farm, and ranch roads. There is also a well developed rail system serving this area with either main or branch lines of the MKT, T&NO, T&P, Burlington, Rock Island, GC&SF, IGN, SL&SW, SLSF&T, CRI&P and the P&Mt.P. running through the area (Figure 12).

During the 1952-1953 cotton year Area 4 produced 683,550 bales of lint cotton or about 18 percent of the total state production (Figure 1). In addition there were 119 cars of cotton moved into the area by rail from Area 6, 180 cars from California, and 47 cars from Oklahoma. There were also 1064 cars of cottonseed products moved into the area from Areas 1, 2, and 3. These inshipments added to local production gave a total of around 718,150 bales of cotton and 310,273 tons of cottonseed and cottonseed products to be handled by the transportation facilities of the area.

The rail movement of cotton out of the area is shown in Figure 2. There were 3215 cars of cotton shipped out by rail to the Carolinas, Georgia, and other southeastern milling states. There were also 1857 cars shipped by rail to Houston and Galveston for export.

The rail movement of cotttonseed products (Figure 3) was not quite so large. There were 1159 cars of cottonseed products shipped northward into other states and 498 cars shipped to Houston and Galveston. There were a total of 1657 cars of cottonseed products shipped out of the area and 5072 cars of cotton or a total outgoing inter-area rail movement of 6729 cars of cotton, cottonseed, and cottonseed products.

Since Area 4 is a wholly inland area with no short haul access to any major cotton consuming or processing area, most of the cotton was hauled by rail. The only highway shipments of cotton out of the area were the 833 truck loads shipped to the Houston and Galveston ports (Figure 4). This could be a relatively short haul since it is only 50 miles from the southern end of the area to Houston.

The truck movement of cottonseed products out of Area 4 is equally small (Figure 5). Here again most of the movement was to Houston and Galveston. These were intended both for processing at plants in that area and for export. There were 455 loads of cotttonseed products trucked out of the area during the period studied. Of this total 408 loads were sent to the Houston and Galveston ports. The other 47 shipments were sent to the states of Colorado, Kansas and Oklahoma.

The inter-area movement of ginned cotton would doubtlessly have been considerably larger had Area 4 not have had a rather large local consumption. There are several small cotton mills and a number of cottonseed oil processors located within the area. The cotton mills process cotton grown principally within a 50 mile radius of the plant which neces-

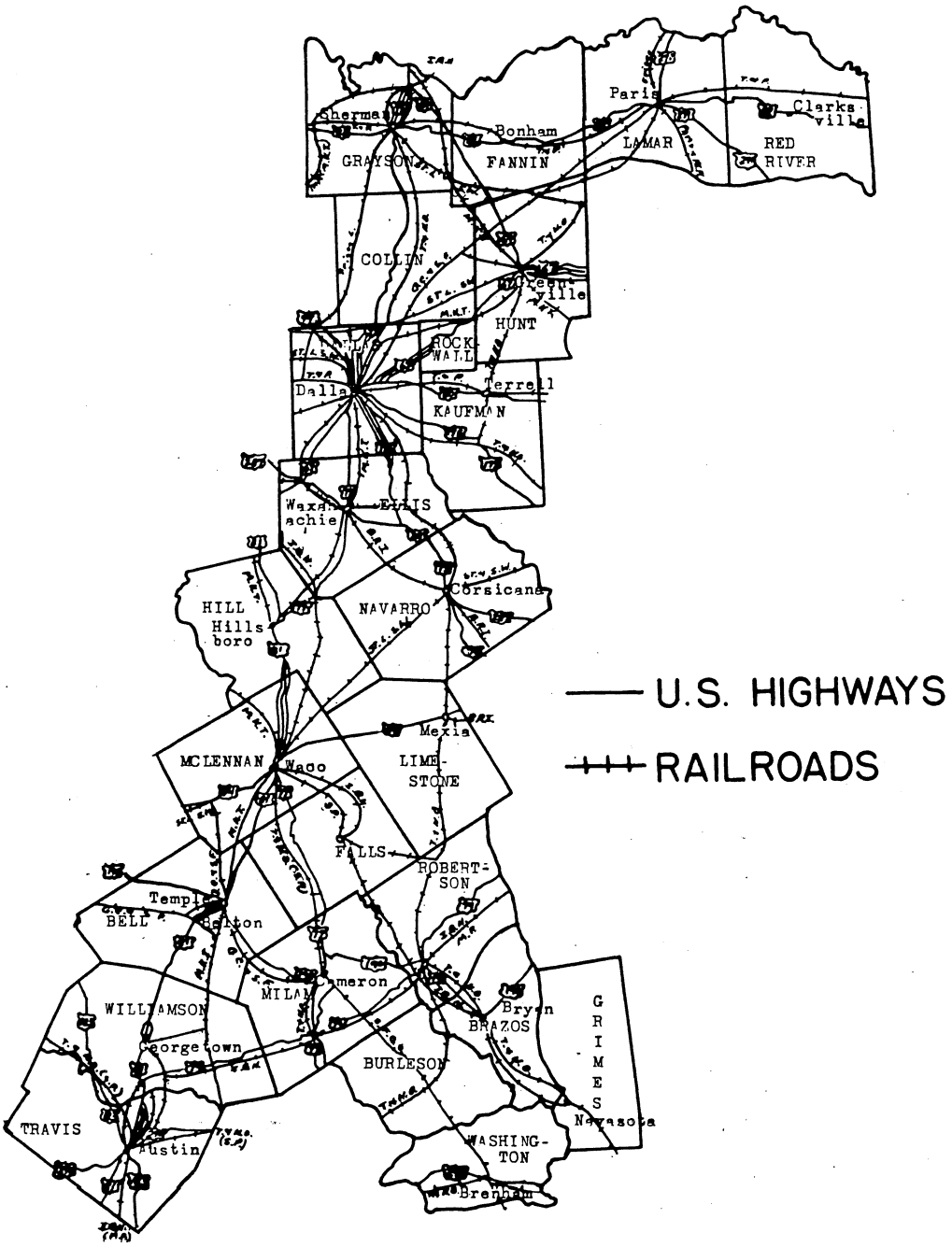


Figure 12. Major surface transportation facilities—Area 4.

sitates considerable local hauling. There were some 40,000 bales of ginned cotton transported by trucks to the local mills during the period studied.

The local movement of both cotton and cottonseed products is shown in Figure 13. In addition to the short-haul transportation required to satisfy the needs of local mills, other

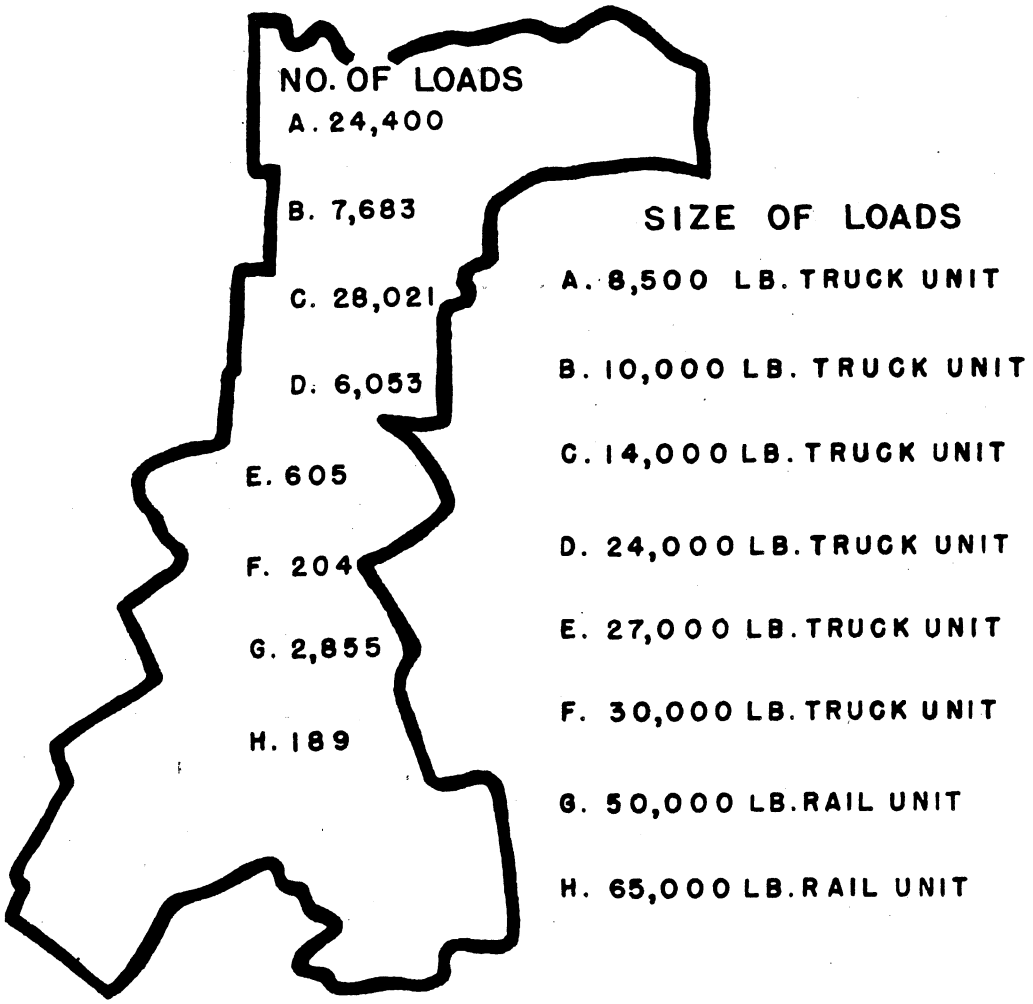


Figure 13. Intra-area transportation of ginned cotton, cottonseed, and cottonseed products—Area 4.

local highway transportation was generated by the transporting of flat cotton from gins to compresses within the area. Sixty-one percent of the ginned cotton received at the compresses was transported on the highways. The other 39 percent was shipped in by rail.

The movement of cottonseed from gins to cottonseed oil plants was conducted almost entirely by truck. Ninety-seven percent of the cottonseed was transported to oil mills in this manner, and almost one-third of the cottonseed oil was moved from oil mills by highway transportation. The oil mills also supplied the area with considerable quantities of other cottonseed products such as meal, hulls and cake. Because of the large livestock and dairy population, 92 percent of the hulls and 75 percent of the meal and cake were retained in the area. This further increased the number of local shipments necessary to move these products from the mills to local farms and ranches.

As can be seen in Table 4, there were a total of 66,966 local truck shipments and 3044 local rail shipments made within Area 4 during the year. The large number of light weight shipments was primarily caused by the previously mentioned movement of cottonseed products from mills to local farms and ranches. The movement of cotton from gins to compresses was also usually made in small loads that averaged about 17 bales or 8500 pounds per load.

Table 4 shows the total traffic generation, both local and inter-area, which is directly attributable to the cotton industry in Area 4. As in the previous tables, these figures do not include any transportation necessary to move the unginned cotton from the farm to the gin.

AREA V

Area 5, the El Paso-Pecos Area, is actually two areas located in the extreme western edge of the state. However, the areas are close together being separated by one county, and both the production and marketing procedures are enough alike so that they are considered as one major area in this study. To point up minor differences, the major area is divided into 5A for the El Paso Area and 5B for the Pecos Area (Figure 1).

The four counties included in this area are El Paso and Hudspeth Coun-

TABLE 4

HIGHWAY AND RAILWAY TRAFFIC GENERATION OF THE GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS INDUSTRIES IN AREA 4 (1952-1953)

	Average Size of Loads, Pounds	Number of Shipments		
		Intra-Area	Inter-Area	Total
	8,500	24,400		24,400
	10,000	7,683		7,683
	14,000	28,021		28,021
T	24,000	6,053		6,053
R	27,000	605	833	1,438
U	30,000	204	408	612
C	35,000		47	47
K				
S	Total Truck	66,966	1,288	68,254
	Percent of Total Truck	98%	2%	100%
RAIL	Rail Car	3,044	6,729	9,773
	Percent of Total Rail	31%	69%	100%

ties in 5A and Pecos and Reeves Counties in 5B. Together they have a total area of 12,923 square miles located in the high plateau, the Diablo Plateau, and the eastern part of the Trans-Pecos. This area is often referred to as a part of the great Texas desert and is indeed the driest area of the state. Rainfall varies from practically none in the high western area to a maximum of around 15 inches per year in the extreme east.

Soils in the area vary from rich alluvials in the Rio Grande Valley to sandy clays and sands in the uplands. A large portion of the upland soils is heavily gypsiferous and is devoted largely to livestock production with the exception of irrigated areas. All crop production within the area is concentrated in the irrigated valleys and the spring and shallow-well irrigated upland areas.

About 10 percent of Area 5A is irrigated by water received from the Elephant Butte Reservoir for the production of Pima 32 and Acala 1517 as well as some medium staple high altitude cotton. Area 5B is a new cotton-producing area that has been developed since 1948 following the discovery of a sufficient supply of underground water for shallow-well irrigation. One cotton company has been particularly active in promoting the expansion of cotton production in this area.

This company introduced, experimentally, compress-gins on a large scale for the first time because there were no cotton compresses and few gins in the vicinity. This type of machinery gins and compresses cotton to a standard density bale in a single operation. This has been considered as an economic success since it eliminates the hauling of cotton from conventional-type gins to compresses and the consequent unloading and reloading involved. This revolutionary innovation has altered the traditional intra-area transportation pattern in Area 5 and may alter the pattern of movement in other areas over a period of time. The possible displacement of compresses in other areas would come very slowly and as a result of a tedious struggle between the economic efficiency of the compress-gin and the capital investment of already existing conventional gins and compresses with their convenient cotton storage facilities.

During the 1952-1953 cotton year Area 5 produced 221,000 bales of cotton, or 5.8 percent of the total state production. In addition there were 1400 rail cars of flat cotton (70,000 bales) shipped into Area 5A from New Mexico and Arizona for compressing and transhipment with locally grown cotton to the Houston and Galveston ports and the southern textile mills. This was the only recorded movement of either cotton or cottonseed products into the area from either out-of-state points or other areas of the state.

The rail movement of cotton out of the area is shown in Figure 2. There were 1432 rail cars of cotton shipped out of Area 5A and 892 cars shipped from Area 5B for a total of 2324 rail cars moved from the area as a whole. These shipments included the 70,000 bales of New Mexico and Arizona cotton that was compressed in Area 5A. All of the movement was eastward toward the Houston and Galveston ports and the southern textile mills.

In addition to the rail movement there was a limited number of truck shipments of cotton out of the area (Figure 4). These shipments also included the movement of linters which are considered as cotton. One-fourth of the linters produced in Area 5 was moved by highway to Houston and Galveston for exportation. It was the opinion of several oil mill operators that linters could be shipped to the port by truck at a lower cost, when return hauls were scheduled, than by rail. The trucks usually returned to the area with loads of fertilizer since it is a general practice for some cottonseed oil mill operators to handle fertilizers, in addition to various types of feeds, for the convenience of farmers and ranchers. All of the truck

movement of cotton and linters was to the Houston and Galveston ports.

The rail movement of cottonseed products from Area 5 is shown in Figure 3. The local livestock enterprises provided a local market for all of the Area 5B cottonseed products with the exception of cottonseed oil and 98 railway cars of cottonseed meal and cake which were shipped to livestock feed manufacturers in St. Louis. There were 154 rail cars of cottonseed oil shipped from 5B to northern states. There were also 154 rail cars of cottonseed products shipped eastward from Area 5A and 123 cars shipped westward to New Mexico and Arizona. All but 14 cars of the eastern movement which were shipped to the Big Springs vicinity were moved to the northern markets.

There were no truck movements of cottonseed products out of the area during the period studied.

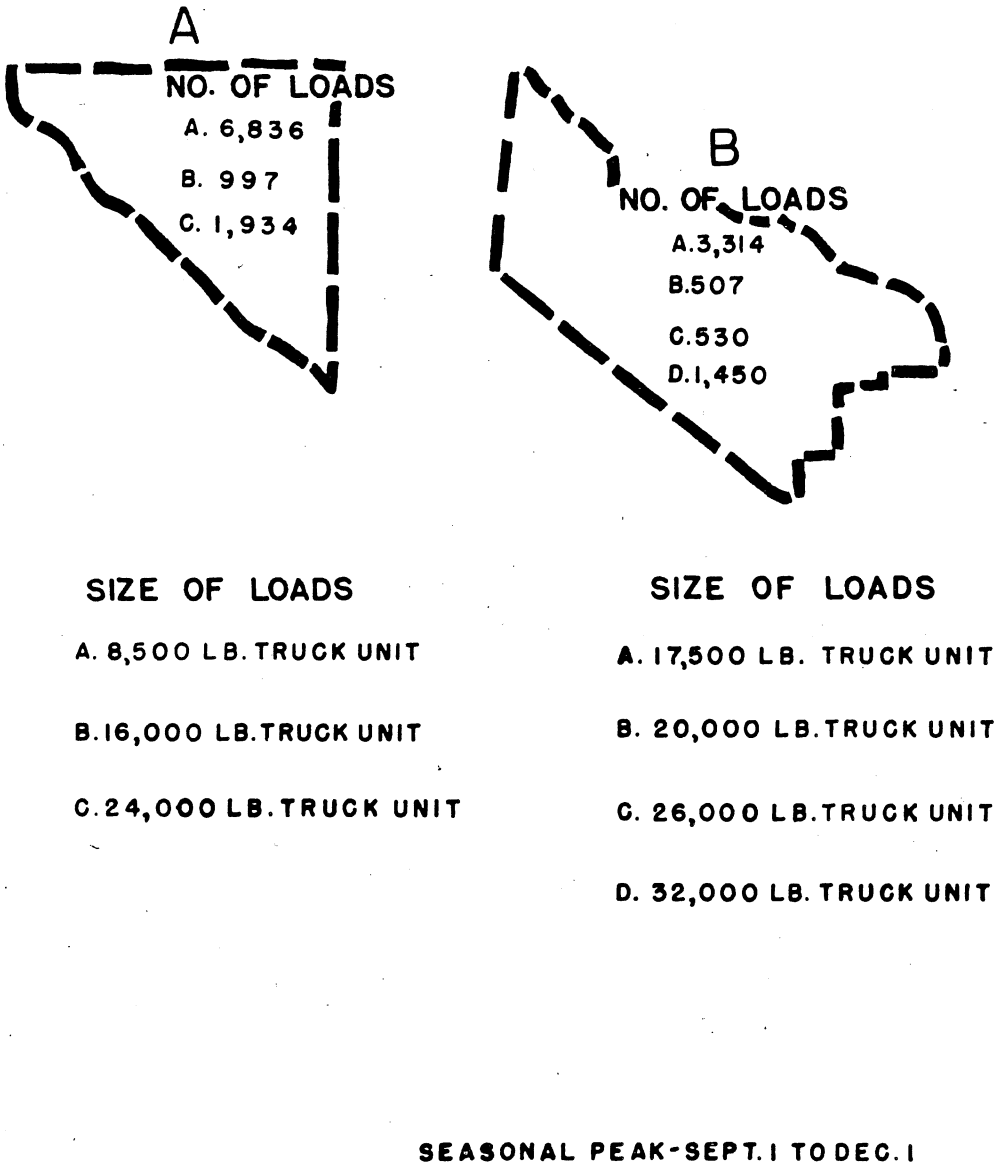


Figure 14. Intra-area transportation of ginned cotton, cottonseed, and cottonseed products—Area 5.

The transportation of cotton and cottonseed products within Area 5 can be seen in Figure 14. There was no local rail movement of either cotton or cottonseed products within the area. Because of the large number of compress-gins, there was a much smaller movement of cotton from gins to compresses in this area than in the other areas of the state. More than 80 percent of the cotton produced in Area 5B was received at the compress-gins and moved directly to railway facilities for shipment. In the western part of the area, 5A, the compress-gin is not as prevalent; consequently, there is a considerable movement of flat cotton by truck in that section. The large number of small shipments were again largely attributable to the movement of cottonseed meal, cake and hulls from the oil mills to farms and ranches. There was a total of 15,568 local truck shipments within the area with 11,147 or over 70 percent of them averaging less than 20,000 pounds per load.

Table 5 shows the total transportation generated by the ginned cotton, cottonseed and cottonseed products industries in Area 5 during the 1952-1953 cotton year. By far the majority of the transportation, from the standpoint of the number of trips, was used in the local movement of ginned cotton from gins to compresses, the shipment of cotton seed from gins to oil mills and the movement of cottonseed meal, cake and hulls back to the farms and ranches.

This table points up the division of transportation within the industry in this area. All the local transportation is handled by trucks while almost all of the long-distance inter-area transportation is handled by the railroads. The transportation of the area is carried by highways and railways only, since there is no access to water transportation. Highway traffic is handled by a network of nine U. S. highways plus the state and local roads. Rail transportation is furnished by the T&P, T&NO, P&SF, GC&SF and the Pecos and Valley Railroads. Both the U. S. Highway system and rail system can be seen in Figure 15.

AREA VI

The last area of the study, Area 6, is by far the most important from the standpoint of cotton production. This area, known as the Lubbock Area, produces both irrigated and dryland cotton in the high plains and

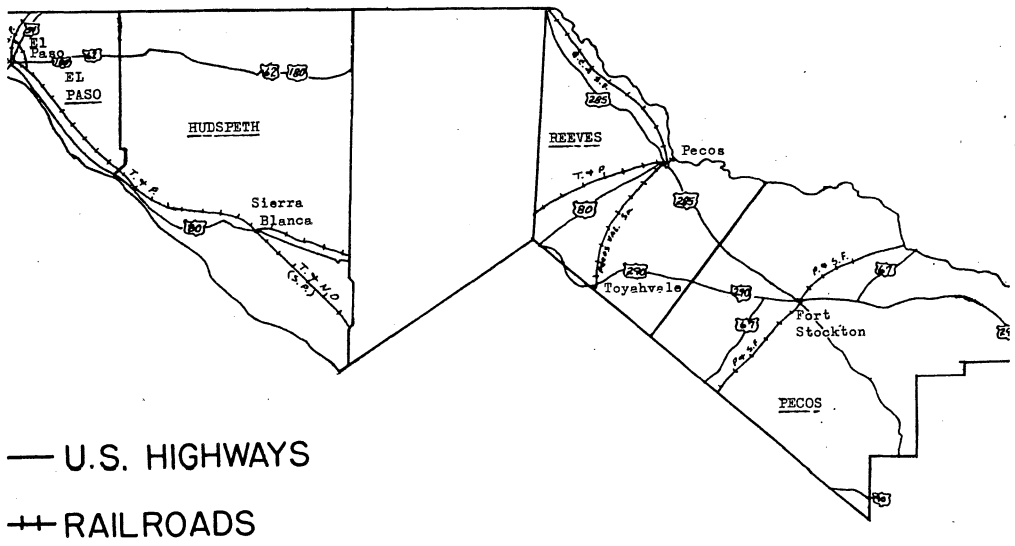


Figure 15. Major surface transportation facilities—Area 5.

panhandle sections of Texas. The 26 counties of this area comprising a total of over 23,900 square miles make this the largest area of the state in size as well as in cotton production.

The area itself stretches completely across the panhandle in an east and west direction for a distance of about 200 miles. The southern tip extends to within 10 miles of Midland while the northernmost point is Wheeler County in the northeastern corner of the area adjacent to the Oklahoma border. This is a total north-south distance of over 275 miles.

The soils of the area are largely sandy and clay loams and sands, with smaller areas of blacks, reds, greys and chocolates. As a whole the soils have a high degree of fertility, with production in the past being mainly limited by rainfall. Dryland wheat, grain sorghum and cotton farming have been practiced in this area for years, and bumper crops have been raised in years of above average moisture. However, in dry years crops have been completely lost from lack of water and blowing sand. Since rainfall varies from 16 to 22 inches per year, dryland farming in this area has always been a hazardous operation. Extensive well-irrigation has converted much of this vast plains area into an agricultural paradise.

With the advent of large scale irrigation much of the fluctuation was removed from the production of cotton since the irrigated land is generally used for cotton rather than one of the grain crops. There is still a considerable acreage of non-irrigated land devoted to cotton in the area, however, but the average yield from these acres is well below that of the irrigated land. In years of above normal rainfall the production from non-irrigated land, in addition to that from irrigated land, is more than local compressing facilities can handle without lengthy delays. This causes the so-called "blocks" which were mentioned previously, and results in some flat cotton being sent to other areas for compressing.

The major transportation facilities of the area are shown in Figure 16. There are twelve major U. S. highways serving at least part of the area as well as numerous state and local roads. There is also a good network of rail facilities in the area with main lines centering through Lubbock and Amarillo.

During the 1952-1953 cotton year this area produced 1,579,400 bales of ginned cotton (Figure 1). This was 41.5 percent of the total production of the state and over 10 percent of the national cotton crop. Well over half of the Area 6 cotton was produced in the four counties of Hale, Hockley, Lamb, and Lubbock. These counties, which include the cities of Lubbock and Plainview, produced 810,000 bales of ginned cotton.

Since Area 6 is a wholly inland area with no access to water transportation, has no major cotton milling industry, produces an excess of cottonseed products, and has no normal excess compressing facilities, there is no movement of either cotton, cottonseed or cottonseed products into the area. The transportation facilities of the area are, therefore, required to cope with only locally produced material.

The rail movement of cotton out of Area 6 is shown in Figure 2. During the period studied 92 percent of the ginned cotton and linters moved out of the area by rail. There were a total of 11,834 rail car loads shipped to Houston, Galveston, the southern cotton mills and Area 4. With the exception of 119 cars, which were sent to the Dallas vicinity in Area 4, the direction of movement here was much the same as in Areas 4 and 5 with practically all local production going either to the Houston and Galveston ports for export or to the eastern cotton mills.

In addition to the rail movement of cotton, there was also a considerable amount of cottonseed products shipped out of Area 6 by rail (Figure 3). Lubbock is the world's largest cotton-

seed oil extraction center, and all the cottonseed oil is moved out of the area by railway. The direction of this movement was northward toward the major processing centers. Of the 5389 cars of cottonseed products shipped out of the area by rail, 5286 cars were shipped northward while 103 cars were shipped west into New Mexico. These latter shipments were largely cottonseed cake, meal and hulls shipped to livestock feeders in New Mexico.

Although Area 6 is located a long distance from all major ports or cotton consuming areas, there are more truck hauls out of this area than any of the other areas of the state. Figures 4 and 5 show that there were 4463 truck shipments of cotton and cottonseed products out of the area during the 1952-1953 cotton year. As would be expected the movement of cotton was all toward the Gulf ports (Figure 4). Of the total truck movement of 1706 loads, Houston and Galveston were the destinations for all but 204 loads which were shipped to Corpus Christi and Brownsville. This cotton was then either exported or carried by water to the southeastern mills. About 8 percent of the area's production for the 1952-1953 season was trucked to these four ports.

The truck movement of cottonseed products shown in Figure 5 consisted entirely of shipments of cottonseed cake, meal and hulls. There was no cottonseed oil shipped out of the area by truck. These shipments were sent to the livestock producing areas of the western and mountain states where supplemental protein feed is generally scarce. In addition a considerable number of shipments were made to the Sweetwater-Colorado City-Abilene Area of West Texas. Almost 80 percent of the 2757 truck shipments of cottonseed products were made to out-of-state points with less than 20 percent going to Texas producers.

Although Area 6 had the largest number of truck shipments of cottonseed products out of the area, these shipments were actually only a small percentage of the total production. Seventy percent of the cottonseed meal and cake and 97 percent of the hulls were retained in the area. The distribution of these products natur-

TABLE 5

HIGHWAY AND RAILWAY TRAFFIC GENERATION OF THE GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS INDUSTRIES IN AREA 5 (1952-1953)

	Average Size of Loads, Pounds	Number of Shipments		
		Intra-Area	Inter-Area	Total
	8,500	6,836		6,836
	16,000	997		997
	17,500	3,314		3,314
T	20,000	507		507
R	24,000	1,934		1,934
U	26,000	530		530
C	27,000		89	89
K	32,000	1,450		1,450
S	40,000		184	184
	Total Truck	15,568	273	15,841
	Percent of Total Truck	98%	2%	100%
RAIL	Rail Car	0	2,853	2,853
	Percent of Total Rail	0%	100%	100%

ally added greatly to the area's local transportation load as shown in Figure 17. A large part of the highway transportation of these products was made in small loads of around two tons each.

Another factor adding to the local transportation load is the movement

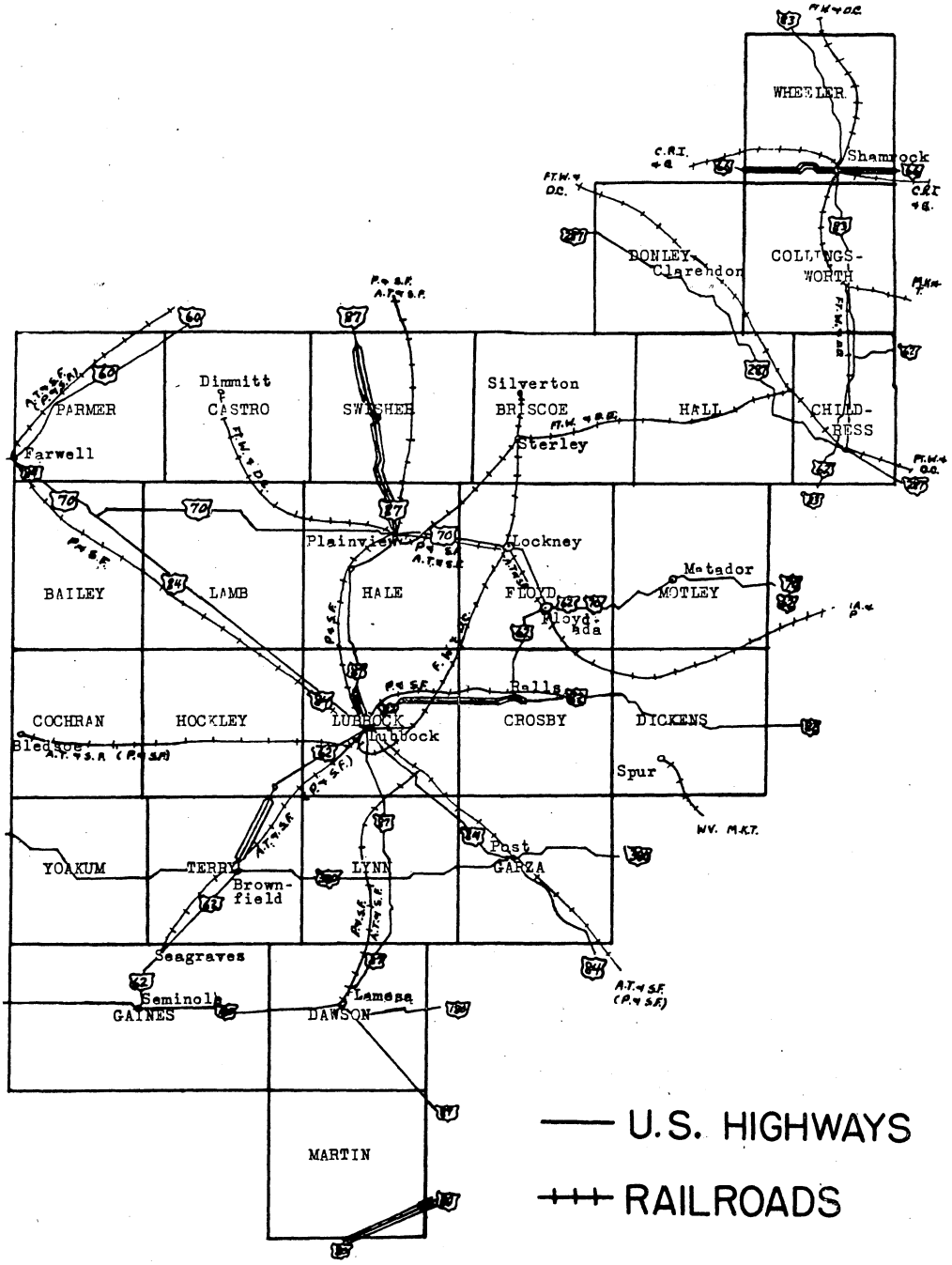


Figure 16. Major surface transportation facilities—Area 6.

of ginned cotton from gins to compresses since this area has not been converted to the combination compress-gin. The compress companies have kept pace with the growth of cotton production in this area by locating receiving stations and compresses geographically so that no truck hauls of cotton from gins to compresses exceed 25 to 30 miles. The development of a good farm-to-market road system has made these convenient locations possible. The importance of the network of local compresses and receiving stations is revealed by the rail and truck movement from gins to compresses. Ninety-eight percent of the ginned cotton was transported from gins to cotton receiving stations and compresses by truck while only 2 percent was moved by rail.

The total rail and highway transportation required to handle the traffic generated by the cotton industry in Area 6 is shown in Table 6. This includes both the local or intra-area and the inter-area transportation. As in the other areas it does not include the transportation required to move the unginned cotton from the farm to the gin.

This table points up the division of transportation that would normally be expected in an area of this sort with two rather well-defined markets. The local transportation needs, requiring relatively short hauls, are served primarily by trucks while the long distance traffic is usually handled by the railroads. Of the 203,423 truck shipments, 98 percent were confined to local hauls within the area while over 98 percent of the rail shipments were terminated outside of the area.

TRANSPORTATION REQUIREMENTS OF THE STATE

In the preceding pages the production characteristics and transportation requirements have been described for each of the major cotton producing areas of the state. These areas were studied separately so that the importance of the cotton industry to local areas could be better illustrated. Table 7 is presented to show the cumulative importance of these six areas in their demands upon our surface transportation system.

This table presents an imposing picture of the transportation required to handle the Texas cotton crop. However, it must be remembered that this does not present the full transportation picture. In the first place, the six areas included in this table only accounted for about 88 percent of the total production of the state. The other 12 percent was not included in the study because the production was not sufficiently concentrated. Secondly, and perhaps even more important, is the fact that this study deals only with the ginned cotton, cottonseed and cottonseed products industries.

To show a complete picture of the total transportation required to sustain the Texas cotton industry would require that the transportation of unginned cotton from the farm to the gin also be included in the study. Because of the lack of central sources of this information and the time and expense that would be required to develop accurate data from primary sources, the inclusion of this movement was considered impractical. For the same reason another important segment of transportation, the transportation required to produce the crop, was omitted from the study. From a standpoint of sheer volume of traffic these two factors would probably be much more important than the movements covered in this report. This transportation, however, is generally noncommercial in nature with the farmer himself providing the facilities. Commercial transportation is well covered in this study.

Some interesting observations that can be drawn from Table 7 are 1) the large number of small truck shipments made within the various areas,

2) the rather sharp cleavage between the sizes of loads shipped by truck within an area and those shipped outside, 3) the high percentage of total truck shipments that are local in nature, and 4) the small percentage of total rail shipments that are completed within a local area.

As would be expected the large number of very small local truck shipments is largely a result of the movement of cottonseed products such as meal, cake and hulls from the oil mills to farms and ranches. The Lubbock Area which has the largest concentration of cottonseed oil mills in the world is responsible for the greatest number of these shipments. However they are prevalent although to a lesser extent in other areas as well. Another cause of small local shipments is the movement of flat cotton from gins to compresses. The smaller gins which have limited storage space move their ginned cotton to the local compress frequently and in small lots.

Of the truck shipments made within the local areas, the carried loads ranged from 4000 to 32,000 pounds. About 96 percent of these payloads were of less than 26,000 pounds each of either cotton, cottonseed or cottonseed products. On shipments destined to points outside the area, however, loadings were considerably heavier. In our study the minimum loading for inter-area truck shipments was 27,000 pounds or more. The cleavage between loading weights in relation to distance of haul is rather pronounced.

Truck shipments to points outside the local area were relatively insignificant in relation to total truck shipments. Although there seems to be a growing trend toward moving more cotton and cottonseed products relatively long distances by truck, the longer hauls are still primarily handled by the railroads. Of a total truck movement of 369,798 truck loads, only 9,786 or less than 3 percent were terminated outside the area of origination. The other 97 percent is termed local since they began and ended within the same area.

Railroads on the other hand had an opposite ratio of local to out-of-area movements. Of a total of 42,596 rail cars originated within the six areas only 5122 or less than 12 percent were terminated within the same area. It is also significant to note that all of the movement of cotton to the southern textile mills was handled by

TABLE 6

HIGHWAY AND RAILWAY TRAFFIC GENERATION OF THE GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS INDUSTRIES IN AREA 6 (1952-1953)

	Average Size of Loads, Pounds	Number of Shipments		
		Intra-Area	Inter-Area	Total
	4,000	74,962		74,962
	17,500	47,778		47,778
T	20,000	20,016		20,016
R	22,000	56,204		56,204
U	35,000		2,757	2,757
C	40,000		1,706	1,706
K				
S	Total Truck	198,960	4,463	203,423
	Percent of Total Truck	98%	2%	100%
RAIL	Rail Car	262	17,223	17,485
	Percent of Total Rail	1%	99%	100%

the railroads. Their economy of operation with heavy loads over long distances has kept long distance transportation of cotton relatively free from competitive inroads by the trucking industry.

CONCLUSION

Although people in Texas are generally aware of the magnitude and economic importance of the cotton industry to the welfare of the state, few people are aware of the significant role that transportation has played and continues to play in the development and perpetuation of this industry. Cotton like many other raw materials has little economic value in its natural state. It has no value as a food or fuel and acquires value as a covering only after extensive processing. In the absence of a transportation system capable of moving the raw material through the many steps of processing and distribution, the cotton industry as we know it would vanish overnight. Since cotton is Texas' leading cash farm crop, the economic welfare of large segments of both our rural and urban population is dependent upon the fortunes of the cotton industry.

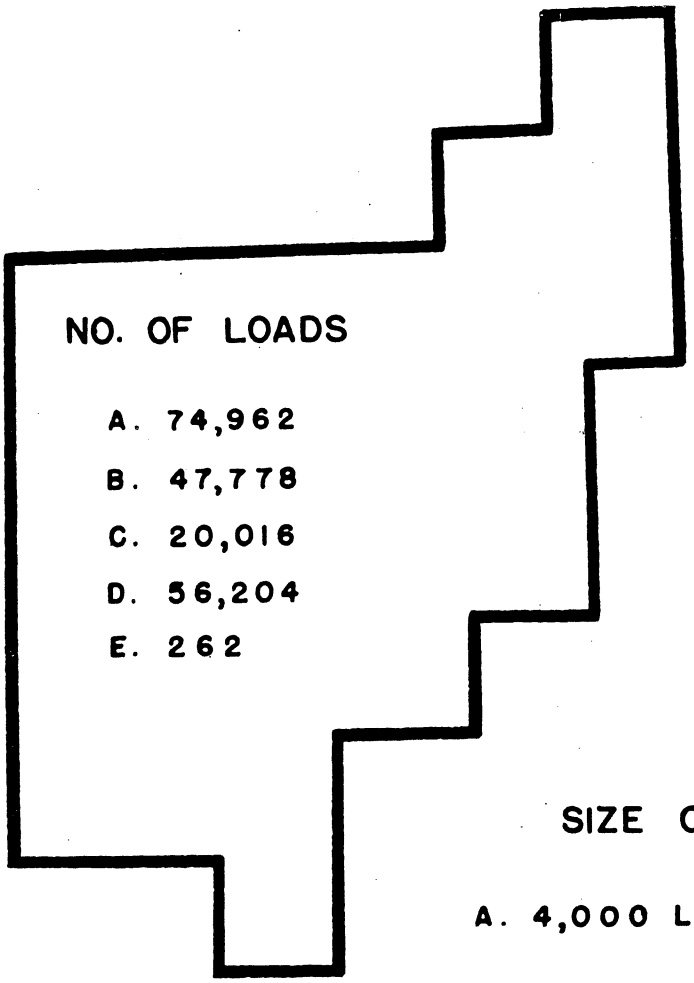
Transportation in both its availability and its absence, has acted and continues to act as a dominant and dynamic force on the social, economic, physical and political development of Texas. The following quotation from **Rural Texas** by W. B. Bizzell[2] focuses attention on the importance of transportation, both as a dynamic force and as a service. It also indicates the importance of transportation in the development of Texas' economy and the continuing need for an improved transportation system to adequately provide for future growth.

> "Facilities for transportation are vitally related to rural economic and social welfare. One of the greatest handicaps to the development of Texas previous to the Civil War was the inadequate transportation facilities. The rivers of the State were not navigable to any great extent, the roads were almost impassable in bad weather, there were few bridges and ferries across the streams and these were widely separated, and there were no railroads. Farm products that the farmers wished to sell often had to be hauled hundreds of miles to markets or shipping points on the Gulf Coast. Cattle and horses had to be driven long distances to market. Merchandise, purchased or exchanged for farm products, had to be transported long distances at great cost. Ox wagons were principally used for transportation of farm products and merchandise."

Bizzell's publication of 1924 also stated:

> "Railroads are inadequate to meet the present demands for transportation of farm products. The evolution of transportation agencies from ox-drawn and horse-drawn vehicles to the motor-driven car and the truck has increasingly directed the attention to the need of hard-surfaced roads to supplement the steam trains. The concentration of population in urban centers has increased the need for rapid and dependable conveyance of food supplies from the farm to the local markets, and from there to centers of population. It is almost as important to have an extensive system of improved highways connecting the farms with the local markets as it is to have railroads joining the local markets with the towns and cities. Improved highways accessible

[2]Rural Texas, W. B. Bizzell, The MacMillan Company, New York, 1924, pp. 233, 234.



SIZE OF LOADS

A. 4,000 LB. TRUCK UNIT

B. 17,500 LB. TRUCK UNIT

C. 20,000 LB. TRUCK UNIT

D. 22,000 LB. TRUCK UNIT

E. 65,000 LB. RAIL UNIT

SEASONAL PEAK- NOV. 1 TO JAN. 1

Figure 17. Intra-area transportation of ginned cotton, cottonseed, and cottonseed products—Area 6.

to every farm are essential to the solution of the problems of rapid and dependable transportation of agricultural products. Texas has 180,000 miles of (rural) public roads. Only 18,000 miles, or approximately 10 percent, of this total are designated as State highways."

The Texas Legislative Council reported, in **Texas Roads and Highways,** that the rural road estimate had grown to 196,000 miles in 1950 and that 62.4 percent of the rural roads were improved, including 42,000 miles that were paved or hard-surfaced.

The recent improvement of rural roads has done much to alter the transportation pattern previously described by Bizzell. Today many farmers by-pass the local markets, which are sometimes inadequate, and transport their agricultural products directly to the urban centers of population. In these instances the hard-surfaced roads have not "supplemented the steam trains," they have instead supplanted them.

The study of **"The Traffic Pattern of Ginned Cotton, Cottonseed, and Cottonseed Products Transported in Texas by Railway, Highway, and Waterway"** concerns only one facet of the complex transportation force that has attributed to the rapid development of Texas since the Civil War. Since this study gives only one view of the transportation pattern for cotton and its products and as it operated for only one year, the writer cannot assume dogmatic, crystallized or static conclusions. The same cotton producing areas of the State should be re-studied from time to time to better deleniate the specific transportation trends and the forces that motivate change in a highly complex and altering economy.

However, the following conclusions have been drawn from analysis of information gathered in the course of this study. The conclusions based on the movement of cotton are supported by the statistical evidence presented in the preceding pages; those dealing with opinions and attitudes of cotton handlers and those concerning the probability of future trends are based on conversations with the gin operators, compress operators, truckers and railroads.

1. It appears that 100 percent of all unginned cotton is moved to cotton gins by rural roads and highways.

2. Almost 93 percent of all ginned cotton and cottonseed is transported from the cotton gins to compresses and oil mills by highway.

3. The long-haul movements of cotton and cottonseed products from compresses and cotton seed oil mills produce a dominate pattern of railway transportation.

4. Cotton except for the small amount that is processed in local areas moves eventually to the Gulf Coast for export or to the southern textile mills. The direction of movement is affected by an increase or decline in cotton exportation.

5. Long-distance hauls of cottonseed products are primarily by railway. There is, however, an increase in the percent of cottonseed oil that is being transported for long distances by highway from the Blackland Area.

6. The consumption of cottonseed products such as meal, cottonseed cake and hulls by a large population of livestock within an area produces a transportation pattern of short-hauls by highway.

7. Long-hauls of ginned but uncompressed cotton to the coastal ports by highway frequently originate in the Blackland and Lubbock Areas when "blocks" occur (unusual congestion at compresses that develop because of extremely high cotton production in some years.)

8. There are indications of a natural increase in the number of long-hauls of cotton to the Texas

ports by highway from the Lubbock Area. Attitudes of displeasure with railway operations constitute one of the contributing factors for the increase. This trend is independent of the occasional movements of cotton by highway that result from "blocks" in the area.

9. The perfection of the "compress-gin" is likely to alter the traditional inter-area transportation pattern for cotton. Compress-gins are likely to increase in number and they may eventually eliminate the conventional cotton compress in the distant future.

10. The development of farm-to-market roads has made it possible for the compress companies to keep pace with the rapid development of cotton production in the Lubbock Area by conveniently locating receiving stations and compresses geographically so that no hauls of cotton from gins to compresses exceed 25 to 30 miles.

11. The attitudes of people are important, especially when these attitudes motivate action and change. In general the attitudes of compress managers are loyal to railways. They are traditionally and functionally more closely allied with the railway pattern of transportation than are the managers of cottonseed oil mills.

12. The advocates of highway transportation for cotton and cottonseed products most commonly criticise the railways because of high freight rates,

TABLE 7

HIGHWAY AND RAILWAY TRAFFIC GENERATION OF THE GINNED COTTON, COTTONSEED, AND COTTONSEED PRODUCTS INDUSTRIES OF THE SIX MAJOR COTTON PRODUCING AREAS OF TEXAS (1952-1953)

	Average Size of Loads, Pounds	Number of Shipments		
		Intra-Area	Inter-Area	Total
	4,000	75,558		75,558
	4,800	19,050		19,050
	6,000	12,764		12,764
	8,500	31,236		31,236
	10,000	7,683		7,683
	14,000	28,021		28,021
	15,000	12,510		12,510
	16,000	997		997
T	17,500	51,092		51,092
R	20,000	45,155		45,155
U	22,000	56,204		56,204
C	24,000	7,987		7,987
K	26,000	530		530
S	27,000	9,571	4,340	13,911
	30,000	204	408	612
	32,000	1,450		1,450
	35,000		2,804	2,804
	40,000		1,890	1,890
	50,000		334	334
	Total Truck	360,012	9,776	369,788
	Percent of Total Truck	97%	3%	100%
RAIL	Rail Car	5,122	37,474	42,596
	Percent of Total Rail	12%	88%	100%

slowness of movement, inability to obtain freight cars when needed, monopoly control, callousness of railway officials, unwillingness to meet competition, non-progressiveness, and delay of shipments in route.

13. The advocates of railway transportation for cotton most commonly criticize highway transportation because of alleged law violations; because railways, upon which compresses are located and dependent for economic existence, are undermined; because trucks use highways to divert cotton from local compresses to other areas during periods of "blocks"; trucks are less convenient to load; truck drivers are disagreeable; and some trucks offer unfair competition.

The trucking industry is without doubt exerting competitive pressure upon the railroads in the transportation of cotton and its products. Cumulative factors indicate that this obvious pressure will continue to increase in the future rather than to diminish. The trucking industry may have some pertinent competitive advantages over the railway industry, especially in regard to (a) flexibility of operation, (b) speed, and (c) convenience to the customer. One may note that the cotton shipper is demonstrating a growing consciousness of these three factors, even though he deals with a non-perishable product.

The railroads also retain several competitive advantages of their own. These advantages, however, are generally historic in nature; consequently, they are often overlooked or not given their full importance by trucking advocates. Such factors as (a) ease of loading or convenience to the compress operator, (b) economy of operation over long distances, and (c) mill buying preferences are all important factors in choosing a method of transportation.

As the transportation industry becomes more and more competitive, both the railroads and the trucking industry will need to improve their services to maintain their business. Each has several inherent advantages to protect as well as disadvantages to correct and improve. Needless to say, each improvement will be welcomed by the Texas cotton industry.