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IN HIGHWAY TRAVEL IT'S BUSINESS 2 TO 1

PUBLIC ROADS

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D. M. BEACH, *Editor*

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The reports of research published in this magazine are necessarily qualified by the conditions of the tests from which the data are obtained. Whenever it is deemed possible to do so, generalizations are drawn from the results of the tests; and, unless this is done, the conclusions formulated must be considered as specifically pertinent only to described conditions.

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SOME CHARACTERISTICS OF MOTOR-VEHICLE TRAVEL

BY THE DIVISION OF CONTROL, PUBLIC ROADS ADMINISTRATION

Reported by ROBERT H. PADDOCK, Highway Engineer-Economist

APPROXIMATELY 65 percent of all motor-vehicle travel in the United States is for "business" purposes, or in connection with such essential activities as earning a living or maintaining the home. Data on this subject were obtained in the road-use studies conducted as a part of the State-wide highway planning surveys that were initiated in 1935.

The road-use studies are integral parts of the highway planning surveys that have been undertaken in all States and the District of Columbia. Information regarding road use was obtained by means of a large number of personal interviews with motor-vehicle owners and drivers. These interviews were selected and carefully analyzed to provide a proper representation of each geographical division of a State, of each group of governmental jurisdictions within similar population ranges, of various occupations, and of vehicles in operation according to types and ages.

Some of the preliminary results of the studies, relating particularly to use of the various highway systems and length of trips, have already been published.¹ The application of the road-use survey methods to other problems has also been studied² and considerable statistical review and analysis of the road-use methods and data have been made.³

Two general methods of obtaining the information were used. In most States a group of full-time, trained personnel interviewed motor-vehicle owners to obtain the desired information. In other States the data were obtained by high school students from their parents and friends who owned motor vehicles. The students received instruction regarding the data to be obtained from a small group of full-time instructors who visited all the high schools in the State. Figure 1 shows the methods by which road-use information has been

There is much current interest in the purpose of travel on the Nation's highway and street systems. The accompanying article is timely both because of existing war-impelled restrictions on the production and sale of motor vehicles and tires for private use and because of the recurring threat of motor fuel rationing.

Road-use studies of the highway planning surveys in 35 States indicate that 58.6 percent of passenger-car travel in those States was for business purposes and that nearly all truck travel was for business or commercial purposes. Thus, during the period here reported, 65 percent of the annual travel of all motor vehicles was for business purposes.

The article also presents an estimate of total vehicle-miles traveled during 1940 and, on the assumption that no appreciable change occurred between the study years (usually 1936-37) and 1940 in the ratio of business to social-recreational travel, the vehicle-mile total for 1940 by type of vehicle is given in terms of the estimated extent of driving in connection with the two major travel purposes.

The age of a passenger car is shown to exert an influence upon the character of its use to such an extent that, although the number of round trips made annually averages 619 for vehicles 1 year old and 417 for vehicles more than 8 years old, the percentage of total travel for business purposes was 55 percent for the former and 61 percent for the latter. Since a relationship has previously been shown to exist between situs of vehicle ownership and age of vehicle, the greater percentage use of the rural-owned vehicle for business purposes is a corollary.

obtained in the various States. Tabulation and analysis of the data have not yet been completed for Connecticut, Delaware, Georgia, Maine, Massachusetts, Mississippi, New Jersey, Rhode Island, and Tennessee. The Pennsylvania survey did not provide for a classification of business and pleasure travel.

The primary purpose of the road-use surveys was to obtain information that would make it possible to estimate:

1. The total amount of travel on the various highway systems in a given area or in the State; and
2. The amount of travel performed on the various highway systems in the State by vehicle owners residing in the several governmental jurisdictions.

On the basis of these estimates it would be possible to compare the travel benefits received by the various population groups of the State with their respective highway-user tax contributions.

TRAVEL DATA DIVIDED INTO BUSINESS AND PLEASURE CLASSIFICATIONS

However, in addition to such basic data it was possible to obtain considerable supplemental information from the road-use interviews. The classification of travel into business and pleasure purposes was one type of supplemental information. Figure 2 is a reproduction of the front of the Connecticut interview form and shows how the data were originally entered on each interview so that the separation into business and pleasure travel could be made in the office analyses. In the initial surveys only two classifications were used—business and pleasure. Subsequently, it was believed that the pleasure travel might be more properly classified as recreational and social travel and this separation is made in the Connecticut and other recent surveys.

Generally the classification of travel into business and pleasure purposes was applied only to the analysis of passenger-car travel. For comparative purposes in this study the travel of all trucks has been assumed to be entirely for business purposes. It is known that a small percentage of truck travel is for purposes other than business, but this is usually limited to farmers' trucks that are often used as general utility vehicles. In a few States where truck travel was also classified

¹ A description of the road-use survey methods is given in Preliminary Results of Road-Use Studies, by Robert H. Paddock and Roe P. Rodgers, PUBLIC ROADS, May 1939.

² The Application of Road-Use Survey Methods in Traffic Origin and Destination Analysis, by T. M. C. Martin and Homer L. Baker, PUBLIC ROADS, May 1941.

³ Road-use studies have been conducted in all but four States and the District of Columbia, and are now under way in Delaware. Most of the surveys were made in 1936 and 1937 although several have been made more recently and the New York study was conducted in 1934-35. More than 800,000 usable interviews have been obtained in the several States. Table 1 shows the number of interviews obtained in each of the States in which the surveys have been conducted.

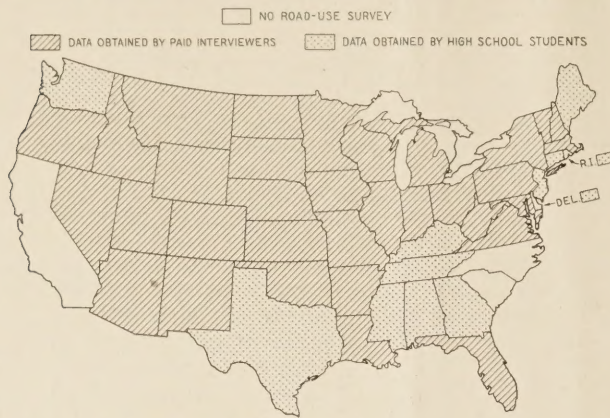


FIGURE 1.—METHODS BY WHICH ROAD-USE INFORMATION HAS BEEN OBTAINED IN THE VARIOUS STATES.

TABLE 1.—States in which road-use interviews were obtained

State	Interviews obtained for—		
	Passenger cars	Trucks	All vehicles
Alabama.....	14,600	2,989	17,589
Arizona.....	3,440	2,277	5,717
Arkansas.....	4,176	1,992	6,168
Colorado.....	1,892	1,262	3,154
Connecticut.....	54,194	5,021	59,215
Florida.....	6,972	3,203	10,175
Georgia.....	25,912	5,667	31,579
Idaho.....	2,000	1,000	3,000
Illinois.....	29,236	10,533	39,769
Indiana.....	13,567	6,264	19,831
Iowa.....	8,066	3,314	11,380
Kansas.....	9,244	3,588	12,832
Kentucky.....	15,290	2,360	17,650
Louisiana.....	4,614	2,624	7,238
Maine.....	14,000	2,800	16,800
Maryland.....	8,616	2,000	10,616
Massachusetts.....	20,379	9,830	30,209
Michigan.....	25,300	6,313	31,613
Minnesota.....	13,657	7,736	21,393
Mississippi.....	7,017	1,525	8,542
Missouri.....	12,445	5,770	18,215
Montana.....	2,598	1,887	4,485
Nebraska.....	8,213	5,077	13,290
Nevada.....	2,244	990	3,234
New Hampshire.....	2,007	1,039	3,046
New Jersey.....	63,000	9,000	72,000
New Mexico.....	2,761	2,463	5,224
New York.....	20,000	5,000	25,000
North Dakota.....	2,550	1,004	3,554
Ohio.....	33,761	9,419	43,180
Oklahoma.....	10,996	3,743	14,739
Oregon.....	5,020	2,277	7,297
Pennsylvania.....	23,600	10,640	34,240
Rhode Island.....	9,673	2,416	12,089
South Dakota.....	3,607	1,750	5,357
Tennessee.....	21,600	2,400	24,000
Texas.....	71,500	20,500	92,000
Utah.....	2,186	1,135	3,321
Vermont.....	1,494	873	2,367
Virginia.....	6,495	3,241	9,736
Washington.....	18,828	3,118	21,946
West Virginia.....	4,265	1,867	6,132
Wisconsin.....	15,041	7,059	22,100
Wyoming.....	1,258	803	2,061
Total.....	627,314	185,769	813,083

as to purpose it was found that the use of trucks for other than business purposes was about 2 to 3 percent of the total truck travel.

Analysis of truck travel according to business or pleasure use was made in 15 States. A summary of the results is given in table 2. For the 15 States, 2.5 percent of truck travel was for other than business purposes. It will be noted that these 15 States include

no highly industrialized or urbanized States such as New York, Pennsylvania, New Jersey, Ohio, Michigan, or Illinois. One of the fifteen States is a Southern State and eight are Western States. In the represented Middle States, where a moderate industrialization and urbanization is combined with agricultural development, the percentage of use for other than business purposes is only 0.7 percent for Indiana and 0.8 percent for Minnesota and Wisconsin.

It is believed that the percentages shown in table 2 are not entirely representative of the country as a whole and the data for the 15 States are not sufficient to provide a basis for estimating percentages for the other States. For the purposes of this study it has been considered practicable to classify all truck travel as having been made for business purposes. It will be noted in table 2 that only in the unincorporated areas for the 15 States reported was there much use of trucks for other purposes. The total in this group for the 15 States was 4.4 percent for pleasure purposes. In the next group, incorporated places having a population of 1,000 or less, the percentage was only 2.1 and in each of the other population groups the percentage was less than 2.0.

In the road-use surveys initiated during 1935 and 1936 travel of passenger cars was classified as follows:

Business use.—Trips to regular business or work, other business trips, hauling milk, farm produce, etc., trips to market, to the railroad or bus station, shopping trips, and taking children to and from school.

Pleasure use.—All other travel such as going to games, week-end vacation trips, hunting, fishing, and holiday trips, going to the theater, dancing or visiting, and Sunday and evening drives.

For surveys initiated in 1937 and in subsequent years the following classification of trips was used:

<i>Business</i>	To theater.
To business or work.	To dances.
Business trips.	Visiting.
Hauling milk, etc.	<i>Recreational</i>
To market.	To games.
To railroad or bus station.	Sunday drives.
Shopping.	Evening drives.
Deliveries.	Week end.
<i>Social</i>	Holiday.
Children to and from school.	Hunting.
To church.	Fishing.

It will be noted that there was no change in the business classification except that "children to and from school" was placed under the "social" classification. Subsequently special studies of this particular item have been made and indicate that less than 2 percent of the total travel is for that purpose and that this change in classification does not affect the general relations existing between business and pleasure travel.

FIFTY-SEVEN PERCENT OF PASSENGER-CAR TRAVEL FOR BUSINESS PURPOSES

Tables 3 and 4 present the general data available from the road-use surveys for the percentage classification of passenger-car travel into business and pleasure purposes by States and by population groups. The classification of travel by population groups refers to the travel performed by motor-vehicle owners resident in the several population groupings and does not refer to the travel which occurred on the streets of those places. Table 3 shows the percentages of travel by residents of 35 States in the respective States of residence, while table 4 shows the percentages of travel in all States by residents of

FORM NO. HPS-RU-1

SUGGESTED TYPES OF TRIPS

BUSINESS	RECREATION	SOCIAL
TO BUSINESS	HOLIDAY TRIPS	TO CHURCH
TO FARM	VACATION TRIPS	TO SCHOOL
SHOPPING	TO GAMES	VISITING
TO MARKET	EVENING DRIVING	TO MOVIES
TO GET MAIL	SPEEDY DRIVING	TO DANCES
BUSINESS ROUTES	WEEK-END TRIPS	TO CLUB
DELIVERIES	HUNTING-FISHING	TO LODGE

STATE OF CONNECTICUT
STATE HIGHWAY DEPARTMENT
 STATE-WIDE HIGHWAY PLANNING SURVEY
 IN COOPERATION WITH
UNITED STATES BUREAU OF PUBLIC ROADS
 ROAD USE INTERVIEW FORM

PRESENT SPEEDOMETER READING _____
 TOTAL MILES DRIVEN PAST 12 MONTHS _____
 TOTAL MILES DRIVEN LAST 12 MONTHS TAKEN FROM: _____
 CHECK ONE (✓) ACTUAL RECORDS ESTIMATE

GENERAL DATA

(b) OWNER'S NAME _____
 MAILING ADDRESS _____ STREET _____ CITY, TOWN OR BOROUGH _____ CONN. _____
 BUSINESS ADDRESS _____ STREET _____ CITY, TOWN OR BOROUGH _____ CONN. _____
 VEHICLE GARAGED IN _____ STREET _____ CITY, TOWN OR BOROUGH _____ CONN. _____
 LOCATE THE OWNER'S HOME ON MAP GIVEN YOU WITH A CIRCLE ○ WRITE OWNER'S NAME ON MAP AND RETURN WITH THIS QUESTIONNAIRE

(c) PLEASE ANSWER EITHER (c₁) OR (c₂) (NOT BOTH):
 # OWNER GARAGES INSIDE CITY LIMITS: HOW FAR IS HOME FROM CENTER OF CITY? _____ MILES
 WHAT DIRECTION IS HOME FROM CENTER OF CITY? N S E W check one (✓)
 NAME OF NEAREST CROSS STREET _____

(d) # OWNER GARAGES OUTSIDE CITY LIMITS: HOW FAR IS HOME FROM CENTER OF TOWN? _____ MILES
 WHAT DIRECTION IS HOME FROM CENTER OF TOWN? N S E W check one (✓)
 WHAT IS THE NUMBER OF NEAREST NUMBERED HIGHWAY? _____
 HOW FAR IS HOME FROM THIS HIGHWAY? _____ MILES
 WHAT DIRECTION IS HOME FROM THIS HIGHWAY? N S E W check one (✓)

(e) PASSENGER CAR: MAKE _____ YEAR OF MODEL _____
 AVERAGE MILES PER GALLON OF GAS _____ AMOUNT OF REGISTRATION FEE \$ _____

(f) TRUCK, TRACTOR, TRUCK OR BUS: MAKE _____ YEAR OF MODEL _____
 AVERAGE MILES PER GALLON OF GAS _____ AMOUNT OF REGISTRATION FEE \$ _____
 CARRYING CAPACITY _____ LBS.
 GROSS WEIGHT _____ LBS.
 PRIVATE CONTRACT COMMON
 check kind of hauling (✓)
 IF BUS, GIVE NUMBER OF PASSENGERS _____

DATE OF INTERVIEW _____ NAME OF STUDENT _____ GRADE _____
 NAME OF SCHOOL _____ TEACHER _____
(write name of teacher in empty class (X) record registration in filling out questionnaire)

PURPOSE OF TRIP	TYPE OF TRIP		FROM	TO	ROUTE FOLLOWED TO AND FROM DESTINATION	ESTIMATED MILEAGE	
	BUSINESS	RECREATION/SOCIAL				NUMBER ROUND TRIPS PER YEAR	TOTAL MILES
1					REGULAR DAILY TRIPS		
2							
3							
4							
5							
6							
7					OTHER REGULAR TRIPS		
8					SEM-WEEKLY, WEEKLY, MONTHLY, ETC.		
9							
10							
11							
12							
13							
14							
15							
16							
17							
18					OCCASIONAL TRIPS		
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
						(h) GRAND TOTAL MILES	

FIGURE 2.—INTERVIEW FORM USED IN CONNECTICUT ROAD-USE STUDY.

TABLE 2.—Classification of the total travel of trucks of 15 States for business and pleasure purposes

State	Distribution of travel by residents of—																	
	Unincorporated areas		Incorporated places having a population of—														All places	
			1,000 or less		1,001 to 2,500		2,501 to 5,000		5,001 to 10,000		10,001 to 25,000		25,001 to 100,000		100,001 or more			
	Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—			
Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	Business	Pleasure	
Alabama	90.1	9.9	96.5	3.5	96.9	3.1	97.5	2.5	95.4	4.6	97.8	2.2	99.3	0.7	97.9	2.1	94.2	5.8
Arizona	96.0	4.0	96.0	4.0	97.6	2.4	97.7	2.3	99.0	1.0	99.6	.4	99.6	.4	99.8	.2	98.0	2.0
Indiana	98.4	1.6	98.8	1.2	99.4	.6	99.1	.9	99.3	.7	99.7	.3	99.9	.1	99.8	.2	99.3	.7
Kentucky	94.2	5.8	95.6	4.4	96.8	3.2	96.7	3.3	97.2	2.8	91.4	8.6	96.4	3.6	98.1	1.9	95.4	4.6
Minnesota	98.3	1.7	98.9	1.1	99.7	.3	100.0	(1)	98.6	1.4	99.8	.2	99.8	.2	99.8	.2	99.2	.8
Missouri	97.0	3.0	97.6	2.4	97.6	2.4	99.2	.8	99.2	.8	99.3	.7	98.4	1.6	99.2	.8	98.4	1.6
Nebraska	98.7	1.3	99.7	.3	99.7	.3	99.5	.5	99.9	.1	99.9	.1	99.9	.1	99.6	.4	99.5	.5
Nevada	94.6	5.4	96.4	3.6	99.3	.7	99.4	.6	99.5	.5	98.9	1.1	99.9	.1	99.6	.4	97.4	2.6
New Mexico	95.7	4.3	98.6	1.4	98.9	1.1	99.2	.8	99.9	.1	99.6	.4	100.0	(1)	99.9	.1	97.9	2.1
North Dakota	97.0	3.0	96.7	3.3	98.7	1.3	100.0	-----	98.6	1.4	99.6	.4	100.0	-----	99.9	.1	97.8	2.2
Oklahoma	94.7	5.3	94.7	5.3	94.1	5.9	96.4	3.6	94.5	5.5	92.9	7.1	96.4	3.6	95.3	4.7	94.7	5.3
Oregon	86.5	13.5	86.5	13.5	94.2	5.8	93.6	6.4	97.1	2.9	93.4	6.6	94.0	6.0	96.1	3.9	91.5	8.5
Vermont	96.8	3.2	98.1	1.9	98.5	1.5	98.2	1.8	98.2	1.8	99.3	.7	99.3	.7	99.3	.7	97.6	2.4
Washington	91.9	8.1	95.6	4.4	98.0	2.0	96.5	3.5	96.5	3.5	97.1	2.9	93.2	6.8	97.8	2.2	95.2	4.8
Wisconsin	98.5	1.5	99.6	.4	99.6	.4	99.6	.4	99.6	.4	99.7	.3	99.5	.5	99.7	.3	99.2	.8
Total	95.6	4.4	97.9	2.1	98.2	1.8	98.5	1.5	98.4	1.6	98.1	1.9	99.0	1.0	98.8	1.2	97.5	2.5

¹ Less than 0.1 percent.

31 States. Because of the methods of tabulation adopted by the States, data for Arkansas, Colorado, Michigan, and New York are available only for the travel within the State of residence as shown in table 3.

Comparison of the data in tables 3 and 4 indicates that in all but one State the percentage of total travel for business purposes is smaller than the percentage of the travel within the State of residence for business purposes. This indicates that generally passenger-car travel outside the State of residence is predominantly for pleasure purposes, probably for vacation or holiday trips.

The one State where this condition is not true is Utah. The factor that controls this State percentage is the travel of Ogden and Salt Lake City motor-vehicle owners. The out-of-State travel of the motor-vehicle

owners living in unincorporated areas was also largely for business purposes and may be accounted for by the heavy concentration of residents in the northern sections of the State whose business centers are towns in Idaho and Wyoming. In 4 other States individual population groups show this difference, but in all cases the differences in percentages are small and in no case are large enough to affect the State total. In Montana, for incorporated places having a population of less than 1,000 there is a difference of 0.2 percent. In Louisiana, for incorporated places having a population of 1,001 to 2,500 there is a difference of 0.1 percent. In New Mexico, for incorporated places having a population of 2,501 to 5,000 there is a difference of 3.2 percent. This may be explained by the fact that all of the incorporated places in this group except Las Vegas are near

TABLE 3.—Classification of the travel in the State of residence of passenger cars of 35 States

State	Distribution of travel by residents of—																	
	Unincorporated areas		Incorporated places having a population of—														All places	
			1,000 or less		1,001 to 2,500		2,501 to 5,000		5,001 to 10,000		10,001 to 25,000		25,001 to 100,000		100,001 or more			
	Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—			
Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	Busi-ness	Pleas-ure	
Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Alabama	73.6	26.4	73.6	26.4	72.9	27.1	66.0	34.0	66.1	33.9	66.7	33.3	68.4	31.6	65.0	35.0	70.3	29.7
Arizona	68.3	31.7	66.5	33.5	62.4	37.6	62.3	37.7	58.1	41.9			60.8	39.2			64.1	35.9
Arkansas	79.6	20.4	78.9	21.1	72.3	27.7	69.1	30.9	61.8	38.2	66.6	33.4	66.0	34.0			73.0	27.0
Colorado	73.7	26.3	63.7	36.3	62.5	37.5	55.1	44.9	63.5	36.5	62.3	37.7	51.1	48.9	58.4	41.6	62.6	37.4
Florida	69.6	30.4	71.9	28.1	64.7	35.3	59.1	40.9	61.2	38.8	50.5	49.5	50.8	49.2	54.0	46.0	59.5	40.5
Idaho	75.3	24.7	70.2	29.8	59.3	40.7	63.4	36.6	64.5	35.5	59.6	40.4					69.1	30.9
Illinois	61.9	38.1	53.7	46.3	49.3	50.7	48.5	51.5	48.5	51.5	43.8	56.2	47.3	52.7	54.8	45.2	52.8	47.2
Indiana	66.9	33.1	67.2	32.8	56.1	43.9	53.9	46.1	47.0	53.0	55.3	44.7	50.1	49.9	49.9	50.1	57.3	42.7
Iowa	67.7	32.3	63.9	36.1	54.9	45.1	51.7	48.3	31.6	68.4	45.1	54.9	62.6	37.4	51.7	48.3	59.4	40.6
Kansas	69.6	30.4	58.1	41.9	49.8	50.2	53.9	46.1	53.9	46.1	55.9	44.1	53.8	46.2	54.2	45.8	59.2	40.8
Kentucky	67.7	32.3	69.2	30.8	68.2	31.8	65.3	34.7	66.5	33.5	69.8	30.2	62.6	37.4	64.3	35.7	66.7	33.3
Louisiana	81.6	18.4	72.7	27.3	76.1	23.9	65.1	34.9	65.4	34.6	70.9	29.1	71.4	28.6	58.7	41.3	71.2	28.8
Maryland	74.7	25.3	65.9	34.1	69.3	30.7	64.0	36.0	64.0	36.0	68.4	31.6	57.9	42.1	79.7	20.3	74.7	25.3
Michigan	61.9	38.1	52.8	47.2	49.9	50.1	54.9	45.1	49.9	50.1	53.7	46.3	50.2	49.8	52.2	47.8	53.4	46.6
Minnesota	59.4	40.6	47.8	52.2	41.8	58.2	43.5	56.5	40.4	59.6	45.0	55.0			39.8	60.2	46.7	53.3
Missouri	75.1	24.9	69.4	30.6	69.4	30.6	63.9	36.1	63.9	36.1	55.5	44.5	67.7	32.3	60.1	39.9	65.3	34.7
Montana	73.0	27.0	51.2	48.8	55.7	44.3	63.3	36.7	53.7	46.3	56.2	43.8	51.4	48.6			63.5	36.5
Nebraska	71.2	28.8	65.8	34.2	59.7	40.3	59.8	40.2	60.8	39.2	61.1	38.9	57.2	42.8	63.0	37.0	65.1	34.9
Nevada	76.8	23.2	55.5	44.5	73.0	27.0	64.9	35.1	71.0	29.0	59.4	40.6					70.0	30.0
New Hampshire			72.4	27.6	70.2	29.8	63.7	36.3	63.7	36.3	53.5	46.5	52.5	47.5			62.8	37.2
New Mexico	57.7	42.3	68.0	32.0	66.7	33.3	38.4	61.6	60.6	39.4	56.4	43.6	59.0	41.0			58.0	42.0
New York	57.1	42.9	54.1	45.9	54.1	45.9	49.2	50.8	49.2	50.8	50.1	49.9	49.9	50.1	57.5	42.5	55.8	44.2
North Dakota	70.9	29.1	62.5	37.5	67.2	32.8	59.5	40.5	66.3	33.7	57.4	42.6	66.3	33.7			67.4	32.6
Ohio	59.4	40.6	56.7	43.3	52.7	47.3	44.2	55.8	44.2	55.8	44.5	55.5	44.5	51.6	49.3	50.7	51.3	48.7
Oklahoma	79.2	20.8	79.2	20.8	73.5	26.5	67.9	32.1	78.9	21.1	70.1	29.9	65.8	34.2	62.8	37.2	72.6	27.4
Oregon	67.1	32.9	58.4	41.6	48.7	51.3	56.2	43.8	48.1	51.9	53.0	47.0	38.1	61.9	54.6	45.4	57.9	42.1
South Dakota	66.8	33.2	57.6	42.4	52.7	47.3	57.0	43.0	54.1	45.9	55.8	44.2	52.5	47.5			60.0	40.0
Texas	63.1	36.9	66.0	34.0	61.0	39.0	61.2	38.8	57.4	42.6	55.5	44.5	56.5	43.5	57.3	42.7	59.9	40.1
Utah	51.5	48.5	51.1	48.9	55.9	44.1	53.4	46.6	49.4	50.6	32.2	67.8	47.4	52.6	61.2	38.8	54.4	45.6
Vermont	70.6	29.4	71.2	28.8	66.7	33.3	58.0	42.0	58.0	42.0	58.4	41.6					65.6	34.4
Virginia	70.2	29.8	58.4	41.6	74.5	25.5	56.9	43.1	61.0	39.0	65.2	34.8	57.3	42.7	51.8	48.2	65.7	34.3
Washington	69.7	30.3	65.2	34.8	64.6	35.4	61.6	38.4	61.6	38.4	59.8	40.2	58.3	41.7	61.9	38.1	64.3	35.7
West Virginia	64.1	35.9	62.3	37.7	54.9	45.1	61.2	38.8	52.9	47.1	47.1	52.9	53.4	46.6			58.5	41.5
Wisconsin	55.2	44.8	53.6	46.4	48.6	51.4	49.9	50.1	53.6	46.4	48.7	51.3	52.9	47.1	43.8	56.2	50.8	49.2
Wyoming	70.1	29.9	59.1	40.9	50.9	49.1	49.4	50.6	45.0	55.0	58.2	41.8					59.7	40.3
Total	67.0	33.0	61.0	39.0	57.7	42.3	56.0	44.0	54.6	45.4	53.9	46.1	53.7	46.3	54.5	45.5	58.6	41.4

the boundaries of the State. For several of them El Paso, Tex., is a natural shopping and marketing center and undoubtedly is the cause of the increased percentage of out-of-State travel for business purposes.

In Ohio, for incorporated places having a population of 5,001 to 10,000, there is a difference of 2.3 percent. There is no apparent geographic reason for this condition in Ohio since all the places in this group are spread more or less uniformly throughout the State.

Classification of the data of table 4 by geographic groupings of the States (table 5) indicates that in the Middle States the percentage of travel for business purposes is definitely lower than in other sections of the country. For purposes of comparison the groupings of States is the one that has previously been used in studying motor-vehicle trends in the United States.⁴

The groupings used are:

Region	States
Northeast	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Delaware and Maryland.
Southeast	Virginia, West Virginia, Kentucky, North Carolina, Tennessee, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Arkansas.
Middle States	Ohio, Michigan, Indiana, Illinois, Wisconsin, Missouri, Iowa, and Minnesota.

Region	States
Northwest	North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Idaho, and Utah.
Southwest	Oklahoma, Texas, New Mexico, and Arizona.
Far West	Washington, Oregon, California, and Nevada.

Data are available for a representative number of States in all except the Northeast region, where data for only Vermont, New Hampshire, and Maryland, are available. In a regrouping of this region with the Middle States with which it is somewhat similar it is found that the percentage of travel for business purposes (52.5 percent) is lower than in any other region or group of regions. Even if New York data, which are only for travel within the State of residence, were included the percentage of travel for business purposes in this region would still be lower than in the other areas since New York travel for business purposes was 55.4 percent of the total travel (table 3).

TWO-THIRDS OF ALL MOTOR-VEHICLE TRAVEL FOR BUSINESS PURPOSES IN 1940

Table 5 also indicates that generally as the size of the incorporated place increases the percentage of the motor-vehicle travel of the residents of those places for business purposes decreases. This condition appears to be true for all places except the cities having more than 100,000 population. In the Northeast region, Balti-

⁴ Significant Trends in Motor-Vehicle Registrations and Receipts, by Robert H. Paddock, PUBLIC ROADS, October 1939.

TABLE 4.—Classification of the total travel of passenger cars of 31 States

Table with columns for State, Unincorporated areas, Incorporated places having a population of (1,000 or less, 1,001 to 2,500, 2,501 to 5,000, 5,001 to 10,000, 10,001 to 25,000, 25,001 to 100,000, 100,001 or more), and All places. Rows list 31 states and a total row, with percentages for Business and Pleasure travel.

TABLE 5.—Percentage of total passenger-car travel for business purposes, by regions

Table with columns for Region (Unincorporated areas, Incorporated places having a population of), and All places. Rows list regions: Northeast, Southeast, Southwest, Middle States, Northwest, Far West, and 31 States, with percentages for business travel.

The 31 States for which data were available were: Northeast—Maryland, New Hampshire, and Vermont; Southeast—Alabama, Florida, Kentucky, Louisiana, Virginia, and West Virginia; Southwest—Arizona, New Mexico, Oklahoma, and Texas; Middle States—Illinois, Indiana, Iowa, Minnesota, Missouri, Ohio, and Wisconsin; Northwest—Idaho, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming; Far West—Nevada, Oregon, and Washington.

more, Maryland, is the only city reported in that group and 75.6 percent of the travel by its residents was for business purposes. In New York, cities having more than 100,000 population reported 57.5 percent of their travel for business purposes. These are higher percentages of travel for business than are reported in the cities in the lower population groups. The same condition may be noted in the Northwest and Far West

regions and to a lesser degree in the Southwest region.

Table 6 presents data showing the estimated percentages of all motor-vehicle travel for business purposes in all States in 1940. These approximations have been determined on the following basis. The total vehicle-miles of travel by passenger cars and trucks in 1940 was determined for the several States on the basis of data from the traffic and road-use surveys. These mileages are preliminary and subject to revision but are believed to be approximately correct. The distribution of passenger-car travel by purpose in the 35 States where such data were available was used in estimating the distribution in States where there were no data. All truck travel was classified as travel for business purposes. The sum of truck travel and of passenger-car travel for business purposes was taken to be the amount of total motor-vehicle travel for business purposes. It will be seen that the percentage of business travel varies from 55.8 percent in Minnesota to 80.8 percent in Arkansas but that in 31 States and the District of Columbia the range is between 62 and 72 percent.

In 16 States, the classification of travel was made on the basis of business, social, and recreational purposes rather than the break-down into business and pleasure purposes. For those 16 States it is therefore possible to note the classification of travel otherwise considered as pleasure travel into the two purposes—social and recreational. It was found difficult to establish arbitrary definitions of what is business or social or recreational travel since so frequently a single trip accomplishes several purposes. The farmer, for example,

TABLE 6.—Classification of estimated motor-vehicle travel by purposes in 1940

State	Total travel for all purposes	Passenger car travel for—		Truck and bus travel	Total travel for business purposes	
		Social and recreational purposes	Business purposes		Amount	Percentage of total travel
	Million vehicle-miles	Million vehicle-miles	Million vehicle-miles	Million vehicle-miles	Million vehicle-miles	
Alabama	3,193	723	1,601	869	2,470	77.4
Arizona	1,219	380	549	290	839	68.8
Arkansas	2,323	446	1,206	671	1,877	80.8
California	22,558	7,816	11,725	3,017	14,742	65.4
Colorado	2,901	892	1,492	517	2,009	69.3
Connecticut	5,123	1,949	2,461	713	3,174	62.0
Delaware	787	162	477	148	625	79.4
Florida	5,230	1,793	2,414	1,023	3,437	65.7
Georgia	5,283	1,505	2,796	982	3,778	71.5
Idaho	1,199	296	597	306	903	75.3
Illinois	20,115	8,744	8,102	3,269	11,371	56.5
Indiana	7,458	2,615	3,171	1,672	4,843	64.9
Iowa	5,814	2,055	2,814	945	3,759	64.7
Kansas	4,962	1,795	2,304	863	3,167	63.8
Kentucky	4,167	1,120	2,044	1,003	3,047	73.1
Louisiana	3,434	794	1,861	779	2,640	76.9
Maine	1,798	509	857	432	1,289	71.7
Maryland	4,055	938	2,343	774	3,117	76.9
Massachusetts	10,598	3,898	4,922	1,778	6,700	63.2
Michigan	14,785	5,871	6,727	2,187	8,914	60.3
Minnesota	6,771	2,991	2,527	1,253	3,780	55.8
Mississippi	2,488	525	1,226	737	1,963	78.9
Missouri	8,268	2,418	4,136	1,714	5,850	70.8
Montana	1,425	408	694	323	1,017	71.4
Nebraska	3,374	981	1,620	773	2,393	70.9
Nevada	366	97	187	82	269	73.5
New Hampshire	996	319	468	209	677	68.0
New Jersey	12,243	4,470	5,643	2,130	7,773	63.5
New Mexico	1,193	403	504	286	790	66.2
New York	26,086	9,371	11,830	4,885	16,715	64.1
North Carolina	5,972	1,675	3,111	1,186	4,297	72.0
North Dakota	1,152	348	577	227	804	69.8
Ohio	16,420	7,040	6,873	2,507	9,380	57.1
Oklahoma	5,240	1,265	3,068	907	3,975	75.9
Oregon	2,957	1,112	1,381	464	1,845	62.4
Pennsylvania	19,841	7,434	9,384	3,023	12,407	62.5
Rhode Island	1,948	747	942	259	1,201	61.7
South Carolina	2,983	864	1,605	514	2,119	71.0
South Dakota	1,433	460	608	365	973	67.9
Tennessee	5,451	1,415	2,833	1,203	4,036	74.0
Texas	17,056	5,103	7,252	4,701	11,953	70.1
Utah	1,483	536	657	290	947	63.9
Vermont	772	223	369	180	549	71.1
Virginia	4,602	1,310	2,330	962	3,292	71.5
Washington	4,445	1,413	2,314	718	3,032	68.2
West Virginia	3,202	1,073	1,354	775	2,129	66.5
Wisconsin	6,972	2,913	2,866	1,193	4,059	58.2
Wyoming	708	237	306	165	471	66.5
District of Columbia	1,478	441	844	193	1,037	70.2
Total	294,327	101,893	137,972	54,462	192,434	65.4

goes to town to market some of his goods, to obtain provisions, to see a movie, and to visit with other farmers and their families of that area. Similarly, the city wife may take her husband to work, her children to school, and do her marketing on the way home, all on the same trip. In the case of such overlapping purposes, it was generally the policy to classify the trip according to its major purpose.

Although this difficulty in classifying travel definitely according to purposes existed to a limited extent when the classification was made between business and pleasure purposes, the further classification of pleasure travel into social and recreational purposes was frequently even more difficult. A Sunday ride which included a visit to friends, a week-end or vacation trip which included a visit with relatives as well as the pursuit of purely recreational activities, a trip to the theater or to a dance which combined social and recre-

ational functions were all difficult to classify definitely. However, a large majority of the trips could be classified correctly and the results in 16 States where this was done are shown in table 7.

The data in table 7 show that travel for recreational purposes is generally greater than that for social purposes. There appears to be no general pattern of travel in the several States, or among the several population groups. In some States recreational travel is about the same percentage of total travel as is travel for social purposes; in other States recreational travel is more than twice as great as social travel; in only four States is social travel greater than recreational travel.

These data suggest that there may actually be considerable differences in the purpose of travel in the several States depending on economic conditions and also on available recreational facilities in the State or adjacent States. It is also possible that the difficulty in distinguishing accurately between social and recreational travel may be the cause of the conditions observed in table 7. If this be true then the data in table 7 can be considered only as indicative of general conditions.

Certain other studies have been made recently which furnish additional information on the subject of the purpose of travel.⁵ The Automobile Manufacturers Association made a special study in six States⁶ of the road-use survey data previously collected in connection with the regular highway planning surveys. The special six-State study was particularly concerned with a detailed analysis of business or necessity use of passenger cars, and included as business use travel incurred taking children to and from school, a type of travel generally classed as nonbusiness travel in most of the State surveys.

Special attention was directed to business travel to determine the number of trips and amount of travel annually for each of the business purposes specifically classified in the road-use studies. It was the objective of this special study to determine for the various occupational groups among car owners how much of the business travel was concerned with transportation to and from work, how much with the actual conduct of business, how much for shopping and marketing, how much for taking children to and from school, etc.

BUSINESS TRIPS RELATIVELY SHORT BUT VERY NUMEROUS

Date obtained in these special studies indicate that while the percentage of travel for business purposes is high, the percentage of the total trips for business purposes is even higher. Table 8 shows that in four of the six States this condition was true. Complete data on the analysis of travel in Connecticut and Georgia are not yet available, the special analyses in those two States having been made by the Automobile Manufacturers Association personnel prior to the completion of the regular planning survey study. This relation is that which would be expected because today the automobile has come to occupy such an important part in everyday business activities. The large mileage that is accounted for in social and recreational purposes is generally accomplished in a smaller number of long trips such as vacation, fishing, and hunting trips and visits to friends. Business trips, though more numerous, are generally shorter—between home and place of employment—and it has not been generally realized what a large

⁵ See particularly, A Factual Survey of Automobile Usage, Automobile Manufacturers Association, 1941.

⁶ Connecticut, Georgia, Indiana, Michigan, Nebraska, and Oregon.

TABLE 7.—Classification of the total travel of passenger cars of 17 States for social and recreational purposes

State	Distribution of travel by residents of—																				
	Unincorporated areas		Incorporated places having a population of—														All places				
			1,000 or less		1,001 to 2,500		2,501 to 5,000		5,001 to 10,000		10,001 to 25,000		25,001 to 100,000		100,001 or more						
	Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—		Travel for—				
Social	Recreation	Social	Recreation	Social	Recreation	Social	Recreation	Social	Recreation	Social	Recreation	Social	Recreation	Social	Recreation	Social	Recreation	Social	Recreation		
Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
Alabama.....	15.5	11.9	14.6	12.8	13.9	15.6	16.4	19.4	15.6	20.5	14.4	21.3	10.9	21.5	13.7	23.2	14.6	16.5	13.8	27.1	
Arizona.....	13.5	23.9	14.4	26.5	18.9	24.5	15.3	26.1	16.9	26.6	12.0	32.4	12.0	32.4	10.0	38.0	12.9	29.7	26.5	18.7	
Florida.....	15.8	16.0	11.6	18.0	16.0	21.7	11.9	30.9	13.2	28.8	12.5	39.5	14.7	36.7	10.0	38.0	12.9	29.7	26.5	18.7	
Indiana.....	22.3	12.4	19.6	15.3	26.1	19.3	30.4	17.7	30.8	22.9	22.1	25.1	33.6	20.1	29.3	23.9	23.9	26.5	18.7	21.2	14.2
Kentucky.....	24.1	9.7	21.8	10.1	18.7	15.5	18.1	19.7	17.3	18.6	15.1	17.0	18.6	21.6	18.6	20.1	21.2	14.2	14.4	26.1	26.1
Louisiana.....	10.2	9.0	13.2	15.6	7.9	15.9	14.8	21.0	10.6	24.6	6.4	23.0	9.0	20.9	5.7	36.4	9.1	20.8	9.5	27.5	27.5
Montana.....	9.3	18.0	11.5	37.1	14.2	31.7	4.5	34.3	3.0	43.5	8.0	36.3	13.4	35.3	9.7	29.7	16.1	21.6	5.3	28.8	28.8
Nebraska.....	19.8	10.8	15.7	22.1	19.4	24.7	15.6	29.3	11.8	30.7	14.9	27.1	16.4	28.9	9.7	29.7	16.1	21.6	5.3	28.8	28.8
Nevada.....	5.9	21.5	10.9	37.3	3.1	26.4	4.6	34.2	2.5	29.6	6.2	38.7	12.0	39.7	14.4	26.1	14.4	26.1	14.4	26.1	26.1
New Hampshire.....			18.4	11.0	15.8	17.2	14.6	23.6	14.6	23.6	11.2	39.2	12.0	39.7	14.4	26.1	14.4	26.1	14.4	26.1	26.1
New Mexico.....	9.9	34.5	10.2	27.8	5.7	30.4	11.0	47.4	8.8	32.6	6.2	41.6	9.6	34.8	9.1	35.3	9.1	35.3	9.1	35.3	35.3
North Dakota.....	20.0	12.2	17.2	25.4	14.2	25.8	3.8	42.0	8.8	30.7	15.6	32.1	7.2	41.3	16.9	20.7	16.9	20.7	16.9	20.7	20.7
Oregon.....	17.5	18.2	18.8	25.4	22.3	30.9	14.7	31.8	19.7	34.6	16.5	32.1	28.0	34.7	16.4	31.2	17.7	26.9	16.1	27.0	27.0
South Dakota.....	20.4	14.9	14.9	30.0	13.2	37.7	12.7	33.1	10.6	40.1	11.1	36.3	18.3	33.7	19.5	24.5	21.4	19.9	21.4	19.9	19.9
Texas.....	25.4	12.2	18.2	16.7	19.6	20.6	18.3	22.0	20.0	23.4	19.3	26.4	19.3	25.8	19.5	24.5	21.4	19.9	21.4	19.9	19.9
Vermont.....	16.8	15.7	18.2	14.3	13.7	21.5	16.8	29.6	16.8	29.6	18.3	26.6	26.4	23.4	16.8	20.9	16.8	20.9	24.8	19.4	19.4
West Virginia.....	23.0	14.7	23.0	17.5	22.8	24.3	25.9	15.9	25.8	24.3	30.6	24.8	26.4	23.4	24.8	19.4	24.8	19.4	24.8	19.4	19.4
Total.....	20.2	13.5	17.1	19.5	18.1	21.9	17.7	24.1	17.9	26.5	16.4	28.8	19.3	26.6	17.5	27.8	18.6	21.5	18.6	21.5	21.5

mileage is accounted for by these relatively short but very numerous trips.

TABLE 8.—Relation of business travel to total travel by passenger cars in four States with a comparison of number of trips and mileage traveled

State	Percentage for business purposes of—	
	Total number of trips	Total annual vehicle-miles of travel
Indiana.....	76.3	54.8
Michigan.....	73.9	53.4
Nebraska.....	78.4	62.3
Oregon.....	80.9	55.4

Another important set of data obtained by the Automobile Manufacturers Association in their special study in the six States indicated the relation between the age of the vehicle and the percentage of use for business purposes. A previous study⁷ by the Public Roads Administration in which an analysis of planning survey data was made reported the observed decrease in average annual travel of passenger cars in relation to their age. A similar study was made of the data in the six States and the results are shown in table 9. These data have not been adjusted in the manner followed by the several States in handling their respective motor-vehicle and road-use survey data but it is believed that, despite their having been taken directly from the road-use interviews, they satisfactorily indicate the general trends that are present.

It will be seen that the annual travel is less for the older vehicles, but that the older vehicles are used to a greater extent for business travel than are the newer vehicles. This is particularly true of the vehicles 9 years or more in age and indicates that these vehicles serve a more utilitarian purpose than do the newer cars.

⁷ Distribution of Motor Vehicle Registrations and Tax Payments by Regions and Population Groups, by Ralph S. Lewis and Homer L. Baker, PUBLIC ROADS, January 1942.

It also suggests that the older cars are not used as extensively for long trips away from home, because for the older vehicles the percentage of trips for business purposes is only slightly higher than in the case of the newer vehicles although the percentage of annual miles traveled for business purposes is considerably higher than in the case of the newer vehicles. It should also be noted in this connection that the average trip length for the older cars is approximately a third less than the average trip for the newest cars.

TABLE 9.—Effect of age of passenger car on travel characteristics¹

Age of car, years	Average annual travel	Average number of round trips	Average trip length	Percentage of total travel for business purposes	Percentage of total trips for business purposes
	Miles	Number	Miles	Percent	Percent
1.....	10,768	619	17.4	54.7	77.2
2.....	9,628	620	15.5	54.7	77.6
3.....	8,592	593	14.5	54.2	77.2
4.....	8,106	604	13.4	53.5	77.5
5.....	7,624	545	14.0	52.8	75.2
6.....	7,083	524	13.5	53.0	74.8
7.....	6,718	496	13.5	53.9	75.9
8.....	5,804	468	12.4	56.6	76.6
9 and more.....	4,770	417	11.4	61.2	78.8

¹ Unadjusted data for Connecticut, Georgia, Indiana, Michigan, Nebraska, and Oregon, analyzed by the Automobile Manufacturers Association.

A special study by the Opinion Research Corporation, also reported in Automobile Manufacturers Association study indicates that the percentage of total travel for business purposes in the 35 States as reported in this article may be quite conservative. The Opinion Research Corporation survey covered a period of 1 week in the early part of the winter of 1940. It would be expected that some bias would result from such a seasonal choice since cars would be used more for shopping and other similar purposes and less for recreational purposes than at certain other times of the year. Results of that study for the test week in December showed 37 percent of the total travel to have been for business, 18 percent going to and from work, 11 percent

for shopping, 2 percent taking children to and from school, and 32 percent for social and recreational purposes. It will be noted that the first three purposes, which are classed in the States' road-use surveys as business travel, account for 66 percent of the total travel while the results reported in this article for 31 States, in table 4, show 56.7 percent of the total travel for business purposes.

It would be desirable, if adequate data were available, that comparisons be made between the purposes of travel today, and those in earlier years. Some data for early traffic surveys are available on this subject but are not comparable with the present data. However, the data for the early years are of interest in showing, for such observations as were made, the relationships existing in those years between the various purposes of travel. Although it is believed that the available data for various reasons represent a considerably smaller percentage of the travel for business purposes than actually existed it is significant that even under these conditions the percentage of travel for business purposes was high.

DATA FROM EARLY TRAFFIC STUDIES PRESENTED

A Connecticut transportation study made in 1923 classified all trip mileage according to business and nonbusiness travel and indicated that 44.5 percent of all passenger-car travel was for business purposes.⁸ A definite relation was also observed in this survey between trip length and the purpose for which the car was used. For trips of less than 19 miles, 52.2 percent were for business while on trips of 500 miles or over, the percentage for business was only 12.6. In trips of 100 to 149 miles the percentage for business was 34.5 percent. In this travel study data were classified according to trips and not according to total mileage traveled, and the study was limited to the rural highways.

In the Pennsylvania survey conducted in 1924 52.8 percent of the passenger car traffic on the primary highway system of the State was found to be for business purposes.⁹

The survey made in the Cook County, Ill., area in 1924 revealed that at selected stations in that area 32.1 percent of the passenger car trips were for business purposes.¹⁰

The Ohio survey conducted in 1925 indicated that 55.4 percent of the passenger car traffic on the Ohio State Highway system was for business purposes.¹¹

A Vermont survey in 1926 obtained data on the basis of which it was estimated that 33.7 percent of the travel on Federal-aid and numbered State-aid roads was for business purposes.¹²

A similar study in New Hampshire in the same year indicated that 24.6 percent of the passenger-car traffic on the trunk line system of the State was for business

purposes.¹³ This figure approximates that for Vermont and shows a considerably lower percentage for business travel on primary rural routes than in other States. This may be accounted for by the high volume of travel in those two States for recreational purposes by motor-vehicle owners of adjacent States. The higher percentage of travel for business purposes in Vermont as compared to New Hampshire may also be accounted for by the fact that at that time, and to a considerable extent even today, the tourist or recreational facilities of Vermont had not been developed or utilized as much as those in New Hampshire. Also the recreational facilities in the latter State were closer to the large populations of Connecticut, Massachusetts, and Rhode Island than were the existing facilities of Vermont.

In contrasting these figures with those from the current studies it should also be remembered that the recent figures include travel on all roads and streets and that the travel reported is that performed both in and out of the State by the motor-vehicle owners of that State. The earlier study essayed analysis of the travel as it occurred on any given system of roads regardless of that travel's in-State or out-of-State origin.

Several factors affect the comparability of the data from all these surveys. In all cases the figures from the earlier studies represent only traffic on rural roads and in several cases only that on the primary highway systems. There is thus omitted a large volume of traffic on city streets and on local rural roads where generally the percentage of travel for business purposes is considerably higher than on the main rural highways. In some of the surveys percentages of travel for business purposes were computed only on the basis of the number of trips observed which gives undue weight to the longer trips.

Data that are more nearly comparable with those of the present studies were obtained in financial-economic studies conducted in Wisconsin in 1930 and in Minnesota in 1933. Road-use surveys were integral parts of these studies and provided the following data relative to the purpose of travel of Wisconsin passenger-car owners.¹⁴

Place of ownership:	Percentage of total travel for business purposes
Rural areas.....	64.3
Incorporated places having a population of—	
2,500 or less.....	54.9
2,501 to 15,000.....	54.9
15,001 to 75,000.....	56.7
Milwaukee.....	62.9
State.....	60.1

These figures are somewhat higher than the planning survey figures obtained 6 years later where only 49.6 percent of the travel of residents of the State was found to be for business purposes. It is possible that there has been an increased use of the automobile for pleasure purposes in more recent years, especially since the economic depression of the early 1930's. This theory appears to be substantiated by the results of the Minnesota study conducted in 1933.¹⁵ Analyses of the

⁸ The Connecticut Transportation Survey, PUBLIC ROADS, August 1926.

⁹ Report of a Survey of Transportation on the State Highways of Pennsylvania. United States Bureau of Public Roads and the Pennsylvania Department of Highways, 1928.

¹⁰ Report of a study of Highway Traffic and the Highway System of Cook County, Ill., by the United States Bureau of Public Roads and the Cook County Highway Department, 1925.

¹¹ Report of a Survey of Transportation on the State Highway System of Ohio. United States Bureau of Public Roads and the Ohio Department of Highways and Public Works, 1927.

¹² Digest of Vermont Highway Transportation Survey, by J. Gordon McKay, PUBLIC ROADS, December 1927.

¹³ Report of a Survey of Transportation on the State Highways of New Hampshire, United States Bureau of Public Roads and the New Hampshire State Highway Department, 1927.

¹⁴ The Wisconsin Financial Survey, PUBLIC ROADS, April 1933.

¹⁵ Highways and Public Finance in Minnesota in 1932, by the United States Bureau of Public Roads and the Minnesota Department of Highways, 1934.

TABLE 10.—Percentage of passenger cars traveling outside State of ownership

State	Percentage of cars owned in—							Total
	Unincorporated areas	Incorporated places having a population of—						
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	
Alabama	38.0	50.1	57.1	68.1	60.0	53.2	49.6	47.3
Arizona	31.5	34.2	37.3	48.0		42.7		38.2
Arkansas	22.9	24.3	39.4	34.7	36.4	32.6		27.6
Colorado	28.1	43.4	50.0	43.4	63.8	38.1	35.3	38.3
Florida	27.7	27.2	40.9	33.8	37.7	38.0		32.7
Idaho	45.7	58.3	57.1	70.2	51.9			53.7
Illinois	26.1	38.2	46.4	55.2	50.7	61.1	75.6	56.6
Indiana	31.2	44.2	49.1	48.1	50.6	58.5	48.7	43.4
Iowa	28.8	40.3	49.6	50.6	52.4	61.8	52.1	43.9
Kansas	34.3	50.4	54.4	63.0	68.6	49.1	75.0	51.5
Kentucky	34.2	38.3	54.8	62.0	57.8	69.0	51.2	44.9
Louisiana	21.2	27.0	31.9	32.0	40.4	45.7	36.9	31.6
Maryland	73.2	87.1	90.7	87.0	84.8	92.0	81.2	79.3
Michigan	24.0	27.2	31.7	32.5	49.4	36.5	37.6	34.7
Minnesota	21.0	32.8	31.1	39.2	38.6		37.6	31.2
Missouri	17.7	30.8	30.8	26.8	27.8	31.1	33.3	27.3
Montana	27.9	52.6	50.0	52.8	52.8	24.2		39.5
Nebraska	27.5	49.0	52.8	58.3	44.0	41.4	42.8	39.3
Nevada	55.2	20.2	58.4	72.8	83.8			66.6
New Hampshire		56.7	62.0	75.8	82.2	71.3		69.6
New Mexico	28.0	74.0	58.9	53.6	45.4	31.9		40.7
New York	34.5	39.2	39.2	42.0	48.1	47.2	47.0	44.6
North Dakota	24.9	40.8	65.2	51.6	63.3	75.3		37.0
Ohio	24.0	37.2	38.6	43.8	47.1	49.1	53.5	42.0
Oklahoma	30.8	30.8	40.6	50.9	53.6	34.2	56.9	42.6
Oregon	31.4	51.1	49.3	50.3	68.4	36.7	60.1	47.1
Pennsylvania	32.0	43.0	48.0	50.5	51.7	59.1	69.3	50.9
South Dakota	38.8	52.6	66.7	66.6	54.3	83.7		50.5
Texas	14.2	17.6	18.3	26.4	29.0	24.7	21.1	19.9
Utah	31.5	43.9	46.4	43.4	45.5	69.8	63.7	47.7
Vermont	45.2	53.8	52.8	61.5	59.8			51.6
Virginia	43.3	71.3	61.7	55.8	75.9	47.9	61.8	50.8
Washington	34.7	43.2	45.3	51.0	62.4	49.9	48.5	44.6
West Virginia	45.4	59.0	64.4	64.6	78.0	68.0		57.9
Wisconsin	23.3	37.1	49.9	42.5	53.9	50.4	51.2	40.4
Wyoming	57.1	63.7	64.8	67.2	60.8			61.2
Total	29.9	40.3	44.2	46.7	51.1	50.4	50.1	42.8

Minnesota data indicated that the following percentages of the total passenger-car travel of Minnesota motor-vehicle owners were for business purposes.

Place of ownership:	Percentage of total travel for business purposes
Rural areas	59.0
Incorporated places having a population of—	
2,500 or less	48.9
2,501 to 15,000	50.0
15,001 to 75,000	53.0
75,001 to 400,000	48.2
Minneapolis	51.9
State	52.7

In the road-use survey conducted as a part of the Minnesota planning survey three years later only 45.8 percent of the total travel was found to have been for business purposes, or, as in the case of Wisconsin, a definite decrease from the earlier figure. In Wisconsin, where the decrease was somewhat larger the period of time involved was twice as long as that between the two Minnesota studies and may account for the difference if the trend observed is actual. It should be noted, however, that Minnesota and Wisconsin, along with Ohio and Illinois are the only States included in this study in which less than 50 percent of the passenger-car travel was reported to be for business purposes. It is, therefore, possible that the trends noted in Minnesota and Wisconsin, of an increasing percentage of the total travel for social and recreational purposes, may not be true of other States where different economic

TABLE 11.—Percentage of trucks traveling outside State of ownership

State	Percentage of trucks owned in—							Total
	Unincorporated areas	Incorporated places having a population of—						
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	
Alabama	36.7	35.1	41.7	36.3	22.7	21.4	12.9	32.1
Arizona	11.0	11.3	9.5	18.3		19.9		14.8
Arkansas	19.4	23.5	17.5	17.8	20.9	7.6		18.8
Colorado	11.1	13.0	12.0	5.3	22.1	4.4	15.6	11.8
Florida	16.0	8.9	13.2	4.7	6.1	4.9	5.1	9.1
Idaho	30.9	45.7	15.5	41.5	21.3			30.7
Illinois	13.8	17.0	14.9	8.6	3.2	10.7	6.1	10.1
Indiana	17.9	23.1	21.4	14.2	12.7	18.8	10.8	16.5
Iowa	15.1	15.5	16.6	13.2	9.2	7.4	3.4	11.9
Kansas	16.3	13.0	15.4	14.8	15.0	4.6	29.1	16.3
Kentucky	26.7	41.3	29.0	27.2	19.1	31.8	11.7	25.6
Louisiana	7.9	6.9	9.5	7.4	18.7	22.1	9.0	9.5
Maryland	43.5	59.2	64.8	44.6	29.5	66.8	43.1	45.2
Michigan	10.3	9.7	9.8	3.9	16.0	3.7	43.9	6.0
Minnesota	9.5	10.4	6.5	8.2	5.2		2.8	7.6
Missouri	18.6	27.6	27.6	12.4	10.7	14.1	11.8	16.5
Montana	14.4	14.5	18.5	15.5	15.2	1.1		13.8
Nebraska	15.2	20.8	18.4	18.4	9.1	7.7	11.0	15.4
Nevada	28.6		12.1	12.9	17.6			20.6
New Hampshire		29.2	32.2	43.8	41.8	24.0		33.8
New Mexico	7.2	17.5	23.9	19.3	21.8	16.9		13.7
New York	8.4	9.3	9.3	8.4	9.1	9.4	7.9	8.8
North Dakota	7.6	17.0	24.1	15.2	9.6	37.5		11.6
Ohio	9.5	13.3	10.5	12.6	15.5	9.8	11.5	11.5
Oklahoma	14.3	14.3	12.6	15.5	14.0	9.1	5.1	14.0
Oregon	16.2	17.6	23.2	10.6	32.6	5.1	24.5	18.3
Pennsylvania	14.5	16.1	17.8	12.6	10.8	19.1	19.7	16.4
South Dakota	25.6	25.8	33.7	12.9	12.6	26.1		24.1
Texas	6.0	7.9	6.6	9.8	12.4	11.8	8.8	8.1
Utah	18.5	23.8	23.8	17.1	7.4	32.4	18.1	20.0
Vermont	23.6	9.1	15.6	28.8	17.8			22.0
Virginia	30.6	41.8	40.0	20.8	37.8	11.1	8	23.6
Washington	20.8	26.4	16.0	21.2	22.4	9.0	12.6	18.9
West Virginia	31.8	43.7	34.0	32.7	36.8	22.5		30.6
Wisconsin	5.6	9.4	11.3	7.0	14.6	9.4	2.4	7.0
Wyoming	32.2	32.2	19.8	30.0	14.7			28.0
Total	15.7	18.0	16.7	13.6	14.7	13.2	12.9	14.0

and other conditions have resulted in higher percentages of travel for business purposes.

FORTY-THREE PERCENT OF PASSENGER CARS PERFORM SOME TRAVEL OUTSIDE STATE OF OWNERSHIP

From the data obtained in the road-use surveys it is possible also to make certain other analyses regarding travel characteristics. These items include (1) percentage of vehicles traveling in other States than that where owned; (2) percentage of the total travel that is performed outside the State where the motor vehicle is owned; and (3) percentage of vehicles traveling in counties other than that where owned. Because of variations in size of counties, size of States, geographical conditions, location of marketing centers and location of population areas within the respective States, these figures cannot be used without proper qualifications. They are, however, informative of general characteristics.

Tables 10 and 11 show for each of the various population groups of 36 States the percentage of all passenger cars and of all trucks that travel outside the State at some time during the year. Other analyses of the road-use survey data have indicated that a large percentage of the total travel is accounted for by numerous short trips within a short radius of the place of residence. It is somewhat surprising, however, to discover in an era of surfaced roads connecting all parts of the country that almost 60 percent of the passenger cars, in the 36

¹⁶ Throughout this report, the term "place where owned" is used to indicate the place where the vehicle is regularly garaged.

States studied, never leave the State where they are owned in the course of their annual travel.

Table 10 shows that the lowest percentage of vehicles traveling outside the State occurs in the unincorporated areas and that generally the percentage traveling out of the State tends to increase as the size of the population group increases. There are few exceptions to this general tendency and most of those can be readily explained.

In Alabama, a somewhat smaller percentage of Birmingham (largest population group) cars travel outside the State than is the case for other population groups. This is undoubtedly caused by the location of that city in the interior of the State. A similar condition is evidenced in Colorado for cars owned by Denver residents. Denver, too, is toward the interior of the State and a large share of the vacation or holiday travel of Denver residents would be in the mountain areas to the west of the city.

In Florida a similar condition, to a somewhat lesser degree, is noted in the largest population group, which includes Jacksonville, Miami, and Tampa. Although Jacksonville is near the northern boundary of the State, Tampa and Miami residents have to travel 200 to 400 miles to get outside the State. As in the case of Alabama and Colorado, it is therefore understandable that a smaller percentage of vehicles in this population group should go outside the State, even though the proximity of Jacksonville provides a somewhat counterbalancing effect.

Similar conditions can also be observed in varying degrees in the 100,001 or more population group in Iowa where Des Moines is in the interior of the State, in Indiana where Indianapolis is in the center of the State though four other smaller cities in the group are nearer the State boundaries, and in Louisiana where New Orleans is some distance away from State boundaries.

The situation in Kentucky where Louisville is the only city in that group may be explained by the fact that although this city is on a State boundary the toll bridges across the Ohio River probably form an effective barrier to the north and disperse more of the traffic in other directions than would otherwise be the case.

It should be observed that in four Southern States—Arkansas, Florida, Louisiana, and Texas—the percentage of vehicles traveling outside the State is low. General economic conditions, including lower average cash incomes than elsewhere in the country, may account for this travel characteristic in some instances, but for Texas the distances which must be traveled from most population concentrations in order to reach a State boundary no doubt provides the explanation.

Although a low percentage of vehicles traveling outside the State is found in Michigan and Minnesota it is believed that the explanation there is somewhat different. Michigan has only a relatively small portion of its boundaries contiguous with other States. For the greater part of its boundaries it has four of the Great Lakes. In addition it has varied and extensive natural and developed recreational facilities within its own boundaries so that its residents need not drive outside the State for their recreation. Conditions in Minnesota are somewhat similar. To the north lies a sparsely populated section of Canada, which serves somewhat as a natural barrier to out-of-State travel in that direction. States to the east, south, and west of Minnesota offer few recreational facilities that the State itself does not have. It might be thought that

similar conditions would exist in Wisconsin but it must be remembered that the most densely populated areas are located in the southeastern part of the State which is adjacent to the Chicago metropolitan area, a fact which might be expected to create greater out-of-State travel by Wisconsin residents.

The rather high number of Maryland cars traveling out-of-State, as shown in table 10 is to be expected because of the size and shape of the State. The narrow western panhandle and the Baltimore concentration within 40 miles of the State boundary are both conducive to a large percentage of cars traveling outside the State. A similar condition exists in New Hampshire, a relative small State, where approximately 70 percent of the population is concentrated in the five southern counties which account for only about 40 percent of the area of the State.

The high percentage of Nevada cars traveling outside the State can likewise be accounted for by the distribution of population in the State. Approximately 39 percent of the population is located within a short distance of the California boundary in the Reno-Carson City area, 24 percent in the northeast area adjacent to Idaho and Utah and 9 percent in the southern tip of the State in the Las Vegas area.

FOURTEEN PERCENT OF TRUCKS PERFORM SOME TRAVEL OUTSIDE STATE OF OWNERSHIP

Table 11 presents similar data for trucks. It will be noted that the percentage of trucks traveling outside the State of ownership is relatively small compared to that for cars.

As in the case of cars, the 45.2 percent of Maryland trucks going outside the State is definitely higher than for any other State.

Only four other States reported more than 30 percent of their trucks traveling outside the State. These were Alabama, Idaho, New Hampshire, and West Virginia. This condition can be explained in the latter State by the heavy industrial development in the western part of the State and also in the panhandle region near the Pittsburgh area.

Tables 12 and 13 show for 34 States the percentages of cars and of trucks traveling outside the counties of ownership in the respective States. Adequate bases of comparison are even more lacking here than in the case of out-of-State travel. In addition to such factors as the degree of urbanization of the county, the location of shopping and marketing centers, and the condition of road systems in the county of residence and adjacent counties, the size of the county is probably the most important single item. Counties throughout the United States vary widely in size from Arlington County, Va., of 25 square miles to San Bernardino County, Calif., with 20,175 square miles.

Only 6 of the 34 States reported that less than 80 percent of the passenger cars traveled outside the county of residence during the year. Four of these were Western States—Arizona with an average county area of 8,129 square miles, Nevada with an average county area of 6,460 square miles, New Mexico with an average county area of 3,952 square miles and Wyoming with an average county area of 4,241 square miles.

A comparison of Nevada data in tables 10 and 12 reveals an apparent contradiction of table 10 by table 12. This is due to the nature of the out-of-county travel analysis. In table 10 Nevada was shown to have the third from the highest percentage of cars

TABLE 12.—Percentage of passenger cars traveling outside county of ownership¹

State	Percentage of cars owned in—							Total
	Unincorporated areas	Incorporated places having a population of—						
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	
Alabama	84.7	93.9	94.4	94.8	89.6	82.3	86.5	86.9
Arizona	61.9	61.6	77.9	63.2		77.6		66.8
Arkansas	71.2	84.2	90.1	90.1	91.3	91.0		80.0
Colorado	90.0	96.3	99.2	98.8	93.3	95.7	98.0	94.8
Florida	76.9	89.4	91.1	86.2	87.9	76.5	79.6	81.3
Idaho	85.0	94.0	95.7	94.7	95.8			89.9
Illinois	80.7	89.9	88.3	91.1	88.2	88.8	82.1	85.0
Indiana	78.5	89.3	92.7	92.4	90.1	84.3	75.5	81.9
Iowa	84.4	92.6	93.4	93.0	92.5	79.5	91.5	87.7
Kansas	83.6	92.6	94.5	91.1	93.1	91.2	86.6	87.7
Kentucky	83.4	92.2	94.0	92.9	89.6	87.3	76.3	83.2
Louisiana	75.6	91.7	91.9	85.8	79.0	70.6	55.5	70.9
Maryland	86.0	90.6	92.0	94.7	96.0	88.3	95.4	90.5
Michigan	86.1	93.4	94.6	90.4	90.8	95.1	90.8	90.8
Minnesota	80.7	95.8	94.5	96.4	97.5		98.3	91.6
Missouri	78.4	89.7	89.7	83.6	33.9	84.0	75.2	76.3
Montana	83.8	95.1	97.9	92.9	95.8	93.6		90.4
Nebraska	79.4	90.6	89.8	84.6	92.8	85.4	55.7	80.6
Nevada	54.6	62.3	91.1	54.0	87.8			63.2
New Mexico	67.1	77.0	84.7	68.8	81.8	87.1		74.1
New York	81.2	90.9	90.9	90.1	90.4	91.9	83.7	81.6
North Dakota	81.5	95.0	92.0	95.9	87.7	77.8		86.3
Ohio	85.8	92.7	94.8	93.2	93.4	94.0	90.4	90.4
Oklahoma	83.1	83.1	87.7	88.7	96.6	64.6	91.9	86.9
Oregon	88.0	92.7	95.8	98.1	95.6	98.1	92.9	91.9
Pennsylvania	80.4	99.7	83.5	91.9	92.8	92.4	80.1	86.5
South Dakota	73.7	83.7	95.2	94.1	91.2	98.4		85.1
Texas	83.8	93.1	94.8	93.0	90.6	86.5	82.1	86.2
Utah	92.6	93.6	89.6	95.0	84.9	99.3	97.6	94.3
Virginia	81.5	94.1	95.3	92.9	89.7	92.0	94.9	87.1
Washington	82.8	90.2	91.5	92.7	89.0	91.2	90.2	87.9
West Virginia	88.0	91.9	91.0	96.2	95.6	92.9		90.8
Wisconsin	86.1	94.4	93.9	95.4	97.0	92.0	96.6	92.2
Wyoming	74.0	83.0	88.5	84.4	80.2			79.5
Total	81.5	90.0	89.4	89.8	88.3	88.1	85.3	85.2

¹ Travel outside the county refers only to travel in other counties in the State of ownership. Data for New Hampshire and Vermont not analyzed on a county basis.

TABLE 13.—Percentage of trucks traveling outside county of ownership¹

State	Percentage of trucks owned in—							Total
	Unincorporated areas	Incorporated places having a population of—						
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	
Alabama	83.2	87.3	95.3	92.1	76.0	59.7	67.0	80.8
Arizona	32.3	45.0	44.6	20.7		31.2		31.7
Arkansas	64.8	71.8	64.9	65.0	38.7	44.3		61.6
Colorado	72.4	77.1	79.5	78.9	57.5	62.5	74.8	72.8
Florida	50.3	58.0	62.9	45.1	29.5	18.4	35.4	42.6
Idaho	64.8	79.0	68.9	70.2	79.6			69.1
Illinois	54.3	60.8	51.4	38.8	30.5	27.2	8.4	31.4
Indiana	53.9	65.7	57.9	50.5	37.2	33.3	22.3	44.0
Iowa	52.7	63.9	67.5	52.9	45.0	23.4	31.3	47.3
Kansas	56.5	62.0	51.6	37.5	42.7	31.4	43.8	47.7
Kentucky	72.0	86.5	68.7	69.1	41.2	47.9	18.1	61.4
Louisiana	56.6	57.7	61.0	61.0	56.1	40.9	48.6	40.4
Maryland	66.0	73.0	77.2	75.0	68.2	40.4	77.4	70.4
Michigan	55.5	59.7	63.5	37.8	47.2	52.3	31.2	40.8
Minnesota	56.7	68.3	64.2	53.7	53.2		45.6	54.1
Missouri	66.1	66.3	66.3	57.7	59.6	34.6	23.9	45.7
Montana	74.9	73.2	75.1	70.6	65.9	44.1		70.5
Nebraska	47.5	68.4	69.7	50.9	52.0	31.9	24.3	50.5
Nevada	37.7	16.2	51.4	32.9	24.0			30.0
New Mexico	39.3	56.3	44.6	25.7	38.9	37.2		36.9
New York	45.3	49.8	49.8	52.9	52.3	51.0	31.4	31.4
North Dakota	52.7	79.9	59.3	72.5	49.7	37.5		57.6
Ohio	63.7	71.6	71.0	58.2	54.2	47.7	34.5	50.7
Oklahoma	63.2	63.2	62.2	60.1	75.3	66.0	43.1	62.1
Oregon	62.7	65.2	60.8	61.5	52.9	86.4	43.6	58.8
Pennsylvania	53.6	92.2	29.9	52.8	53.1	59.2	36.1	49.1
South Dakota	51.7	54.1	64.2	52.5	49.1	59.1		53.9
Texas	73.4	80.7	83.4	77.1	68.3	64.3	59.5	69.8
Utah	79.8	84.5	80.6	76.0	74.1	74.3	55.7	74.0
Virginia	65.3	67.2	64.4	79.6	70.7	57.1	53.7	63.3
Washington	61.6	67.5	44.3	60.2	52.6	59.7	28.5	48.1
West Virginia	71.1	80.3	74.7	55.4	57.5	64.0		66.8
Wisconsin	48.6	65.3	51.7	53.1	54.9	35.0	18.5	46.3
Wyoming	51.2	46.7	44.3	37.5	33.6			44.8
Total	59.7	65.5	60.4	55.7	50.7	44.6	34.5	49.5

¹ Travel outside the county refers only to travel in other counties in the State of ownership. Data for New Hampshire and Vermont not analyzed on a county basis.

traveling outside the State. This is not true for travel outside the county as shown in table 12, nor is the percentage of cars traveling outside the counties of residence in Nevada as great as the percentage of cars traveling outside the State. Travel outside the county refers only to travel in other Nevada counties so that a passenger car might be driven from Washoe County into California but not driven into any other counties in Nevada during the year. The Nevada data, and those for most other States also, are therefore a measure of use of other road facilities in the State rather than entirely a measure of travel outside limited boundaries. It should be noted, however, that the Nevada State percentage is controlled in the case of table 12 by the travel of residents of unincorporated areas and those in places of 2,501 to 10,000 population because only in those two population groups are the percentages of those traveling outside the county of residence smaller than the percentages of those traveling outside Nevada.

Table 13 presents data on truck travel in other counties of the respective States. While the total for the 34 States shows that almost half the trucks traveled in other counties, as compared to 85.2 percent of the cars, the percentage exceeds 70 in Alabama, Colorado, Maryland, Montana, and Utah.

It is noted, however, that again the Western States of Arizona, Nevada, and New Mexico report relatively low percentages of their trucks traveling in other counties. Similar low percentages are reported in

Illinois, Michigan, and New York, where the travel of large numbers of trucks is limited to the metropolitan areas of Cook County in which Chicago is located, Wayne County, with Detroit, and the five counties or boroughs of New York City, all of which were classed as one county in the New York study.

The somewhat erratic percentages of truck travel in other counties as compared with car travel are undoubtedly more closely allied with the factors of shopping and marketing center locations. Size of the county, imposing geographic limitations on car travel, undoubtedly affects truck travel also but the economic factors involved in the operation of commercial vehicles are undoubtedly more significant in the case of trucks than in the case of cars.

OUT-OF-STATE TRAVEL A LOW PERCENTAGE OF TOTAL

As a further development of the data in tables 10 and 11 an analysis was also made of the percentage of the total vehicle-miles traveled by cars and trucks that occurred outside the State where the vehicle was registered. This information is shown in tables 14 and 15.

Although 43 percent of all cars and 14 percent of all trucks, according to the data shown in tables 10 and 11, make at least one trip outside the State of ownership during the period of a year, tables 14 and 15 indicate that the percentage of the total travel so accounted for is very much less. This, of course, is consistent with

other data obtained in the road-use surveys that show the small percentage of travel performed at any considerable distance from home.¹⁷

In the 36 States for which data are reported only 7.7 percent of all passenger-car travel and 5.5 percent of all truck travel was outside the respective State of ownership. The highest percentage of out-of-State travel for cars is found in New Mexico and Nevada, both Western States. High percentages of such travel are also found in the Eastern States of New Hampshire and Maryland whose State areas are restricted. Generally, with the exception of Washington and Oregon, out-of-State travel is a higher percentage of the total travel of car owners in most of the Western States than it is in the case of Eastern States. This can be observed in the case of Arizona, New Mexico, Nevada, Idaho, Utah, and Wyoming.

TABLE 14.—Percentage of total travel of passenger cars outside the State of ownership

State	Percentage of travel outside the State of cars owned in—							Total
	Unincorporated areas	Incorporated places having a population of—						
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	
Alabama	3.9	4.6	7.5	9.7	8.8	9.4	6.8	6.2
Arizona	13.4	14.9	12.9	13.5		15.3		14.0
Arkansas	13.9	11.8	11.8	13.4	12.4	12.6		13.1
Colorado	5.1	10.0	12.9	8.3	11.2	7.5	8.5	8.3
Florida	10.2	11.7	12.8	13.8	13.6	17.6	12.5	12.8
Idaho	7.8	12.0	13.5	17.7	10.3			11.4
Illinois	3.1	4.3	5.4	7.5	8.9	10.1	13.4	9.8
Indiana	3.8	5.3	5.2	6.7	8.7	10.8	7.7	6.6
Iowa	3.8	6.2	9.7	11.2	12.3	12.5	10.0	8.5
Kansas	6.6	9.1	12.3	16.6	13.3	7.9	17.6	11.6
Kentucky	5.3	4.1	9.6	9.5	10.4	15.7	8.8	7.9
Louisiana	6.3	4.6	9.1	8.4	9.9	16.4	14.1	10.4
Maryland	13.1	15.6	20.6	21.8	18.4	16.8	13.0	14.4
Michigan	2.0	2.9	3.5	4.5	7.4	4.7	5.8	5.0
Minnesota	2.3	4.5	4.2	5.9	4.9		5.1	4.3
Missouri	2.8	4.4	4.4	4.3	4.6	5.4	6.4	11.2
Montana	7.6	7.5	9.8	9.3	10.3	8.0		8.4
Nebraska	3.5	7.1	10.3	11.4	7.1	7.2	9.0	6.9
Nevada	13.9	11.7	21.8	17.3	15.5			15.9
New Hampshire		10.0	11.7	13.5	19.1	13.4		13.5
New Mexico	12.3	19.0	12.2	24.7	15.9	10.8		15.9
New York	3.9	4.8	4.8	7.1	9.0	9.0	9.3	8.0
North Dakota	4.4	9.0	15.2	10.7	16.1	29.5		9.1
Ohio	2.5	4.7	5.9	7.6	6.6	7.5	8.3	6.4
Oklahoma	5.8	5.9	6.4	6.2	6.9	6.9	9.4	6.9
Oregon	6.4	7.6	9.3	8.8	8.0	8.2	13.1	9.5
Pennsylvania	4.2	5.8	7.1	7.8	7.4	10.5	13.5	8.6
South Dakota	6.2	11.9	14.3	14.3	13.4	16.3		10.8
Texas	1.8	3.4	2.3	3.1	4.2	3.7	2.9	2.7
Utah	7.8	6.9	9.4	10.2	9.7	14.5	15.8	11.8
Vermont	7.2	9.5	4.9	12.2	8.0			8.1
Virginia	5.8	9.7	8.2	6.9	14.5	5.4	6.4	6.6
Washington	5.7	7.8	7.0	8.9	10.6	6.5	9.1	7.9
West Virginia	4.7	10.4	10.7	13.5	18.0	13.2		9.9
Wisconsin	2.8	4.5	6.6	4.3	8.5	7.8	6.2	5.6
Wyoming	10.5	10.6	14.8	14.3	15.5			12.9
Total	4.6	6.2	7.0	8.1	8.8	9.2	9.1	7.7

When the States are studied individually it is also found that in two-thirds of them the percentage of total passenger-car travel that is out-of-State is smallest for the unincorporated areas. The exceptions occur generally for the smaller places. Out-of-State travel for cars in the 1,000 or less population group is smaller than similar travel for cars in unincorporated areas in Arkansas, Kentucky, Louisiana, Montana, Nevada, and Utah. Similar conditions exist for the 1,001 to 2,500 population group for Arizona, Arkansas, New Mexico,

¹⁷ Preliminary Results of Road Use Studies, by Robert H. Paddock and Roe P. Rodgers, PUBLIC ROADS, May 1939.

and Vermont, for the 2,501 to 10,000 and 10,001 to 25,000 population groups only for Arkansas; for the 25,001 to 100,000 population group for Arkansas, New Mexico, and Virginia, and for the 100,001 or more population group only for Maryland.

On the basis of the percentage of trucks traveling outside the State annually (table 13) the data in table 15 appear reasonable. A considerably smaller percentage of trucks than of cars travels outside the State annually; likewise, a considerably smaller percentage of the total travel of trucks is outside the State than is the case for cars.

Trucks owned in unincorporated areas traveled outside the State less than those of other population groups. However, there is less variation among the population groups than in the case of cars. It is also noteworthy that in only eight of the States was the lowest percentage

TABLE 15.—Percentage of total travel of trucks outside the State of ownership

State	Percentage of travel outside the State of trucks owned in—							Total
	Unincorporated areas	Incorporated places having a population of—						
		1,000 or less	1,001 to 2,500	2,501 to 10,000	10,001 to 25,000	25,001 to 100,000	100,001 or more	
Alabama	6.0	5.9	9.6	6.1	5.9	7.1	6.9	6.5
Arizona	7.0	2.7	2.9	7.1		29.2		16.1
Arkansas	15.8	19.5	11.4	8.9	17.8	27.9		16.3
Colorado	4.3	5.2	1.2	1.1	8.8	2.2	14.5	6.7
Florida	5.0	9.1	5.5	6.8	3.7	4.5	5.8	5.6
Idaho	7.2	48.0	10.3	12.1	20.8			16.9
Illinois	2.8	2.0	1.0	1.9	.4	2.7	7.1	4.0
Indiana	6.4	7.0	5.5	8.1	10.5	9.4	10.6	8.4
Iowa	3.0	10.7	3.7	5.1	6.8	7.1	.9	5.9
Kansas	3.9	3.0	7.5	10.4	3.9	.7	12.3	5.8
Kentucky	5.2	8.4	4.9	6.0	5.8	8.1	9.6	6.3
Louisiana	3.5	.9	3.7	1.6	5.8	15.8	5.0	4.9
Maryland	16.4	18.5	19.7	24.3	20.9	19.7	8.1	14.2
Michigan	2.1	2.1	3.4	3.5	4.9	2.4	3.6	3.2
Minnesota	1.2	2.7	3.2	4.1	2.1		3.5	2.5
Missouri	2.6	7.1	7.1	1.0	3.3	4.6	12.7	6.9
Montana	3.9	4.0	6.0	5.2	1.9	1.9		3.7
Nebraska	5.4	13.0	12.0	15.2	11.3	11.8	9.0	11.0
Nevada	14.0		37.8	14.9	2.8			16.4
New Hampshire		5.8	11.9	10.6	19.0	13.5		12.3
New Mexico	8.2	9.5	10.9	14.8	8.7	4.1		9.8
New York	4.1	2.5	2.5	3.3	2.4	2.8	6.8	5.0
North Dakota	1.9	2.6	3.5	4.2	4.5	18.5		4.2
Ohio	3.5	2.9	3.3	4.6	4.7	6.4	5.5	4.8
Oklahoma	3.0	3.0	3.3	2.6	3.4	4.7	1.9	2.8
Oregon	5.0	7.8	6.9	7.8	10.9	3.2	8.4	6.9
Pennsylvania	5.5	9.7	7.4	5.3	5.9	8.5	7.7	6.8
South Dakota	5.0	9.4	11.9	6.2	11.6	7.7		8.5
Texas	1.2	1.3	.8	1.5	1.8	2.3	1.1	1.4
Utah	6.7	6.4	7.0	6.3	7.3	7.9	9.1	7.4
Vermont	12.9	1.2	5.2	9.2	21.8			12.5
Virginia	1.3	2.7	9.3	.9	2.3	.8	.2	1.4
Washington	3.3	3.3	2.7	4.0	6.0	.2	3.7	3.6
West Virginia	4.6	2.5	9.2	9.4	10.9	10.5		7.7
Wisconsin	1.3	4.1	2.8	1.7	5.4	3.5	1.6	2.5
Wyoming	12.0	10.4	7.8	14.5	16.9			12.2
Total	4.3	6.6	4.6	5.0	5.6	6.3	6.2	5.5

of out-of-State travel performed by trucks owned in unincorporated areas. This is entirely different from the tendency noted in car travel.

In another respect the travel of cars and trucks is strikingly similar. In both cases, in 13 of the 36 States the highest percentage of out-of-State travel was reported for cars and trucks owned in the largest population group. In the case of cars in 10 other States the highest percentage for out-of-State travel was in the next to the largest population group; this condition held for trucks in 6 States.

SUMMARY

The data presented in this report indicate generally certain travel characteristics of passenger car and truck owners in the several States.

A small percentage of the total travel of all trucks is for other than business or commercial purposes. For the States for which such data are available only 2.5 percent of all truck travel was for other than business or commercial purposes.

More than half, or 56.7 percent, of all passenger-car travel in 31 States was for business purposes, and this travel combined with the travel by trucks indicates that approximately 65 percent of all motor-vehicle travel is for business purposes.

A classification of pleasure travel into social and recreational travel indicates that, although the percentages vary from State to State, pleasure travel is divided approximately equally between social and recreational travel.

Although older cars travel fewer miles each year and make shorter trips, a higher percentage of their total travel is for business purposes than is the case for the newer cars.

Cars and trucks owned in unincorporated areas make a smaller percentage of trips outside the State where they are owned, are used to visit fewer other counties in the State of ownership, and perform a smaller percentage of their total travel outside the State of ownership than do the cars and trucks of any other population group.

In the 36 States studied 42.8 percent of the cars but only 14.0 percent of the trucks traveled outside the State of ownership during the year.

In 34 States, almost 15 percent of the cars and 50.5

percent of the trucks did not travel into other counties of the State of ownership during the year studied.

In 36 States included in the study, 7.7 percent of the total travel of the passenger cars and 5.5 percent of the total travel of trucks was performed outside the State of registration.

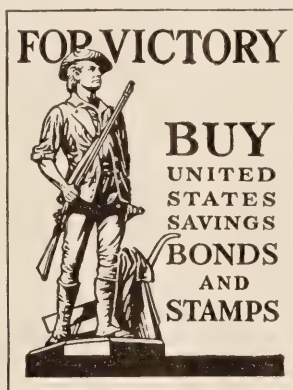
Generally, the extent of travel including the percentage of vehicles traveling outside the county and State of registration, and the percentage of total travel performed outside the State, increase as the size of the population group increases.

PUBLICATION REPORTS RESEARCH ON FLEXIBLE PIPE CULVERTS

The first rational analysis ever made of the behavior of flexible types of culvert pipe, based on accepted principles of mechanics, has recently been published as Bulletin No. 153 of the Iowa Engineering Experiment Station. This bulletin, *The Structural Design of Flexible Pipe Culverts*, by M. G. Spangler, reports the results of a joint investigation by the Public Roads Administration and the Iowa Engineering Experiment Station.

The study reveals that the thin-ring elastic analysis is valid for calculation of deflections of corrugated metal pipe. This analysis is used as a basis for deriving a design formula for pipe deflection which evaluates the effect of fill load, pipe size, bedding, properties of the soil, moment of inertia of the pipe wall, modulus of elasticity of the metal, and time of service.

Single copies of this 80-page bulletin may be obtained without charge from the Iowa Engineering Experiment Station, Ames, Iowa.



STATUS OF FEDERAL-AID HIGHWAY PROJECTS

AS OF MARCH 31, 1942

STATE	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			BALANCE OF ADDED FUND BALANCE FOR PROGRAMMED PROJECTS
	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	
Alabama	\$6,456,558	\$3,207,060	228.2	\$4,053,534	\$2,134,580	115.2	\$415,400	\$206,050	0.3	\$2,622,366
Arizona	1,683,133	1,181,957	68.1	1,138,071	835,693	40.5	384,302	283,319	8.4	1,993,612
Arkansas	3,634,317	1,665,856	57.4	1,173,174	585,470	60.1	152,496	96,396	4.5	1,722,154
California	8,938,376	4,823,259	149.3	5,016,942	3,321,288	56.3	472,203	307,723	14.3	4,464,555
Colorado	2,297,094	1,278,286	154.6	3,618,770	2,255,799	155.6	1,148,565	652,450	41.1	2,191,480
Connecticut	1,419,554	696,181	17.1	1,115,156	821,787	18.4	483,485	231,471	9.4	1,228,870
Delaware	606,586	297,972	17.1	441,010	216,559	9.0	268,040	134,020	8.4	1,498,157
Florida	1,342,189	698,897	66.7	3,131,576	1,753,655	49.2	512,242	293,621	4.6	3,031,766
Georgia	2,994,295	1,495,854	111.4	7,399,882	3,709,691	281.9	2,914,444	1,457,222	122.2	7,032,315
Idaho	1,812,907	1,182,907	93.7	1,283,694	917,647	63.1	58,224	36,000	1	1,982,651
Illinois	4,129,995	2,014,092	89.7	7,033,216	3,564,536	121.7	1,361,200	680,600	6.2	7,107,155
Indiana	4,621,229	2,127,735	75.1	6,572,139	3,207,304	92.8	800,300	400,150	14.3	2,898,930
Iowa	3,903,246	1,887,215	170.6	4,348,332	1,798,282	130.2	493,917	91,450	13.1	2,533,968
Kansas	4,678,783	2,375,589	263.2	6,127,089	3,223,190	253.4	997,444	442,350	47.9	4,804,799
Kentucky	4,063,448	2,002,228	146.9	6,150,960	2,932,510	118.8	2,004,624	935,397	15.1	2,022,821
Louisiana	1,514,168	801,291	33.5	1,382,924	914,401	28.5	2,553,917	1,251,767	56.3	4,265,087
Maryland	948,788	469,405	26.8	2,070,392	1,061,696	27.8	78,610	39,305	1	1,225,422
Maryland	2,765,267	1,381,553	29.6	3,446,909	1,466,154	15.0	35,000	17,500	1	1,587,227
Massachusetts	2,351,862	1,178,572	17.3	2,239,903	1,159,262	14.9	1,273,400	658,873	9.1	3,817,721
Michigan	8,467,297	4,215,312	174.2	2,919,748	1,891,824	561.8	976,500	561,825	9.5	3,295,032
Minnesota	4,463,072	2,183,470	378.0	9,522,463	4,717,659	388.9	360,358	180,179	19.6	3,516,916
Mississippi	5,332,567	2,502,918	283.3	3,744,324	1,874,762	218.1	21,400	13,700	2	3,064,404
Missouri	5,059,170	2,680,179	160.1	10,477,229	5,955,231	193.2	1,888,556	630,413	24.8	4,213,849
Montana	2,181,671	1,659,152	117.1	4,026,424	2,135,912	173.9	387,917	224,823	55.2	4,451,757
Nebraska	2,921,742	1,430,733	277.8	5,228,396	2,629,153	476.0	82,976	41,888	10.9	4,494,991
Nevada	2,233,884	1,910,826	110.6	742,339	643,031	22.7	297,496	257,831	3.4	1,401,980
New Hampshire	356,013	199,086	6.0	1,700,559	1,022,873	20.2				831,642
New Jersey	2,998,818	1,466,835	26.6	2,988,902	1,494,371	16.2				3,045,748
New Mexico	1,629,712	1,018,416	112.8	1,098,866	778,293	63.2				2,825,765
New York	2,593,156	4,820,744	126.7	7,932,755	5,062,640	80.6	1,035,400	620,300	12.5	5,186,477
North Carolina	4,004,928	2,112,295	162.8	2,918,474	1,596,559	123.5	575,070	287,535	8.8	3,663,261
North Dakota	3,221,529	1,882,679	287.6	2,566,134	1,451,752	203.9	2,448,925	1,279,699	205.5	4,006,811
Ohio	10,008,288	5,303,101	97.9	11,204,292	6,139,043	75.1	5,385,210	2,201,043	28.0	3,212,120
Oklahoma	2,505,159	1,267,267	113.8	2,530,422	1,353,270	51.6	1,694,180	896,004	60.2	6,252,003
Oregon	2,783,897	1,644,626	73.0	3,200,754	1,659,318	71.4	1,662,790	503,480	36.2	1,408,320
Pennsylvania	10,068,733	4,993,380	98.5	10,310,764	5,334,562	78.6	1,442,004	902,291	10.8	4,393,457
Rhode Island	1,196,895	596,429	10.0	644,776	322,368	4.8	644,448	322,224	2.0	945,132
South Carolina	2,190,404	1,063,179	92.1	3,977,759	2,494,452	93.7	714,490	430,100	18.3	1,467,885
South Dakota	2,232,437	1,315,959	278.6	4,864,023	3,202,055	54.5	545,110	325,580	59.3	2,880,650
Tennessee	4,045,617	2,167,763	106.5	5,060,450	2,999,979	103.1	250,044	142,648	3.5	3,481,260
Texas	11,542,429	5,636,837	570.5	11,390,330	5,419,551	365.6	1,882,230	731,310	64.2	9,529,623
Utah	1,206,046	907,446	53.8	1,885,271	1,428,236	46.7				1,253,842
Vermont	819,207	448,606	28.8	1,195,762	716,441	20.7	36,906	18,453	3	392,152
Virginia	3,941,867	1,839,199	74.7	3,510,798	1,737,536	57.3	35,490	17,745	4	2,891,214
Washington	1,685,728	897,956	25.7	2,605,052	1,408,897	31.5	43,686	23,400	1.0	2,207,258
West Virginia	2,166,115	1,372,978	51.4	2,482,738	1,231,611	29.3	338,900	166,750	1.8	2,206,248
Wisconsin	2,205,117	1,114,356	92.7	5,618,496	3,567,693	163.9				4,282,329
Wyoming	1,404,738	964,312	148.3	1,807,737	1,339,648	123.6				1,313,397
District of Columbia	1,072,296	547,140	3.5	227,782	135,272	9				1,217,464
Hawaii	133,296	66,648	2.8	1,078,243	792,916	10.9				1,574,165
Puerto Rico	493,285	238,835	3.9	2,138,555	1,056,215	18.0				806,133
TOTALS	174,932,930	90,835,027	5,966.4	199,943,990	109,618,807	5,572.8	39,739,749	20,098,685	1,015.7	151,687,597

STATUS OF FEDERAL-AID SECONDARY OR FEEDER ROAD PROJECTS
AS OF MARCH 31, 1942

STATE	COMPLETED DURING CURRENT FISCAL YEAR			UNDER CONSTRUCTION			APPROVED FOR CONSTRUCTION			FINANCE ALL AVAILABLE FOR PRO-GRAMMATIC PROJECTS
	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	Estimated Total Cost	Federal Aid	Miles	
Alabama	\$1,392,972	\$695,108	62.5	\$519,982	\$285,130	25.2	\$206,701	\$96,830	6.0	\$861,400
Arizona	245,110	174,247	14.1	15,183	13,767	3.4	129,775	63,749	6.8	546,644
Arkansas	623,246	237,499	33.1	483,854	241,861	26.5				335,559
California	1,014,242	614,434	18.3	756,159	580,393	7.6				1,046,299
Colorado	157,106	82,891	20.7	184,366	103,592	3.4				501,761
Connecticut	298,035	136,331	6.1	266,247	115,938	4.8				199,604
Delaware	81,076	38,116	11.6	224,923	111,986	12.3				246,037
Florida	1,082,471	519,285	43.4	292,018	153,304	16.1				398,953
Georgia	542,666	257,833	26.2	1,209,213	694,957	74.9				1,125,116
Idaho	293,347	172,516	26.2	225,220	157,021	7.7				285,992
Illinois	1,087,098	518,844	59.4	1,147,660	573,830	54.5				903,476
Indiana	594,207	291,074	39.8	1,128,455	531,071	46.7				941,303
Iowa	638,766	296,061	165.0	414,792	183,645	57.1				589,321
Kansas	806,405	404,547	106.4	1,615,909	813,484	90.5				1,039,609
Kentucky	1,157,864	321,329	83.2	1,249,010	417,668	37.2				324,331
Louisiana	536,142	265,678	20.6	7,700	3,850	10.6				666,649
Maine	77,540	38,770	3.6	235,218	117,609	1.8				161,416
Maryland	179,966	89,808	20.7	226,410	113,205	1.8				345,564
Massachusetts	179,789	93,569	4.1	688,233	377,683	10.1				547,304
Michigan	1,217,047	599,924	76.3	786,598	393,299	24.8				639,267
Minnesota	1,599,861	757,479	217.1	990,917	201,197	86.9				290,308
Mississippi	829,715	414,858	46.5	1,474,046	670,888	59.0				425,220
Montana	435,334	214,924	52.9	873,976	419,400	89.7				1,053,332
Nebraska	377,420	214,407	58.5	292,724	170,722	31.0				889,999
Nevada	361,584	178,543	49.4	483,813	244,580	64.7				699,809
New Hampshire	324,082	265,067	28.6	96,404	64,163	4.6				231,959
New Jersey	1,96,094	95,143	4.7	239,437	118,619	3.6				133,683
New Mexico	487,496	239,245	9.6	412,615	230,410	12.1				575,787
New York	566,935	357,245	47.7	189,504	122,533	15.2				296,856
North Carolina	959,667	469,927	28.8	1,135,012	608,144	14.9				1,096,021
North Dakota	339,015	178,344	34.9	522,407	278,748	36.3				687,399
Ohio	29,802	15,664	2.4	7,382	7,382	14.5				755,112
Oklahoma	1,785,007	884,427	57.6	901,610	498,775	10.4				1,373,937
Oregon	400,250	210,874	27.6	27,872	14,715	4.0				894,506
Pennsylvania	459,181	244,030	41.8	482,318	256,794	28.5				366,285
Rhode Island	2,015,130	986,906	37.6	513,989	256,587	10.4				766,798
South Carolina	220,879	111,427	2.6	22,194	18,197	5.5				130,911
South Dakota	787,256	307,866	54.6	221,700	79,945	11.4				397,720
Tennessee	36,665	22,152	15.2	4,156	4,156	11.4				762,018
Texas	468,207	232,400	14.1	1,337,954	668,977	46.0				770,269
Utah	1,439,323	699,860	146.2	584,379	285,797	48.9				2,249,798
Vermont	186,949	123,241	17.0	153,666	101,709	6.8				337,043
Virginia	40,708	18,109	1.2	180,204	85,595	7.8				53,580
Washington	406,206	191,396	16.2	346,766	159,395	4.5				676,811
West Virginia	293,361	170,221	17.8	440,348	201,425	13.7				413,564
Wisconsin	427,292	215,822	19.8	301,364	150,069	6.4				501,897
Wyoming	936,033	464,999	42.7	1,421,925	658,289	46.0				596,353
District of Columbia	365,617	158,064	18.8	508,423	218,112	34.3				220,633
Hawaii	76,620	37,756	9.9	2,558	1,279	3.1				163,600
Puerto Rico	170,027	77,541	7.5	73,642	38,810	3.1				334,875
TOTALS	29,551,971	14,660,801	1,935.4	25,918,830	13,113,100	1,195.2	7,394,028	4,473,973	546.6	30,089,846

PUBLICATIONS of the PUBLIC ROADS ADMINISTRATION

Any of the following publications may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. As his office is not connected with the Agency and as the Agency does not sell publications, please send no remittance to the Federal Works Agency.

ANNUAL REPORTS

- Report of the Chief of the Bureau of Public Roads, 1931. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1932. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1933. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1934. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1935. 5 cents.
Report of the Chief of the Bureau of Public Roads, 1936. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1937. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1938. 10 cents.
Report of the Chief of the Bureau of Public Roads, 1939. 10 cents.
Work of the Public Roads Administration, 1940.
Work of the Public Roads Administration, 1941.

HOUSE DOCUMENT NO. 462

- Part 1 . . . Nonuniformity of State Motor-Vehicle Traffic Laws. 15 cents.
Part 2 . . . Skilled Investigation at the Scene of the Accident Needed to Develop Causes. 10 cents.
Part 3 . . . Inadequacy of State Motor-Vehicle Accident Reporting. 10 cents.
Part 4 . . . Official Inspection of Vehicles. 10 cents.
Part 5 . . . Case Histories of Fatal Highway Accidents. 10 cents.
Part 6 . . . The Accident-Prone Driver. 10 cents.

MISCELLANEOUS PUBLICATIONS

- No. 76MP . . . The Results of Physical Tests of Road-Building Rock. 25 cents.
No. 191MP . . . Roadside Improvement. 10 cents.
No. 272MP . . . Construction of Private Driveways. 10 cents.
No. 279MP . . . Bibliography on Highway Lighting. 5 cents.
Highway Accidents. 10 cents.
The Taxation of Motor Vehicles in 1932. 35 cents.
Guides to Traffic Safety. 10 cents.
An Economic and Statistical Analysis of Highway-Construction Expenditures. 15 cents.
Highway Bond Calculations. 10 cents.
Transition Curves for Highways. 60 cents.
Highways of History. 25 cents.
Specifications for Construction of Roads and Bridges in National Forests and National Parks. 1 dollar.

DEPARTMENT BULLETINS

- No. 1279D . . . Rural Highway Mileage, Income, and Expenditures, 1921 and 1922. 15 cents.
No. 1486D . . . Highway Bridge Location. 15 cents.

TECHNICAL BULLETINS

- No. 55T . . . Highway Bridge Surveys. 20 cents.
No. 265T . . . Electrical Equipment on Movable Bridges. 35 cents.

Single copies of the following publications may be obtained from the Public Roads Administration upon request. They cannot be purchased from the Superintendent of Documents.

MISCELLANEOUS PUBLICATIONS

- No. 296MP . . . Bibliography on Highway Safety.
House Document No. 272 . . . Toll Roads and Free Roads.
Indexes to PUBLIC ROADS, volumes 6-8 and 10-21, inclusive.

SEPARATE REPRINT FROM THE YEARBOOK

- No. 1036Y . . . Road Work on Farm Outlets Needs Skill and Right Equipment.

REPORTS IN COOPERATION WITH UNIVERSITY OF ILLINOIS

- No. 303 . . . Solutions for Certain Rectangular Slabs Continuous Over Flexible Support.
No. 304 . . . A Distribution Procedure for the Analysis of Slabs Continuous Over Flexible Beams.
No. 313 . . . Tests of Plaster-Model Slabs Subjected to Concentrated Loads.
No. 314 . . . Tests of Reinforced Concrete Slabs Subjected to Concentrated Loads.
No. 315 . . . Moments in Simple Span Bridge Slabs With Stiffened Edges.

UNIFORM VEHICLE CODE

- Act I.—Uniform Motor Vehicle Administration, Registration, Certificate of Title, and Antitheft Act.
Act II.—Uniform Motor Vehicle Operators' and Chauffeurs' License Act.
Act III.—Uniform Motor Vehicle Civil Liability Act.
Act IV.—Uniform Motor Vehicle Safety Responsibility Act.
Act V.—Uniform Act Regulating Traffic on Highways.
Model Traffic Ordinances.

A complete list of the publications of the Public Roads Administration, classified according to subject and including the more important articles in PUBLIC ROADS, may be obtained upon request addressed to Public Roads Administration, Willard Bldg., Washington, D. C.

STATUS OF FEDERAL-AID GRADE CROSSING PROJECTS

AS OF MARCH 31, 1942

STATE	COMPLETED DURING CURRENT FISCAL YEAR				UNDER CONSTRUCTION				APPROVED FOR CONSTRUCTION				BALANCE OF FUNDS AVAILABLE FOR PROGRAMMED PROJECTS
	Estimated Total Cost	Federal Aid	NUMBER		Estimated Total Cost	Federal Aid	NUMBER		Estimated Total Cost	Federal Aid	NUMBER		
			Grade Crossing by State or Reclamation	Grade Crossing by Other-wise			Grade Crossing by State or Reclamation	Grade Crossing by Other-wise			Grade Crossing by State or Reclamation	Grade Crossing by Other-wise	
Alabama	\$151,436	\$151,436	2	4	\$390,025	\$386,803	5	2	\$80,935	\$80,935	3	5	\$1,095,604
Arkansas	184,378	184,361	1	1	125,874	116,883	1	1	13,255	13,255	2	2	234,179
California	471,125	469,820	5	7	171,946	169,336	1	2	12,359	12,359	3	4	683,335
Colorado	836,454	646,882	2	5	870,516	868,399	8	8	9,914	9,914	3	3	2,319,499
Connecticut	5,685	5,646	2	1	664,333	664,333	7	1	21,042	21,042	10	10	730,652
Delaware	166,022	165,415	2	1	61,712	60,676	1	1	231,374	222,740	1	1	525,593
Florida	89,25	89,725	1	1	191,999	189,867	1	6	508,406	321,735	2	14	179,564
Georgia	120,61	120,961	20	6	843,067	840,887	1	10	82,432	82,432	4	13	870,795
Idaho	668,29	668,629	7	2	840,130	840,130	5	6	937,709	937,709	3	4	1,515,675
Illinois	271,30	271,603	3	4	322,273	313,602	4	1	4,189	4,189	1	2	427,671
Indiana	686,580	564,611	2	84	1,667,042	1,572,807	8	1	412,199	393,249	1	34	2,564,700
Iowa	607,483	607,483	6	26	471,234	465,525	2	17	79,950	79,950	23	23	1,170,601
Kansas	350,362	340,272	3	1	1,444,738	1,192,530	10	2	191,014	183,590	45	45	656,633
Kentucky	69,711	69,206	2	7	756,728	756,728	9	4	135,254	131,170	3	6	1,334,353
Louisiana	1,109,873	1,107,509	9	1	441,711	441,711	1	1	481,835	480,667	4	4	924,798
Maryland	6,965	6,965	2	2	586,220	586,220	8	1	7,739	7,739	3	3	285,099
Massachusetts	490,900	459,107	2	11	367,291	367,291	4	4	7,739	7,739	7	7	399,876
Michigan	346,270	335,829	1	4	871,258	733,460	4	2	37,325	37,325	1	3	1,250,554
Minnesota	1,321,793	1,314,906	3	4	791,642	790,770	5	2	763,830	763,830	2	1	1,325,454
Mississippi	638,427	638,112	5	4	249,521	249,521	1	1	329,729	299,568	1	9	1,194,726
Missouri	253,874	253,874	2	1	968,896	968,896	5	4	59,688	59,688	1	1	646,612
Montana	120,702	120,702	2	2	843,110	843,110	10	2	25,808	25,808	2	2	1,489,049
Nebraska	441,549	441,549	2	2	1,970,283	1,514,663	6	2	416,991	416,991	2	2	733,051
Nevada	179,203	178,161	2	22	99,178	99,178	21	1	13,020	13,020	3	3	473,945
New Hampshire	119,382	116,832	4	1	57,946	57,946	2	2	28,124	28,124	9	9	196,487
New Jersey	265,368	265,069	4	1	96,565	96,240	2	1	2	2	1	1	313,961
New Mexico	852,812	850,349	4	1	622,304	497,354	3	1	354,985	295,560	1	2	941,191
New York	2,422,733	2,364,650	2	13	1,966,196	1,921,057	3	8	259,103	259,103	3	1	522,006
North Carolina	516,515	518,515	4	5	195,211	192,333	6	2	133,998	133,998	1	15	1,407,381
North Dakota	174,102	172,899	2	4	585,815	585,815	6	2	872,117	872,117	1	1	1,688,941
Ohio	1,545,117	1,529,900	8	1	2,780,072	2,456,350	10	2	403,460	199,330	1	6	1,454,250
Oklahoma	193,054	189,260	1	34	938,159	934,749	7	3	372,820	374,783	3	4	1,447,396
Oregon	419,536	355,255	4	3	203,552	187,715	2	2	10,433	10,433	3	3	2,526,669
Pennsylvania	1,907,614	1,876,905	4	1	3,016,340	3,002,411	14	4	359,074	359,074	2	2	2,526,669
Rhode Island	205,241	205,241	1	1	3,695	3,695	2	2	238,868	123,735	1	2	273,921
South Carolina	341,464	328,115	6	4	245,569	224,728	2	3	41,200	41,200	2	8	989,463
South Dakota	511,904	511,793	13	9	515,821	499,871	9	9	41,200	41,200	2	2	829,229
Tennessee	301,580	289,686	3	3	1,325,647	1,325,647	7	1	102,106	102,106	1	1	1,005,387
Texas	1,329,036	1,309,617	16	3	1,361,837	1,350,243	13	4	4,350	4,350	2	2	2,375,282
Utah	61,859	61,117	2	20	66,304	66,304	1	8	60,140	60,140	23	23	359,457
Virginia	18,663	18,671	2	4	322,869	293,090	2	2	4,015	4,015	1	1	103,978
Washington	516,966	516,966	2	4	392,327	372,367	5	1	5,152	4,015	1	1	959,061
West Virginia	179,205	178,958	1	2	1,250,182	553,508	7	1	5,152	5,152	2	2	439,678
Wisconsin	253,143	247,512	3	6	654,510	654,510	6	1	3,330	3,330	1	1	776,753
Wyoming	468,542	451,282	2	39	568,523	567,635	3	2	15,484	15,484	3	3	1,674,169
District of Columbia	481,274	466,615	6	1	1,974	1,974	1	1	8,417	8,417	6	6	429,928
Hawaii	2,193	2,193	1	1	299,675	275,206	1	1	214,170	214,170	1	1	103,351
Puerto Rico	103,629	102,980	1	1	780,618	772,106	11	2	21,555	21,555	1	1	282,756
TOTALS	22,427,244	21,782,762	161	54	35,689,623	33,351,950	253	46	7,763,801	7,044,578	35	16	48,508,209

