

IMPROVED METHODS OF TRANSPORT AND THEIR SIGNIFICANCE*

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TRANSPORTATION rates its own high and secure place in the sun. Although it is not in itself the objective, it is the most potent tool for human accomplishment. There is far too great blindness to this definitive truth.

Economists have in a high degree predicated their major conclusions as to current human affairs and trends of future progress upon two considerations—production and consumption. They have been inclined to place little emphasis upon the effects of transportation on the existing status or the actual attainment of the latent potentials inherent within these two elements.

Humanists measure their conclusions by other considerations, such as capacity for self-government, proficiency in the arts and sciences, and opportunity to develop mental discipline and to advance the ethical conduct of the individual. These men of good will recognize the importance of environment in shaping the life of the individual, but they focus their ideas too closely. Back of the immediate surroundings, one of the major elements in the creation and perpetuation of these conditions, good and bad, is transportation.

If these criticisms are reasonably fair, how much greater, then, must be the lack of understanding of the ruling influence of transportation on the part of the general public. Such criticisms reflect adversely upon the colleges and universities because of

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their failure to include in their curricula the courses that will give the needed academic training for public leadership in the transportation field. They reflect adversely upon all of us who are connected with the many phases of transportation, because of as yet too-limited research of the character and scope needed to uncover the knowledge upon which to found sound laws and administrative policies.

It is high time that we recognize and accept the fact of the profound influence exercised by the kinds, the availability, and the characteristics of transportation upon human affairs. These factors have been potent in the past and will be increasingly more determinative of the future trends which affect the daily life of the individual and the many currents of national and international relations.

In our thinking, certainly transportation with its essential concomitant, terminal facilities, including storage, must be accorded equal weight with production, consumption, and social relations in their combined determination of human economy and social trends.

The inherent characteristics of each method of transportation as it has developed have exerted a ruling influence in creating the present pattern of agricultural and industrial development and consequent population distribution. Certainly the availability of natural resources, including fertile soils, determined what has been done *in toto*, but the methods and costs of transportation have fixed the pattern of the physical national structure as it exists today.

Beginning with the earliest form, water transport (which in the fifteenth century

opened the New World to exploitation and settlement by European countries) fixed the location of our great population centers. There are only nine American cities of more than 200,000 population that are not served by navigable water.

These foci of water transport became the natural origins and termini of rail lines to serve inland areas and to integrate them internally and transcontinentally. The development of rail transport radially from established ports brought this service to large inland areas. Communities dependent upon the horse and ox for local transport power developed along the rail lines at distances fixed primarily by the limitations of animal travel. At important convergings of railroad routes, communities gradually grew into cities. Their location was largely dependent upon topography, itself a determiner of rail-line location. They became the gateways from which supplies were distributed radially and to which the products of the land flowed for processing or for shipment beyond.

More recently, air transport has demonstrated its capacity for relatively light net loads to reduce the time-distance ratio to a fraction of that previously existing. The whole world is brought into physical contact measured by hours in place of days and weeks. Major lines of air transport are dependent for sustaining income upon the already established metropolitan areas and intercommunication between these.

The result of the development of water and rail transport, particularly in combination, has been to build population concentrations that, until about 1900, were compact in form and thus occupied limited land areas.

With minor exception, all three types of transport—rail, water, and air—are predicated upon regimentation of the individual. No matter how commonplace or how luxurious his personal accommodations, he becomes one of a group subject to the discipline of the fixed schedule for departure and arrival over a fixed route. Once he adjusts his personal convenience to the schedule, he normally enjoys a fast, comfortable, and safe trip. Except for suburban train service, these three types are chiefly used for passengers over relatively long distances and take on the

aspect of state-wide, nation-wide, or international movement.

The transport of commodities, livestock, and all articles of commerce at present does not fall into as easily defined groups. The bulk of the tonnage moved in carload and larger units goes to the railroads and to the waterways. The average distance of the movement is relatively long. There is, however, in the aggregate a very large movement of goods of commerce and types of articles such as mail, parcel post, perishable foods, and other items of relatively small bulk and weight and relatively high value that is divided among all the types of transport.

HIGHWAY transport in its major uses is the antithesis of water, rail, and air transport. Its growth in the past two decades has been nothing less than fantastic, yet none of its early pioneers who are honest lay any claim to foreseeing its present dimensions. There was celebrated last year at Detroit the fiftieth anniversary of the automotive industry, but the early years gave little indication of the stature this type of transport was destined to acquire.

Between 1921 and 1941, the number of motor vehicles in use increased threefold, and the annual use of the average vehicle, measured by miles operated, doubled. Thus in the two decades prior to World War II, the motor-vehicle mileage increased 600 percent. After deducting trucks and busses, the state with the minimum ownership of passenger automobiles in 1941 had one car for every 9.9 persons, and the state with the maximum ownership had one car for every 2.6 persons. The average for the nation was one car for every 4.5 persons. Each car traveled in 1941 an average distance of 9,285 miles. The passenger-car capacity was thus equal to the moving of the whole population of the nation simultaneously. Although the number of cars in service was reduced during the war years, the prior highest level will be regained rapidly.

These facts are perhaps indicative of the over-all growth of highway transport, but carry little illumination as to the intensity of its impact upon existing conditions and its potency to effect changes.

The growth of industry brought with it a constantly increasing urban population and concentrated more people in compact areas. The typical city developed without much planning and without an over-all conception as to the form that might have a chance for survival. The stage was being set for a movement so spectacular it has been well named "the explosion of the cities." The motor vehicle did not create this situation. The blighted and slum areas had been slowly developing until now the estimate is made by Commissioner W. E. Reynolds that "the health, safety, and morals of some 25 millions of Americans are being seriously affected by blighted areas." Rather than creating these conditions, highway transport has become one of the basic tools to remedy them, to shape the pattern of daily life, and to make possible a new urban culture. There are 140 urban areas of 50,000 or more, which aggregate about one-half of our whole population.

There is a wide variation in the pattern of the central city and its satellite communities, but the problems of both are common to those of other metropolitan areas. Actually, some of these metropolitan areas are approaching the autonomous quality of the old Grecian city-states. Los Angeles, for example, has an actual corporate area of 452 square miles, but the urban area spreads over 600 square miles, equal to more than one-half the area of the state of Rhode Island. Within this urban area there are 1.5 million people and 30 cities of 5,000 or more population. For the larger urban areas highway transport is being used as a tool to effect—although as yet in the early stages—city redevelopment, abolishment of slum areas, opening of parks and parkways and suburban communities of far superior living facilities, with the minimum of time required to reach place of employment. There are some 2,042 cities with more than 5,000 people within their corporate limits, and the concentric bands of urban population widely overflow the corporate limits. Statistics based on the 1940 census, show that 56.5 percent of the total population live in urban surroundings and are very largely dependent upon highway transport for their daily movements and services.

Probably the most significant service in its

long-range effect is the change made possible by the school bus. The little red schoolhouse is being rapidly replaced by the consolidated elementary and high schools. The relative opportunities of these two need no comment.

Rural free mail delivery started with horse-drawn vehicles, but the service has been greatly augmented by the speed and capacity of the motor vehicle, plus better roads.

Traveling libraries and other potentials have already contributed, and in the future will in an increasing degree contribute, to rural life. Opportunities for recreation, social contact, or education are now quite generally shared by the farmer, and these will be extended by reason of the rural road-improvement program now under way.

War production required many new plants employing astounding numbers of people who were dependent upon highway transport. The Willow Run and Chrysler plants at Detroit and many of the Chicago plants were built away from the hearts of the cities in locations where land was available quickly and at lower relative costs. Here, revolutionary ideas were put into practice because highway transport was available. Industrial plants were located in the areas where labor of the required skills and in sufficient numbers was established. Highway transport became a part of the assembly line. All kinds of raw materials were moved to plants over the highways, and units built in plants situated miles apart were brought together for assembly over the highways. There were numerous instances of almost fantastic procedures. For example, wings for bomber assembly at Tulsa, Oklahoma, were built at Willow Run.

One industrial organization during the war had four plants, located in three cities. It hauled, by means of motor trucks, forgings from plant A to plant B, 100 miles away, for heat treating; then hauled the heat-treated forgings another 100 miles to plant C for machining; and finally to plant D, 15 miles away, for assembly into finished unit. The prime contractor in this instance had an assembly line of approximately 215 miles between the forging plant and final assembly.

The hauling on highways in normal peacetime is shown in Table 1.

TABLE 1

COMMODITIES TRANSPORTED ON RURAL HIGHWAYS

ITEM	MASSACHUSETTS 1938	CALIFORNIA 1936-37	WYOMING 1936-37	48 STATES— SURVEY YRS. 1936-39
	Per- cent	Per- cent	Per- cent	Per- cent
Products of agriculture ...	8.05	16.96	17.17	12.8
Animals and products	12.37	9.93	10.00	13.2
Products of mines	4.71	2.85	12.08	6.4
Products of forests	3.31	3.80	4.01	5.2
Manufactures and miscellaneous .	62.03	66.46	56.74	53.5
Mixed freight ..	9.53			8.9
Total	100.00	100.00	100.00	100.0

The specialized equipment available for transport over the highways of products difficult to handle has been particularly marked in the growth of the milk industry, contributing alike to farm income and the provisioning of the cities with better-quality foods. The consumption of milk in Washington, D. C., in 1925 was 40,850 tons; in 1945 it had increased to 216,290 tons—an increase of more than five times the earlier figure in a two-decade period during which the population doubled. This milk is produced largely in the near-by areas of Maryland and Virginia. The fine dairy farms with their sanitary buildings and highbred dairy cattle have become perhaps the most pleasing elements of the rural landscape in the vicinity of Washington.

THERE is far too great emphasis upon the element of competition between the available types of transportation, and far too little accent upon the degree to which each type is necessary and supplementary to the others. Each type of transportation is supreme in the service it can best render. This does not mean necessarily the cheapest service. As a general rule, the public has evidenced its willingness to pay a premium for time-saving, but this has decided limits. Since, ordinarily, water, rail, and air transport cannot perform

a complete service—that is, from origin to destination—highway transport must supplement each one. Highway service is chiefly important in the short-haul field. In the transportation of persons, the figures in Table 2 are indicative.

TABLE 2

PASSENGER TRIPS—AVERAGE LENGTH

	MILES	YEARS
Rail	82	1936-40
Air	525	1946
Private motor vehicles	14.6	1937-38
Bus—intercity	30-40	1941-44

Studies of the use of the passenger car reflect in a major degree the repetitive daily travel of the average individual and his family within the environs of his own community. Eighty-five percent of all individual trips of the passenger car are within a 20-mile radius. Focusing this more closely upon the use of passenger cars in four cities of different population, origin-and-destination studies of 1944-45 (Table 3) show within what narrow limits passenger cars operate.

TABLE 3

CITY	POPULATION (METROPOLITAN AREA)	TRIPS ENTIRELY WITHIN CITY	
		Miles	Miles
Denver, Colo.	361,100	3.12	3.67
Fort Wayne, Ind.	120,000	2.07	2.61
Greenville, S. C.	75,000	1.47	1.81
Spartanburg, S. C.	45,000	1.37	1.98

In the field of truck use there seems to be little evidence to show that distance in itself is a determining factor in competition between rail and highway transportation, although trucks are at present little used for transcontinental hauling. Trucks are used, however, in regular hauling for distances of 1,000-1,500 miles. The nature of the commodity to be moved, the particular conditions surrounding the shipment, and the importance of the time element are more significant than distance in the shipper's choice of mode of transportation.

Fruit and vegetables are hauled by truck to New York City from states as far south as Florida and as close as New Jersey. Furniture is conveniently moved by van, principally because of the elimination of the need for crating. Once loaded, the van may traverse a few blocks or, as readily, as many states. Livestock movement by truck is increasing, with trips often covering substantial distances, for truck movement is quicker and loss of weight of the animals is reduced. In Ohio large quantities of coal are hauled from the southern Ohio fields to Columbus and other cities by truck. Here the product of the small mines tunneled into the hillside by one or two miners is loaded onto light trucks or semitrailers and hauled directly to the consumer. In areas of large-scale operations, however, in which loading facilities are designed for use of railroad cars, shipment of the same product by rail over the same or even much shorter distances would be the rule. Milk moves into New York City from near-by farms and likewise from the Adirondack milkshed by highway, now that suitable truck bodies are available, with the obvious advantages of its receipt in bulk rather than in cans. Many other examples could be cited in which the product to be moved and the peculiar advantages of truck movement direct from producer or shipper to consumer or processor are of far greater significance than distance alone.

Another factor in actual or potential competition between rail and highway, the importance of which should be investigated as opportunity offers, is the degree in which truck haul between points served by rail is in reality not competition. Undoubtedly, much Southern fruit is sold in Northern markets because it can be brought in quickly and with little handling by truck, when such shipment by rail would not have been practicable and would not have been made. In other words, is it not possible that the truck has developed markets that otherwise never would have existed? Probably few trucks are actually

competing with the freight trains they pass.

The idea that trucks compete in tonnage hauling with freight trains becomes somewhat ludicrous when it is shown that in 1941, of the 3,711,000 registered trucks, classified according to manufacturer's capacity in tons, 3,212,000, or 86.6 percent, were in the 1.5-ton-and-less class, and over half of these, in the less-than-one-ton class.

Although highway transport in the aggregate reaches tremendous proportions of passenger-miles and ton-miles, its sphere is in the local field, supplementary to, rather than competitive with, other kinds of transport. The road program is geared into this aspect and will be governed by the principles of developing urban, main rural, and secondary roads on a balanced program to serve primarily the objectives of the communities in which they are located. In the cities the most distinctive newer type of improvement will be the controlled-access road, which is designed to carry traffic rapidly and safely into and through the metropolitan areas. The main rural roads, when they reach a daily volume of 4,000 vehicles, will be considered for improvement as four-lane, divided highways. Rural secondary roads will be built to serve the travel with the quality of minimum annual maintenance cost.

The highway builders are not fumbling the problems. The state-wide planning surveys that started generally in 1934 have been continued, and the highway program reflects the actual and potential uses that the individual highways composing the different classes or groups are called upon to serve. Many new techniques have been developed. The origin-and-destination studies alone have added tremendously to our knowledge of how and why humans behave as they do on the roads. Because the motor vehicle is so closely tied to the needs and demands of the individual, it is through research into these factors that we must determine the future highway pattern and thus the ability of the motor vehicle to serve.