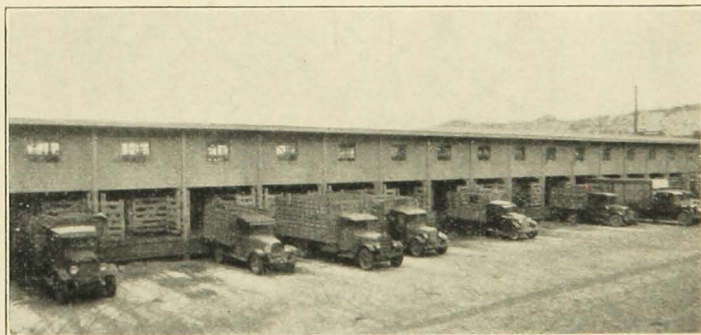


UNIVERSITY OF MINNESOTA
AGRICULTURAL EXPERIMENT STATION

TRUCKING LIVESTOCK TO SOUTH ST. PAUL

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UNIVERSITY FARM, ST. PAUL

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By E. C. JOHNSON and E. A. JOHNSON

INTRODUCTION

Transportation costs are a major item of expense in marketing livestock. Any changes in the methods of transportation that may affect costs and service rendered, therefore, are of interest to livestock producers. The most significant change in the transportation of livestock in recent years has been the rapid growth in the use of motor trucks. Trucks are now used for hauling livestock from farms to the railroad shipping points; from farms to packing plants or concentration yards, and to terminal markets. This bulletin presents facts relative to the problem of transportation of livestock by motor trucks to the South St. Paul market. The analysis is based upon records of the Union Stock Yards Company and livestock commission agencies in South St. Paul, from railroads, and from operators of trucks.

AMOUNT OF LIVESTOCK TRUCKED TO SOUTH ST. PAUL

The first shipment of livestock by motor truck to South St. Paul arrived on September 17, 1912. In the years following, the motor truck came into quite general use for transportation of livestock from territory proximate to the market, but on the whole it remained comparatively unimportant as a means of transporting livestock until after 1920. Only 1.2 per cent of all the livestock shipped to South St. Paul in 1920 came by motor truck. Following 1920 there was a great growth in the use of trucks, especially after 1925. In 1925, 6.4 per cent of all the livestock received at South St. Paul rode to market in motor trucks. This percentage had increased to 16.7 per cent in 1929. In 1930 receipts included 160,470 head of cattle, 254,511 calves, 733,007 hogs, and 162,265 sheep, a total of 1,310,253 head, or 24 per cent of all receipts (See Table 1).

Nearly half of the calves received at South St. Paul now come by truck, largely because the producing area is relatively close to the market. Many of the hogs, also, are produced comparatively close to the market and 26.6 per cent of the hogs came by truck in 1930. Only 20.6 per cent of the cattle and 12 per cent of the sheep were shipped by truck, but a larger proportion of these classes are produced far from the market and consequently are shipped by rail.

Table 1
Receipts by Truck at South St. Paul*

Year	Cattle	Calves	Hogs	Sheep
1920	18,159	9,527	34,939	2,558
1921	18,039	11,595	42,124	5,401
1922	23,903	21,648	65,315	10,244
1923	28,448	33,159	122,302	12,206
1924	33,708	47,831	150,614	21,572
1925	50,643	76,623	218,640	29,975
1926	75,456	105,025	294,287	44,675
1927	77,736	108,631	353,573	57,244
1928	114,895	143,231	423,363	80,902
1929	125,637	181,151	488,643	113,082
1930	160,470	254,511	733,007	162,265

* From reports of the St. Paul Union Stock Yards Company.

Table 2
Percentage of Livestock Arriving by Truck at South St. Paul*

Year	Cattle	Calves	Hogs	Sheep
1920	1.8	2.5	1.6	0.4
1921	2.9	3.2	1.9	0.8
1922	2.6	4.7	2.6	2.1
1923	3.4	6.5	3.7	2.7
1924	4.3	9.0	4.0	4.5
1925	5.1	11.9	6.0	5.5
1926	6.4	14.4	8.5	5.8
1927	8.1	17.3	11.4	8.1
1928	12.5	25.0	14.6	9.1
1929	14.3	33.1	17.0	9.9
1930	20.6	45.5	26.6	12.0

* From reports of the St. Paul Union Stock Yards Company.

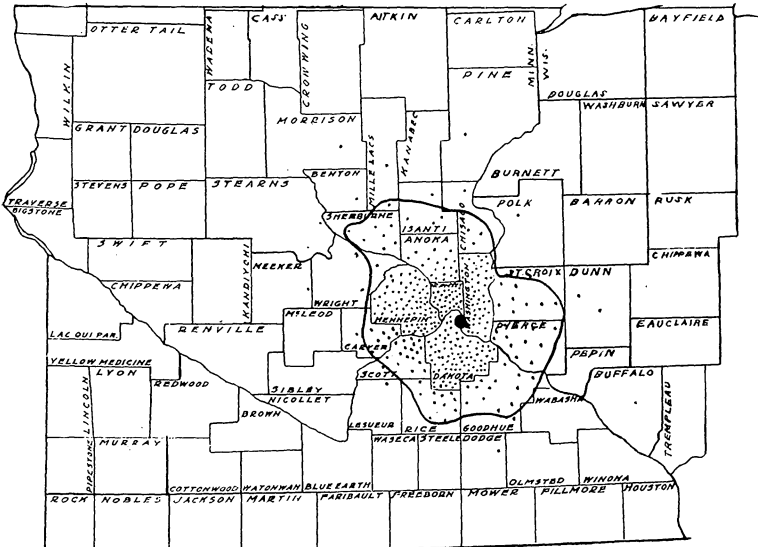


Fig. 1. Origin of Loads of Livestock Trucked to South St. Paul in 1924
Each dot represents 100 loads or a major part of that number.

SOUTH ST. PAUL TRUCKING AREA

Before 1925, practically all the livestock trucked to South St. Paul came from farms within a radius of 40 miles. With the improvement in roads and in the trucks used, this area has widened to 100 miles or more. To determine the sources of receipts, records were obtained from the St. Paul Union Stockyards Company of all truck loads for one full week of each month of the years 1924, 1926, 1928, and 1929. These records gave the origin of each load and the number of head of different kinds of livestock in the load. Constituting a sample of over 20 per cent of all truck receipts for each year, these data are adequate for an analysis of the development of the trucking area.

In 1924 the South St. Paul trucking territory approximately extended 60 miles north, 40 miles west, 50 miles south, and 40 miles east

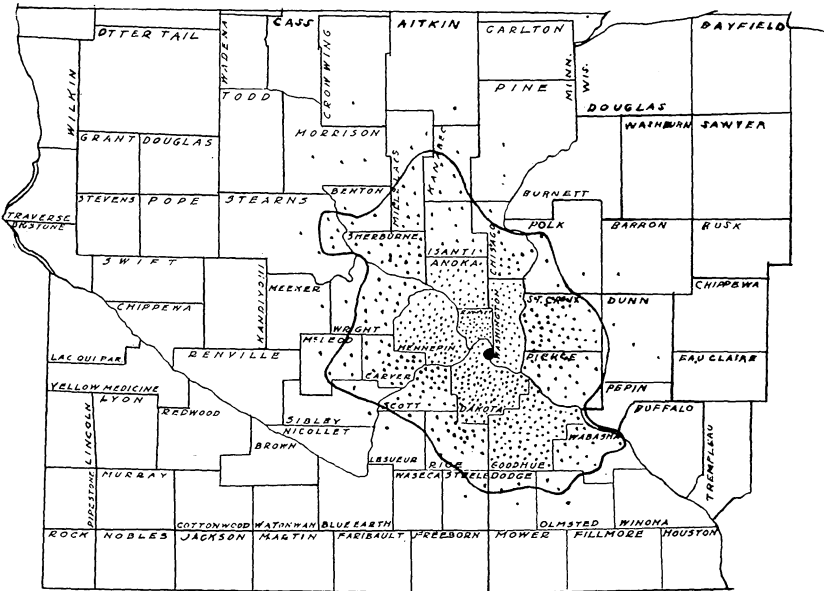


Fig. 2. Origin of Loads of Livestock Trucked to South St. Paul in 1926
Each dot represents 100 loads or a major part of one.

of the market. In 1929 the South St. Paul trucking territory extended approximately 100 miles north of the market, 70 miles west, 60 miles south, and 80 miles east. Figures 1, 2, and 3 show the sources of truck receipts of the years 1924, 1926, and 1929, respectively, and illustrate the great extension of the trucking territory within recent years.

The extension of the trucking area is associated closely with the improvement of roads in Minnesota and Wisconsin. During the five

years, 1920-24, many roads leading to South St. Paul were graded and graveled and a few roads close to the market were paved, making it possible to operate trucks to advantage from adjacent points. In the five-year period, 1925-29, there was a marked increase in paved roads, and this to a large extent explains why trucking increased so rapidly. Paved roads make it possible to operate larger trucks at greater speed and also to travel during unfavorable weather.

The development of paved roads is shown in Figure 4. To the north, paved roads now tap territory as far as 150 miles and some trucks come from that distance. To the west, roads are paved to about 75 miles. Further paving in territory west of the market, which

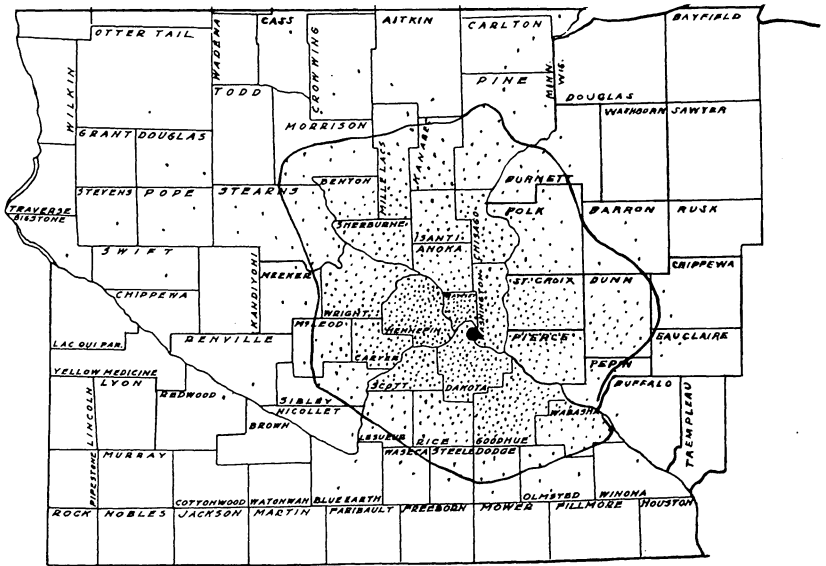


Fig. 3. Origin of Loads of Livestock Trucked to South St. Paul in 1929
Each dot represents 100 loads or a major part of one.

is also an important livestock area, will increase greatly the volume of livestock arriving by truck. To the south many roads are paved, but local packing plants are found in southern Minnesota cities and much of the livestock moves to these plants or to Chicago and Iowa points, limiting the expansion of the South St. Paul trucking area in this direction. The area in Wisconsin from which livestock is trucked has many fine graveled roads but only one paved road. Paving in this area will no doubt increase truck receipts greatly, but here again we find that beyond a certain distance, which is now approximately 75 miles, the livestock tends to move to Chicago. If costs of transportation to the South St. Paul market are reduced as a result of new roads, allowing the use of trucks, the South St. Paul

market area may push eastward, providing costs of transportation to Chicago are not reduced in equal degree. The development of paved highways in the trucking area is shown in Figure 4.

While the truck area has been widening and many loads of livestock come by motor from distances near and beyond 100 miles, most of the loads come from an area within 75 miles of the market. During 1929, 94 per cent of all truck loads arriving at South St. Paul came from points within the 75-mile zone, and 67 per cent of all loads came from less than 45 miles. As loads coming from short distances are smaller

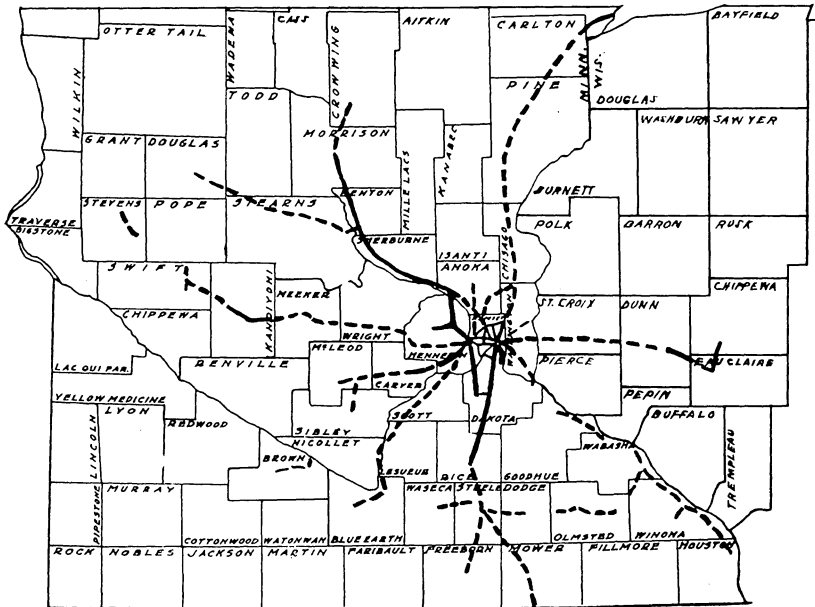


Fig. 4. Paved State Highways Within the South St. Paul Trucking Area
 ———— Paved roads January 1, 1924; - - - - November 1, 1930.

than those from more distant points, the percentage of all loads does not give as accurate a picture as the percentage of livestock. Even the latter, however, emphasizes the importance of neighboring territory as a source of truck receipts. In 1929, 58 per cent of the cattle, 58 per cent of the calves, 60 per cent of the hogs, and 41 per cent of the sheep came from territory within 45 miles of the market. Table 3 shows the relative importance of different zones in this respect.

The great increase in the use of motor trucks for transportation of livestock to the terminal market has decreased the rail shipments. In other words, the truck is replacing the railroad service to a great extent on the short haul. Table 4 shows the cars of livestock shipped by rail from 50 representative towns in the trucking territory from 1924

to 1929, inclusive. There has been a sharp decline in the rail shipments from points within 75 miles of the market. At present, practically all the livestock within a radius of 40 miles comes by truck. In zones more distant, the decline in rail shipments, also, is very evident. For example, the six towns at distances of 60 to 75 miles in 1924 shipped 875 cars of livestock by rail, in 1929 only 241 cars.

Table 3
Percentage of Truck Receipts from Different Zones in 1929

Zone— miles from market	Percentage of all receipts				
	All loads	Cattle	Calves	Hogs	Sheep
0-15	17.3	12.6	8.2	6.0	4.0
16-30	23.6	20.2	21.9	21.7	18.1
31-45	26.1	25.3	27.8	31.9	18.7
46-60	16.7	17.5	19.8	21.8	20.9
61-75	10.1	13.5	12.4	11.7	21.1
76-90	2.5	3.5	4.4	2.6	8.3
91-105	1.7	2.9	2.7	2.2	3.7
106-120	0.7	1.3	1.2	0.5	1.6
121-135	0.6	1.4	0.7	0.5	1.4
136-150	0.5	1.3	0.8	0.8	1.1
151 and over	0.2	0.4	0.1	0.3	1.1
	100.0	100.0	100.0	100.0	100.0

Table 4
Carloads of Livestock Shipped by Rail from 50 Representative
Towns During 1924-1929

Zone.....	I	II	III	IV	V	VI	VII	Total
Miles.....	0-15	16-30	31-45	46-60	60-75	76-90	91-105	0-105
Towns reporting..	1	9	16	14	6	3	1	50
Year								
1924	2	894	2,203	2,285	875	289	113	6,661
1925	8	664	1,865	1,992	527	320	105	5,481
1926	1	599	1,685	2,178	539	268	151	5,421
1927	10	389	1,571	2,240	551	181	111	5,053
1928	3	171	1,116	1,704	427	300	117	3,838
1929	2	120	603	1,093	241	385	131	2,575

A study of Figure 5 shows the importance of trucks in transporting livestock from neighboring zones. Thus in Zone I, within 15 miles of the market, trucks are used entirely and the curves showing the number of receipts show little change. In Zone II, trucks apparently had gained practically complete control of the situation by 1928, because receipts reached a peak in that year and showed no gain in 1929. In Zone III, truck shipments have been increasing rapidly since 1924 and it may be only a year or two until trucks will haul all the livestock. Just to what distance the truck will replace the rail service for livestock hauling can not be predicted. It will depend largely upon the relative costs of truck and rail transportation for comparable service.

With railroads and trucks both serving the territory it becomes important for the shipper to study transportation costs and service, if he is to decide which method of shipping is most economical.

LENGTH OF HAUL AND SIZE OF LOADS

With the increase in the use of motor trucks the average length of haul is increasing. In 1924 the average haul for all truck loads arriving at South St. Paul was approximately 22 miles. In 1929 the average was approximately 41 miles. Because small loads are relatively more numerous from adjacent territory, it is perhaps better to view the increase

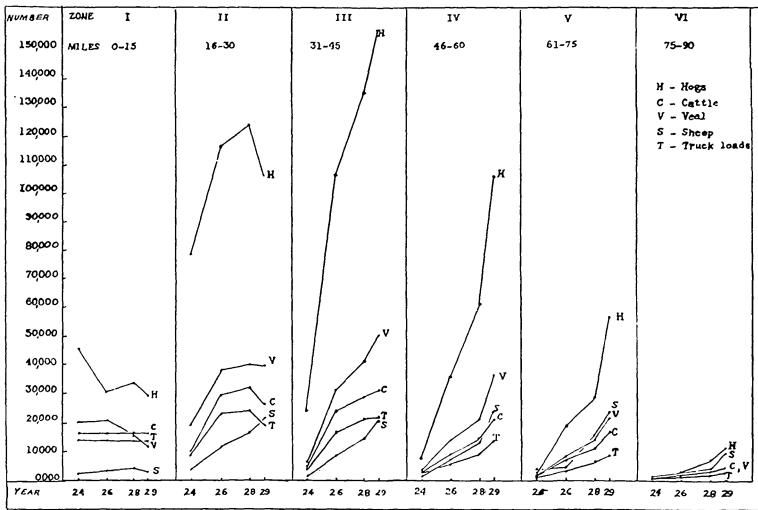


Fig. 5. Number of Hogs, Cattle, Calves, and Sheep Trucked from Different Zones to South St. Paul, During 1924-29

in length of haul from the standpoint of different classes of livestock, as shown in Table 5. Between 1924 and 1929 the average haul for cattle increased from approximately 22 to 47 miles. The increase for calves was 24 to 47 miles; for hogs 25 to 46; and for sheep 44 to 55. In other words, in five years the average distance of haul practically doubled for cattle, calves, and hogs. As previously mentioned, sheep are not produced in large numbers close to the market, therefore the haul increased only 24 per cent.

A few words of explanation about the method of calculation of the average length of haul may be in order. The territory was divided into zones by drawing concentric circles at 15-mile intervals from the South St. Paul market. The first zone was 0-15 miles, the second 16-30 miles, and so on. The loads of livestock and the various kinds of

livestock were then classified according to the zones from which they came. It was assumed that the average length of haul for all the loads and livestock within a particular zone was the distance from the market to the midpoint of the zone. In obtaining the average for the year, the arithmetic average of distances to midpoints of zones weighted according to number of loads in the respective zones, gave the average length of haul for all loads. Similarly, weighting according to number of head gave the average haul for different kinds of livestock. This method gives results sufficiently accurate for the comparisons made.

Table 5
Average Length of Haul

	1924	1926	1928	1929
	Miles	Miles	Miles	Miles
All trucks	22.0	31.6	35.7	40.8
Cattle	21.9	33.7	39.4	47.4
Calves	23.7	35.1	40.3	47.2
Hogs	24.9	35.8	39.4	45.9
Sheep	44.2	43.4	48.7	54.9

Table 6
Relationship Between Sources of Truck Receipts and Average Size of Load

Zones (miles from So. St. Paul)	Average size of loads (pounds)
0- 15	1,712
16- 30	2,896
31- 45	3,539
46- 60	3,826
61- 75	4,155
76- 90	4,262
91-105	5,120
106-120	4,398
121-135	5,620
136-150	6,683
151 and over	6,706

The size of loads of livestock trucked to South St. Paul varies largely but, generally speaking, the longer the haul the larger the load. In territory close to the market, much of the livestock is hauled by farmers themselves, who own small trucks for general purposes. Farther from the market are the commercial truckers, who own large trucks and specialize in livestock trucking. From longer distances, it is possible to haul only one load a day and economical use of the truck demands a full load. Furthermore, the driver's time can be used to better advantage if a large truck capable of hauling large loads is used. In 1929, loads coming from 15 miles or less averaged only 1,712 pounds; those from the 61- to 75-mile zone averaged 4,155 pounds. Loads ar-

iving from points 136 to 150 miles from the market averaged 6,683 pounds. Figures on the average weight of livestock per load from different zones are given in Table 6.

The average size of loads of livestock trucked to South St. Paul has been steadily increasing in recent years. The average during 1924 was 2,109 pounds but, as indicated in Table 7, the average weight increased in each year following, reaching 3,252 pounds in 1929 and 3,630 pounds in 1930. The improvement in roads allows the use of larger trucks and at present we find large up-to-date trucks, many of them double-decked for hogs and sheep, coming in from distant points with loads weighing upward of 8,000 pounds. The average size of loads referred to in Tables 6 and 7 were obtained by calculating first the average weight per head for different kinds of livestock from a limited number of loads and applying these weights to the number of head in the loads.

Table 7
Changes in Average Size of Loads

Year	Average No. of head	Average weight (lb.)
1923	7.0	2,109
1924	7.4	2,211
1925	7.9	2,382
1926	8.7	2,598
1927	9.3	2,793
1928	9.6	2,889
1929	10.8	3,252
1930	12.5	3,630

SEASONAL VARIATIONS IN TRUCK RECEIPTS

The number of truck loads of livestock arriving at South St. Paul is greatest in September, October, November, and December, and lowest in January and February. Normally, the receipts are heaviest in the fall, and this is reflected, not only in a larger number of loads, but also in a greater amount of livestock per load. In 1929 the average weight of livestock in a truck load was approximately 3,500 pounds in September, October, November, and December. On the other hand, weights during the first six months of the year averaged about 2,900 pounds. Figure 6 shows the number of truck loads and average weight for each month in 1929.

There is a marked seasonal variation in the receipts of different classes of livestock trucked to South St. Paul, as shown in Table 8, giving the average percentage distribution between months for both truck and rail receipts for the six-year period 1924 to 1929.

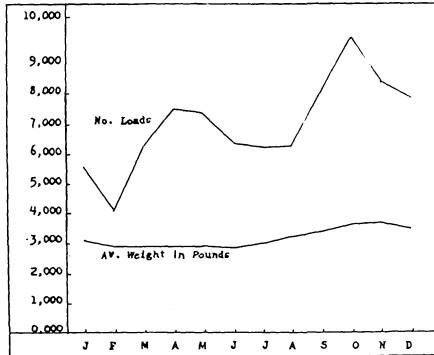


Fig. 6. Truck Loads of Livestock Received Each Month in 1929 at South St. Paul

Table 8
Percentage of Truck Receipts and Rail Receipts Arriving Each Month—
Average of Six Years, 1924-29

	Cattle		Calves		Hogs		Sheep	
	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail
January	5.6	6.3	6.6	8.5	7.1	13.5	4.3	6.9
February	5.2	5.3	6.5	8.7	5.4	9.5	3.5	4.5
March	7.3	6.3	8.0	10.1	7.5	8.6	3.2	2.5
April	9.3	5.9	8.5	9.9	7.8	7.1	2.8	1.3
May	10.2	5.7	9.9	10.0	7.3	6.7	1.7	1.3
June	8.3	5.4	8.8	8.6	6.2	6.7	3.7	1.1
July	7.5	7.6	7.6	7.6	5.3	5.8	6.4	2.7
August	8.6	9.6	6.9	5.7	5.0	3.4	12.2	6.3
September	9.3	11.8	7.7	6.2	8.8	4.1	18.1	16.3
October	10.5	16.2	10.3	8.7	14.1	8.7	20.9	29.1
November	10.4	12.6	9.9	8.1	14.0	11.8	14.4	18.4
December	7.8	7.3	9.3	7.9	11.5	14.1	8.8	9.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Cattle marketing by truck reaches a low point in January or February, increases to a peak in May, declines during the summer, increases again in the fall, reaching the highest point for the year in October or November. Rail receipts of cattle do not show a marked increase in May but a higher peak in the fall than truck receipts. The heavy movement of cattle from the West in the fall is largely responsible for this condition. Calves are marketed more uniformly during the year than cattle; but, like cattle, truck receipts are lowest in January and February and highest in October, November, and December. Calves marketed by rail reach a peak in the spring because at points out of the Twin City milk area a large share of the calves are born in the spring and marketed within a few weeks as veal; within the Twin City milk area, an area which is also part of the trucking territory, more of the

calves are born during the fall and about six weeks after birth are trucked to the market for sale.

Approximately 40 per cent of the hogs marketed by truck are shipped during October, November, and December. There is a fairly large movement to market during March, April, and May, but in the summer months comparatively few hogs are trucked to the market. Rail receipts reach a peak a little later than truck receipts, November, December, and January being the most important. There is a tendency for farmers living in the trucking area to market hogs earlier in the fall and also to have more hogs for sale in the spring. Sheep receipts are more seasonal than of any other class of livestock. Approximately two-thirds of the sheep shipped by truck and three-fourths of those shipped by rail are marketed during September, October, November, and December.

Table 8 indicates that, compared to rail receipts, truck receipts are relatively low in January and February, probably because of the differences in production practices in adjacent and distant territory. On the other hand, the condition of the roads, especially the secondary roads, during these months is such as to interfere at times with the use of a truck. Heavy snowfalls often block the secondary country roads, making it impossible for trucks to reach farms off the main roads for several days. During the spring, when the ground is thawing, marketing often must be postponed several days because secondary roads are impassable for trucks.

The seasonal variations in truck receipts are of special significance from the standpoint of economic utilization of trucks. The peak load for all classes of livestock comes in the fall and no one class of livestock supplements the other as to time of marketing. The result is that in the fall truck owners usually have no difficulty using their trucks every day and get capacity loads on most of the hauls. During the fall, therefore, the truck and the driver's time is utilized more effectively than during other seasons. Not only is the total income per day greater, but the cost per head hauled is lower than during the other months of the year, unless hauling of other products increases during other months.

The average variation in truck receipts within the week is indicated in Figure 7. Tuesday, Wednesday, Thursday, and Friday are the big days for truck receipts at South St. Paul. Monday usually has a fair volume, but Saturday receipts are very low.

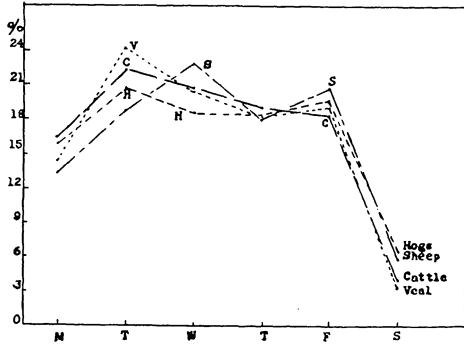


Fig. 7. Percentage of Weeks' Truck Receipts Arriving Each Day at South St. Paul (Average of September to December, 1929)

LOSSES DUE TO DEAD AND CRIPPLED ANIMALS

In order to determine the extent of losses due to dead and crippled animals, figures were obtained from the St. Paul Union Stockyards Company giving the number of head of crippled and dead animals unloaded from both trucks and railroad cars during 1929. For sheep received by truck, death losses were 0.81 head for each 1,000 head. Similar figures for cattle, calves, and hogs were 0.30, 0.65, and 0.62 per 1,000 head, respectively. Losses due to crippling of livestock while in transit to market by truck were higher in cattle than in any other class, 2.39 in every 1,000 received by truck. Hogs were next with 1.49 head; calves 0.41 head; and sheep only 0.34 head per 1,000.

While no specific study was made of the factors causing these losses, it seems logical to conclude that overcrowding and improper footing were important factors. Improper footing often causes animals to slip and fall while in transit and seems to be a common cause of crippling, especially among cattle. A liberal amount of sand or straw bedding will provide good footing and reduce losses. Heavy feeding on the farm before loading may cause losses, especially among hogs, during hot weather. Careless loading is often a cause of crippled animals, and if losses are to be reduced to a minimum, careful handling at the time of loading is absolutely essential. Care in loading will also reduce the number of bruised hogs in truck shipments, which should have a favorable reaction on prices so far as the producer is concerned.

In 1929 losses from dead and crippled animals were greater in rail than in truck shipments for all classes of livestock except cattle. Table 9 gives the average losses in both rail and truck receipts at South St. Paul in 1929. At this point it is important to emphasize the fact that these comparisons are not for the same type of service. Most of the rail receipts come from longer distances than the truck receipts and

naturally with a longer haul and a greater interval of time, losses would be expected to be larger in the rail shipments. Data were not available for comparisons from equal distances for rail and truck losses.

The truck, however, seems to have some advantages over the railroad with respect to losses on the shorter haul. In using the truck, the livestock goes direct from the farm to the market, thus eliminating the additional loading at the shipping point, which is necessary for rail shipments. Furthermore, the truck makes the haul in a shorter time and without delays in crowded terminal yards. Finally, it is possible to avoid, to some extent, the hauling of livestock during unfavorable weather when the truck is used, while with railroads the trains must go on schedule. This is especially important in summer, when hauling during the hottest part of the day might result in heavy losses.

Table 9
Dead and Crippled Animals Received at South St. Paul in 1929
(Losses per 1,000 head)

	Dead animals per 1,000		Crippled animals per 1,000	
	Rail	Truck	Rail	Truck
Cattle	0.29	0.30	0.77	2.39
Calves	3.29	0.65	0.98	0.41
Hogs	1.66	0.62	2.90	1.49
Sheep	1.75	0.81	0.78	0.34

Losses in transit may be insured against with commercial insurance agencies. According to schedules in force in 1930, the rates on rail shipments for distances less than 100 miles are higher than on truck shipments. These rates are given in Table 10.

Table 10
Schedule of Insurance Rates Covering Death and Crippling in Transit,
Effective in 1930

Miles to market	Rail rates, cents per head			Miles to market	Truck rates, cents per head		
	Cattle and calves	Hogs	Sheep		Cattle and calves	Hogs	Sheep
1- 150	10	7	5	1- 75	5	3	3
151- 350	12	9	5	76-100	8	5	5
351- 750	15	11	5	101-125	10	7	7
751-1100	20	15	6	126-150	15	10	10
1101-1450	25	20	7	151-200	20	15	10

RATES FOR TRUCKING LIVESTOCK

For the purpose of determining charges made for trucking, the account sales of four commission firms at South St. Paul were examined and figures obtained giving the truck rates in 1929 and 1930 from various points within the trucking area. The rates for hogs are shown in Figure

8. Cattle rates usually are the same as hog rates. At many points the same is true for calves and sheep, but at others calves are charged for by the head and sheep take a somewhat higher rate than hogs.

Figure 8 shows that truck rates are not the same for all towns of equal distance from the market. For example, there are many towns approximately 50 miles north of South St. Paul with rates on hogs of 50 cents per hundredweight; from most points the same distance west of the market the rate is 35 cents. These variations are due largely to local conditions, as differences in number of livestock per square mile, differences in roads, and the state of competition among truckers.

In regions where livestock is relatively sparse the trucker frequently must call at several farms to get a full load. This means greater ex-

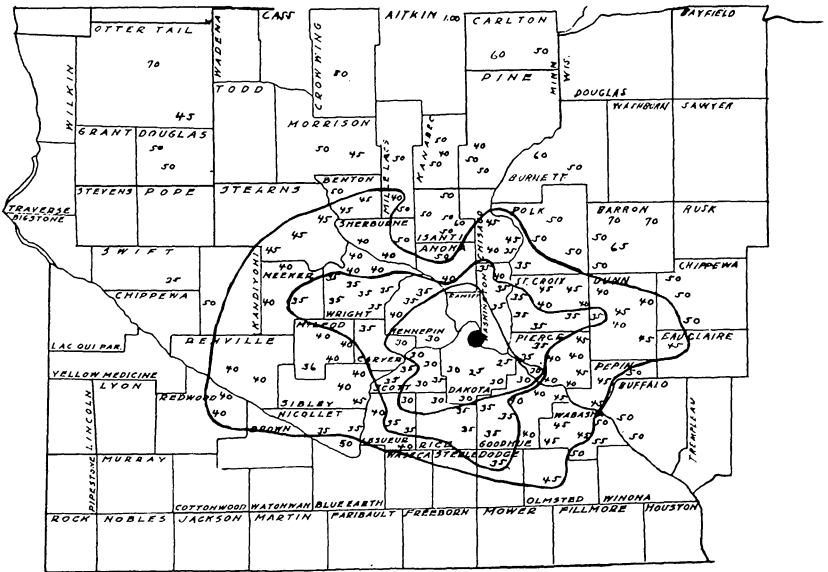


Fig. 8. Truck Rates for Hogs to South St. Paul, 1929-30
(Cents per hundredweight)

pense for local collection, as more time is required and the truck must cover greater distances. Where the trucker can obtain a full load at one or two farms, the expense is less and rates are lower.

The condition of roads affects costs of operating trucks and consequently has an influence on rates. In general, the communities with good roads have an advantage over those that may be equally distant from the market but have poorer roads. This is well illustrated in Figure 8, in the case of rates from Wisconsin points directly east of South St. Paul. The towns on the concrete highway have a 35-cent rate on hogs; a few towns off the highway but just as near to the market have a 40-cent rate.

Trucking of livestock is carried on primarily by individuals owning one, two, or perhaps three trucks. It is comparatively easy for a man to go into the trucking business. A few, apparently, have started with only sufficient capital to make the initial payment on the truck, expecting to pay for it out of earnings. In their desire to increase their volume of business they have often cut rates, in some instances forcing rates down to "cut throat" levels. The result has been that in some communities competition apparently has forced rates to a level so low that it is difficult for the operator to make a profit.

No study was made of return loads and their effect on livestock rates, but it seems that in some instances the rates are relatively low because the trucker is fairly sure of a return load. Where rates are relatively low from points far from the market, like points 100 miles west of South St. Paul showing a 40 cent rate (Figure 8), the trucker may make a good income hauling machinery, feed, and other supplies back to the local point. Consequently, he can offer a more favorable rate on livestock than if he had to drive an empty truck on the return trip.

Considering the distance from the market, it is evident that the rates charged for the short hauls are relatively higher than those on the longer hauls. From points less than 15 miles from the market, much of the hauling is done by farmers themselves or by buyers operating trucks, making it difficult to find established rates. However, on hauls of 20 to 25 miles the rate is 25 to 30 cents per hundredweight; from points more than twice that distance from the market, in many instances rates are 30 to 35 cents. Generally speaking, the driver's time is used more effectively on the longer haul. It takes just as much time to load and unload a truck load of livestock coming from a distance of 20 miles as from 50 miles. Furthermore, it is more difficult to get large loads on the short hauls. Large loads allow more economical utilization of both the truck and the driver's time. These conditions cause relatively higher charges per ton mile on the shorter haul.

It is difficult to make a comparison of railroad and truck charges because they are not for comparable service. Railroad rates are a charge for hauling livestock from the shipping point to the market, while truck rates are a charge for transportation service from the farm to the market. In using the rail service, therefore, the farmer must haul the livestock from the farm to the shipping point or hire this service. In comparing costs of shipping by rail and by truck, the cost of local transportation must be included in rail costs.

Freight rates in 1930 from representative shipping points within the trucking territory are given in Figure 9. In general, there is a more definite relationship between distance and rail freight rates than for truck rates. That is, towns of equal distance from South St. Paul

are more likely to have the same freight rate on livestock than the same truck rate. This fact is brought out in Figure 9.

Truck rates are higher than rail rates on livestock to South St. Paul from any given shipping point. However, the shipper of livestock can not base his decision whether to ship by truck or rail on rates alone. The service rendered and other costs involved must also be considered.

COMPARISON OF COSTS OF SHIPPING LIVESTOCK BY TRUCK AND BY RAIL

Costs of marketing livestock will be considered as including all the costs incurred in transferring the livestock from the farm to the buyer in the terminal market. In comparing costs between marketing by rail and by truck it is important that we begin at the farm and consider all items of expense. These items are given below.

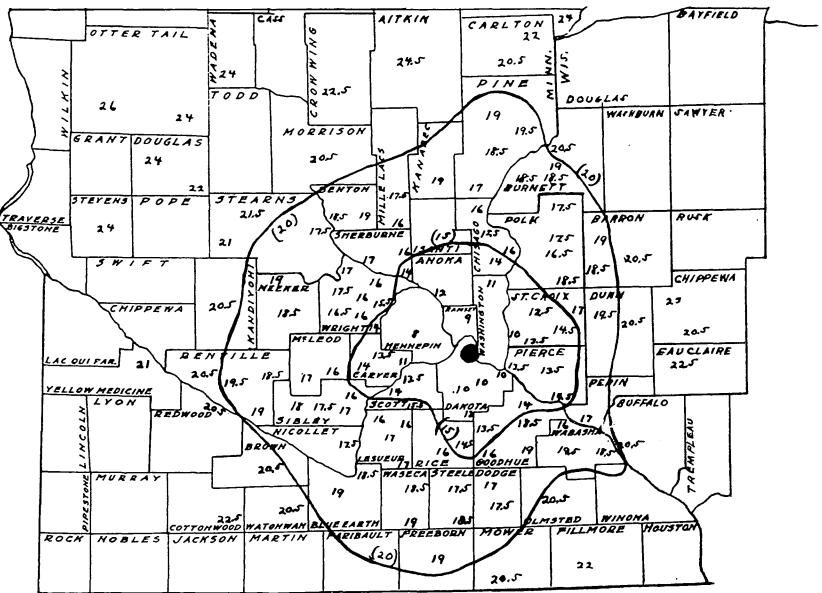


Fig. 9. Freight Rates for Hogs in 1930 (Cents per hundredweight)

1. **Local hauling.**—Rail rates include the cost of transporting livestock from the shipping point to the market. When shipping by rail there is also a transportation cost between the farm and the local shipping point that must be considered. Interviews with farmers in the trucking area indicated that the cost of hiring truck service between the farm and the local point ranged from 3 cents to 15 cents per hundred pounds. This charge varies according to the distance of the farm

from the shipping point and also between different communities. A conservative estimate for an average charge would be $7\frac{1}{2}$ cents per hundred pounds. This cost must be included in figuring costs of marketing by rail; in marketing by truck the rates cover the transportation costs from the farm.

2. **Local handling expense.**—In shipping by rail there is a cost of local assembling. If livestock is purchased and assembled by a local buyer this cost is included in the buying margin. If assembled by a shipping association, there is the cost of manager's salary and incidental expenses. Studies of shipping associations in Minnesota indicate that while local costs vary among associations, the average cost is about 10 cents per hundredweight, not including insurance fund to cover losses. Local handling costs must be considered in rail shipments, but are included in the rates when marketing is done by truck.

3. **Transportation charges.**—This item represents the costs of transportation of livestock from the shipping point to the terminal yards in rail shipments, and from the farm to the terminal yards for truck shipments. Truck rates are higher than rail rates by a large margin, but when local hauling and local handling costs are added, the difference is not so great. In Table 11 for hogs and Table 12 for cattle, a comparison is made between average truck rates and average rail rates, plus $17\frac{1}{2}$ cents to cover all local costs, and 2 cents for terminal switching charges. The average rates given are simple averages of rates from towns grouped according to distances, as shown.

From the standpoint of the expenses in moving the livestock from the farm to the terminal market, the costs by truck are somewhat higher than by rail. The costs also increase with distance. At distances of 20 to 30 miles, however, the differences are only 3 cents per hundredweight for hogs and 2.2 cents for cattle. For all towns up to 50 miles, the average would be approximately 5 cents per hundredweight in favor of rail shipments. This is partly offset by lower insurance on losses in transit. Furthermore, these figures make no allowance for shrinkage.

Another factor that must be recognized is that while the local handling costs are eliminated in using the truck, the producers may lose the services of the co-operative livestock shipping associations. In some communities these associations have not only assembled livestock, but also have provided the producers with valuable market information, and assisted them in merchandising their product. Truckmen may not be as well qualified as managers of shipping associations to guide the producers.

Table 11
Comparison of Average Rail and Truck Rates for Hogs, from Towns in the
South St. Paul Area
 (Rates in cents per cwt. in effect, 1930)

Distance (miles)	No. of towns	Average hog rate		Rail rate plus 2 cents switching, 7.5 cents local hauling, 10 cents local handling	Amount truck rate exceeds rail rate plus 19.5 cents
		Rail cents	Truck cents		
0-20	2	9.5	25.0	29.0	-4.0
20-	17	10.6	34.1	31.1	+3.0
30-	11	13.1	35.5	32.6	+2.9
40-	17	15.6	38.5	35.1	+3.4
50-	17	17.6	42.9	37.1	+5.8
60-	16	17.9	45.0	37.4	+7.6
70-80	8	18.7	47.5	38.2	+9.3

Table 12
Comparison of Average Rail and Truck Rates for Cattle, from Towns in the
South St. Paul Area
 (Rates in cents per cwt. in effect, 1930)

Distance (miles)	No. of towns	Average cattle rate		Rail rate plus 2 cents switching, 7.5 cents local hauling, 10 cents local handling	Amount truck rate exceeds rail rate plus 19.5 cents
		Rail cents	Truck cents		
0-20	2	9.3	25.0	26.8	-1.8
20-	17	11.1	33.8	28.6	5.2
30-	11	12.0	34.5	29.5	5.0
40-	17	14.7	38.8	32.2	6.6
50-	17	16.6	42.6	34.1	8.5
60-	16	16.9	46.3	34.4	11.9
70-80	8	17.1	46.9	34.6	12.3

4. **Transit insurance.**—In marketing livestock, losses arise from the death or crippling of animals in transit. This risk can be covered by either commercial insurance or, in the case of shipping associations, by a sinking fund. Commercial rates, as previously mentioned, are lower for truck shipments than for rail shipments for distances up to 100 miles. On distances under 75 miles, truck insurance rates are lower than rail insurance rates by the following amounts per head: Cattle and calves 5 cents, hogs 4 cents, sheep 2 cents. Some truckers provide insurance and include it in the truck rate. Others provide insurance at cost, as an additional charge.

5. **Shrinkage.**—Shrinkage represents the difference between the weight of livestock at the farm at the time of loading and the weight at the terminal market. In rail shipments it is common practice to refer to shrinkage as the difference between weights at the shipping point and the terminal market. This shrinkage, however, may be quite different from the shrinkage between the farm and the terminal market. A

fair comparison of shrinkage between rail and truck shipments should begin at the farm.

Obtaining farm weights on livestock is difficult and it was impractical in this study. For that reason, no definite information can be presented on shrinkage. Shippers of livestock who are faced with the problem of deciding whether to ship by rail or by truck will find it to their advantage to secure weights and make comparisons of shrinkage.

Shrinkage is an indefinite item of cost in the marketing of livestock. Livestock is sold in the terminal markets on the basis of terminal weights. When animals decline in weight between the shipping point and the market, obviously there are less pounds to sell. If this decline is greater when the livestock is shipped by rail than by truck, the pounds of livestock will be less in the former case and the gross value lower. The shipper receiving less for his livestock would say it was more expensive to ship by rail, or vice versa, if the shrinkage was greater by truck. In this sense, shrinkage enters into the problem as a cost of marketing. To the extent that shrinkage is a favorable factor in price, it would not be a cost. That is, if the load showing the greater shrinkage on the same grade of livestock would dress higher, and if the packer would pay a higher price for this load, the total value might be the same. Whether or not buyers discriminate against livestock arriving by truck is a question which can not be answered, as data used in this study are inadequate for that purpose. Several men in the trade, however, were interviewed on this point, and they were all of the same opinion that, on the average, rail and truck hogs of the same grade tend to sell for the same price.

6. **Terminal yardage charges.**—The discussion relating to rates and charges in the terminal market is for the purpose of comparing the charges against livestock arriving by rail and by truck, and does not question the reasonableness of these charges. Terminal market charges must have the approval of the Packers and Stockyards Administration, which has the duty of seeing that such charges are fair and reasonable. Furthermore, yardage and commission fees as well as other charges are subject to change and in the future may be different from those given in this analysis.

Charges for yardage are on a per-head basis and are higher for trucked-in stock than stock arriving by rail. The yardage fees at South St. Paul in 1930 for livestock arriving by rail was 30 cents per head for cattle; 20 cents for calves (300 pounds or under); 10 cents for hogs; and 7 cents for sheep. Livestock arriving by truck were charged in addition to the above regular fees, 5 cents for cattle; 2 cents each for calves, hogs, and sheep.

7. **Terminal commission charges.**—Commission charges¹ at South St. Paul in 1930 for livestock arriving by truck were: Cattle 80 cents per head; calves 40 cents; hogs 30 cents; sheep 20 cents. Carload rates apply if the load exceeds 18 head in the case of cattle, 40 head for calves, 40 head for hogs, and 70 head for sheep. Selling commissions on single ownership carload lots were:

Cattle, single deck	Minimum	\$15	Maximum	\$19
Calves, single deck	"	15	"	20
Calves, double deck	"	21	"	26
Hogs, single deck				
not over 17,000 lb.	"	12	"	14
Hogs, double deck				
not over 27,000 lb.	"	17	"	22
Sheep, single deck	20 cents per head		"	14
Sheep, double deck	20 " "		"	20
Mixed loads, single deck	Minimum	\$15	"	25
Mixed loads, double deck	"	20	"	28

Assuming straight single-deck carloads averaging 25 head of cattle; 60 calves; 75 hogs; 100 sheep, the commission charge per head would be, 73 cents for cattle, 30 cents for calves; 21 cents for hogs, and 14 cents for sheep. These rates for cattle are 7 cents less per head than trucked-in lots less than a carload. Similarly, the rate on calves is 10 cents less per head, hogs 9 cents less, and sheep 6 cents less than truck shipments.

8. **Feeding in terminal markets.**—Feeding of livestock in the terminal market is at the option of the owner, but the general practice is to feed that shipped in by rail but not that brought in by trucks. Feeding in the terminal market is one of the costs in marketing, and as livestock trucked in usually is not fed, it seems that this is a cost that should be charged against rail shipments, in making comparisons of the costs of marketing by rail and by truck. This is true providing shrinkage in weight also is considered as a cost. Feeding adds to the weight of the animals and reduces shrinkage. Charging the cost of feed against rail shipments in a comparison with trucking costs would be unfair unless shrinkage is also considered in figuring costs. In making this statement it is assumed that the buyer pays the same price for livestock of the same grade whether they arrive by rail or truck. It is possible, however, that animals carrying a heavy fill, either due to heavy feeding at the farm before loading on the truck, or heavy feeding in the terminal market, would be discriminated against to some extent, and sell for somewhat lower prices.

¹ Selling commissions are those charged by private agencies, members of the St. Paul Livestock Exchange. The rates of a large co-operative agency on the market are somewhat lower.

Other terminal market costs.—All livestock arriving at South St. Paul is insured against loss due to fire. The charge is 15 cents per car, when livestock is received by rail, and one cent per head when received by truck, with a maximum of 15 cents per load.

State weighing fees are one cent per head for all hogs and sheep and 2 cents for cattle and calves.

ILLUSTRATIONS OF COSTS

Using the items referred to above, it is possible to illustrate the costs of marketing a certain volume of livestock from a particular town. Assume a case of marketing—75 hogs weighing 17,000 pounds from Delano, Minnesota, a point approximately 40 miles from South St. Paul, with truck rates 35 cents and rail rates 14 cents per hundredweight. These were the rates charged when the study was made.

Figuring costs on a hundredweight basis, the following results were obtained:

	Truck	Rail
Transportation	\$0.35	\$0.14
Local hauling .....		.075 (Estimated)
Local handling .....		.10 "
Terminal switching charge .....		.024
Transit insurance .....	.013	.031
Yardage .....	.053	.044
Commission .....	.132	.093
Total	\$0.548	\$0.507

The figures indicate a difference of about 4 cents a hundredweight in favor of the rail shipment. However, no account is taken of the shrinkage. While data are not available, shrinkage on the trucked hogs probably would be no greater than by rail from a point 40 miles from the market. The hogs can be loaded on a truck on the farm and weighed in at South St. Paul about two hours later. Shipping by rail means loading on a truck at the farm, unloading at the local stock yards, loading on car, and, finally, several hours later, unloading at the terminal market. If we assume equal shrinkage, we would have to add also the feed cost at South St. Paul. If \$17 worth of corn were fed, this would mean an additional 10 cents per hundred pounds to be added to the rail costs. Therefore, under the conditions set up, assuming equal shrinkage it would cost 6 cents more per hundred pounds to market by rail than by truck.

The following is a similar illustration for cattle, using a truck rate of 35 cents per hundredweight. Truck rates on cattle from Delano were the same as on hogs, 35 cents. The figures are for a car of 25 cattle weighing 22,000 pounds.

	Truck	Rail
Transportation	\$0.35	\$0.135
Local hauling .....		.075 (Estimated)
Local handling .....		.10 "
Terminal switching charge .....		.018
Transit insurance .....	.006	.011
Yardage .....	.04	.038
Commission .....	.091	.083
	<u>\$0.487</u>	<u>\$0.46</u>

CONVENIENCE OF THE TRUCK IN MARKETING LIVESTOCK

One of the important reasons for the rapid development of livestock trucking is that the producer finds truck transportation convenient. He may use his own truck or he may call a commercial trucker and his livestock will be transported direct from the feedlot on his farm to the market. If he can fill a truck, there is no delay in waiting for neighbors to obtain sufficient livestock to load a carload as is true in co-operative rail shipments. Even the large feeder who ordinarily can market a carload himself, finds that all animals do not finish at the same time and it is economical to market a truck load at a time as the stock is ready for the market.

Marketing livestock by truck enables the producer to study market conditions and to move the livestock to market when prices seem favorable. Producers comparatively near the market, especially those having their own trucks, can get a report on the market in the morning and then decide whether or not to deliver the livestock to the terminal market for sale that day. There are limitations to this practice for the producers who do not own their own trucks, because it is usually impossible to hire truck service on such short notice.

No doubt many producers study the market and truck the livestock when conditions are favorable, but a study of the situation fails to show that a majority of the producers do so, altho they may follow the market as to longer periods. Truck receipts constitute only a fraction of the total receipts of the South St. Paul market. One would expect if producers shipping by truck were hitting the high markets that on the days when prices had risen, more than a normal amount of stock would arrive by truck. In studying this situation, an average weekly movement of hogs arriving by truck was computed for the period September to December, inclusive, in 1929. This gave the percentage of livestock arriving by truck for different days of the week for the period as a whole, and was considered a normal movement. As the next step, a study was made of the deviation of daily truck receipts of hogs from the normal weekly movement. The relation of these deviations to the

top price of hogs was then studied. On the days when prices were higher than the previous day, and when we might expect truck receipts to increase if farmers were following the market, we find that actually the receipts were above normal in only 9 cases and below normal in 22 cases. On the other hand, on days when the price was below that of the previous day and when we might expect some curtailment of truck shipments, the receipts were above normal 24 times and below normal only 14 times. This indicates that producers selling livestock by truck were not very successful in hitting the most favorable market. The study, however, showed a tendency for truck receipts to be above normal on days that were preceded by a day of higher prices. In other words, if prices rise on a particular day, the day following may be expected to have a greater than normal number of hogs arriving by truck.

While the truck has advantages in the way of convenience and flexibility, there may be times when truck service is uncertain. In the spring when country roads are opening up they may be impassable for trucks. The same is often true for a few days after heavy snowfalls during the winter. Furthermore, breakdowns sometimes result in expensive delays in marketing livestock by truck.

EFFECT OF TRUCKING ON CO-OPERATIVE SHIPPING ASSOCIATIONS

A large share of the livestock sent to South St. Paul is shipped by co-operative livestock shipping associations in the Northwest. Co-operative shipping grew very rapidly between 1910 and 1920; in 1919, Minnesota alone had 655 shipping associations.² The main purpose of these associations is to assemble the livestock into carload lots at country shipping points and ship it to the terminal livestock market, where it is sold. The price the farmer receives is the price the livestock sells for, less the expense of marketing.

As trucks came into common use in the transportation of livestock, the situation with respect to shipping associations changed considerably. Formerly it was necessary for producers to co-operate in loading carlots if they were to sell at terminal markets. Today, in a large territory around South St. Paul, it is possible for the farmer to call a trucker and have his livestock hauled direct from the farm to the terminal market for sale. Many producers have found the latter method more to their liking, with the result that in many communities where livestock formerly was marketed by co-operative shipping associations it is now shipped by truck and the shipping association has passed out of the picture. Figure 10 shows the location of 160 co-operative livestock ship-

² Minn. Agr. Expt. Sta. Bull. 201.

ping associations in Minnesota that were operating in 1920 but not in 1930. Of these 160 associations, 83 are located in what would be considered South St. Paul trucking territory. This territory, which in 1920 had only one-fifth of the associations in Minnesota, has more than half of the failures. The direct cause for many of the failures is the increased use of motor trucks in transporting livestock. In the south-

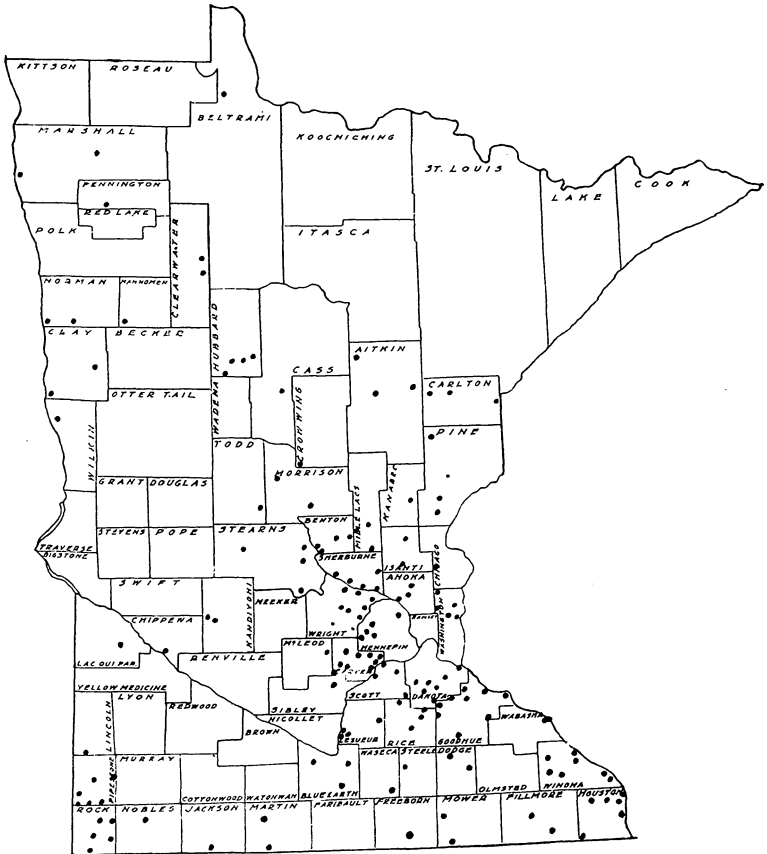


Fig. 10. Co-operative Livestock Shipping Associations in Minnesota Operating in 1920 but not in 1930

western corner of the state, 13 associations that ceased operations between 1920 and 1930, are within the trucking area of the Sioux Falls market. Others of the 160 associations are in territory where direct marketing by producers to interior packers has increased. It is evident, therefore, that the motor truck has been eliminating many co-operative shipping associations.

The question is often asked, "What can a co-operative shipping association do to meet the competition of the motor truck?" One

answer might be for the association to purchase a truck and transport livestock for its members. This has been done by only one association in the South St. Paul territory, and it is doubtful if a co-operative shipping association can haul livestock at lower rates than those now charged by private truckers. Competition has been keen in the trucking of livestock and apparently the rates are as low as or lower than could be maintained by the average shipping association owning and operating a truck. In some communities, where a large volume of livestock is shipped and where competition has not forced rates to relatively low levels, it may be economical for an association to meet truck competition by owning and operating a truck, but certainly such a program should not be attempted without first studying carefully the costs of operating trucks and the rates that it would be necessary to charge for hauling livestock.

In the second place, the producers might maintain their co-operative livestock shipping association but contract with one or more local truckers to haul livestock for the members at a certain rate. Presumably, the association should be in a position to secure more favorable rates than the individual farmer because the trucker would be assured of greater volume in contracting with an association, thus enabling him to haul at a lower cost. If the producers had taken an active interest in their association, many associations now dissolved would probably still be functioning as a local agency to assist the livestock producer in securing better and more economical trucking service. One of the difficulties in connection with the association contracting for trucking service is the instability of truck rates. Truckers not under contract with the association might cut rates to figures below those in the contract, or even below cost, and producers would hire their service, thus defeating the plan of the association. In the long run, it is likely that producers would obtain better and more economical trucking service by maintaining an association to bargain for rates and check on services rendered, but loyalty on the part of the members is essential to the success of such a program.

A third means of meeting truck competition might be providing truck service between the farm and the local shipping point by the co-operative shipping association. One reason for the great growth in trucking is the convenience of the trucking service. The truck gathers the livestock at the farm and the farmer is relieved of the responsibility of transporting it to the local shipping point. Associations in the more distant points, by providing a trucking service for the farmers between the farm and the shipping point, can relieve the producer of some of the responsibility, placing the association rail shipping service on a basis of convenience more nearly comparable to the trucking service.

The difficulty encountered, however, is that some livestock is likely to go direct to the terminal market by truck. Every such truck load reduces the volume available for rail shipment and makes it more difficult to get full carloads. This difficulty has crippled many associations in the trucking territory. Associations find it hard to ship regularly and to load the minimum weight in cars, when part of the livestock of the community is trucked to the terminal market.

The experiences of shipping associations in the South St. Paul trucking area indicate that it is very difficult for the association to meet the competition of trucks. Farmers have preferred to ship by truck instead of by rail through co-operative shipping associations. This does not mean, however, that under high-class management and a loyal membership the shipping association can not adjust itself to this situation and aid in improving the trucking service.

In some communities, truckers are buying livestock from farmers. This is a step backward, from a system of organized marketing through shipping associations to a country buyer system, which has many weaknesses from the standpoint of the producer of livestock. In bargaining with a buyer, the farmer, lacking knowledge of the market values, is at a distinct disadvantage. Furthermore, when the trucker has a load composed of livestock he has purchased in the country as well as livestock consigned to the market by farmers, there is an opportunity for the switching of livestock to benefit the trucker. This might be prevented by carefully marking animals in loads involving plural ownership, and the use of written agreements between the producer and the trucker in which the livestock is listed and the commission firm to which it is consigned, is indicated.

CONCLUSIONS

It has been shown in the preceding analysis that there has been a great increase during recent years in the use of motor trucks for the transportation of livestock to the South St. Paul market. The truck is established permanently as a means of transporting livestock within a large territory surrounding this market. With further improvements in roads we can expect that the use of motor trucks will continue to increase. The convenience and flexibility of the truck appeals to the producer, which is another factor contributing to the permanency of truck transportation.

The important problem in marketing livestock by trucks is to make the truck service more efficient. This means that operators of trucks must study the costs of operation more carefully than they are doing at present. Some truckers do not know their costs and apparently at some points have furnished truck service at rates lower than cost.

Such a condition must be adjusted in time and rates will at least be equal to costs. Furthermore, any program that looks to a reduction of costs of operation must give consideration to the back haul. Driving an empty truck is expensive. Truckers that can obtain a load of feeder stock, feed, supplies, or other merchandise for the return haul will utilize their time and their trucks to much better advantage than if no return load is obtained. This should have a tendency to maintain rates on livestock at lower levels than if no return load is obtained. The livestock, in other words, will not assume the costs of both hauls. Part of the cost will be borne by the merchandise hauled back to the country points. Hauling full loads will also increase the efficiency of trucks in transporting livestock. Many light loads now come to the market and the costs of hauling per head in these loads is relatively great. The trucker who can get full loads regularly should be able to haul livestock at lower costs than the man who does not regularly utilize the capacity of his truck. An association of truck owners acting as an agency to get freight for the return trip should be of service in increasing income from their return hauls. An association of producers contracting with truckers for service could aid in providing full loads of livestock.

Public regulation of commercial motor trucking service for livestock, which is now under consideration, is likely to improve the service rendered by trucking agencies. A Minnesota law of 1925 (Ch. 185 Session Laws 1925) made the commercial trucking business operating between fixed terminals subject to the supervision of the Minnesota Railroad and Warehouse Commission, but trucks hauling agricultural products exclusively were exempted from this regulation. However, the right type of regulation should tend to insure the development of commercial livestock trucking along sound economic lines. Safeguards can be placed around the trucking business by making insurance compulsory. Such insurance should protect the trucking concern from liability owing to personal injury and damage to property. Insurance against losses due to death and crippling of livestock could be provided, either by commercial insurance companies or by insurance funds of co-operative associations, where hauling is done for members of associations. Also, improvement in trucking practices would result by requiring a written receipt for the freight handled. This receipt should show the name of the owner of the livestock, date and place received, description of the shipment, approximate value, destination, name of the commission firm, and the rates and charges.

The rate structure in the case of trucks is very unstable. Rates vary from time to time at particular points because of changes in the state of competition among truckers. Unrestrained competition car-

ried to the extreme may result in demoralization of the trucking business. For this reason, regulation with respect to rates and practices seems desirable. The requiring of commercial livestock truck operators to file rates and obtain approval of rates with the State Railroad and Warehouse Commission should tend to stabilize rates and protect truckers who are furnishing constant and reliable service from the concern that steps into livestock hauling for a few weeks with unreasonably low rates and then ceases transportation of livestock when other hauling is available. Another uncertain element in the rate structure is the registration fee paid by truckers. There is a feeling in some quarters that trucks should pay higher taxes because they use the public roads. Registration fees are subject to change by legislative action. If, in the future, trucks are called upon to pay a larger share of the cost of building and maintaining roads than they now do, and registration fees are raised, this will have a tendency to hold rates at higher levels than if fees were lower.

The development of livestock trucking has been responsible for many co-operative shipping associations ceasing operations in the South St. Paul trucking area. Even tho the co-operative shipping associations in this area are no longer important, there is still room for co-operative activity. This is particularly true in connection with the securing of economical trucking services. Producers have the opportunity to form district associations to contract with truckers for hauling livestock at definite rates. If a large membership is obtained at local points the trucker would be more assured of full loads and, therefore, should be able to offer the association more favorable rates than individuals. A district secretary employed part time could see that the truckers live up to their contract and provide reliable service. By authorizing commission agencies to make a small deduction from returns, a fund could be provided to maintain the organization and provide insurance against loss at a low cost.

Some attention should be given to the matter of the time of day of arrival of truck loads at South St. Paul. Truck receipts are an uncertain element in the market on any particular day. Trucks come in at all hours, many loads arriving after the bulk of the rail receipts have been sold. If a larger share of the livestock were trucked in during the night or the early morning, a fairly accurate estimate would be made of the trucked livestock in the market that day. The truck receipts, in other words, would play a more definite part in "making the market." Buyers and sellers having more accurate information on receipts in the market could price the livestock more nearly in line with true market conditions.

Finally, it should be emphasized that the whole problem of trucking of livestock and its effect on the market organization needs further study. Particularly should attention be given to shrinkage in truck shipments. A study of costs of operating trucks and their relation to rates would be of value. Truck transportation and its relation to the transportation structure as a whole needs special attention. The preceding analysis is more or less preliminary, an attempt to point out the developments in the trucking of livestock and the problems arising. For definite conclusions on many problems, further study is necessary.