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Transportation of Poultry Feed Ingredients from the North Central States

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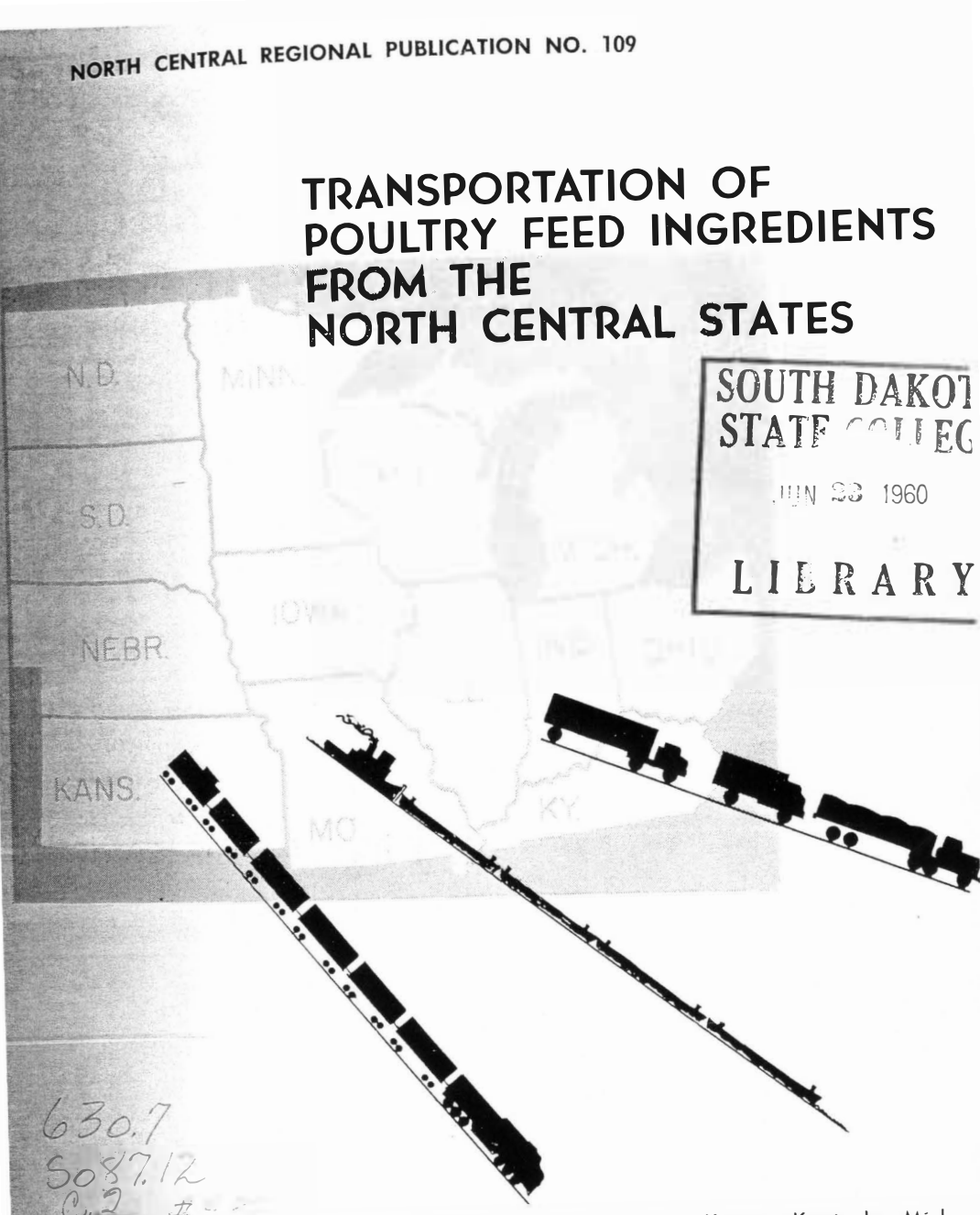

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Application of Findings

A. For Processors

1. The increase in broiler production in southeastern states since 1953 greatly exceeds the increase nationally. Increases in the other areas tended to be less than the national average.
2. Relatively low transportation charges, induced primarily by water carrier competition, appear to be a factor in the rapid expansion of broiler production in southeastern states.
3. Lower transportation charges on poultry feed ingredients shipped from the North Central States is probably an important reason why producers in the major broiler areas can compete intensively in the markets of the North Central States.
4. Relatively low transportation charges on poultry feed ingredients is probably not the only production cost advantage of the rapidly expanding broiler industry in southeastern states.
5. Whereas water carriers show the lowest transportation charges of all three agencies utilized in the feed ingredient movements, they are not well adapted to the rapid movement of perishable products, such as dressed poultry.

B. For Grain Marketing Agencies and Producers

1. The broiler producing regions studied in this report are important markets for corn and soybean oil meal produced in surplus in the North Central Region. These feed ingredients comprise 80% of the modern broiler ration.
2. Shifts in the production of broilers within and between these regions will require reevaluation of transportation services and charges for shipments of the poultry feed ingredients from the North Central States.
3. Corn and soybean oil meal are transported from North Central origins to milling and/or destination points by railroad, motor carrier, and barge.
4. Bulk transportation facilities encourage the milling of the ingredients into feed at concentration points near destinations. This is particularly true where water transportation is used.
5. The heaviest volumes of corn were shipped during the first half of the year into southeastern states; during the second and third quarters into Arkansas and Missouri; and during the last half of the year into the Delaware-Maryland-Virginia (Del-Mar-Va) region.
6. Soybean oil meal shipments were heaviest during the second and third quarters into the south and southeast and were uniform throughout the year into the Del-Mar-Va region.

C. For Transportation and Regulatory Agencies

1. Rail transport was used primarily on shipments from North Central origins to North Carolina and the Del-Mar-Va region.
2. Truck and barge movements, or a combination of the two, were the most common transportation arrangements for the shipments into southern and southeastern states.
3. Rail transport was more important for the movement of soybean oil meal than for corn.
4. Except for the railroads, few common carriers were used on the movements of the commodities.

5. Where data were available for comparison, water carrier charges were found to be less than half of those of motor or rail carriers.
6. The variety of motor carriers used and the absence of published data on their movements makes difficult, if not impossible, an accurate analysis of the transportation problems involved on these shipments.
7. The traditional railroad arrangements and charges for the movement of grain are tending to break down under the impact of the exempt motor and water carriers.
8. A tendency toward a breakdown of traditional railroad arrangements and charges will have serious repercussions upon markets, milling centers, and transit points.
9. The rising importance of water carriers is reflected in the expansion of river ports as concentration points for the feed ingredients and distribution points for the feed.
10. Transportation requirements for the commodities will tend to vary according to the seasonality of production and seasonality of demand.

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Transportation of Poultry Feed Ingredients From the North Central States

by
William H. Thompson[1]

Findings of the Study

The area from which poultry feed ingredients—corn and soybean oil meal—were shipped is the North Central Region, which consists of 12 states bounded on the west by North Dakota, south through Kansas, and on the east by Michigan and Ohio. This area produces a surplus of corn and soybeans, some of which move into deficit feed producing states for processing into poultry and animal feeds. This study examines the transportation factors and costs involved in the movement of these ingredients into the important broiler producing regions in the South and East—regions which are competing on an increasing scale with North Central States for markets for dressed poultry.

This study should be useful to poultry producers and processors in the North Central States, for it points out the methods used and charges incurred in the movement of the commodities from these states to competing regions. As more efficient methods of transportation are utilized, costs usually decline; and lowered costs of feed in the competing poultry producing areas mean more intensive price competition on dressed poultry between these areas and the North Central States which originate the feed ingredients.

Grain producers and processors should also have a direct interest in this report since it emphasizes the importance of the poultry industry, both in the North Central States and other regions, as an outlet for their products. Whether or not some markets will decline and others expand will depend partially upon the transportation factors and costs involved in moving feed grains on one hand and the finished product on the other.

For the transportation agencies and regulatory bodies, the study is sufficiently detailed to suggest

[1]Professor of Transportation, Iowa State University, Ames, Iowa. The author is principally responsible for the opinions and conclusions expressed in this report.

certain trends. The ever present problem of the regulated versus non-regulated carrier on grain movements is apparent. The expansion of grain traffic by water carrier is a development worth noting. The possible need of a complete revision of the grain rate structure of the railroads may bear further study. These are but a few of the issues suggested by the data in this report.

Three important commercial broiler producing regions were selected for analysis of corn and soybean oil meal shipments from the North Central States. These were the Arkansas - Missouri region; Southeast region, including Alabama, Georgia, and North Carolina; and the Delaware-Maryland-Virginia (Del-Mar-Va) region. The criteria for selection was based upon the transportation of broilers from these areas into North Central markets and into other common markets in competition with North Central poultry.

Traditionally, the movement of poultry feed ingredients from the North Central States into eastern and southern markets was by railroad, and by water carriers over the Great Lakes. Since 1946 water carriers on the Mississippi River and its tributaries, as well as motor carriers, have been used on an inreasing scale for shipments into southern and southeastern broiler regions.

Competition is probably the most important factor in establishing the rate structure on movements of poultry feed ingredients from the North Central States. However, these rate structures are being re-evaluated constantly as broiler feed markets shift from one region to another, as different agencies of transportation are developed and compete for the traffic, and because grain shipments are exempt from regulation when carried by certain classes of water and motor carriers. The influence of the private carrier is tending to break down the traditional rate arrangements of the common carriers of grain.

Demand for corn and soybean oil meal is relatively inelastic. Demand for these commodities from the North Central States has increased as the production of broilers has risen. Except for a few months during the crop year, production of feed grain in other regions has not kept pace with increased production of broilers, especially in southeastern states.

Grain produced in the North Central States stops from one to three times in transit for storage, mixing, or processing and is difficult to trace from first origins. Studies on the railroad movement of grains into southeastern states, offered in testimony in grain rate cases, show that Kansas, Nebraska, Iowa, and Minnesota originated almost 60% of the grain terminated as animal and poultry feed in that region.

These and other studies showed also that over one-third of the grain moved into the southeast from North Central States was milled into feed in Tennessee and Alabama. Concentration and transit points in these states are located where the services of railroads, motor carriers, and water carriers can be readily utilized. Circuity of routing is very high, with actual lengths of haul

averaging well over 1,000 miles, and in some instances over 1,500 miles.

Where it was possible to find first origins of corn and soybean oil meal shipped into the three broiler producing regions, Iowa, Illinois, and Missouri were found to be the most important shippers into the Arkansas-Missouri region; Illinois and Indiana into the southeastern states; and Illinois, Indiana, and Ohio into the Del-Mar-Va region. However, it is known that considerable volumes of corn and soybean oil meal are moved from these and other North Central States by motor and water carriers into milling centers on the waterways, but origin data were not available. The traffic flow patterns developed from first origin data indicate that shifts in the production of broilers within and between the regions studied will have an important bearing upon the grain market outlets of the North Central origin states. These production changes should be given close attention by grain shippers in the North Central States.

The intense competition for grain traffic among the transportation agencies is emphasized by the varieties of carriers used on the movements. A mixture of regulated and non-regulated for-hire carriers and of common, contract, and private haulers are employed both as single carriers on a through movement and as part of a combination of carriers from origin to destination. There is a definite trend toward the use of private trucks and water carriers as grain haulers.

The inland waterway system, largely created by the TVA-improved Tennessee River, which serves the North Central States through the Mississippi River and its tributaries, has been an important factor in the growth of broiler production in the Southeast. Movements of feed ingredients by water have held down transfer costs by keeping railroad and motor carrier charges on a competitive basis. The relatively low rates of the water carriers have been at least partially responsible for the creation of Guntersville, Ala., and Chattanooga, Tenn., on the Tennessee River and Memphis, Tenn., on the Mississippi River as major concentration and transit ports for North Central originated grain.

Corn moved primarily by truck from North Central origins into the Arkansas-Missouri region and into southeastern states, although the motor carriers were part of a combined barge-truck movement into Georgia and Alabama. Merchant truckers and private barges were the principal carriers utilized on the latter movement. Railroads hauled the highest volumes of corn into North Carolina and the Del-Mar-Va region and were used extensively on soybean oil meal movements from all origins to all regions.

Charges for corn shipments from Iowa, Illinois, and Missouri into the Arkansas - Missouri region varied from 15 cents per bushel in trucks owned by feed manufacturers to 25 cents by railroad. Company owned trucks also showed the lowest charges on soybean oil meal movements from these states. Into southeastern states, barges moved the commodities at charges which were

less than half of those of the motor carriers and railroads. From Illinois to Alabama, for example, barges handled corn for 8 cents per bushel as compared with a range of 18-20 cents by railroad and 19-22 cents by truck. Shipments to the Del-Mar-Va region were made entirely by railroad, and comparisons were not possible. From the river points to the southeastern broiler regions, trucks moved the commodities almost exclusively, but railroads were making a determined effort to compete, especially on traffic from Memphis.

The problem of analyzing charges is complicated by the fact that motor carriers do not publish rates on grain movements. Available information on motor carrier charges suggests 1 cent per 10 miles for an 800 bushel carrier.

Movements of corn and soybean oil meal from North Central origins into Arkansas-Missouri were heaviest in the second and third quarter of the year, reached a peak during the second quarter into the southeast, and showed a uniformly rising trend throughout the year into the Del-Mar-Va region. The corn traffic into the southeast fell substantially during the fourth quarter because of the availability of locally grown grain for feed purposes.

Reasons for the Study

Shifts in the nature and relative importance of the poultry industry in different regions of the United States have been accompanied by far-reaching changes in transportation methods and costs. These changes which have taken place in the character of transportation services make it desirable to analyze the extent to which transportation and related factors have been responsible for changes in the marketing methods, practices, and channels for handling poultry feed ingredients produced in the North Central States and shipped to regions elsewhere. These regions not only compete with North Central States in producing poultry for common markets outside of the North Central Region, but also ship a considerable volume of poultry into these states. The methods used in transportation and the costs of shipping can have an important influence in decisions of poultry producers and processors in the North Central Region to expand or contract their operations in light of the interregional competition existing at present or trends which may be developed in the future. This analysis of poultry feed grain movements when combined with other marketing studies should provide some basis for a more effective planning by the industry as to the nature and location of production, processing, and handling facilities as well as a possible basis for improvements in efficiency and serv-

ice on the part of the carriers, and suggest some guide lines to regulatory agencies.

Objectives of the Study

The objectives of this study were to determine for the states in the North Central Region, (1) the transportation carriers and types of services used in moving some poultry feed ingredients, (2) the traffic flow patterns of these products to markets in competing broiler producing regions, (3) transportation charges, and (4) factors related to the transportation of these products, such as length of haul, routing, season of movement, and special services required. The commodities involved in this study are corn and soybean oil meal—the two principal ingredients produced in the North Central States which are used in the manufacture of poultry feed rations.[2]

This report is the second phase of a North Central Regional Poultry Marketing (NCM-14) transportation study. The first phase analyzed the movement of poultry and poultry products from the North Central States and was published in 1958,[3] whereas the third phase will be concerned with the

[2]Corn and soybean oil meal account for approximately 80 percent of the weight of ingredients in the rations in the commercial broiler areas. Balloun, S. L., Poultry Extension Bulletin P-102, Iowa State University Extension Service, Ames, Iowa.

[3]Thompson, W. H., *Transportation of Poultry and Poultry Products from the North Central States*, North Central Regional Publication No. 92, Agricultural Experiment Station, South Dakota State College, Brookings, Bulletin 472, October, 1958.

Table 1. Number and Average Live Weight of Commercial Broilers Produced in States Surveyed, 1958*

State and region	Number (in thousands)	% of U. S. total	Average live weight per bird
Arkansas-Missouri			
Arkansas	133,331	8.0	3.0
Missouri	33,900	2.0	3.1
Total	167,231	10.0	—
Southeast			
Georgia	292,119	17.6	3.2
Alabama	131,640	7.9	3.2
North Carolina	134,600	8.1	3.3
Total	558,359	33.6	—
Del-Mar-Va			
Delaware	94,250	5.7	3.5
Maryland	86,209	5.2	3.4
Virginia	63,495	3.8	3.1
Total	243,954	14.7	—
Other States	**690,144**	**41.7**	—
Total United States	**1,659,688**	**100.0%**	**3.2**

*USDA, AMS, *The Poultry and Egg Situation, P.E.S. 201*, May, 1959.

competitive position of the North Central States relative to other producing regions on poultry movements into common markets, as well as analyzing the shipments of commercial broilers from these competing regions into midwestern states.

Method of Investigation

A preliminary study was undertaken in 1957 to determine the poultry producing regions which ship significant volumes of broilers into the North Central States. Three regions were found to be important. These were, (1) Arkansas-Missouri, (2) the southeastern states—particularly Georgia, Alabama, and North Carolina, and (3) the Del-Mar-Va region. The regions selected for study in 1958 produced approximately 58% of commercial broilers in the United States. The states comprising these regions, together with their production of commercial broilers, are found in table 1.

Field research was initiated in Arkansas and Missouri in 1957. In 1958 the research was continued in southeastern states and the Del-Mar-Va region.[4] The major purpose was to compile data from the records of feed manufacturers located in these areas concerning the volume of corn and soybean oil meal received from the North Central States, the state origin of the movement, the methods used in transporting the commodities, and charges for the transportation. A total of 220 feed manufacturers located in the three regions furnished data. Approximately 20% were cooperatives.

The movement of grain is difficult to trace since it may be stopped two or three times while in transit between origin and destination for concentration, storage, and milling; and the origin identity of each shipment is lost. To obtain a reasonably accurate picture of the grain flow patterns, it was necessary to get data from the records of the receivers rather than from those of the shippers.

Secondary data were obtained from publications of the Interstate Commerce Commission, United States Department of Agriculture, U. S. Army Corps of Engineers, railroads, barge lines, and exhibits and testimony in grain rate cases which at the time of preparation of this study had not been decided by the Commission.

[4]Within these states, the heaviest producing areas were selected for analysis. One section of Missouri, including the counties of Lawrence, Webster, and Barry was included even though Missouri is in the North Central Region. In Arkansas research was undertaken in Washington, Crawford, Pulaski, Madison, Conway, Stone, Faulkner, Independence, and Prairie counties. In Alabama the following counties were selected: Calhoun, Cleburne, Cullman, DeKalb, Marshall, Morgan, Walker, and Winston. In Georgia: Barrow, Barstow, Carroll, Cherokee, Clarke, Dawson, Douglas, Forsythe, Franklin, Fulton, Gordon, Hall, Hart, Jackson, Murray, Pickens, Polk, Stephens, Whitfield, and WinNetta. In these two regions an attempt was made to contact every feed manufacturer. However, in North Carolina and the Del-Mar-Va region, only a representative sample, including the largest feed manufacturers, was used.

Production of Corn and Soybeans as Broiler Feed Ingredients

Between 1947 and 1957 the per capita consumption of chicken meat in the United States increased from 18.1 pounds to 25.6 pounds. The percentage which was specialized broiler meat ranged from 24% of 18.1 pounds in 1947 to 76% of 25.6 pounds in 1957.[5] An indication of this growth between 1953 and 1958 is found in table 2.

Rapidly rising per capita consumption of commercial broilers during the post war years and expansion of production in the three regions shown in table 2 required a a continuing supply of feed and feed ingredients to these areas. The southern and eastern broiler producing states are deficient in corn and soybeans except for a few months of the year and must draw upon the surplus states of the North Central Region. Whether the ingredients are shipped into these regions for processing into feed near the consumption point or are mixed in the producing states and shipped as mixed feed depends upon a number of economic factors, not the least of which are the transportation arrangements and charges for these movements.[6]

Production of corn and soybeans has risen in the broiler producing states in this study, and trends are indicated in table 3.

The inclusion of Missouri in the Arkansas region would seem to indicate some measure of self-sufficiency in the production of the feed ingredients; yet, as will be shown in a later section, this area drew upon other North Central States for supplies. In all destination states, spectacular gains were shown, particularly in the production of soybeans. By way of contrast, two states in the North Central Region—Illinois and Iowa—each produced more corn in 1958 than the combined total of the eastern and southern states; and five states—Illinois, Minnesota, Indiana, Iowa, and Ohio—each produced more soybeans in 1958 than the combined total.

Despite the gains shown in eastern and southern states, they are deficients in both commodities when production per grain-consuming animal unit is analyzed. In 1957, the national production of corn per animal unit fed was 212 bushels, whereas that of soybeans was 30 bushels. Data showing these ratios as well as deviations from the

[5]USDA, AMS, *Egg and Poultry Statistics through 1957*. Statistical Bulletin No. 249, May, 1959.

[6]The demand for feed (corn and concentrates) generally is relatively inelastic. That is, the quantity of feed which farmers and processors will use varies less than the accompanying change in price. The demand for transportation of the feed ingredients, however, may be relatively elastic; wherein a small change in the rates or charges by one carrier may cause a more than proportionate decline in volume offered. The sensitivity of price and service considerations arises not only because of the competition within and between railroads, motor carriers, and water carriers, but also because of the competition of regulated and non-regulated carriers for the business. For further reference, see USDA, "The Demand and Price Structure for Corn and Total Feed Concentrates," Technical Bulletin No. 1061; D. P. Locklin, *Economics of Transportation*, Chapter 3, Richard D. Irwin Co., 1954.

national averages for nine regions of the United States are shown in table 4, and for the states in this study are given in table 5.

Movement of Corn and Soybean Oil Meal Into the Broiler Producing Regions

Origins of the Movement

The 1956-1957 data collected from feed manufacturers in the three broiler producing regions did not show first origins of the commodities in all instances. Where one carrier was used almost exclusively on the movements, such as the truck shipments into Arkansas and Missouri, or the railroad movement into the Del-Mar-Va region, it was relatively easy to trace the traffic. Into the southeastern states, however, a combination of carriers was used into and out of the major transit points of Guntersville, Ala., and Chattanooga and Memphis, Tenn., and the identity of the origin state was lost. Here the grain was stopped for mixing or storage which further added to the difficulty of tracing the shipments. Information furnished by the feed manufacturers and carriers indicated that North Central grain used in animal and poultry feed stopped on the average two to three times while in transit.

When questioned as to the origin of their feed ingredients, most of the manufacturers in Alabama and Georgia gave the Tennessee River ports; thus, the data in the tables which follow show Tennessee and Alabama as sources of ingredients moving into the southeast. Secondary data did not show origin states of grains shipped into these points, but some clues were found in a series of studies, referred to in this report as the "Edwards studies,"

Table 2. Percentage Increases in Commercial Broiler Production in Regions Analyzed, 1953-1958*

Region	Production (thousands)		Increase	
	1953	1958	Number	%
Arkansas-Missouri				
Arkansas	74,080	133,331	59,251	80
Missouri	25,898	33,900	8,002	31
Southeast				
Georgia	121,631	292,119	170,488	140
Alabama	28,416	130,024	101,608	358
North Carolina	50,738	154,185	83,447	164
Del-Mar-Va				
Delaware	68,451	94,250	25,799	38
Maryland	62,093	86,209	24,116	39
Virginia	58,745	62,879	4,134.	7
United States Total	**957,174**	**1,646,550**	**689,376**	**72**

*USDA, AMS, Crop Reporting Board, February, 1959.

which were based on 1954-1955 movement data.[7]

These studies analyzed the movement of about 20 million bushels of grain from midwest origins which terminated as animal and poultry feed in the south. They showed that eight of the twelve states in the North Central Region originated almost 79% of the total. Among those shipping the heaviest volumes were Kansas, 26%; Nebraska, 11%; and Iowa and Minnesota, 10% each. It was also found that milling of animal and poultry feed, unlike milling of flour, is performed primarily in the destination area. In his analysis, Edwards showed that Tennessee accounted for 25% and Alabama 10% of the grain milled into feed.[8]

It is doubtful that revolutionary changes occurred in the origin-destination traffic pattern between 1955, the year used by Edwards, and 1957, the year of analysis in this report. In fact, it is quite probable that the same patterns hold to the present time. Therefore, when Tennessee and Alabama are considered to be the origin states of the feed ingredients as shown in tables 6 and 7, it should be assumed that the movement from these states was transshipment traffic. Probably a more accurate description of origin-destination patterns would result by

[7]These reports were placed in testimony as exhibits in ICC Docket No. 31874 et al. *Southeastern Association of Railroad and Utilities Commissioners*, et al v *Atchison, Topeka, and Santa Fe Railroad Company*, et al. The studies were prepared by Ford K. Edwards, Washington, D. C. and consisted of the following: *Grain Marketing; Basic Elements of Grain Production, Consumption, Marketing, and Transportation*, Exhibit 534; *Grain Marketing—Flow and Routing of Grain Products West to South*, Exhibit 535; and *Grain Marketing—The Relation of the Grain Rate Structure to Grain Marketing*, Exhibit 536. The case involved a petition from southern interests for changes in the railroad grain rate structure within the south and between western and southern states.

[8]See tables 1 and 2, Appendix.

Table 3. Percentage Increases in Corn and Soybean Production, 1945-1954 and 1958*

Region	Corn production (thousands of bushels)			Soybean production (thousands of bushels)		
	Average 1945-54	1958	% change	Average 1945-54	1958	% change
Arkansas-Missouri						
Arkansas	22,488	14,688	—35	8,226	49,637	503
Missouri	141,798	180,712	36	20,616	55,432	169
Southeast						
Georgia	46,942	86,752	85	242	1,125	365
Alabama	44,008	66,848	52	1,128	2,970	163
North Carolina	62,535	82,192	31	4,049	10,212	152
Del-Mar-Va						
Delaware	6,091	8,580	41	914	3,622	296
Maryland	20,922	27,776	33	1,235	4,246	244
Virginia	37,575	40,969	9	2,250	6,052	169

*USDA, AMS, *Crops and Markets, 1957*, Volume 34: U. S. Crop Reporting Board, May, 1959.

Table 4. Production of Corn and Soybeans Per Animal Unit Fed for Nine Regions of the United States,* 1957

Region	Corn (bushels)		Soybean (bushels)	
	Per animal unit fed	Deviation from national average	Per animal unit fed	Deviation from national average
New England	202.5	—9.8	.9	
Middle Atlantic	94.1	—118.2	.9	—29.1
East North Central	300.9	+88.6	54.4	+24.4
West North Central	275.1	+62.8	32.1	+2.1
South Atlantic	118.4	—93.9	14.7	—15.3
East South Central	181.4	—30.9	18.0	—12.0
West South Central	71.3	—140.6	35.3	+3.3
Mountain	111.7	—100.6		
Pacific	33.6	—178.7		
U. S.	212.3		30.0	

*Grain consuming livestock. USDA, AMS, Crop Reporting Board, *Field and Feed Crops,* May, 1959. USDA, ARS, *Animal Units of Livestock Fed Annually 1909 to 1957,* Statistical Bulletin No. 235, September, 1958.

applying the percentages found by Edwards to the movement data found in this research, but to do so would distort the data from the records of the feed manufacturers.

Despite the difficulties of tracing the traffic movements into the southeast, the Edwards studies and this report both point out this significant fact; namely, the importance of the Tennessee River in the transportation of North Central grain, and the importance of the river ports of Guntersville, Chattanooga, and Memphis as concentration and reshipping points for movements of feed ingredients into the southeastern states.

Table 5. Production of Corn and Soybeans Per Animal Unit Fed for the States Analyzed,* 1957

State	Corn (bushels)		Soybeans (bushels)	
	Per animal unit fed	Deviation from national average	Per animal unit fed	Deviation from national average
Arkansas	60.5	—151.8	141.0	+111.0
Missouri	179.6	—32.7	43.9	+13.9
Georgia	137.1	—75.2	2.7	—27.3
Alabama	185.5	—26.8	7.8	—22.2
North Carolina	139.4	—72.9	20.4	—9.6
Delaware	44.0	—168.3	26.0	—4.0
Maryland	102.2	—110.1	22.0	—8.0
Virginia	80.0	—132.3	16.2	
U. S.	212.3		30.0	

*Grain consuming livestock. USDA, AMS, Crop Reporting Board, *Field and Feed Crops,* May, 1949. USDA, ARS, *Animal Units of Livestock Fed Annually 1909 to 1957,* Statistical Bulletin No. 235, September, 1958.

Tables 6 and 7 show the origins of the corn and soybean oil meal shipped into each state in the broiler producing regions. For comparative purposes, southern and southeastern states reported as origins are also shown in the tables.

Types of Carriers

Railroads, motor carriers, and water carriers were the general forms of transportation used on the movements of corn and soybean oil meal. Motor carriers and water carriers are further subdivided into merchant trucks, contract trucks, company owned trucks, contract and company owned barges; and in the tables which follow, each is shown separately with the volume carried. Except for the railroads, no

Table 6. Origins of Corn Shipped into the Broiler Producing Regions, 1956-1957 (Thousands of Bushels)

From:	To: Arkansas	Missouri	Georgia	Alabama	North Carolina	Del-Mar-Va
N. C. States						
Iowa	1,687	649	—	—	—	—
Illinois	1,986	119	460	874	41	4,194
Missouri	3,249	771	7	1,079	371	—
Indiana	50	28	588	316	41	4,443
Nebraska	35	30	—	—	—	—
Minnesota	32	11	—	80	—	—
South Dakota	10	12	—	—	—	—
Kansas	18	—	—	—	—	—
Ohio	—	—	—	—	—	1,903
Total	7,076	1,620	1,055	2,349	453	10,600
S. and S.E. States						
Arkansas	404	—	—	—	—	—
Tennessee*	—	—	25,664	198	1,462	—
Alabama	—	—	14,689	5,310	—	—
North Carolina	—	—	—	—	2,840	4,171
Georgia	—	—	4,051	—	—	—
Kentucky	—	—	202	278	258	—
Total	404	—	44,606	5,786	4,560	4,171
Del-Mar-Va	—	—	—	—	—	1,601
Grand Total	**7,471**	**1,620**	**45,661**	**8,135**	**5,013**	**16,372**

Summary

Distribution of Origins of Corn Shipments into the Broiler Producing Regions 1956-57 (Thousands of Bushels)

From:	To: Ark-Mo		Southeast		Del-Mar-Va		
	Amount	%	Amount	%	Amount	%	Total
N. C. States	8,687	95.5	3,857	6.5	10,600	64.7	23,144
S. and S. E. States	404	4.5	54,952	93.5	5,772	35.3	61,128
Grand total	9,091	100.0	58,809	100.0	16,372	100.0	84,272

*Data from Tennessee was primarily transshipment traffic.

common carriers were reported as being used in hauling the grain to the feed manufacturers.

Tables 8 and 9 indicate that North Central originated corn moved primarily into the Arkansas-Missouri area and into southeastern states by truck. However, a considerable volume of the truck movement shown into the southeast was by truck from the river ports as part of a combined barge-truck movement. Railroads hauled the highest percentage of the commodities shipped into North Carolina and the Del-Mar-Va region. Merchant truckers handled heavy volumes of corn moving into Arkansas, Missouri, and Georgia, whereas company owned barges were the major carriers into Alabama. Contract trucks were used only on the shipments into Alabama.

Soybean oil meal shipments by railroad from North Central origins were relatively heavy into all states. Merchant trucks were used extensively on the movements into Arkansas and Georgia, whereas the contract barge movement was was heavy into Alabama. From the southern and southeastern states, railroads carried relatively heavy volumes of soybean oil meal into Georgia, Alabama, and North Carolina, whereas company owned and contract trucks were important carriers into all states. Contract barges predominated on the movement into Alabama.[9] The distribution of

[9]The merchant grain trucker handles a heavy volume of grain which moves direct from farms to terminal elevators and mills. During the harvest season, this truck owner-operator moves into a harvest area and buys a truckload of grain from the producer or elevator. The sale is for cash, and title to the grain passes immediately to the merchant trucker. He may offer several cents more per bushel than the farmer can get at the local elevator. In addition, the farmer is saved the time and expense of loading and transporting the grain to the elevator. The merchant trucker then carries the grain to the market which will offer him the best price on arrival, or at which he can obtain another load of commodities. Typically, the merchant trucker follows the traffic and only occasionally would he be found following his original route. He also buys grain from country and sub terminal elevators, paying the operator spot cash and often 5-10 cents per 100 pounds above the track price. In some quarters, these operators are referred to as "itinerant" or "gypsy" truckers. They are not regulated carriers but are generally considered in the category of for-hire operations. Carriers owned and operated by the feed manufacturers are considered as private carriers, utilizing their equipment for the movement of both raw materials, mill products, and mill supplies. Important reasons given for ownership and operation of trucks and barges were (1) less expense incurred in transferring inventories from one mill to another, (2) availability of the equipment when needed, (3) grain remained under their control, (4) service was faster and more flexible than that of the railroads. The contract carriers, truck and barge, are specialized for-hire carriers and include those classified as exempt carriers. They do not take title to the load, and in grain trucking they customarily enter into contractual agreements with shippers to haul a specified amount of grain at specified intervals into specified markets at a specific transportation charge. These carriers use truck-trailer combinations which carry a payload of 30-40 thousand pounds. For a further description of the motor carriers used in grain movements see USDA, PMA, *The Transportation and Handling of Grain by Motor Truck in the South West*, Washington, D. C., May, 1952; and *A Study of Conditions Affecting the Transportation of Grain by Railroad*, Washington, D. C., June, 1953.

corn and soybean oil meal shipments by type of carrier are found in tables 8 and 9 and are graphically portrayed on the traffic flow patterns in figures 1 through 10.

Movements to the Southeastern States by Water Carriers

Barge movements of corn from the North Central Region to southeastern states have had a tremendous growth during the past decade. The traffic is carried over the inland waterway system shown in figure 11. Receipts of corn at the Tennessee River ports and Memphis between 1947 and 1957 increased from 55,000 to 879,000 tons.[10] Receipts at these ports in 1957 were

[10]United States Army Corps of Engineers, *Waterborne Commerce of the United States, National Summaries, Part V*, 1958.

Table 7. Origins of Soybean Oil Meal Shipped into the Broiler Producing Regions, 1956-1957 (Tons)

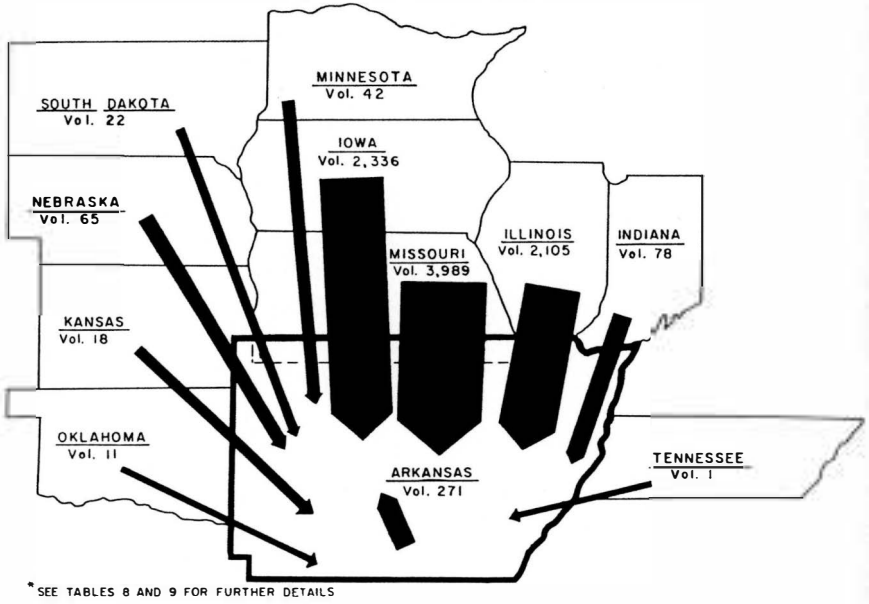
From:	To: Arkansas	Missouri	Georgia	Alabama	North Carolina	Del-Mar-Va
N. C. States						
Illinois	44,041	23,507	22,368	54,446	31,764	74,850
Iowa	11,685	1,210	—	—	—	120
Missouri	3,301	213	40	—	—	—
Indiana	40	—	740	1,251	—	97,566
Ohio	—	—	286	—	—	31,165
Michigan	—	—	—	—	—	7,454
Total	59,067	24,930	23,434	55,697	31,764	211,155
S. and S. E. States						
Tennessee	2,614	—	98,721	111,371	—	—
Alabama	—	—	3,722	7,187	—	—
Georgia	—	—	8,210	—	3,149	—
N. Carolina	—	—	—	—	905	—
S. Carolina	—	—	—	—	3,653	—
Mississippi	—	—	2,620	1,996	—	—
Kentucky	—	—	3,932	392	—	828
Arkansas	15,410	—	2,228	—	—	—
Total	18,024	—	119,433	120,946	7,707	828
Del-Mar-Va	—	—	—	—	—	1,200
Grand total	**77,091**	**24,930**	**142,867**	**176,643**	**39,471**	**213,183**

Summary

Distribution of Origins of Soybean Oil Meal Shipped into the Broiler Producing Regions 1956-57 (Tons)

From:	To: Ark-Mo		Southeast		Del-Mar-Va		
	Amount	%	Amount	%	Amount	%	Total
N. C. States	83,997	82.3	110,895	30.9	211,155	99.0	406,047
S. & S. E. States	18,024	17.7	248,086	69.1	2,028	1.0	267,138
Total	102,021	100.0	358,981	100.0	213,183	100.0	673,185

FIGURE 1
TRAFFIC FLOW PATTERN OF CORN INTO ARKANSAS-MISSOURI*
1956-1957 (THOUSANDS OF BUSHELS)



*SEE TABLES 8 AND 9 FOR FURTHER DETAILS

Table 8. Distribution of Corn Shipments into the Broiler Producing Regions by Type of Carrier, 1956-1957 (Thousands of Bushels)

From:	To:					
	Arkansas		Missouri		Georgia	
	Amount	%	Amount	%	Amount	%
N. C. States						
Rail	1,062	15.0	469	29.0	34	3.2
Merchant truck	5,679	80.4	1,151	71.0	834	79.0
Company owned barge	326	4.6	—	—	—	—
Contract truck	—	—	—	—	187	17.8
Total	7,067	100.0	1,620	100.0	1,055	100.0
S. and S. E. States						
Rail	—	—	—	—	172	0.4
Merchant truck	404	100.0	—	—	1,095	2.5
Company owned truck	—	—	—	—	7,007	15.7
Contract truck	—	—	—	—	36,332	81.4
Company owned barge	—	—	—	—	—	—
Common carrier barge	—	—	—	—	—	—
Contract barge	—	—	—	—	—	—
Total	404	100.0	—	—	44,606	100.0
Grand total	**7,471**	—	**1,620**	—	**45,661**	—

equal to approximately 20% of the production of corn in the states of Alabama, Georgia, and Mississippi, and if used entirely in broiler rations would have fed out almost half of the commercial broilers produced in those states.

Within this decade, grain con-

Table 8 (continued)

From:	To: Alabama		N. Carolina		Del-Mar-Va	
	Amount	%	Amount	%	Amount	%
N. C. States						
Rail	24	1.0	453	100.0	10,600	100.0
Merchant truck	668	28.4	—	—	—	—
Company owned barge	1,657	70.6	—	—	—	—
Contract truck	—	—	—	—	—	—
Total	2,349	100.0	453	100.0	10,600	100.0
S. and S. E. States						
Rail	444	7.7	2,116	46.4	824	14.3
Merchant truck	76	1.3	2,444	53.6	4,403	76.3
Company owned truck	3,581	61.9	—	—	—	—
Contract truck	1,421	24.5	—	—	—	—
Company owned barge	173	3.0	—	—	—	—
Common carrier barge	28	0.5	—	—	—	—
Contract barge	63	1.1	—	—	545*	9.4
Total	5,786	100.0	4,560	100.0	5,772	100.00
Grand total	**8,135**	—	**5,013**	—	**16,372**	—

*Bay boat.

Summary

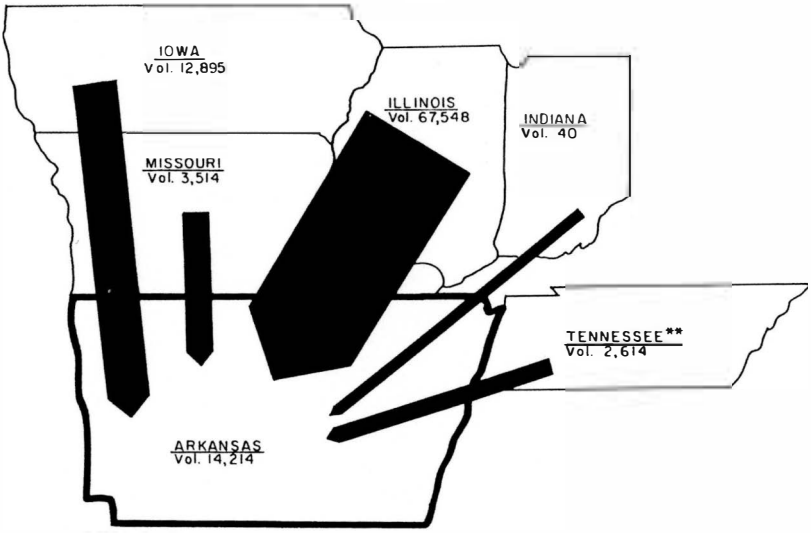
Distribution of Corn by Type of Carrier 1956-57 (Thousands of Bushels)

From:	To: Ark-Mo		Southeast		Del-Mar-Va		
	Amount	%	Amount	%	Amount	%	Total
N. C. States							
Rail	1,531	17.6	511	13.2	10,600	100.0	12,642
Merchant truck	6,830	78.6	1,502	38.9	—	—	8,332
Com. owned truck	326	3.8	1,657	43.0	—	—	1,983
Contract truck	—	—	187	4.9	—	—	187
Total	8,687	100.0	3,857	100.0	10,600	100.0	23,144
S. and S. E. States							
Rail	—	—	2,732	5.0	824	14.3	3,556
Merchant truck	404	100.0	3,615	6.6	4,403	76.3	8,422
Com. owned truck	—	—	10,588	19.2	—	—	10,588
Contract truck	—	—	37,753	68.7	—	—	37,753
Com. owned barge	—	—	173	0.3	—	—	173
Common car. barge	—	—	28	0.1	—	—	28
Contract barge	—	—	63	0.1	545	9.4	608
Total	404	100.0	54,952	100.0	5,772	100.0	61,128

FIGURE 2

TRAFFIC FLOW PATTERN OF SOYBEAN OIL MEAL INTO ARKANSAS*

1956 - 1957 (TONS)



*See tables 8 and 9 for further details.
**Primarily transshipment volume.

Table 9. Distribution of Soybean Oil Meal Shipments into the Broiler Producing Regions by Type of Carrier, 1956-1957 (Tons)

From:	To: Arkansas		Missouri		Georgia	
	Amount	%	Amount	%	Amount	%
N. C. States						
Rail	33,001	55.9	24,667	98.9	22,106	94.3
Merchant truck	19,296	32.6	263	1.1	1,070	4.6
Company owned truck	2,420	4.1	—	—	40	0.2
Contract truck	4,350	7.4	—	—	218	0.9
Contract barge	—	—	—	—	—	—
Total	59,067	100.0	24,930	100.0	23,434	100.0
S. and S. E. States						
Rail	3,705	20.6	—	—	14,767	12.5
Merchant truck	3,728	20.7	—	—	4,553	3.8
Company owned truck	—	—	—	—	74,296	62.7
Contract truck	10,591	58.7	—	—	24,817	21.0
Contract barge	—	—	—	—	—	—
Total	18,024	100.0	—	—	118,433	100.0
Grand total	**77,091**		**24,930**		**141,867**	

suming animal and poultry units in these states increased by 29%, whereas corn production increased only 19%. Prior to 1950, railroads moved almost all of the corn; but improved navigational facilities on the waterways and the postwar series of railroad rate increases have contributed to the waterway movement, particularly on the Tennessee River.

A new era of water borne shipments of grain into the southeast

Table 9 (continued)

From:	To:					
	Alabama		N. Carolina		Del-Mar-Va	
	Amount	%	Amount	%	Amount	%
N. C. States						
Rail	15,378	27.6	31,764	100.0	211,155	100.0
Merchant truck	—	—	—	—	—	—
Company owned truck	—	—	—	—	—	—
Contract truck	4,318	7.8	—	—	—	—
Contract barge	36,001	64.4	—	—	—	—
Total	55,697	100.0	31,764	100.0	211,155	100.0
S. and S. E. States						
Rail	19,799	16.3	4,608	59.8	828	40.8
Merchant truck	444	0.4	—	—	—	—
Company owned truck	15,450	12.8	3,099	40.2	1,200	59.2
Contract truck	10,011	8.3	—	—	—	—
Contract barge	75,241	62.6	—	—	—	—
Total	120,946	100.0	7,707	100.0	2,028	100.0
Grand total	**176,643**	—	**39,471**	—	**213,183**	—

Summary

Distribution of Soybean Oil Meal by Type of Carrier
1956-57 (Tons)

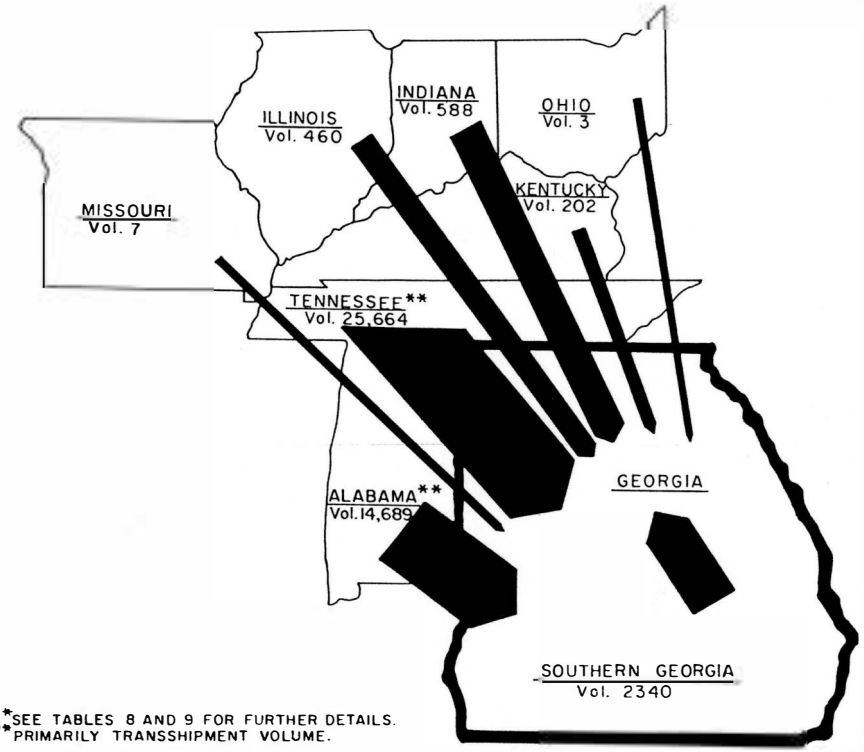
From:	To:						
	Ark-Mo		Southeast		Del-Mar-Va		
	Amount	%	Amount	%	Amount	%	Total
N. C. States							
Rail	57,668	68.7	69,248	62.4	211,155	100.0	338,071
Merchant	19,559	23.3	1,070	1.0	—	—	20,629
Company truck	2,420	2.9	40	—	—	—	2,460
Contract truck	4,350	5.1	4,536	4.1	—	—	8,886
Contract barge	—	—	36,001	32.5	—	—	36,001
Total	83,997	100.0	110,895	100.0	211,155	100.0	406,047
S. and S. E. States							
Rail	3,705	20.6	39,174	15.9	828	40.8	43,707
Merchant truck	3,728	20.7	4,997	2.0	—	—	8,725
Company truck	—	—	92,846	37.6	1,200	59.2	94,046
Contract truck	10,591	58.7	34,828	14.1	—	—	45,419
Contract barge	—	—	75,241	30.4	—	—	75,241
Total	18,024	100.0	247,086	100.0	2,028	100.0	267,138

began in 1939—the first year the Tennessee Waterway operated. Encouraged by the barge lines and TVA, private grain interests rapidly built up grain handling facilities on the river during the following years, creating major grain ports at Guntersville, Ala., and Chattanooga, Tenn. From 1946 to 1957 annual volumes of corn entering the Tennessee River increased from 25,000 to 630,000 tons.

Published data on the port-to-port or state-to-state movement of inland water borne commerce are not available from government or private agencies. The annual publications of the United States Army Corps of Engineers group origins and destinations into "shipping areas" and "receiving area." This procedure fails to show the precise points involved, thus making the task of tracing commodities carried on the inland waterways practically impossible. Trends in the waterborne movement of corn from shipping areas contiguous to the North Central States may be seen in table 10.

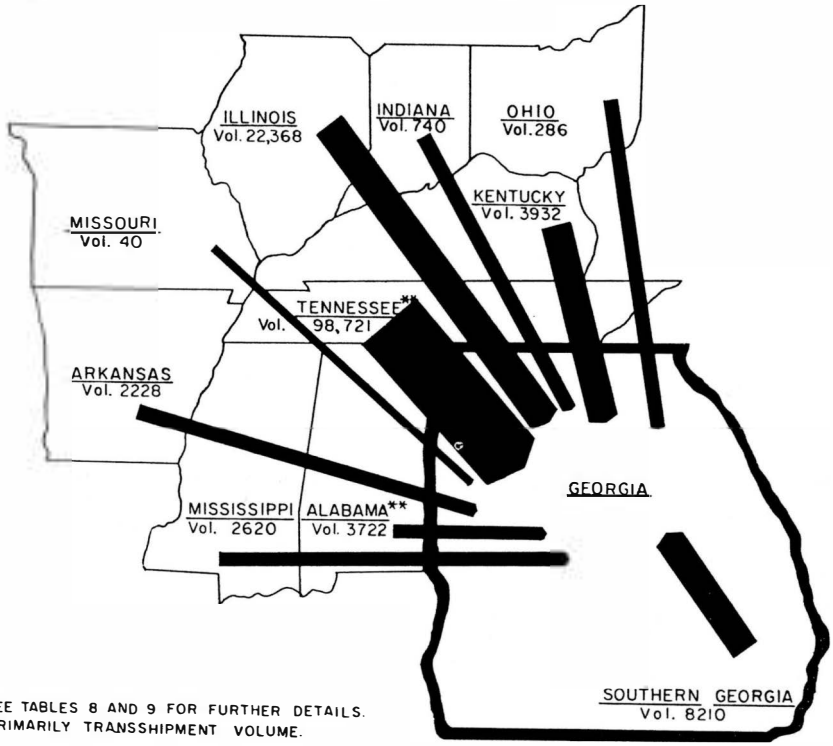
The third important inland port in terms of corn receipts is Mem-

FIGURE 3
TRAFFIC FLOW PATTERN OF CORN INTO GEORGIA*
1956-1957 (THOUSAND OF BUSHELS)



*SEE TABLES 8 AND 9 FOR FURTHER DETAILS.
**PRIMARILY TRANSSHIPMENT VOLUME.

FIGURE 4
TRAFFIC FLOW PATTERN OF SOYBEAN OIL MEAL INTO GEORGIA*
1956-1957 (TONS)



*SEE TABLES 8 AND 9 FOR FURTHER DETAILS.
**PRIMARILY TRANSSHIPMENT VOLUME.

phis, whose growth in volume of traffic parallels that of the Tennessee River ports. In 1946 only 6,000 tons of corn were received by barge, increasing to 351,000 tons in 1954, and 216,000 tons to 249,000 tons annually between 1955 and 1957. Memphis is located in the "receiving area" listed by the Army Engineers as "Mouth of the Ohio River,

Table 10. Shipments of Corn by Water Carrier from the North Central Region to the Tennessee River Ports, 1953 and 1957* (Thousands of Bushels)

From shipping area	1953	1957	Comparable points on figure 11
Mississippi River—Minnesota to mouth of Missouri	438	4,266	St. Paul to St. Louis
Mississippi River—Mouth of Missouri to mouth of Ohio	2,023	7,487	St. Louis to Cairo
Ohio River	2,141	6,065	Cincinnati to Cairo
Illinois River	—	3,235	Chicago to St. Louis

*U. S. Army Corps of Engineers, *Waterborne Commerce of the United States, 1958.*

to, but not including, Baton Rouge;" and no attempt has been made to show movements from other "shipping areas" into this destination area.[11]

Movements from Memphis and the Tennessee River Ports into the Southeast

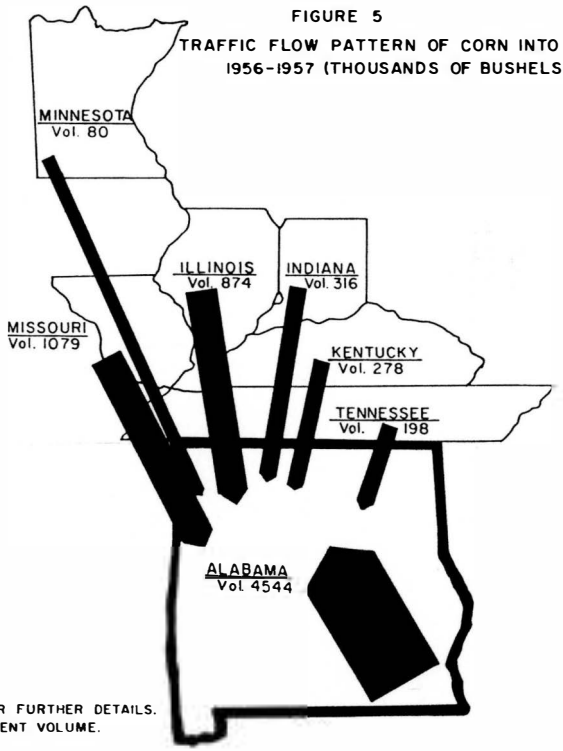
Railroads were not an important carrier of corn or soybean oil meal from the Tennessee River ports. On the other hand, company owned and contract motor trucks handled heavy volumes into each of the destination states, with merchant truckers used primarily on the shipments into Georgia. Barges were used only on the shipments from Guntersville into Alabama.

Railroads, trucks, and barges were important carriers of the commodities from Memphis. The heaviest volume of soybean oil meal moved from Memphis and the heaviest volume of corn from the Tennessee River. Railroad and barge movements of soybean oil meal were relatively high into Alabama, whereas trucks dominated the movements into Georgia. The distribution of the traffic by type of carrier is found in tables 11 and 12.

[11]Trends in the movement of waterborne corn are discussed by Herman Bluestone in USDA, AMS, *The Poultry and Egg Situation*, March, 1959.

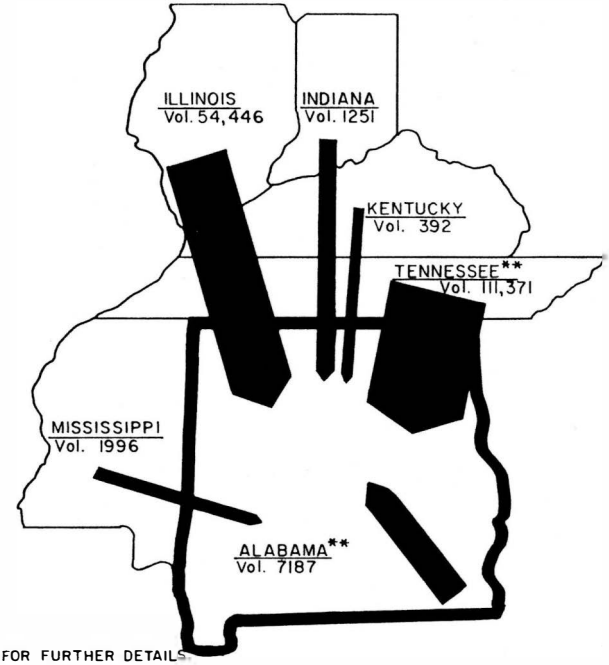
FIGURE 5

TRAFFIC FLOW PATTERN OF CORN INTO ALABAMA*, 1956-1957 (THOUSANDS OF BUSHELS)



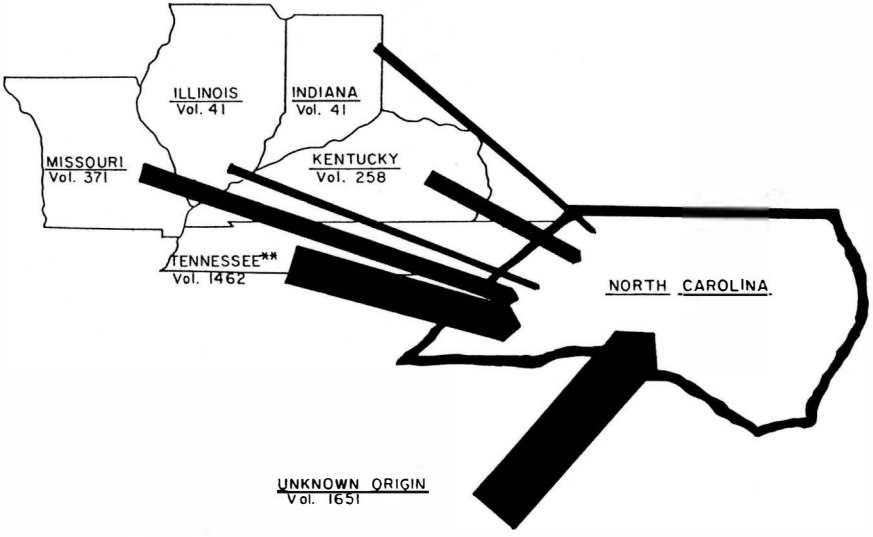
*SEE TABLES 8 AND 9 FOR FURTHER DETAILS.
**PRIMARILY TRANSSHIPMENT VOLUME.

FIGURE 6
TRAFFIC FLOW PATTERN OF SOYBEAN OIL MEAL INTO ALABAMA*
1956-1957 (TONS)



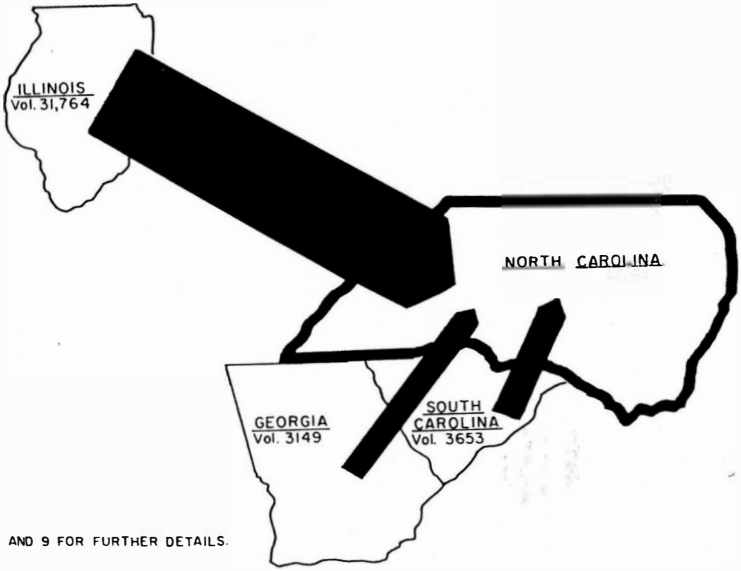
*SEE TABLES 8 AND 9 FOR FURTHER DETAILS.
**PRIMARILY TRANSSHIPMENT VOLUME.

FIGURE 7
TRAFFIC FLOW PATTERN OF CORN INTO NORTH CAROLINA*
1956-1957 (THOUSANDS OF BUSHELS)



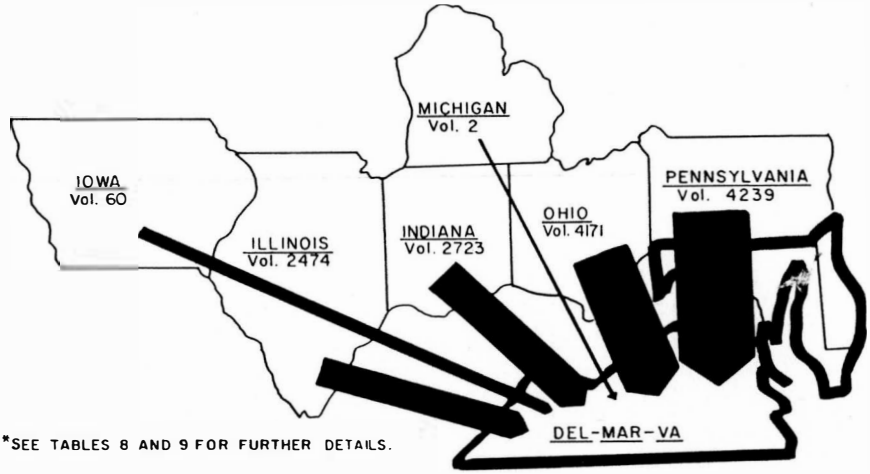
*SEE TABLES 8 AND 9 FOR FURTHER DETAILS.
**PRIMARILY TRANSSHIPMENT VOLUME.

FIGURE 8
TRAFFIC FLOW PATTERN OF SOYBEAN OIL MEAL INTO NORTH CAROLINA*
1956-1957 (TONS)



*SEE TABLES 8 AND 9 FOR FURTHER DETAILS.

FIGURE 9
TRAFFIC FLOW PATTERN OF CORN INTO DEL-MAR-VA*
1956-1957 (THOUSANDS OF BUSHELS)



*SEE TABLES 8 AND 9 FOR FURTHER DETAILS.

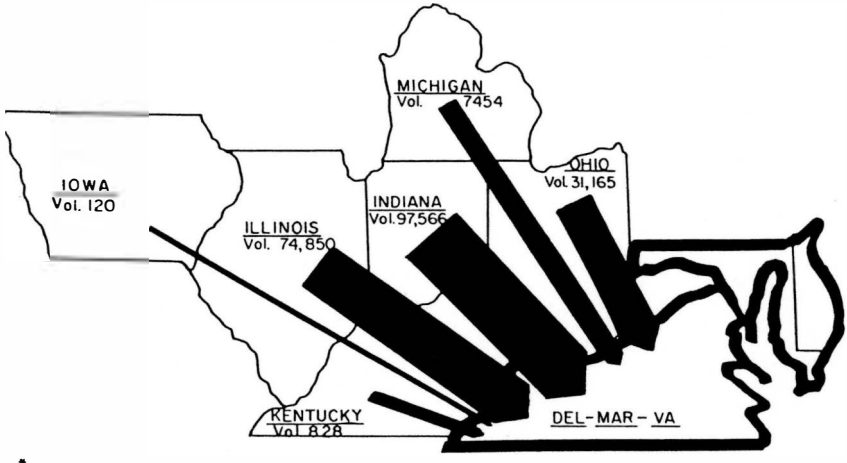
Table 11. Shipments of Corn into Alabama and Georgia from River Transit Points by Type of Carrier, 1956-1957 (Thousands of Bushels)

Carrier	To Alabama from:			To Georgia from:		
	Guntersville	Chattanooga	Memphis	Guntersville	Chattanooga	Memphis
Rail	355	—	67	8	8	96
Merchant truck	—	—	—	425	534	—
Company owned truck	2,027	11	—	3,227	3,268	—
Contract carrier truck	937	119	—	11,029	21,248	—
Common carrier barge	28	—	—	—	—	—
Total	3,347	130	67	14,689	25,558	96

Table 12. Shipments of Soybean Oil Meal into Alabama and Georgia from River Transit Points by Type of Carrier, 1956-1957 (Tons)

Carrier	To Alabama from:			To Georgia from:		
	Guntersville	Chattanooga	Memphis	Guntersville	Chattanooga	Memphis
Rail	—	—	19,655	—	—	3,545
Merchant truck	—	—	—	—	951	3,566
Company owned truck	3,950	—	11,501	2,160	56,865	13,167
Contract carrier truck	—	6,411	1,800	562	18,725	671
Contract carrier barge	—	—	72,004	—	—	—
Common carrier barge	3,237	—	—	—	—	—
Total	7,187	6,411	104,960	2,722	76,541	20,949

FIGURE 10
TRAFFIC FLOW PATTERN OF SOYBEAN OIL MEAL INTO DEL-MAR-VA*
1956-1957 (TONS)



* SEE TABLES 8 AND 9 FOR FURTHER DETAILS.

Charges for Transporting Corn and Soybean Oil Meal

Charges for shipping corn and soybean oil meal from the North Central States into the broiler producing areas are shown in tables 13 through 22. Charges for the movements from states outside the North Central Region are shown for comparative purposes. In the Arkansas-Missouri region and Del-Mar-Va region, the data were computed by grouping key destination points and considering each of the regions as a single destination. On the movements into the southeast, because of its importance as a market for North Central corn and soybean oil meal, transportation charges were computed for each state insead of grouping all three states into one destination area. The charges are the actual amounts paid for by the feed manufacturers who also identified the type of carrier used on the movements. Charges are given in cents per bushel of corn and dollars per ton for soybean oil meal, and in some instances are shown as a range of figures reflecting the use of several origin points in each origin state. The range is used when the figures would show distortion through averaging distances between origin and destination.

Arkansas-Missouri

Tables 13 and 14 show a range of charges incurred in shipping corn and soybean oil meal from the major origin states of Iowa and Illinois. As might be expected, Missouri shipments were heavy as was the intrastate movement in Arkansas. Railroad charges were slightly higher and also showed a wider range than those of the motor carriers on corn movements from Iowa. From Illinois the charges by all carriers were quite competitive with wider ranges shown for the motor carrier movement. On soybean meal shipments, the railroads apparently were able

Table 13. Charges for Shipping Corn into Arkansas-Missouri Region, 1956-1957 (Cents per Bushel)

From	Rail			Merchant truck			Company owned truck		
	Charges	Volume*	%	Charges	Volume*	%	Charges	Volume*	%
Iowa	20–25	361	15	18–19	1,961	84	15–18	14	1
Illinois	16–20	131	6	15–20	1,746	83	15–21	228	11
Nebraska	16	16	25	14–25	49	75			
Minnesota	25	4	10	21–24	38	90			
Indiana				16–24	78	100			
South Dakota	26–29	17	79	19–28	4	21			
Kansas	20	12	69	19	5	31			
Tennessee				23	1	100			
Oklahoma				16	8	73	14	3	27
Arkansas	15–19	271	100						
Missouri	14–17	990	25	13–20	2,915	73	15–17	84	2

*Thousands of bushels.

Table 14. Charges for Shipping Soybean Oil Meal into Arkansas-Missouri Region, 1956-1957 (Dollars per Ton)

From	Rail			Merchant truck			Company owned truck			Contract carrier truck		
	Charges	Volume*	%	Charges	Volume*	%	Charges	Volume*	%	Charges	Volume*	%
Illinois	$10.15 to 11.48	52,885	78	$11.45 to 12.00	9,204	14	$11.89	1,109	2	$13.18	4,350	6
Iowa	$10.30 to 12.15	3,471	27	$10.25 to 10.46	8,113	63	$10.00	1,311	10	----	----	----
Tennessee	$7.20 to 13.18	2,243	86	$12.50	371	14	----	----	----	----	----	----
ndiana	$12.45	40	100	----	----	----	----	----	----	----	----	----
Arkansas	$5.36	1,462	10	$5.26 to 5.75	2,161	15	----	----	----	$3.75 to 3.88	10,591	75
Missouri	$6.00 to 6.10	1,272	36	$8.00	2,242	64	----	----	----	----	----	----

*Tons.

Table 15. Charges for Shipping Corn into Alabama,* 1956-1957 (Cents per Bushel)

From	Barge			Rail			Merchant truck			Contract truck			Company owned truck		
	Charges	Volume†	%	Charges	Volume†	%	Charges	Volume†	%	Charges	Volume†	%	Charges	Volume†	%
Indiana				18–20	19	6	20	297	94						
Illinois	8	524	60	18–20	5	1	19–22	345	39						
Missouri	8	1,053	98				17–20	26	2						
Minnesota	14	80	100												
Tennessee‡				21–23	67	34				7	119	60	7	11	6
Kentucky	7	173	62	25–42	21	8	17	72	26				15	12	4
River Points															
Decatur, Ala.										4–6					
Guntersville	1–3	91	2	1	356	8				4–5	1,305	29	5	2,792	61

*Actual charges for movements primarily into Guntersville, but including shipments into Cullman, Empire, Haleyville, Jasper, Scottsboro, Albertsville, Fort Payne, Piedmont, and Anniston.

†Thousands of bushels.

‡From Memphis and Nashville.

Table 16. Charges for Shipping Soybean Oil Meal into Alabama,* 1956-1957 (Dollars per Ton)

From	Barge			Rail			Merchant truck			Contract truck			Company owned truck		
	Charges	Volume†	%	Charges	Volume†	%	Charges	Volume†	%	Charges	Volume†	%	Charges	Volume†	%
Indiana				$12.50	1,251	100									
Illinois	$4.00	36,001	66	$12.00	14,127	26				$8.00	4,318	8			
Tennessee‡	$3.00	72,004	65	$5.00	19,655	18				$5.00	8,211	7	$5.00	19,712	17
Kentucky				$6.75	144	37	$7.00	248	63						
Mississippi							$6.00	196	10	$6.00	1,800	90			
Guntersville	$0.50	3,237	45										$0.72	3,950	55

*Actual charges for movements primarily into Guntersville, but including shipments into Cullman, Empire, Haleyville, Jasper, Scottsboro, Albertsville, Fort Payne, Piedmont, and Anniston.

†Tons.

‡From Memphis and Nashville.

to compete favorably with the motor carriers.

Southeastern Region

The importance of the inland waterway system may be readily seen on the movements into southeastern states. Barges were used extensively to move the traffic of both corn and soybean oil meal at charges which were less than half of those by railroad and truck. Figures shown in tables 15 and 16 represent prices paid for shipping into destinations in northern Alabama, but are influenced by the charges for the traffic into Guntersville. To reach final destinations, the charges in many cases would be increased by the distance from the river port; and the tables show the range from the ports by different media.

Charges found on the corn movements from Indiana and Illinois into Georgia were rather uniform with merchant truckers showing a somewhat higher range than that of the railroads. In some instances, feed manufacturers indicated a willingness to pay higher prices for trucked grain, providing it arrived without delay and was of good quality. Thus, it is not surprising to find that railroad charges may have been lower

Table 17. Charges for Shipping Corn into Georgia,* 1956-1957 (Cents per Bushel)

From	Rail			Merchant truck		
	Charges	Volume†	%	Charges	Volume†	%
Indiana	18–20	17	3	20–25	463	79
Illinois	18–20	17	4	20–25	364	79
Missouri				20	7	100
Tennessee‡	20	114	100			
Kentucky	25	50	25	19	136	67
S. Georgia						
River Points						
Chattanooga				9–11	534	2
Guntersville	19	8		9–11	425	3

From	Contract truck			Company owned truck		
	Charges	Volume†	%	Charges	Volume†	%
Indiana	20	108	18			
Illinois	20	79	17			
Missouri						
Tennessee‡						
Kentucky	18	7	4	15	9	4
S. Georgia	10–12	2,337	100			
River Points						
Chattanooga	8–12	21,248	83	8–12	3,768	15
Guntersville	10–15	11,029	75	10–12	3,227	22

*Actual charges primarily to Gainesville, Canton, and Cummings, but including movements to 21 other destinations in northern Georgia.
†Thousands of bushels.
‡From Memphis.

than those of trucks on some movements, yet volume hauled by truck is higher. Railroads dominated the soybean oil meal movement though their charges were higher from Illinois—the only North Central State from which it was possible to find comparable data between the media.

Table 18. Charges for Shipping Soybean Oil Meal into Georgia,* 1956-1957 (Dollars per Ton)

From	Rail			Merchant truck		
	Charges	Volume†	%	Charges	Volume†	%
Indiana	$14.00	740	100			
Illinois	$14.00 to 14.50	21,226	95	$11.50	1,070	5
Ohio	$11.85	100	35			
Missouri	$14.00	40	100			
Tennessee‡	$10.50	4,494	100			
Kentucky	$10.50	3,932	100			
Mississippi	$11.84	590	23	$9.60	36	1
S. Georgia	$7.95	5,621	69			
River Points						
Chattanooga				$5.00	4,517	5
Guntersville						

From	Contract truck			Company owned truck		
	Charges	Volume†	%	Charges	Volume†	%
Indiana						
Illinois	$12.10	32		$12.36	40	
Ohio	$12.00	186	65			
Missouri						
Tennessee‡						
Kentucky						
Mississippi	$12.10	1,994	76			
S. Georgia	$3.50	2,565	31	$1.50	24	
River Points						
Chattanooga	$3.50 to 4.20	19,678	21	$3.20 to 4.00	70,032	74
Guntersville	$3.50	562	21	$3.50	2,160	79

*Actual charges primarily to Gainesville, Canton, and Cummings, but including movements to 21 other destinations in northern Georgia.
†Tons.
‡From Memphis.

From the river ports, charges were quite uniform to the final destinations in Georgia. There were no comparable figures on the traffic into North Carolina except on soybean oil meal traffic from the southeastern states.

Del-Mar-Va Region

All traffic into the Del-Mar-Va region from the North Central States was hauled by railroads. As shown in tables 21 and 22, no comparable figures were available except on the intraregional movement of corn.

Pattern of Charges on the Inland Waterway Movements

When grain is transported on routes which use water carriers as part of a through movement, at least three separate movements from producer to final consumer in the broiler producing regions are re-

FIGURE 11
INLAND WATERWAY (RIVER) SYSTEM INVOLVED IN GRAIN MOVEMENT IN THIS STUDY

Table 19. Charges for Shipping Corn into North Carolina, 1956-1957 (Cents per Bushel)

From	Rail			Merchant truck		
	Charges	Volume*	%	Charges	Volume*	%
Tennessee	29–34	1,462	100			
Kentucky	34	258	100			
Missouri	40–45	371	100			
Indiana	46†	41	5		825	95
Illinois	52	41	5		826	95
North Carolina	5	396	33	7	793	67

*Thousands of bushels.
†Proportional rate—23c. See Appendix II.

Table 20. Charges for Shipping Soybean Oil Meal into North Carolina, 1956-1957 (Dollars per Ton)

From	Rail			Merchant truck		
	Charges	Volume*	%	Charges	Volume*	%
South Carolina	$3.96	986	27	$4.00	2,667	73
Georgia	$5.89	2,717	86	$4.00	432	14
Illinois	$15.00 to 17.89	31,764	100			
North Carolina	$2.65	905	100			

*Tons.

Table 21. Charges for Shipping Corn into Del-Mar-Va, 1956-1957 (Cents per Bushel)

From	Rail			Merchant truck			Bayboat		
	Charges	Volume*	%	Charges	Volume*	%	Charges	Volume*	%
Illinois	41†	4,193	100						
Indiana	33	4,443	100						
Ohio	30	1,903	100						
North Carolina		126	3	12	3,865	93	11	180	4
Michigan	30	2	100						
Iowa	61	60	100						
Del-Mar-Va	4–17	698	43	9	538	34	8	365	23

*Thousands of bushels.
†Proportional rate—29c. See Appendix II.

quired. Unless the farmer is located on the rivers, he must move his grain by land carrier to barge loading terminals where it is transported to concentration and transit ports on the rivers and moved again by land carrier to ultimate destination—the feed manufacturer in this study. The through movement may employ several combinations of carriers; for example, truck-barge-truck, rail-barge-truck, rail-barge-rail, or truck-barge-rail. In some cases arrangements are made between two car-

Table 22. Charges for Shipping Soybean Oil Meal into Del-Mar-Va, 1956-1957 (Dollars per Ton)

From	Rail		
	Charges	Volume*	%
Illinois	$14.50†	74,850	100
Indiana	$12.30	97,566	100
Ohio	$10.70	31,165	100
Michigan	$17.00	7,454	100
Kentucky	$14.00	828	100
Iowa	$21.80	120	100
Del-Mar-Va	——	1,200	100

*Tons.
†Proportional rate—$10.50. See Appendix II.

riers and joint rates published for the movements. These are most common between the railroads and water carriers.

Where water carriers are able to compete for the grain traffic, railroad and motor carriers find it necessary to meet such competition. Motor carriers, because of their exempt status, are in a more advantageous position to do so than are the railroads. There is evidence that motor carriers are hauling grain from North Central origins, particularly into Arkansas-Missouri and the southeast, at an increasing rate at distances beyond their traditional range (300 to 500 miles). However, railroads are making a serious attempt to stay in competition with these other carriers and have been somewhat successful in publishing reductions in rates on the grain traffic into the south and southeast, particularly from the river ports into the broiler producing areas.

In areas close to the Mississippi River, encompassing roughly a belt 10 to 15 miles wide on either side, the farmer will probably truck directly to a river elevator or loading terminal and bypass concentration points. The grain is usually carried in small trucks, 50 to 100 bushels per trip. Beyond this distance, the small lots are combined at a country point or elevator where the grain is separated into 500 to 700 bushel loads and delivered to the port elevator.

The price paid for the grain is the delivered price at the river or port elevator. The dealer generally pays 1 cent per bushel for every 10 miles the grain is hauled. If the river price is $1.25 and the farmer trucks 50 miles, he nets $1.20. Along the Illinois River the average haul is about 25 miles, but may range to 150 miles and to 500 or 600 miles in extreme cases. The farmer located close to the river may net as much as 5 or 6 cents per bushel over the railroad prices. On the extreme fringe, the farmer may net ½ cent per bushel. Because of the waterway movements, it is estimated that broiler producers in northern Alabama have as much as a $2.00 per ton advantage over those located in Mississippi or other southeastern states.[12]

Grain is transported on the basis of published tariff rates per ton moving in bargeload quantities with specified applicable weights. It is also moved in private barges owned by the large feed manufacturing companies. In addition to the rates, there are charges for elevation by which grain is transferred from barge to car or truck, and for such

[12]Testimony of the Federal Barge lines in Docket 31784, et. al., Highland Park, Ill., November 8, 1956. See also "Barges and Broilers," *Broiler Industry*, May, 1959.

additional services as storage, screening, clipping, drying, or mixing.

Published rates also govern the railroad movements, but there are no published rates for the movement by motor carriers. Motor carriers negotiate their charges which may change almost daily, depending upon the availability of grain for shipment, demand for the grain at destination, whether or not the movement is a forward haul or backhaul, and for a variety of other reasons. Despite the lack of uniformity of motor carrier charges over a period of time, truck brokers and grain cooperatives have developed a rather stable schedule of rates. One of these covering movements within a 200 mile radius of Memphis covers the trucking of coarse grains in a dual-wheel, tandem axle, open bed trailer with a rated capacity of 800 bushels. The charges range from 7 cents per bushel for 70 miles to 10 cents per bushel for 175 miles.

From Red Wing, Minnesota, to Gainesville, Georgia, the combined truck-barge charge for corn would be 32 cents per bushel over a barge route covering 1,307 miles. From a Minnesota farm located 40 miles inland, shelling, trucking, and handling charges would add 15 cents, for a total cost of 47 cents. To Charlotte, North Carolina, the charge from the same Minnesota origin via the inland waterways would be 59 cents per bushel. From an Iowa farm inland 50 miles from Davenport to Alabama, destination via Memphis, the charge would be approximately 36 cents per bushel. By contrast, the railroad rate from Davenport to Memphis would be about 52 cents per bushel.[13]

Seasonal Fluctuations in the Movements of Corn and Soybean Oil Meal

Quarterly seasonal index numbers of the shipments are shown in tables 23 and 24. In each table total traffic, as well as traffic to the individual states by type of carrier, is indicated. Table 23 presents the quarterly movement of corn, which reached a peak during the second quarter into Arkansas, Missouri, and the southeast, but showed a rising trend into the Del-Mar-Va region throughout the year.

North Central corn usually sells at a discount during the last half of the crop year—April to September—relative to the price of corn grown in the southern and southeastern states, a probable reason for the heavy movements during the second quarter. Traffic into the southeast declined substantially in the fourth quarter due to the use of locally grown corn in that region. The heaviest use of local corn was found in Georgia where feed manufacturers purchased 25,000 bushels in the second quarter and almost 15 million bushels in the fourth quarter. Seasonal pattern of shipment by type of carrier followed generally the quarterly trends of the traffic into the southeast, whereas the pattern by carrier varied considerably by quarter into the other two regions.

Soybean oil meal shipments shown in table 24 varied by seasons

[13]Federal Barge Lines Exhibit, Docket 31874, October, 1956. See also *Farm Journal,* September, 1959.

Table 23. Quarterly Seasonal Index Numbers of the Movement of Corn*

Destination and Transportation	Quarters 1	2	3	4
Southeast Alabama				
All traffic	114	125	97	63
Rail	98	117	98	86
Truck	92	104	112	92
Barge	88	101	123	86
Georgia				
Rail	88	92	84	139
Truck	125	138	96	41
North Carolina				
Rail	119	104	93	84
Truck	100	101	100	98
Arkansas-Missouri				
All traffic	94	109	104	94
Rail	100	121	85	93
Truck	93	107	108	92
Del-Mar-Va				
All traffic	92	91	100	117
Rail	91	106	117	86
Truck	123	54	50	172
Barge	49	100	96	156

*100 equals quarterly average.

Table 24. Quarterly Seasonal Index Numbers of the Movement of Soybean Oil Meal*

Destination and Transportation	Quarters 1	2	3	4
Southeast Alabama				
All traffic	90	108	109	93
Rail	78	101	111	110
Truck	78	101	121	100
Barge	87	114	118	81
Georgia				
Rail	114	111	104	71
Truck	86	109	102	103
North Carolina				
Rail	103	98	96	102
Truck	99	102	101	98
Arkansas-Missouri				
All traffic	87	112	108	93
Rail	92	106	107	95
Truck	81	118	109	93
Del-Mar-Va				
Rail	100	100	100	100

*100 equals quarterly average.

into the southeastern states and Arkansas - Missouri, but uniform throughout the year into the Del-Mar-Va region. Seasonal variations by type of carrier followed closely the trends for all traffic. Soybean oil meal produced locally was used in relatively small quantities in Arkansas, Missouri, and the Del-Mar-Va regions, but none was reported as used in the southeastern states.

Appraisal of Findings

This study was designed to analyze the transportation factors involved in moving poultry feed ingredients—corn and soybean oil meal—which are produced and shipped from the North Central States. The commodities were moved into the major broiler producing areas by three transport media—railroads, motor carriers, and water carriers.

Data currently published by private or public sources do not adequately nor accurately cover the factors analyzed in this report. Therefore, it was necessary to work directly with the records of cooperating feed manufacturers. Until such time as public regulatory agencies or carrier associations encourage or require the reporting of the

data by the carriers, this technique will be necessary on research projects concerned with agricultural movements.

The analysis was meant to be descriptive without pretense of predicting future trends in the transportation of commodities. Certain weaknesses are obvious:

1. Origins of the commodities carried by the railroads and water carriers could not be precisely determined because of the number of times they were stopped in transit.
2. Difficulties were encountered in accurately defining the various types of motor carriers used in the movements.
3. The lack of a published rate schedule of motor carrier movements complicated the problem of analysis of transportation charges.

The study, however, suggests certain areas in which further research might be undertaken on this problem. These are:

1. The influence of transportation charges, facilities, and services on the development of feed processing at concentration points in consuming areas.
2. A more comprehensive analysis of the use of exempt carriers on these movements and their impact upon the railroad rate structure.
3. The effects of transportation on the competitive interregional aspects of the poultry industry through an appraisal of the broiler movements into the North Central States from competing production areas. Work is in progress on this phase of the problem.

The reader is reminded that this study is the second phase of the analysis of transportation factors involved in the interregional competitive problems in the marketing of poultry and products. The first analyzed the transportation factors found in the movements of poultry and poultry products from the North Central States, whereas the third and final report will study the movement of poultry into the North Central States.

Appendix I

Table 1. Origin States of Grain Which Terminated as Animal and Poultry Feed in the Southern States, 1954-1955*

Origin States	Hundredweight	Percentage of total hundredweight	
		By states	Cumulative
Kansas	2,748,449	25.86	25.86
Nebraska	1,192,978	11.22	37.08
Iowa	1,116,038	10.50	47.58
Minnesota	1,102,485	10.37	57.95
North Dakota	869,961	8.19	66.14
Missouri	788,351	7.42	73.56
South Dakota	426,334	4.01	77.57
Wisconsin	134,722	1.27	78.84
Other states	2,248,963	21.16	100.00
Totals	10,628,281	100.00	

*Edwards, Ford K., *Grain Marketing—Flow and Routing of Grain and Grain Products, West to South*, Exhibit 535, Table 9.

Table 2. Milling States of North Central Origin Grain Terminated as Animal and Poultry Feed in the South, 1954-1955*

Milling States	Hundredweight	Percentage of total hundredweight	
		By states	Cumulative
Tennessee	2,702,191	25.42	25.42
Alabama	1,022,039	9.62	35.04
Missouri	925,277	8.70	43.74
Mississippi	826,384	7.78	51.52
Ohio	766,765	7.21	58.73
Georgia	737,664	6.94	65.67
North Carolina	647,140	6.09	71.76
Illinois	571,945	5.38	77.14
Kentucky	544,940	5.13	82.27
Other states	1,883,936	17.73	100.00
Totals	10,628,281	100.00	

*Edwards, Ford K., *Grain Marketing—Flow and Routing of Grain and Grain Products, West to South*, Exhibit 535, Table 10.

Appendix II

Types of Carriers

Whereas some grain and grain products are produced in all states, the great bulk is raised in the North Central Region and traditionally has been shipped to markets in the east and south by railroad and inland water carrier. These commodities lend themselves readily to rail and water movements, since they are non-perishable bulk commodities which move in large volumes over long distances.

To the eastern markets, grain moves via all rail routes or combinations of rail-water-rail routes, with the water movement routed over the Great Lakes. On movements into southern and southeastern states, two significant developments have occurred during the past decade. One has been the increase in truck movements over intermediate distances, and the other the remarkable growth of water borne movements on the Mississippi and Tennessee Rivers. Navigational improvements on these waterways, the series of railroad rate increases on grain and grain products during the postwar years, and the increasing demand for feed by poultry and livestock producers in the southeast are factors responsible for the rising emphasis on water and motor carrier traffic.

Characteristics and Regulation

How easily grain and grain products move from surplus to deficit areas depends in part upon the rate structures of each transportation agency. Rates and services in turn depend upon economic and physical characteristics of each mode. From a cost viewpoint, railroads have a distinct advantage in the long distance high volume traffic generated in the grain trade; water carriers compete quite easily for the grain traffic although their service is slow and limited. They can quote lower rates since they do not provide their right of way. Motor carriers, gradually moving into the long haul traffic, have the advantage of flexibility of operation and speed of movement.

Perhaps the reason why water and motor carriers compete so successfully with the railroads for grain traffic lies more in the extent and scope of federal regulation governing each agency. Railroads are common carriers who must serve all shippers without discrimination and must provide adequate service at reasonable rates. Motor and water carriers may operate as common, contract, private, and/or exempt carriers. A contract carrier may limit his operations to a particular shipper and is not subject to the intensive regulation applied to a common carrier. A private carrier is one which transports commodities as part of a business operation in which transportation is incidental to or a furtherance of the enterprise. Motor and water carriers owned by feed manufacturers fall into this category, and the Interstate Commerce Commission regulates only the qualifications and maximum hours of work of drivers and standards of safety. Another type of

motor carrier becoming increasingly important in the grain traffic is the so-called "itinerant" or merchant trucker who combines some of the characteristics of the contract and private carrier and is not under regulation.

Exemptions from regulation are permitted for those interstate motor carriers which carry non-manufactured or non-processed agricultural commodities if such vehicles are not used in carrying any other property or passengers for compensation. [Section 203 (b) (6) Interstate Commerce Act.] Inland water carriers engaged in the transportation of bulk commodities, if the cargo space available is used for carrying not more than three such commodities, are also exempt from regulation. [Section 303 (b) of the Interstate Commerce Act.] Grain, moved by motor and water carriers under the above conditions, becomes an exempt commodity; but no such exemptions are permitted for the railroads. Exempt private and merchant truckers, in particular, hold a decided advantage in obtaining grain traffic since they can negotiate their charges, whereas the railroads and common carriers by motor and water must adhere strictly to the published rates filed with the Commission.

Rate Structure and Services

The transportation pattern for grain and grain products is complex. Complexity stems from the enormous volume shipped each year, the multiplicity of routings, the demand for special services, and the fact that each commodity has its own distinctive traffic flow dictated by the factors of production, the location of consuming markets, and the end use of the product.

Probably no other commodity movement demonstrates the influence of market competition upon a rate structure and the services it provides more clearly than that of grain and grain products. Whereas the aggregate demand for grain transportation is quite inelastic in terms of responsiveness of the volume of grain shipped to changes in freight charges, the distribution of the grain traffic among competing agencies of transportation is governed by competitive charges and services.

The present rate structure evolved from the economic pressure of country grain seeking markets, the use of agencies of transportation in addition to railroads, markets, interior transit points, and milling centers seeking to share in the vast flow of grain, and the ultimate consumers seeking the protection and freedom of choice which maintenance of competition alone can bring. Shifting markets, new and expanding modes of transportation, and expanding producing regions call for a continual reevaluation of grain rates. The issues can never be finally settled. At present, certain of the adjustments prescribed in the earlier cases are before the Commission as various parties urge further changes in rates in recognition of continual market competition. This is particularly true of the proposed adjustments in the southeast where grain rates from the North Central

Region and within the South are at issue.[1]

To move grain and grain products through primary markets to milling centers and thence to consuming areas, three broad railroad rate plans were used:

(1) Combination of flat rates in and out of primary markets.[2]
(2) Combination of flat rates into and proportional rates out of the markets.[3]
(3) Overhead rates with transit privileges.[4]

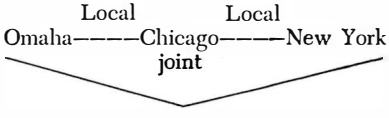
Transit Privileges

The transit privilege is basically a special service developed and offered by the railroads, although in recent years an increasing number have been granted by the motor carriers. The earliest recorded transit privilege in 1870 applied to grain, and it is probable that these services are the most extensively used at present on the grain movement. It is established as a result of industrial and/or carrier competition and to facilitate the free movement of grain. Without it, many small communities having processing plants would be unable to compete transportationwise with plants in larger cities.

Transit privileges permit the movement of grain from origin to final destination with a stop at an intermediate point for storage, mixing inspection, grading, or processing, then to be reloaded and forwarded. Although two separate movements are involved, the transportation is regarded as an interrupted through movement. The freight charges consist of a through rate from origin to final destination plus a nominal "transit charge," instead of separate

[1] I.C.C. Docket 31874 et. al., *Southeastern Association of Railroad and Utilities Commissions, et. al.* v *Atchison, Topeka and Santa Fe Railway Co., et. al.*

[2] A flat rate is one from origin to destination published by a single carrier (local) or by two cooperating carriers (joint) which did not depend upon previous or subsequent transportation for application.



[3] A proportional rate is a local or joint rate dependent for application upon (a) previous transportation to the point from which the proportional rate is applied, (b) subsequent transportation from the point to which the proportional rate applied, (c) both. It is a part of the through rate but usually lower than the flat rate between the same points. When a proportional rate was dependent upon previous inbound transportation, it was applicable only upon surrender of the inbound freight bill showing the transportation of an inbound shipment. The freight bill needed to cover only an equivalent volume of inbound tonnage without the requirement of preservation of identity of the grain.

[4] These were flat or proportional rates under which shipments could be stopped at an intermediate point for marketing, milling, storage, or inspection and forwarded to destination on the balance of the through rate, plus a nominal transit charge.

Whether the outbound shipments were made on proportional rates or "transit balances" depended upon the selection of the inbound freight bill. If the bill covered a movement from an origin point from which there was no overhead rate with transit to final destination, the outbound shipment was on proportional rates.

inbound and outbound rates to and from the point at which the shipment is stopped.[5]

[5]An example of the general nature of a transit privilege is as follows:
Assume that a carload of corn is shipped from Springfield, Illinois, to Chicago for milling into poultry feed, thence reforwarded to Baltimore for distribution in the Dal-Mar-Va region. For illustrative purposes, the rate is assumed to be 20 cents per 100 pounds on the Springfield-Chicago movement, and the rate on corn from Chicago to Baltimore is 50 cents. In the absence of a transit privilege, the Chicago miller would pay the sum of the two rates, or 70 cents. However, railroads have established a through rate of 60 cents—Springfield to Baltimore via Chicago. The Chicago miller may use this rate since at the time of the shipment to Chicago, the local rate of 20 cents is paid.

When the poultry feed is shipped from Chicago, the difference between the 20 cent inbound rate and the through rate, Springfield to Baltimore is paid. The difference of 40 cents is the transit balance rate (60 cents less 20 cents) instead of the local rate from Chicago to Baltimore of 50 cents. Thus, the Chicago miller is equalized with the miller at Springfield or at Baltimore transportationwise, into the eastern market, assuming that the corn is shipped from the Springfield area. The market for the Springfield grain producer has expanded to include Springfield, Chicago, and Baltimore; and the purchaser of poultry feed in Baltimore can secure it not only from Springfield and Baltimore, but from Chicago as well.

Additional details may be found in Taff, Charles A., *Traffic Management, Principles and Practices,* 1955, Richard D. Irwin, Homewood, Illinois.

The importance of the milling in transit service on soybean movements will be seen in USDA, AMS, *Trends in Marketing Soybeans,* Marketing and Transportation Situation, April, 1955.