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INTERSTATE HAULING OF

California-Arizona  
Fresh Fruits  
and Vegetables  
by Rail and Truck

Marketing Research Report No. 673  
Economic Research Service U.S. Department of Agriculture



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## PREFACE

The study reported here was recommended by the U.S. Department of Agriculture's Transportation Advisory Committee, Vegetable Advisory Committee, and Deciduous Fruit and Tree Nut Advisory Committee. It was endorsed by the California-Arizona Perishable Traffic Council composed of the Western Growers Association, the California Citrus League, the California-Arizona Potato Growers Association, and the California Grape and Tree Fruit League, who number among their membership many of the leading fruit and vegetable growers, processors, and distributors in business throughout the California-Arizona area. Additional backing was received from the United Fresh Fruit and Vegetable Association, a national organization of the produce trade servicing shippers, receivers, and allied business firms. Representatives of the supporting agencies offered many constructive suggestions that proved to be most helpful in planning the research.

Much of the project's organization was directed by Robert C. Haldeman, transportation economist, before his transfer from the Department's Economic Research Service to private industry. Under his supervision, the study's sampling technique was devised and a questionnaire to gather the primary data was completed.

Joseph R. Corley and Ralph O. Foster, economists with the Economic Research Service, assisted in conducting the shipper interviews.

The cooperation extended to the Department's representatives was very gratifying. Ninety-seven percent of the firms conforming to sample requirements released information concerning their business activities.

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## SUMMARY

Data were gathered in interviews with fresh-produce shippers on how rail and motor carriers participate in hauling California-Arizona fresh fruits and vegetables to interstate markets. The findings are based on the composite transportation patterns of 93 firms.

Three-fifths of the total fresh fruit and vegetable shipments sent to other States by the respondent shippers moved by rail, though more than half the volume of some commodities was handled by motor carriers. In all, the firms shipped approximately 185,000 carlot equivalents of fresh produce to interstate markets in 1960. Deciduous fruit, watermelons, and miscellaneous vegetables accounted for about a fourth of the out-bound shipments, and 51 percent or more of the volume in each of these classes was handled by truck. Three-fourths of the interstate shipments consisted of citrus fruit, lettuce, potatoes, and melons (except watermelons). At least 62 percent of each of these four classes of commodities moved by rail.

Only 27 percent of the respondent shippers used trucks as the principal carriers. Railroads were the predominant haulers for firms in all size groups. However, firms of one particular type--commercial packinghouses growing some produce--shipped a little more than half of their fresh produce by truck.

Nearly 14 percent of the total fresh produce shipped by the 93 survey firms moved unsold. Around 25,000 carlot equivalents left the loading docks of 73 shippers not covered by any sales contract. The other 20 firms indicated that they rarely, if ever, dispatched shipments not already sold. Only 3 percent of the unsold traffic was handled by truck. Approximately 87 percent of the volume moved unsold was marketed through receiving agents acting for the shippers. Thirteen percent was sold in route by the shippers themselves.

Ninety-one of the firms reported some truck shipments, totaling about 74,000 carlot equivalents. Seventy-four of these firms were able to identify the type of trucker handling their shipments. These firms moved 56,000 carlot equivalents by truck in 1960. They reported that 14 percent of this total was hauled by private carriers, 14 percent by common or contract carriers, and about 6 percent principally in receiver-owned or leased trucks. The remaining 66 percent was hauled by truckers engaged only in hauling exempt agricultural commodities, that is, not subject to ICC economic regulation.

Shippers indicated that some carlots hauled by rail reached 54,000 pounds. However, the most common carlot weights given to rail carriers by the survey firms ranged between 40,000 and 44,000 pounds for a majority of the commodities. No truck-lot weights over 44,000 pounds were reported, and those most often mentioned ranged between 35,000 and 39,000 pounds.

Time in route to destinations in practically all parts of the country was reported to be 1 or 2 days less by truck than by rail. Depending upon the shipping points, hauls to the Western and Northwestern Regions of the United States were reported to take 1 to 3 days by motor carrier, and 2 to 5 days by rail. Deliveries by rail to outlets in the central section of the Nation were made in 3 to 6 days as opposed to 2 to 4 days by truck. To points east of the Mississippi River, motor carriers took 3 to 6 days while railroads required 4 to 8 days.

A comparison of shipments of 40,000 pounds (reasonably indicative of shipping weights for fresh commodities moved on occasion in each carrier) showed that rail charges were lower than truck charges to selected destinations both east and west of the Mississippi River. All of the markets sampled were within 1,000 to 3,200 miles of California's and Arizona's principal production areas. Depending upon the commodity and market in question, truck rates ranged from slightly more to three times as much as rail rates.

Further data assembled from USDA publications revealed some significant shifts in the use of rail and motor carriers to move California-Arizona fresh produce to out-of-State markets. In the years 1951 to 1960, average annual shipments carried by rail and truck from the two States amounted to about 350,000 carlot equivalents. Traffic did not vary much from year to year, but user preference for rail or truck changed substantially.

Within this period of 10 years, the share of annual outbound traffic shipped by truck rose from 13 to 30 percent. (The 93 survey shippers reported moving 40 percent of their produce by truck in 1960.) The major gain made by trucks was in shipments moving to destinations west of the Mississippi River. Over the 10-year span, the share of annual traffic shipped to this sector by truck climbed from 38 to 73 percent.

From 1951 to 1960, trucks also registered some gains in shipments to points east of the Mississippi River, although railroads continue to dominate this traffic. Shipments by motor carrier to regions east of the river jumped from about 1,000 carlot equivalents to a little over 17,000 carlot equivalents, but this only brought the proportion shipped by truck to about 8 percent.

The extent to which rail and motor carriers are used for out-of-State shipments of California-Arizona fresh produce depends on their ability to provide transportation commensurate with the needs of fruit and vegetable handlers. Rates and service features both greatly influence a firm's choice of the mode of transport to be used. The charges made by railroads and truckers favor each carrier for different types of shipments. Trucks are cheaper for short-haul traffic and, except for part loads, railroads charge less for shipments moving the longer distances. Since the regions of low population closer to California and Arizona do not require as much fresh produce as the more populated regions farther away, these differences in transportation rates have a direct bearing on the degree in which both carriers share in the outbound traffic. However, demand for rail or truck transportation rests on the functional utility of the carrier to the user, and does not necessarily reflect economies in rates. The quality and type of service offered play an important role in attracting interstate shipments regardless of the price asked for the hauls.

# Interstate Hauling of California-Arizona Fresh Fruits and Vegetables by Rail and Truck

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## INTRODUCTION

For-hire interstate hauling in this country is in part a federally regulated industry. The Government has been involved in regulating the State-to-State activities of our dynamic transportation system for over 75 years, and during that period, land, water, and air carriers have each fallen under separate regulatory programs. But in the course of developing these programs, Congress granted certain exemptions. The movement of unmanufactured agricultural commodities by motor carrier is included within the scope of these exemptions. Fresh fruits and vegetables are among the farm products whose interstate movements by truck are given this special status. The railroads, on the other hand, do not have the same freedom when hauling identical commodities between States.

The California-Arizona area is the Nation's leading producer and shipper of fresh fruits and vegetables. The application of modern techniques of agricultural irrigation in a generally dry, semitropical area has created an environment ideally suited to raising vegetable and fruit crops. In recent years, production moved by truck and rail from both States as fresh commodities has averaged about 350,000 carlot equivalents annually. Shipments originate from 24 specialized farming districts scattered over the bi-State area. Many producers in these districts market several harvests a year. This unique production capacity generates a year-round demand for transportation equipment.

Physical characteristics of rail and motor carriers, and services they can provide influence their ability to share in commercial traffic movements. The extent to which each carrier can participate depends in some degree on the distance to the primary distribution centers of the country. Three-fifths of the volume of fresh fruits and vegetables shipped from Arizona and California moves to destinations east of the Mississippi River, where 27 States now report two-thirds of the country's population. Hauls to these markets range from 1,400 to about 3,500 miles. On the basis of most rates charged, it would appear that these long hauls would discourage the use of trucks. Demand for motor carriers, however, rests on their functional utility to the user and does not necessarily depend on a rate advantage over rail.

This report presents an appraisal of the part played by rail and motor carriers in the out-of-State marketing of fresh fruits and vegetables grown in California and Arizona. Major emphasis is focused on the demand for rail or motor transportation. The competitive status of each type of carrier is examined from patterns revealed in 1960 data gathered direct from fruit and vegetable shippers, and from 1951-60 trends derived from data published by the U.S. Department of Agriculture. In addition, the report suggests guidelines for future research in related fields of transportation.



## SOURCES OF INFORMATION

Information on the pattern of interstate shipments from California and Arizona was obtained primarily from personal interview questionnaires completed by a sample of fresh-produce shippers in the two States. The sample was developed from a list of shipping firms, including branch offices, taken from the 1960 editions of the Red Book and Blue Book. Both publications are accepted credit guides of the Nation's fruit and vegetable industry. The two sources contained the names of 2,260 headquarter firms and branches operating in 48 of the 72 counties in California and Arizona. Refining the number to exclude all firms in counties with less than 1 percent of the State's firms, the count was reduced to 2,097 firms located in 24 counties--1,777 in 19 California counties and 320 in 5 Arizona counties. The firms were arranged alphabetically by counties and a 10 percent random sample was taken from each county. Of the 210 installations selected, 16 were branch offices whose headquarter firms were also drawn. These facilities were dropped and their headquarter firms retained. Ten other branch offices were among the firms chosen. They were eliminated and their headquarter firms, not originally drawn in the sample, were substituted. The adjustment set the number of shippers to be approached for information at 194. When the sample firms were canvassed, those whose 1960 interstate shipments totaled 200 carlot equivalents or less were not asked to complete the questionnaire.

Fifty-one percent of the shippers in the sample could not be contacted or did not qualify for an interview. This percentage included 31 firms that were not in business or were closed temporarily; 29 making only intrastate shipments; and 38 moving 1960 interstate shipments of not more than 200 carlot equivalents. Ninety-six firms, or 49 percent of the sample, fitted the type of shipper sought for interview. All but three completed questionnaires. These questionnaires were the primary source of data used in Part I of the report.

The information presented in Part II is taken from published sources as follows:

Data on interstate rail and truck shipments are from "Fresh Fruit and Vegetable Shipments, by Commodities, States, and Months," AMS-36, published annually by the Agricultural Marketing Service, U.S. Department of Agriculture.

Data on shipment destinations are from "Fresh Fruit and Vegetable Unload Totals," AMS-25, published annually by the Agricultural Marketing Service; "Recapitulation of Arizona Interstate Truck Movement for Month. . .," published monthly by the Agricultural Marketing Service in cooperation with the Arizona Bureau of Market News; and "Truck Passings of Fresh Fruits and Vegetables Through California Stations," published annually by the Agricultural Marketing Service with the cooperation of the Bureau of Plant Quarantine, California Department of Agriculture.

Production data are taken from "Agricultural Statistics," published annually by the U.S. Department of Agriculture.

PART I.  
PATTERNS OF INTERSTATE SHIPMENT IN 1960

Reliability and Organization of Project Data

It cannot be said with complete certainty just how many firms were shipping California-Arizona fresh fruits and vegetables to interstate markets during 1960. It was not feasible to determine whether all firms were enumerated in the trade directories consulted. Furthermore, sufficient information was not available in these publications to permit the extraction of a stratified sample. Consequently, the results of the interviews could not be expanded to represent all firms moving fresh fruits and vegetables out of California and Arizona. The data reveal only the transportation activities of a cross section of shippers in the two States; how closely they reflect the conditions prevailing throughout the entire population of interstate shipping firms is not known. However, the shipments of the 93 participating firms accounted for a little over 50 percent of the fresh fruit and vegetable traffic reported by the Federal-State Market News Service as moving interstate from California and Arizona in 1960.

The 93 cooperating firms were divided into five categories based on the kind of operations they reported. The categories are:

- (1) Grower-shipper: A fruit and vegetable producer who also packs, sells, and ships his output as fresh commodities.
- (2) Commercial packinghouse owning some acreage: An organization engaged in packing, selling, and shipping fresh fruits and vegetables, grown on a limited basis by the firm, but purchased primarily from local producers.
- (3) Commercial packinghouse owning no acreage: An organization engaged in packing, selling, and shipping fresh fruits and vegetables acquired solely through purchases from local producers.
- (4) Shipper's agent: An agency that contracts for the sale of fresh fruits and vegetables and transacts related business for shippers.
- (5) Cooperative packinghouse: An organization owned and operated by a group of fruit and vegetable producers, through which they pack, sell, and ship their output as fresh commodities.

The firms were also classified, without regard to type, into six size groups based on the level of 1960 interstate shipments. The concept of firm size is based on carlot equivalents shipped rather than on more accepted criteria such as capital investment or maximum shipping capacity, on the assumption that, under ordinary circumstances, shipment levels are an acceptable representation of firm size. Table 1 gives the size range of each group in terms of carlot equivalents shipped, and the number of firms of each type in each of the size groups.

The terms carlot and carlot equivalent, as used throughout the report, are defined as follows:

Carlot: A unit of measure identifying a payload carried by a single rail car, which meets minimum weight requirements for shipments of individual commodities or mixed commodities in carload quantities.

Carlot equivalent: A statistical standard adopted to convert truck shipments to the equivalent of rail carlots. For individual commodities, conversion is made on the

TABLE 1.--Identification of participating survey firms by type and size

Firm size (carlot equivalents)	Total firms cooperating	Firm type				
		Grower- shipper	Commercial packing- house owning--		Shipper's agent	Cooperative packinghouse
			Some acreage	No acreage		
	<u>Firms</u>	<u>Firms</u>	<u>Firms</u>	<u>Firms</u>	<u>Firms</u>	<u>Firms</u>
Small:						
200-399.....	20	10	4	5	1	--
400-799.....	27	12	6	4	3	2
Total.....	47	22	10	9	4	2
Medium:						
800-1,599.....	21	9	8	--	4	--
1,600-3,199.....	14	7	2	1	1	3
Total.....	35	16	10	1	5	3
Large:						
3,200-6,399.....	8	5	--	--	1	2
6,400 and over.....	3	1	1	--	--	1
Total.....	11	6	1	--	1	3
Grand Total.....	93	44	21	10	10	8

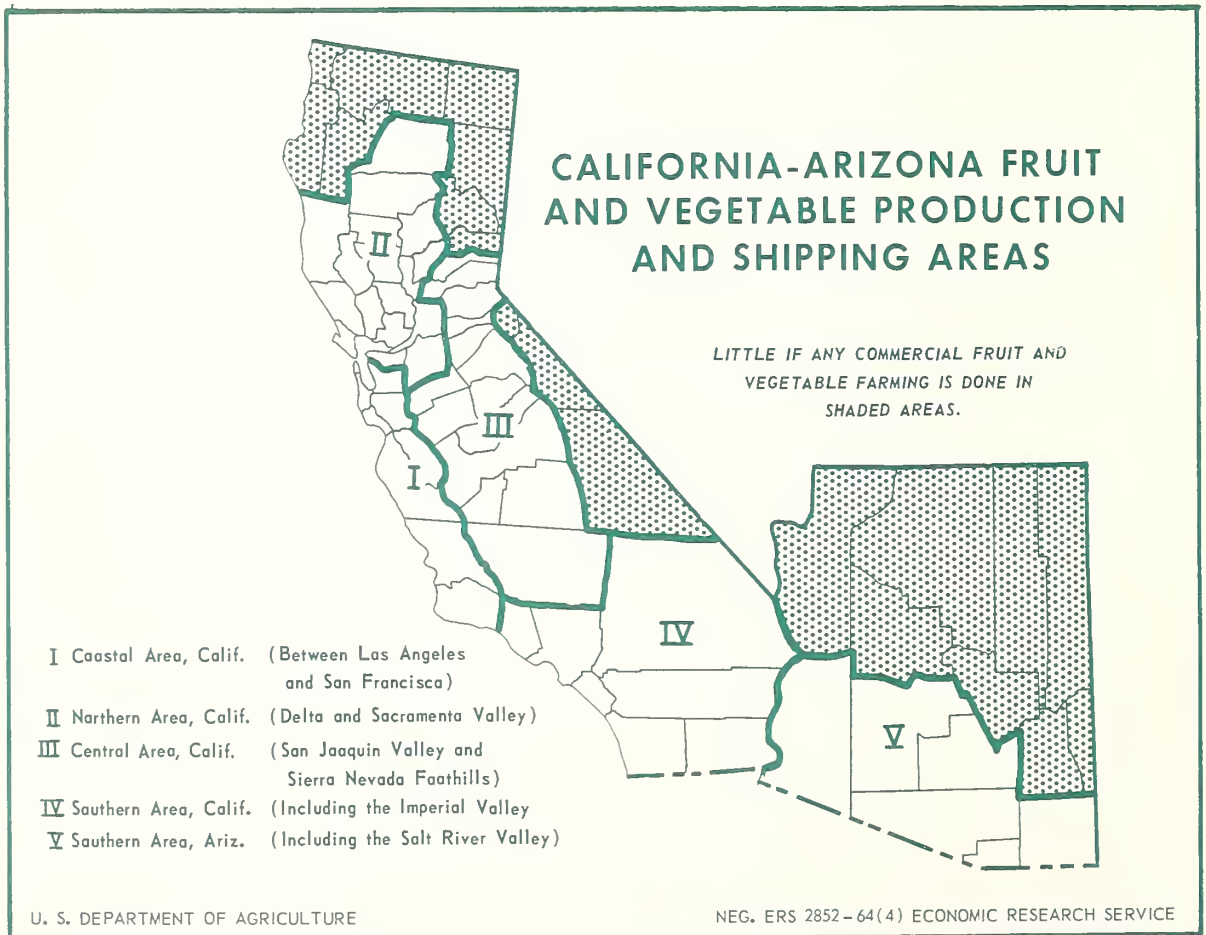


Figure 1

basis of the number and type of containers that are most frequently hauled by rail as carlot quantities. When rail and truck shipments are discussed collectively, the term carlot equivalent is used as the identifying statistical standard.

### Shipping Areas and Their Importance

There are approximately 24 specialized growing districts for fruits and vegetables scattered widely throughout California and Arizona. They can be grouped into five major areas, four in California and one in Arizona (fig. 1). In 1960, the 93 survey firms shipped a total of 185,000 carlot equivalents from these areas. The bulk of the traffic originated in the Coastal and Central Areas of California. The grower-shippers and cooperative packinghouses ranked the Coastal Area first and the Central Area not lower than third in volume shipped. These firms were responsible for about 66 percent of the total volume shipped from the two States. The ranking by firms in the three largest size groups follows a similar pattern. These firms accounted for approximately 76 percent of the total movement in 1960. Table 2 shows how the firms in each group ranked the originating areas in terms of the volume they shipped from the various areas.

TABLE 2.--Interstate rail and truck shipment of California-Arizona fresh fruits and vegetables, and ranking assigned to shipping areas; survey firms by type and size, 1960<sup>1</sup>

Firm type and size	Firms	Shipments	Coastal Area, Calif.	Northern Area, Calif.	Central Area, Calif.	Southern Area, Calif.	Southern Area, Ariz.
	Number	Carlot equivalents	Rank	Rank	Rank	Rank	Rank
Type:							
Grower-shipper.....	44	72,266	1	5	2	4	3
Commercial packinghouse owning some acreage.....	21	42,871	1	( <sup>2</sup> )	2	3	4
Commercial packinghouse owning no acreage.....	10	5,447	2	4	3	1	( <sup>2</sup> )
Shipper's agent.....	10	14,345	3	5	2	4	1
Cooperative packinghouse.....	8	49,704	1	5	3	2	4
Total.....	93	184,633	1	5	2	3	4
Size (carlot equivalents):							
200-399.....	20	5,857	2	5	3	4	1
400-799.....	27	14,253	3	( <sup>2</sup> )	4	1	2
800-1,599.....	21	23,806	2	5	1	3	2
1,600-3,199.....	14	34,788	1	( <sup>2</sup> )	2	3	4
3,200-6,399.....	8	40,639	1	5	2	3	4
6,400 and over.....	3	65,290	1	5	3	2	4
Total.....	93	184,633	1	5	2	3	4

<sup>1</sup> For delineation of shipping areas, see figure 1, page 4.

<sup>2</sup> No shipments reported.

### Rail and Truck Participation In Commodity Movements

Sixty percent of the commodities shipped to interstate markets by the 93 firms in 1960 were moved by rail and 40 percent by truck. Movements by commodity groups are summarized in table 3 by size and type of firms making the shipments. Firms in the various size groups differed very little in their relative use of rail and motor carriers. The proportion of the shipments moved by rail by those in each group ranged from 55 to 64 percent.

TABLE 3.--California-Arizona fresh fruits and vegetables shipped interstate, by mode of transport; survey firms by type and size, 1963

Firm type and size	All citrus fruits				All deciduous fruits, grapes, and berries				Melons, except watermelons				Watermelons			
	Shipments		Truck		Shipments		Truck		Shipments		Truck		Shipments		Truck	
	Carlott equiv.	Percent	Percent	Percent	Carlott equiv.	Percent	Percent	Percent	Carlott equiv.	Percent	Percent	Percent	Carlott equiv.	Percent	Percent	
Type:																
Grower-shipper.....	800	41	59	49	11,327	51	49	26	5,250	74	26	1,103	9	91		
Commercial packinghouse owning some acreage.....	2,982	58	42	54	7,515	46	54	49	2,475	51	49	832				
Commercial packinghouse owning no acreage.....	322	67	33	53	599	47	53	25	92	75	25	--	--	--		
Shipper's agent.....	41,031	--	35	60	123	40	60	10	2,570	90	10	35	40	6		
Cooperative packinghouse.....																
Total.....	45,185	64	36	51	19,656	49	51	28	10,387	72	28	1,970	16	84		
Size (carlot equivalents):																
200-399.....	322	67	33	39	1,502	61	39	15	114	85	15	35	40	60		
400-799.....	495	22	78	66	1,633	66	34	25	354	75	25	40	--	100		
800-1,599.....	90	10	90	42	3,310	58	42	32	3,036	68	32	1,585	15	8		
1,600-3,199.....	30	100	--	42	5,160	58	42	27	73	73	27	68	71	29		
3,200-6,399.....	11,168	56	44	60	6,123	40	60	11	2,884	89	11	--	--	--		
6,400 and over.....	33,080	68	32	85	1,928	15	85	60	1,205	40	60	242	5	95		
Total.....	45,185	64	36	51	19,656	49	51	28	10,387	72	28	1,970	16	84		
Firm type and size	Potatoes				Lettuce				Other vegetables				All commodities			
	Shipments		Truck		Shipments		Truck		Shipments		Truck		Shipments		Truck	
	Carlott equiv.	Percent	Percent	Percent	Carlott equiv.	Percent	Percent	Percent	Carlott equiv.	Percent	Percent	Percent	Carlott equiv.	Percent	Percent	
Type:																
Grower-shipper.....	6,716	69	31	33	38,084	67	33	36	8,986	64	36	72,266	63	37		
Commercial packinghouse owning some acreage.....	8,967	76	24	76	6,406	24	76	66	13,694	34	66	42,871	46	54		
Commercial packinghouse owning no acreage.....	1,992	91	9	36	457	64	36	55	1,985	45	55	5,447	65	3		
Shipper's agent.....	3,710	66	34	30	5,354	70	30	15	2,284	85	15	14,345	76	24		
Cooperative packinghouse.....	5,800	40	60	33	1,800	67	33	59	900	41	59	49,704	62	38		
Total.....	27,185	66	34	38	52,101	62	38	51	28,149	49	51	184,633	60	40		
Size (carlot equivalents):																
200-399.....	457	92	8	29	1,119	71	29	44	2,303	56	44	5,857	64	36		
400-799.....	2,754	52	48	32	4,042	68	32	49	4,935	51	49	14,253	57	43		
800-1,599.....	3,760	73	27	50	6,221	50	50	43	5,804	52	48	23,806	55	45		
1,600-3,199.....	15,103	64	36	33	10,852	67	33	42	781	58	42	34,788	64	36		
3,200-6,399.....	1,014	70	30	72	16,902	72	28	25	2,548	75	25	40,639	64	36		
6,400 and over.....	4,097	75	25	53	12,965	47	53	61	11,773	39	61	65,290	57	43		
Total.....	27,185	66	34	38	52,101	62	38	51	28,149	49	51	184,633	60	40		

In contrast, firms of different types differed significantly in proportionate volume shipped by rail and motor carrier. Shippers' agents dispatched 76 percent of their commodities by rail, a larger proportion than any other group. The grower-shippers, cooperative packinghouses, and commercial packinghouses owning no acreage shipped from 60 to 65 percent of their produce by rail. The commercial packinghouses owning some acreage were the only firms to ship more by truck than by rail, but the margin was slight--motor carriers handled just 54 percent of the amount shipped.

Rail and motor carrier participation in the movement of specific commodities differed for the various categories of fresh fruits or vegetables. Movement of deciduous fruits and the combined movement of all vegetables, except lettuce and potatoes, were about equally divided between rail and motor carrier. Watermelon shipment was 84 percent by truck; 70 percent of the shipment of other melons was by rail. Citrus fruits, potatoes, and lettuce were dispatched predominantly by rail, with trucks hauling only about 35 percent.

Nearly 53 percent of the fresh produce shipped interstate by the 93 shippers consisted of lettuce and citrus fruits. The cooperative packinghouses reported about 90 percent of the citrus movement. Around 73 percent of the lettuce was shipped by grower-shippers. A large proportion of the lettuce and citrus was handled by the larger firms; 98 percent of the citrus was shipped by firms in the two largest size groups, and 78 percent of the lettuce was shipped by firms in the top three groups.

The 91 shippers who made some interstate shipments of produce by truck in 1960 were asked to indicate whether the participation of trucks in their commodity movements had changed during the period 1958 through 1960. Sixty-five percent of the firms reported that the share shipped by trucks had increased. Only 5 percent reported a decrease, and 30 percent said there had been little change. Table 4, which summarizes the answers by type and size of shipper, shows that a majority of the firms of each type and in each size group reported an increase in their use of trucks. This improvement in the competitive position of trucks is substantiated by trends identified in Part II.

TABLE 4.--Changes reported in share of California-Arizona fresh fruits and vegetables shipped interstate by truck; survey firms by type and size, 1958 to 1960

Firm type and size	Firms <sup>1</sup>	Firms reporting truck's share has--		
		Increased	Decreased	Remained about the same
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
Type:				
Grower-shipper.....	44	32	2	10
Commercial packinghouse owning some acreage.....	21	11	1	9
Commercial packinghouse owning no acreage.....	10	6	2	2
Shipper's agent.....	8	4	--	4
Cooperative packinghouse.....	8	6	--	2
Total.....	91	59	5	27
Size (carlot equivalents):				
200-399.....	20	12	--	8
400-799.....	26	16	4	6
800-1,599.....	20	11	1	8
1,600-3,199.....	14	10	--	4
3,200-6,399.....	8	8	--	--
6,400 and over.....	3	2	--	1
Total.....	91	59	5	27

<sup>1</sup> 2 of the 93 firms said they did not ship by truck.

## Regional Destination Patterns of Truck Shipments

The 91 firms shipping by truck were requested to rate the principal States of destination in 1960 according to their share of total truck shipments. The State ratings were weighted to determine a ranking for the geographic regions delineated in figure 2. The West South Central Region was placed first, followed in order by the Western and Northwestern Regions (table 5). The West North Central Region ranked fifth, and the East North Central Region was fourth. Although there were noticeable exceptions, in general the regions west of the Mississippi River were designated as most important. However, firms of various types and sizes ranked a few of the areas east of the Mississippi River high in their shipping patterns. Thus, motor carriers show a tendency to attract some traffic moving to eastern regions. Data presented in Part II of the report show a similar pattern for truck traffic to that indicated by the rankings in table 5.

The 91 firms shipping by truck in 1960 were asked whether any shipments were made to regions not serviced by motor carriers in 1958. Seventy-seven of the shippers (85 percent), including majorities in each type and size group, reported that their regional destinations for motor carrier shipments had remained unchanged since 1958 (table 6). All of these firms dispatched trucks to the area west of the Mississippi River, but only about half of them sent any truck traffic beyond this point to the east. In 1958, the other 14 firms were sending truck shipments to the Western Regions only; by 1960, all 14 were shipping by truck to destinations east of the Mississippi. During the period, the number of shippers routing trucks to eastern markets increased from 48 to 62, a gain of about 30 percent. Shippers disclosed that some eastern buyers were beginning to specify trucks for many shipments formerly handled by rail.

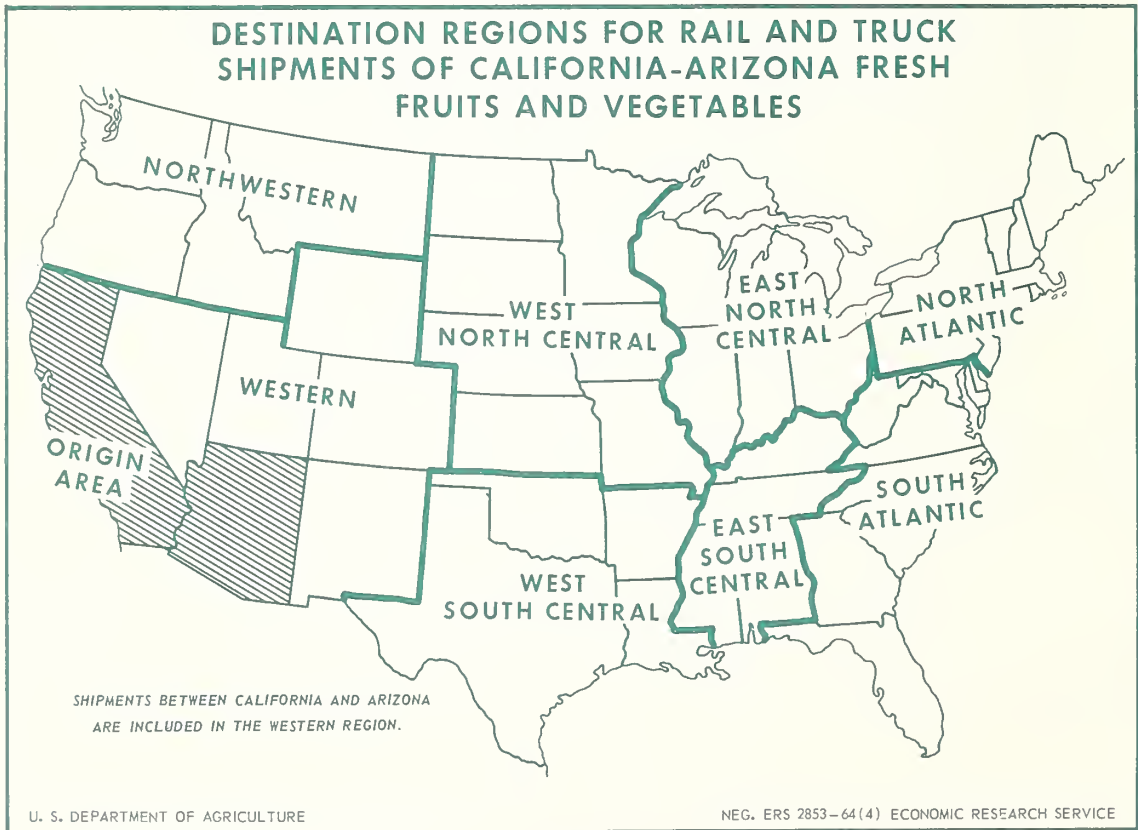


Figure 2

TABLE 5.--Interstate destination regions of California-Arizona fresh fruit and vegetable ranked by their truck shipments; survey firms by type and size, 1960<sup>1</sup>

Firm type and size	Truck shipments	Northwestern	Western <sup>2</sup>	West North Central	West South Central	North Central	East South Central	North Atlantic	South Atlantic
Type:									
Grower-shipper.....	26,440	3	2	4	1	5	7	8	6
Commercial packinghouse owning some acreage..	<sup>3</sup> 23,188	2	4	6	1	3	5	8	7
Commercial packinghouse owning no acreage....	<sup>4</sup> 1,888	1	5	6	2	3	8	4	7
Shipper's agent.....	3,492	1	2	4	3	--	--	--	5
Cooperative packinghouse.....	18,943	5	2	3	1	4	7	6	8
Total.....	73,951	3	2	5	1	4	8	7	6
Size (carlot equivalents):									
200-399.....	2,105	1	2	6	5	7	3	8	4
400-799.....	<sup>3</sup> 6,116	3	4	6	1	2	8	5	7
800-1,599.....	10,697	2	3	4	1	5	8	7	6
1,600-3,199.....	<sup>4</sup> 12,350	4	2	3	1	7	8	5	6
3,200-6,399.....	14,582	8	2	4	1	6	7	3	5
6,400 and over.....	28,101	4	5	2	1	--	6	--	3
Total.....	73,951	3	2	5	1	4	8	7	6

<sup>1</sup> For delineation of regions, see figure 2, page 8.

<sup>2</sup> Includes shipments between California and Arizona.

<sup>3</sup> Includes 315 carlot equivalents not ranked by destination region.

<sup>4</sup> Includes 150 carlot equivalents not ranked by destination region.

TABLE 6.--Firms shipping California-Arizona fresh fruits and vegetables by truck to same regions, and firms shipping to additional regions; survey firms by type and size, 1958 to 1960

Firm type and size	Firms <sup>1</sup>	Firms reporting--	
		Shipments to new regions	Shipments to same regions
	Number	Number	Number
Type:			
Grower-shipper.....	44	6	38
Commercial packinghouse owning some acreage.....	21	4	17
Commercial packinghouse owning no acreage.....	10	2	8
Shipper's agent.....	8	1	7
Cooperative packinghouse.....	8	1	7
Total.....	91	14	77
Size (carlot equivalents):			
200-399.....	20	5	15
400-799.....	26	3	23
800-1,599.....	20	3	17
1,600-3,199.....	14	1	13
3,200-6,399.....	8	2	6
6,400 and over.....	3	--	3
Total.....	91	14	77

<sup>1</sup> 2 of the 93 firms said they did not ship by truck.



## Markets Serviced by Some Shippers Entirely by Motor Carrier

Sixty-three percent of the firms making some shipments by truck, consisting of a majority of the firms in practically all type and size groups, reported that they serviced some of their interstate outlets entirely by truck (table 7). Shippers' agents were the major exception; only 1 of the 8 firms reported servicing any markets just by truck. About 70 percent of the total truck traffic shipped interstate by the respondent firms in 1960 was dispatched by these 57 firms. This does not necessarily mean that fresh produce from the California-Arizona area moves entirely by truck to any of the markets named; however, a great deal can be learned about truck movements through the identification of these markets.

The 57 firms were asked to designate the major outlets to which they made all shipments by motor carrier; the total number of such markets was not requested. Table 8 shows the distribution of the 127 markets named, by geographic region and by population range. Ninety-five of the markets (75 percent) were scattered throughout the four regions west of the Mississippi River. The other 32 were mainly in the East North Central and East South Central Regions. The pattern points to a broad network of markets, in both the eastern and western sections of the country, that draw truck shipments from California and Arizona. Both large and small markets were represented, but it is significant that 46 percent of the outlets had populations under 38,000. Trucks would be expected to fare extremely well in the smaller markets for most hauls, regardless of length, since many of these markets probably never had rail service or have seen it abandoned or drastically reduced in recent years. In practically all of the larger markets, however, trucks must contend with strong rail competition that obstructs their ability to attract other than short-haul or intermediate traffic. Nevertheless, they are offering some competition to railroads for long hauls to many large markets.

The 57 shippers were also asked if the principal markets to which they shipped only by truck were accounting for a growing share of their total interstate motor carrier

TABLE 7.--Firms reporting they did or did not service some interstate markets for California-Arizona fresh fruits and vegetables by truck only; survey firms by type and size, 1960

Firm type and size	Firms <sup>1</sup>	Some markets serviced only by truck	No markets serviced only by truck
	<u>Number</u>	<u>Number</u>	<u>Number</u>
Type:			
Grower-shipper.....	44	32	12
Commercial packinghouse owning some acreage.....	21	14	7
Commercial packinghouse owning no acreage.....	10	6	4
Shipper's agent.....	8	1	7
Cooperative packinghouse.....	8	4	4
Total.....	91	57	34
Size (carlot equivalents):			
200-399.....	20	15	5
400-799.....	26	13	13
800-1,599.....	20	14	6
1,600-3,199.....	14	8	6
3,200-6,399.....	8	5	3
6,400 and over.....	3	2	1
Total.....	91	57	34

<sup>1</sup> 2 of the 93 firms said they did not ship by truck.

TABLE 8.--Location and population range of major interstate markets for California-Arizona fresh fruits and vegetables specified by survey firms as being serviced only by truck, 1960

Destination region <sup>1</sup>	Markets	Markets having population of--						
		Under 12,500	12,500 to 37,499	37,500 to 87,499	87,500 to 187,499	187,500 to 387,499	387,500 to 787,499	787,500 and over
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
West of Mississippi River:								
Northwestern.....	16	2	7	3	2	1	1	--
Western.....	14	1	5	3	1	2	2	--
West North Central.....	42	11	14	6	5	3	3	--
West South Central.....	23	4	3	3	5	4	3	1
Total.....	95	18	29	15	13	10	9	1
East of Mississippi River:								
East North Central.....	21	4	4	8	2	1	1	1
East South Central.....	5	--	2	1	1	1	--	--
North Atlantic.....	3	1	--	--	--	--	1	1
South Atlantic.....	3	--	--	--	1	1	1	--
Total.....	32	5	6	9	4	3	3	2
Grand total.....	127	23	35	24	17	13	12	3

<sup>1</sup> For delineation of regions, see figure 2, page

traffic. Sixty-three percent of the firms expressed the belief that the outlets were absorbing an increasing percentage of their annual truck shipments. These firms dispatched approximately 31,000 carlot equivalents interstate by motor carrier in 1960, of which 36 percent went to one or more of the major markets to which they shipped only by truck. The other shippers handled almost 21,000 carlot equivalents, of which only 4 percent went to the major markets which they serviced entirely by truck. In total, 23 percent of the fresh produce dispatched by all 57 shippers went to the 127 markets in 1960, and about nine-tenths of this was reported by the firms who said that the outlets were taking an increased share of their interstate truck shipments. All signs point toward an increased demand for truck service in the markets under consideration.

### Types of Truckers Competing for Shipments

Under the Motor Carrier Act of 1935, trucks hauling fresh fruits and vegetables or other specified commodities interstate are not subject to regulation by the Interstate Commerce Commission as to rates, routes, or rights of entry, although they must comply with all safety measures prescribed by the Commission. Some truckers just haul exempt commodities; others haul nonexempt commodities as well. The 91 survey firms shipping by motor carrier were asked to estimate what percentage of their truck transportation was provided in 1960 by truckers engaged only in nonregulated hauling and what percentage by truckers who did both nonregulated and regulated hauling. The 74 firms giving this information shipped approximately 56,000 carlot equivalents of fresh produce by truck in 1960. They reported that 66 percent of this was handled by truckers who hauled only exempt commodities, 14 percent by common or contract carriers who at other times engaged in regulated hauling, 14 percent by private carriers not generally for hire who occasionally solicited exempt hauls, and 6 percent by receivers in their own trucks (table 9). Less than 1 percent was moved in trucks owned or leased by the shippers, or by itinerant merchant truckers who bought the produce

TABLE 9.--Percentage of interstate truck shipments of California-Arizona fresh fruits and vegetables hauled by specified types of truckers; survey firms by type and size, 1960

Firm type and size	Total shipments <sup>1</sup>	Type of trucker					
		Carrier of exempt commodities <sup>2</sup>	Common or contract carrier	Itinerant merchant trucker <sup>3</sup>	Private carrier <sup>4</sup>	Receiver in owned or leased trucks	Shipper in owned or leased trucks
	Carlot equiv.	Percent	Percent	Percent	Percent	Percent	Percent
Type:							
Grower-shipper.....	23,237	60	17	1	17	3	2
Commercial packinghouse owning some acreage..	19,566	76	13	1	6	4	--
Commercial packinghouse owning no acreage....	1,523	32	36	1	15	16	--
Shipper's agent.....	3,492	50	3	--	31	16	--
Cooperative packinghouse.....	8,585	74	2	--	18	6	--
Total.....	56,403	66	14	( <sup>5</sup> )	14	6	( <sup>5</sup> )
Size (carlot equivalents):							
200-399.....	1,682	46	33	( <sup>5</sup> )	13	5	--
400-799.....	5,507	32	31	( <sup>5</sup> )	22	8	7
800-1,599.....	7,305	40	25	2	29	4	--
1,600-3,199.....	10,150	60	14	( <sup>5</sup> )	21	5	--
3,200-6,399.....	13,016	61	16	--	15	8	--
6,400 and over.....	18,743	94	1	( <sup>5</sup> )	1	4	--
Total.....	56,403	66	14	( <sup>5</sup> )	14	6	( <sup>5</sup> )

<sup>1</sup> Represents 76 percent of the truck shipments reported. 17 of the 91 firms, shipping 17,548 carlot equivalents by truck, did not identify the type of trucker.

<sup>2</sup> Truckers engaged only in for-hire hauling of exempt agricultural products.

<sup>3</sup> Truck operator who takes title to commodities hauled and negotiates their sale on his own account.

<sup>4</sup> Persons or firms not engaged primarily in for-hire transportation.

<sup>5</sup> Less than 1 percent.

for resale. This pattern leaves little doubt as to the importance of the trucker who carries only exempt products. Also, receivers handling California-Arizona fresh produce seem to be transporting these commodities in their own or leased trucks in significant volume.

### Use of Truck Brokers

A truck broker is a businessman who arranges for hauls at the request of the shipper, receiver, or trucker. The fee for his services is normally collected from the trucker and amounts to about 10 percent of the shipping charge.

The 91 firms making some shipments by motortruck all stated that the receivers were entirely responsible for securing trucks for shipping the produce they purchased. However, 53 firms reported dealing with truck brokers as an accommodation to the receivers. These firms accounted for about 70 percent of the produce shipped interstate by truck from the survey firms in 1960. Table 10 shows to what degree truck brokers were used for these shipments. The information obtained does not provide an exact indication of the volume moved in equipment secured through these intermediaries. However, the data in the table indicate that probably between 17 and 37 percent of the total was handled by truck brokers.

Eighteen of the firms reported that they were using truck brokers more in 1960 than in 1958, and two firms reported using them less (table 11). The 33 firms who said that their use of truck brokers had not changed since 1958 were responsible for over two-thirds of the volume shipped by the 53 firms making some use of truck brokers.

TABLE 10.--Firms reporting that specified percentage ranges of their interstate truck shipment of California-Arizona fresh fruits and vegetables were handled through truck brokers; survey firms by type and size, 1960

Firm type and size	Firms <sup>1</sup>	Average annual truck shipments per firm	Firms reporting the share as--			
			1 to 10 percent	11 to 25 percent	26 to 49 percent	50 percent or over
Type:	<u>Number</u>	<u>Carlot equiv.</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
Grower-shipper.....	28	739	19	2	3	4
Commercial packinghouse owning some acreage.....	11	1,798	5	1	1	4
Commercial packinghouse owning no acreage.....	5	226	--	1	--	4
Shipper's agent.....	4	401	2	2	--	--
Cooperative packinghouse.....	5	1,707	3	1	--	1
Total.....	53	976	29	7	4	13
Size (carlot equivalents):						
200-399.....	11	101	3	1	4	3
400-799.....	14	254	5	3	--	6
800-1,599.....	8	579	6	1	--	1
1,600-3,199.....	11	972	7	1	--	3
3,200-6,399.....	7	1,859	6	1	--	--
6,400 and over.....	2	9,372	2	--	--	--
Total.....	53	976	29	7	4	13

<sup>1</sup> Represents 58 percent of the 91 firms shipping by truck. 38 firms said they did not use truck brokers.

TABLE 11.--Changes in use of truck brokers for arranging interstate shipment of California-Arizona fresh fruits and vegetables; survey firms by type and size, 1958 to 1960

Firm type and size	Firms <sup>1</sup>	Firms reporting that use of truck brokers had--		
		Increased	Decreased	Remained about the same
Type:	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
Grower-shipper.....	28	10	1	17
Commercial packinghouse owning some acreage.....	11	5	1	5
Commercial packinghouse owning no acreage.....	5	2	--	3
Shipper's agent.....	4	--	--	4
Cooperative packinghouse.....	5	1	--	4
Total.....	53	18	2	33
Size (carlot equivalents):				
200-399.....	11	4	1	6
400-799.....	14	5	--	9
800-1,599.....	8	3	1	4
1,600-3,199.....	11	5	--	6
3,200-6,399.....	7	--	--	7
6,400 and over.....	2	1	--	1
Total.....	53	18	2	33

<sup>1</sup> Represents 58 percent of the 91 firms shipping by truck. 38 firms said they did not use truck brokers.

## Control of Carrier Selection and Disposition of Transit Claims

Whether the shipper or the receiver controls the choice of carrier depends primarily on who holds title to the product while it is in transit. If ownership is vested in the receiver at point of origin, then he has a legal right to select the carrier he wants to perform the hauling operation. However, should title not pass to the receiver until the shipment arrives at destination, the shipper is legally entitled to specify which carrier will be used. Another factor that often decides which party selects the hauling carrier is who pays the transportation charges. If the shipper has the right to choose rail or motor carrier service, he will often comply with receiver preference even though he has no obligation to do so. The survey shippers said that shipments are almost always by rail when receivers control the choice of carrier and do not indicate their preference.

Sixteen percent of the firms reported that they selected the carrier for the major share of their shipments; 84 percent said that receivers usually designated the type of carrier. A majority of the firms of all types and in all size groups reported that receivers generally made the decision (table 12).

Filing a claim for loss or damage during transit by rail or truck is legally the responsibility of the firm having title to the shipment in route. When the receiver is confronted with processing a claim, sometimes the shipper will function as his agent in handling the task. This is merely an accommodation. In most cases, the shipper's role in assuming the receiver's responsibility is predicated on his part in arranging for (not selecting) the transportation. On the other hand, the receiver seldom enters a settlement in any capacity if the task is the shipper's responsibility. Seventy-eight of the survey firms indicated that the receivers generally handled all claims for loss and damage, while 15 of them said that they themselves almost always had the responsibility.

TABLE 12.--Firms reporting that the shipper or receiver generally selects the carrier for interstate rail or truck shipments of California-Arizona fresh fruits and vegetables; survey firms by type and size

Firm type and size	Firms	Number reporting--	
		Shipper or shipper's agent	Receiver or receiver's agent
	<u>Number</u>	<u>Number</u>	<u>Number</u>
Type:			
Grower-shipper.....	44	5	39
Commercial packinghouse owning some acreage.....	21	3	18
Commercial packinghouse owning no acreage.....	10	3	7
Shipper's agent.....	10	1	9
Cooperative packinghouse.....	8	3	5
Total.....	93	15	78
Size (carlot equivalents):			
200-399.....	20	6	14
400-799.....	27	2	25
800-1,399.....	21	1	20
1,600-3,199.....	14	3	11
3,200-6,399.....	8	2	6
6,400 and over.....	3	1	2
Total.....	93	15	78

## Influence of Marketing Conditions on Choice of Carrier and on Shipments Rolled Unsold

Each of the 89 firms that used both rail and truck for interstate shipments was asked whether there was any noticeable difference in the degree to which the two types of carriers participated in transporting fresh produce during poor marketing periods. Forty-one shippers, a significant number, reported a step-up in the share handled by rail in such periods (table 13). Thirty-six firms (41 percent) reported that the choice of carrier was not influenced by adverse conditions. The other 12 firms reported an increase in the use of trucks.

Shipping fresh produce unsold is a practice followed by many firms in both good and bad market years. Under favorable circumstances, some shippers follow this practice in order to take advantage of the flexibility it offers, yet unsold shipments can often indicate a shipper's difficulty in marketing some of his produce.

In 1960, approximately 14 percent of the volume of fresh produce shipped by the respondent firms was shipped unsold. Twenty firms reported that they had not dispatched any shipments unsold in 1960, and had not done so to any extent in previous years. The other 73 firms moved a little over 25,000 carlot equivalents unsold in 1960 (table 14). Ninety-seven percent of this was hauled by rail, only 3 percent by truck. The heavy preference for rail grows out of the carrier's ability to meet the diversion and reconsignment needs essential to the successful marketing of such shipments at practically no additional cost to the shipper. Trucks offer the same service, but at a higher cost.

Eighty-seven percent of the produce shipped unsold by the survey firms was consigned to agents for disposal--84 percent of the rail shipments and 93 percent of the truck shipments. The remainder was sold by the shippers while in transit.

TABLE 13.--Firms reporting on how rail and truck shipment of California-Arizona fresh fruits and vegetables is affected by poor marketing periods; survey firms by type and size

Firm type and size	Firms <sup>1</sup>	Firms reporting increase in share moved by--		Firms reporting no change
		Rail	Truck	
	Number	Number	Number	Number
Type:				
Grower-shipper.....	43	21	6	16
Commercial packinghouse owning some acreage.....	21	9	3	9
Commercial packinghouse owning no acreage.....	10	4	--	6
Shipper's agent.....	7	2	2	3
Cooperative packinghouse.....	8	5	1	2
Total.....	89	41	12	36
Size (carlot equivalents):				
200-399.....	20	7	3	10
400-799.....	25	8	7	10
800-1,599.....	19	10	--	9
1,600-3,199.....	14	13	--	1
3,200-6,399.....	8	2	2	4
6,400 and over.....	3	1	--	2
Total.....	89	41	12	36

<sup>1</sup> 4 firms did not use both rail and truck.

TABLE 14.--Extent to which California-Arizona fresh fruits and vegetables were shipped unsold by rail or truck to interstate destinations; survey firms by type and size, 1960

Firm type and size	Shipments Rolled Unsold					
	Total	Percentage shipped by--		Share assigned to agent for disposal		
		Rail	Truck	Percentage of total shipment	Percentage of rail shipment	Percentage of truck shipment
Type:		<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
Grower-shipper.....	4,562	90	10	68	65	90
Commercial packinghouse owning some acreage.....	1,708	99	1	14	14	50
Commercial packinghouse owning no acreage.....	304	80	20	88	86	98
Shipper's agent.....	1,619	91	9	75	72	100
Cooperative packinghouse.....	17,030	100	--	99	99	--
Total.....	25,223	97	3	87	84	93
Size (carlot equivalents):						
200-399.....	784	99	1	77	77	80
400-799.....	1,618	71	29	89	85	99
800-1,599.....	1,440	90	10	56	51	100
1,600-3,199.....	3,946	100	--	48	48	--
3,200-6,399.....	1,241	100	--	90	90	--
6,400 and over.....	16,194	99	1	99	99	--
Total.....	25,223	97	3	87	84	93

<sup>1</sup> Represents volume reported by 73 shippers. 20 shippers said they did not roll any shipments unsold.

The 73 firms moving unsold shipments in 1960 were asked whether the percentage of shipments rolled unsold had changed since 1958. Sixty-two firms (85 percent) said it had remained about the same, six said it had increased, and five that it had decreased (table 15).

TABLE 15.--Changes in share of California-Arizona fresh fruits and vegetables shipped unsold by rail or truck to interstate destinations; survey firms by type and size, 1958 to 1960

Firm type and size	Firms <sup>1</sup>	Number reporting annual share rolling unsold has--		
		Increased	Decreased	Remained about the same
Type:	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
Grower-shipper.....	37	4	5	28
Commercial packinghouse owning some acreage.....	15	1	--	14
Commercial packinghouse owning no acreage.....	9	--	--	9
Shipper's agent.....	5	1	--	4
Cooperative packinghouse.....	7	--	--	7
Total.....	73	6	5	62
Size (carlot equivalents):				
200-399.....	15	2	--	13
400-799.....	22	--	3	19
800-1,599.....	15	1	--	14
1,600-3,199.....	13	2	1	10
3,200-6,399.....	5	1	--	4
6,400 and over.....	3	--	1	2
Total.....	73	6	5	62

<sup>1</sup> Represents 78 percent of the 93 firms interviewed. 20 firms said they did not roll shipments unsold.

## Shipments Composed of a Single Commodity

During 1960, the survey firms shipped about 146,000 carlot equivalents, or 79 percent of their total interstate shipments, in full loads of one commodity (loads meeting tariff prescribed carlot minima). Eighty-eight percent of the approximately 111,000 carlots shipped by rail consisted of only one commodity (table 16). It is assumed that most of the remaining shipments moved in mixed loads. Shippers stated that less-than-carlot rail movements from the California-Arizona area were rare because of high freight charges for part loads.

The pattern for truck shipment was quite different. Of the nearly 74,000 carlot equivalents of fresh fruits and vegetables shipped by truck to interstate markets in 1960, 64 percent of the total was delivered to the trucker in full loads of one commodity. It follows, then, that the other 36 percent must have been in full loads of mixed commodities or in part loads of single or mixed commodities. Without giving an exact percentage, the shippers stated that a significant volume of part loads was given to truckers. The ability of truckers to move such shipments at a rate per hundredweight generally equal to that charged for full lots encourages this practice. Because of the greater speed and mobility of trucks, operations costs are not substantially altered by consolidating loads, and it is possible for them to carry the smaller shipments at full-load rates. Railroads cannot offer similar charges because they are not physically equipped to effect consolidations as expeditiously or as economically as motor carriers. The capacity of truckers to jointly service small shipments of separate shippers is one of the factors contributing to their popularity as carriers of fresh produce.

For the most part, rail traffic included a larger percentage of single commodity loads than truck traffic. The reason stems from a stricter policy toward the commodity composition of mixed lots. The annual share of total traffic handed individually to rail and truck in full lots of one commodity remained unchanged between 1958 and 1960 for a majority of the survey firms. Eighty-six percent of the shippers reported that their rail shipments of single commodities, as a percentage of total rail shipments, had stayed about constant; 13 percent stated that it had decreased; and 1 percent said that it had increased (table 17). Of the 91 firms making some shipments by truck, 67 percent indicated that the proportion of single commodity loads had remained approximately the same; 32 percent said it had decreased; and only 1 percent felt it had increased.



TABLE 16.--Share of the interstate shipment by rail and truck of California-Arizona fresh fruits and vegetables given to carriers in full loads of one commodity; survey firms by type and size, 1960

Firm type and size	Rail		Truck		Rail and truck	
	Total shipments	Share moved in full loads of one commodity	Total shipments	Share moved in full loads of one commodity	Total shipments	Share moved in full loads of one commodity
	<u>Carlots</u>	<u>Percent</u>	<u>Carlot equiv.</u>	<u>Percent</u>	<u>Carlot equiv.</u>	<u>Percent</u>
Type:						
Grower-shipper.....	45,826	84	26,440	54	72,266	73
Commercial packinghouse owning some acreage....	19,683	83	23,188	73	42,871	78
Commercial packinghouse owning no acreage.....	3,559	88	1,888	75	5,447	83
Shipper's agent.....	10,853	99	3,492	91	14,345	97
Cooperative packinghouse..	30,761	95	18,943	62	49,704	82
Total.....	110,682	88	73,951	64	184,633	79
Size (carlot equivalents):						
200-399.....	3,752	89	2,105	62	5,857	79
400-799.....	8,137	86	6,116	74	14,253	81
800-1,599.....	13,109	96	10,697	61	23,806	80
1,600-3,199.....	22,438	93	12,350	70	34,788	85
3,200-6,399.....	26,057	87	14,582	58	40,639	77
6,400 and over.....	37,189	85	28,101	64	65,290	76
Total.....	110,682	88	73,951	64	184,633	79

TABLE 17.--Changes in the share of rail and truck shipments of California-Arizona fresh fruits and vegetables shipped in full loads of one commodity; survey firms by type and size, 1958 to 1960

Firm type and size	Firms <sup>1</sup>	Shippers using rail		Firms <sup>2</sup>	Shippers using truck	
		Rail share has--			Truck share has--	
		Decreased	Remained about the same		Decreased	Remained about the same
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
Type:						
Grower-shipper <sup>3</sup> .....	43	8	34	44	18	25
Commercial packinghouse owning some acreage.	21	4	17	21	5	16
Commercial packinghouse owning no acreage...	10	--	10	10	2	8
Shipper's agent.....	9	--	9	8	2	6
Cooperative packinghouse.....	8	--	8	8	2	6
Total <sup>3</sup> .....	91	12	78	91	29	61
Size (carlot equivalents):						
200-399.....	20	2	18	20	5	15
400-799.....	26	4	22	26	7	19
800-1,599.....	20	2	18	20	8	12
1,600-3,199.....	14	1	13	14	6	8
3,200-6,399 <sup>3</sup> .....	8	1	6	8	2	5
6,400 and over.....	3	2	1	3	1	2
Total <sup>3</sup> .....	91	12	78	91	29	61

<sup>1</sup> 2 firms did not ship by rail. <sup>2</sup> 2 firms did not ship by truck.

<sup>3</sup> Omission of response of 1 firm reporting an increase in share hauled by both rail and truck in full loads of one commodity accounts for slight discrepancy.

## Transit Time To Destination

In movements of perishable traffic such as fresh fruits and vegetables, speed of delivery can be very important, and here trucks have a definite advantage. The survey firms were asked to estimate the time it took for rail and truck shipments to reach interstate destinations. Information was sufficient to make comparisons for shipments to all except the East South Central, North Atlantic, and South Atlantic Regions. As shown in figure 3, truck shipments required from 1 to 2 days less than rail shipments to reach any destination in the other regions. Depending on the origin in California or Arizona and the point of delivery, movements by motor carrier to the Western and Northwestern Regions took 1 to 3 days as against 2 to 5 days by rail. Truck hauls to the West North Central and West South Central Regions were accomplished in 2 to 4 days, while rail shipments took 3 to 6 days. Destinations in the East North Central Region were reached by truck in 3 to 5 days in contrast to the 4 to 7 days required by rail. Although data were not sufficient to provide representative schedules for the other regions east of the Mississippi River, movements to the East South Central region by each carrier probably took about the same time as those to the East North Central Region, and shipments to the North Atlantic and South Atlantic Regions probably took 5 to 8 days by rail against 4 to 6 days by truck.

Truck transportation is not only faster than rail, but truckers may possibly be more consistent, even with delaying emergencies, in meeting scheduled commitments. This implication is drawn from information given by the largest number of shippers who had common distribution patterns. Twenty-four firms in central California reported shipping to Kansas City by both rail and truck. Sixteen firms gave a common time period (4 days) for rail shipments to reach this destination; 19 firms gave the same period (3 days) for arrival by truck. On the basis of this small number of replies, truckers appear to be meeting their delivery schedules a little more consistently than railroads. However, rail schedules are being greatly improved and the change is narrowing the advantage of fast service held by motor carriers.

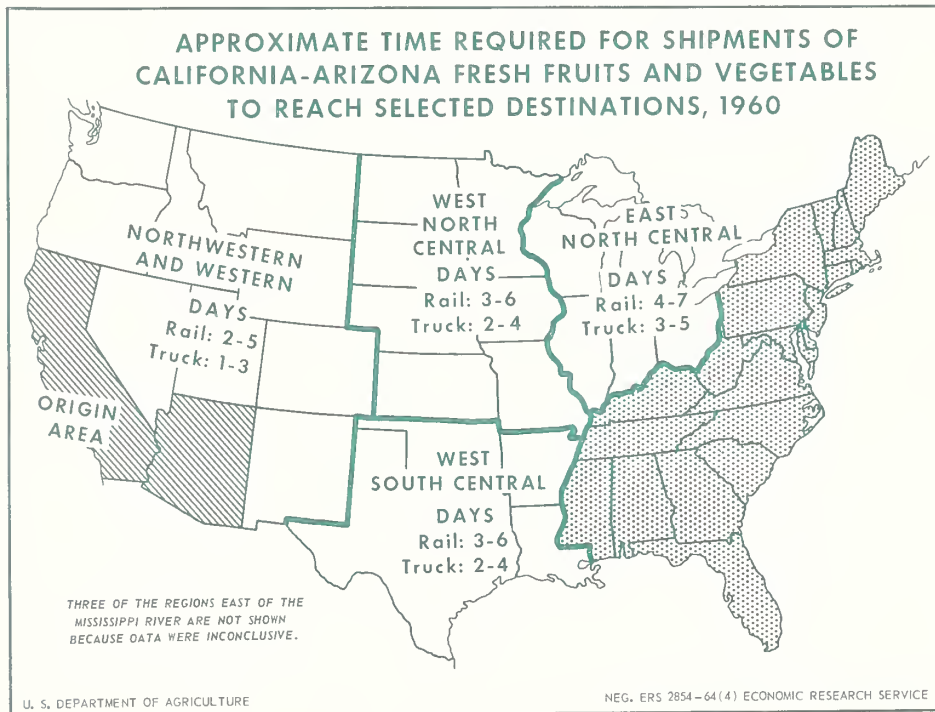


Figure 3

## Shipping Weights Of Carload And Truckload Lots

An attempt was made to develop some representative information on the usual weights of carload and truckload lots moved to interstate destinations by California-Arizona shippers of fresh produce. Because all survey firms did not handle the same commodities, it was impossible to obtain more than a moderate response for each commodity or class of commodities included in the outbound traffic. Furthermore, the data used to identify the usual weights hauled by both rail and motor carriers limited the development of such information to movements of vegetables and melons only. However, these shipments were about 64 percent of the total traffic reported by the respondents for 1960, a large enough share to be representative. Tables 18 and 19 summarize the reports of the cooperating firms as to the usual weight per unit of rail or truck equipment dispatched. None of the full-lot shipments carried by truck exceeded 44,000 pounds, while some loads shipped by rail reached 54,000 pounds. Shipper replies revealed the most popular weight ranges for rail and truck to be noticeably different. Referring to the commodities collectively, the data show that 65 percent of 137 responses placed the usual load given to rail carriers in a range of between 40,000 to 44,000 pounds. On the other hand, 50 percent of 135 replies fixed the weight most frequently handed to trucks within a range of 35,000 to 39,000 pounds; only 7 percent indicated a 40,000- to 44,000-pound range. The variation in the two sets of data appear to strengthen the conclusion that railroads haul, in many of their cars, loads perhaps as much as 14 percent heavier than the usual truckload. Weights of some bulky but relatively light commodities were reported for truck only, thus accounting for the lower weight ranges designated for the usual weight of full loads given to motor carriers. Some commodities of relatively high density are also contained in the lower truck ranges, but since the weights are classed as truckload lots they must reflect the presence of some fairly small trucks for many fresh commodity shipments.

TABLE 18.--Weight ranges of interstate rail carlot shipments of California-Arizona fresh vegetables and melons, by commodity group; survey firms, 1960

Commodity groups	Replies	30,000 to	35,000 to	40,000 to	45,000 to	50,000 to
		34,000 pounds	39,000 pounds	44,000 pounds	49,000 pounds	54,000 pounds
	Number	Percent	Percent	Percent	Percent	Percent
Melons <sup>1</sup> .....	18	5	67	23	--	5
Potatoes.....	23	--	--	100	--	--
Lettuce.....	55	27	13	58	--	2
Other vegetables <sup>2</sup> ...	41	10	5	71	2	12
Total.....	137	14	15	65	1	5

<sup>1</sup> Includes all types of melons except watermelons.

<sup>2</sup> Includes carrots, tomatoes, cabbage, celery, and onions.

TABLE 19.--Weight ranges of interstate truckload shipments of California-Arizona fresh vegetables and melons, by commodity group; survey firms, 1960

Commodity groups	Replies	20,000 to	25,000 to	30,000 to	35,000 to	40,000 to
		24,000 pounds	29,000 pounds	34,000 pounds	39,000 pounds	44,000 pounds
	Number	Percent	Percent	Percent	Percent	Percent
Melons <sup>1</sup> .....	18	--	11	22	56	11
Potatoes.....	25	--	--	4	72	24
Lettuce.....	34	6	21	38	31	4
Other vegetables <sup>2</sup> ...	58	7	19	24	50	--
Total.....	135	4	15	24	50	7

<sup>1</sup> Includes all types of melons except watermelons.

<sup>2</sup> Includes all vegetables not otherwise identified.

## Rail and Truck Rates

An exact comparison of rail and truck charges is difficult, because all rail rates are regulated by the ICC and truck rates for hauling fresh fruits and vegetables are not. Rail rates are on record in published tariffs, but motor carrier charges are negotiable and fluctuate continuously with changes in demand for service. Because the vast majority of truck shipments are billed "free-on-board" at origin, shipper copies of invoices do not show complete transportation charges. Firms that supplied some information were few; the response was too small to be of any value. Consequently, truck brokers were approached for whatever assistance they could provide. They proved to be extremely helpful, but would report only suggested rates that did not necessarily reflect the actual rates negotiated. However, the final rates agreed on were said to be only slightly above or below the suggested level. Table 20 shows some of the rail and truck rates in effect during 1960 on specific commodities. A carlot and trucklot shipping weight of 40,000 pounds was chosen to exemplify a load capable of being hauled by either carrier in one unit of equipment. Many commodities shown in the table can and usually do move in lots of this general size. Some are not usually loaded at this weight because of their bulk, low-weight density, or high perishability.

Truckers usually charge by the package. Therefore, it was necessary to convert all quotations to a hundredweight base to attain comparability with rail standards. The approximate loaded weights of containers in most frequent use were adopted for this adjustment.

Truck rates do not vary with the size of the load. Rail rates, on the other hand, are higher for less-than-carlot loads, and carlot charges are lowered as weight increases. However, despite basic inconsistencies in the rate structures of rail and motor carriers, enough similarity exists to support a brief discussion of the level of charges asked by both of them.

With a very few exceptions, the rates shown in table 20 for truck shipments exceed rail rates to the same destinations. For the 17 commodities, the average truck rate to Dallas was 29 percent above the average rail rate, and the rate to New York City was 95 percent higher.

Both truck and rail charges increase with distance, but truck charges show a continuous increase whereas rail charges tend to level out, as seen by comparing the charges listed in table 20 for shipments to the cities between Denver and New York, a distance of about 1,800 miles. This puts trucks at a definite rate disadvantage in competing for intermediate- and long-haul traffic in full load lots. Nevertheless, data published by the Market News Service indicate that 94 percent of the fresh fruits and vegetables shipped in 1960 from California and Arizona to Denver was handled by truck, as was 87 percent of the volume shipped to Dallas-Ft. Worth, and 36 percent of the volume shipped to Miami. The fact that truck charges for part loads to these markets are far below rail charges may help to explain why motor carriers have obtained such a large share of this traffic. For example, the rail charge in 1960 for shipping lettuce in less-than-carlot loads from Central California to Miami was \$11.36 per hundred-weight. The comparable truck rate was \$3.50.

In 1958, the western railroads inaugurated multiple-minimum rates on vegetables and melons, providing progressively lower charges as carlot weight increased. These rates have been recently extended to deciduous fruit. Of the 83 survey firms shipping only vegetables and melons and using both rail and truck in 1960, 40 percent thought that the incentive rates had helped to keep their shipments by rail to about the same proportion, 38 percent that they shipped relatively more by rail because of the rates, and 2 percent that the rates had caused a decline in the proportion of their shipments made by rail (table 21). The other 20 percent said that the rates had had no effect. Thus the incentive rates appear to have helped the railroads to retain, and perhaps to increase, their share of vegetable and melon shipments from many shippers.

TABLE 20.--Published rail rates and truck rates suggested by brokers for shipment of fresh fruits and vegetables from Central California to specified interstate markets at a shipping weight of 40,000 pounds, December 31, 1960<sup>1</sup>

Commodity	Denver, Colo.		Dallas, Tex.		Chicago, Ill.		Atlanta, Ga.		Miami, Fla.		New York, N.Y.	
	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck
	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Apples.....	1.71	1.83	1.81	2.12	1.91	2.79	2.16	2.79	2.31	3.17	2.26	3.46
Cabbage.....	1.45	1.83	1.70	1.50	1.78	2.33	2.13	2.50	2.19	2.75	2.19	2.92
Carrots.....	1.45	1.60	1.70	2.00	1.78	2.40	2.13	2.70	2.19	3.00	2.19	4.00
Celery.....	1.45	1.75	1.70	2.08	1.78	2.67	2.13	2.58	2.19	2.92	2.19	3.58
Grapefruit.....	1.17	3.00	1.32	3.12	2.02	2.25	2.02	4.75	2.22	6.25	2.02	7.25
Grapes.....	1.86	2.17	2.16	2.50	2.26	2.83	2.26	3.33	2.36	3.83	2.26	3.67
Lemons.....	1.19	3.00	1.34	3.12	2.04	2.25	2.04	4.75	2.22	6.25	2.04	7.25
Lettuce.....	1.45	2.38	1.70	2.00	1.78	2.62	2.13	3.25	1.19	3.50	2.19	3.88
Cantaloups.....	1.99	1.78	2.18	2.06	1.78	2.50	2.13	3.17	2.19	4.00	2.19	3.61
Onions (dry).....	1.30	1.80	1.36	2.10	1.60	2.50	1.89	2.80	1.99	3.00	1.96	4.10
Oranges.....	1.17	3.00	1.32	3.12	2.02	2.25	2.02	4.75	2.22	6.25	2.02	7.25
Peaches.....	1.86	2.00	2.16	2.50	2.26	3.00	2.26	3.25	2.36	3.75	2.26	3.75
Pears.....	1.86	1.90	2.16	2.20	2.26	2.70	2.26	2.90	2.36	3.40	2.26	3.50
Plums.....	1.86	1.97	2.16	2.27	2.26	2.42	2.26	3.18	2.36	3.48	2.26	3.33
Potatoes.....	1.30	2.00	1.36	2.15	1.60	2.75	1.89	2.90	1.99	3.10	1.96	3.35
Tomatoes.....	1.45	2.50	1.70	2.29	1.78	3.12	2.13	3.33	2.19	3.75	2.19	4.38
Watermelons.....	1.99	1.65	2.18	1.75	2.19	2.50	2.54	2.75	2.60	3.00	2.60	3.20

<sup>1</sup> Does not include charge for refrigeration. Reflects only differences in rates and is not meant to indicate that these commodities consistently move at this weight level.

TABLE 21.--Effect of rail incentive rates on the share of California-Arizona fresh fruits and vegetables shipped to interstate destinations by rail; survey firms by type and size, 1958 to 1960

Firm type and size	Firms <sup>1</sup>	Firms reporting rail incentive rates have--			
		Had no effect on rail's share	Increased rail's share	Decreased rail's share	Helped to keep rail's share about the same
		Number	Number	Number	Number
Type:					
Grower-shipper.....	42	6	19	2	15
Commercial packinghouse owning some acreage.....	16	5	4	--	7
Commercial packinghouse owning no acreage.....	8	2	3	--	3
Shipper's agent.....	9	2	3	--	4
Cooperative packinghouse.....	8	1	3	--	4
Total.....	83	16	32	2	33
Size (acres equivalent):					
200-399.....	16	3	3	1	9
400-799.....	25	7	11	--	7
800-1,599.....	19	6	6	1	6
1,600-3,199.....	13	--	8	--	5
3,200-6,399.....	7	--	3	--	4
6,400 and over.....	3	--	1	--	2
Total.....	83	16	32	2	33

<sup>1</sup> Represents 83 of the 91 firms reporting rail shipments. 8 firms did not handle commodities covered by incentive rail rates in 1960.

## Advantages and Disadvantages of Shipping by Rail or Truck

The survey firms were requested to enumerate the main advantages and disadvantages of shipping fruits and vegetables by rail and by truck. Their comments are presented below in terms of advantages and disadvantages in the use of trucks, and reflect the opposite viewpoint expressed toward rail service.

The following advantages were reported by shippers. They are stated in the order of their importance, based on the number of firms mentioning them:

- (1) Due to more rapid service, fruits and vegetables shipped by truck often arrive in better condition. Risk of a price change while in transit is reduced by the shorter transit time of trucks.
- (2) Multiple pickups and deliveries can be accomplished by truck, and are not practical by rail.
- (3) Motor carriers provide more uniform refrigeration, and the incidence of loss or damage is below that of rail. Claims against truckers can usually be settled immediately, while the process is more time consuming with rail.
- (4) In many instances, a truck can be loaded at less cost than a rail car and can be obtained faster than some types of rail equipment. Expensive stripping and bracing material and heavy containers needed in rail transit are not used as much in loading truck shipments.
- (5) Truck charges are lower for short hauls of full lots, and are well below rail charges for part lots whatever the distance.
- (6) Rail regulations governing the size and type of containers or methods of loading have no parallel among truckers. Truckers will accept practically any shipment regardless of how it is packaged.

The disadvantages reported by the firms, in the order of importance, were as follows:

- (1) Truck operators cannot be depended upon to meet prearranged loading schedules. This disrupts shipping routine, and creates labor problems by requiring irregular hours. Truckers insist on immediate departure and this places the shipper at a disadvantage in meeting his other loading commitments.
- (2) As truck charges for hauling exempt products are not regulated, a bargaining situation exists. Shippers said that limited knowledge of truck availability impairs their ability to judge whether a charge quoted is reasonable.
- (3) The financial responsibility of some truck operators is uncertain.
- (4) The lack of uniformity in truck equipment, as opposed to rail equipment, causes more of a problem when scheduling equipment for large loads.
- (5) Trucks, more than railroads, have delaying emergencies in route such as accidents, breakdown of equipment, delays resulting from traffic or weight violations, etc.
- (6) Diversion in route is not practical with trucks, because such service as a general rule is very costly.

The comments listed above are not to be taken as the only advantages or disadvantages attached to rail and truck service. They merely represent those characteristics that the shipping firms felt were the prime factors functioning for or against the selection of either carrier.

## Shortages of Rail or Truck Equipment

The seasonal demand for rail or truck equipment to handle interstate shipment of fresh fruits and vegetables is remarkably consistent from year to year throughout the California-Arizona area. However, because of similar growth cycles for most of the major crops, fruit and vegetable harvests and the need for transportation tend to be concentrated within the span of several months. The demand for equipment between January and April stands relatively constant. It then begins to rise sharply until it hits a peak in June. A major decline follows through August and gradually tapers off up to December. With the need for rail or truck service geared to this seasonal pattern, the question arises as to whether any shipping firms encounter shortages of equipment.

The survey firms were asked about their experiences in obtaining carrier space when needed. Of the 91 firms that shipped by rail, only 27 percent reported any difficulty in obtaining rail cars in 1960 (table 22). The problem occurred mainly during the peak season, and was considered of no real consequence. However, these firms reported that at times it was very difficult to obtain mechanically refrigerated cars, as opposed to standard ice cars.

TABLE 22.--Firms indicating whether any shortages of rail or truck equipment interrupted the interstate shipment of California-Arizona fresh fruits and vegetables; survey firms by type and size, 1960

Firm type and size	Shippers using rail			Shippers using truck		
	Firms <sup>1</sup>	Number reporting--		Firms <sup>2</sup>	Number reporting--	
		Some shortages	No shortages		Some shortages	No shortages
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
Type:						
Grower-shipper.....	43	15	28	44	20	24
Commercial packinghouse owning some acreage.....	21	6	15	21	10	11
Commercial packinghouse owning no acreage.....	10	1	9	10	1	9
Shipper's agent.....	9	1	8	8	2	6
Cooperative packinghouse.....	8	2	6	8	3	5
Total.....	91	25	66	91	36	55
Size (carlot equivalents):						
200-399.....	20	1	19	20	5	15
400-799.....	26	11	15	26	11	15
800-1,599.....	20	4	16	20	5	15
1,600-3,199.....	14	5	9	14	8	6
3,200-6,399.....	8	2	6	8	4	4
6,400 and over.....	3	2	1	3	3	--
Total.....	91	25	66	91	36	55

<sup>1</sup> 2 firms did not ship by rail.

<sup>2</sup> 2 firms did not ship by truck.

Of the 91 firms that shipped by motor carrier, 40 percent reported some difficulty in 1960 in engaging truckers when needed. Here again, the shortages occurred during the heavy shipping season, had come to be expected, and did not cause any major delay in shipment. There was some indication, however, that certain shippers had more of a problem with truck shortages than others. When the fruit and vegetable seasons overlap, truckers tend to bid for the commodities that generally bring the most profitable pay load. Since most types of fruit generally command the higher rates, truck operators are inclined to lean toward such commodities and away from the shipper of vegetables and melons.

PART II  
DEVELOPMENTS DURING A DECADE OF COMPETITION  
BETWEEN RAIL AND MOTOR CARRIERS

The major portion of the fresh fruits and vegetables shipped from the California and Arizona producing areas has always been handled by the railroads. However, shortly after World War II a rapid increase began in the share moved by motor carriers.

An examination of developments during the 10 years from 1951 to 1960 shows the extent to which the competitive positions of the two carriers have been modified by this trend. The pattern of shipments for 1951, 1954, 1957, and 1960 provides a basis for analyzing the changes that took place during the decade. The following discussion deals with the movement of 17 commodities which account for about 95 percent of the interstate shipments of fresh produce grown in the area.

Data used to conduct an analysis of these developments were compiled from sources listed on page . However, the statistics were not readily comparable in the form in which they were presented, and required substantial adjustments. The adjusted material is presented in the tables of this section of the report. It was developed as follows.

- (1) The publications reported truck volume without differentiating between mixed and straight loads, whereas the rail volume of mixed and straight loads was reported separately. To compensate for the difference, mixed load shipments by rail were converted to straight-load equivalents by commodity in a ratio based on each commodity's importance as a component of the total straight load traffic. It is possible that the allocation may not be entirely accurate, as mixed loads may have included a higher concentration of the commodities produced on a small scale than was assumed in making the adjustment.
- (2) It was impossible to determine the destination of approximately 20 percent of the volume shipped out-of-State by rail and about 2 percent of that shipped by truck. This volume was distributed by commodity among the geographic sectors used for the study in the same ratio as the traceable shipments.
- (3) Rail carloads are the basis from which factors for converting truck shipments to equivalent carlots were designed. Because of changes in carlot averages, some factors used by the published sources in converting 1960 truck shipments to rail carlot equivalents were different from those used to convert 1951, 1954, and 1957 truck shipments. Therefore, in compiling the tables in this report the 1960 figures were adjusted somewhat to attain comparability with shipments in the other years. Corresponding adjustments were made in estimating 1960 rail shipments. The procedure for adjusting the data was devised by the Market News Branch, Fruit and Vegetable Division, Agricultural Marketing Service, U.S. Department of Agriculture.
- (4) Production information, drawn from "Agricultural Statistics," was converted to carlot quantities as a basis for certain comparisons by use of factors published in "Fresh Fruit and Vegetable Unload Totals."

**Total Production, and the Proportion Moved Out of State**

It is estimated that in each of the years 1951, 1954, 1957, and 1960 more than 1.4 million acres of fresh fruits and vegetables were harvested in California and Arizona. Commodity totals indicate that the productive acreage of most fruits and vegetables



fluctuates constantly from year to year. This is occasioned by good or bad growing seasons, and by producers' decisions to effect step-ups or cutbacks in output. However, although these factors influence the acreage for individual commodities, they do not seem to drastically alter total production acreage over an extended period. Overall estimates for each of the selected years do not vary by more than 9 percent.

In each of the 4 years detailed in table 23, production exceeded 880,000 carlot equivalents. Sizable variations in the annual output of certain commodities such as grapes, lettuce, oranges, and tomatoes were generally responsible for the wide fluctuations in total fruit and vegetable production. Together, the four crops constituted nearly 60 percent of the total fruit and vegetable production and about the same percentage of all harvested acreage for each of the selected years. In 1960, the estimated output reached approximately 1.1 million carlot equivalents. This volume, about 4 percent above the 1951 level and 7 percent over that of 1957, topped the 1954 figure by almost 20 percent.

TABLE 23.--Production of fruits and vegetables in California and Arizona and percentage shipped out of State as fresh produce by rail and truck; by commodity, selected years 1951 to 1960

Commodity	Production				Percentage shipped out of State as fresh produce			
	1951	1954	1957	1960	1951	1954	1957	1960
	Carlot equiv.	Carlot equiv.	Carlot equiv.	Carlot equiv.	Percent	Percent	Percent	Percent
Apples <sup>1</sup> .....	10,100	12,505	12,245	12,123	8.4	7.5	6.3	4.1
Cabbage.....	10,228	7,328	9,792	10,952	25.2	14.3	30.8	33.0
Carrots.....	30,328	28,748	26,584	26,177	69.4	54.3	47.1	39.4
Celery.....	25,448	30,222	34,307	33,148	77.0	78.5	80.6	69.1
Grapefruit.....	11,065	10,935	10,620	11,761	48.5	48.1	42.4	51.9
Grapes.....	230,107	166,500	167,371	193,005	14.2	18.8	18.0	16.2
Lemons.....	28,635	33,208	36,576	34,891	56.5	47.2	47.0	43.6
Lettuce <sup>2</sup> .....	103,781	111,214	127,500	143,838	78.9	80.8	73.8	63.6
Melons <sup>3</sup> .....	44,880	48,276	39,576	47,354	73.6	76.3	68.8	71.4
Onions.....	12,960	12,618	16,356	19,400	43.9	35.7	33.6	25.0
Oranges <sup>4</sup> .....	93,207	80,565	67,000	63,543	56.5	52.7	62.1	56.6
Peaches <sup>1</sup> .....	60,786	52,143	59,143	65,000	7.8	9.5	9.6	7.8
Pears <sup>1</sup> .....	20,406	23,304	24,232	21,043	26.4	28.5	22.3	20.1
Plums <sup>1 5</sup> .....	35,204	32,840	32,316	29,032	15.2	11.4	14.0	15.3
Potatoes.....	63,014	67,664	91,622	86,414	65.3	59.9	53.4	61.9
Tomatoes.....	225,403	149,333	215,352	240,509	5.3	10.8	9.1	7.5
Watermelons.....	12,919	13,796	12,800	16,515	50.0	53.2	44.9	40.4
Total.....	1,018,471	881,199	983,392	1,054,705	34.0	39.3	36.0	33.0

<sup>1</sup> For California only. Very little, if any, of this commodity is grown commercially in Arizona.

<sup>2</sup> Includes romaine.

<sup>3</sup> Includes all types of melons except watermelons.

<sup>4</sup> Includes tangerines.

<sup>5</sup> Includes fresh prunes.

The share of total fruit and vegetable production shipped out of the two States as fresh produce during the study years ranged from 33 percent in 1960 to 39 percent in 1954 (table 23). Among the individual crops making up the total, the proportions shipped varied considerably, but for some commodities the share was always higher than others. Individual out-of-State movements of apples, grapes, peaches, plums, and tomatoes amounted to 19 percent or less of each commodity's yearly production. Shipments of cabbage, onions, pears, and watermelons ranged between 20 to 45 percent of the output; carrot, grapefruit, orange, lemon, and potato shipments amounted to 46 to 65 percent of production; and 66 percent or more of the celery, lettuce, and melons were shipped out of State. Methods of marketing within the producing States is not within the scope of this report.

### Total Shipments

The total volume of fresh fruits and vegetables moved out of California and Arizona by rail and truck was about the same for each of the four years studied (table 24). Annual shipments ranged from a low of 346,000 carlot equivalents in 1954 to a high of 354,000 carlot equivalents in 1957, a variation of no more than 2 percent. Movements of most commodities fluctuated only moderately, but shipments of a few commodities, such as carrots, lettuce, oranges, potatoes, and tomatoes, varied considerably, mainly because of changes in annual crop production. In a few instances the deviation may have been caused by abrupt changes in demand.

TABLE 24.--Percentage distribution of the out-of-State rail and truck shipment of California-Arizona fresh fruits and vegetables; by commodity, selected years 1951 to 1960

Commodity	1951	1954	1957	1960
	Percent	Percent	Percent	Percent
Apples <sup>1</sup> .....	0.2	0.3	0.2	0.1
Cabbage.....	0.7	0.3	0.8	1.0
Carrots.....	6.1	4.5	3.5	3.0
Celery.....	5.7	6.9	7.8	6.6
Grapefruit.....	1.5	1.5	1.3	1.7
Grapes.....	9.4	9.0	8.5	9.0
Lemons.....	4.7	4.5	4.9	4.4
Lettuce <sup>2</sup> .....	23.6	25.9	26.6	26.3
Melons <sup>3</sup> .....	9.5	10.6	7.7	9.7
Onions.....	1.6	1.3	1.6	1.4
Oranges <sup>4</sup> .....	15.2	12.3	11.7	10.3
Peaches <sup>1</sup> .....	1.4	1.4	1.6	1.5
Pears <sup>1</sup> .....	1.6	1.9	1.5	1.2
Plums <sup>1 5</sup> .....	1.5	1.1	1.3	1.3
Potatoes.....	11.9	11.7	13.8	15.4
Tomatoes.....	3.5	4.7	5.6	5.2
Watermelons.....	1.9	2.1	1.6	1.9
	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>
Total shipped.....	346,543	346,487	354,088	348,028

<sup>1</sup> For California only. Very little, if any, of this commodity is grown commercially in Arizona.

<sup>2</sup> Includes romaine.

<sup>3</sup> Includes all types of melons except watermelons.

<sup>4</sup> Includes tangerines.

<sup>5</sup> Includes fresh prunes.

As indicated by table 25, the geographic allocation of out-of-State shipments from the bi-State area changed slightly between 1951 and 1960, but not enough to significantly alter the pattern of distribution to Canada, Mexico, and the eight regions of the United States. Annual shipments during the 10-year period to all regions in the United States were about 94 percent of the total. Around 32 percent of the commodities shipped went to markets west of the Mississippi River. East of the river, the North Atlantic and East North Central Regions were first and second in importance, receiving about 50 percent of the total.

TABLE 25.--Percentage distribution of the out-of-State rail and truck shipment of California-Arizona fresh fruits and vegetables; by destination, selected years 1951 to 1960<sup>1</sup>

Destination <sup>2</sup>	1951	1954	1957	1960
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
West of Mississippi River:				
Northwestern.....	5.9	6.4	5.5	6.0
Western <sup>3</sup> .....	6.1	7.0	6.8	7.3
West North Central.....	11.1	11.0	10.2	9.8
West South Central.....	8.9	8.9	9.5	8.7
All Western Regions.....	32.0	33.3	32.0	31.8
East of Mississippi River:				
East North Central.....	22.8	21.9	21.6	20.9
East South Central.....	3.1	2.9	3.0	2.9
North Atlantic.....	30.6	29.1	29.0	29.6
South Atlantic.....	6.9	7.1	7.5	7.6
All Eastern Regions.....	63.4	61.0	61.1	61.0
United States.....	95.4	94.3	93.1	92.8
Canada and Mexico.....	4.6	5.7	6.9	7.2
	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>
Total Shipped.....	346,543	346,487	354,088	348,028

<sup>1</sup> For a summary of individual commodities and commodity groups see table 27, page 30.

<sup>2</sup> For delineation of Regions, see figure 2, page 8.

<sup>3</sup> Includes shipments between California and Arizona.

### Movement of Specific Commodities

Lettuce, oranges, and potatoes accounted for approximately 50 percent of the fresh produce shipped out of State from California and Arizona in the 4 years studied, followed by grapes and melons, which accounted for about 20 percent. Tables 26 to 29 show the distribution patterns by destination and by type of carrier for these and other commodities.

About 29 percent of the 82,000 to 94,000 carlot equivalents of lettuce shipped out of Arizona and California in each the 4 years studied went to the regions west of the Mississippi, mostly to the West South Central and West North Central Regions. Truck shipments to these two regions increased from 13 and 18 percent, respectively, of the total shipped in 1951 to 60 and 88 percent of the total shipped in 1960.

TABLE 26.--Percentage distribution between rail and truck of California-Arizona fresh fruits and vegetables shipped out of State; by commodity, selected years 1951 to 1960

Commodity	Percentage shipped by--							
	Rail				Truck			
	1951	1954	1957	1960	1951	1954	1957	1960
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Apples <sup>1</sup> .....	56.0	29.6	10.6	5.6	44.0	70.4	89.4	94.4
Cabbage.....	80.2	78.8	62.5	56.8	19.8	21.2	37.5	43.2
Carrots.....	87.4	80.2	72.3	65.7	12.6	19.8	27.7	34.3
Celery.....	85.3	81.7	73.9	70.4	14.7	18.3	26.1	29.6
Grapefruit.....	50.4	32.8	37.2	44.9	49.6	67.2	62.8	55.1
Grapes.....	90.2	85.9	78.8	73.9	9.8	14.1	21.2	26.1
Lemons.....	89.8	84.1	80.4	73.0	10.2	15.9	19.6	27.0
Lettuce <sup>2</sup> .....	88.6	85.8	76.3	69.3	11.4	14.2	23.7	30.7
Melons <sup>3</sup> .....	91.4	89.4	81.8	81.1	8.6	10.6	18.2	18.9
Onions.....	92.7	88.8	86.0	80.6	7.3	11.2	14.0	19.4
Oranges <sup>4</sup> .....	88.9	76.8	78.3	74.1	11.1	23.2	21.7	25.9
Peaches <sup>1</sup> .....	78.5	71.8	60.6	51.5	21.5	28.2	39.4	48.5
Pears <sup>1</sup> .....	93.4	89.5	83.5	80.5	6.6	10.5	16.5	19.5
Plums <sup>1 5</sup> .....	90.9	85.3	80.1	74.6	9.1	14.7	19.9	25.4
Potatoes.....	94.6	90.2	84.1	82.7	5.4	9.8	15.9	17.3
Tomatoes.....	65.3	51.6	31.4	37.4	34.7	48.4	68.6	62.6
Watermelons.....	47.6	47.8	26.2	25.6	52.4	52.2	73.8	74.4
Total.....	87.3	81.5	74.1	70.5	12.7	18.5	25.9	29.5

<sup>1</sup> For California only. Very little, if any, of this commodity is grown commercially in Arizona.

<sup>2</sup> Includes romaine. <sup>3</sup> Includes all types of melons except watermelons. <sup>4</sup> Includes tangerines.

<sup>5</sup> Includes fresh prunes.

About half the lettuce shipped during the 4 years studied was sent to the North Atlantic and East North Central Regions. Here the change between rail and truck was less significant. In 1951 almost no shipments of lettuce were made by truck to either region. By 1960, truck shipments amounted to only 8 percent of total shipments to the East North Central Region, and for almost none of the total to the North Atlantic Region.

Out-of-State shipments of oranges from Arizona and California in the four selected years ranged between 36,000 and 53,000 carlot equivalents a year. About 28 percent of the total shipped each year went to destinations west of the Mississippi River, 59 percent to destinations east of the river, and 13 percent to Canada and Mexico. Between 1951 and 1960, shipments by rail fell from 62 to 21 percent of the total shipped to the western regions, and from near 100 percent to 93 percent in the eastern regions.

The East North Central and North Atlantic Regions absorbed about 45 percent of the yearly total of potatoes shipped from the two States. Nearly 100 percent of the total was shipped by rail in both 1951 and 1960. In contrast, rail shipments of potatoes to the West South Central Region dropped from 96 to 45 percent of the total between 1951 and 1960, and rail shipments to the West North Central Region dropped from 99 to 88 percent. These two western regions accounted for nearly 30 percent of the potatoes shipped from California and Arizona in the study years.

To summarize, the three commodities--lettuce, oranges, and potatoes--moved to geographic marketing outlets in the same ratio in 1960 and in 1951. However, the participation of rail and motor carriers in their distribution changed considerably. By 1960, trucks had become the major carrier for short and intermediate hauls of lettuce and oranges, leaving the long hauls predominantly to the railroads; however, trucks also made some gains in shipments to regions in the east. While truck shipments of potatoes increased considerably during the period, rail remained the major carrier to most regions in both the eastern and western parts of the country. Potatoes are less perishable than lettuce and oranges, and the faster service offered by trucks is less important in determining how they are shipped.

TABLE 27.--Percentage distribution of the out-of-State rail and truck shipment of California-Arizona fresh fruits and vegetables among destination areas; by commodity or commodity group, selected years 1951 to 1960

Commodity and year	Shipments	Destination <sup>1</sup>									
		Regions west of Mississippi River					Regions east of Mississippi River				
		Northwestern	Western <sup>2</sup>	West North Central	West South Central	Total <sup>3</sup>	East North Central	East South Central	North Atlantic	South Atlantic	Total <sup>3</sup>
	Carlot equiv.	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Grapes:											
1951.....	32,575	2.9	2.3	6.8	6.7	18.7	18.9	3.2	46.0	7.5	75.6
1954.....	31,245	2.8	2.5	6.4	6.9	18.6	18.7	3.0	44.2	7.7	73.6
1957.....	30,047	2.8	2.6	6.1	6.5	18.0	18.0	2.8	41.4	8.0	70.2
1960.....	31,353	2.7	2.7	6.2	6.4	18.0	17.6	2.9	38.7	8.0	67.2
Lettuce: <sup>4</sup>											
1951.....	81,867	3.9	5.5	11.5	9.8	30.7	24.1	5.3	26.3	10.4	66.1
1954.....	89,841	4.2	4.9	12.3	8.7	30.1	24.6	4.6	25.8	10.8	65.8
1957.....	94,070	3.6	5.0	11.0	9.1	28.7	23.9	4.7	26.6	11.4	66.6
1960.....	91,426	4.1	6.2	10.0	8.4	28.7	22.4	4.2	28.5	11.5	66.6
Melons: <sup>5</sup>											
1951.....	33,047	4.1	4.4	7.3	3.9	19.7	22.4	2.7	44.4	9.2	78.7
1954.....	36,858	4.7	5.0	7.7	3.5	20.9	21.2	2.4	43.2	9.5	76.3
1957.....	27,240	5.5	6.4	6.9	2.8	21.6	20.1	2.0	43.3	9.6	75.0
1960.....	33,828	5.3	5.9	7.6	3.3	22.1	21.2	2.2	41.9	9.7	75.0
Oranges: <sup>6</sup>											
1951.....	52,675	6.6	3.6	12.1	4.6	26.9	23.4	1.3	35.2	2.7	62.6
1954.....	42,468	7.4	6.1	12.2	4.6	30.3	21.4	.6	31.6	1.9	55.5
1957.....	41,577	6.2	4.6	10.8	5.4	27.0	20.8	.7	33.9	2.1	57.5
1960.....	35,939	5.6	4.6	10.9	4.6	25.7	21.2	.9	35.3	2.6	60.0
Potatoes:											
1951.....	41,162	6.2	5.7	16.5	18.7	47.1	32.2	2.4	13.4	3.0	51.0
1954.....	40,546	7.0	6.7	15.1	17.7	46.5	29.4	2.8	15.7	3.4	51.3
1957.....	48,972	5.7	6.1	13.7	16.3	41.8	29.5	3.3	18.1	4.2	55.1
1960.....	53,501	6.5	6.7	13.7	13.7	40.6	27.8	3.0	20.1	4.3	55.2
Other fruits: <sup>7</sup>											
1951.....	37,880	5.1	10.2	11.7	9.0	36.0	18.3	4.0	30.0	7.5	59.8
1954.....	37,175	4.9	11.7	10.7	9.8	37.1	17.3	4.4	28.5	8.0	58.2
1957.....	38,093	3.8	9.9	10.3	10.7	34.7	16.0	4.1	30.9	9.1	60.1
1960.....	35,565	3.7	11.3	10.7	9.9	35.6	15.4	3.7	30.1	9.2	58.4
Other vegetables: <sup>8</sup>											
1951.....	67,337	10.4	9.7	10.4	8.4	38.9	19.5	1.9	28.7	6.4	56.5
1954.....	68,354	11.7	11.1	10.4	9.7	42.9	18.4	1.5	25.7	5.4	51.0
1957.....	74,089	9.4	11.1	9.4	10.8	40.7	19.0	1.9	25.4	5.9	52.2
1960.....	66,416	11.5	11.5	8.2	10.8	42.0	17.4	2.0	24.6	5.6	49.6
Total commodities:											
1951.....	346,543	5.9	6.1	11.1	8.9	32.0	22.8	3.1	30.6	6.9	63.4
1954.....	346,487	6.4	7.0	11.0	8.9	33.3	21.9	2.9	29.1	7.1	61.0
1957.....	354,088	5.5	6.8	10.2	9.5	32.0	21.6	3.0	29.0	7.5	61.1
1960.....	348,028	6.0	7.3	9.8	8.7	31.8	20.9	2.9	29.6	7.6	61.0

<sup>1</sup> For delineation of regions, see figure 2, page 8.

<sup>2</sup> Includes shipments between California and Arizona.

<sup>3</sup> Where the percentage totals for the regions east and west of the Mississippi River do not add to 100, the difference measures the shipments moving to Canada and Mexico.

<sup>4</sup> Includes romaine.

<sup>5</sup> Includes all types of melons except watermelons.

<sup>6</sup> Includes tangerines.

<sup>7</sup> Apples, grapefruit, lemons, peaches, pears, and plums (including fresh prunes). No apples, peaches, pears, or plums were shipped out of Arizona.

<sup>8</sup> Cabbages, celery, onions, tomatoes, and watermelons.

TABLE 28. ---Percentage distribution between rail and truck of California-Arizona fresh fruits and vegetables shipped to each region west of the Mississippi River; by commodity or commodity group, selected years, 1951 to 1960

Commodity and year	Total, regions west of the Mississippi River <sup>1</sup>						Western <sup>2</sup>						West North Central						West South Central						
	Shipments		Rail		Truck		Shipments		Rail		Truck		Shipments		Rail		Truck		Shipments		Rail		Truck		
	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	Carlot equiv.	Percent	
<b>Grapes:</b>																									
1951.....	6,078	35.5	47.5	64.4	926	35.6	64.4	749	20.0	80.0	2,212	73.5	26.5	2,191	49.5	50.5									
1954.....	5,816	32.5	64.5	872	27.9	772	4.3	95.7	60.0	95.7	2,012	60.0	40.0	1,660	26.9	73.1									
1957.....	5,408	17.7	82.3	835	7.7	92.3	3.6	96.4	37.8	96.4	1,834	37.8	62.2	1,967	8.7	91.3									
1960.....	5,678	10.1	89.9	858	12.9	87.1	0.9	99.1	20.2	99.1	1,955	20.2	79.8	2,017	3.1	96.9									
<b>Lettuce:<sup>3</sup></b>																									
1951.....	25,075	64.3	35.7	3,149	17.6	82.4	17.1	82.9	4,466	17.1	82.9	9,428	87.3	12.7	8,032	81.8	18.2								
1954.....	26,984	55.5	44.5	3,734	7.7	92.3	14.8	85.2	4,407	14.8	85.2	11,015	76.7	23.3	7,828	71.5	28.5								
1957.....	27,024	31.9	68.1	3,378	9.0	91.0	4.1	95.9	4,736	4.1	95.9	10,306	52.8	47.2	8,604	31.1	68.9								
1960.....	26,230	18.7	81.3	3,778	7.3	92.7	1.8	98.2	5,645	1.8	98.2	9,148	39.8	60.2	7,659	11.6	88.4								
<b>Melons:<sup>4</sup></b>																									
1951.....	6,524	58.3	41.7	1,343	31.3	68.7	27.9	72.1	1,472	27.9	72.1	2,413	89.5	10.5	1,296	62.7	37.3								
1954.....	7,745	51.6	48.4	1,732	28.2	71.8	15.1	84.9	1,865	15.1	84.9	2,839	86.0	14.0	1,309	60.0	40.0								
1957.....	5,884	29.2	70.8	1,503	10.8	89.2	4.9	95.1	1,746	4.9	95.1	1,875	67.7	32.3	760	26.3	73.7								
1960.....	7,478	31.1	68.9	1,798	34.6	65.4	4.2	95.8	2,002	4.2	95.8	2,558	55.2	44.8	1,120	18.5	81.5								
<b>Oranges:<sup>5</sup></b>																									
1951.....	14,166	61.7	38.3	3,505	33.4	66.6	30.5	69.5	1,893	30.5	69.5	6,368	81.8	18.2	2,400	74.5	25.5								
1954.....	12,841	32.0	68.0	3,115	26.3	73.7	1.2	98.8	1,865	1.2	98.8	5,194	60.0	40.0	1,934	23.2	76.8								
1957.....	11,233	33.0	67.0	2,597	26.3	73.7	5.9	94.1	1,919	5.9	94.1	4,473	55.3	44.7	2,244	19.4	80.6								
1960.....	9,256	21.2	78.8	2,026	32.2	67.8	1.6	98.4	1,653	1.6	98.4	3,931	30.6	69.4	1,646	5.0	95.0								
<b>Potatoes:</b>																									
1951.....	19,383	88.9	11.1	2,576	83.3	16.7	43.5	56.5	2,332	43.5	56.5	6,783	98.9	1.1	7,692	95.6	4.4								
1954.....	18,855	80.0	20.0	2,860	75.3	24.7	29.4	70.6	2,700	29.4	70.6	6,122	97.3	2.7	7,173	86.1	13.9								
1957.....	20,455	64.1	35.7	2,781	68.2	31.8	19.3	80.7	2,971	19.3	80.7	6,696	94.0	6.0	8,007	54.7	45.3								
1960.....	21,718	60.1	39.9	3,482	73.1	26.9	21.3	78.7	3,592	21.3	78.7	7,325	87.9	12.1	7,319	45.2	54.8								
<b>Other fruits:<sup>6</sup></b>																									
1951.....	13,615	53.6	46.4	1,933	46.0	54.0	15.4	84.6	3,850	15.4	84.6	4,437	84.5	15.5	3,395	61.1	38.9								
1954.....	13,775	35.9	64.1	1,831	31.6	68.4	5.1	94.9	4,329	5.1	94.9	3,986	76.2	23.8	3,629	30.3	69.7								
1957.....	13,213	31.1	68.9	1,432	24.3	75.7	3.2	96.8	3,778	3.2	96.8	3,926	65.1	34.9	4,067	26.4	73.6								
1960.....	12,660	22.1	77.9	1,311	21.7	78.3	1.4	98.6	4,023	1.4	98.6	3,798	51.5	48.5	3,528	14.2	85.8								
<b>Other vegetables:<sup>7</sup></b>																									
1951.....	26,180	49.2	50.8	7,013	45.5	54.5	22.2	77.8	6,543	22.2	77.8	6,965	84.8	15.2	5,659	41.4	58.6								
1954.....	29,336	37.7	62.3	8,015	39.6	60.4	16.2	83.8	7,604	16.2	83.8	7,098	71.8	28.2	6,619	23.7	76.3								
1957.....	30,160	19.6	80.4	6,973	22.3	77.7	6.2	93.8	8,253	6.2	93.8	6,973	43.4	56.6	7,961	10.2	89.8								
1960.....	27,879	17.1	82.9	7,644	29.5	70.5	3.1	96.9	7,632	3.1	96.9	5,454	31.5	68.5	7,149	8.0	92.0								
<b>All commodities:</b>																									
1951.....	111,021	62.4	37.6	20,445	42.6	57.4	23.3	76.7	21,305	23.3	76.7	38,606	87.0	13.0	30,665	71.8	28.2								
1954.....	115,352	48.8	51.2	22,159	33.5	66.5	13.4	86.6	24,275	13.4	86.6	38,266	76.6	23.4	30,652	53.1	46.9								
1957.....	113,377	33.6	66.4	19,499	25.7	74.3	6.7	93.3	24,175	6.7	93.3	36,093	60.3	39.7	33,610	29.0	71.0								
1960.....	110,899	27.4	72.6	20,897	32.3	67.7	5.0	95.0	25,395	5.0	95.0	34,169	49.0	51.0	30,438	18.4	81.6								

1 For delineation of regions, see figure 2, page 8.  
2 Includes shipments between California and Arizona.  
3 Includes romaine.  
4 Includes all types of melons except watermelons.  
5 Apples, grapefruit, lemons, peaches, pears, and plums (including fresh prunes). No apples, peaches, pears, or plums were shipped out of Arizona.  
6 Cabbages, celery, onions, tomatoes, and watermelons.

TABLE 29.--Percentage distribution between rail and truck of California-Arizona fresh fruits and vegetables shipped to each region east of the Mississippi River: by commodity and commodity group, selected years, 1951 to 1960

Commodity and year	Total regions east of the Mississippi River <sup>1</sup>				East North Central				East South Central				North Atlantic				South Atlantic							
	Shipments		Percent		Shipments		Percent		Shipments		Percent		Shipments		Percent		Shipments		Percent		Shipments		Percent	
	Carlot equiv.	Percent	Truck	Percent	Carlot equiv.	Percent	Truck	Percent	Carlot equiv.	Percent	Truck	Percent	Carlot equiv.	Percent	Truck	Percent	Carlot equiv.	Percent	Truck	Percent	Carlot equiv.	Percent	Truck	Percent
<b>Grapes:</b>																								
1951.....	24,628	99.3	0.7	99.4	6,139	99.4	0.6	99.4	1,051	94.8	5.2	100.0	14,993	100.0	( <sup>2</sup> )	97.1	2,445	97.1	( <sup>2</sup> )	2,395	94.4	5.6	36.1	
1954.....	5,855	98.4	1.6	98.8	5,855	98.8	1.2	98.0	820	82.0	18.0	100.0	13,412	100.0	( <sup>2</sup> )	94.4	2,395	94.4	( <sup>2</sup> )	2,398	80.2	19.8		
1957.....	21,106	93.3	6.7	93.6	5,420	93.6	6.4	838	33.1	66.9	33.1	99.8	12,450	99.8	0.2	63.9	2,515	63.9	1.0	2,515	80.2	19.8		
1960.....	21,052	88.8	11.2	87.9	5,527	87.9	12.1	890	23.9	76.1	23.9	99.0	12,120	99.0	1.0	80.8	2,515	80.8	1.4	10,518	80.8	19.2		
<b>Lettuce:<sup>3</sup></b>																								
1951.....	54,170	99.6	0.4	99.8	19,757	99.8	0.2	4,328	99.6	0.4	21,549	100.0	( <sup>2</sup> )	8,536	98.1	1.9	98.1	8,536	98.1	( <sup>2</sup> )	9,750	98.4	1.6	
1954.....	59,194	99.4	0.6	99.4	22,115	99.4	0.6	4,170	98.7	1.3	23,159	99.9	0.1	10,733	90.0	10.0	10,733	90.0	1.1	10,733	90.0	10.0		
1957.....	62,656	94.5	5.5	94.5	22,448	97.0	3.0	4,469	68.2	31.8	25,006	98.9	1.1	10,518	80.8	19.2	10,518	80.8	1.4	10,518	80.8	19.2		
1960.....	60,903	90.4	9.6	92.1	20,513	92.1	7.9	3,783	50.4	49.6	26,089	98.6	1.4	10,518	80.8	19.2	10,518	80.8	1.4	10,518	80.8	19.2		
<b>Melons:<sup>4</sup></b>																								
1951.....	25,987	99.7	0.3	99.7	7,390	99.7	0.3	882	97.7	2.3	14,687	100.0	( <sup>2</sup> )	3,028	98.1	1.9	98.1	3,028	98.1	( <sup>2</sup> )	3,497	99.3	0.7	
1954.....	28,089	99.8	0.2	99.8	7,804	99.8	0.2	878	97.8	2.2	15,910	100.0	( <sup>2</sup> )	2,627	94.1	5.9	94.1	2,627	94.1	0.8	3,292	91.6	8.4	
1957.....	20,430	97.2	2.8	97.1	5,475	97.1	2.9	537	70.6	29.4	11,791	99.2	0.8	3,292	91.6	8.4	3,292	91.6	0.7	3,292	91.6	8.4		
1960.....	25,375	96.2	3.8	94.9	7,174	94.9	5.1	728	69.1	30.9	14,181	99.3	0.7	3,292	91.6	8.4	3,292	91.6	0.7	3,292	91.6	8.4		
<b>Oranges:<sup>5</sup></b>																								
1951.....	32,967	99.9	0.1	99.7	12,318	99.7	0.3	672	99.1	0.9	18,567	100.0	( <sup>2</sup> )	1,410	99.8	0.2	99.8	1,410	99.8	( <sup>2</sup> )	1,410	99.8	0.2	
1954.....	23,607	99.4	0.6	99.3	9,101	99.3	0.7	263	94.3	5.7	13,425	99.6	0.4	858	99.5	0.5	99.5	858	99.5	( <sup>2</sup> )	858	99.5	0.5	
1957.....	23,883	97.4	2.6	94.4	8,627	94.4	5.6	287	59.9	40.1	14,111	100.0	( <sup>2</sup> )	934	88.3	11.7	88.3	934	88.3	( <sup>2</sup> )	934	88.3	11.7	
1960.....	21,536	93.1	6.9	85.1	7,631	85.1	14.9	306	34.0	66.0	12,665	99.7	0.3	934	88.3	11.7	934	88.3	0.3	934	88.3	11.7		
<b>Potatoes:</b>																								
1951.....	21,006	100.0	( <sup>2</sup> )	100.0	13,272	100.0	( <sup>2</sup> )	1,006	99.9	0.1	5,508	100.0	( <sup>2</sup> )	1,220	99.6	0.4	99.6	1,220	99.6	( <sup>2</sup> )	1,389	99.5	0.5	
1954.....	20,797	99.9	0.1	99.9	11,911	99.9	0.1	1,147	99.9	0.1	6,350	100.0	( <sup>2</sup> )	1,389	99.5	0.5	99.5	1,389	99.5	( <sup>2</sup> )	1,389	99.5	0.5	
1957.....	26,997	99.2	0.8	99.8	14,455	99.8	0.2	1,622	91.1	8.9	8,550	99.9	0.1	2,070	98.9	1.1	98.9	2,070	98.9	( <sup>2</sup> )	2,070	98.9	1.1	
1960.....	29,539	98.6	1.4	98.9	14,882	98.9	1.1	1,612	87.7	12.3	10,749	100.0	( <sup>2</sup> )	2,296	97.5	2.5	97.5	2,296	97.5	( <sup>2</sup> )	2,296	97.5	2.5	
<b>Other fruits:<sup>6</sup></b>																								
1951.....	22,662	99.5	0.5	98.5	6,923	98.5	1.5	1,507	98.3	1.7	11,383	100.0	( <sup>2</sup> )	2,849	98.2	1.8	98.2	2,849	98.2	( <sup>2</sup> )	4,286	95.2	4.8	
1954.....	21,652	98.6	1.4	98.8	6,451	98.8	1.2	1,633	91.9	8.1	10,587	100.0	( <sup>2</sup> )	2,982	96.9	3.1	96.9	2,982	96.9	( <sup>2</sup> )	3,660	88.1	11.9	
1957.....	22,909	93.5	6.5	93.7	6,116	93.7	6.3	1,551	56.9	43.1	11,764	99.9	0.1	3,478	87.9	12.1	87.9	3,478	87.9	( <sup>2</sup> )	4,411	67.3	32.7	
1960.....	20,787	89.9	10.1	87.6	5,496	87.6	12.4	1,307	44.8	55.2	10,692	99.3	0.7	3,292	71.2	28.8	71.2	3,292	71.2	( <sup>2</sup> )	3,688	71.2	28.8	
<b>Other vegetables:<sup>7</sup></b>																								
1951.....	38,082	98.8	1.2	98.5	13,160	98.5	1.5	1,272	86.0	14.0	19,364	100.0	( <sup>2</sup> )	4,286	95.2	4.8	95.2	4,286	95.2	( <sup>2</sup> )	4,286	95.2	4.8	
1954.....	34,878	97.2	2.8	98.8	12,606	98.8	1.2	1,016	65.2	34.8	17,596	99.7	0.3	3,660	88.1	11.9	88.1	3,660	88.1	( <sup>2</sup> )	3,660	88.1	11.9	
1957.....	38,662	88.0	12.0	88.6	14,071	88.6	11.4	1,378	26.3	73.7	18,802	97.0	3.0	4,411	67.3	32.7	67.3	4,411	67.3	( <sup>2</sup> )	4,411	67.3	32.7	
1960.....	32,968	87.2	12.8	85.2	11,575	85.2	14.8	1,334	27.1	72.9	16,371	97.2	2.8	3,688	71.2	28.8	71.2	3,688	71.2	( <sup>2</sup> )	3,688	71.2	28.8	
<b>All commodities:</b>																								
1951.....	219,502	99.5	0.5	99.7	78,959	99.7	0.3	10,718	97.2	2.8	106,051	100.0	( <sup>2</sup> )	23,774	97.7	2.3	97.7	23,774	97.7	( <sup>2</sup> )	23,774	97.7	2.3	
1954.....	211,206	98.9	1.1	99.3	75,843	99.3	0.7	10,033	92.6	7.4	100,839	99.9	0.1	24,491	96.5	3.5	96.5	24,491	96.5	( <sup>2</sup> )	24,491	96.5	3.5	
1957.....	216,643	94.3	5.7	95.2	76,612	95.2	4.8	10,682	61.8	38.2	102,774	99.0	1.0	26,575	86.4	13.6	86.4	26,575	86.4	( <sup>2</sup> )	26,575	86.4	13.6	
1960.....	212,160	91.8	8.2	91.3	72,798	91.3	8.7	9,960	51.1	48.9	102,867	98.9	1.1	26,535	81.0	19.0	81.0	26,535	81.0	( <sup>2</sup> )	26,535	81.0	19.0	

<sup>1</sup> For delineation of regions, see figure 2, page 8.  
<sup>2</sup> Less than 0.1 percent.  
<sup>3</sup> Includes romaine.  
<sup>4</sup> Includes all types of melons except watermelons.  
<sup>5</sup> Includes tangerines.  
<sup>6</sup> Apples, grapefruit, lemons, peaches, pears, and plums (including fresh prunes). No apples, peaches, pears, or plums were shipped out of Arizona.  
<sup>7</sup> Cabbages, celery, onions, tomatoes, and watermelons.

## Mode of Shipment to Specified Destinations

During the 10 years from 1951 to 1960, the North Atlantic Region was the destination of about 48 percent of the fresh produce shipped from California and Arizona to all eastern regions. Railroads handled all of the traffic to this region in 1951; in 1960, rail shipments still accounted for 99 percent of the total (table 30). Shifts in the other regions were more pronounced. Rail shipments dropped from almost 100 to 91 percent of the total for the East North Central Region and from 98 to 81 percent for the South Atlantic Region. The most substantial shift took place in the East South Central Region, for which the share shipped by rail dropped from 97 to 51 percent. For all of the area east of the Mississippi, the share of the volume handled by rail declined from 99 to 92 percent in the 10-year period.

About a third of the fresh fruits and vegetables shipped out of California and Arizona during the years studied went to markets west of the Mississippi River. Between 1951 and 1960, rail shipments to the western regions, as a percentage of total volume shipped, dropped from 62 to 27 percent (table 30). This represents a decline from 43 to 32 percent for the Northwestern Region, from 23 to 5 percent for the Western Region, a sharp decline for the West South Central Region from 72 to 18 percent, and from 87 to 49 percent for the West North Central Region.

TABLE 30.--Percentage distribution between rail and truck of California-Arizona fresh fruits and vegetables shipped out of State; by destination, selected years 1951 to 1960<sup>1</sup>

Destination <sup>2</sup>	Rail				Truck			
	1951	1954	1957	1960	1951	1954	1957	1960
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
West of Mississippi River:								
Northwestern.....	42.6	33.5	25.7	32.3	57.4	66.5	74.3	67.7
Western <sup>3</sup> .....	23.3	13.4	6.7	5.0	76.7	86.6	93.3	95.0
West North Central.....	87.0	76.6	60.3	49.0	13.0	23.4	39.7	51.0
West South Central.....	71.8	53.1	29.0	18.4	28.2	46.9	71.0	81.6
All western regions..	62.4	48.8	33.6	27.4	37.6	51.2	66.4	72.6
East of Mississippi River:								
East North Central.....	99.7	99.3	95.2	91.3	0.3	0.7	4.8	8.7
East South Central.....	97.2	92.6	61.8	51.1	2.8	7.4	38.2	48.9
North Atlantic.....	100.0	99.9	99.0	98.9	( <sup>4</sup> )	0.1	1.0	1.1
South Atlantic.....	97.7	96.5	86.4	81.0	2.3	3.5	13.6	19.0
All eastern regions..	99.5	98.9	94.3	91.8	0.5	1.1	5.7	8.2
United States.....	87.0	81.2	73.5	69.7	13.0	18.8	26.5	30.3
Canada and Mexico.....	93.1	86.9	83.0	81.2	6.9	13.1	17.0	18.8
All destinations...	87.3	81.5	74.1	70.5	12.7	18.5	25.9	29.5
Total shipped.....	302,568	282,509	262,391	245,439	43,975	63,978	91,697	102,589
	Carlot equiv.	Carlot equiv.	Carlot equiv.	Carlot equiv.	Carlot equiv.	Carlot equiv.	Carlot equiv.	Carlot equiv.

<sup>1</sup> For a summary of individual commodities and commodity groups see tables 28 and 29, pages 31 and 32.

<sup>2</sup> For delineation of regions, see figure 2, page 8.

<sup>3</sup> Includes shipments between California and Arizona.

<sup>4</sup> Less than 0.1 percent.



The share of fresh produce shipped out of California and Arizona to all parts of the United States that moved by rail declined from 87 to 70 percent between 1951 and 1960; the proportion shipped by rail to Canada and Mexico dropped from 93 to 81 percent.

## Shipping Patterns for Each Type of Carrier

### Rail Shipments

The interval from 1951 through 1960 witnessed a significant drop in fresh fruit and vegetable traffic handled by rail from the two States. In 1951, shipments totaling about 303,000 carlots were dispatched by rail to out-of-State markets, including Canada and Mexico (table 31). The volume was down in 1954 and again in 1957, and was nearly 19 percent below the 1951 level in 1960. Declines for the 10-year period were registered for all commodities except potatoes (table 32). The 1960 shipments of this commodity exceeded 1951 shipments by 14 percent.

Rail shipments routed to out-of-State destinations in the United States declined by 22 percent, between 1951 and 1960, dropping steadily from 288,000 carlots to 225,000. The decrease in shipments west of the Mississippi River was 56 percent; shipments east of the river decreased 11 percent. On the other hand, traffic by rail to Canada and Mexico, a small share of the total, increased about 36 percent, climbing from about 15,000 to 20,000 carlots.

Although the total rail traffic in California-Arizona fresh produce moving to each of the eight regions in this country has declined, the percentage going to each region

TABLE 31.--Out-of-State rail and truck shipment of California-Arizona, fresh fruits and vegetables; by destination area, selected years 1951 to 1960<sup>1</sup>

Destination <sup>2</sup>	Rail				Truck			
	1951	1954	1957	1960	1951	1954	1957	1960
	<u>Carlots</u>	<u>Carlots</u>	<u>Carlots</u>	<u>Carlots</u>	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>	<u>Carlot equiv.</u>
West of Mississippi River:								
Northwestern.....	8,700	7,433	5,014	6,750	11,745	14,726	14,485	14,147
Western <sup>3</sup> .....	4,962	3,248	1,624	1,277	16,343	21,027	22,551	24,118
West North Central.....	33,582	29,299	21,755	16,758	5,024	8,967	14,338	17,411
West South Central.....	22,028	16,263	9,750	5,614	8,637	14,389	23,860	24,824
Total.....	69,272	56,243	38,143	30,399	41,749	59,109	75,234	80,500
East of Mississippi River:								
East North Central.....	78,717	75,315	72,919	66,460	242	528	3,693	6,338
East South Central.....	10,414	9,291	6,597	5,086	304	742	4,085	4,874
North Atlantic.....	106,034	100,713	101,783	101,723	17	126	991	1,144
South Atlantic.....	23,224	23,637	22,962	21,501	550	854	3,613	5,034
Total.....	218,389	208,956	204,261	194,770	1,113	2,250	12,382	17,390
United States total.	287,661	265,199	242,404	225,169	42,862	61,359	87,616	97,890
Canada and Mexico.....	14,907	17,310	19,987	20,270	1,113	2,619	4,081	4,699
Grand total.....	302,568	282,509	262,391	245,439	43,975	63,978	91,697	102,589

<sup>1</sup> For a summary of individual commodities and commodity groups see table 33, page 36.

<sup>2</sup> For delineation of regions, see figure 2, page 8.

<sup>3</sup> Includes shipments between California and Arizona.

has remained generally constant during the 10-year period, except for a decrease in the percentage shipped to the West North Central and West South Central Regions, and an increase in the percentage shipped to the North Atlantic Region. Consequently, the proportion of rail shipments to points west of the Mississippi has shifted from 23 to 12 percent, with a corresponding increase from 72 to 79 percent to points east of the river (table 33). The proportion of annual rail traffic moving to terminations within the United States has dropped from 95 to 92 percent, with an accompanying increase from 5 to 8 percent in shipments going to Canada and Mexico.

### Truck Shipments

The volume of California-Arizona fresh fruits and vegetables shipped out of State by truck more than doubled between 1951 and 1960, increasing from almost 44,000 to 103,000 carlot equivalents (table 31). Volume shipped by truck increased substantially for each of the major commodities (table 32).

TABLE 32.--Out-of-State rail and truck shipment of California-Arizona fresh fruits and vegetables; by commodity, selected years 1951 to 1960

Commodity	Rail				Truck			
	1951	1954	1957	1960	1951	1954	1957	1960
	Carlots	Carlots	Carlots	Carlots	Carlot equiv.	Carlot equiv.	Carlot equiv.	Carlot equiv.
Apples <sup>1</sup> .....	478	279	82	28	375	664	692	472
Cabbage.....	2,066	824	1,883	2,054	510	222	1,129	1,561
Carrots.....	18,405	12,524	9,048	6,772	2,655	3,099	3,461	3,533
Celery.....	16,711	19,383	20,416	16,143	2,872	4,337	7,219	6,777
Grapefruit.....	2,706	1,725	1,673	2,742	2,662	3,530	2,829	3,364
Grapes.....	29,393	26,852	23,679	23,180	3,182	4,393	6,368	8,173
Lemons.....	14,524	13,174	13,827	11,097	1,644	2,494	3,367	4,102
Lettuce <sup>2</sup> .....	72,500	77,122	71,734	63,395	9,367	12,719	22,336	28,031
Melons <sup>3</sup> .....	30,194	32,943	22,281	27,445	2,853	3,915	4,959	6,383
Onions.....	5,272	4,003	4,723	3,900	416	506	769	941
Oranges <sup>4</sup> .....	46,850	32,607	32,566	26,633	5,825	9,861	9,011	9,306
Peaches <sup>1</sup> .....	3,734	3,552	3,446	2,610	1,025	1,395	2,238	2,459
Pears <sup>1</sup> .....	5,026	5,936	4,518	3,411	358	697	893	824
Plums <sup>5</sup> .....	4,860	3,182	3,626	3,323	488	547	902	1,133
Potatoes.....	38,953	36,586	41,205	44,233	2,209	3,960	7,767	9,268
Tomatoes.....	7,819	8,310	6,180	6,764	4,147	7,809	13,519	11,299
Watermelons.....	3,077	3,507	1,504	1,709	3,387	3,830	4,238	4,963
Total.....	302,568	282,509	262,391	245,439	43,975	63,978	91,697	102,589

<sup>1</sup> For California only. Very little, if any, of this commodity is grown commercially in Arizona.

<sup>2</sup> Includes romaine.

<sup>3</sup> Includes all types of melons except watermelons.

<sup>4</sup> Includes tangerines.

<sup>5</sup> Includes fresh prunes.

Shipments dispatched by truck from California and Arizona to outlets in this country increased nearly 128 percent between 1951 and 1960, rising sharply from 43,000 carlot equivalents to 98,000 carlot equivalents. Traffic to destinations east of the Mississippi River climbed sixteen fold, while movements west of the river rose about 93 percent. Motor carrier hauls to Canada and Mexico increased by more than four times over the 1951 level.

While total shipments by truck to each of the eight regions of the country have increased, the percentages of outbound truck shipments routed to the various regions have also undergone considerable change. The Northwestern and Western Regions accounted for a smaller percentage of the total in 1960 than in 1951, while the percentage shipped to each of the other regions increased. The percentage routed to the western half of the United States dropped from 95 to 79 percent, and the share moving to the eastern part of the country increased from 3 to 17 percent (table 33). The percentage sent to all points within the United States dropped slightly from 98 to 96 percent, occasioned by a meager increase in the share moved to Canada and Mexico. The overall trend indicates that although trucks continue to service short hauls extensively, they are beginning to move into the long-haul field.

TABLE 33.—Distribution of the out-of-State rail shipment and truck shipment of California-Arizona fresh fruits and vegetables among destination areas; by commodity or commodity group, selected years 1951-1960

Commodity or year	Rail <sup>1</sup>			Truck <sup>2</sup>		
	Shipments	West of Mississippi River <sup>3</sup>	East of Mississippi River	Shipments	West of Mississippi River <sup>3</sup>	East of Mississippi River
	Carlots	Percent	Percent	Carlot equiv.	Percent	Percent
<b>All:</b>						
1951.....	10,475	10.8	83.3	3,122	90.7	5.0
1954.....	14,821	7.8	84.1	4,393	85.4	8.6
1957.....	17,877	7.0	83.1	6,368	69.7	22.2
1960.....	13,140	12.5	80.6	2,173	62.4	29.0
<b>Apples:<sup>4</sup></b>						
1951.....	71,500	100.0	100.0	2,387	95.6	2.6
1954.....	77,170	100.0	76.2	12,727	94.3	2.8
1957.....	71,734	100.0	82.6	22,336	82.4	15.4
1960.....	63,399	100.0	80.2	28,031	76.1	21.0
<b>Oranges:<sup>5</sup></b>						
1951.....	30,194	100.0	86.8	2,853	95.3	3.1
1954.....	32,845	100.0	85.0	3,115	95.8	1.5
1957.....	22,281	100.0	89.2	4,759	84.0	11.5
1960.....	27,449	100.0	88.9	6,383	80.7	15.0
<b>Peaches:<sup>6</sup></b>						
1951.....	21,357	100.0	70.2	5,825	93.1	0.8
1954.....	21,607	100.0	72.0	9,861	88.5	1.5
1957.....	21,506	100.0	71.4	9,011	83.6	7.0
1960.....	26,633	100.0	74.3	9,306	78.4	15.9
<b>Potatoes:<sup>7</sup></b>						
1951.....	38,453	100.0	51.9	2,204	97.6	0.3
1954.....	36,586	100.0	56.8	3,960	95.4	1.4
1957.....	41,756	100.0	65.1	7,767	84.2	2.6
1960.....	44,233	100.0	65.9	9,268	73.5	11.4
<b>Other fruits:<sup>8</sup></b>						
1951.....	31,322	100.0	72.0	6,552	96.3	1.8
1954.....	27,848	100.0	76.7	9,327	84.7	3.2
1957.....	27,172	100.0	78.8	11,921	83.4	13.7
1960.....	23,211	100.0	80.6	12,354	79.9	16.9
<b>Other vegetables:<sup>9</sup></b>						
1951.....	23,350	100.0	71.5	13,987	95.1	3.2
1954.....	28,521	100.0	67.2	14,803	92.2	5.0
1957.....	23,754	100.0	77.2	20,335	79.9	15.3
1960.....	37,542	100.0	77.0	29,074	79.4	14.5
<b>Other commodities:<sup>10</sup></b>						
1951.....	21,400	100.0	71.1	15,475	94.9	2.6
1954.....	22,100	100.0	71.0	23,078	92.4	3.5
1957.....	21,791	100.0	71.9	16,047	82.0	13.5
1960.....	21,000	100.0	74.4	10,589	78.5	17.0

<sup>1</sup> See delineation of regions, see figure 2, page 2.  
<sup>2</sup> Where the percentage totals for the regions east and west of the Mississippi River do not add to 100, the difference measures the shipments moving to Canada and Mexico.  
<sup>3</sup> Includes shipments between California and Arizona.  
<sup>4</sup> Includes all types of apples.  
<sup>5</sup> Includes all types of oranges.  
<sup>6</sup> Includes all types of peaches.  
<sup>7</sup> Includes all types of potatoes.  
<sup>8</sup> Includes all types of other fruits, including fresh prunes.  
<sup>9</sup> Includes all types of other vegetables, including fresh prunes.  
<sup>10</sup> Includes all types of other commodities, including fresh prunes.  
<sup>11</sup> Includes all types of other commodities, including fresh prunes.