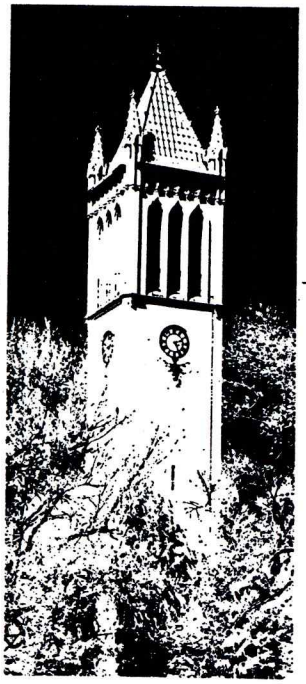
Transportation of Livestock and Meats From Iowa



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CONTENTS

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SUMMARY

1. Data (for 1962-65) covering livestock shipments were furnished by 111 livestock handlers and state agencies. Fifty-six of these were meat processors whose plants were located outside Iowa, 31 were state agricultural departments, 18 were stockyards, and 6 were railroads. Data covering the movement of fresh, cured and packaged meats were furnished by 34 federally inspected processing plants. They recorded 7.6 million tons of livestock and 7.8 million tons of meats shipped from Iowa during the period.

2. The volume of livestock shipped from Iowa to other states declined by 7 percent or 140,000 tons during 1962-65. Cattle and calf traffic declined 1 percent, or 13,000 tons; swine shipments by 15 percent, or 131,000 tons; whereas sheep and lamb movements increased 13 percent, or 4,000 tons. Fresh-meat tonnage shipped from Iowa increased 6 percent, or 151,000 tons, whereas cured-meats traffic declined by 2 percent, or 9,000 tons.

3. Five states contiguous to Iowa accounted for the largest volume (approximately 90 percent) of livestock for each year of the period. The most important market was Nebraska, followed by Illinois, Minnesota, Missouri and South Dakota for cattle and calves; California is added to this list for swine movements and New Jersey for sheep and lambs. On the other hand, fresh meat moved considerable distances from Iowa, with approximately 70 percent each year shipped to Illinois, New York, Massachusetts, California, New Jersey and Pennsylvania. Cured meat shipments were to scattered markets throughout the nation, with the heaviest concentrations moving to Illinois, Texas, New York and California.

4. Motor carriers hauled 97 percent of all livestock moved from Iowa during the period but suffered slight losses in the tonnage from year to year. Railroads carried relatively small volumes and also had losses in the traffic each year. Fresh meat was shipped by motor carrier, railroad and piggyback, with tonnage equally divided among the three. Similar trends were found for the cured-meat movements, but motor carriers hauled a larger percentage of cured meat than of fresh meats. The most significant trend was the sharp increase noted in the piggyback movements of both commodities.

5. The relationship of rates between livestock and products often determines whether livestock will be shipped on the hoof or as dressed meat. Railroads raised the rates on both commodities during the postwar period and, as a result, lost a large share of the traffic to exempt livestock motor carriers and to private and "illegal" motor carriers of meats. Since 1956, railroads have attempted to regain some of this traffic through the development of piggyback service and by coordinating rate adjustments to changes in minimum weights per car.

6. It was estimated that Iowa shippers spent 69.7 million dollars on the transportation of 7.6 million tons of livestock, 235 million dollars on fresh-meats shipments, and 32 million dollars for cured-meat movements. For all three commodities, the transportation bill over the period amounted to approximately 336.7 million dollars.

7. Cattle and swine movements were the heaviest during the fourth quarter of each year, whereas sheep and lamb movements were heaviest during the first and fourth quarters. The first and fourth quarters of the year were also the most important for both fresh- and cured-meat traffic.

8. The most frequent movement of livestock appeared to be 30,000-34,000 pounds in straight trailers and 39,000-42,000 pounds in double-decked and possum-belly trailers, 40 to 45 feet long. By railroad, livestock moved from Iowa in 40- and 50-foot cars.

9. Because of the perishability of meat products, the mode of transportation must fit into shippers' delivery schedules. The trend in equipment for meat movements was toward larger trucks and railroad cars. Truck sizes are limited by state laws, but loads of 75,000 to 125,000 pounds by railroad were not uncommon from Iowa.

10. Among major problems reported by the shippers, the three that ranked highest included the need for dependable service from both truck and rail agencies; the bruising and death of cattle, suggesting overloading of animals; and the difficulty of obtaining adequate equipment.

11. A variety of arrangements concerning the ownership of transportation equipment were reported by meat shippers. However, data were not sufficient to show costs for shipper-owned equipment.

12. Shrink in livestock and meat in transit is of major concern to shippers. It occurs at the same rate on either truck or rail shipments, but trucks usually will move the animals further per hour than rail carriers. Thus the *method* of transportation is not as important as the *time* in transit.

13. Attractive possibilities exist for the further development of piggyback operations and containerization, particularly for meats, on the movements from Iowa. Standardization of containers is sorely needed, however, especially for foreign markets. Mergers of railroads operating in Iowa also hold some promise for better levels of service and lower costs of movements.

14. Producers and processors of livestock in Iowa must be constantly alert, not only to changes in the livestock-meat products rate relationship, but also to the relationship of feed-grain rates to those of livestock and meats on long-distance movements.

Transportation of Livestock and Meats from Iowa[1]

by W. H. Thompson

The economic productivity of a region or state, despite its potential, cannot be greater than the value of its products in consuming areas, less transportation costs. Therefore, efficiency of transportation systems limits the productivity of areas distant from markets and influences the patterns of productive methods.

Transportation plays a vital role in structural change in the raising of livestock and the distribution of meats and other products and in the location of livestock production, meat processing and marketing facilities. One authority suggests, for example, "that no single factor contributed more to the direct marketing, growth of auctions, development of a local country marketing system, decentralization of the meatpacking industry and the shifting regional location of production and marketing than the development of motor carriers, together with the growth of all-weather highways."[2]

Since the middle 1850's when railroad construction began in Iowa, producers and shippers in the state have been faced with the problem of moving their products long distances to the consuming markets of the East and West. Adequate, dependable and efficient transportation for livestock and meat is essential to the continued growth of this industry in Iowa as well as to the growth of related industries. Adequate transportation facilities influence benefits from trade with other regions of the nation and other nations of the world. Efficient transportation will tend to broaden Iowa's markets and offer larger selections of its products at reduced costs.

Changes in the techniques of producing and processing farm commodities, coupled with technological advances in transportation, have necessitated improved arrangements for distributing Iowa's farm products among markets. Competition for livestock and meat traffic among and between the various modes of transport have caused and will continue to cause changes in the patterns of rates, charges and services. If they are to reach their markets at the lowest possible expense, Iowa's producers and shippers must be aware of current and proposed changes in rates, equipment and levels of service by transportation agencies.

Historically, the livestock-meat marketing system has displayed a marked tendency for adjusting to the most economical means of transport available. But economical transportation cannot be measured only in terms of rates and charges. In the past and to a degree now, too much emphasis has been placed on rates and not enough on service as an influence in the growth of the livestock-meat industry. In many respects, service as a cost component is as important as, if not more important than, rates and charges, especially since service pertains to such factors as equipment availability, time in transit and delivery at destination.

Currently, motor and railroad carriers separately and in combination compete for the livestock and meat traffic of Iowa. Figure 1 illustrates the percentage of livestock and meats included in the survey moved by motor and rail carriers. The state is served by 10 Class I railroads that offer piggyback service. Approximately 4,000 highway contract and 8,000 common carriers, plus thousands of privately owned and operated trucks, offer service within the state. Over 1,000 interstate carriers are registered by the Interstate Commerce Commission. These trucks operate on 11,500 miles of paved highways and use portions of three interstate systems that bisect the state in north-south and east-west directions.[3]

METHOD OF RESEARCH

The location of Iowa relative to the heavily populated markets of the nation and the problems of moving farm commodities were the reason for a series of research studies designed to evaluate the transportation factors in the marketing of these products. The project was initiated in July 1965 and sponsored by the Iowa Agricultural Marketing Division and Iowa State University of Science and Technology.

It concerned three general commodity groups; grains (corn and soybeans) and mixed feeds, livestock and meats, and poultry and poultry products. Data covering these movements were requested from shippers, shipper organizations, receivers, carriers, and state and federal agencies for the years 1962-65. For each commodity group, the research attempted to:

(a) evaluate the transportation method used
(b) determine the markets
(c) calculate the charges

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[1] Project 1254 of the Iowa Agriculture and Home Economics Experiment Station.

[2] Willard F. Williams and Thomas T. Stout. Economics of the livestock-meat industry. McMillan Company. New York. 1963. p. 314.

[3] Data furnished by the Iowa Development Commission, Des Moines. The railroad figures are subject to decisions of the Interstate Commerce Commission relative to proposals for merger of the Northwestern, Milwaukee, and Great Western railroads and the dispute over the merger of the Union Pacific or northwestern railroads with the Rock Island. If approved, some of the branch lines operated within Iowa could be discontinued. These proposals are currently in public hearings under Finance Docket Nos. 24182, 24183, 24184 Chicago and Northwestern Railway Co. Consolidation, Chicago, Milwaukee, St. Paul and Pacific Railroad Co.; Finance Docket No. 22688 et al. Chicago and Northwestern Railway Co. Consolidation, Chicago Rock Island and Pacific Railroad.

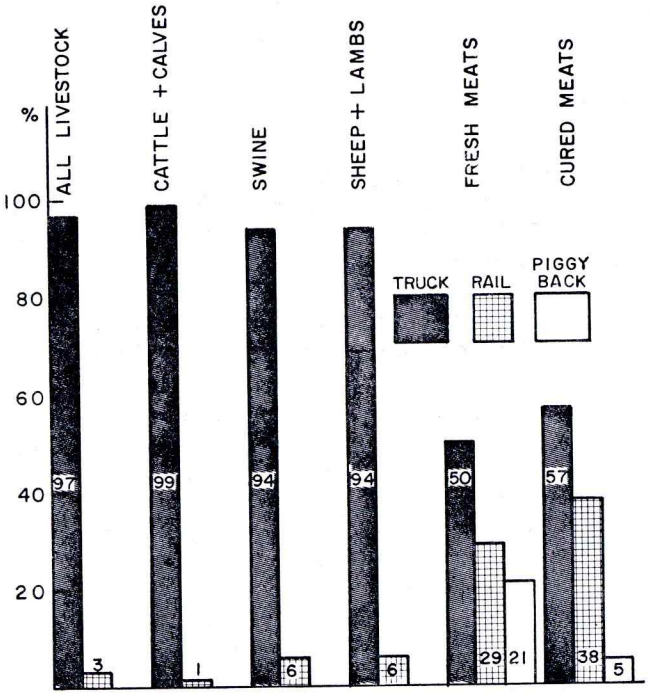

Fig. 1. Distribution of livestock and meats from Iowa reported in the 4-year survey, by type of media, 1962-65.

(d) compare and contrast the volume and per-ton costs for each company
(e) study the seasonal factors in shipping
(f) achieve a consensus of the major transportation problems of shippers

The first report, which analyzed the transportation of grain and mixed feeds, was published in 1967.[4]

Data were collected through personal visits to the organizations just mentioned, and conferences were held with traffic and executive personnel. Except for mail communication to distant state statisticians, packing plants and terminal livestock exchanges, an average of 4 man-days was spent at each firm or agency. Transportation data were compiled on a state-to-state basis by assuming that each state represented the major market for Iowa shippers. No data were collected on movements beyond the first destinations, on the intrastate movement of the products or on the inbound shipments of feeder cattle.

Livestock destined for slaughter plants moves through the following channels: terminal markets, country buyers or direct from farms, and auctions. There are no data available on the percentage of Iowa livestock moving through each channel, but for the United States in 1964, the National Commission on Food Marketing estimated the following percentages of livestock purchases through the different market outlets:

Market	*Cattle*	*Calves*	*Sheep*	*Hogs*
Terminal	36.5	18.8	28.6	23.8
Country buyers and direct	44.6	31.7	57.7	63.1
Auctions	18.9	49.5	13.7	13.1
	100	100	100	100

In the same year, the commission reported that Iowa had 737 dealers and order buyers, 226 buying stations, and 143 auctions merchandising livestock.[5]

Resources did not permit an analysis of livestock movements through these buying agencies, so the initial research effort was made by correspondence with agricultural statisticians in each state, requesting information and data on receipts of Iowa livestock. Responses came from 31 states, and with the exception of California, the heaviest volumes were received by states contiguous to Iowa. The second step involved personal visits to terminal markets, stockyards and federally inspected packing plants in the states showing the heaviest receipts. From the records of these firms, transportation data were compiled on a state-to-state basis by assuming that each state represented the major market for Iowa shippers. The data in the tables represent only the movement of livestock from an origin in Iowa. The origin may have been a farm, a feedlot, a stockyard or a buying station. The data may reflect a direct movement from a farm or from farm to and through the various marketing channels. Therefore, the reader should be cautioned against the use of the tables to represent the movement of all livestock from Iowa in the period. Volumes shipped to independent packing plants or to buying agencies in other states are not known. The records of the firms did not isolate the specific origins in Iowa. The tables showing livestock movements cover 4 years, 1962-1965, because these firms operated on a calendar year.

The North Central Regional NCM-25 Project Committee estimated the production of Iowa livestock for slaughter in 1960 at 4,307,191 tons.[6] If this estimate is compared with the 4,277,190 tons of livestock marketed as reported in 1960 by the U.S. Department of Agriculture, there is a difference of only 30,000 tons.[7] If, therefore, the tons marketed liveweight in Iowa could be used as a base figure, the livestock transportation data in this report represented approximately 42 percent of the 18.4 million tons marketed in the years studied.

[4] W. H. Thompson. Transportation of grain and mixed feeds from Iowa. Iowa Agr. and Home Econ. Exp. Sta. Spec. Rpt. 50. 1967.

[5] National Commission of Food Marketing. Organization and competition in the livestock and meat industry. Technical Study No. 1. Washington, D.C. 1966. pp.130-132.

[6] J. Havlicek, R. L. Rizek, and G. G. Judge. Spatial structure of the livestock economy. S. D. Agr. Exp. Sta. Bul. 521. 1964. Tables C3-C4, C7-C8, C11-12, and C15-C16. The procedure for estimating production is found on page 7.

[7] Statistical Reporting Service. Meat animals, farm production, disposition, and income by states, 1960-1964. U. S. Dept. Agr. Stat. Bul. 400. 1967 and suppl. MTAN1-1 1964-1965. 1966. Tables 16, 22, and 33 and tables 4, 6, and 10, respectively.

All federally inspected meat packing plants in Iowa furnished data on fresh and cured meat shipments. Because these firms operated on a fiscal year, the data were available for only 3 years during the period. Thus, the portion of the study involving livestock movements cover 4 calendar years, whereas the meat shipments are analyzed for 3 fiscal years within the same interval.

Federally inspected packing plants in Iowa are responsible for 98 percent of the red meat produced in the state, as compared with 68 to 90 percent, depending upon species of animals, reported for the United States in 1965. Iowa production of red meat for the 1962-1965 period amounted to 8.9 million tons, whereas the fresh meat movements shown in this study totaled 7.8 million tons, or 88 percent of the volume produced.[8]

If the 1.1 million tons of cured meat shipments were added to the fresh meat tonnage, the total would account for the red meat production during the period. Not all packing plants process meats, however, and it is possible that carcasses were shipped on intraplant movements from other states into Iowa for further processing. Therefore, the tonnage of fresh and cured meat shipments is probably higher than the 88 percent shown, but less than the total volume of red meat produced.

This report concerns the transportation of livestock and meats from Iowa and includes an analysis of the movements of cattle, calves, swine, sheep and lambs, and fresh, cured and processed meats. The report is divided into sections that discuss the traffic patterns of the products, costs of the movements, seasonality of the shipments, equipment used and transportation problems of the shippers as reported by them.

TRAFFIC PATTERNS

Livestock Transportation

The livestock industry is difficult to define because of its wide variation in firm structure and differences in competition. Over-all livestock production is most heavily concentrated in the Corn Belt, and Iowa unquestionably is in the center of this concentration. Livestock's principal movement, except for swine, tends to be from the grazing areas in the mountain and plains states east and west to farms and feedlots for feeding, and thence toward the centers of population and consumption.[9]

One-hundred-eleven livestock handlers and state agencies participated in the study. Of this number, 56 were meat processors whose plants were located outside Iowa, 31 were state agricultural departments, 18 were stockyards and 6 were railroads. Because the interstate movement of livestock by motor carrier is exempt from economic regulation by the Interstate Commerce Commission, it was difficult to determine the location of these carriers, and none submitted data.[10] The data from all sources covered the move-

[8] The percentage of red meat produced and the volume in tons was furnished by the state statistician's office in Des Moines. Percentages for the United States are found in National Commission on Food Marketing, op. cit., p.14. The meat production volume was determined by taking liveweight slaughter for each year and applying dressing yields for each specie. Dressing yields used were 58 percent for cattle, 56 percent for calves, 58 percent for hogs, and 49 percent for sheep and lambs. Red meat production for Iowa may be summarized from the Monthly Slaughter Reports, Iowa Crop and Livestock Reporting Service, Des Moines; and verified through: U.S. Department of Agriculture. Livestock and meat statistics. U. S. Dept. Agr. Stat. Bul. 333. Supplements for 1963, 1964, and 1965. August 1964, September 1965, and August 1966. Tables 90 to 93. p.66.

[9] Newburg suggests that patterns of livestock movement are seldom simple and straightforward. Most livestock is handled more than once in the channels from farm to packing plants. Packing plants rank first in volume of livestock slaughter receipts. Terminals rank second, but are ranked before packing plants as the most important single point of first sale off the farm. The most important shift in the pattern of livestock movement between 1940 and 1957 was the decline in the share if total receipts handled by terminal markets and the increase in percentage of marketings received by auctions. There is great pressure to reduce the direct marketing costs of hauling, handling, and selling and the indirect costs of shrinkage, crippling, or death in the movements. Richard R. Newburg. Livestock marketing, North Central Region. II. Channels through which livestock move from farm to final destination. Ohio Agr. Exp. Sta. Res. Bul. 932. 1963. Further detail on livestock transportation problems as viewed by individual states may be found in: Clive R. Houston and Jack Richards. Montana livestock transportation. Mont. Agr. Exp. Sta. Bul. 592. 1965; Edmund Barmettler. Interstate transportation of Nevada cattle. Nev. Agr. Exp. Sta. Bul. 234. 1964; James St. Clair and Richard L. Kelley. Truck transportation of Wyoming livestock. Wyo. Agr. Exp. Sta. Bul. 395. 1962; and J. B. Wycoff. Cattle transportation in Washington. Wash. Agr. Exp. Sta. Bul. 636. 1962.

[10] See Appendix A for discussion of the motor carrier livestock exemption.

TABLE 1. Livestock movements from Iowa reported in the 4-year survey, 1962-65.

To:	1962		1963		1964		1965		1962-65		% change
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Nebraska	675,031	35	703,580	36	700,985	36	641,836	36	2,721,432	35	− 5
Illinois	469,671	24	457,411	23	485,158	25	444,768	25	1,857,008	24	− 5
Minnesota	311,593	16	317,422	16	326,480	17	325,652	18	1,281,147	17	+ 5
Missouri	163,716	8	154,244	8	120,486	6	109,072	6	547,518	7	−33
S. Dakota	112,445	6	124,656	6	122,029	6	117,448	7	476,578	6	+ 4
Kansas	32,529	2	25,909	1	18,047	1	7,654	*	84,139	1	−76
California	29,008	2	34,116	2	36,677	2	24,381	1	124,182	2	−16
Wisconsin	27,664	1	26,014	1	34,058	2	29,531	2	117,267	2	+ 7
Other	113,148	6	110,276	7	104,509	5	94,498	5	422,431	6	−16
TOTALS	1,934,805	100	1,953,628	100	1,948,429	100	1,794,840	100	7,631,702	100	− 7

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

ment of 7.6 million tons of livestock during the period, and as far as can be determined there were no duplications.

Table 1 shows the distribution of all livestock reported in the survey as shipped from Iowa. For the period, shipments declined by 7 percent or approximately 140,000 tons. Five states contiguous to Iowa received the largest volumes (approximately 90 percent) for each year of the period. There were no significant changes in the tonnage shipped to each state for each year.

Railroads and motor carriers were the major agencies hauling livestock. No tonnages were reported as shipped by piggyback. Motor carriers have gradually increased their share of livestock deliveries to major markets. Nationwide, by truck, cattle movements rose from 58.1 percent in 1945 to 96.1 percent in 1965; calves from 65 percent to 90 percent; swine from 60.3 percent to 99.8 percent; and sheep and lambs from 56.1 percent to 85.5 percent.[11] From Iowa, shipments of all livestock by truck amounted to 97 percent of the tonnage reported in the survey (table 2). Railroads, which carried the remaining 3 percent, lost traffic both absolutely and relatively over the period, dropping from the 4 percent hauled in 1962 to 2 percent in 1965.

[11] Motor truck facts, 1967. Automobile Manufacturers Association. Detroit, Mich. 1967. p.57.

Water and air transportation are not important in the marketing of livestock, meats or other animal products. Generally, water transportation is considered the lowest cost mode for bulk nonperishable movements and is used extensively in the grain and grain-products traffic. Air transportation has never achieved a prominent place in livestock marketing, although it is occasionally used to move race horses and breeding animals. It could become important in the future movements of meats, especially as improved containers are developed and used.[12]

The decline in the railroad transportation of livestock from Iowa is a continuation of a trend that has been obvious for many years. Maki estimated that, between 1949 and 1960, the railroad tonnage of hogs dropped by 71 percent; and cattle and calves, by about 50 percent.[13] However, the average length of haul, as contrasted to total tonnage, has increased. Between 1955 and 1963, the average railroad short-line haul

[12] Five thousand pounds of pork loins were shipped by truck and air from Perry, Iowa, to Hawaii in 1966. Part of a 40,000 pound shipment in a refrigerated truck to Seattle went to Vancouver, British Columbia, and was there transferred to a jet plane; it arrived in Hawaii in less than 80 hours from origin, as compared with the usual 8 to 10 days by surface carriers. No special refrigeration was required on the plane since the low temperature of the cargo hold at high altitudes provided enough cooling. The added cost of air freight was reflected in a higher price to the consumer of 3 to 4 cents per pound. See: Air freight opens a new market for midwestern pork. Traffic Management. June 1966. p.69.

[13] Wilbur R. Maki. Unpublished research. Department of Economics. Iowa State University. 1966.

TABLE 2. Surveyed livestock movements from Iowa, by type of media, 1962-65.

Media:	1962		1963		1964		1965		1962-65		% change
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Railroad	74,009	4	66,007	3	66,294	3	42,548	2	248,858	3	−43
Truck	1,860,796	96	1,887,621	97	1,882,135	97	1,752,292	98	7,382,844	97	− 6
TOTALS	1,934,805	100	1,953,628	100	1,948,429	100	1,794,840	100	7,631,702	100	− 7

TABLE 3. Surveyed livestock movements from Iowa by railroad, 1962-65.

To:	1962		1963		1964		1965		1962-65		% change
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
California	28,544	39	32,973	50	35,588	54	22,943	54	120,048	48	− 20
Illinois	7,464	10	6,350	10	8,410	13	3,305	8	25,529	10	− 56
Washington	5,759	8	5,047	8	3,745	6	5,119	12	19,670	8	− 11
Oregon	5,180	7	3,510	5	2,714	4	2,215	5	13,619	6	− 57
New Jersey	4,202	6	3,008	5	5,736	9	5,538	13	18,484	7	+ 32
Arizona	3,973	5	2,174	3	177	*	17	*	6,341	3	− 99
Utah-Nev.	3,139	4	3,311	5	998	2	187	*	7,635	3	− 94
S. Dakota	3,038	4	0	0	1,592	2	823	2	5,453	2	− 73
New York	2,695	4	148	*	45	*	15	*	2,903	1	− 99
Connecticut	2,604	4	7,515	11	3,080	5	428	1	13,627	6	− 84
Nebraska	1,800	2	33	*	654	*	727	2	3,214	1	− 60
Missouri	1,561	2	785	*	103	*	57	*	2,506	1	− 96
Minnesota	1,228	2	0	0	710	*	318	1	2,256	1	− 74
N. Carolina	0	0	372	*	1,315	2	229	*	1,916	1	+229
Other	2,822	3	781	3	1,427	3	627	2	5,657	2	− 78
TOTALS	74,009	100	66,007	100	66,294	100	42,548	100	248,858	100	− 43

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

per ton for cattle and calves in double-decked cars increased by 14 percent to 821 miles; for sheep and lambs in single-deck cars, by 28 percent to 892 miles; and for swine in double-decked cars, by 24 percent to 1,231 miles.[14] Similar data for truck movements are not available.

Changes in the surveyed railroad tonnage carried to each state are found in table 3. Losses varied from 11 percent on the movements to the state of Washington to 99 percent on smaller volumes to Arizona and New York. Arizona and New York seem lost as markets for rail transportation of livestock from Iowa. Sharp losses occurred in the traffic reported to all states except New Jersey and North Carolina.

Table 4 shows the movements reported in the survey of livestock by motor carrier. Substantial losses were found on the movements to Missouri and Kansas, with slighter declines noted to Nebraska and Illinois. On the other hand, slight gains were registered by the motor carriers to Minnesota, South Dakota and Wisconsin.

The influence of each major mode of transportation on the surveyed volume moved into each state for the 4-year period may be seen in table 5 and fig. 2. Railroads made their best record on the distant movements to states on the East and West coasts. Trucks dominated the shorter hauls to the states close to Iowa.

[14] Interstate Commerce Commission. Carload waybill statistics, 1955 and 1963. Mileage block progressions, traffic, and revenue by commodity groups and classes. Statement MB 6. Washington, D.C. March 1956, April 1966. pp.6-8.

CATTLE AND CALVES

The surveyed movements of cattle and calves are shown in Appendix tables C-1 through C-5. The traffic reported over the period was 4.1 million tons, which declined by 1 percent during the 4 years as contrasted to the loss of 7 percent on all livestock movements. The sharpest change within the period occurred on the movements to Missouri. Almost all (99 percent) traffic was hauled by trucks, with only Illinois and New Jersey as relatively important destinations for the railroads. The movements by truck seemed primarily short haul.

TABLE 4. Surveyed livestock movements from Iowa by truck, 1962-65.

	1962		1963		1964		1965		1962-65		% change
To:	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Nebraska	673,231	36	703,547	37	700,331	37	641,109	37	2,718,218	37	− 5
Illinois	462,207	25	451,061	24	476,748	25	441,463	25	1,831,479	25	− 4
Minnesota	310,365	17	317,422	17	325,770	17	325,334	19	1,278,891	17	+ 5
Missouri	162,155	9	153,459	8	120,383	6	109,015	6	545,012	7	−33
S. Dakota	109,407	6	124,656	7	120,437	6	116,625	7	471,125	6	+ 7
Kansas	31,936	2	25,909	1	17,997	1	7,600	*	83,442	1	−76
Wisconsin	27,602	1	25,993	1	34,058	2	29,531	2	117,184	2	+ 7
Other	83,893	4	85,574	5	86,411	6	81,615	4	337,493	5	− 3
TOTALS	1,860,796	100	1,887,621	100	1,882,135	100	1,752,292	100	7,382,844	100	− 6

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE 5. Surveyed livestock movements from Iowa to major states, by type of media, 1962-65.

	Railroad		Truck		
To:	Tons	%	Tons	%	Total
Nebraska	3,214	0.1	2,718,218	99.9	2,721,432
Illinois	25,529	1.4	1,831,479	98.6	1,857,008
Minnesota	2,256	0.2	1,278,891	99.8	1,281,147
Missouri	2,506	0.5	545,012	99.5	547,518
S. Dakota	5,453	1.1	471,125	98.9	476,578
California	120,048	96.7	4,134	3.3	124,182
Wisconsin	83	0.1	117,184	99.9	117,267
Texas	496	0.6	87,518	99.4	88,014
Kansas	697	0.8	83,442	99.1	84,139
New Jersey	18,484	34.9	34,399	65.1	52,883
Washington	19,670	47.5	21,742	52.5	41,412
Oregon	13,619	44.5	16,969	55.5	30,588
Mississippi	--	--	26,024	100.0	26,024
Indiana	138	0.7	21,221	99.3	21,359
Other	36,665	22.6	125,486	77.4	162,151
TOTALS	284,858	3.0	7,382,844	97.0	7,631,702

NOTE: Other=all destinations individually receiving 1% or less of total movements from Iowa.

SWINE

Swine movements surveyed for the period are found in Appendix tables C-6 through C-10. Shipments reported for the 4 years were 3.3 million tons, which declined by 15 percent over the period. The decreases in total surveyed livestock movements, as shown in table 1, were influenced primarily by the decline in the swine movements. Patterns similar to those found on the cattle shipments were present on the swine traffic into Missouri and Kansas. Receipts by Minnesota represented the only significant increase in swine volume shipped to the states listed.

Railroads carried a larger volume and had a larger percentage of total traffic than they had on the cattle movements, with the major flow into the western states. However, the railroads' share of 6 percent of total volume originated in Iowa represented a decline of 40 percent over the period. Losses were found in the railroad movement into each of the states.

The movement by truck declined by 14 percent during the period, with decreases shown on most movements. Except for the tonnage moved to "other" states, too small to be isolated, the percentage changes in the truck volumes were quite similar to those shown in table 4.

SHEEP AND LAMBS

Shipment data from the survey covering sheep and lambs are found in Appendix tables C-11 through C-15. While cattle and swine movements declined during the period, those of sheep and lambs increased by 13 percent. The traffic gains were registered entirely through expanded truck movements. Railroad tonnage, which amounted to 6 percent over the period, had fallen substantially by 1965 because of a 70-percent loss during the 4 years. The trend of heavy losses on the cattle and swine movements to Missouri and Kansas was reversed on the sheep and lamb traffic to these states. Trucks not only showed a 23 percent gain in traffic but also served more distant points than had been found on the other livestock movements.

Meat Transportation

Livestock slaughtering plants tend to be located between the principal producing or feeding areas and the consumption centers. Early in the nation's history, meat packers were inclined to locate their facilities in or near metropolitan centers. The livestock-slaughtering industry has gradually shifted, however, nearer to areas of livestock production and feeding.

This arises from cost savings from two principal sources. One of these developed from the large numbers of slaughter livestock available that meet packer requirements and the subsequent savings in procurement costs. Another is associated with the shipment of carcasses and meat products rather than the live animals: Costs are higher and losses greater because of shrinkage, death and bruises in shipping the live animal long distances to consuming points.

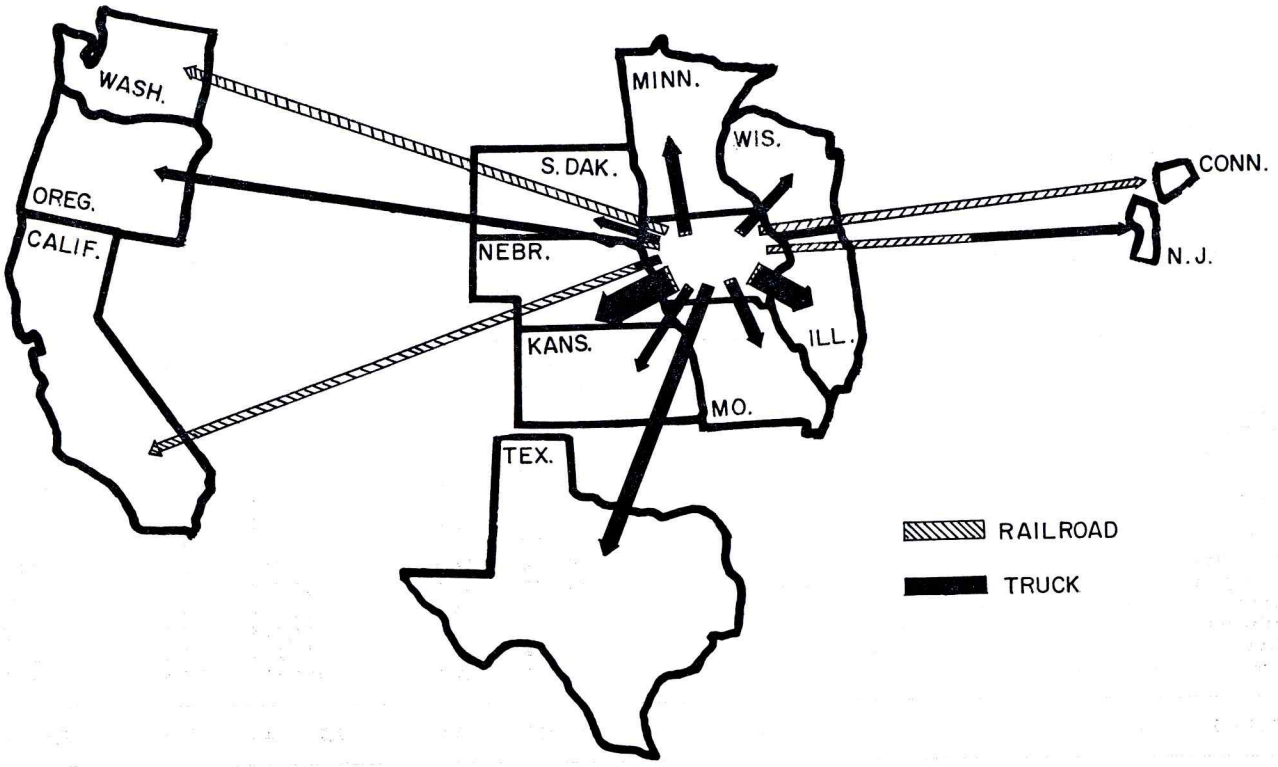

Fig. 2. Livestock movements from Iowa reported in the 4-year survey to major receiving states, by type of media, 1962-65.

In 1965, Iowa ranked first in the commercial slaughter of cattle and swine and fifth in the slaughter of sheep and lambs.[15] To analyze the meat movements from Iowa, data were collected by personal visits to 34 federally inspected meat packing plants and covered the 3 fiscal years within the 1962-65 period. The data are divided into fresh, and cured and packaged meat classifications.

FRESH MEATS

Surveyed movements of fresh meats from Iowa for 3 fiscal years are shown in table 6. Over half of the total of 7.8 million tons reported for the period was shipped to three states, Illinois, New York and Massachusetts. The volume shipped increased by 6 percent during the 3 years, with the greatest percentage changes occurring on the movements to Ohio, New Jersey, Michigan and Texas. Except for the traffic to Florida, which showed a slight loss, all states increased receipts. The tonnage moved to each state was constant for each year.

Railroads, motor carriers and piggyback were used to move the fresh meat from Iowa. Motor carriers hauled the greatest surveyed tonnage, 50 percent of the total, and showed a gain of 7 percent for the 3 years (table 7). Railroads carried 29 percent of total volume, but lost 11 percent of the traffic during the period. The most significant change among the media used occurred on the piggyback movements, which accounted for 21 percent of the total movement but increased during the period by 34 percent. It appeared that the piggyback gain was made at the expense of the railroads.

From a regulatory point of view, piggyback operations are considered as railroad movements and are subject to the rules and regulations of Part I of the Interstate Commerce Act. Therefore, there is a temptation to suggest that, by combining the railroad and piggyback traffic, the fresh-meat tonnage over the period was divided equally between railroad and motor carriers. Such a conclusion could be erroneous, however; especially if the railroads hauled trailers owned by meat packers or by motor carriers. The piggyback operation is a coordinated movement of the best features of railroads and trucks and offers services often absent in each of the separate agencies.[16]

Except for the rather significant increases in the railroad movement of fresh meat to Texas and North

[15] Livestock slaughter, commercial. Statistical Reporting Service, Crop Reporting Board. U.S. Department of Agriculture. Washington, D.C. April 1966.

[16] Among the advantages generally associated with piggyback movements are: greater flexibility in loading and services; speed in transit time; reduction in inventory requirements; smaller loads, split deliveries, multiple pickups and door-to-door service; possible savings in direct transportation costs; reduced loss and damage; and reduction in handling. See: Interstate Commerce Commission, Bureau of Economics. Piggyback traffic characteristics. Statement No. 66-1. Washington, D.C. December 1966.

TABLE 6. Surveyed fresh meat movements from Iowa reported in the 3 fiscal years, 1962-65.

	1962-63		1963-64		1964-65		1962-65		% change
To:	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Illinois	551,960	22	595,599	22	568,678	21	1,716,237	22	+ 3
New York	476,585	19	503,615	19	488,722	18	1,468,922	19	+ 3
Massachusetts	276,323	11	293,108	11	292,880	11	862,311	11	+ 6
California	180,001	7	192,670	7	182,294	7	554,965	7	+ 1
New Jersey	145,100	6	174,625	6	172,868	7	492,593	6	+19
Pennsylvania	125,334	5	137,483	5	135,781	5	398,598	5	+ 8
Ohio	80,983	3	91,534	3	94,296	4	266,813	3	+16
Florida	81,680	3	88,790	3	78,673	3	249,143	3	− 4
Michigan	62,730	3	70,067	3	80,839	3	213,636	3	+29
Texas	45,677	2	56,620	2	61,980	2	164,277	2	+36
Minnesota	52,355	2	57,468	2	58,230	2	168,053	2	+11
Louisiana	40,263	2	46,540	2	43,415	2	130,218	2	+ 8
Connecticut	43,042	2	46,742	2	45,165	2	134,949	2	+ 5
Other	336,683	13	350,572	13	345,823	13	1,033,078	13	+ 3
TOTALS	2,498,716	100	2,705,433	100	2,649,644	100	7,853,793	100	+ 6

NOTE: Other=all destinations individually receiving 1% or less each year.

TABLE 7. Surveyed fresh meat movements from Iowa, by type of media, for 3 fiscal years, 1962-65.

	1962-63		1963-64		1964-65		1962-65		% change
Item:	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Truck	1,236,127	49	1,342,563	50	1,318,669	50	3,897,359	50	+ 7
Railroad	795,730	32	784,838	29	707,485	27	2,288,053	29	−11
Piggyback	466,859	19	578,032	21	623,490	23	1,668,381	21	+34
TOTALS	2,498,716	100	2,705,433	100	2,649,644	100	7,853,793	100	+ 6

Carolina, the volumes to most other states declined between 1962 and 1965. Almost 75 percent of the surveyed railroad tonnage went to eastern states, with the percentages of the surveyed volumes into all states remaining quite constant for each year of the period (table 8). Truck movements were significant for two reasons. One was the wide distribution of fresh meat hauled by trucks. Although over 50 percent of their share of the traffic was hauled to Illinois, California and New York, substantial tonnage was moved to all other states. Another important factor in the movements surveyed was the trend toward the increase in truck traffic to most states except Georgia (table 9). Few changes were found in the percentage of the traffic carried by either railroad or truck to these states in each year of the period.

Tables 10 and 11 show the importance of the eastern markets for tonnage moved by piggyback operations reported in the survey, which showed increases in traffic to all states except for Virginia. The percentage of westbound movement by this mode was insignificant and movements to the southern and southeastern states did not exist.[17]

CURED MEATS

Shipment patterns of cured meats are found in table 12. The total of 1.1 million tons represented a

[17] Shippers in Iowa as well as other midwestern states should carefully watch the trend of meat movements to southeastern states in the future. Livestock production and meat packing will probably expand in this area because of the lowered grain-rate structure permitted in the 1963 "Big John" grain-rate case (I & S Docket No. 7656. Grain in multiple car shipments-river crossings to the South; 318 Interstate Commerce Commission 641; 321 Interstate Commerce Commission 582). For further analysis, see W. K. McPherson and H. G. Witt. Feed and livestock transport cost relationships. Transportation Journal. Vol. 8 No. 1. Fall 1968. Low-cost grain in "Big John" cars has resulted in a 2-billion-dollar per-year new livestock industry in the Southeast. This includes 119 new or expanded grain elevators and feedmills; 91 new feedlots for cattle and 80 for swine: Traffic World. May 21, 1967. p.49.

TABLE 8. Surveyed fresh meat movements from Iowa by railroad for 3 fiscal years, 1962-65.

To:	1962-63		1963-64		1964-65		1962-65		% change
	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
New York	266,872	34	268,637	34	236,425	33	771,934	34	−11
Massachusetts	132,572	17	136,599	17	135,405	19	404,576	18	+ 2
New Jersey	93,100	12	90,087	12	75,582	11	258,769	11	−19
Pennsylvania	59,270	7	61,210	8	53,851	8	174,331	8	− 9
Illinois	33,269	4	29,048	4	22,644	3	84,961	4	−32
Connecticut	23,806	3	19,802	2	16,502	2	60,110	3	−31
Louisiana	19,642	2	21,897	3	18,485	3	60,024	3	− 6
Texas	18,826	2	20,876	3	23,103	3	62,805	3	+23
California	17,257	2	14,815	2	14,341	2	46,413	2	−17
D. C.	14,439	2	14,588	2	14,631	2	43,658	2	+ 1
Tennessee	12,529	2	12,625	2	13,044	2	38,198	2	+ 4
North Carolina	8,815	1	12,204	2	12,085	2	33,104	1	+37
Ohio	14,077	2	8,510	1	6,806	1	29,393	1	−52
Other	81,256	10	73,940	8	64,581	9	219,777	8	−20
TOTALS	795,730	100	784,838	100	707,485	100	2,288,053	100	−11

NOTE: Other=all destinations individually receiving 1% or less each year.

TABLE 9. Surveyed fresh meat movements from Iowa by truck for 3 fiscal years, 1962-65.

To:	1962-63		1963-64		1964-65		1962-65		% change
	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Illinois	381,525	31	396,563	30	377,015	29	1,155,103	30	− 1
California	150,598	12	166,145	12	155,713	12	472,456	12	+ 3
New York	112,158	9	118,107	9	123,833	9	354,098	9	+10
Florida	74,369	6	81,791	6	73,334	6	229,494	6	− 1
Massachusetts	58,645	5	61,761	5	63,956	5	184,362	5	+ 9
Ohio	54,534	4	60,865	4	60,771	5	176,170	4	+11
Michigan	53,843	4	56,565	4	60,897	5	171,305	4	+13
Minnesota	50,357	4	56,022	4	56,982	4	163,361	4	+13
Pennsylvania	35,287	3	41,522	3	39,381	3	116,190	3	+12
Texas	26,315	2	35,181	3	38,085	3	99,581	3	+45
Wisconsin	22,517	2	30,627	2	27,295	2	80,439	2	+21
New Jersey	19,851	2	27,550	2	28,252	2	75,653	2	+42
Louisiana	20,519	2	24,378	2	24,305	2	69,202	2	+18
Georgia	22,195	2	19,262	1	19,508	2	60,965	2	−12
Other	153,414	12	166,224	13	169,342	11	488,980	12	+10
TOTALS	1,236,127	100	1,342,563	100	1,318,669	100	3,897,359	100	+ 7

NOTE: Other=all destinations individually receiving 1% or less each year.

2-percent decline in the volume over the period and was substantially smaller than the fresh-meat tonnage. No definite pattern emerged concerning the changes in the traffic to each state. Generally, the losses canceled the gains. The possibility that some states may be engaged in processing fresh meats into cured or processed products is suggested by studying the fresh-meat traffic and comparing these data with the decline in the cured meat movements into specific states.

The surveyed movement of cured meats by carrier (table 13) is somewhat similar to that of the fresh-meat traffic. Railroads lost tonnage over the period, whereas trucks hauled a slightly higher volume, and the piggyback tonnage showed the largest percentage increase. However, the trucks hauled a higher total volume of cured meats than did railroads and piggyback operations combined.

The 15-percent loss of railroad traffic in the survey was spread over all states listed except Illinois, North Carolina and Georgia (table 14). Trucks made their best showing in the movements to Illinois, California

TABLE 10. Surveyed fresh meat movements from Iowa by piggyback for 3 fiscal years, 1962-65.

To:	1962-63 Tons	%	1963-64 Tons	%	1964-65 Tons	%	1962-65 Tons	%	% change 1962-65
Illinois	137,166	29	169,988	29	169,019	27	476,173	28	+ 23
New York	97,555	21	116,871	20	128,464	21	342,890	21	+ 32
Massachusetts	85,106	18	94,748	16	93,519	15	273,373	16	+ 10
New Jersey	32,149	7	56,988	10	69,034	11	158,171	10	+115
Pennsylvania	30,777	7	34,751	6	42,549	7	108,077	6	+ 38
Virginia	23,697	5	23,891	4	20,376	3	67,964	4	− 14
Ohio	12,372	3	22,159	4	26,719	4	61,250	4	+116
California	12,146	3	11,710	2	12,240	2	36,096	2	+ 1
Connecticut	7,204	2	10,695	2	11,327	2	29,226	2	+ 57
Washington	6,263	1	6,184	1	8,563	1	21,010	1	+ 37
Michigan	3,540	1*	8,686	2	13,577	2	25,803	2	+284
Other	18,884	3	21,361	4	28,103	5	68,348	4	+ 49
TOTALS	466,859	100	578,032	100	623,490	100	1,668,381	100	+ 34

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE 11. Surveyed fresh meat movements to major states, by type of media, for 3 fiscal years, 1962-65.

To:	Railroad Tons	%	Truck Tons	%	Piggyback Tons	%	Total Tons
Illinois	84,961	5	1,155,103	67	476,173	28	1,716,237
New York	771,934	53	354,098	24	342,890	23	1,468,922
Massachusetts	404,576	47	184,362	21	273,373	32	862,311
California	46,413	8	472,456	85	36,096	7	554,965
New Jersey	258,769	53	75,653	15	158,171	32	492,593
Pennsylvania	174,331	44	116,190	29	108,077	27	398,598
Ohio	29,393	11	176,170	66	61,250	23	266,813
Florida	18,754	8	229,494	92	895	--	249,143
Michigan	16,528	8	171,305	80	25,803	12	213,636
Minnesota	4,431	3	163,361	97	261	--	168,053
Texas	62,805	38	99,581	61	1,891	1	164,277
Connecticut	60,110	44	45,613	34	29,226	22	134,949
Louisiana	60,024	46	69,202	53	992	1	130,218
Georgia	32,456	35	60,965	65	504	--	93,925
Wisconsin	6,780	8	80,439	92	261	--	87,480
Virginia	7,863	9	7,626	9	67,964	82	83,453
Washington	16,823	22	39,374	51	21,010	27	77,207
D. C.	43,658	59	19,550	27	9,976	14	73,184
Nebraska	216	1	42,077	99	---	--	42,293
Kansas	931	2	40,299	98	---	--	41,230
Tennessee	38,198	69	16,890	31	17	--	55,105
Missouri	1,997	5	35,471	95	18	--	37,486
N. Carolina	33,104	57	24,575	43	18	--	57,697
Colorado	2,018	7	26,762	91	658	2	29,438
Rhode Island	17,699	46	9,270	24	11,674	30	38,643
Other	93,281	30	181,473	57	41,183	13	315,937
TOTALS	2,288,053	29	3,897,359	50	1,668,381	21	7,853,793

NOTE: Other=all destinations individually receiving 1% or less of total movements from Iowa.

TABLE 12. Surveyed cured meat movements from Iowa for 3 fiscal years, 1962-65.

To:	1962-63 Tons	%	1963-64 Tons	%	1964-65 Tons	%	1962-65 Tons	%	% change 1962-65
Illinois	48,410	13	55,226	14	57,015	16	160,651	14	+18
Texas	42,173	11	38,121	10	32,908	9	113,202	10	−22
New York	37,226	10	38,895	10	36,788	10	112,909	10	− 1
California	28,909	8	30,246	8	27,886	8	87,041	8	− 4
Minnesota	23,799	6	24,497	6	25,001	7	73,297	6	+ 5
Pennsylvania	23,325	6	25,532	7	23,828	6	72,685	6	+ 2
New Jersey	17,095	5	17,812	5	17,147	5	52,054	5	0
Ohio	13,290	4	14,327	4	12,914	3	40,531	4	− 3
Massachusetts	11,917	4	11,969	3	11,883	3	35,769	3	0
Georgia	8,879	2	10,983	3	10,017	3	29,879	3	+13
Michigan	8,902	2	9,049	2	9,422	3	27,373	2	+ 6
N. Carolina	6,879	2	10,294	3	9,626	3	26,799	2	+40
Indiana	8,340	2	7,983	2	7,267	2	23,590	2	−13
Alabama	8,971	2	7,619	2	6,470	2	23,060	2	−28
Missouri	7,760	2	7,286	2	7,663	2	22,709	2	− 1
Tennessee	7,826	2	7,178	2	6,443	2	21,447	2	−18
Louisiana	6,769	2	6,848	2	6,135	2	19,752	2	− 9
Florida	7,295	2	5,677	1	5,192	1	18,164	2	−29
Washington	7,102	2	4,429	1	4,037	1	15,568	1	−43
Other	49,505	13	51,084	13	47,618	12	148,207	14	− 4
TOTALS	374,372	100	385,055	100	365,260	100	1,124,687	100	− 2

NOTE: Other=all destinations individually receiving 1% or less each year.

TABLE 13. Surveyed cured meat movements by type of media, for 3 fiscal years, 1962-65.

	1962-63 Tons	%	1963-64 Tons	%	1964-65 Tons	%	1962-65 Tons	%	% change 1962-65
Truck	203,951	54	223,888	58	207,380	57	635,219	57	+ 2
Rail	156,275	42	140,060	36	133,570	36	429,905	38	−15
Piggyback	14,146	4	21,107	6	24,310	7	59,563	5	+72
TOTALS	374,372	100	385,055	100	365,260	100	1,124,687	100	− 2

TABLE 14. Surveyed cured meat movements from Iowa by railroad for 3 fiscal years, 1962-65.

	1962-63 Tons	%	1963-64 Tons	%	1964-65 Tons	%	1962-65 Tons	%	% change 1962-65
New York	22,677	15	20,524	15	18,501	14	61,702	15	−18
Texas	23,127	15	19,878	14	16,745	13	59,750	14	−28
California	14,816	10	11,434	8	13,364	10	39,614	9	−10
Pennsylvania	12,553	8	11,313	8	10,604	8	34,470	8	−16
Illinois	9,558	6	7,689	6	10,123	8	27,370	7	+ 6
New Jersey	10,017	6	9,080	7	8,094	6	27,191	7	−19
N. Carolina	4,565	3	8,365	6	7,953	6	20,883	5	+74
Massachusetts	6,954	5	5,708	4	6,050	5	18,712	4	−13
Georgia	4,844	3	6,827	5	6,167	5	17,838	4	+27
Louisiana	5,260	3	5,291	4	4,729	4	15,280	4	−10
Ohio	6,067	4	4,894	3	4,212	3	15,173	4	−31
Alabama	5,203	3	4,146	3	3,509	3	12,858	3	−33
Tennessee	4,072	3	3,850	3	3,558	3	11,480	3	−13
Washington	3,302	2	2,393	2	2,429	2	8,124	2	−26
Other	23,260	14	18,668	12	17,532	10	59,460	11	−25
TOTALS	156,275	100	140,060	100	133,570	100	429,905	100	−15

NOTE: Other=all destinations individually receiving 1% or less each year.

and Ohio (table 15). Piggyback traffic (table 16) showed substantial gains to all states except California, although the volumes carried were substantially lower than the other modes. The loss of tonnage into California could be the result of the rate structure or the absence of a backhaul. The importance of the piggyback movements is found in the gradual increase of tonnage of piggyback movements contrasted to the rather uniform volume carried by the other modes. Railroads showed a slight advantage over the trucks and the piggyback movements on the long-haul traffic reported in the survey (table 17).

The movements of fresh and cured meats from Iowa point out the long distances necessary for Iowa shippers to move to markets, and the data illustrate the distribution by all modes into half the states of the nation. There is no clear trend showing the advantage of one mode over the other as was evident on the livestock shipments. Rather, there appeared to be considerable competition for the tonnages to all states. Since all three modes involved are under federal interstate regulation, the one who can dominate future movements will be the one able to provide superior services. The increased popularity of the piggyback movements could further impair the railroad movements. Currently, there seems no significant impact on the motor carriers of such competition on over-the-road hauls.

TRANSPORTATION COSTS AND TRENDS

Historically, railroad freight rates have played an important part in the location of meat packing plants because the rates on each commodity to a great extent

TABLE 15. Surveyed cured meat movements from Iowa by truck for 3 fiscal years, 1962-65.

	1962-63		1963-64		1964-65		1962-65		% change
To:	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Illinois	38,708	19	47,167	21	45,904	22	131,779	21	+19
Minnesota	22,050	11	22,934	10	23,006	11	67,990	11	+ 4
Texas	19,046	9	18,233	8	16,066	8	53,345	8	−16
New York	11,624	6	13,029	6	11,041	5	35,694	6	− 5
California	8,902	4	14,503	6	13,058	6	36,463	6	+47
Pennsylvania	8,709	4	10,907	5	8,792	4	28,408	4	+ 1
Ohio	6,939	3	8,906	4	7,969	4	23,814	4	+15
Michigan	7,248	3	7,820	4	7,572	4	22,640	3	+ 4
Missouri	7,567	4	7,146	3	7,340	4	22,053	3	− 3
New Jersey	5,581	3	6,287	3	5,650	3	17,518	3	+ 1
Indiana	5,992	3	6,079	3	5,312	3	17,383	3	−11
Kansas	4,787	2	4,900	2	4,359	2	14,046	2	− 9
Florida	5,461	3	4,343	2	4,001	2	13,805	2	−27
Massachusetts	4,252	2	4,825	2	4,226	2	13,303	2	− 1
Georgia	4,035	2	4,156	2	3,808	2	11,999	2	− 6
Wisconsin	3,417	2	3,933	2	3,728	2	11,078	2	+ 9
Tennessee	3,754	2	3,328	1	2,856	1	9,938	2	−24
Alabama	3,719	2	3,333	1	2,730	1	9,782	2	−27
Arkansas	3,677	2	3,314	2	2,660	1	9,651	1	−28
Other	28,483	14	28,745	13	27,302	13	84,530	13	− 4
TOTALS	203,951	100	223,888	100	207,380	100	635,219	100	+ 2

NOTE: Other=all destinations individually receiving 1% or less each year.

TABLE 16. Surveyed cured meat movements from Iowa by piggyback for 3 fiscal years, 1962-65.

	1962-63		1963-64		1964-65		1962-65		% change
To:	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
New York	2,925	21	5,342	25	7,246	30	15,513	26	+148
California	5,191	37	4,309	20	1,464	6	10,964	18	− 72
Pennsylvania	2,063	14	3,312	16	4,432	19	9,807	16	+115
New Jersey	1,497	10	2,445	11	3,403	14	7,345	12	+127
Massachusetts	711	5	1,436	7	1,607	7	3,754	6	+126
Connecticut	372	3	971	5	1,020	4	2,363	4	+174
Rhode Island	370	3	970	5	980	4	2,320	4	+165
Ohio	284	2	527	2	733	3	1,544	3	+158
Illinois	144	1	370	2	988	4	1,502	3	+586
Maine	108	1*	337	1	531	2	976	2	+392
Other	481	3	1,088	6	1,906	7	3,475	6	+296
TOTALS	14,146	100	21,107	100	24,310	100	59,563	100	+ 72

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

will determine whether livestock will be shipped on the hoof or as dressed meat. The relationship of rates between these commodities is often more significant to shippers than the absolute level of rates on each item. Packers located near consumer markets seek a high ratio of dressed meat rates to livestock rates, whereas packers located near livestock sources seek a low ratio.

Both the structure and level of freight rates on livestock and meats changed significantly during the postwar period. For at least half this period, rates moved steadily upward on each commodity, and the livestock: dressed-meat rate relationship changed as a result. Also services were important. In 1956, Hassler concluded that the longer transit time on fresh frozen pork practically eliminated railroad use for the westbound movements.[18] Before 1954, strong advantage existed for the movement of hogs from the Midwest relative to pork. Since that date, however, the rate structure shifted the advantage toward pork and beef from origins east of Omaha and toward livestock from points west of Omaha.

In 1931, railroad rates on livestock were prescribed, and for several years thereafter, these rates were considerably lower than those on the products. In 1945, fresh-meat rates were approved that averaged about 150 percent of the rates on fat livestock.[19] Before this date, rates on fresh meats westbound were about 241 percent of livestock rates. The relationship was assailed by midwestern interests who sought the 150-percent relationship of eastern movements. The Interstate Commerce Commission has never prescribed a fixed relationship between livestock and fresh-meat rates, but set meat rates at about 150 percent of livestock rates on several occasions.

As a result of the postwar railroad-rate cases, the meat rates rose to a level 56 percent higher than livestock rates on eastbound movements and 65 percent higher on the westbound movements by 1956.[20]

[18] James B. Hassler. Transportation rates and other pricing factors affecting the California swine industry. Calif. Agr. Exp. Sta. Bul. 754. 1956.

[19] Livestock, western district, 176 Interstate Commerce Commission 1; George A. Hormel & Co. vs. Atchison, Topeka, & Santa Fe Railroad, 213 Interstate Commerce Commission 9.

[20] Despite the opposition of midwestern packers, the Commission consistently allowed the rates to be increased by a uniform percentage, which tended to destroy origin relationships of both livestock and meats. Although recognizing the merits of the rate increase proposals, shippers argued for rate increases in the nature of a "holddown" that would have protected the origin points. A "holddown" is usually expressed in either a flat increase in cents per 100 pounds or a percentage application. W. H. Thompson. Postwar railroad rate increase on livestock and products. Current Economic Comment. University of Illinois. May 1957. pp.47-60.

TABLE 17. Surveyed cured meat movements from Iowa to major states, by type of media, 3 fiscal years, 1962-65.

	1962-65						
	Railroad		Truck		Piggyback		Total
To:	Tons	%	Tons	%	Tons	%	tons
Illinois	27,370	17	131,779	82	1,502	1*	160,651
Texas	59,750	53	53,345	47	107	0	113,202
New York	61,702	54	35,694	32	15,513	14	112,909
California	39,614	46	36,463	42	10,964	12	87,041
Minnesota	5,251	7	67,990	93	56	0	73,297
Pennsylvania	34,470	48	28,408	39	9,807	13	72,685
New Jersey	27,191	52	17,518	34	7,345	14	52,054
Ohio	15,173	37	23,814	59	1,544	4	40,531
Massachusetts	18,712	52	13,303	37	3,754	11	35,769
Georgia	17,838	60	11,999	40	42	0	29,879
Michigan	4,315	16	22,640	84	418	1	27,373
N. Carolina	20,883	78	5,874	22	42	0	26,799
Indiana	6,128	26	17,383	74	79	0	23,590
Alabama	12,858	56	9,782	42	420	2	23,060
Missouri	642	3	22,053	97	14	0	22,709
Tennessee	11,480	54	9,938	46	29	0	21,447
Louisiana	15,280	77	4,059	21	413	2	19,752
Florida	4,331	24	13,805	76	28	0	18,164
Washington	8,124	52	7,007	45	437	3	15,568
Kansas	309	2	14,046	98	--	--	14,355
Connecticut	5,199	36	6,640	47	2,363	17	14,202
Wisconsin	2,154	16	11,078	84	--	--	13,232
Maine	3,691	36	5,533	54	976	10	10,200
Arkansas	381	4	9,651	96	39	0	10,071
Virginia	4,656	65	2,454	35	2	0	7,112
Rhode Island	1,965	32	1,939	31	2,320	37	6,224
Colorado	526	9	5,563	91	--	--	6,089
Oklahoma	28	0	5,866	100	--	--	5,894
D. C.	648	17	2,871	77	223	6	3,742
New Hampshire	923	28	1,741	53	593	18	3,257
Other	18,313	34	34,983	65	533	1*	53,829
TOTALS	429,905	--	635,219	--	59,563	--	1,124,687

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less of total movements from Iowa.

Between 1945 and 1956, the movement of meat products in refrigerated trucks developed a large volume, and by 1957, the railroads had lost the bulk of the traffic. The rising influence of truck competition was noted by the Commission in 1960, and adjustments were made on the westbound movements by adopting the "Cudahy Scale." This proposal called for a reduction of 30 cents under the prevailing authorized motor carrier rates on a minimum load of 33,000 pounds.[21]

In 1961, rates were adjusted to eastern destinations. Actually, there were three sets of rates in effect at this time. The first reflected those established in the Morrell Case. (John Morrell & Co. vs. N. Y. Central Railroad Co., 104 Interstate Commerce Commission 104; 120 Interstate Commerce Commission 537). These rates were subject to a minimum weight of 21,000 pounds, meat hung or suspended, or other than hung or suspended.

A second set of rates on fresh meat, hung or suspended, minimum of 25,000 pounds, and a third set on other than hung or suspended, minimum of 30,000 pounds, were established in 1958. Between 1958 and 1960, livestock rates rose only slightly, whereas fresh meat rates on the key haul from Chicago to New York decreased by 20 cents and 63 cents per 100 pounds on hung and other than hung meat, respectively.[22] Testimony in this case had shown that midwestern packers derived a 65 percent yield of products from liveweight as against 62.5 percent by eastern packers on hogs received from the Midwest and that 86 percent of meat moved was hung. Because of this decision, the relationship of rates on fresh meats to livestock, eastbound on 30,000 pounds minimum, other than hung, was 104 from Davenport, 93.5 from Cedar Rapids, 98.3 from Ottumwa, Des Moines, and Fort Dodge, and 101.5 from Sioux City. On 21,000 pounds, hung meats, the relationship varied from 150 percent from Davenport to 131 percent from Fort Dodge.[23]

The competitive struggle between carriers carried into the 60's and was further stimulated by the increase in piggyback movements and the increase in private and pseudo-private carriage. Further reductions in meat rates by authorized carriers were approved in 1962 and 1963.[24] It was obvious by this time that a considerably higher percentage of the meat traffic was moving in private and so-called grey-area or illegal trucking. When fresh meat is sold F.O.B. processing plant, the purchaser arranges for the transportation. Charges for nonregulated carriers, operating as buy-and-sell or under the guise of agricultural exempt cooperatives, are usually below the rates of regulated carriers, and differences in 1962 and 1963 were as much as 50 cents per 100 pounds. These nonregulated carriers bid for the traffic and change their rates at will and without notice. The situation had reached the point at which illegal and private carriers could bid down prices on fresh meats on the East Coast to levels lower than the sales prices in the Midwest plus transportation.

Rates for trailers on flat car (T.O.F.C.) service, minimum 66,000 pounds (two trailers) were lower than any rates proposed during the early 60's and were the lowest common-carrier rates available. The service, however, had certain limitations. At smaller midwestern slaughter locations, 66,000 pounds of fresh meat cuts were difficult to assemble in one day; shipping times were inflexible; there were no stops in transit; and some purchasers had difficulty handling such large shipments.

Motor carriers hauled 97 percent of the livestock shipped from Iowa during the period studied. Since this movement was not regulated, it was difficult to get accurate cost data from these carriers. Accounts for owner-operator trucks, for example, are not kept on a uniform basis, and the Interstate Commerce Commission cannot require uniform accounts. Shippers reported a wide variety of truck charges over the period; some increased year by year, and some decreased. All agreed, however, that the charges depended on vehicle size, the distance livestock moved and delivery speed. Most rates were quoted in cents per 100 pounds, but in a few instances (on long distance movements), rates were made on the basis of dollars per load, per truck.

Table 18 shows a list of representative charges for 1965 to the states served by railroad and motor carriers. The instability of the truck charges during the period precluded averaging to costs, so the data shown were taken from the general commodity rate tariffs of the railroads and state trucking-rate bureaus. Applying these charges to the tonnages moved in each year resulted in the estimates shown in table 19, which indicated a total of 69.7 million dollars spent on the transportation of 7.6 million tons of livestock over the period.

Generally, the differences in the charges of both media tend to be wider over the shorter distances and to narrow considerably on the long-distance movements. The data in table 18 should be used only for comparisons involving a line-haul rate situation for 1 year. Total costs were not available of movement that included additional services such as switching and interchange by one or the other mode.

Whenever permitted by the Interstate Commerce Commission during the past decade, railroads have offered incentive rate plans to correspond with heavier loadings and larger equipment. Such rates may be

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[21] Fresh meats, transcontinental, westbound. 309 Interstate Commerce Commission 529. It was in this case that the Commission pointed out the loss of traffic to the nonregulated carriers.

[22] Fresh meats from Midwest to East. 313 Interstate Commerce Commission 345.

[23] Ibid., p. 380.

[24] Meats and packinghouse products from central and western states for far western states, 319 Interstate Commerce Commission 667. I & S Docket No. 7730. Meats, fruits, vegetables, trailer on flat car, Transcontinental. 316 Interstate Commerce Commission 585.

published in cents per 100 pounds, by carload or by trainload.[25] The meat traffic is no exception to this.

From the 30,000 pound minimum established in 1958, minimum weights have increased to 35,000 and 45,000 pounds, and some of the meat shippers are currently working on a 55,000-pound rate. There seems no problem in loading 45,000 pounds of fresh meat boxed in a refrigerator car with an inside length of 33 feet, but it is difficult to load 30,000 pounds of hanging beef in such a car. To take advantage of a 45,000-pound minimum for hanging beef, cars would have to be at least 45 feet long (inside measurements).

[25] For example, on a shipment of 60,000 pounds, the rate from certain Iowa origins to Texas points may be computed as follows: On the first 25,000 pounds, $335 per car; on the next 10,000 pounds, 81c per 100 pounds; and on the next 25,000 pounds, 52c per 100 pounds. Unit trainload rates require a minimum number of loaded cars or a minimum tonnage. Perhaps the most intriguing proposal now is the Rent-A-Train concept of the Illinois Central Railroad. See: Business Week, Oct. 14, 1967. pp.70-77.

TABLE 18. Representative 1965 costs for shipping livestock from Iowa by type of media.

To:	Railroad $/Ton (25,000 lb. minimum)	Truck $/Ton
Alabama	35.00	27.95
Arizona	31.45	35.00
Arkansas	--	20.21
California	36.86	37.00
Canada	40.50	32.00
Colorado	17.40	24.82
Connecticut	39.50	40.00
Florida	44.40	40.00
Georgia	35.20	36.00
Idaho	35.00	25.00
Illinois	16.20	9.76
Indiana	24.20	15.03
Kansas	12.70	9.34
Kentucky	25.00	20.00
Louisiana	36.00	30.00
Maryland	37.70	36.00
Michigan	29.90	19.64
Minnesota	12.70	6.41
Mississippi	--	19.75
Missouri	17.40	10.33
Mexico	--	39.33
Montana	28.20	18.00
Nebraska	6.70	6.26
New Hampshire	39.50	45.00
New Jersey	39.50	36.20
New Mexico	--	40.00
New York	39.50	42.63
N. Carolina	40.60	34.00
N. Dakota	14.60	13.00
Ohio	28.30	21.82
Oklahoma	--	11.00
Oregon	34.21	34.00
Pennsylvania	38.50	32.39
S. Carolina	38.40	37.00
S. Dakota	7.90	6.16
Tennessee	29.80	18.12
Texas	23.20	17.71
Utah	24.60	25.00
Virginia	37.70	35.18
Washington	29.85	34.12
Wisconsin	15.40	11.13
Wyoming	--	20.00

SOURCE: Commodity rate tariffs of railroads and state trucking rate agencies.

TABLE 19. Estimated charges as reported for shipping livestock from Iowa, by type of media, 1962-65.

Media:	1962-65				
	1962 $	1963 $	1964 $	1965 $	1962-65 $
Railroad	2,249,202	2,212,654	2,159,049	1,407,303	8,028,208
Truck	15,527,017	15,754,850	15,782,879	14,693,550	61,758,296
TOTALS	17,776,219	17,967,504	17,941,928	16,100,853	69,786,504

SOURCE: Table 18 data applied to surveyed tonnages moved each year.

Other than privately owned cars, there are few mechanical cars available with beef rails of that length.

The most startling change in recent years was the publication of per-car rates on fresh meats to western states; cars, when loaded to 75,000 pounds, resulted in considerable savings to shippers. Shippers involved in eastbound movements suggested that the proposed railroad mergers within the Midwest and between midwestern and eastern points would offer possibilities of per-car rates on eastbound traffic.

Another recent rate change involved piggyback movements. The railroads reduced minimum weights to the East from the two-trailer requirement on a flat car, or 70,000 pounds, to one trailer of 35,000 pounds with the rate per 100 pounds remaining the same.[26] There seems little doubt that the increase in piggyback movements resulted from these rate and weight changes in addition to the other services provided by the coordinated operation.

The importance of the meat-packing industry to Iowa may be realized, in part by the transportation cost of moving the products during the period studied. The financial stake of the carriers in this traffic is enormous. Over 265 million dollars was reported spent on transportation by railroad, motor carrier and piggyback operations (tables 20 and 21). The shipping costs into each state are summarized in tables 22 and 23. That all carrier operations are regulated on the meat traffic made easier the task of finding movement costs. The data shown are weighted averages in which the total charges from each origin to each destination were computed and then divided by the tonnage moved between each two points to arrive at the specific charges shown in the tables. No attempt was made to isolate the costs by various weight levels since such data were not available from the shippers.

In most cases, the costs as shown in tables 22 and 23 were relatively competitive as between railroads and trucks, especially on the long-haul traffic. But, it was not always possible to find switching charges on these movements since, on some traffic, reciprocal switching was involved. The piggyback costs were almost uniformly lower than those of rail or motor carriers. These data suggest a favorable future for the piggyback movement of meat products from Iowa if such service can be adapted to the physical facilities of

[26] Plans II, II ¼ and II ½ (see Appendix B) appear most popular for the meat movements.

TABLE 22. Computed weighted-average costs of shipping fresh meat from Iowa by type of media.

	1962-65		
	Railroad $/Ton	Truck $/Ton	Piggyback $/Ton
Illinois	15.86	12.09	13.37
New York	39.35	39.09	34.62
Massachusetts	40.33	40.94	35.50
California	52.00	44.51	43.36
New Jersey	40.35	41.21	34.24
Pennsylvania	38.88	37.32	32.74
Ohio	27.41	26.78	19.36
Florida	44.98	46.23	49.61
Michigan	25.98	23.08	19.81
Minnesota	13.64	10.78	9.00
Texas	29.00	35.76	--
Connecticut	37.13	41.58	30.86
Louisiana	33.62	33.60	18.31
Georgia	32.19	32.57	--
Wisconsin	15.74	15.13	14.20
Virginia	37.13	40.30	34.03
Washington	52.29	48.00	38.39
D. C.	37.37	41.02	29.57
Nebraska	16.00	10.88	--
Kansas	18.37	15.49	--
Tennessee	28.58	25.88	--
Missouri	19.37	15.63	16.80
N. Carolina	35.02	39.51	42.00
Colorado	24.12	25.49	20.00
Rhode Island	40.97	43.34	31.79

TABLE 20. Estimated charges for shipping surveyed fresh meat tonnages from Iowa by type of media.

	1962-65			
Media:	1962-63 $	1963-64 $	1964-65 $	1962-65 $
Truck	32,763,904.79	35,948,553.80	35,209,464.05	103,921,922.64
Railroad	29,949,413.60	29,657,700.50	26,313,327.06	85,920,441.16
Piggyback	12,735,337.50	15,644,157.76	16,795,345.20	45,174,840.46
TOTALS	75,448,655.89	81,250,412.06	78,318,136.31	235,017,204.26

TABLE 21. Estimated charges for shipping surveyed cured meat tonnages from Iowa, by type of media.

Media:	1962-63	1963-64	1964-65	1962-65
Truck	$ 5,033,295.90	$ 5,492,304.80	$ 4,905,818.80	$15,431,419.50
Railroad	5,257,118.70	4,698,250.30	4,468,358.00	14,423,727.00
Piggyback	487,946.00	668,452.00	692,111.40	1,848,509.40
TOTALS	$10,778,360.60	$10,859,007.10	$10,066,288.20	$31,703,655.90

shippers and receivers and service requirements can be met.

SEASONAL MOVEMENTS

Livestock and meat products move from Iowa in seasonal patterns. Table 24 and fig. 3 show the averages of the years, 1962-1965 in percentages of total tonnage moved in each quarter of the year. Cattle and swine movements were heaviest during the fourth quarters, whereas sheep and lambs moved most heavily during the first and fourth quarters. Movements during the second quarters were the lowest for all animals. Swine and sheep traffic showed a wider variance throughout the period by quarters than did cattle and calf movements. The first and fourth quarters were the most important for both fresh and cured meats, with the movement during the third quarter showing the lowest percentage. Demand for transportation service for all livestock movements and for meats would be highest during January, February and March and also October, November and December.

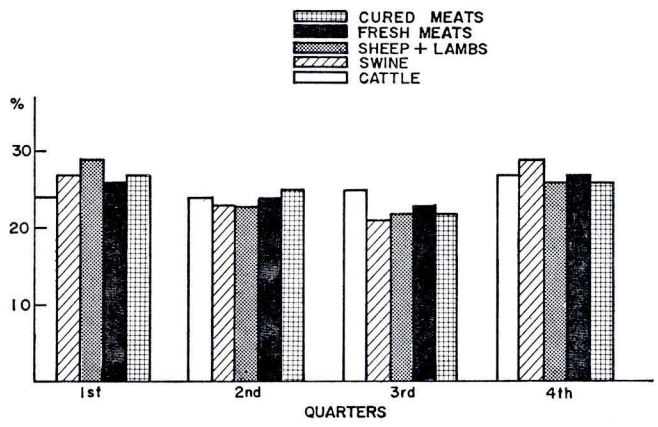

Fig. 3. Seasonal movements of livestock and meats from Iowa, by quarter averages, 1962-1965.

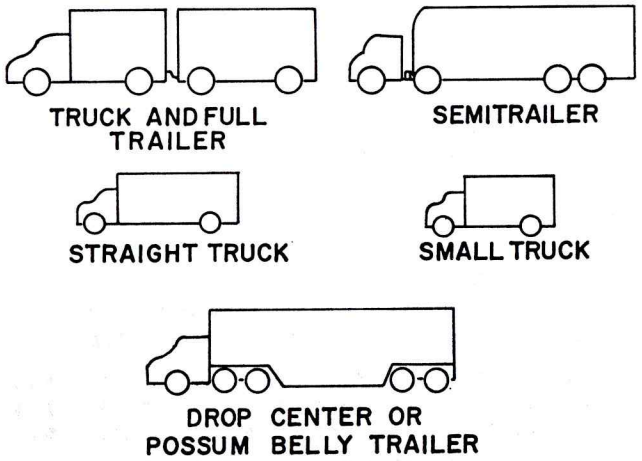

Fig. 4. Types of vehicles used to transport livestock from Iowa.

TRANSPORTATION EQUIPMENT AND SERVICES

Livestock

Many different types of vehicles transport livestock to market. By truck, most shipments would fall into categories shown by vehicle sketches in fig. 4. Truck sizes vary within each category, but the type of vehicle is the major factor to be considered.

On out-of-state traffic, double-decked, and so-called possum-belly trailers, 40 to 45 feet long were used to transport livestock. Most interstate operators used equipment capable of hauling 42,000 pounds. As of July 1, 1967, tractor-trailer combinations could not handle more than a 72,600 pound gross load for

TABLE 23. Computed weighted-average costs of shipping cured meats from Iowa by type of media.

	1962-65		
	Railroad $/Ton	Truck $/Ton	Piggyback $/Ton
Illinois	15.49	10.44	10.28
Texas	28.37	32.37	32.20
New York	36.04	35.53	28.63
California	51.54	48.89	44.70
Minnesota	13.34	8.53	--
Pennsylvania	35.98	34.88	26.88
New Jersey	37.98	37.54	29.54
Ohio	23.81	21.96	22.40
Massachusetts	39.01	38.32	31.98
Georgia	31.43	31.87	--
Michigan	24.74	21.38	24.62
N. Carolina	33.37	34.80	--
Indiana	23.11	20.14	17.00
Alabama	29.85	29.46	17.80
Missouri	20.46	16.53	--
Tennessee	25.49	23.10	--
Louisiana	33.39	29.55	18.78
Florida	40.10	46.13	--
Washington	52.10	48.31	44.25
Kansas	16.90	14.79	--
Connecticut	38.38	37.80	29.80
Wisconson	14.84	13.03	--
Maine	39.32	43.95	33.48
Arkansas	35.25	25.91	28.60
Virginia	36.03	35.03	35.00
Rhode Island	40.01	41.53	31.60
Colorado	37.34	29.94	--
Oklahoma	31.00	29.39	--
D. C.	36.00	37.00	26.13
New Hampshire	40.00	40.77	31.73

TABLES 24. Surveyed seasonal movements of livestock and meats from Iowa, 1962-65, in percentages.

Quarters	Cattle & calves	Swine	Sheep & lambs	Fresh meats	Cured meats
1	24	27	29	26	27
2	24	23	23	24	25
3	25	21	22	23	22
4	27	29	26	27	26
	100	100	100	100	100

trucks where the distance between the first and last axle was 47 feet, nor load into double bottoms longer than 60 feet under Iowa law.

The most frequent movements appeared to be 30,000-34,000 pounds in straight trailers and 39,000-42,000 pounds in the double-decked and possum-belly trailers. It was estimated that the possum-belly trailer could load about 15 percent more livestock, but all shippers did not agree upon their utility in carrying livestock. Some preferred them over the double-decked vehicles because of loading ease and suggested that fewer bruised cattle resulted from their use. Other shippers indicated more bruising and crippling of animals in possum-belly trailers and preferred semi-trailers with partitions, proper bedding and corrugated floors. However, the trend over the period seemed to indicate a heavier use of larger equipment, including possum-belly trailers.

There seemed no specific answer to the question of how many animals constituted a load. Vehicle size in terms of available floor space, bed or box, weight of the animals, species shipped, weather conditions, length of haul, and other factors had a bearing on the number of animals loaded safely and properly into the truck or trailer. An indication of number and weight of livestock hauled in trucks of various sizes is found in tables 25 and 26.

Shippers reported that livestock was shipped from Iowa in 40- and 50-foot railroad cars. A single-deck car will carry 88, 200-pound hogs and 81, 225-pound animals as contrasted to the smaller 36-foot car with a capacity of 79, 200-pound hogs and 73, 275 pound animals. Although no piggyback movements were indicated into the first destinations from Iowa origins, it is known that some hogs and sheep moved by this mode from nearby stockyards to western states.

Shippers reported that cattle bruise more when hauled by rail than by truck and that transit time is shorter by truck. Also, there is less shrink and packers can schedule their kill better when animals are transported by truck rather than by rail.

In moving livestock, railroads offer services such as diversion in transit, feed and rest stops, feeding or grazing in transit, market testing privileges, loading facilities, scales and holding pens. Many of these services cannot be duplicated by trucking operations. Thus, trucks compete best when movements take less than 28-36 hours, the federal limit for confining animals before a rest and feed stop. Railroads have a definite advantage when the time required for delivery is beyond these limits. That railroads must publish rules, regulations and rates on livestock movements means that shippers know what services to expect. By contrast, because of the truck exemptions, policies and arrangements must be negotiated between the shipper and the carrier.

Truck hauling of livestock has the advantage of loading at the farm or assembly point, and the shipments can be scheduled at any time. Such arrangements provide convenience, flexibility and personal service to the shipper. Also, a truck's speed between origin and destination is difficult for the railroad to match.

Meat

Meat movements do not fall within the category of motor carrier agricultural exemptions. Therefore, on common and contract-carrier shipments, rates and services will be published in the tariffs. Because of the perishability of meat products, the mode of transportation selected must fit into delivery schedules of the shippers. Delivery time ranks high among priorities when selecting the carrier.

TABLE 25. Loading capacity of livestock trucks of various sizes, in number of head.

Length of bed	Number of head loaded				
	1,000-lb cows	845-lb 2-yr. olds	600-lb yearlings	395-lb calves	68-lb feeder lambs[a]
13 --	9	12	13	17	77
15 --	10	13	15	20	90
20 --	14	17	20	27	120
25 --	17	20	25	35	151
30 --	20	24	30	42	182
32 --	21	25	32	45	195
34 --	23	27	34	48	208
36 --	24	28	36	51	220
38 --	26	30	38	54	232
40 --	27	31	40	57	245
42 --	29	33	42	59	258
44 --	30	34	44	62	270
46 --	31	35	46	65	282

[a] Two-deck loading.

SOURCE: James St. Clair and Richard L. Kelley. Truck transportation of Wyoming livestock. Wyoming Agr. Exp. Sta. Bul. 395. 1962. Table 7, p. 27.

TABLE 26. Total weight of livestock hauled in trucks of various sizes.

Length of bed (ft.)	Total weight-loaded				
	1,000-lb cows (lbs.)	845-lb 2-yr. olds (lbs)	600-lb yearlings (lbs.)	395-lb calves (lbs.)	68-lb feeder lambs[a] (lbs.)
13 ----	9,000	10,400	7,800	6,715	5,236
15 ----	10,000	10,985	9,000	7,900	6,120
20 ----	14,000	14,365	12,000	10,665	8,180
25 ----	17,000	16,000	15,000	13,825	10,268
30 ----	20,000	20,280	18,000	16,590	12,376
32 ----	21,000	21,125	19,200	17,775	13,260
34 ----	23,000	22,815	20,400	18,960	14,144
36 ----	24,000	23,660	21,600	20,145	14,960
38 ----	26,000	25,350	22,800	21,330	15,776
40 ----	27,000	26,195	24,000	22,515	16,660
42 ----	29,000	27,885	25,200	23,305	17,544
44 ----	30,000	28,730	26,400	24,490	18,360
46 ----	31,000	29,575	27,600	25,675	19,176

[a] Two-deck loading.

SOURCE: James St. Clair and Richard L. Kelley. Truck transportation of Wyoming livestock. Wyoming Agr. Exp. Sta. Bul. 395. 1962. Table 8, p. 27.

Approximately 25 percent of the shippers interviewed reported difficulty in obtaining equipment for eastern and southern hauls. Some indicated that the problem was acute, especially as it pertained to customers not on railroad lines or sidings. Other shippers suggested that the difficulty was compounded by holding the equipment in eastern cities. Another 25 percent attempted to solve this problem by leasing or purchasing railroad cars. The increased demand for piggyback service caused equipment shortages, but these shortages were partly relieved through the expansion from 36 feet to 40 feet in the average length of the over-the-road trailer. The increased length meant that an additional 4,000 pounds of meat could be hauled.

The trend toward larger railroad cars and heavier loadings was reported by most shippers. This should be expected as the higher minimum weights and lower rates made their impact on the packing plants. Loads of 75,000 to 125,000 pounds were not uncommon from Iowa to distant markets. Those unable to use the higher minimums were handicapped by customers who could not handle large volumes and did not wish to pay high demurrage charges when unloading could not be accomplished within the 48-hour free-time period.

Equipment Ownership

The question of equipment ownership was asked only of meat shippers. Over 50 percent of those interviewed used common or contract carriers on interstate hauls, either exclusively or in combination with private fleets and leased vehicles for local distribution. Six firms either owned their equipment or leased trucks, some on a long-haul basis, and others on a mileage contract with a variety of arrangements involved. Some leased the truck at 23-25 cents per mile and paid the driver's wages and insurance. Others leased the complete service including all expenses except insurance. Local shipping arrangements included the sale and leaseback of trucks. Estimates of mileage costs by truck varied from 33-40 cents per mile, including driver's wages and insurance. Insufficient data were collected to show a mileage cost for shipper-owned trucks or for shipper-owned railroad cars.

MAJOR TRANSPORTATION PROBLEMS

Ninety-four shippers and livestock processors were questioned about their transportation problems, and 77 responded. Twenty reported that dependable service was a major concern in both rail and truck movements. Eighteen stressed the problem of bruising and dead animals, suggesting that too many animals were being loaded in the vehicles without proper facilities and care. The difficulty of obtaining adequate equipment was reported by 14 shippers, whereas 9 objected to the Iowa trailer-length laws because of space limitations for the comfort of animals in transit. Other problems mentioned were the spring highway restrictions, usually because of bad weather (6);[27] variations in the interstate rates between regulated and nonregulated carriers (4); delay in settling claims (3); obsolescence of railroad docks and sidings (2); and loss of traffic to the southeastern states (1).

The most important problems reported by the meat shippers were inadequate railroad equipment, poor delivery schedules and having the products arrive at markets in poor condition. For these reasons, shippers tended to turn to trucks, although there was evidence of discontent because of unclean and poorly equipped vehicles. Another major problem was the loss of meat hooks on all movements. Other problems mentioned included the rate structures to the Southeast and loss and damage due to faulty refrigeration and rough handling of the products.

LOSSES OF LIVESTOCK AND MEAT IN TRANSIT

This study did not request specific information concerning losses from bruising, crippling, death and shrink while the animals were in transit, but the problem deserves some comment as part of this report. Such losses are marketing costs that must be absorbed by the producer or shipper.

The seriousness of the problem is indicated by the studies of Rickenbacker.[28] He estimated that the national loss in the years 1955-56 for dead and crippled animals alone amounted to 8 million dollars per year at the average annual prices. In other words, it would have taken 410 railway cars or 4,433 semitrailer trucks to haul the annual total tonnage of livestock that arrived dead or crippled at the point of slaughter. To this figure must be added the carcass devaluation and turnout losses on animals showing bruises after slaughter.

Shrinkage in animals in transit is due to two types of weight loss. One is the excretory loss of weight from belly fill, and the other is tissue shrinkage or decrease in the actual carcass weight. The greatest shrinkage occurs during the loading and in the first hour of handling.

A controlled experiment at the University of Wyoming[29] showed that feeder steers in a moving truck lost 5.5 percent of their weight in 8 hours; 7.9 percent in 16 hours and 8.9 percent in 24 hours. Feeder cattle shrink about 25 percent more than fat cattle on long hauls, but net shrink after fillback showed little difference. During the first 9 hours in transit, fat cattle showed more shrink than feeder cattle; beyond

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[27] Numbers in parentheses indicate numbers of times mentioned.

[28] Joseph E. Rickenbacker. Losses of livestock in transit. Farmers Cooperative Service. U.S. Department of Agriculture. Market. Res. Rpt. 247. June 1958; Causes of losses in trucking livestock. Farmer Cooperative Service. U.S. Department of Agriculture. Market. Res. Rpt. 261. June 1958.

[29] As reported in J. B. Horton and J. Richards. Montana livestock transportation. op. cit. p.27.

9 hours shrinkage for feeder cattle was greater. Wycoff[30] found that slaughter steers lose nearly 3 percent of body weight in shrinkage during the first 100 miles of travel and an additional 1 percent for each additional 100 miles.

Although other factors, such as temperature, sex, breed, feeder or fat, may influence shrinkage, time in transit is the most important. Shrinkage occurs at about the same rate on either truck or rail shipments, but trucks usually will move the animals further per hour than will rail carriers. Therefore, even though the method of transportation alone will have little impact upon shrinkage, the time in transit will have a definite effect.

Another type of shrinkage is known as cooler shrink. It occurs from the time the carcass moves from the killing floor into the cooler until removed for sale. It is the difference between the hot weight and chilled weight of the carcass that results from evaporatoin of moisture from the tissues. Meat packers compute dressing percentages or yield on a chilled-weight basis. A 500-pound carcass would lose approximately 15 pounds from cooler shrink.[31]

The Burlington Railroad recently announced the use of a new type of refrigeration unit on cars that cuts carcass shrinkage losses by 50 percent, representing a saving of approximately $400 per carload of 80,000 pounds of pork during the 100-hour trip between Iowa and the West Coast. The refrigerant used is liquid nitrogen, released in carefully regulated amounts to both cool the cars and to induce a low-oxygen atmosphere designed to impede product deterioration. The experiments on beef movements have not been as successful as those on pork products.[32]

THE FUTURE

Transportation services will probably continue to represent an important component of the marketing costs for livestock and meats shipped from Iowa. Trends in the rates charged for equipment and services currently offered and the relative levels of fixed and variable costs of the transportation media offer little hope of any immediate substantial reductions in the expense of moving the commodities. But attractive possibilities exist in the further development of piggybacking operations and in the use of containers, particularly for the movements of meats.

Standard-sized containers with mechanical refrigeration are needed for the coordinated movement involving railroads, trucks and air carriers on domestic movements and merchant vessels on overseas shipments. Some national and international organizations have reached agreement on a family of moduler sizes in 10-foot increments from 10 to 40 feet with an 8 x 8 foot cross section. However, these sizes do not fit well with existing highway operations. The 24-foot Sealand and 35-foot Matson Line containers are more readily accommodated on the highways of the eastern and western states.[33]

The U.S. Department of Agriculture has made a series of test shipments of fresh beef and frozen poultry in containers to markets in Germany, Italy, Spain and Greece. The results of the experiments were excellent for all shipments in containers.[34]

The greatest advantage of the container is reduced handling expenses and losses due to damage or pilfering, especially on special-order shipments, such as prepackaged meats to retail outlets. Containers could also be the instrument that could result in a more coordinated movement by rail, truck and air carriers —movements in which the inherent advantages of each media could be used to a greater degree than now. Both the expansion of piggyback operations and the use of containers should reduce transportation costs.

Historically, changes in federal regulation of transportation have been rather slow. From time to time, proposals have been made to curtail the motorcarrier agricultural exemptions or to expand such to other forms of transportation. To date, such proposals have met with little or no success. The increased use of private carriers may force changes in regulation that would probably affect the meat traffic more than livestock movement although any dramatic effects on slaughter would affect livestock shipping patterns.

Within the regulatory framework, the current trend toward mergers in the railroad industry offers possibilities of higher standards of service, particularly in the greater transit speed desired by shippers and the probability of more dependable delivery service. Obviously, these mergers are designed to reduce fixed costs of operations, and hopefully, some of the savings would be passed on to shippers and consumers. State laws concerning size and weight of vehicles will probably become more uniform as the states and regions of the nation become more closely tied together through the multilane interstate highway systems.

It is generally assumed that, to minimize transport costs, the packing industry will continue to locate near sources of livestock supply. On the basis of transport-cost considerations alone, areas where slaughter capacity is small relative to both production and consumption appear to offer favorable opportunities for slaughter development. Most of the southeastern states have displayed these characteristics during the past decades.

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[30] J. B. Wycoff. Cattle transportation in Washington. op. cit. p.17.

[31] Stewart Fowler. The marketing of livestock and meat. The Interstate Printers and Publishers. Danville, Illinois. 1961. pp.472-473.

[32] Reported in conference with Burlington Railroad officials at Chicago, Jan. 9, 1968.

[33] American Trucking Associations. Containers, land, sea, and air. Current Report No. 17. October 1967. p.7.

[34] John E. Clayton. Containerization research by the U.S. Department of Agriculture. Unpublished paper presented at the 7th Annual Conference on Containerization and Packaging. New York. Jan. 24-25, 1967. (Mimeo.) Transportation and Facilities Branch, U.S. Department of Agriculture. ca. 1967.

Dramatic changes in shipping patterns of livestock and meat products from Iowa are difficult to visualize in the foreseeable future. The state seemingly has the capacity to process more livestock than it produces, and from a transportation view point, this could persist if pressures continue to reduce feed-grain rates from Iowa into deficit livestock-producing states. In other words, not only must producers and processors of livestock be continually alert to changes in the livestock-meat products rate relationships, but also to changes in the relationship of feed-grain rates to those of livestock and meats on long-distance movements.

APPENDIX A: LEGAL STATUS OF COMMON, CONTRACT, PRIVATE AND EXEMPT CARRIERS

Motor carriers may be classified as common, contract, private or exempt carriers. Railroads usually are considered as common carriers. A common carrier has a duty to serve all shippers without discrimination, whereas for a contract carrier status, the Interstate Commerce Commission has stated: "Each case requiring a determination whether or not common carriage exists, when brought to its irreducible minimum, turns finally on the question of whether or not a holding out to the public has been shown." (Craig Contract Carrier Application, 31 M.C.C., 705, 708-709. (1941).)

On the other hand, private carriage is considered as that incidental to or a furtherance of a nontransportation business enterprise. Private carriers are regulated by the Interstate Commerce Commission only with respect to qualifications and maximum hours of service of employees, and equipment and safety standards, whereas the others are subject to regulation of business practices.

Under section 203 (b) (6) of the Interstate Commerce Act, motor vehicles carrying ordinary livestock, fish or nonprocessed agricultural commodities are exempt from economic regulation by the Interstate Commerce Commission if such vehicles are not used in carrying any other property or passengers for compensation. However, the Act did not prescribe what constituted "processing" or what cargoes specifically would exempt the carrier from regulation. Court action has been necessary to establish the exempt status of many products.

The Transportation Act of 1958 gave status of law to the Interstate Commerce Commission rulings on exempt commodity lists. At present, provisions relating to exemption in interstate trucking are found in three subsections of the Act. Exemptions are extended to (1) farm trucks used in ordinary farm business, (2) trucks owned and operated by agricultural cooperatives, and (3) common or contract carriers that haul for compensation but carry nothing but exempt cargo. Ruling 107 carries some of the following items under the heading of "livestock":

Ordinary, except those valuable for breeding, racing, show purposes and other special uses. Exempt.

Registered or Purebred, for ordinary farm or use. Exempt.

Show animals. Not exempt.

Cattle, Slaughtered. Not exempt.

Feathers. Exempt.

Hides, Green and Salted. Not exempt.

Meat and Meat Products, fresh, frozen or canned. Not exempt.

Poultry, dressed, fresh or frozen. Exempt.

Skins, Animal. Not exempt.

APPENDIX B: PIGGYBACK PLANS

I. Carriage by railroad of trailers of motor common carriers at a flat charge per trailer. A substituted service performed for the trucker who solicits the business and bills the shipper. The railroad, in effect, works on a subcontract basis for the trucker.

II. Railroad performs all the service, including the furnishing of trailer, loading and unloading the pickup and delivery. The railroad solicits the business at truck competitive rates and bills the shipper.

II¼. Railroad performs pickup service at origin, but consignee must arrange for delivery at destination.

II½. Railroad performs ramp to ramp service only and does not furnish pickup or delivery.

II¾. Shipper delivers railroad trailers to origin ramp, and the railroad performs the delivery service.

III. Railroad furnishes the flatcar and provides loading and unloading of trailers. Shippers handle pickup and delivery. Ramp-to-ramp rates made for these shipper-owned or leased trailers are based on commodity and quantity moved at a flat charge per trailer.

IV. Railroad furnishes only the power and rails for shippers who, not only furnish both flatcar and trailers, but also perform all loading and unloading and pickup and delivery services. A flat charge per car is made for not exceeding two trailers whether loaded or empty.

V. Joint rail-truck rates. In effect, such rates extend the territory of each carrier into that served by the other, permitting each to handle shipments originating in or destined to the other's territory. Each may sell for the other.

APPENDIX C: TABLES OF SUPPLEMENTARY SURVEY DATA

TABLE C-1. Surveyed movements of cattle and calves from Iowa, 1962-65.

To:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Nebraska	367,660	35	359,378	35	363,212	35	396,522	39	1,486,772	36	+ 8
Illinois	330,427	32	327,456	32	343,585	33	314,486	31	1,315,954	32	− 5
Minnesota	160,566	15	157,587	15	166,721	16	153,298	15	638,172	15	− 5
Missouri	74,890	7	83,647	8	64,810	6	57,334	6	280,681	7	−23
S. Dakota	60,726	6	66,295	6	66,068	6	66,488	6	259,577	6	+ 9
Other	44,262	5	37,280	4	48,235	4	37,694	3	167,471	4	−15
TOTALS	1,038,531	100	1,031,643	100	1,052,631	100	1,025,822	100	4,148,627	100	− 1

NOTE: Other=all destinations individually receiving 1% or less each year.

TABLE C-2. Surveyed movements of cattle and calves from Iowa, by type of media, 1962-65.

Media:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Railroad	18,477	2	7,724	1	14,663	1	10,161	1	51,025	1	−45
Truck	1,020,054	98	1,023,919	99	1,037,968	99	1,015,661	99	4,097,602	99	
TOTALS	1,038,531	100	1,031,643	100	1,052,631	100	1,025,822	100	4,148,627	100	− 1

TABLE C-3. Surveyed movements of cattle and calves from Iowa by railroad, 1962-65.

To:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Illinois	6,870	37	4,785	62	7,852	52	3,008	30	22,245	44	− 56
New York	2,178	12	0	0	0	0	15	*	2,193	4	− 99
New Jersey	2,170	12	2,451	32	3,862	26	4,719	46	13,202	26	+117
S. Dakota	2,080	11	0	0	670	5	702	7	3,452	7	− 66
Nebraska	1,718	9	33	*	603	4	664	7	3,018	6	− 61
Minnesota	844	5	0	0	614	4	318	3	1,776	3	− 62
Ohio	684	4	34	*	66	*	0	0	784	2	−100
Kansas	578	3	0	0	50	*	54	*	682	*	− 91
California	304	2	46	*	556	4	130	*	1,036	2	− 57
Canada	0	0	13	*	342	2	0	0	355	*	0
Colorado	54	*	47	*	136	*	420	4	657	*	+678
Other	997	5	315	6	182	3	131	3	1,625	6	− 87
TOTALS	18,477	100	7,724	100	14,933	100	10,161	100	51,025	100	− 45

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE C-4. Surveyed movements of cattle and calves from Iowa by truck, 1962-65.

To:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Nebraska	365,942	36	359,345	35	362,609	35	395,858	39	1.483,754	36	+ 8
Illinois	323,557	32	322,671	32	336,003	32	311,478	31	1,293,709	32	− 4
Minnesota	159,722	16	157,587	15	166,107	16	152,980	15	636,396	16	− 4
Missouri	74,707	7	83,575	8	64,749	6	57,277	6	280,308	7	−23
S. Dakota	58,646	6	66,295	6	65,398	6	65,786	6	256,125	6	+12
Others	37,480	3	34,446	4	43,102	5	32,282	3	147,310	3	−14
TOTALS	1,020,054	100	1,023,919	100	1,037,968	100	1,015,661	100	4,097,602	100	--

NOTE: Other=all destinations individually receiving 1% or less each year.

TABLE C-5. Surveyed cattle and calves shipped from Iowa to major receiving states, by type of media, 1962-65.

To:	Railroad		Truck		Total
	Tons	%	Tons	%	Tons
Nebraska	3,018	*	1,483,754	100	1,486,772
Illinois	22,245	2	1,293,709	98	1,315,954
Minnesota	1,776	*	636,396	100	638,172
Missouri	373	*	280,308	100	280,681
S. Dakota	3,452	1	256,125	99	259,577
Wisconsin	83	*	45,124	100	45,207
New Jersey	13,202	42	18,021	58	31,223
Other	6,876	8	84,165	92	91,041
TOTALS	51,025	1	4,097,602	99	4,148,627

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less of total movements from Iowa.

TABLE C-6. Surveyed movements of swine shipped from Iowa, 1962-65,

To:	1962		1963		1964		1965		1962-65		% change
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
Nebraska	295,795	34	327,777	37	319,926	38	232,796	32	1,176,294	35	−21
Minnesota	146,348	17	155,127	18	155,342	18	168,251	23	625,068	19	+15
Illinois	135,029	16	125,183	14	135,153	16	124,026	17	519,391	16	− 8
Missouri	86,491	10	67,601	8	50,886	6	47,448	6	252,426	8	−45
S. Dakota	46,754	5	53,869	6	51,595	6	47,144	6	199,362	6	+ 1
California	28,639	3	33,840	4	35,418	4	23,474	3	121,371	4	−18
Kansas	27,483	3	21,109	2	11,635	1	2,327	*	62,554	2	−92
Texas	19,524	2	16,879	2	13,234	2	12,918	2	62,555	2	−34
Wisconsin	19,189	2	16,421	2	18,900	2	17,550	2	72,060	2	− 9
Washington	10,651	1	12,579	1	10,262	1	7,635	1	41,127	1	−28
Other	46,385	7	52,144	6	47,605	6	47,212	8	193,346	5	+ 2
TOTALS	862,288	100	882,529	100	849,956	100	730,781	100	3,325,554	100	−15

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE C-7. Surveyed movements of swine shipped from Iowa by railroad, 1962-65.

To:	1962		1963		1964		1965		1962-65		% change
	Tons	%	Tons	%	Tons	%	Tons	%	Tons	%	1962-65
California	28,207	55	32,927	58	35,001	71	22,813	73	118,948	63	− 19
Washington	5,596	11	5,033	9	3,745	8	5,119	16	19,493	10	− 9
Oregon	5,180	10	3,494	6	2,714	6	2,215	7	13,603	7	− 57
Arizona	3,973	8	2,137	4	160	*	17	*	6,287	3	−100
Utah-Nev.	3,139	6	3,311	6	998	2	187	*	7,635	4	− 94
Connecticut	2,529	5	7,446	13	3,080	6	428	*	13,483	7	− 83
Missouri	1,361	3	704	*	34	*	0	0	2,099	*	−100
New Jersey	252	*	105	*	1,395	3	191	*	1,943	*	− 24
No. Carolina	0	0	372	*	1,315	3	229	*	1,916	*	+229
Other	1,517	2	893	4	675	1	51	4	3,136	6	− 97
TOTALS	51,754	100	56,422	100	49,117	100	31,250	100	188,543	100	− 40

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE C-8. Surveyed movements of swine shipped from Iowa by truck, 1962-65.

To:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Nebraska	295,795	37	327,777	40	319,875	40	232,796	33	1,176,243	37	−21
Minnesota	146,348	18	155,127	19	155,342	19	168,251	24	625,068	20	+15
Illinois	134,760	17	124,621	15	134,936	17	123,983	18	518,300	17	− 8
Missouri	85,130	11	66,897	8	50,852	6	47,448	7	250,327	8	−44
S. Dakota	46,754	6	53,869	7	51,595	6	47,136	7	199,354	6	+ 1
Kansas	27,483	3	21,109	3	11,635	*	2,327	*	62,554	2	−92
Texas	19,450	2	16,863	2	13,234	2	12,918	2	62,465	2	−34
Wisconsin	19,189	2	16,421	2	18,900	2	17,550	3	72,060	2	− 9
Other	35,625	4	43,423	4	44,470	8	47,122	6	170,640	6	+32
TOTALS	810,534	100	826,107	100	800,839	100	699,531	100	3,137,011	100	−14

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE C-9. Surveyed movements of swine shipped from Iowa to major receiving states by types of media, 1962-65.

To:	Railroad Tons	Railroad %	Truck Tons	Truck %	Total Tons
Nebraska	51	*	1,176,243	100	1,176,294
Minnesota	0	0	625,068	100	625,068
Illinois	1,091	*	518,300	100	519,391
Missouri	2,099	1	250,327	99	252,426
S. Dakota	8	*	199,354	100	199,362
California	118,948	98	2,423	2	121,371
Wisconsin	0	0	72,060	100	72,060
Texas	90	*	62,465	100	62,555
Kansas	0	0	62,554	100	62,554
Other	66,256	28	168,218	72	234,474
TOTALS	188,543	6	3,137,012	94	3,325,555

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less of total movements from Iowa.

TABLE C-10. Surveyed movements of swine from Iowa, by type of media, 1962-65.

Media:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Railroad	51,754	6	56,422	6	49,117	6	31,250	4	188,543	6	−40
Truck	810,534	94	826,107	94	800,839	94	699,531	96	3,137,012	94	−14
TOTALS	862,288	100	882,529	100	849,956	100	730,781	100	3,325,555	100	−15

TABLE C-11. Surveyed movements of sheep and lambs shipped from Iowa, 1962-65.

To:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Nebraska	11,576	34	16,425	42	17,847	39	12,518	33	58,366	37	+ 8
S. Dakota	4,965	15	4,492	11	4,366	10	3,816	10	17,639	11	− 23
Minnesota	4,679	14	4,708	12	4,417	10	4,103	11	17,907	11	− 12
Illinois	4,215	12	4,772	12	6,420	14	6,256	16	21,663	14	+ 48
New Jersey	3,419	10	2,305	6	2,501	5	2,475	6	10,700	7	− 28
Missouri	2,335	7	2,996	8	4,790	10	4,290	11	14,411	9	+ 84
Texas	1,368	4	1,350	3	1,357	3	1,272	3	5,347	3	− 7
Kansas	694	2	600	2	910	2	1,394	4	3,598	2	+101
Michigan	514	2	311	*	186	*	70	*	1,081	*	− 86
New York	27	*	1,176	3	2,283	5	1,554	4	5,040	3	+ 57
Other	194	*	321	1	765	2	488	2	1,768	3	+152
TOTALS	33,986	100	39,456	100	45,842	100	38,236	100	157,520	100	+ 13

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE C-12. Surveyed movements of sheep and lambs from Iowa, by type of media, 1962-65.

Media:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Railroad	3,778	11	1,861	5	2,514	5	1,137	3	9,290	6	−70
Truck	30,208	89	37,595	95	43,328	95	37,099	97	148,230	94	+23
TOTALS	33,986	100	39,456	100	45,842	100	38,236	100	157,520	100	−13

TABLE C-13. Surveyed movements of sheep and lambs from Iowa by railroad, 1962-65.

To:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
New Jersey	1,780	47	452	24	479	19	628	55	3,339	36	− 65
S. Dakota	958	25	0	0	922	37	113	10	1,993	21	− 88
Minnesota	384	10	0	0	96	4	0	0	480	5	−100
Illinois	325	9	1,003	54	611	24	254	22	2,193	24	− 22
Texas	87	2	109	6	170	7	9	1	375	4	− 90
Nebraska	82	2	0	0	0	0	63	6	145	2	− 23
Michigan	61	2	247	13	186	7	70	6	564	6	+ 15
Other	101	3	50	3	50	2	0	0	201	2	−100
TOTALS	3,778	100	1,861	100	2,514	100	1,137	100	9,290	100	− 70

NOTE: Other=all destinations individually receiving 1% or less each year.

TABLE C-14. Surveyed movements of sheep and lambs from Iowa by truck, 1962-65.

To:	1962 Tons	1962 %	1963 Tons	1963 %	1964 Tons	1964 %	1965 Tons	1965 %	1962-65 Tons	1962-65 %	% change 1962-65
Nebraska	11,494	38	16,425	44	17,847	41	12,455	34	58,221	39	+ 8
Minnesota	4,295	14	4,708	12	4,321	10	4,103	11	17,427	12	− 4
S. Dakota	4,007	13	4,492	12	3,444	8	3,703	10	15,646	11	− 8
Illinois	3,890	13	3,769	10	5,809	13	6,002	16	19,470	13	+ 54
Missouri	2,318	8	2,987	8	4,782	11	4,290	12	14,377	10	+ 85
New Jersey	1,639	5	1,853	5	2,022	5	1,847	5	7,361	5	+ 13
Texas	1,281	4	1,241	3	1,187	3	1,263	3	4,972	3	− 1
Kansas	679	2	600	2	910	2	1,394	4	3,583	3	+105
Michigan	453	2	64	*	0	0	0	0	517	*	−100
New York	0	0	176	3	2,272	5	1,554	4	5,002	3	*
Other	152	1	280	1	734	2	488	1	1,654	1	+221
TOTALS	30,208	100	36,595	100	43,328	100	37,099	100	148,230	100	+ 23

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.

TABLE C-15. Surveyed movements of sheep and lambs from Iowa to major receiving states, by type of media, 1962-65.

To:	Railroad Tons	Railroad %	Truck Tons	Truck %	Total Tons
Nebraska	145	*	58,221	100	58,366
Illinois	2,193	10	19,470	90	21,663
Minnesota	480	3	17,427	97	17,907
S. Dakota	1,993	11	15,646	89	17,639
Missouri	34	*	14,377	100	14,411
New Jersey	3,339	31	7,361	69	10,700
Texas	375	7	4,972	93	5,347
New York	38	1	5,002	99	5,040
Kansas	15	*	3,583	100	3,598
Other	678	24	2,171	76	2,849
TOTALS	9,290	6	148,230	94	157,520

NOTE: *=less than 1%. Other=all destinations individually receiving 1% or less each year.