

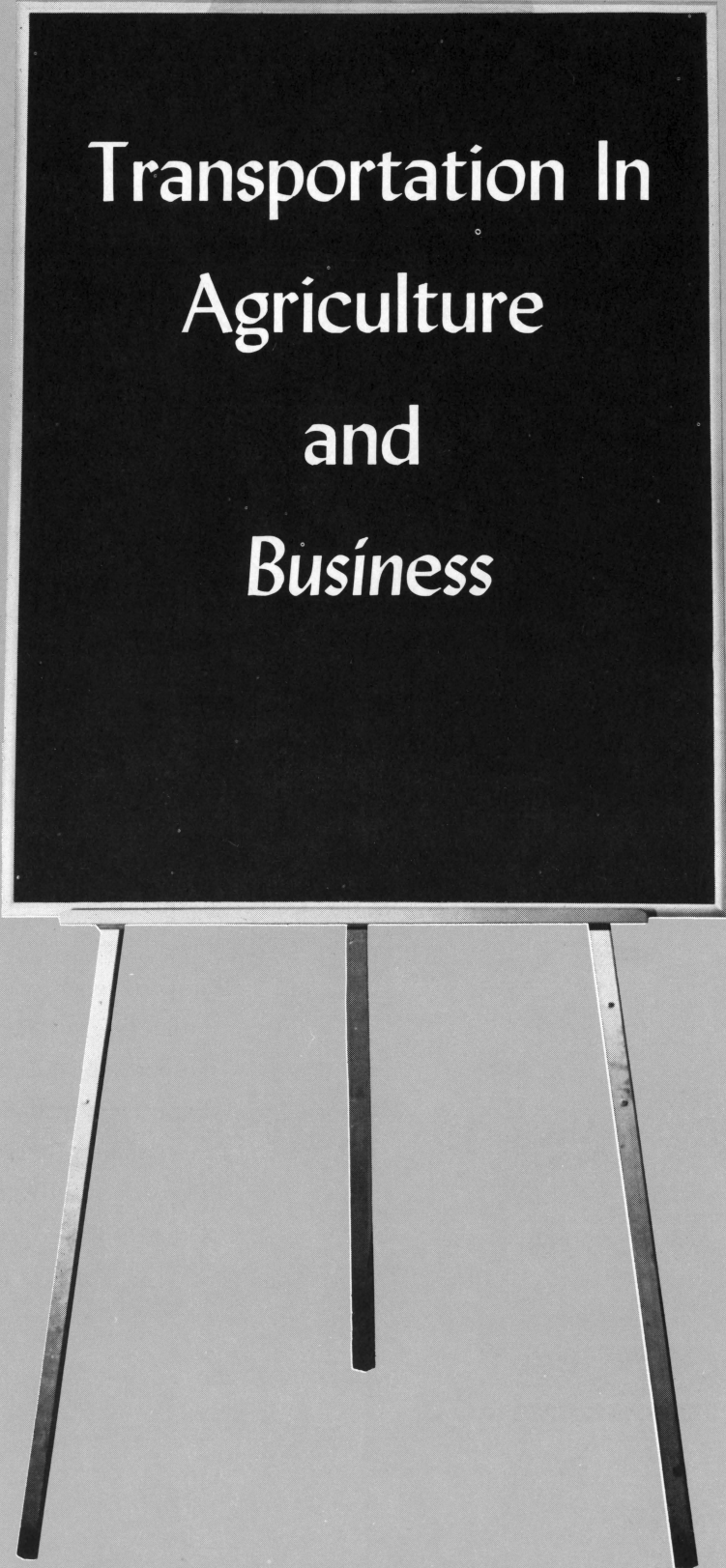
# Transportation In Agriculture and Business

Description-Problems-Research-Education



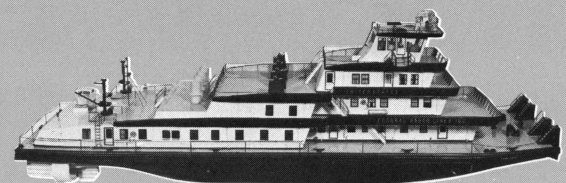
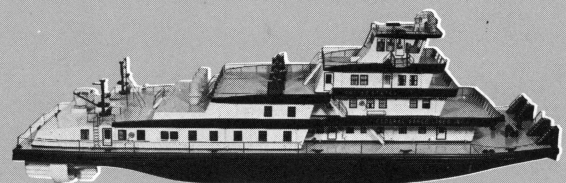
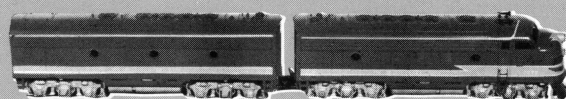
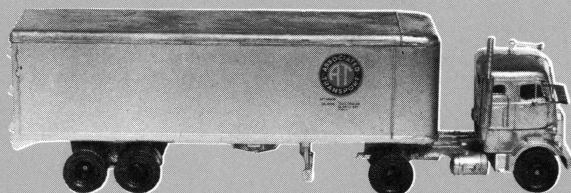
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Transportation In  
Agriculture  
and  
*Business*

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CPT I  
THE  
CHALLENGE  
IN  
TRANSPORTATION  
EDUCATION



—Eastern Air Lines photo

● It is estimated that the people of the United States consume more than a million railroad carloads of fresh fruit and vegetables and almost a million carloads of meat each year. About half of this total volume of food-stuffs is transported by motor truck and the other half primarily by rail. When we add to this the millions of carloads of dry grains, cotton and other fibres, and the processed agricultural products moving to final markets, the vital role transportation plays in agriculture and in supplying our daily needs begins to come into focus.

The transportation bill for food alone is estimated by the U. S. Department of Agriculture at over \$4 billion per year. Since World War II the average unit cost of transporting food has risen approximately 50 percent. A recent study by *Distribution Age* suggests that total physical distribution costs in the food industry absorb about 34 percent of today's food sales dollar. Farm producers, processors, and marketing firms and many thousands of transportation and physical distribution workers are dependent for their livelihood upon the smooth, efficient functioning of our transportation system. Here, then, is reason enough to make efficiency in transportation and physical distribution services a matter of central and vital concern to all who share a responsibility for assuring the health of agricultural enterprise.

There are special reasons for the Cooperative Extension Service to concern itself with current problems in agricultural transportation and physical distribution management. As noted above, agricultural transportation costs have mounted very rapidly in recent years, and there is evidence that they are taking a progressively larger proportion of the food sales dollar.

#### Education Channels Lacking

The transportation industry is beset with a host of problems which have contributed to inefficiency of operations, a complicated rate structure, and service deficiencies. The rate of adoption of research findings has been retarded because of the lack of adequate communication and education channels for funneling this information to persons in the transportation services who could make effective use of it.

The Cooperative Extension Service is committed to concern itself with the efficiency of all segments of agricultural enterprise, from production on the farm to the retail purveyor of agricultural products. If it is to successfully discharge this commitment **the Extension Service must place increasing emphasis upon transportation and physical distribution.** These functions offer

**unparalleled opportunities for improvement in efficiency.** They are greatly in need of the type of educational services which the Extension Service has been so successful in providing over the years in agricultural production and in other phases of agricultural marketing.

The development of a mass merchandising system in recent years, with the rise of the supermarket and grocery retail chains, has paralleled the increasing role of transportation in today's agricultural market structure. By 1958, a total of 29,920 supermarkets (stores with annual sales of \$375,000 or more per unit), representing 10.5 percent of all grocery stores, accounted for 68 percent of all food store sales, up from 48 percent in 1953. It is estimated that in 1958 the nation's 50 largest grocery chains were doing 90 percent of the grocery-chain business and about 39 percent of the total grocery-store volume of the United States.

### **Decline in Bulk Shipments**

Along with this concentration of volume in food retailing, other significant trends have developed—many of them directly related. One of the more important, from the standpoint of marketing and physical distribution, is the trend away from central markets and toward direct transactions between firms of increasing size. Tied in with this structural change in markets is the decentralization of processing. As the processor has moved closer to the area of production, we see a decline in the shipping of bulky raw agricultural products to distant central markets located at transport terminals. Conversely, the processed products of agriculture are being shipped over longer distances. Interregional competition has increased correspondingly. As the mass merchandising system interposes its demand for quality, uniformity, volume, con-

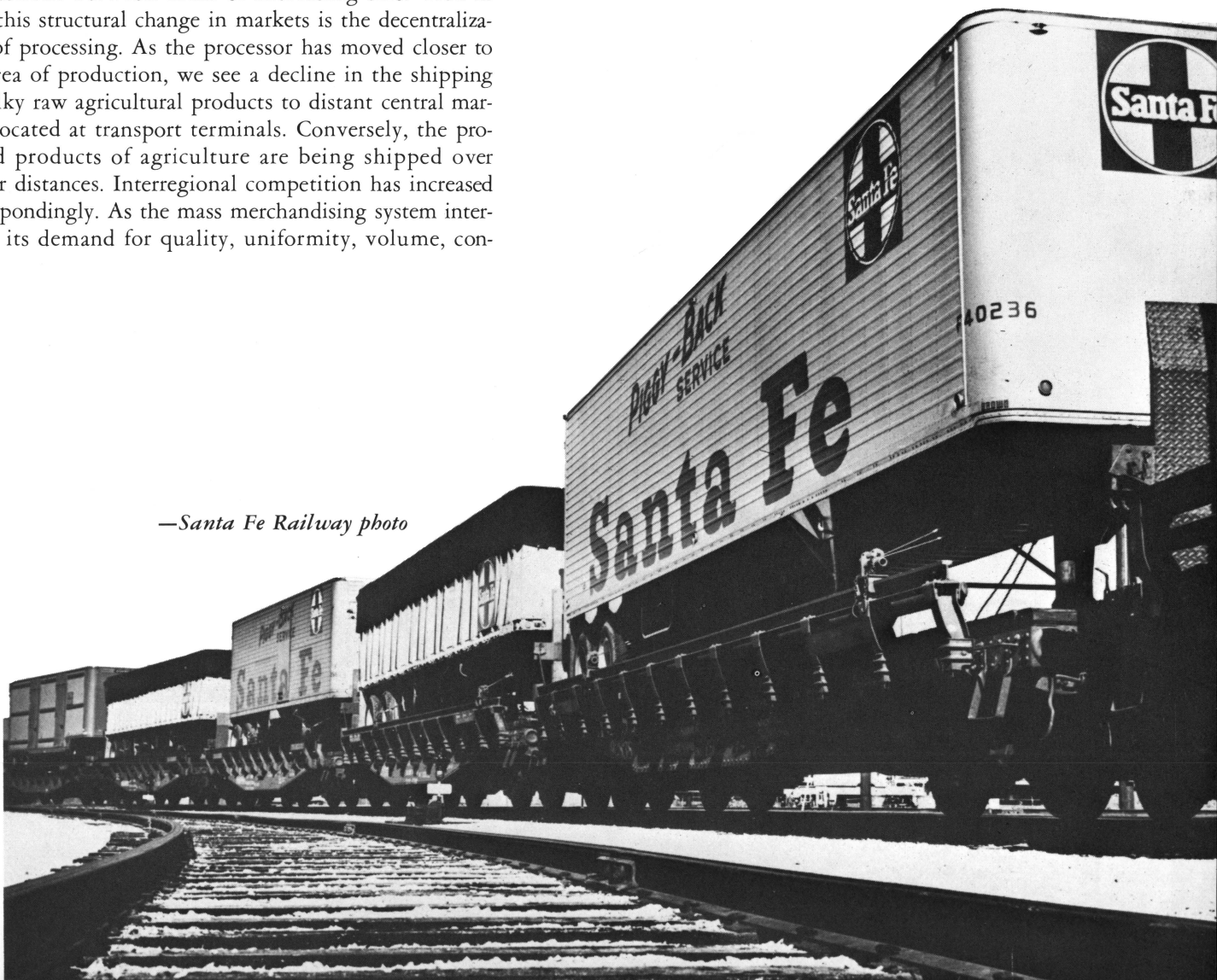
tinuous supply and low unit cost, the individual agricultural enterprise will find itself increasingly involved in problems of physical distribution and transportation as a matter of survival among the crosscurrents of a changing market structure.

Another factor in the increasing regional specialization and competition has been the change which has occurred in supplying farms with mixed feed, fuel, fertilizer, machinery and other supplies. An understanding of the role of transportation in the changes now taking place in farm supply logistics is vital if agricultural enterprisers are to understand the economic forces which must influence their decisions.

### **Nationwide Markets**

Changes in transportation technology, organization structure, management, and pricing have been potent factors in influencing agricultural marketing patterns. For example, agricultural producers and marketing firms have been enabled by faster and lower cost transportation and

—Santa Fe Railway photo



improved refrigerated cars and other specialized equipment to reach out for new, more distant markets, and to follow shifting markets to an increased degree. Today, for many commodities, the entire country is the farmer's potential market, no matter where his farm is located.

The Extension Service's transportation work with marketing firm management is designed: (1) to increase their perception in matters of transportation and physical distribution; (2) to improve coordination between carriers and shippers in coping with common problems and opportunities; (3) to assist transportation managers toward a better awareness and understanding of agricultural marketing problems; and (4) to increase efficiency, improve service, and reduce cost, and thus to enhance the return to producers and the marketing segments of the economy.

Chapter 2 of this manual is designed to familiarize Extension workers with the various types of *public carriers* and some of their current problems and advantages. Chapter 3 takes up *privately owned* and leased transport facilities—those operated by firms outside the transportation business to handle their own products and supplies. This broad category, ranging from farmers' trucks to fleets of oil company tankers, comprises a major segment of our transportation facilities.

Chapter 4 is devoted to discussion of management problems of carrier and shipper firms. Chapter 5 takes up educational needs and activities in the transportation field. Chapters 6 and 7 outline progress and sources of research and information on transportation as a guide to further study by Extension transportation specialists and others interested in increasing their knowledge of this field of economic activity.

*River barge and ocean-going freighter meet at Mobile, Ala., grain elevator. —Waterway Operators, Inc., photo*

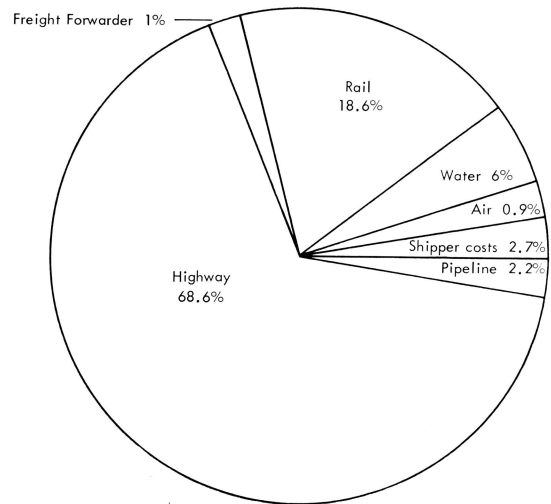


CPT 2  
PUBLIC CARRIERS



# Transportation Is the Leading Economic Activity

Fig. 1 - Distribution of the 1962 Freight Dollar



*Public carriers* are carriers that provide for-hire transportation. The emphasis on type of transportation varies from carrier to carrier:

- Some concentrate on *passenger service*.
- Others are strictly *freight operations*.
- Some are primarily *perishables haulers*.
- There are *terminal* and *switching companies*.
- Some firms operate *coast-to-coast* while others are local cartage companies serving metropolitan areas.

But they all offer their services to the public. Included are railroads, motor common carriers, motor contract carriers, exempt for-hire motor carriers, inland and coastal water transport, air transport, and freight forwarders. Each of these is described in a section of this chapter. First, a brief over-all picture of the transportation industry is offered.

According to *Dun's Review*, the transportation industry, with its \$100 billion a year business, is the nation's leading economic activity. In 1960, more than 8 million Americans were employed in transportation occupations, including managerial, professional, technical, sales, supervisory, clerical, operative, and service work. If highway construction, petroleum, government transportation and other related industries are included, 1960 transportation employment totaled 9,324,000, or 14 percent of the total employed civilian labor force. Average 1960 compensation per full-time transportation employee amounted to \$5,928, an increase of almost \$1,000 over 1956.

## Regulation of Public Carriers

Because of the public utility characteristics of transportation services, and the importance of our transportation system to all segments of the economy, the federal government and all of the states have established regulatory agencies to supervise the rates, operating authority, and safety practices of public carriers. Chief among these regulatory agencies is the Interstate Commerce Commission (ICC) which was created in 1887 by act of Congress

to regulate the transportation of passengers and goods from one state to another by railroad. The main objective of the Interstate Commerce Act was to remove discrimination, preference, and prejudice in localities, services, rates, fares, and charges. By the end of 1961, this independent regulatory agency had some 133,000 carriers and carrier organizations subject to its regulation, thus embracing in varying degrees substantially all modes of domestic surface transportation engaged in interstate commerce.

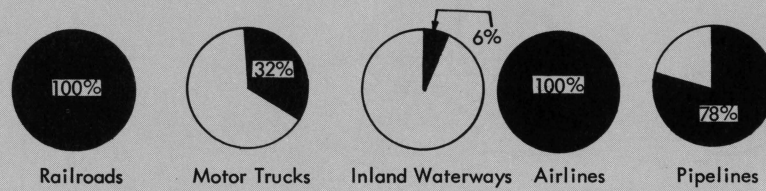
The Commission's jurisdiction now includes the railroads, common and contract carriers by motor vehicle and by inland and coastal waterways, common carriers by pipeline of oil and other commodities except water and gas, private car lines, express companies, sleeping car companies, freight forwarders, stockyard companies, holding companies, rate bureaus and organizations, and brokers of transportation. Additional jurisdiction extends to private and exempt-commodity carriers of property by motor vehicle with respect to safety of operations, qualifications and maximum hours of service of employees, and standards of equipment.

## Three Commission Divisions

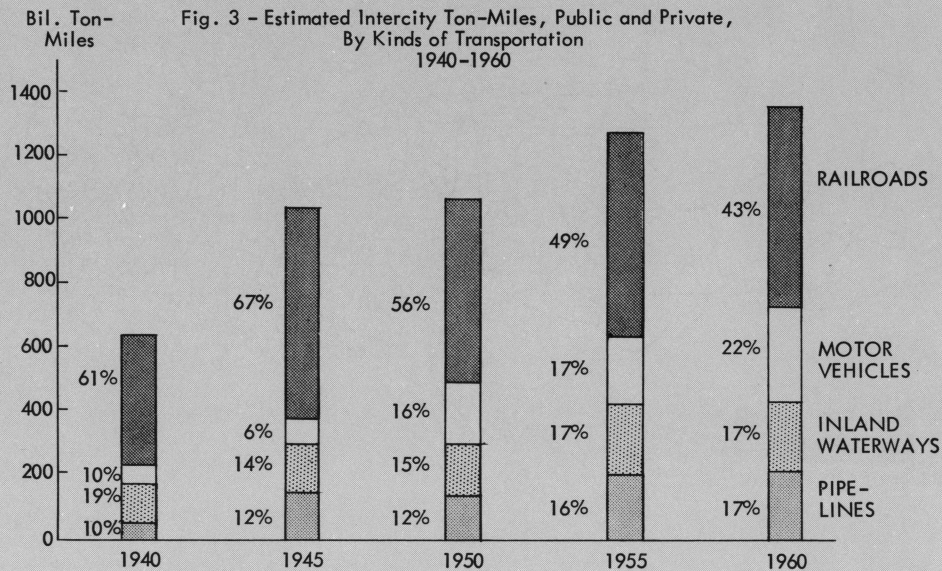
The Commission consists of 11 members, no more than 6 of whom may belong to the same political party. In March 1961, the Commission organized its membership into three divisions. Division 1 deals with operating rights; division 2 with rates, tariffs, and valuation, and division 3 with finance, safety, and service. Division membership consists of not less than three commissioners each.

Today there are 3 staff offices and 10 bureaus in Washington, D.C, and a total of 88 offices operating within 13 ICC regions to assure effective and coordinated Commission programs with the regulated carriers, shippers, and the public.

Fig. 2 - Percent of intercity freight traffic handled by federally regulated carriers, 1958.



Source: Data from ICC, CAB, and Bureau of Public Roads.



Source: 75th Annual Report, Interstate Commerce Commission, Washington, D.C., page 4.

The Transportation Association of America estimates that the proportion of regulated to non-regulated freight has been declining since 1947. However, as of 1962, 69 percent of the 1377 billion ton miles of intercity freight was still subject to regulation by the ICC.

Note in Figure 2 that unregulated carriers handle a big percentage of the motor truck and inland waterway hauling. In the case of trucks, this reflects trucking by farmers and others engaged in transportation of their own property. They are exempted by the Motor Carrier Act of 1935 from all regulation except the safety requirement. Farmer cooperatives are exempt from economic regulation in the products and supplies for their members. For-hire hauling of unprocessed agricultural products is also exempt from economic regulation.

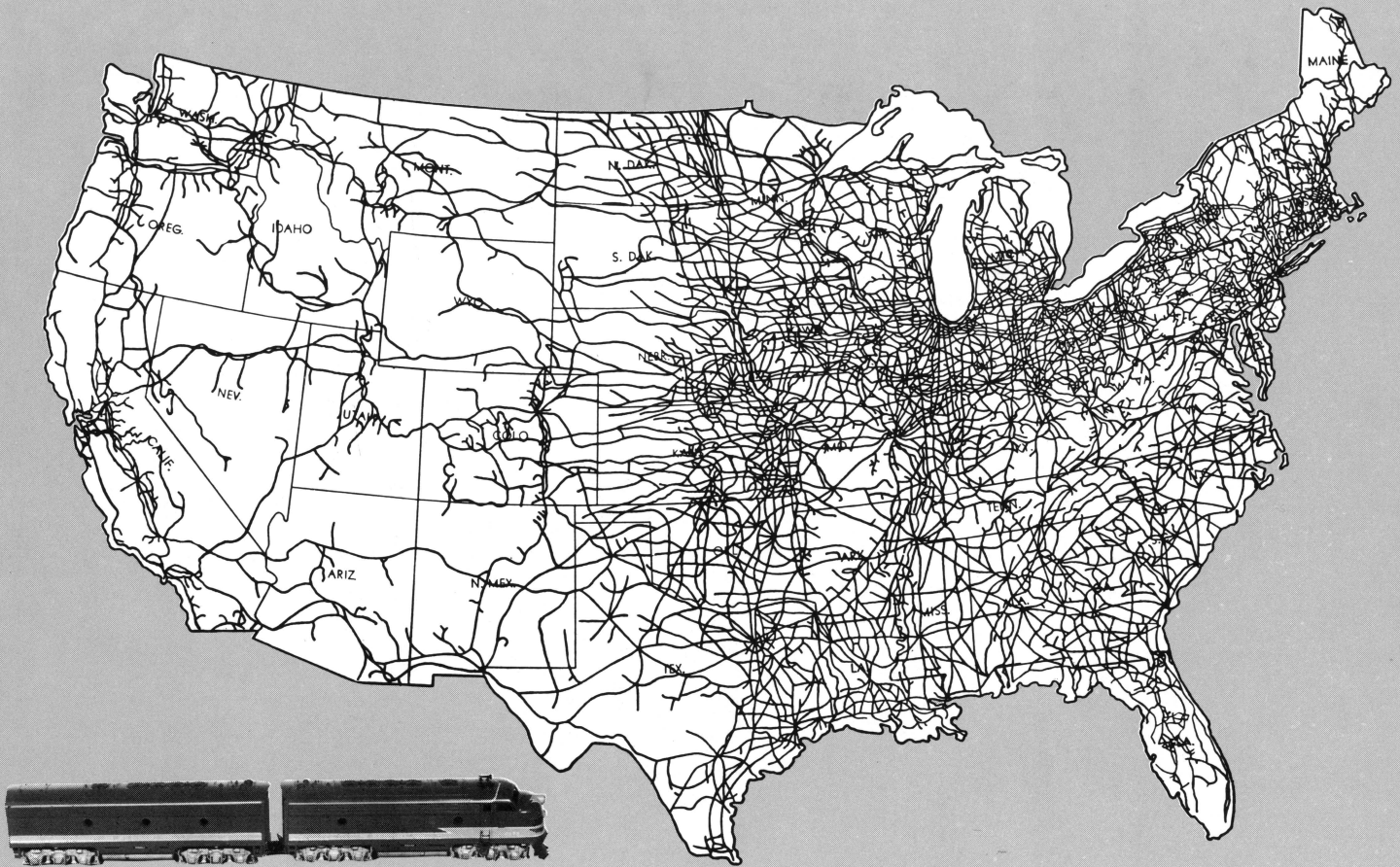
The percentage of regulated waterway hauling is low because under prescribed conditions, bulk commodities such as grain, iron ore, coal and liquid cargo, which rep-

resent a large proportion of inland waterway traffic, are exempted from regulation by the Transportation Act of 1940, the act regulating domestic water carriers.

Interstate Commerce Commission estimates included in Figure 3 reveal the steady growth of intercity freight transportation. The relative position of each mode, including both public and private carriage, is shown by percentages.

The railroads are the primary long-haul carriers and still perform the bulk of the nation's common carrier service, though they dropped from hauling 61 percent of the total intercity freight in 1940 to 43 percent in 1960. Motor carriage expanded significantly during this period from 10 percent in 1940 to 22 percent in 1960.

The volume of freight handled by exempt for-hire and private (unregulated) carriers has increased greatly. Air transportation accounted for less than 1 percent of the total ton-miles in 1960, and was not included in this graph.



# Railroads

## GENERAL DESCRIPTION

The railroads of America constitute one of the oldest and largest industrial complexes in the country. They represent a financial investment of \$35 billion in equipment, facilities and other property holdings, including some 217,500 miles of trackage; they employ about 700,000 workers, representing an annual payroll of \$4.5 billion; despite a steadily declining share of the total market for transportation services, they continue to transport an estimated 40 percent of our domestic freight traffic, receiving revenues in excess of \$7.7 billion annually for their services.

Railroads are **common carriers** and as such they hold themselves ready to serve the public generally. They are required by law to offer transportation services to all shippers, large and small, who can and wish to avail themselves of such services, under published rates which are judged by the regulatory agencies to be just and

reasonable, and free from unjust discrimination or undue prejudice. They are regulated by the Interstate Commerce Commission with respect to traffic across state lines and by public utility commissions of the various states when such services are performed entirely within state borders.

In recent years the financial plight of many of our railroads has become a matter for increasing concern, both within the industry and among those responsible for public policy decisions affecting transportation. Since 1955, total railroad net income has declined progressively despite a period of general expansion of the nation's economy. This phenomenon stems from the fact that the railroads have steadily lost ground to other modes in terms of their share of the total market for transportation services. (See Figure 3.) Because of their high property investment and fixed costs, which do not vary proportionately with changes in volume of traffic, railroad net earnings are extremely vulnerable when traffic declines.



*Feeder cattle hit the chute on their way to the feed lot. —Santa Fe Railway photo*



*Frozen orange juice being loaded in mechanical refrigerator car. —Santa Fe Railway photo*

In 1961 the railroads spent \$650 million to improve roadways and structures and to buy new equipment—the lowest level of expenditure in 15 years. By comparison, four independent surveys estimate railroad capital investment requirements at from \$1,424 million to \$2,000 million per year, or two to three times the 1961 rate of expenditure.

Faced with a steadily worsening financial position, the railroads have pursued several lines of endeavor in an effort to reverse the trend. Most obvious have been their attempts to increase the revenue per unit of freight hauled by raising rate levels. Under the influence of this push for higher rates, the index of average rail rates for all commodities increased 16 percent from 1950 to 1960. While these higher rate levels have increased the return per unit of freight hauled, they have sometimes had the effect of driving additional business into competing transport channels.

To the extent that funds have been available for investment in improved equipment and facilities this has offered an avenue for reduction of operating expense, and in some instances, for improvement of service and resultant recapture of lost business. With the aid of technological advances such as centralized traffic control, electronic classification yards and large numbers of new and specially designed freight cars, railroad operating expenditures were reduced almost 1 billion dollars between 1957 and 1961. The average freight train hauls more cars

loaded with more freight per car and moves faster than ever before. Reductions in operating expenses were spread throughout the major groups of expenditures.

High wage rates and fringe benefits have a tendency to encourage the railroads toward more concerted efforts to increase the size of freight trains, and the efficiency of auxiliary facilities. High labor costs have also stimulated renewed efforts toward modernizing work rules which have levied a burden of additional expense in railroad operation.

#### Quotable Quote

*"The selling of transportation is governed to a very large extent, whether there be nominal competition or not, by the same laws which govern the selling of any other commodity; and these laws require that the railway company, like anyone else with something to sell, shall consult the convenience, and even sometimes the unreasonable whims, of the buyer, if it would sell its goods to him."*

*Arthur M. Wellington, in "The Railroad Future"*

To improve their competitive position and strengthen their financial structure, many Class I<sup>1</sup> and Class II railroads are either actively considering consolidation or have submitted formal merger proposals for approval by the Interstate Commerce Commission. Advantages claimed for mergers include better service, more efficient and economical single line operations, increased revenues, and other savings in all areas of operation.

Among the merger disadvantages claimed by opposing interests are inequitable distribution of ownership among stockholders, reduction of services, and loss of special advantages historically enjoyed by shippers, and loss of jobs. The trend toward consolidation is being spurred in part by the high cost of the advanced equipment brought on by modern technology, plus its greater applicability and efficiency in large economic units. Another reason for the increased merger interest is the parallel nature of existing rail facilities in many areas of the country. Each merger issue is complex, involving the interest of various competing railroads and other com-

<sup>1</sup>The ICC classifies railroads with annual operating revenues of \$3,000,000 or more as Class I. This group of railroads currently operate approximately 207,000 miles of track. Class II railroads, those with annual operating revenues below \$3,000,000, operate about 10,200 miles of track.

peting modes, the adequacy of service and facilities, the interest of affected employees, and the burden of total fixed cost following the consolidation.

### VOLUME OF BUSINESS

The chief source of railroad income has always been freight traffic. Fig. 4 gives a percentage income breakdown for the 107 major railroads operating in 1961.

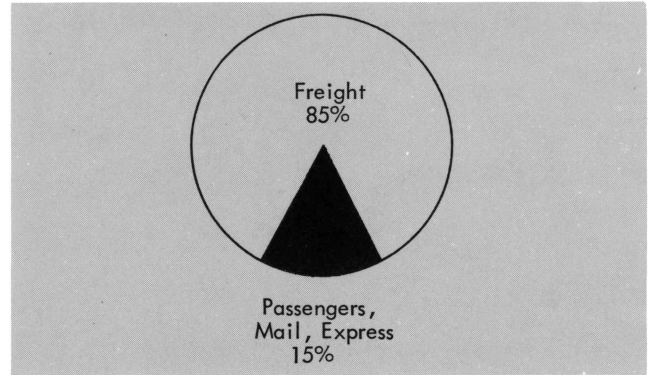
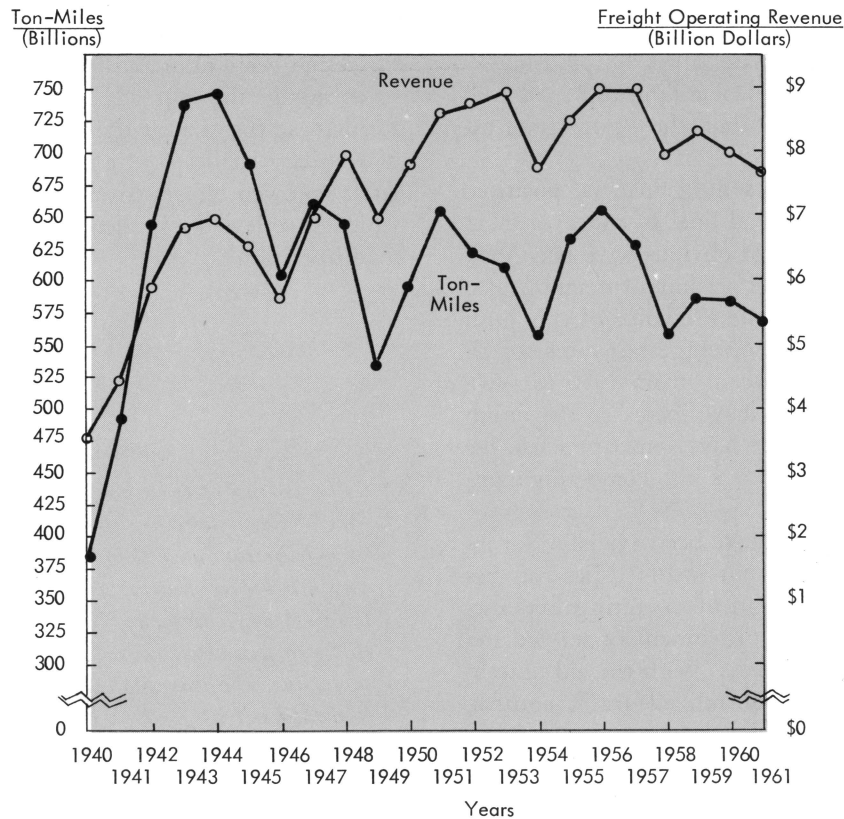


Fig. 4 - Percentages of the \$9.2 Billion revenue of 107 major railroads that came from freight and other sources.

Over the years railroad freight traffic has followed the ups and downs of our economy, experiencing sharp

Fig. 5 - Railroad Traffic and Revenue Trends, 1940-1961.



Source: Intercity Ton-Miles, ICC, 1961; Transportation Association of America; Association of American Railroads.



*Loading apples in refrigerator car at Wenatchee, Wash.  
—Great Northern Railway photo*

declines during periods of economic depression and sharp increases during war emergencies. (Figure 5.) Traffic exceeded 700 billion ton-miles in 1943-44, the all-time high. After 1946, with the resumption of a peace-time economy, rail freight leveled off at an average yearly volume of around 600 billion ton-miles. However, since 1956 a downward trend of rail freight traffic and revenue has occurred, during a period of generally expanding economic activity. With a minor recovery in 1959, freight operating revenue declined from \$8.9 billion in the middle 1950s to \$7.7 billion in 1961. However, despite an average freight revenue loss of about 3 percent per year over the past several years, the rails still carry almost twice the ton-miles of any competing mode.

Products of agriculture, including cereal grains, flour, cotton, fresh fruits and vegetables and several other items, accounted for slightly more than 10 percent of the 1.2 billion tons of freight originated by Class I railroads in 1960. Products of mines supplied more than 50 percent, and manufactured items and other miscellaneous commodity classes contributed 24 percent to the total.

Although products of agriculture appear to contribute a relatively small proportion of the total tons moved, they are highly significant for certain railroads, for certain shippers and especially during certain periods of the marketing season. For example, the Pacific Fruit Express and its owning lines, the Southern Pacific and Union Pacific railroads, operate more than 23,000 refrigerated rail cars (about 28 percent of the total U. S. fleet). In 1961, a total of 287,917 carloads of perishables were shipped in PFE cars to all parts of the nation.

Where we have highly specialized areas of production rather remote from major metropolitan areas, pro-



*This electronically-controlled icing machine can ice a car in 90 seconds. —Santa Fe Railway photo*

duction and rail transportation services may be mutually dependent. For example, most of the potatoes produced in Idaho and Maine move by rail to consuming areas. As the distance widens between areas of production and consumption, the inherent advantages of railroads as volume carriers of low- and medium-value goods become more pronounced, largely because of their capability of handling a very large volume of goods as a single shipment, with a closely inter-connected system and interchange of equipment. The railroads, historically, have maintained an advantage in long-haul transportation, due principally to the low cost involved per unit of commodity shipped. Today, however, competing modes are cutting in even here, as mounting volumes of long-haul traffic are moving by truck and barge.

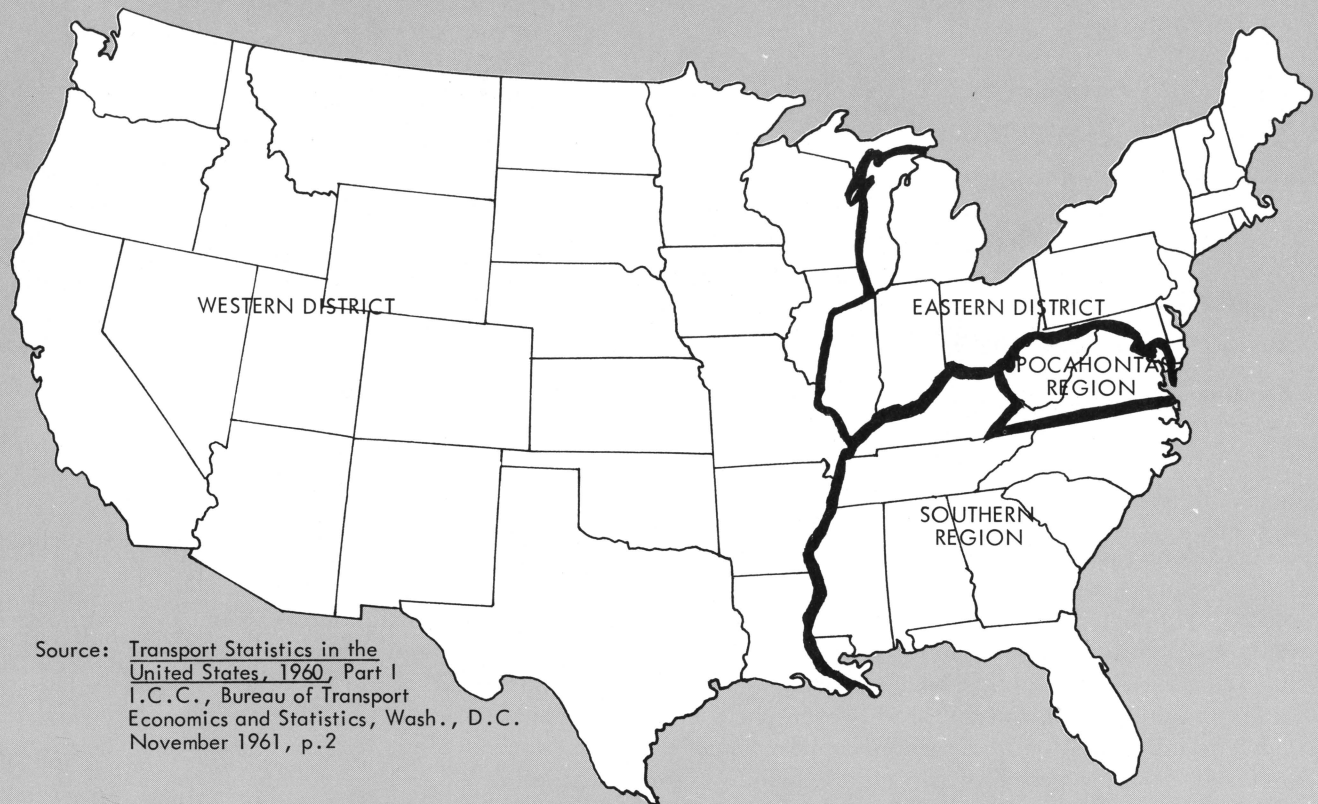
In 1947, fresh fruit and vegetable loadings by all railroads totaled 963,998 carloads. By 1961, this had de-

#### Quotable Quote

*"Much of the remaining potential improvement in the Nation's economic efficiency lies in the area of distribution. Transportation is the largest single element within that area."*

*Report by the Secretary of Commerce of the U. S. on Federal Transportation Policy and Program*

FIG. 6 - STATISTICAL REPORTING AREAS  
for Railroads  
as designated by the  
Interstate Commerce Commission



Source: *Transport Statistics in the United States, 1960, Part I*  
I.C.C., Bureau of Transport  
Economics and Statistics, Wash., D.C.  
November 1961, p.2

creased to 448,960 carloads, or a decrease of 53 percent. In 1951, trucks hauled 290,883 interstate truck loads. By 1961 this had increased to 503,522 loads, an increase of 73.1 percent. These truckload figures by no means represent the entire perishable loadings by highway transport as it is very difficult to get accurate truck-loading figures.

The growth in population, industry, and the general economy in the mountain, Pacific and Gulf states has been so rapid that these areas have produced new rail traffic as rapidly as the trucks and barges have diverted other business from the rails. This situation has enabled many western and southern railroads to hold or even exceed their wartime freight traffic levels. The relative prosperity of these lines comes from the new traffic they are able to handle on their existing routes without proportionate increases in expense. Contributing to this has been the general use of diesel locomotives and centralized traffic control, along with shrinkage of passenger operations, thereby eliminating some double or multiple track which might otherwise be required.

Less-than-carload lot (LCL) shipments are a relatively minor contributor to the total tons shipped by rail. LCL is important to some railroads at certain times of the year and in certain geographic regions; however, the major commodities that move by rail are shipped in carload lots, often moving over considerable distances.

Annual reports are submitted to the ICC by all railroads; statistics from these are compiled according to geographic districts or territories as indicated in Figure 6. The statistical data are recorded for each carrier according to its home office address.

## CUSTOMERS AND SERVICES PERFORMED

The railroads are important to the agricultural producing areas of the United States. Some railroads look upon agricultural freight as a major contributor to their operating revenues. This varies depending upon the producing area, the agricultural commodity involved, and the character and extent of the services required. Bulky commodities such as wheat, lumber, and cotton may be

moved from producing areas to areas of consumption, developing revenue on a back-haul movement, and at the same time moving equipment back into position for a primary haul. For example, wheat produced in the Great Plains area going to terminal or processing markets in the Midwest produces revenue from what might otherwise be empty cars.

In recent years concerted efforts have been directed toward coordination of schedules of through freight trains, providing for more rapid delivery of goods. This is especially important to agricultural enterprises which are moving perishable commodities over long distances. Less than a decade ago one of the major roads in the Southwest went to work on a project to speed up its perishables schedules into Chicago from the west coast. Ninth morning delivery became eighth morning and in due course eighth morning became seventh. This effort continued until today this railroad is claiming fifth morning delivery in Chicago, compared to ninth morning only a few years ago. Such express "highballing" requires that refrigerator cars be equipped for fast movement. High speed locomotives, steel wheels and spring-suspended trucks help to insure rapid and dependable delivery. Smooth coordination among connecting carriers is also essential if the full advantage of the faster service is to be realized.

### Transit and Reconsignment Privileges

Transit privileges and reconsignment and diversion privileges are almost exclusively railroad services which figure heavily in agricultural transportation. Another freight service available from both the railroads and motor carriers is protected freight service. Without these specialized services the marketing of farm commodities would be greatly restricted.

The transit privilege is the right of a shipper to stop a product at an intermediate or transit point for inspection, conditioning, storage or processing, with the privilege of reshipping it to the final destination under the original through freight rate which applied from point of origin to final destination. Shippers of livestock may stop shipment at transit points to test markets. The carload shipment may be partly loaded or unloaded in transit without loss of through freight rates. The major part of the grain assembled at country elevators is funneled into a smaller number of terminal markets by this method. Privileges such as these offer many advantages to the shipper of agricultural products, for they tend to equalize competitive conditions, facilitate the marketing of commodities, relieve congestion at terminal markets and reduce shipping costs.

Reconsignment is widely used in the rail shipment of grain, livestock, cotton, fruits, and vegetables. The cars are routed from producing areas to a reconsignment point from which shippers are able to take advantage of

### Quotable Quote

*"The farmer has a direct interest in transportation. He bears the freight charges on products he ships and pays freight charges on items consumed on his farm. The farmer has an interest in freight charges from farm to consumer irrespective of who holds title of the commodity."*

*Charles B. Bowling,  
The National Grange*

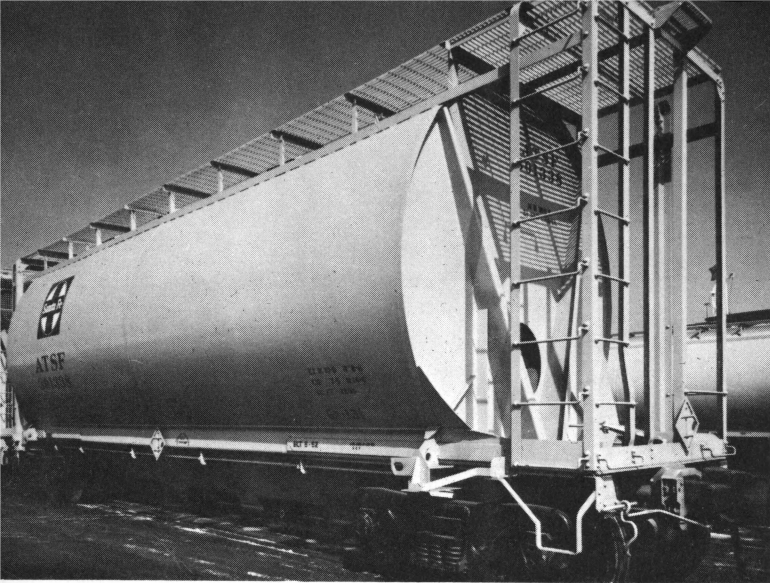
the most favorable markets. The commodity may be sold to brokers and wholesalers enroute, thereby speeding up the marketing process because shippers are not required to wait for a buyer before moving their product. This privilege provides the shipper an opportunity to change destinations, routing, name of the consignor or consignee or any other change that requires a change in billing or additional moving of the car. It includes the movement of goods at through-rates which are generally lower than the combination of rates to some intermediate point. The railroad tariff must show these rates, with a statement of all of the conditions under which they may be used and the charges that will be made for the particular service.

Many shipments of perishables require special protection against heat or cold on the way to market. A separate charge is collected by the railroad to compensate for this service and varies according to the type of refrigeration used or icing service performed.

In many transactions, particularly those involving produce, the dealers may unload the shipment directly from the cars. When this practice is followed, railroads may impose an added track storage charge under which

*Livestock train being loaded at Hanna, Wyo. — Union Pacific Railroad photo*





*New center-flow, 2900 cubic foot (5200 cu. ft. car also available) covered hopper car for transporting grain and other dry bulk commodities. —Santa Fe Railway photo*



*New REA Express key-point terminal at Savannah, Ga., features unique radial conveyor system. —REA Express photo*

the dealer pays rent for storage space in the freight yard. To maximize utilization of equipment the railroads have a practice of imposing a charge or penalty on shippers or consignees if they retain cars for loading or unloading or other purposes beyond the specified time. Such a charge is referred to as demurrage. Rules for demurrage are uniform throughout the railroad industry and permit a "free time" of 48 hours for loading and unloading and 24 hours for reconsignment, diversion or reshipment, or for holding a car in transit when under the order of the shipper, consignee, or owner.

Each mode of transportation attempts to see that its special advantages of economy, reliability, and speed of transit between production and consumption areas are fully utilized. For example, the railroads are attempting to capitalize on certain unique capabilities in providing greater economy and efficiency in transporting bulky commodities. One method receiving renewed emphasis today is the so-called integral train. Multiple coupling of cars containing like commodities that make up a single shipment reduces expensive switching charges, and time in transit. Recent innovations in construction, notably the substitution of aluminum for steel, have made possible covered hopper cars with a payload of up to 3300 bushels of grain, compared with 1800 to 2000 bushels for box cars.

### **Railway Express Developed**

The railroads have figured importantly in the development of the express service familiarly known as the Railway Express Agency. REA Express, as it is now known, engages the services of the railroad for transportation of its shipments. This agency utilizes over 176 thousand miles of railway lines, and also operates a fleet of some 13,500 motor vehicles of its own—the largest

commercial motor fleet in the United States under one management. Approximately 5,000 passenger trains transport REA Express traffic each day. The agency also utilizes its own refrigerator cars for the transportation of perishables, special cars for the transportation of horses and other animals, and tank cars for transportation of live fish.

One of the most dramatic and promising developments in freight service is the rapidly expanding practice of hauling truck trailers on railroad flat cars, commonly known as "piggyback." Trailer-on-flat-car (TOFC) makes it possible to provide a complete door-to-door service with low cost, rapid, coordinated rail transportation. TOFC operates in any kind of weather and of course it eases truck congestion on highways. It saves the expense of loading and unloading from truck to freight car and back to truck, with resultant reduction in loss and damage claims.

In 1962 there were 5 plans under which piggyback service was offered by 61 railroads:

### **Piggyback Plans**

**Plan I—Railroads and Motor Common Carriers.** The railroads transport motor carrier trailers or containers, usually charging a flat rate per trailer based on weight and distance, regardless of commodity. The railroad has no direct contact with the shipper and simply substitutes for the trucker on a part or all of the total road haul. The shipment moves under billing done by the trucker.

**Plan II—A Railroad Operation.** Railroads carry only their own or leased trailers, or those of a subsidiary company and deal directly with shippers. Rates charged for the service are generally competitive with those charged by commercial trucking firms. Pick-up or delivery is usually confined to areas adjacent to rail terminals.



*Truck-trailer being lifted from flatcar in piggyback operation. —Southern Railway System photo*

**Plan III—Shipper Trailers on Rail Cars.** In this plan the shipper owns or leases trailers and delivers them to the railroad. The rail carrier transports to destination and the shipper then picks them up at the rail terminal. A ramp-to-ramp rate is charged.

**Plan IV—Shipper Trailer on Shipper Cars.** The Railroads move shipper trailers on shipper flat cars. In this method the railroad provides only power and rails and charges a flat per-car rate.

**Plan V—A Joint Rail-Truck Operation.** Tariffs are published showing joint rail-truck rates for complete door-to-door service. In a joint operation of this type the territory of each participating carrier extends into that served by the other. Each participant is permitted to handle shipments originating in, or destined to the others' territory, and to sell for the other participants. Normally a truck haul is involved at one or both ends.

In 1955, TOFC service was available between 160 points in the United States. In 1962, more than 620 ramps were in operation. In the latter year, after an investigation of piggyback service, the ICC noted that the plan showing the greatest revenue and number of trailers moved was Plan II, under which the railroads carry their own trailers, deal directly with shippers, and provide pick-up and delivery between shipper's plant and rail terminal.

A *Railway Age* survey of railroads offering piggyback service verifies the rapid expansion in use of Plans II and III, but also suggests that new emphasis upon Plan V

may be anticipated as more truck lines and freight forwarders use TOFC.

The Interstate Commerce Commission has offered for industry consideration a proposed new structure of piggyback services designed to simplify piggyback operations and make them more flexible. Basically, the proposal would replace the five piggyback plans with two. A "joint intermodal" plan would combine the present Plans I and V. A second "all-rail" TOFC service would blend Plans II, III and IV, with variations of these.

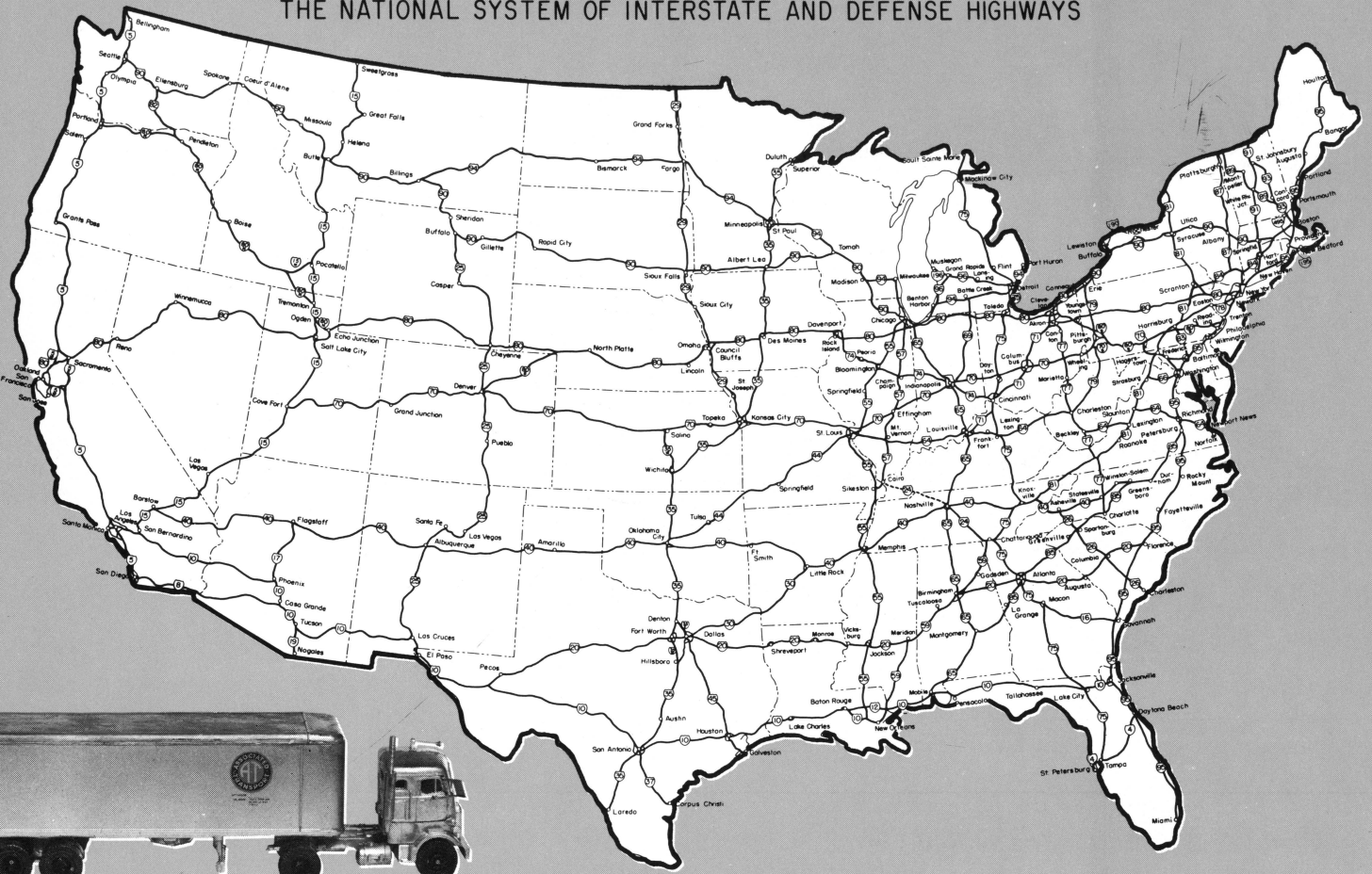
Although only a relatively small percentage of railroad traffic is presently represented by piggyback, its rapid growth and appeal to shippers give promise of stimulating important new traffic for the railroads.

#### Quotable Quote

*"Shipments of materials or merchandise frequently go through 7 to 15 handlings between manufacturers' plants and arrival in the hands of consumers. Any unit or method that offers the tremendous cost-cutting advantage of less handling is certain to command serious consideration."*

*Leslie C. Allman, President  
The Allman Company  
Detroit*

PLANNED ROUTES OF  
THE NATIONAL SYSTEM OF INTERSTATE AND DEFENSE HIGHWAYS



## Motor Common Carriers

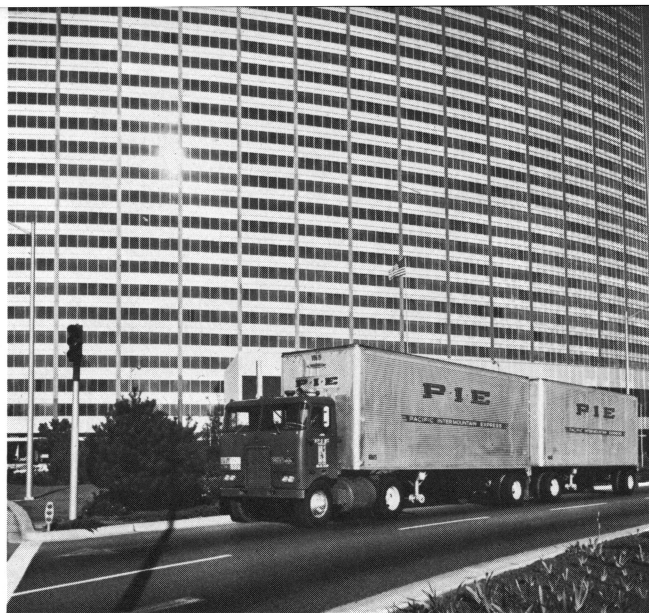
### GENERAL DESCRIPTION

The commercial trucking industry in the United States has revolutionized transportation methods. The farm marketing system has changed substantially with improved highways and technological improvements in the motor vehicle. Motor trucks have reduced farmers' transportation costs, especially in local hauling to nearby assembly points. Their greater mobility has made it possible for new producing areas to thrive, thus contributing to the development of specialized agricultural producing areas as we know them today. Products can be marketed in smaller quantities, resulting in more orderly distribution throughout the season. More farmers are producing milk for fluid use, eggs are delivered more frequently, and purchased supplies are delivered as needed. The local livestock shipping associations which assembled livestock for rail movement have largely been replaced by direct trucking of livestock to terminal and auction markets or to interior packing houses.

The record of the motor freight industry has been one of steady growth and change. (See Figure 3.) In 1961, approximately 11.7 million trucks (excluding some 649,000 owned by federal, state, and local governments) and 1,165,000 truck-trailers were operated in the United States. In the past 10 years diesel-powered truck sales have more than doubled. Diesel truck units now on the road exceed 210,000.

Some 17,200 trucking companies under interstate licensing are the principal users of the larger trucks and tractor-trailer units of 5 ton or greater capacity. Single unit trucks of two or three axles comprise 65 percent of the for-hire fleets and 97 percent of the private truck fleets. Farmers own more than 3 million trucks, or one out of four trucks under license. Typically, these are half or three-quarter ton units.

The motor common carriers have figured importantly in the expansion and dispersion of our economy. Through interline service these firms are linked directly to the na-



*Double-bottom innovation used extensively in the Western states. —Pacific Intermountain Express photo*

tion-wide motor carrier system. Public supervision of their operations is intended to promote orderly development, to prevent wasteful competition and to stabilize the motor freight industry. The common carrier certificates of operating authority issued by the regulatory agencies limit entry into the industry and thus restrict competition.

The Interstate Commerce Commission has separated the motor common carriers into two groups: common carriers of general freight, and common carriers of commodities other than general freight. Except for carriers of general freight, each commodity classification requires some special service or equipment. Among the more important commodity groups are refrigerated products, household goods, heavy machinery, building materials, motor vehicles, liquid petroleum, and agricultural commodities.

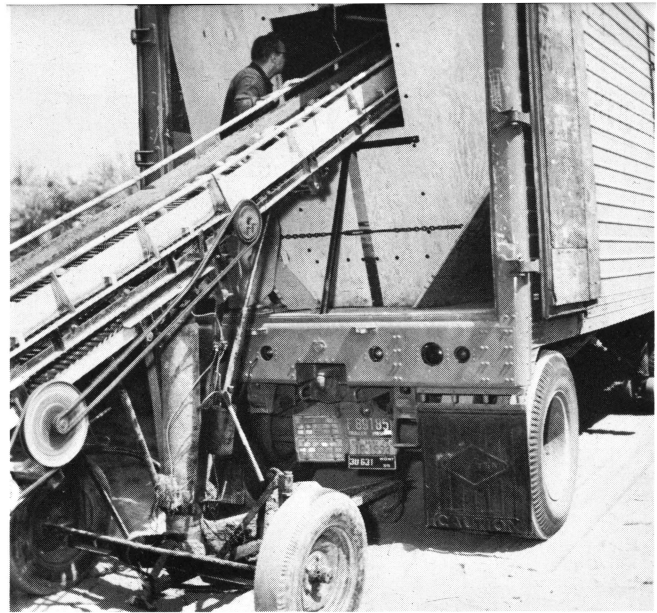
Common carriers operate under authorities classified by type of service. Their routes may be regular or irregular. Service may be scheduled or non-scheduled. Some firms may be limited to local cartage service. Those operating rights concerned with interstate movements may be changed only with ICC concurrence.

The ICC also classifies interstate motor common and contract carriers according to annual gross revenue. Since 1957, the classes have been revised upward as follows:

- Class I      \$1,000,000 or more
- Class II     \$ 200,000 to \$1,000,000
- Class III    under \$200,000

Figures for Class I and II carriers in 1957 are comparable to data for Class I carriers in the period 1950-1956. Class III carriers submit annual reports of a limited nature while Classes I and II file detailed data on their operations to the Commission.

Upon the enactment of the Motor Carrier Act of 1935, "grandfather" rights were extended to carriers already in



*Field-loading potatoes on dry freight van modified to convert to bulk loading hopper unit for return haul. —Consolidated Freightways photo*

operation. For such carriers proof of public convenience and necessity was not required. With the advent of federal regulation the number of firms operating in the field has been limited, and entry has become more difficult.

Motor trucks provide flexible door-to-door service from shipper to receiver. This physical flexibility gives the motor carriers a decided economic advantage over competing transportation modes. Motor carriers are able to adjust more readily their scale of operations and level of investment to changes in the transport market. This type of economic flexibility is not available to pipelines and railroads which have sizable capital investments in specialized equipment and facilities, and a higher level of fixed expenses.

Fast freight movement is another advantage of trucks over other land carriers since the load is usually in continuous movement from origin to destination with relatively less transit time absorbed in terminal and transfer operations.

#### Quotable Quote

*"Distribution is a single integrated and coordinated whole, . . . the activities of inventory control, transportation and traffic, warehouse operations, order processing, customer service, material handling, and special packing are inseparable and interrelated."*

*Anthony E. Cascino  
Vice President of Marketing  
and Physical Distribution  
International Mineral and  
Chemical Corporation in  
Distribution Age*

The average length of haul for regulated motor trucks is 245 miles, compared to 440 miles for the railroads. The length of haul has inched upward over the years for both modes, with greater increases going to railroads. Some motor carriers have coast-to-coast operating authority, or nearly so, and compete with railroads and water carriers on coast-to-coast movements. Connecting and transfer carriers forward additional freight to these firms which then consolidate the shipments in order to maximize routing efficiency and load factors. With terminals strategically located several hundred miles apart, these long-haul carriers are able to efficiently schedule their service, equipment, and manpower. The carrying capacity of the truck and state laws restricting maximum truck weights and lengths are limiting factors in motor transportation, but substantial modifications have been made to accommodate larger volume shipments. Double-bottom trailers, capable of 20 ton capacity in each trailer and hitched in tandem, are legal in a growing number of states and over specific highway systems.

Although figures are not readily available, it is evident that the business mortality rate for inter-city carriers must be quite high. The expenses of Class I and II carriers are taking an increasing share of the revenue dollar. A breakdown of the carrier revenue dollar is shown in Table 1.

TABLE 1 - DISTRIBUTION OF MOTOR CARRIER REVENUE DOLLAR

	1951	1956	1960
	Cents		
Gross Revenue	100	100	100
Expenses			
Transportation	47.6	49.1	50.2
Terminal	11.2	11.9	12.6
Equipment & Maintenance	12.0	10.5	10.3
Administrative & General	7.3	7.7	6.4
Operating Taxes & Licenses	4.7	5.7	6.3
Depreciation	4.0	4.3	4.5
Insurance & Safety	5.6	4.4	4.2
Traffic (includes sales expense)	2.9	2.9	3.0
Total expenses	95.3	96.5	97.5
Net Revenue	4.7	3.5	2.5

Source: *American Trucking Trends*. American Trucking Association. Washington, D.C.. 1960-61.

The transportation item has increased over the years and rising labor costs have been chiefly responsible. The largest proportion of transportation expense is wages for supervisory personnel, drivers, and helpers. The average wage of \$5,810 per employee in 1959 was more than double the \$2,752 average wage of 1946.

Carrier costs vary widely due to the diversity of the firms that make up the industry. Terminal and pick-up and delivery costs often have an important bearing upon the earning record of the firm. In 1948, terminal costs

averaged \$1.80 per inter-city ton. By 1958, this had climbed more than 90 percent to \$3.46. During this same time period revenue per inter-city ton advanced 45 percent, or from \$9.79 to \$14.21. The firms with a large volume of less-than-truck-load traffic (LTL) ordinarily must provide additional services and incur additional expenses as contrasted to truckload traffic which requires no terminal dock utilization.

It is estimated that motor carriers purchase annually 14.5 billion gallons of fuel, and \$3.9 billion worth of new equipment, parts, and accessories. They pay out \$3 billion in highway use taxes, and must meet payrolls for more than 7 million people. (These figures include the private and for-hire segments but exclude government vehicles.)

### Cost-Rate Cycle Dilemma

As costs have increased the pressure to raise rates has increased. As rates climb higher, more shippers begin to put their more easily handled freight shipments in their own trucks. The result to the common carrier is a wide variety of costly-to-handle freight going in many directions. To cover the increased cost of servicing a progressively larger proportion of this kind of traffic the carriers may again attempt to raise rates. This cycle typifies the present-day problem of the motor common carrier with respect to competition from proprietary carriage.

Under the pressure of competition, and in order to strengthen their financial and organizational structure, increasing numbers of for-hire motor carriers have petitioned for permission to merge and consolidate their operations. Interstate motor carriers desiring to consolidate, merge, purchase, or lease the properties of other motor truck lines must first receive ICC approval. Applications involving small fleets are ordinarily handled routinely; however, cases involving fleets of 20 trucks or more are subjected to careful scrutiny, frequently involving extended hearings. In such cases a decision may be delayed for months or even years. This trend toward mergers has been one of the most significant developments of recent years in the expansion of the motor freight industry.

### Trend to Frequent, Small Orders

The growing tendency of business firms toward more frequent ordering of smaller quantities as a means of minimizing inventory expense is reflected in the growing volume of less-truckload (LTL) shipments. Revenues from LTL shipments of 547 Class I motor carriers of general freight amounted to more than \$2 billion in 1960, representing 47 percent of the total revenue of these carriers. The number of shipments continued to grow while tons hauled remained the same as the previous year. The average weight per LTL shipment is about 525



*Night reefer schedule ready to hit the road, a 40-foot western insulated trailer with dromedary box and underslung refrigeration unit. —Consolidated Freightways photo*

pounds (LTL shipments are classified as those weighing less than 10,000 pounds).

Most LTL shipments cross over the terminal dock, thus increasing handling costs. This helps to explain why carriers are devoting so much attention to efficient terminal layout and design and to various cost control methods and procedures. Electronic data processing and communication systems are widely used. In a recent survey of 404 Class I motor carriers, the American Trucking Associations found that 83 percent were using data processing machines. Another 15 percent reported such equipment was ordered for 1962 delivery. These devices are designed to cut expense and improve efficiency in computing payroll, determining revenues, calculating terminal operating costs, and maintaining effective management control.

Short-wave radio, closed-circuit television, electronic calculators, computers, and optical scanners are being introduced by some firms to effect additional economies of operation. The forklift truck-pallet system, along with draglines and conveyors, are commonly used in materials handling operations.

## VOLUME OF BUSINESS

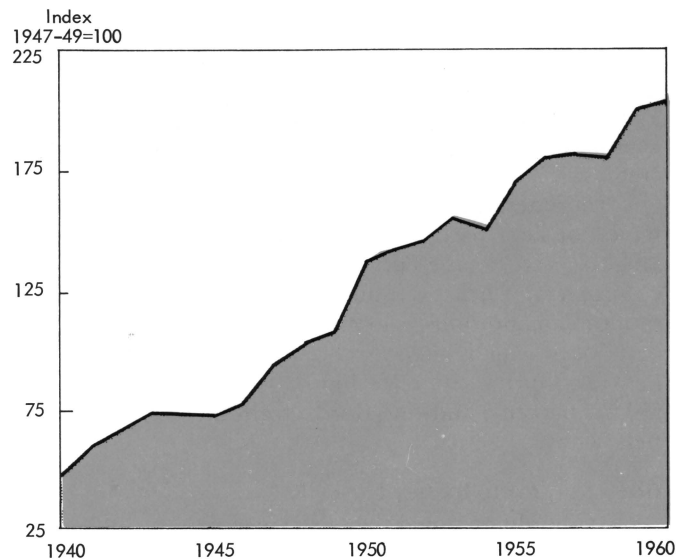
Reliable for-hire motor truck data first became available in 1939 following the passage of the Motor Carrier Act of 1935, known as Part II of the Interstate Commerce Act. The data relates principally to interstate motor carriers of property regulated by the Interstate Commerce Commission.

The American Trucking Associations compile and issue inter-city tonnage reports for Class I and II motor carriers of property. In 1960, a total of 2,199 common and contract carriers transported more than 350 million tons of inter-city freight. The tonnage increase for the period 1940-60 is shown in Figure 7 in terms of index numbers based upon average tonnage for the period 1947-49.



*Loading lamb carcasses in a reefer trailer at Portland, Ore. —Consolidated Freightways photo*

Fig. 7 - Index of Tons Transported by Motor Carrier in Intercity Service, U.S.\* 1940-1960



\* Class I and II Intercity Common and Contract Motor Carriers.

Source: *Intercity Truck Tonnage*. American Trucking Associations, Inc. Washington, D.C., 1960.

### Quotable Quote

*"... the ever increasing difficulties confronting common carriers, pose a serious and continuing threat to our expanding economy and essential defense programs."*

*Kenneth H. Tuggle  
Interstate Commerce Commission*



*A drag-line operation in a modern truck terminal. — American Trucking Assns. photo*



*Closeup view of a refrigerated highway trailer. Notice underslung and front-mounted reefer units. — Campbell 66 Express photo*

In 1960, regulated motor carriers earned revenues of \$7.2 billion, up sharply from the \$4.2 billion realized in 1951. Increased freight rates and the growth in general economic activity have contributed to these revenue increases.

In general, net profits of motor common carriers have not kept pace with the steady increase in revenue and the net income curve has been rather erratic. The commercial trucking industry is vulnerable to general economic conditions. Close attention to managerial and cost-control methods is essential to weather recessionary periods. During the recession of 1960, aggregate profits fell 74 percent, and one-third of all Class I and II carriers were in the red.

### **68% of Traffic Exempt**

It should be noted that a sizable portion (68 percent of the traffic handled by motor carriers is not subject to economic regulation. If the revenues earned or value of services rendered by all intra-state, local, and exempt for-hire carriers and by private motor fleets were added to the \$7.2 billion revenues of the regulated carriers, it is variously estimated that the total of *all* motor carrier services would be somewhere between three and four times the 1960 total for regulated carriers. The Transportation Association of America recently estimated that highway transportation accounted for \$29,691 million of freight expenditures in 1961, or 67.3 percent of the \$44,100 million total spent for all transportation services in that year.

In terms of revenue, the Class I motor carriers (those with annual revenues of \$1 million or more) are the most important group of regulated carriers. Although they represent only about 6 percent of the interstate motor carriers of property, they account for more than 60 percent of the total operating revenues of inter-city and local carriers under the jurisdiction of the Interstate Commerce Commission.

The motor common carriers moved 87.7 percent of the total inter-city tonnage handled by regulated for-hire truckers in 1960, and contract carriers moved the other 12.3 percent. Carriers of general freight comprised 1,087 of a total of 2,199 inter-city motor carriers of property, almost half the number; they hauled by far the largest tonnage of the commodity classes, 46 percent. Liquid petroleum ranked second in numbers of carriers and tonnage hauled.

The ICC issues each year a Motor Carrier Freight Commodity Statistics report which indicates the volume of truck-load business by nearly eight hundred of the largest regulated motor carriers according to commodity groups and classes. Note that Table 2 figures by no means represent totals for the entire motor carrier industry.

Refrigerated liquids and refrigerated solids (primarily perishable fruit juices, various beverages, fresh fruits and vegetables, fresh meats and meat products, dairy products, and frozen foods) require specially designed and constructed temperature-controlled equipment; otherwise the operation is similar to that of the general commodity carrier. In 1960, a total of 77 regulated Class I and II carriers hauled approximately 5 million tons of these two commodity classes. Transportation of refrigerated solids increased 214 percent in volume during the decade, reflecting major improvements in refrigeration and transport equipment, quality control, over-the-road transportation service, and materials handling.

### **Local Tonnage Not Included**

These ICC figures presented in Table 2 cover only tonnage moved by Class I and II inter-city carriers, common and contract; they do not represent motor carrier totals as an industry (for example, tonnage moved by private carriage is not included). Local tonnage, virtually all of which is handled by truck, is not reflected in the ICC statistics. Many commodities moving inter-city involve

TABLE 2 - FREIGHT COMMODITY STATISTICS OF 789 CLASS I INTERCITY COMMON AND CONTRACT MOTOR CARRIERS, U.S., 1960.

Commodity group	Revenue Freight Originated Number of Tons	Gross Freight Revenue Dollars
Products of Agriculture	4,823,561	\$ 65,341,659
Animals and Products	5,249,594	110,335,268
Products of Mines	10,732,189	35,326,160
Products of Forests	973,464	12,966,501
Manufactures and Misc.*	145,652,389	1,686,731,812
Forwarder traffic	897,669	14,615,303
<b>Total Truckload Traffic</b>	<b>168,328,866</b>	<b>\$1,925,316,703</b>

\* Includes agricultural and related items such as cottonseed oil, soybean oil, fertilizers, agricultural implements, cloth, sugar, canned and frozen food products, animal and poultry feeds, etc.

Source: Motor Carrier Freight Commodity Statistics. ICC. Statement No. 6114. 1960. p 4,5.

more than one agency in their movement. These points illustrate difficulties involved in the computation and use of the reported tonnage figures as an index of total inter-city freight service.

### CUSTOMERS AND SERVICES

Many agricultural commodities are grown a short distance from markets, thus involving a single step in transportation. But the general pattern of distribution is in three steps: from farm to assembly point; from assembly point to the market in the consuming area; and, finally, local delivery to the retailer.

Trucks handle virtually all of the short hauling of agricultural commodities, and they are becoming more important in the long-haul. A 1958 Census Bureau study indicated that motor trucks hauled 50 percent of the canned goods which moved inter-city. This 50 percent was about equally divided between for-hire and private motor carriers. Railroads hauled 45 percent, and water carriers and freight forwarders, 5 percent. Under 100 miles, private trucking was the most important of the modes used; for-hire truckers led in the 100-250 mile range; and the railroads exceeded the other modes beyond 250 miles. A noticeable shift to private trucks occurred between the time of a 1954 study and the 1958 study cited above; the rail share declined.

Results of a 1957 Census Bureau shipper survey of transportation of fresh fruits and vegetables by assemblers (i.e., firms that buy farm products directly from producers and receive, sort, grade, pack and ship from growing areas) indicated that 43 percent of the assembler produce tonnage travelled 1000 miles or more, 25 percent travelled between 500 and 999 miles, and 32 percent less than 500 miles. Almost half of the total produce tonnage was hauled by the railroads, and 63 percent of this railroad tonnage moved more than 1000 miles, while 60 percent of the motor carrier tonnage exceeded 500 straight-line

miles. A very high percentage (80 percent) of the fresh fruit and vegetable assembler tonnage shipped by other means (mostly private trucking) travelled less than 500 miles. Citrus and potatoes represented 59 percent of the total assembler produce tonnage moved by all transportation modes.

#### *Distances that assemblers shipped the 1957 tonnage of fresh produce*

- 43% travelled 1,000 miles or more
- 25% travelled between 500-999 miles
- 32% travelled less than 500 miles

By contrast, canned foods travelled fewer miles than fresh fruits and vegetables. In 1958, canners shipped only 21 percent of their food products 1000 miles or more; 18 percent, 500 to 999 miles; and 61 percent, less than

#### Quotable Quote

*"Freight rate increases have created a new awareness of shipping costs and there are four things happening:*

1. *Shippers are providing their own transportation . . .*
2. *The shippers are working with the operations research people in scientifically locating plants and warehouses . . .*
3. *The shippers are conscious of costs of maintaining inventories . . .*
4. *Shipments weigh less . . .*

*What do these things mean? They mean we have to operate more efficiently to stay in business. We have to give good service at minimum costs."*

*J. C. Kebrer  
Roadway Express, Inc.*

*Sea-going container is lifted to deck of ocean vessel in New York Harbor for shipment overseas. —New York Central Railroad photo*



500 miles. Of the canned food traffic enjoyed by the railroads, only 34 percent moved more than 1000 miles, and only 17 percent of the motor carrier tonnage exceeded 500 miles. Private trucks hauled 90 percent of their tonnage less than 500 miles.

*Distances that canners shipped the 1958 tonnage of canned foods*

- 21% travelled 1,000 miles or more
- 18% travelled 500-999 miles
- 61% travelled less than 500 miles

According to the U.S. Department of Agriculture, of the total interstate truck shipments of frozen fruits and vegetables in 1957, 70 percent were hauled by regulated for-hire carriers. With the passage of the Transportation Act of 1958, all interstate movement of frozen fruits and vegetables by motor carrier has been placed under regulation.

### **Extra Services Expected**

In the highly competitive transportation industry, where several carriers of the same mode and/or carriers of different modes compete for a shipper's traffic, hauling is not enough. Many services may be required, depending upon the nature of the commodity. Protective services, such as refrigeration, heat, or ventilation, may be necessary. In some instances, transit privileges, reconsignment, and diversion privileges may be advantageous to agricultural shippers and are made available as special services by a few motor carriers. Split pickup and split delivery for component parts of a single shipment represent another service much in demand by shippers of some types of commodities.

Motor carriers may also provide collect-on-delivery service. ICC regulations govern handling and collection

of charges on such shipments, which are usually small deliveries.

Generally, motor carrier transportation moves agricultural products faster over shorter distances, and requires less handling than other surface modes of transportation. Fast delivery of new grain to market reduces the amount of loss and damage, particularly when it has a high moisture content. The rapid delivery of produce permits greater field maturity; however, with the more mature product the handling requirements become more exacting and the decay and spoilage losses usually more noticeable.

Packing and loading of products are very important preludes to satisfactory transportation service. The relatively high rate of damage during transit proves how important these operations are. More efficient loading can reduce transportation costs through maximum utilization of capacity. Several U.S. Department of Agriculture studies have pointed to substantial savings in transportation costs which could be realized by adopting new loading and stacking methods, new types of packages and containers, new refrigeration techniques, and new insulating materials. Of course, the nature of the commodity and the size of shipments also affect costs.

### **"Piggyback" and "Fishyback"**

Finally, through integrated truck-rail, and truck-water combinations, another service is available to the shipper to maximize speed of delivery. "Piggyback" and "fishyback" unloading are rather cumbersome, but once the trailer is discharged, all that is needed is a tractor to haul the load to the consignee. Further growth of containernization and trailer-on-flat-car (TOFC) coordinated transportation appears inevitable.



## Motor Contract Carriers



*Building materials are often transported by contract carriers. — American Trucking Assns. photo*

## GENERAL DESCRIPTION

In the Motor Carrier Act of 1935, provision was made to regulate two classes of for-hire carriage: *common* carriage and *contract* carriage by motor vehicle. Contract carriers operating interstate are therefore subject to Interstate Commerce Commission regulation and, in effect, their restrictions are quite similar to those applying to common carriage, with the major exception of that portion regarding duties and obligations to the general public.

Motor contract carriers serve only certain shippers with whom they have contracts. Carrier permits, rather than certificates of public convenience and necessity, must be obtained from the ICC to operate this specialized and personalized service in interstate or foreign commerce. Permits differ from certificates in that permits are of limited duration and must be renewed at specific intervals. The applicant is required to show the Commission that he is willing and able to provide a needed service which existing carriers are either unable or unwilling to provide. He also must show that the operation will be consistent with the public interest and the national transportation policy.

### Problem to Define Contract Carrier

Historically, the Commission has wrestled with the problem of precisely identifying and defining a contract carrier operation to the satisfaction of common carrier competitors. For many years contract carriers were thought of as "private carriers for-hire" because they did not transport for the general public, as is the case with common carriers. In the *Contract Steel Carrier, Inc.*, case, the United States Supreme Court in 1956 recognized specialization as a proper test of contract carriage. The court further stated that a contract carrier is free to search aggressively for new business within the limits of its permit.

The effect of the *Contract Steel Carrier* case was to permit great expansion of contract carrier operations, and at the same time to focus attention upon the ICC specialization test. In 1957, the Congress revised the definition of contract carriers to incorporate the specialization test and to limit these carriers to serving one or a limited number of customers under continuing contracts covering either assignment of vehicles to shippers, or transportation services designed to meet the distinct need of each individual customer. As a result of specific restrictions as to the number of shippers they may serve and the types of service they may perform, a significant number of contract carriers have applied to the ICC for permission to convert their operations to common carrier status.

It is estimated that there are approximately 2400 interstate motor contract carriers of property, representing some 13 percent of all motor freight carriers subject to ICC regulation. Contract carriage is a small but important segment of the interstate trucking industry. The number of carriers whose operations are limited to strictly intrastate contract carriage is not available. The states vary as to the rules applicable to contract carriers.

Contract carrier trucking operations are generally lower cost than those of the common carrier. Some of the reasons for this are the very limited number of shippers served by the contract carrier and the greatly reduced terminal facilities required. Frequently, the service involves the handling of bulk freight in truck load quantity picked up at the shipper's dock and delivered directly to the consignee.

## VOLUME OF BUSINESS

The Interstate Commerce Commission publishes an annual summary of selected financial and operating data covering a limited number of contract carriers engaged in inter-city service. In 1960 a total of 68 contract carriers reported carrying nearly 20 million tons of revenue freight in inter-city service. Operating revenues were \$244 million; expenses totalled \$232 million and net income after taxes was \$6 million. The operating ratio averaged 94.8 percent.

Ton-miles of reported contract carriage inter-city freight amounted to an estimated 3.6 billion. Unfortunately, there is no clear indication as to what proportion the reported revenue and tonnage bear to the total volume of contract carrier traffic.

## CUSTOMERS AND SERVICES

Their ability to provide a specialized, personalized service which would not otherwise be available has been offered as the primary justification for granting contract carriers operating authority. Heavy hauling, for example, requires use of special equipment and also the adoption of other physical operations and functions necessary to handle unwieldy cargo. The transportation of liquefied petroleum gases requires highly specialized services and equipment, and skilled personnel.

Contract carriers are available to shipper customers as needed, day or night, sometimes upon very short notice. A contract carrier may be very valuable to a shipper in emergency situations or in peak production or harvesting seasons where expedited handling is required. In certain situations, contract carriers serve shipping firms which operate wholesale or retail units by transporting commodities to and from producing locations and/or distribution points.

# Exempt For-Hire

## Motor

## Carriers



*Fresh oranges being unloaded from a refrigerated truck at a retail outlet. —American Trucking Assns. photo*

## GENERAL DESCRIPTION

The third major group of for-hire motor freight operations is that of the exempt carriers. They may haul un-processed agricultural commodities and certain other specified items for compensation in interstate commerce and are subject to ICC safety, equipment, and hours-of-service rules, but are exempt from federal regulation of routes and rates as applied to common and contract motor carriers. The ICC does not require exempt carriers to obtain operating certification or permits, publish tariffs, or file financial reports.

Farmers and agricultural cooperatives trucking their own products are exempt as private carriers. Farmers and farm organizations worked for an exemption clause in the Motor Carrier Act of 1935 in the belief that exclusion of agricultural commodities, marketing associations and producers from the economic regulation provisions of the Act would assist farmers in securing the least expensive and most convenient and flexible transportation possible in moving their crops to market.

### Contribute Flexibility

The exempt for-hire trucker provides flexibility of service because he can move from the farm or wharf in any direction to any market, split deliveries at several points which may not be served by regulated carriers, and serve distant markets. These special requirements were judged to be too difficult for the certificated carrier to meet regularly, although many common carriers do work with producers in the movement of their agricultural products.

That portion of traffic from the farm to the first market moving in exempt for-hire trucks rarely competes with the regulated carriers. However, much exempt trucking does occur subsequent to this initial farm to first

*An exempt trucker with a load of livestock for a midwestern terminal market. —Alkire Truck Line photo*



market movement, between commercial firms, and often for long distances involving inter-city travel.

Many disputes arose over interpretations as to the commodities to be included under exemption. By 1950, the situation was extremely confused. The ICC tried unsuccessfully to get Congress specifically to limit the exemption to the initial movement from farm to market for raw products. Opposing farmer interests and the courts generally took a broader view. Finally, in 1951, after a lengthy investigation, the ICC defined the term "agricultural commodities (not including manufactured products thereof)." This proceeding was titled *Determination of Exempted Agricultural Commodities* or commonly the *Determinations Case*.

Subsequent modifications in the list of exempt commodities resulted from court decisions, some of which culminated in Supreme Court reviews. ICC Ruling No. 107 of March 19, 1958, spelled out the list of exempt and non-exempt commodities of agricultural origin, thus bringing prior determinations up to date.<sup>2</sup> This ruling became a part of the Transportation Act of 1958.

Individual states have established regulations and exemptions pertaining to intra-state motor freight operations. There are wide variations among the states with respect to exemption of agricultural commodities, co-operatives and farm vehicles from regulations applying to intra-state traffic.

### Backhaul Important Revenue Factor

The basic problem of backhaul is a very important factor in motor transportation. Motor vehicle operating costs per unit of carriage performed are high as compared to a train or barge tow; consequently the matter of scheduling return loads to avoid non-revenue runs back to "home base" is especially important to a profitable operation. In the case of exempt trucking the products eligible to be hauled move from areas of production to the major markets. Ordinarily there is no substantial movement of exempt commodities in the opposite direction. To avoid empty return of equipment to point of origin the alternative is for the owner of the vehicle to lease his equipment to a shipper or to another carrier wanting the service for one trip in the return direction. The details vary but the trip lease is the most common legally acceptable device.

Exempt for-hire carriers are legal so long as they operate within the scope of their authority. Data showing the over-all extent and nature of exempt transportation is not available but Table 3 shows the estimated number of carriers subject to ICC safety regulation in for-hire

TABLE 3 - ESTIMATED NUMBERS OF CARRIERS AND VEHICLES SUBJECT TO ICC SAFETY REGULATION

Type of Carrier	Number of Interstate Carriers (approximate)	Number of Vehicles (approximate)
For-hire (Common and Contract)	18,889	721,508
Private	80,721	648,487
Exempt	30,666	170,019
	130,276	1,540,014

Source: Gray Area of Transportation Operation, ICC, Washington D. C., Statement No. 6010, June 1960 pg. 81

(common and contract), private, and exempt classifications in 1959, plus the estimated number of vehicles operated by each group.

According to this table, exempt motor carriers represented 24 percent of the number of interstate carriers subject to ICC safety regulations and accounted for 11 percent of the total number of vehicles of these carriers.

In its Seventy-Fifth Annual Report, issued in 1961, the ICC gives an estimate of 37,515 exempt carriers operating approximately 199,200 vehicles. The identities and locations of these carriers are not known with certainty. Copies of the ICC safety regulations were served on 22,820 exempt operators in 1961, thus leaving about 14,700 carriers who have not been formally notified that they are to comply with ICC safety rules.

In a nationwide road check in October 1961 it was found that 58.8 percent of the exempt carriers checked had four or more vehicle defects, compared with 28.7 percent of the certificated carriers.

The financial condition of exempt agricultural truckers varies but from available information, the industry appears to be suffering. One perishable commodity carrier association reported that one-third of its small exempt trucker members goes out of business each year. Another

<sup>2</sup>Sperling, Celia, *The Agricultural Exemption in Interstate Trucking: Developments in 1957-58*. Marketing Research Report No. 352, Agricultural Marketing Service, U. S. Dept. of Agriculture, Washington, D. C. July 1959. p. 19.

### Quotable Quote

*"It is not necessary for a business to grow bigger; but it is necessary that it constantly grow better."*

Peter F. Drucker, in  
*"The Railroad Future"*

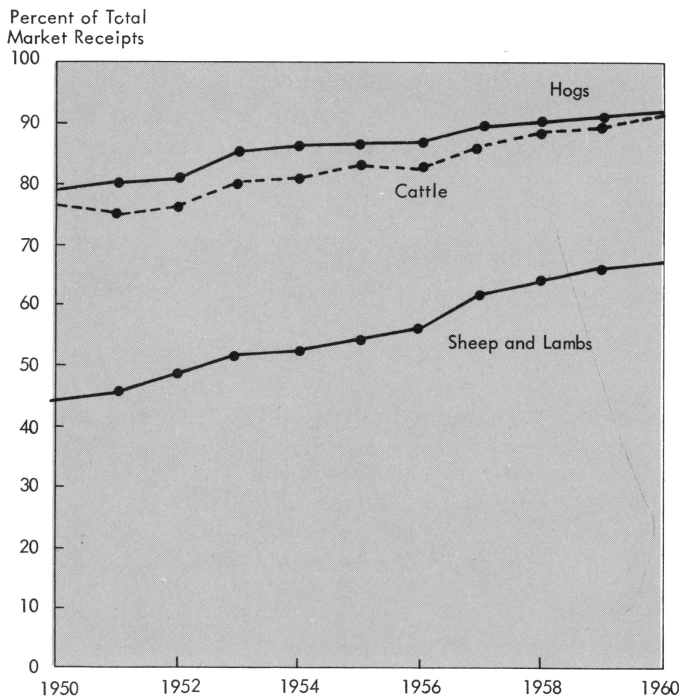
association of agricultural truckers reported that the competitive position of the unregulated trucker is increasingly difficult because of unstable rate practices and over-all competitive conditions. Increases in wages, equipment prices, license fees, taxes, and other costs in many cases have not been balanced by increased vehicle capacity and speed, or by rate adjustments adequate to meet the increased costs. The poor showing with respect to maintenance and driver-time restrictions may be attributed in part to the pricing practices of exempt truckers and their resulting financial stringency.

### VOLUME OF BUSINESS

Accurate figures to represent the size of the exempt trucking business are very limited, though it has been estimated by the ICC to be considerable. The exempt trucker has contributed importantly to the extensive diversion of agricultural traffic from railroads to motor trucks. Regulated motor carriers are believed to have played a less significant role in this development although they often carry certain exempt commodities, especially as a backhaul.

By 1960 more than 90 percent of major market receipts of cattle and hogs and 67 percent of the sheep were transported by truck, primarily by exempt for-hire livestock haulers. Fig. 8 gives a fair notion of the shifts in mode of transportation of livestock which have occurred over the years.

Fig. 8 - Trends in Truck Deliveries of Livestock at 56 Major Markets



Source: *American Trucking Trends*. ATA. Washington, D. C. 1961. p. 20.

Between 1938 and 1958 truck traffic in grain rose from 3 million bushels to almost 20 million bushels. Rail traffic dropped from 187 million to 155 million bushels. The principal mode of transportation used in grain marketing is the railroads, with notable variations by regions, states, and locations.

In 1959, eleven states of the North Central Region produced 67 percent of the total U. S. production of corn, soybeans, wheat, oats, barley, and sorghums for grain. Trucks usually move the grain from the farm to the country elevator where it is conditioned, stored, and finally sold. These interior elevators, increasingly important in terms of stored grain stocks, utilized the railroads to move 69 percent of all 1959 non-government grain shipments in the North Central Region; trucks moved 30 percent, and barges 1 percent.

### Truck Grain Volume Increasing

Truck shipments increased percentagewise 95 percent and rail volume decreased 6 percent from 1954 to 1958, while total North Central Region elevator shipments were increasing 8 percent.

Exempt for-hire truckers did not figure importantly as grain haulers in the North Central Region in 1958. Only 8 percent of 1092 country elevators reporting shipments by truck in that year used exempt for-hire haulers as the principal type of motor carrier. Common and contract truckers were the most frequently used for moving grain to terminals, and ranked second to private or leased trucks in movements to processors. Itinerant merchant truckers who purchase the grain from the elevator operator were important carriers of corn, sorghums for grain, oats, and barley.

In a 1961 Colorado study it was determined that 75 percent of the "free" or non-government wheat shipped from country elevators went by rail and 25 percent by truck; however, in some areas of the state, almost 90 percent of the wheat moved by truck.

### Haul Large Percent of Poultry

Some 96 percent of the processed poultry that arrived in eight major U.S. markets in 1960 was delivered by truck. Practically all shell eggs are now shipped by truck, as are 94 percent of the frozen eggs.

In 1956-57, the USDA studied the interstate trucking of fresh and frozen poultry under agricultural exemption. They found that for-hire trucks were hauling 52 percent of total interstate truck shipments of fresh poultry, compared with 38 percent in 1952. Similarly, frozen poultry hauled by these carriers represented 66 percent in 1955, and increased to 74 percent in 1956-57. According to this study the exempt motor carriers hauled 82 percent of the total for-hire truck shipments of fresh poultry and 70 percent of the frozen poultry moved during the period July, 1956, through June, 1957.

A subsequent study in 1959 reported that of 3 million pounds of dressed poultry moving out of commercial processing plants, 75 percent moved by truck, largely non-regulated.

Two-thirds of all the butter and slightly more than one-third of all cheese shipped in 1960 went by regulated motor carriers. Fluid milk is an exempt commodity and is shipped almost entirely by truck.

From 1946 to 1959 rail volume of fruits and vegetables was cut in half, from more than a million cars to about 500,000, in spite of the substantial increase in production and marketing of these commodities during this period. Exempt commodity carriers performed extensive inter-city service and accounted for a great deal of the motor carrier expansion in fruit and vegetable traffic.

### Important Service for Perishables

In the marketing of perishables, particularly, the truck broker of exempt agricultural commodities has performed a useful service by arranging truck transportation for shippers or receivers for the movement of products to storage, processing points, or market areas. Matching market demands with supplies of maturing perishables in various producing areas, the truck broker must have flexible transportation service at his ready disposal. A 1959 survey reported 246 truck brokers of exempt commodities located throughout the United States. Fifty-four percent of these brokers also operated as for-hire carriers of exempt agricultural commodities, owning or leasing an average of 17 pieces of equipment per broker. For the most part these brokers operated on a full-time basis. They booked 3.8 million tons of commodities of which produce accounted for 75 percent.

Of the commodities booked by the reporting truck brokers, exempt for-hire carriers hauled 81 percent; common and contract carriers, 9 percent; and private carriers 10 percent. Florida had more truck brokers than any other state and booked more tonnage by exempt carrier than any other producing area. (About half was booked through truck brokers.) In California, 25 percent of a total of 1.4 million tons of produce moving interstate was handled through truck brokers.

Truck brokers established trucking charges on almost 40 percent of the exempt commodities which they booked in 1959, so they had a major role in rate-making.

### Frozen Foods Taken off Exempt List

In the two years from 1956 to 1958 frozen fruits and vegetables were placed on the exempt list. It is interesting to note that with deregulation of these commodities motor carrier frozen food rates dropped 20 percent in a short time and truck tonnage increased substantially. In August, 1958, under the Transportation Act of 1958, the competitive factors in transportation and the food processing industry forced the return of frozen fruits and

vegetables, plus several other commodities from exempt to non-exempt status.

## CUSTOMERS AND SERVICES

The regulated carriers in most cases cannot be expected to be in a position to meet all the varying transportation requirements of farmers or fishermen consistently in the first movement from farm or wharf to point of storage, processing, or marketing. The exempt trucker participates in providing this service, in common with producer-owned and -operated equipment. The exempt provision of Section 203(b) (6) was designed to aid producers who needed a flexible transportation system, one that could move food products from the farm or primary market to consuming areas swiftly, economically, and efficiently. Because of certain route, commodity, or territory limitations, common carriers could not comply with the demand nor were they required to accommodate the needs of these exempt marketers.

### Important to Isolated Communities

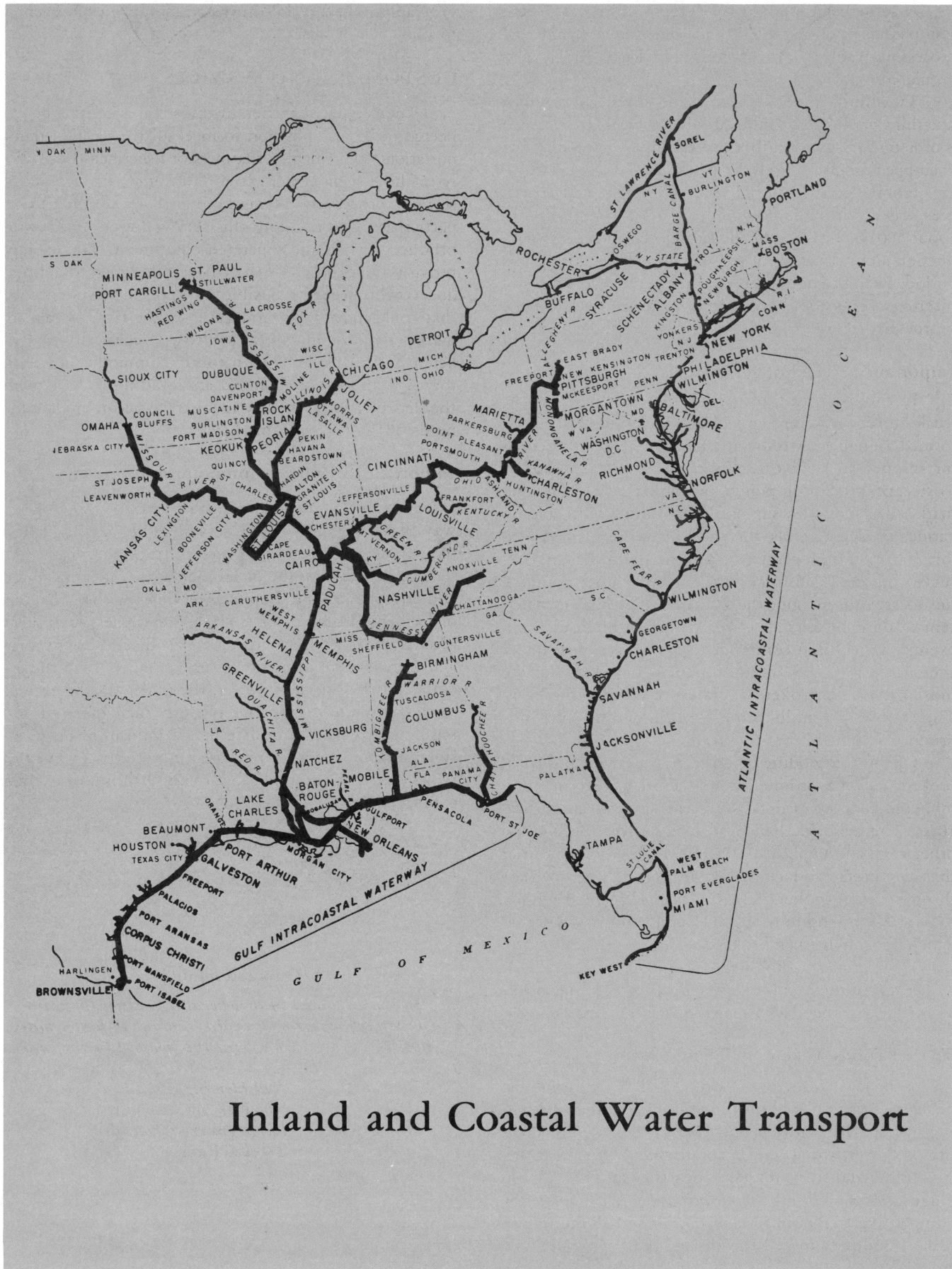
Proponents of exemption state that some out-of-the-way places not adequately served by regulated carriers have come to depend upon exempt trucker services.

In a 1956-57 study of motor carrier cargo insurance and equipment, based upon interviews with 67 haulers of fresh and frozen poultry, USDA researchers found that regulated carriers had greater cargo insurance coverage and carried more insulation in their trailers than the exempt motor carriers. However, the trailers of the exempt carriers were newer on the average than those of the regulated truckers. The ICC has a minimum cargo insurance requirement for regulated motor carriers, but this requirement is not applicable to the hauling of exempt commodities.

#### Quotable Quote

*"Just a little dent in the operating costs of the transportation department could amount to many millions of dollars throughout the food industry in a year."*

*Ned Fleming, President  
The Fleming Company  
Large grocery wholesaler  
Topeka, Kansas*



## Inland and Coastal Water Transport

## GENERAL DESCRIPTION

Our waterways, long considered a factor in plant location and economic development, have rather suddenly become a major factor in transportation. In areas of the nation where the waterways are navigable and accessible, water carriers move large tonnages of bulky commodities long distances at a relatively small cost per ton-mile.

The Mississippi River system accounted for about 52 percent of the 120 billion inland waterway ton-miles in 1960 (exclusive of the Great Lakes and the intracoastal and coastal waterways of the Atlantic seaboard and the Gulf of Mexico).<sup>3</sup> This Mississippi system includes 8,538 miles of waterway out of a total of 25,253 miles of navigable inland waterway routes in the United States. It consists of the main channels and all navigable tributaries of the Mississippi, Illinois, Missouri, and Ohio rivers.

A nine-foot operating depth is considered standard for inland channels, and approximately half of the total miles of channel exceeds this level. The Army Corps of Engineers constructs and maintains the inland navigation channels in the United States (except for the New York State Barge Canal system).

### 1700 Shallow-draft Companies

Nationwide, the shallow-draft carriers number 1,700 companies. Of these, 1297 are for-hire carriers; 174 hold common carrier certificates, and 46 hold ICC permits to engage in contract carriage. Exempt for-hire carriers number 1080, and there are about 400 companies performing proprietary transportation. These data do not include ocean-going ships or Great Lakes vessels.

The Federal Government spent some \$7 billion on improvements to aid water navigation between 1917 and 1960. Most of the construction projects involved work on river channels or construction of dams and locks. The Ohio River, for example, was canalized in 1929 by a system of 52 locks and dams. New construction since 1955 will eventually replace this system with nineteen new high-lift locks and lock chambers. Other similar canalization work is under way to extend and improve the system of navigable inland waterways.

In 1912 the Congress passed the Panama Canal Act to assure that the water transportation industry would be able to develop free of railroad control or domination. In 1918 the government went into the barge business with the Federal Barge Lines to assist in defense transportation and to stimulate activity in river transportation. In the early 1950s the Federal Barge Lines came under private ownership and management.

<sup>3</sup>See "What Lies Ahead for the Barge Lines," Traffic Management, August 1962, page 33 and Waterborne Commerce of the U.S.—Part 5, Calendar year 1958. U. S. Army, page 23.

The domestic water carriers were placed under the jurisdiction of the ICC with the passage of the Transportation Act of 1940, known as Part III of the Interstate Commerce Act. This jurisdiction had previously rested with the Federal Maritime Commission. (The Maritime Commission continues to have jurisdiction over traffic between the continental United States and Hawaii and Alaska, as well as over traffic with foreign countries.) Inland and coastal waterway carriers were classified as common or contract carriers and, for reporting purposes, were divided into three groups based upon their average annual operating revenue:

Class A—Annual revenue exceeding \$500,000

Class B—Annual revenue between \$100,000 and \$500,000

Class C—Annual revenue of \$100,000 or less

### Class A and B Revenue \$225 Million

All regulated water carriers report to the ICC annually, and Class A and B carriers are required to furnish quarterly reports.

In 1960, 73 Class A and 32 Class B inland carriers reported operating revenues of \$255 million. Of this amount, the Class A carriers accounted for 96 percent. Operating ratios for the Class A carriers averaged 91.5 percent; those for Class B carriers averaged 98.6 percent.

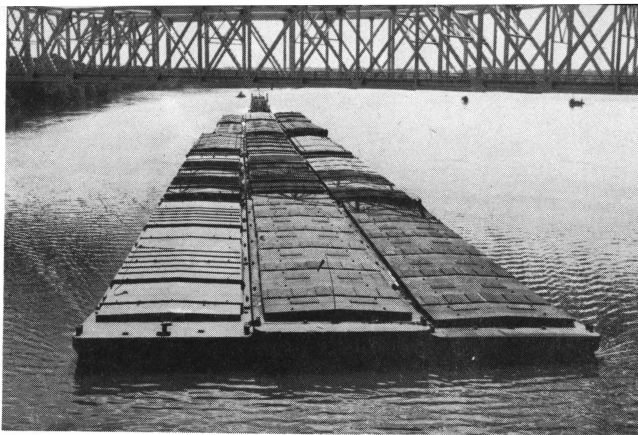
A number of inland water carriers transport only bulk commodities, such as grain, iron ore, coal or liquid cargo. When the cargo space of the vessel is used for the carrying of not more than three different bulk commodities, that cargo may move exempt from economic regulation by the ICC. Liquid petroleum in bulk in certified tank vessels is included in the group subject to exemption from regulation.

The ICC recently estimated that only 10 percent of the total domestic water transport tonnage is subject to

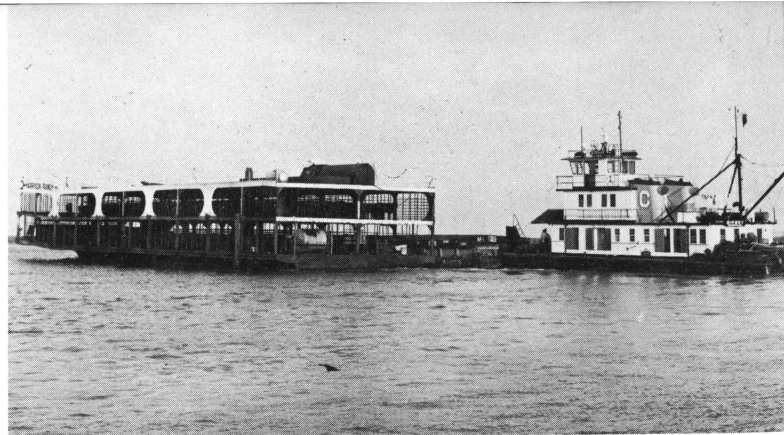
#### Quotable Quote

*"Distribution Economics is a new and vital management tool for firms in many fields whose profit margins are squeezed by rising costs and increased competition."*

*William B. Johnson  
President  
REA Express*



*Left, 15-barge tow of grain on the Illinois River (A. L. Mechling Barge Lines photo). Right, triple-deck cattle barge "Lula Belle" used by Harrison Ranch for experimental shipment of 1000 head of cattle 1200 miles up the Mississippi and Missouri Rivers from Greenville, Miss., to*



*Omaha, Nebr. On loan to the King Ranch, the "Lula Belle" barged 500 steers from Corpus Christi, Tex., 2450 miles to Elizabeth, Pa. The steers gain 10 to 13 percent during their month-long voyage. —King Ranch, Inc., photo*

the jurisdiction of the Commission. The regulated water and rail carriers point out that as regulated carriers they must file rates with the ICC on commodities which many exempt for-hire carriers transport in direct competition. In addition, regulated water carriers contend they cannot obtain full utilization from the larger equipment they have purchased unless allowed to mix non-bulk and exempt commodities in the same tow. The ICC has ruled that the mix is not permissible as the Commission interprets the Act. Litigation with respect to the "mixing rule" is in progress in the Federal courts.

### Move to Diesel Power

Diesel-powered towboats have largely taken over river traffic since World War II. Today, flotillas of barges, assembled in front of the towboat like a raft of logs, move up and down the inland waterways. This mass movement is made possible by a unique towboat design. It has a shallow overhang. Rudders behind and in front of the propellers give forward and backward maneuverability, and a tunnel arrangement on the bottom of the boat raises the water level at the point of propulsion, thus permitting larger-sized propellers. These technological developments have made it possible to operate effectively in restricted channel depths. Although there are two towboats in service on the lower Mississippi which are rated at 8,500 and 9,000 horsepower respectively, the largest boats in general use have 6,000 horsepower. The more typical towboat of approximately 3,200 horsepower can handle from 12,000 to 20,000 tons with ease, depending upon channel conditions.

The size of tows is controlled, of course, by the space available on the rivers. On the Mississippi River, tows of 25,000 to 30,000 tons of revenue freight are common. Standard barges assembled in tows of nine will just fill a 600 foot X 110 foot lock. Loaded to the customary 8 or

8½ foot draft, such a barge will carry about 1,400 net tons.

Modern navigational aids, including radar, telephone, radio, and other electronic devices, have been installed to aid the river boat operator, making possible greater speed and flexibility. River speeds average four to five miles per hour. In a growing number of instances, this rate is being doubled; thus the origin-to-destination time is being progressively reduced.

About 80,000 persons are employed aboard the vessels engaged in inland water transportation. Long hours are the rule because of the necessity for keeping the cargo on the move and the long, slow hauls typical of this industry. The American Waterways Operators, Inc., an association of operators of shallow draft boats and barges on the inland and coastal waterways, has reported the average hourly earnings for all inland water carrier seamen to be about \$2.36 per hour. Crews usually work a twelve-hour day, in six-hours-on and six-hours-off shifts, seven days a week from home port to destination and return.

### VOLUME OF BUSINESS

In 1960 the domestic inland water carriers, excluding those operating on the Great Lakes, hauled almost 400 million tons. Petroleum and coal were the commodities moved in largest volume. Six groups of commodities accounted for 277 million tons, as indicated in Table 4.

Regulated Class A and B water carriers were important carriers of minerals and manufactured items in 1960. (See Table 5.) Note that total tons hauled by regulated carriers amounted to slightly over 100 million tons, of which more than 80 percent fell into two ICC commodity groups. In terms of total revenue, the manufactured items accounted for the largest amount.

TABLE 4 - DOMESTIC WATER TRANSPORTATION, PRINCIPAL COMMODITY MOVEMENTS AND PERCENT TO TOTAL TRAFFIC, 1960.

Commodity Group	Net Tons	Percent
Grain & Grain Products	8,891,464	2.2%
Logs, Lumber & Lumber Products	21,821,211	5.5%
Bituminous Coal & Lignite	88,508,544	22.3%
Petroleum & Petroleum Products	139,378,661	35.2%
Iron & Steel	9,691,800	2.5%
Chemicals	9,099,693	2.3%
Total, Principal Commodities	277,391,373	70.0%
Grand Total, All Commodities	395,250,101	100.0%

Source: Waterborne Commerce of the U.S., 1960 Supplement to Part 5, Department of Army, Corps of Engineers.

Water carriers are important transporters of grain. According to a 1957 Census Bureau study, the domestic grain flow involving line-haul carriage, both in and out of terminal and storage elevators, revealed the following proportions by mode:

	Inbound Tonnage	Outbound Tonnage
Rail	68%	70%
Trucks	19%	7%
Water	13%	23%
Total Tonnage	100%	100%

These figures represented 56 million tons from origins to elevators, and 26 million tons from elevators to destination (foreign and local hauls excluded). The grain volume moved by water varied widely among the different geographic regions of the United States. The percent

of grain shipped by water transportation from origin to terminal elevators was greatest in the northeast and lowest in the southwest, 28 percent and 1 percent, respectively. Outbound water traffic reached 38 percent of all grain transported in 1957 in the West North Central region, in contrast with practically no water transportation in the southwestern area.

The USDA reported water carriers originated a total of 26 million tons of domestic agricultural commodities and farm supplies in 1957. Leading agricultural commodities shipped by water, other than grains, include inedible vegetable products, farm supplies, miscellaneous food products, and animals and animal products. Of the total volume of agricultural commodities moved by water in 1957, more than 90 percent was comprised of these commodities, plus grain and grain preparations.

### One-third Jump in Ag Tonnage

Estimates by USDA researchers indicated the volume of water-borne agricultural tonnage increased about one-third between 1949 and 1957. Forty-four percent of the domestic water-borne agricultural tonnage moved on the rivers in 1957, 29 percent moved coastwise, and 17 percent was involved in lake commerce.

Regulated water carriers derived agricultural commodity revenues in widely varying percentages. Table 6 indicates these proportions by major navigation areas for 1960. Revenue from agricultural traffic exceeded 13 percent on the Mississippi River system. If a detailed breakdown of agriculturally related manufactured items could be readily separated from Commodity Group V, undoubtedly the percentage attributable to agriculture would be substantially greater.

TABLE 5 - TONS OF FREIGHT HAULED AND GROSS REVENUE RECEIVED, BY COMMODITIES, REGULATED CLASS A AND B WATER CARRIERS, INLAND AND COASTAL WATERWAYS, 1960.

Commodity Group*	Total Tons	Per-cent	Total Revenue	Per-cent
I. Products of Agriculture	8,066,089	7.72	19,986,309	10.92
II. Animals and Products	50,928	0.05	340,379	0.19
III. Products of Mines	64,373,952	61.65	74,665,119	40.81
IV. Forest Products	9,540,492	9.14	8,115,359	4.44
V. Manufactured Goods	22,278,383	21.33	78,271,112	42.78
VI. Forwarder Shipments	12,000	0.01	63,000	0.03
VII. LCL Shipments	89,812	0.10	1,512,340	0.83
Grand Total	104,411,652	100.00	182,953,618	100.00

Source: Transport Statistics in the United States. Interstate Commerce Commission. Part V, Water Carriers, 1961, p. 40.

\*Note that due to problems of classification, products derived from agricultural sources are included in all commodity groups, with the possible exception of Group III.

TABLE 6 - REGULATED WATER CARRIER COMMODITY REVENUES BY NAVIGATION AREA, 1960.

(Revenue Figures in Thousands.)

Commodity Group	Atlantic and Gulf		Great Lakes		Mississippi River		Pacific Coast	
	Revenue	Per- cent	Revenue	Per- cent	Revenue	Per- cent	Revenue	Per- cent
I. Products of Agriculture	\$ 1,807	7.7	\$ 3,607	9.6	\$12,725	13.0	\$ 1,848	7.7
II. Animals and Products	83	0.4	2	--	70	0.1	186	0.8
III. Products of Mines	8,354	35.7	24,972	66.3	40,477	41.3	863	3.6
IV. Forest Products	206	0.9	417	1.1	207	0.2	7,285	30.4
V. Manufacturing	11,924	51.0	8,627	22.9	44,283	45.2	13,437	56.0
VI. Forwarder	--	--	--	--	--	--	63	0.2
VII. LCL	1,011	4.3	46	0.1	146	0.2	309	1.3
GRAND TOTAL	\$23,385	100.0	\$37,671	100.0	\$97,908	100.0	\$23,991	100.0

Source: "Transport Statistics in the U.S.": ICC. Part 5, Water Carriers, 1961, p. 40, 50.

## CUSTOMERS AND SERVICES

Specialty barges have been developed for the handling of almost any type of cargo. General purpose dry cargo barges have removable covers which are used for dry cargo, such as grain, sugar, and sulfur. Double-skin barges protect liquids against contamination of minor leaks. Insulated barges are used for handling commodities at a wide range of temperatures, from liquified methane at 258° below zero, to liquid sulfur at 350° above. Air-tight barges protect cement from moisture in the air. Aluminum barges have been built to handle petro-chemicals.

When a shipment moves over the routes of more than one carrier, the rate is referred to as a joint rate. Through routes and joint rates, provided for under ICC regulations, afford coordination of services by different modes of transportation subject to the jurisdiction of the ICC. For example, motor common carriers are permitted to enter into such arrangements with railroad, express, and water common carriers. The rail and water modes may be compelled to establish through routes and joint rates with each other.

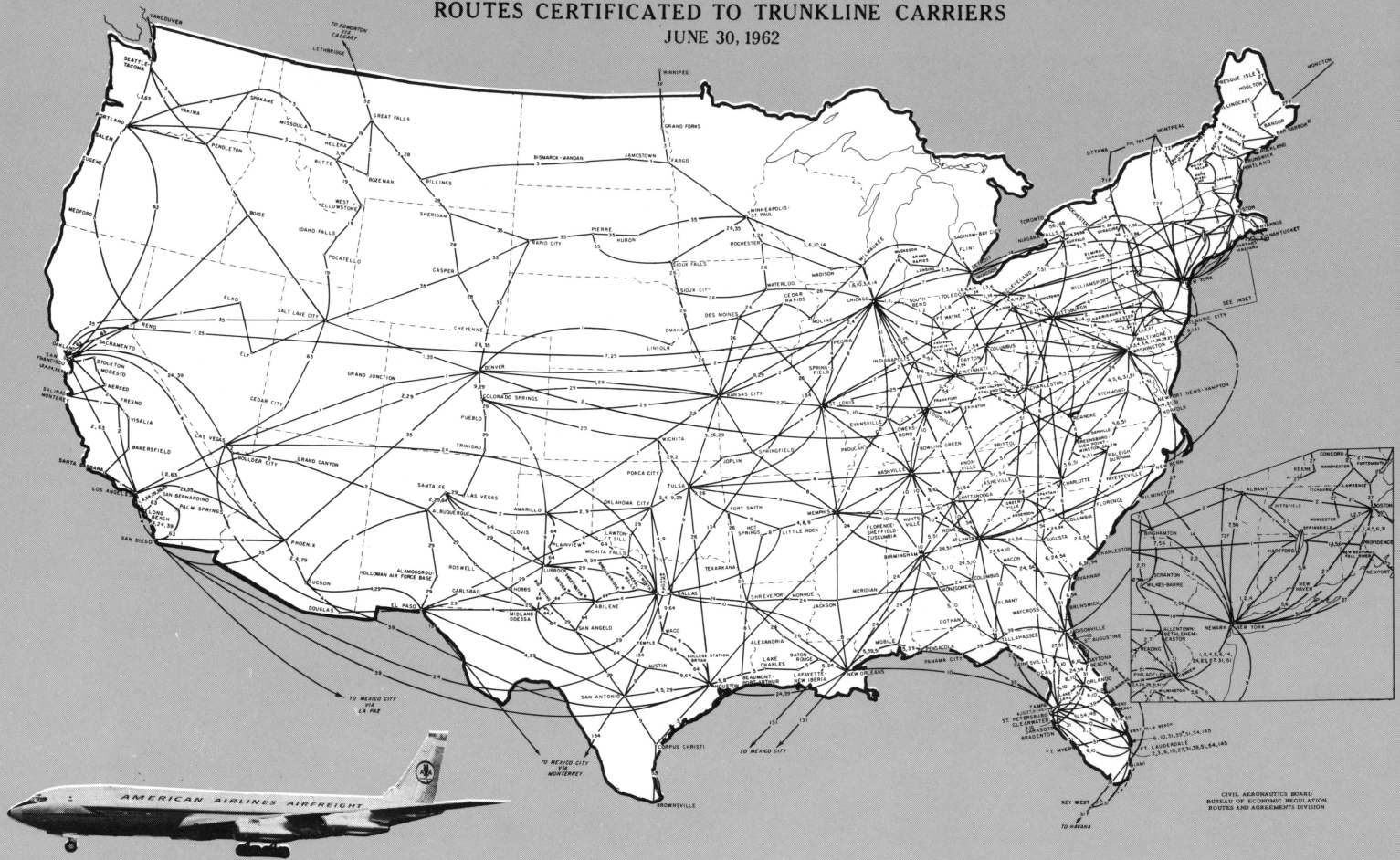
The availability of through routes and joint rates reduces the paper work and centers the responsibility for tracing and damages upon the carrier which attracted the business. The shipper can ascertain the rate for such through movement by consulting a single tariff instead

of many. Generally, joint rates are lower than a combination of local rates of connecting carriers not participating in through service arrangements.

*The "Queen City" with a mixed tow near Madison, Ind. — American Waterways Operators' photo*



**UNITED STATES AIR TRANSPORTATION SYSTEM  
 ROUTES CERTIFICATED TO TRUNKLINE CARRIERS  
 JUNE 30, 1962**



# Air Transport

## GENERAL DESCRIPTION

Domestic United States air freight experienced its first full year of operation in 1946. Since that time, as the youngest member of the transportation network, it has experienced an average annual growth of about 30 percent. Starting as it did from a very small base, such growth is not too surprising. In fact, many of the early-day prophets have been disappointed with the industry up to now, both in terms of volume of business and of net earnings.

Modernization of aircraft is extremely expensive, and the highly competitive nature of the industry has resulted in over-capacity, with painful attendant problems for management. Jet aircraft, although originally designed primarily for passenger service, have given the airlines tremendous extra-cargo capacity. The DC-8 jet passenger plane is said to have more cargo capacity, even with a full passenger load, than an entire DC-4 aircraft. The problem here is to develop the kind of air freight service,

and the demand for it, which will profitably fill the available space.

A comparison of airline operations of the 11 domestic trunkline carriers in 1961 with those of 1957 revealed a 20 percent increase in the number of seat miles (one passenger seat, filled or unfilled, flown one mile). However, the important passenger load factor (the percentage of available seat miles actually sold in scheduled service) dropped from 61.5 percent in 1957 to 56.2 percent in 1961.

These data reflect several significant aspects of available service and utilization. Since domestic trunkline carriers handle by far the largest proportion of air freight traffic in addition to passenger traffic, these figures take on added significance. In many respects, the growth and vitality of air freight transportation hinge upon the domestic trunk airlines. The all-cargo airlines hauled 122 million revenue ton-miles of freight in 1961, compared with 384 million for the domestic trunk airlines.



*Cargo pallets are put aboard freight jets by mechanized loaders. These planes, which can carry 45 tons at up to*

*600 m.p.h., can be fully loaded and unloaded in 40 minutes. — American Airlines photo*

Since the introduction of the jet age in 1959, the major airlines as an industry have faced serious financial problems. For the years 1955 to 1960, net profits (after taxes, interest, and other special items) fluctuated from \$27 million to \$63 million. Depreciation and amortization and interest on long-term debt were relatively low in comparison with conditions since the advent of the jets. The rapid increase in available space, much of it unused, has resulted in excess capacity and substantial losses.

The balance sheets of the major domestic trunk airlines revealed a generally unprofitable 1961. From 1959 to 1961, total operating expenses climbed at a much faster rate (19 percent) than operating revenues (12 percent). Sizable increases in expenses accrued in the interest on long-term debt, flying operations, and depreciation and amortization. Although revenues advanced to a record high in 1961, exceeding \$2 billion, operating expenses and interest resulted in an over-all net loss in 1961 of almost \$35 million. This was the first time since 1948 that earnings of those major carriers which earned a profit were offset by the rest of the industry which lost money, resulting in a net industry deficit.

The new jet freighters are designed to carry 40 to 50 tons of cargo at a speed which will enable them to provide nearly twice as many ton-miles each year as the passenger jets now in use. In addition, it is estimated that the ton-mile costs will be reduced by 35 percent. However, it is a matter of economic necessity at present to sell the extra cargo space in the available passenger jets.

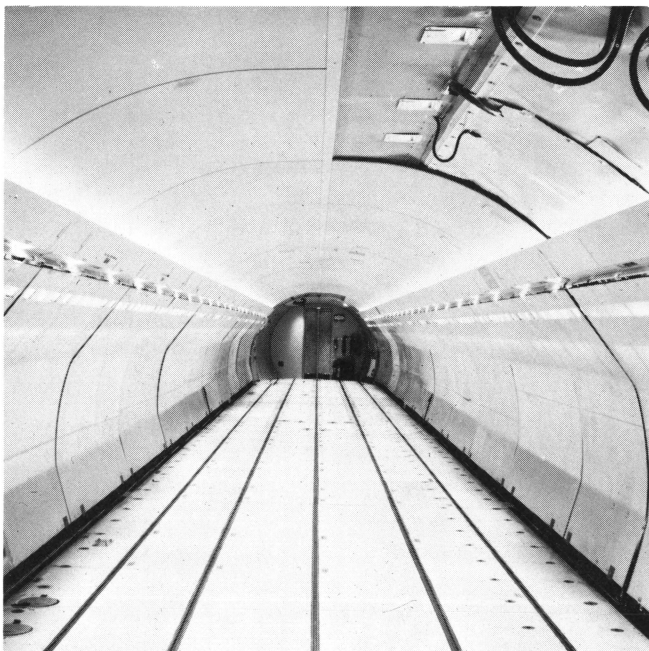
In the past few years, the airlines have come to think of themselves as transportation companies and not just as passenger carriers. The rapid gains in air cargo are very encouraging and more firms are concentrating their efforts on promoting this aspect of their business. The increase in air freight in 1962 over prior years was so great that it is now believed by many in the industry that the big breakthrough has started.

Three major factors will be influential in further air-freight growth: superior aircraft with lower ton mile costs, market stimulation, and reduction in ground handling costs. Air freight rates averaged about 20 cents per ton mile in 1961—about the same as rail express. Truck rates averaged about 6 cents. Many airline officials believe



*Loading operation on Canadair CL 44 swing-tail cargo plane. —Flying Tiger Line photo*

*Interior view of Boeing 707 cargo jet with capacity of up to 96,000 lbs. —Boeing Co. photo*



*Airlines and plane manufacturers have developed advanced cargo handling equipment to speed loading. —American Airlines photo*



that new turboprop planes designed for cargo and the use of improved ground handling facilities will reduce costs to 15 cents per ton mile (possibly as low as 10 cents) in the near future, if the volume of traffic can be increased and the available plane capacity more fully utilized.

International and territorial freight revenues of United States carriers increased tenfold in the last 10 years. United States airlines currently carry about 52 percent of total overseas air freight volume; they feel that rate cuts could expand this market further. Although the cargo moved abroad is not large, the market appears to be growing rapidly.

## REGULATION

The Civil Aeronautics Board, as an independent regulatory agency, has the fundamental responsibility under the Federal Aviation Act of 1958 to promote, encourage, and develop civil aviation in order that it may be properly adapted to the present and future needs of the foreign and domestic commerce of the United States, the Postal Service, and the national defense. Among their major activities is the regulation of fares and rates for carriage of persons and property.

Air carriers are certificated as *common carriers* or *commercial contract carriers*. The scheduled operations of the *combination carriers* (primarily the major domestic trunk airlines which carry cargo in passenger aircraft and in all-cargo aircraft) fall within the common carrier classification. The domestic local service lines are also certificated by the CAB as common carriers. The all-cargo lines operate under temporary common carrier certificates authorizing scheduled cargo flights, mostly between designated areas in the United States. The contract carriers are private carriers for hire and, as such are not now subject to the economic provisions of the Federal Aviation Act.

Contract carriage or air charter service has attained sizable ton-mileage in the transportation of passengers. Because of its lower cost to shippers, contract air cargo is expected to grow. In 1956, air contract volume totaled 165.4 million ton miles. In 1960, the traffic of all air charter service totaled 275 million ton-miles, a 66 percent increase.

## VOLUME OF TRAFFIC

Three major methods are available for shipment of property by air: airmail, air express, and air freight. Data

can be reported for these methods of shipment but figures for specific commodities shipped by air are not available.

In 1961, the scheduled airline system handled a record volume of 795,113,000 ton miles of domestic air freight and express. This type of traffic accounted for 14.6 percent of total U. S. airline ton miles (which also includes passengers, mail, excess baggage and charter flights). American, Eastern, TWA, and United (the big four trunk lines) scheduled 315,161,000 ton miles in 1961, or almost 40 percent of the total cargo revenue ton miles.

Total U. S. mail volume of about 300 million ton miles in 1961 accounted for 5.5 percent of the total revenue ton miles by the airlines, and 3.8 percent of total revenues, ranking well behind freight and passenger traffic revenues.

The difference between air express and air freight is chiefly in the quality of service rendered. Ordinarily, air express receives priority in shipment, and deliveries between airport and city are more frequent, whereas air freight delivery and pickup may be limited to business days and hours. Under an arrangement with the major airlines REA Express performs customer services for air express shipments.

More than 26,000 tons of agricultural commodities were moved by five major airlines in 1961, a 63 percent increase over 1959. Much of this increase may be attributed to improved handling methods which reduced the ground time of aircraft by almost one-half, thus making it more profitable for the airlines to compete for this type of freight.

Cut flowers, baby chicks, fresh fruits and vegetables and horticultural products constituted the bulk of the movement. It has been found that air freight service can cope with most price fluctuations in the markets, due to speed of delivery.

Airline cargo managers believe agriculture presents a very fertile field for future expansion, although raw materials from the forests, mines, and farms may never become major traffic for the air freight industry.

## CUSTOMERS AND SERVICES

In today's jet cargo transportation, the airline management must strive to unload up to 100,000 pounds of freight from a big jetliner and reload up to 100,000 pounds while the plane is on the ground only long enough to refuel. Air carriers have not reached this ultimate goal, but the fact remains that they cannot afford

TABLE 7 - SOURCES OF U. S. AIRLINE REVENUES, SELECTED YEARS.

	Total Revenues	Passengers	Freight	Express	Mail	Other
1950 -	839,920,000	72%	5%	3%	15%	5%
1955 -	1,643,412,000	83%	6%	1%	3%	7%
1960 -	2,884,779,000	83%	6%	1%	3%	7%
1961 *	3,073,292,000	81%	6%	1%	4%	8%

\* - estimated

Source - Air Transportation Magazine. October 1962, p 93.



*Special unit pack containers are expanding airfreight market for perishables that require refrigeration.  
—Trans-World Airlines photo*

to have a very expensive piece of equipment sitting idly on the ground because of inefficient handling of cargo. Great strides are being made in the materials handling aspects to reduce cargo terminal time. Mechanization through power conveyors, pallets, and containerization are now in use or being contemplated by several major airlines to expedite cargo handling.

Communication has been improved to the point where private wire telephone systems across the country are being used to transact business and to complement the speed of flight.

Another service to customers which is provided by the airlines concerns pickup and delivery. The airlines own a service organization called Air Cargo, Inc. which formerly was a division of Air Transport Association of America. It is responsible for setting policy and establishing contracts with some 400 contract truckers for pickup and delivery service, based upon the idea that it is cheaper and better to have one trucker go to the airport to meet the planes and deliver cargo to the carriers than to have numerous truckers meet numerous airplanes. Air Cargo, Inc., is a clearing house for this operation and does all the billing. Many truckers regulated by the ICC are registered in the Air Cargo, Inc., directory. The CAB has a commercial zone rule covering pickup and delivery incidental to air freight, within which no ICC rights are required. Within this zone from the airport, unregulated pickup and delivery service is provided by

the domestic and international airlines.

Interline services are available, such as air-truck, air-rail freight, and of course inter-airline services.

The significance of air transportation in inter-city flow of freight traffic lies in its ability to supply a quality of service unique in the transportation industry. If for no other reason than sheer speed, air transportation provides a very special service to both shipper and receiver. In many situations, only minimum crating or packaging is required, with additional savings in uncrating at the other end because the smoothness of air transport reduces the possibility of breakage. It is also possible to reduce the amount of inventory and warehousing that must be carried at a particular point by the shipper.

Of course, in order to pay for the element of speed, shipments usually represent a high unit value. Air rates are generally significantly higher than surface freight rates.

Inadequate terminal facilities for moving quantities of freight are a limiting factor with some airlines, particularly in the medium-sized and smaller cities. To some extent, airplane requirements and airport limitations hinder air transport due to the weight of the shipments. Cities vary widely in their range of permissible runway weight requirements. Airplane cargoes usually vary from 100 to 15,000 pounds, although the DC-7 all-cargo planes are equipped to haul 15 tons of cargo, and the jet liners haul up to 50 tons.

# Freight Forwarders

## GENERAL DESCRIPTION

Freight forwarders are an important and growing industry, but they do not comprise a large percentage of the total surface transportation service. Data are not available to show the significance of freight forwarders in agricultural transportation, but it is considered to be relatively small.

A freight forwarder consolidates a number of small shipments into truck loads, car loads, or plane loads and arranges for a motor carrier to transport and deliver them to a consolidating station. The forwarder also assumes responsibility for these shipments from origin to destination. To perform these services, he uses the transportation services of regulated carriers. At the forwarder's terminal, the small shipments are pooled or combined with other shipments. Then, the forwarder reships, usually by railroad. However, in recent years motor carriers have been receiving a larger percentage of the transportation expenditures of freight forwarders. The freight is terminated at a point near the destination of the consignment, where arrangements are made for the final movement of the individual shipments to the various consignees.

The net earnings of the forwarder result from the difference in the sum of the rates which he pays to transportation companies for the services rendered and the rate paid to him by the owner of the goods, less his own operating expense. For example, the forwarder collects a less-than-car-load rate from the owner of the goods and pays the common carrier on the basis of a car-load rate. Supposedly there is enough spread between these categories in the line-haul carrier tariffs to yield the forwarder a profit.

In 1960 a total of 87 freight forwarders reported operating revenues of \$442.4 million to the Interstate Commerce Commission. This group paid over \$300 million for transportation services, and the distribution was allocated among carriers as follows:

Railroad	60.8%
Motor Carriers	19.0%
Pickup, Delivery, and Transfer	19.0%
Water	0.6%
Other	0.6%

From a gross revenue of over \$437 million in 1960, 64 Class A forwarding companies (those reporting annual revenues of \$100 thousand or more) reported net income after taxes of \$2.8 million. They handled more than 23 million shipments, comprising more than 8 billion pounds in 1960. The three largest companies received almost 50 percent of total freight forwarder revenues in 1960.

Freight forwarders first came under regulation by the Interstate Commerce Commission in 1942. Coopera-

tive organizations handling agricultural commodities, fish, livestock, and used household goods are all exempt from regulation under the Act. Also, shippers or shippers associations operating on a nonprofit basis are exempt from regulation. These are enterprises which operate like forwarders to the extent that they assemble and consolidate small shipments into carload or truckload lots. These "pool car operators" are not required to publish rates, and they operate technically as nonprofit organizations. Consequently, they enjoy a measure of freedom denied to freight forwarders. It has been said that there are almost as many operators claiming to be exempt as there are regulated freight forwarders, although the regulatory statute covers a substantial group of firms.

## Do Not Act as Carriers

The Interstate Commerce Commission is required to issue a permit to any qualified applicant who is then subject to terms and conditions similar to those for motor carriers. The permits, however, do not authorize a forwarder to conduct carrier operations except in a terminal area for collection, delivery, or transfer purposes. The Act specifically requires freight forwarders to employ only the transportation service of common carriers except in and around terminal areas. The principal effect of bringing forwarders under regulation has been to bring the business practices of the forwarder (particularly with respect to rate arrangements with the carriers) under control of the ICC.

The forwarding industry varies from firms operating in a small area with only a few thousand dollars invested, to the very large organizations controlling hundreds of railroad flat cars and trailer vans. In recent years, several major common carriers have purchased freight forwarding companies to augment their line-haul services. There are a few forwarders who actively offer nationwide services.

Of course, the primary function performed by forwarders is to provide single-carrier service to shippers who do not normally ship in carload or truckload quantities. With the rapid expansion of piggyback service, the freight forwarders have aggressively pursued plans favorable to shippers of limited quantities. Plans III and IV for piggyback service are available to shippers and freight forwarders who are able to buy or lease trailer vans, flat cars, or both and thus qualify for the ramp-to-ramp or the flat per-car rates charged by the railroads. The larger forwarder can acquire trailers and flat cars, and in many cases he is therefore given a flat rate low enough to permit him to compete with truck transportation.

CPT 3  
PRIVATELY OWNED  
&  
LEASED  
TRANSPORT



# Private Carriage



*Private fleet reefer container trucks enable meat packer to deliver individual shipments at constant temperatures with minimum delay. —George A. Hormel & Co. photo*

## GENERAL DESCRIPTION

Private carriage is the practice by a company primarily engaged in a business other than trucking or hauling its own goods in its own trucks. The trucks may be owned or leased. They may go anywhere without special authority, and they need only observe state licensing and ICC safety regulations.

Reliable figures have been difficult to obtain in the private carriage sector of the trucking industry. In 1956, a *Fleet Owner* magazine survey of truck fleets in the United States reported a total of 48,699 fleets of 10 or more vehicles under private operation, representing more than 75 percent of all such fleets reported. The breakdown as to type of operation is given in Table 8.

TABLE 8 - TRUCK FLEETS WITH TEN OR MORE VEHICLES IN THE UNITED STATES, 1956.

Industry	No. of Fleets	Percent
For hire carriers	15,063	24
Food distribution	12,923	21
Government	7,357	11
Construction and mining	9,880	16
Industrial	4,002	6
Petroleum products	2,980	5
Public Utilities	3,415	5
Wholesale and retail	6,379	10
Truck rental, misc.	1,763	2
<b>TOTALS</b>	<b>63,762</b>	<b>100</b>

Source: Address by Editor of *Fleet Owner* magazine at 18th Annual Meeting of Private Truck Council, St. Louis, Missouri, Jan. 31--Feb. 1, 1957.

These data revealed 20,000 more fleets than anyone had estimated up to 1956. Fleets of less than 10 vehicles were not counted.

A more recent report in the June, 1962, issue of *Dun's Review* estimated that 85 percent of America's nearly 12 million motor trucks are operated in private carriage. Included in this figure are the huge tankers of petroleum companies, as well as the pick-up trucks operated by the farmer or the telephone company.

The ICC estimated the number of private carriers subject to their safety jurisdiction on June 30, 1961, to be 76,500.

The Transportation Center at Northwestern University recently surveyed transportation practices of some 10,000 manufacturing companies. The preliminary results of the two-year study indicated that private carriage may not have grown as fast as many had thought, although from 1943 to 1958 the private carriage rate of gain in inter-city ton-miles exceeded that of common carriers.

Examples of enterprises which use sizable numbers of company-owned fleets include baking companies, public utilities, dairies, meat packers, and petroleum companies. Not to be overlooked are the thousands of single-truck farm operators and small businesses.

## The "Primary Business" Test

One significant problem the ICC faced was to define under what conditions a company fleet represented bona fide private carriage. The Commission developed the "primary business" test to determine whether the primary function of the enterprise is a non-carrier activity. This test requires that a company be engaged in a primary business other than trucking, and must operate its own trucks in interstate commerce only in furtherance of the primary business. The "primary business" test was incorporated in the Transportation Act of 1958.



*Another container system for transporting temperature-sensitive foods over long distances without mechanical refrigeration. Containers may be loaded or unloaded by one man with ramp and winch.  
—AVCO Corp. photo*

There are several reasons why a manager may decide to enter private carriage. He may think he can supply his own transportation service more cheaply than he can buy it from a common carrier. He may consider that he can better satisfy his customers. The transportation equipment will be readily available, and he can control the operation, thus assuring himself of flexibility. In-transit time can be controlled, thereby improving inventory control. In some instances, private carriage will permit service to customers at points not adequately served by certificated carriers.

If company-owned trucks stop off on the return trip to the plant and pick up needed raw materials and supplies, further over-all economies are frequently realized. There are no regulations to preclude the backhaul of exempt agricultural commodities, assuming equipment is appropriate.

### Some Disadvantages

On the other hand, a company acquiring its own fleet of trucks ties up considerable capital which might better be allocated to other functions of the primary business. Operation of a truck fleet might also involve new and difficult labor-management relations problems.

Many shippers employ the services of both for-hire carriers and private carriage. In most cases transportation savings are not the sole reason for shipper-operated trucks. Many companies consider the benefits of direct control over their own shipments to be more important than showing a profit from their trucking operations.

The private carrier is a competitor for freight traffic in the sense that he moves freight which for-hire carriers would like to handle. This influence carries over into rate-making, because the certificated motor carriers and the railroads, in order to compete, must maintain

rates sufficiently low to attract traffic and prevent further diversion to private trucking. Private carrier transportation costs therefore provide an important benchmark in rate-making.

### Concentrate on Short Hauls

The activities of private carriage bear most heavily upon the relatively short hauls up to 100 miles. Many common carriers have found important revenue freight, sometimes the "cream of the traffic," was going in company-owned fleets, leaving the less desirable and less profitable cargo for the regulated carriers.

An Interstate Commerce Commission study in 1955 disclosed that in that year the ICC certificated carriers handled 39 percent of the total ton-miles on main rural roads, compared with 14 percent for other for-hire carriers and 47 percent for private carriers.

The assembly of inter-city ton-mile data for private carriage is difficult to achieve because private truck opera-

### Quotable Quote

*"Physical distribution is simply the centralized control of all factors that are involved in moving products between the end of the production line and the customer. To those corporations competing in a struggle for markets, profits, and sometimes survival, this race for improved management of physical distribution is deadly serious."*

*Rhodes C. Berrey,  
Vice President  
U. S. Gypsum Company*

tions are incidental to their primary business of farming, manufacturing, mining, etc. Most bakeries, dairies, soft drink bottlers, wholesale grocers and many other distributors operating home-to-home or store-to-store, seldom sell in units of weight. Thus, for these carriers ton-mile data is difficult, if not impossible, to determine.

### Many Co-ops Have Fleets

Many of the nation's more than 9,000 agricultural cooperatives operate fleets of trucks to supply the purchasing and marketing needs of their members. A recent Farmer Cooperative Service inventory indicates that as of January 1, 1961, farmer cooperatives in the United States owned or leased 33,000 straight trucks, truck-tractors, truck-trailers and semi-trailers. These units were being operated more than 650 million miles per year, of which 28 percent was over-the-road (inter-city) and 72 percent represented local pickup and delivery operations.

It is the judgment of several experienced cooperative transportation executives that many of these firms purchase substantially more transportation services than they supply privately. Some cooperatives may use private carriage because certain products have characteristics that do not lend themselves to regular common carriage. For example, a company may use its own trucks or leased units in situations calling for specialized equipment to truck chemicals or bulk feed direct to the farm premises.

In today's investment climate, shippers are more inclined than ever before to look long and hard at proposed transportation investments. Private carriage involves selecting and hiring of drivers, taking out insurance, maintaining vehicles, and paying for licenses, taxes, fines, and other highway use penalties. Management of a transportation service requires specialized skills and may involve hidden and unexpected costs. Establishment of a truck fleet operation as an adjunct to a primary business should be undertaken only after a detailed evaluation has established sound and compelling reasons for such a move.

### Leased Transport

According to a report in the November, 1962, *Distribution Age*, the equipment leasing business is the fastest growing business in the United States. The report estimated a 1962 expenditure of one billion dollars for leased trucks, rail cars, and materials handling equipment.

Leasing enables a company to obtain the use of equipment without the need for capital outlay, thus freeing cash reserves or credit for other purposes. Other advantages cited are more precise knowledge and predictability of operating costs, and the availability of more reliable and better appearing equipment.

In the trucking industry, a differentiation can be made between leasing and truck rental. Truck rental is identical to leasing except that the equipment is contracted for on a short-time basis, such as an hour, week, or month. Leasing involves a long-term arrangement between the lessor and the user or lessee. Generally, the lessor is in the business of leasing equipment and provides full maintenance service. (A full service lease usually includes fuel, repairs, tires, lubrication, garaging, and insurance; in fact, everything except the driver.) Some truck manufacturers are moving into the leasing of new equipment, and some of the larger transportation firms also lease equipment to customers or to other carriers under a number of different arrangements.

### 2% Under Long-Term Leases

About 2 percent of the nation's trucks (between 250,000 to 300,000) are under long-term leases. Sixty percent of these vehicles are used in local delivery by wholesalers, jobbers, service trades, and retailers. According to one leasing operator, another 30 percent of the full service lease fleet is operated by private carriers over the road. Control of the vehicle is wholly with the customer.

Generally, the two broad types of truck leasing arrangements are the maintenance lease and the owner-operator lease. The former is a long term truck lease under which the lessor is ordinarily responsible for truck maintenance, lubrication, tires, taxes, licenses, and some kinds of insurance. The lessee usually pays for fuel, oil, driver's wages, painting, washing, and some insurance. The owner-operator lease covers both the truck and its owner. The owner of the truck is paid a fee both for his driving service and for the use of the truck. The actual operating expenses are assumed by the truck owner.

The maintenance type of lease seems to be the more popular of the two.

Leaders in the leasing business are reportedly optimistic that the full-service leasing industry will continue to grow by at least 20 percent over the next decade.

CPT 4  
MANAGEMENT PROBLEMS  
OF  
CARRIER & SHIPPER  
FIRMS

# Management Problems

## Excerpts From President Kennedy's Message to

*"Pressing problems are burdening our national transportation system, jeopardizing the progress and security on which we depend. A chaotic patch-work of inconsistent and often obsolete legislation and regulation has evolved from a history of specific actions addressed to specific problems of specific industries at specific times. This patchwork does not fully reflect either the dramatic changes in technology of the past half century or the parallel changes in the structure of competition."*

*"The regulatory commissions are required to make thousands of detailed decisions based on out-of-date standards."*

Recent public attention has focused upon the more dramatic aspects of our transportation problems. Luther N. Hodges, Secretary of Commerce, has warned that the U. S. transportation system is in serious trouble, and calls for strong corrective measures to head off a threatened series of bankruptcies and shut-downs of service. After two presidential commission reports, a Supreme Court decision and various legislative proposals, the railroads' plans for modernizing the work rules under which they operate are still hotly debated, and have been made subject to compulsory arbitration by an Act of Congress.

On April 5, 1962, President Kennedy sent to Congress a comprehensive transportation message in which he stated that "few areas of public concern are more basic to our progress as a nation." The excerpts above from that message highlight some of the major difficulties encountered by transportation within the established regulatory framework under which it must function.

### Message Stirred Much Soul-Searching

As might be expected, President Kennedy's Transportation Message, with its set of legislative proposals, had a rather uneven reception both in transportation and in government circles. It has served to stir much discussion and soul-searching within the industry, the halls of Congress, and the regulatory agencies as to the true character and remedies of our transportation problems.

Industry leaders have been much preoccupied with legislative provisions and regulatory rules and practices as they affect the freedom of transportation management to deal with problems of pricing, service, competition, financial and managerial organization, and control. This

is understandable because the competitive position and even the very life of a firm or of a given segment of the industry may be dependent upon the regulatory provisions on the books and the way in which they are applied.

Following is a list of public policy, legislative, or regulatory types of problems which are of primary interest and concern in the transportation industry:

- a. Variations in size and weight limitations for motor trucks established by the states.
- b. Differences of approach among the states in taxation of motor trucks, and lack of reciprocity provisions in some tax laws.
- c. Discriminatory taxes levied against the operations of individual modes of transportation.
- d. Legislative and regulatory control measures for illegal trucking practices and other transportation practices not in the public interest.
- e. Enforcement of safety regulations.
- f. Restrictions of competition through minimum rate control as applied to some carriers, but not to others, in the hauling of agricultural and bulk commodities.
- g. The question of firm size and ownership control—mergers within a mode and single ownership of two or more modes.
- h. Governmental treatment of competing modes in such matters as provision and maintenance of rights of way, assessment of user charges, etc.
- i. The right of a firm to entry or abandonment of a route or a transportation enterprise.

## Congress on Transportation, April 5, 1962

*The management of the various modes of transportation is subjected to excessive, cumbersome and time-consuming regulatory supervision that shackles and distorts managerial initiative. Some parts of the transportation industry are restrained unnecessarily; others are promoted or taxed unevenly and inconsistently."*

*"Some carriers are required to provide, at a loss, services for which there is little demand. Some carriers are required to charge rates which are high in relation to cost in order to shelter competing carriers. Some carriers are prevented from making full use of their capacity by restrictions on*

*freedom to solicit business or adjust rates. Restraints on cost-reducing rivalry in ratemaking often cause competition to take the form of cost-increasing rivalry—such as excessive promotion and traffic solicitation, or excessive frequency of service.*

*"Some carriers are subject to rate regulation on the transportation of particular commodities while other carriers, competing for the same traffic, are exempt. Some carriers benefit from public facilities provided for their use, while others do not; and of those enjoying the use of public facilities, some bear a large part of the cost, while others bear little or none."*

The competitive forces at work in transportation are a matter of increasing interest both in industry and in government. Admittedly, in an industry in which government and its regulatory and taxing agencies are so deeply involved, the role of public policy can be decisive in the competitive struggle.

As pointed out in 1959 by John J. Allen, Jr., then Undersecretary of Commerce for Transportation, this influence of public policy has wide significance. A regulatory standard can have the effect of denying traffic to one mode and promoting the growth of others. By providing public facilities, government can encourage the growth of one form of transportation at the expense of others. By using its bargaining power in the transport market, Government, as a user of transport services, can bring about the injury of important segments of the industry. On the other hand, public policy can be used to bring about higher standards of service, economy for shippers, and the advancement of the public welfare through a better national system of transportation.

Intensified competition for available traffic has complicated the problems of the carriers. Among the various modes of carriage, regulated and unregulated, the struggle for special advantage or self-preservation continues, bringing into play such weapons as rate-cutting, improved technology and service, and efforts toward legislative imposition of handicaps on competitors. Interstate Commerce Commissioner Kenneth H. Tuggle emphasizes that some of today's most pressing problems in transportation revolve around the gradually diminishing share of inter-city tonnage received by common carriers, and their competitive efforts to stem the tide. The competitive im-

pact has been heightened by the fact that total carrier investment and capacity have expanded at a rate exceeding the growth of the gross national product and the available volume of traffic, thus resulting in an excess of total transport capacity unequalled in history.

Students of transportation have emphasized that each mode of carriage has certain inherent advantages over the others. For example, a comprehensive shipper survey of some years ago to determine why truck service was used in preference to rail for small (LTL) shipments, indicated the following reasons, listed in order of their importance: Faster service, cheaper total cost, store-door delivery, more flexible or convenient service, store-door pickup, cheaper packing, late acceptance, simpler classification of rates, and less damage to or loss of freight.

Conversely, the railroads excel in handling volume shipments over longer distances, and in other ways.

### Quotable Quote

*"The far-reaching changes in America's distribution complex . . . require a new type of transportation man with a new type of education to manage the new types of problems sure to be encountered."*

*William B. Johnson  
President  
REA Express*

A characteristic of the transportation scene has been the preoccupation of segments of the industry with efforts to obstruct the progress of competing modes by legislative barriers. Today, increased attention is being given to improved technology which will narrow the advantage of a competing mode or take fuller advantage of some special endowment.

The development of piggyback service, which combines flexibility of motor carriage with the long-haul economies and volume capabilities of rail transportation, falls in this category. Another thrust in the direction of utilizing the unique advantages of different types of carriage is the effort toward standardization and interchangeability of the carrying units. This permits more effective coordination among the different modes of transport. Given reasonable cooperation in development and operational phases among the agencies involved, containerization and unit handling of products could revolutionize transportation and materials handling.

### Engineering the Smallest Problem

As pointed out by Morris Forgash, president of the United States Freight Company, this will involve tough problems of engineering, compromise of viewpoint, and pricing of new services. Mr. Forgash goes on to say, "The least of these is the engineering problem. We have the inventive and productive skill and ability to produce anything we agree upon. The elusive problems are the intangibles—the meeting of minds on basic standards, the acceptance of new ideas, the approval and acceptance of new pricing structures tailored to meet new and radically different concepts of service."

In these areas of new and promising ideas, new technology and new research findings that lower costs and improve service, the Extension transportation specialist can perform a most useful function. By encouraging new concepts and approaches among transportation decision-makers, and by bringing together representatives of the various distribution functions to consider mutual problems, the Extension specialist may often help to resolve differences and solve problems in the public interest.

### Extension Worker's Role

One area in which the assistance of the Extension specialist can be most helpful is that of shipper-carrier relations. There is a continuing need for these groups to be interpreted to each other by a third party with an objective frame of reference, a party in whom both groups can place their confidence. Some of the most stubborn perennial problems in this field arise out of the inability or refusal of either group to understand and appreciate the other's point of view. The Extension worker must recognize, however, that both groups are a part of his clientele and his usefulness in this role will continue only so long as he is able to maintain his own objectivity and

serve as a moderating and constructive influence in identifying and pursuing useful common goals.

The swing of transportation firms toward the adoption of a customer-oriented marketing concept in shaping policy and establishing planning goals has helped to create a favorable climate for improved shipper-carrier relations. Carriers as a group are more alert than ever before to customer attitudes toward their service.

### Suggested Rail Service Changes

*Railway Age* recently surveyed a group of industrial traffic managers on the question, "Which one or more of the following changes might cause you to increase your use of rail freight service, in relation to your total use of all transport?" The following tabulation of the changes listed and the number of times each was indicated by a respondent offers some clues as to the carrier service features which are of particular concern to shippers:

Suggested Changes	Number of times cited
Wider application of "incentive rates," of any type	50
Faster Service	48
More dependable service	44
More TOFC service	26
Better LCL service	24
Better car supply	22
Less loss and damage	19
More specialized cars	17
Cleaner cars	16
Improved sales techniques	5
Other	18

For their part, the carriers complain of such shipper practices as bringing pressure to bear on individual carriers to file uneconomic special rates for specific commodities or to refuse participation in rate increases considered by the carriers to be necessary to meet rising costs. They contend that shipper pressure is responsible for much of the illegal or "gray area" transportation which is claimed by some authorities to represent a significant proportion of total trucking volume today.

Another carrier complaint is that some shippers threaten loss of traffic to induce the carrier to violate tariff provisions having to do with loading or unloading, stops in transit, or other special services.

### Agriculture's Transportation Problems

A representative group of transportation specialists in cooperative marketing associations and agricultural cooperative-related enterprises were asked recently to list transportation problems which would most affect the progress of agriculture.

Replies were received from 23 respondents geographically distributed as follows:

Pacific Region	3
West North Central Region	6
West South Central Region	1
East North Central Region	7
East South Central Region	2
New England Region	1
South East Region	3
Total	<u>23</u>

Transportation problems cited by these respondents as being of major importance to agriculture may be summarized as follows:

<u>Problem Category</u>	<u>Number of Times Cited</u>
<u>Rates and Charges; Cost of Service</u>	
a. Need for minimum rate regulation to avoid destructive competition.	1
b. Elimination of free terminal privileges.	1
c. High labor cost encouraging "gray area" transportation.	1
d. Inadequate information on exempt commodity rates.	2
e. Need for incentive and volume rates.	4
f. Need for joint water, rail and truck rates	1
g. Maintenance of competitive balance between rates on raw materials.	1
h. Better methods of determining cost of service	1
i. Preferential rate treatment given government traffic.	1
<u>Service and Equipment</u>	
a. Availability and adequacy of equipment and facilities	
1. Equipment shortages.	4
2. Need for special equipment.	6
3. Adequacy of facilities.	3
b. Adequacy of service	
1. Service deficiencies of common carriers	9
c. Adequacy of information on services offered.	1
d. Private truck fleet operation vs. common carrier services.	3
<u>Structure of Transportation Industry</u>	
a. Mergers of Common carriers and their effect on available services	4



*Western doubles tractor-trailer outfit pulls into agricultural inspection station at Oregon-California boundary with a load of produce. —Consolidated Freightways photo*

Carrier-Shipper Relations

- a. Need for carrier consultation with traffic managers on matters of mutual interest and concern. 1
- b. Effective development and utilization of piggyback service. 1

Labor Relations

- a. Elimination of make-work rules and practices. 2

Management Role of Traffic Specialist

- a. Upgrading of management influence and compensation of traffic personnel. 2

Regulation and Taxation

- a. Exemption from regulation
  - 1. Continuation and protection of agricultural and/or cooperative exemption. 10
  - 2. Extension of agricultural and /or bulk commodity exemption to the railroads. 3

**Quotable Quote**

*"The complexities of modern transportation are so enormous that there is a real danger even excellent transportation men may bog down in their particular specialization, overlooking the fact that the complexities of the entire economic structure require knowledge on the part of the traffic man of the larger area beyond his own immediate field."*

*Robert A. Blocki  
Kraft Foods  
Chicago, Illinois*

<u>Problem Category</u>	<u>Number of Times Cited</u>
b. Economic effects of regulatory practices	
1. Failure of ICC to grant trucker permits for specific hauls as needed.	1
2. Need for relaxation of piggyback "mixture rule"	1
3. Need for more freedom in pricing.	2
4. Need to keep control of transportation in the ICC.	1
c. Shipper restrictions	
1. Need for greater freedom of routing by shippers.	1
d. Taxation and user-charges for transportation services.	
1. Proposed fuel tax on waterway transportation.	1
e. Uniformity and reciprocity in state regulations and truck licensing.	
1. Need for uniform reciprocity agreements.	1

It is noteworthy that in the comments of the respondents the focal points of concern were problems related to regulation and taxation (21 citations) and those having to do with service and equipment (26 citations).

The Extension transportation specialist should be well informed on problems of public policy and regulation as they relate to the health and efficiency of transportation enterprises. He should seek through educational means to encourage an objective understanding and evaluation of these problems by all segments of his clientele. However, his major contribution will ordinarily be in the area of internal firm management, through encouraging adoption of the new and improved concepts and methods flowing from transportation research and from experimentation on related problems in other fields of industry. This area offers the greatest opportunity for achieving improved efficiency and lower cost of transportation services, which should be in the interest of both the carrier and the shipper.

### **Much Room for Advancement**

There are broad opportunities for accomplishment in this field. Physical distribution has been characterized as the last great frontier in the application of advanced industrial technology and managerial know-how. Much can be accomplished by helping upgrade the general level of performance to that being achieved by the best operators in the industry. Here the demonstration firm educational method offers unique possibilities.

The problems to be dealt with range through the full spectrum of management responsibility. They will

vary in priority with individual modes or segments of the industry and with individual firms. Field work with industry associations and individual firms and surveys of the current literature dealing with transportation and physical distribution indicate a general need for study and improvement in the following problem areas of management:

*Definition of management objectives.*

*Long range planning.*

*Problem identification and the process of decision-making.*

*Management organization, reporting, and control.*

*Personnel development and administration.*

*Job specifications and standards.*

*Recruiting and selection.*

*Job training; development of personnel potential.*

*Wage and salary administration.*

*Management-personnel communication; motivation and incentives.*

*Equipment specifications, development, and maintenance.*

*Methods and facilities engineering; operations research; equipment utilization; functional performance standards.*

*Office systems; communications and reporting; analysis of operating results.*

*Cost analysis; pricing concepts.*

*Application of advanced marketing concepts and methods.*

Current transportation research in some of these areas will be helpful to the specialist. (See the summary of current research activities in a later section of this handbook.) He should also become familiar with the output of information sources listed in the last section and should review regularly a selected list of periodical publications in the transportation field. In his search for useful concepts and methods, the transportation specialist should not limit himself to transportation sources. Some of his best results may be obtained through application of ideas gleaned from management journals, such as *Advanced Management* and *Management Review*; from contacts with professional organizations in the fields of management and marketing, such as the American Management Association, the Society for the Advancement of Management, and the American Marketing Association; from major suppliers of transportation, communications, and electronic data processing equipment; and from industrial firms in other fields which are leaders in research and experimentation on management problems.

The transportation specialist will also find it essential to engage actively in field contact and applied research and demonstration work with transportation firms and facilities to identify the particular problem areas in which he will be able to make the most useful contributions.

CPT 5  
EDUCATIONAL ACTIVITIES  
IN  
TRANSPORTATION

# Educational Activities in Transportation



*Twenty-foot aluminum container undergoes flight and lifting tests with Sikorsky Skycrane Helicopter. —Fruehauf Trailer Co. photo*

There are few major areas of economic and industrial management inquiry in which we are more limited in educational development and programming than in the field of transportation. In the light of this fact it is not surprising that transportation and physical distribution have been described as "the last great frontier or industrial waste and inefficiency." This is a segment of costs in which, according to one specialist, no more than 15 percent of the possible economies are now being realized.

A recent comprehensive survey of more than 2,000 American colleges and universities by the Transportation Center at Northwestern University serves to highlight the inadequacy of educational activity in this field. A six-page questionnaire was mailed to 2,011 institutions of higher learning listed in the 1959-60 *Education Directory*. More than 1900 questionnaires were completed and returned.

From the responses received in this survey, 75 colleges and universities, or 3 percent of the respondents, appear to have some sort of major transportation program. These programs range from a single department with a possible major or concentration in transportation to programs of transportation in several schools assisted by a transportation center or institute.

Institutions which offer one or more transportation courses in one or more departments, but not including those with major programs in this field, numbered 127.

Only 43 colleges and universities, or 2 percent of the respondents, reported offering short course executive programs or other extension-type activities for industry personnel. Thirty-one of these institutions were also included among the group which reported major transportation programs.

## Transportation Education Neglected

Altogether, 222 institutions of higher learning in the United States reported some kind of educational activity in transportation. This represented about 12 percent of those responding to the questionnaire.

When the replies are analyzed a bit further, the recognition given to transportation in collegiate educational programs is even less impressive. A review of

course offerings and outlines at institutions offering one or more courses in transportation, but having no provision for a concentration or major in this field indicates that a large proportion of such courses are strongly oriented toward the economic history of transportation, or even more narrowly, toward the history of railroad development. Relatively little attention is given to the range of current-day transportation and traffic management problems with which we are here primarily concerned.

Another group of courses, usually offered in schools of engineering, deals with such matters as highway and airport design which are properly classified as transportation-related but would make little direct contribution to competency in transportation management.

Finally, many of these courses, while listed in the college catalogues, are offered only infrequently. We find such comments as: offered irregularly; last offered 1948-49; offered when requested; offered on demand. Such comments certainly do not reflect a continuing educational program in this field.

## Some Hopeful New Signs

There are some encouraging new signs of active interest in education for professional development of traffic and transportation management personnel by the Transportation associations and the universities.

The Associated Traffic Clubs of America and Delta Nu Alpha Transportation Fraternity, with more than 225 local chapters and 20 student chapters throughout the country have active education committees. They are encouraging educational activities among their members and the development of transportation courses, within the organizations and in cooperation with the colleges.

The American Society of Traffic and Transportation was organized in 1946 "to establish standards of knowledge, technical training, experiences, conduct, and ethics and to encourage the attainment of high standards of education and technical training requisite to the proper performance of the various functions of transportation." This organization has developed an examination program for professional certification in traffic and transportation,

in the administration of which a number of colleges and universities are cooperating. To receive certification by the Society a candidate must pass a four-hour written examination in each of four subject areas: transportation economics; traffic and transportation management; general business, including (a) economics and economic theory, (b) marketing, (c) government and political science, and (d) business organization and finance; and transportation law and regulation. In addition, he must write an acceptable research paper on a special aspect of transportation or traffic management.

### Examples of Transportation Programs

The following programs are cited as representative of the different types of offerings by the colleges and universities in transportation and physical distribution.

American University

School of Business Administration

Washington, D. C.

Five annual Transportation Management Institutes: Air; Motor; Railroad; Ocean; and Industrial.

University of California

Institute of Transportation and Traffic Engineering

Colleges of Engineering

Berkeley and Los Angeles, California

Program in Transportation Engineering leading to the degree of Master of Engineering.

Columbia University

Graduate School of Business

New York, New York

Stanford University

Graduate School of Business

Stanford, California

The Transportation Center at Northwestern

University

Evanston, Illinois

Executive programs in transportation, (intensive course programs or seminars of one week to one month duration, primarily for middle management executives); also sponsor research studies and special conferences on transportation problems.

University of Kansas City

(Now Kansas City Campus, University of Missouri)

School of Business Administration

Kansas City, Missouri

A program of evening courses leading to a Certificate in Transportation. Offered in cooperation with eleven associations and organizations rep-

resentative of the transportation industry in Kansas City.

University of Maryland

College of Business and Public Administration

College Park, Maryland

New York University

School of Commerce, Accounts and Finance

New York, New York

Course programs in transportation offering a major in this field and leading to the B.S. degree.

Pennsylvania State University

Institute of Public Safety

University Park, Pennsylvania

Preparation of instructional materials and coordination of courses in motor fleet supervisor training and commercial fleet operation, offered under sponsorship of the National Committee for Motor Fleet Supervisor Training at some seventy-six colleges and universities.

University of Tennessee

College of Business Administration

Knoxville, Tennessee

In-service training programs in motor transportation. Eleven courses developed in cooperation with the American Trucking Associations and available by correspondence.

### U. S. Army Offers Instruction

The U. S. Army Transportation School at Fort Eustis, Va., carries on a broad program of instruction for approximately 5,000 resident students and an additional 8,000 correspondence students each year. Their courses in Freight Services, Freight Tariffs, Basic Freight Classification, and Shipping Practices and Procedures will be of particular interest to Extension transportation and marketing specialists.

#### Quotable Quote

*"In the . . . statement 'Transportation history becomes more and more a race between education and catastrophe,' you have a picture of the industry as it stands today."*

*William B. Johnson*

*President*

*REA Express*

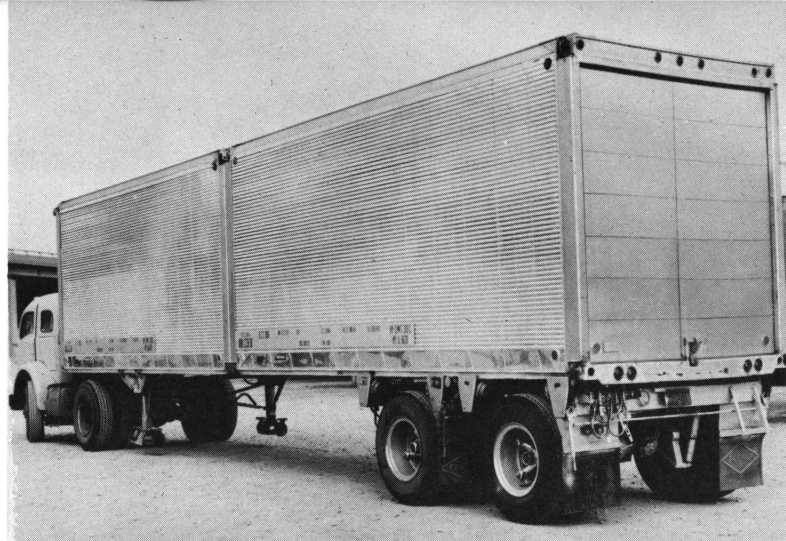


*Aluminum hopper pressure tank-trains developed for handling bulk liquid commodities. —Fruehauf Trailer Co. photo*

Scarcity of fully qualified middle management personnel is generally recognized as one of the primary problems of the transportation industry. Yet, the efforts of the industry to solve this problem through systematic company educational and personnel development programs leave much to be desired. Transportation is far behind other leading industries in this respect. Here and there we find a plan such as that of the Southern Pacific Company, under which 75 to 80 of their personnel are enrolled each year in full-time graduate and under-graduate programs in leading colleges and universities. These programs range from four weeks to two years, with full salaries and all tuition and expenses paid by Southern Pacific. This arrangement is matched by a two-year management training program within the company leading to beginning level management positions. An 18-month management training program with similar objectives is conducted within the engineering and maintenance of way department of the New York Central. However, planned programs of this scope to deal with the problem of management personnel development are more the exception than the rule in the transportation field.

#### **Educational Opportunity for Extension**

Informal education offers great possibility. The informal workshop and "demonstration firm" types of education used so successfully by Extension educators in agricultural production and marketing can be applied to transportation management problems. Here and there, Extension marketing specialists have done some work on transportation and physical distribution problems in carrying out their primary commodity marketing responsibilities. For example, fruit and vegetable marketing specialists in California have long worked with carriers, shippers, and receivers on problems encountered in the transportation of these products, and dairy marketing specialists of Cornell University and Pennsylvania State



*"Walk-through" twin 20-foot containers joined together to form a 40-foot over-the-road high cube trailer. —Fruehauf Trailer Co. photo*

University have teamed-up to conduct a series of management workshops on measuring and improving milk route profitability. But prior to the current project sponsored by the Federal Extension Service at the University of Missouri, there have been no cooperative Extension specialists devoting full time to educational work on management problems in transportation.

#### **Growing Management Need**

The need for management personnel who can make effective use of new technology in solving the problems of transportation and physical distribution is a growing challenge to education. To meet this challenge will require the commitment of additional resources and a coordinated team effort on the part of extension, resident teaching, and research personnel.

More resident programs are needed which will offer the breadth and depth of subject matter necessary to prepare the student for the exacting requirements of today's transportation positions. There is also urgent need for further educational development of persons presently employed at managerial and supervisory levels in the physical distribution function.

Finally, ways must be found to accelerate adoption of advanced technology in handling and movement of goods and to encourage further research. The Cooperative Extension Service organization, with its network of field offices and its long experience in dealing with similar educational problems, is in a unique position to supply leadership in serving the educational needs of this transportation and physical distribution clientele. The favorable reaction to the Missouri Cooperative Extension Service project in transportation and the expressions of interest in it in transportation and university circles suggest the possibility of a further breakthrough and rapid development of extension-type educational work in the transportation field.

CPT 6  
RESEARCH  
ON  
TRANSPORTATION  
PROBLEMS

# Research on Transportation Problems



—Chicago and Eastern Illinois Railroad photo

In his role as innovator, concerned with improvement in the quality and efficiency of transportation services, the Extension specialist must be conversant with the growing body of research results in this field, and with the chief centers of investigation responsible for such research. His educational activities will be concerned largely with helping transportation and marketing personnel to develop their ability to evaluate and apply the advanced ideas and methods generated by these research agencies.

Transportation research is undertaken by several federal agencies, including four research divisions of the Department of Agriculture, and by a majority of the state experiment stations, some state departments of agriculture, and shippers, carriers, equipment manufacturers, chemical companies, and their associations. Research projects in transportation have dealt primarily with transportation costs and services, better utilization and improvement of transportation equipment and facilities, improvement of containers for shipment and handling of product, and maintenance of product quality during transportation and handling.

Some idea of the scope of agriculturally-oriented research activities in transportation may be drawn from the fact that agricultural transportation and storage research programs reported in a 1962 survey by the USDA\* involved the following numbers of professional man years:

- 70 for U. S. Department of Agriculture projects
- 85 for state experiment station studies
- 200 (approximately) for research activities of industry and other organizations.

## TRANSPORTATION RESEARCH BY INDUSTRY AND OTHER ORGANIZATIONS

As might be expected, the participation of industry in transportation research is primarily by shippers, car-

\**Transportation and Storage Research of the United States Department of Agriculture and Cooperating Agencies, December 14, 1962.* U. S. Department of Agriculture, Washington, D. C. 84 pages.

riers, equipment manufacturers, and firms producing packaging materials and chemicals utilized in handling and transportation.

Shippers and receivers collect and analyze considerable information concerning economic and other aspects of transportation, oriented primarily toward particular problems of individual companies in protecting their competitive position or in developing new business. There has been little industry research devoted to the national transportation system and its problems, although industry does give some financial support to economic research in transportation through the colleges and universities, and through carrier associations and other organizations in the transportation industry. Noteworthy among university-affiliated transportation research centers and institutes are the Transportation Center at Northwestern University; Transportation Research Institute, Oregon State University; and Texas Transportation Institute at Texas A & M College.

## Broadening the Field of Research

Much of the industry research in the technological field is undertaken by equipment manufacturers and suppliers and their associations, which have concerned themselves with developmental research in material and design characteristics, performance testing, and related activities. Some progress is now being made toward evaluation studies and the development of industry standards through the cooperation of industry groups and government agencies.

Communications methods, office systems, and electronic data processing equipment are receiving increased attention in applied transportation research. The major railroads and truck lines are also showing increased interest in marketing research, but such research is usually of the firm-oriented type and the results are not available for general industry use.

Manufacturers of truck-trailer bodies and refrigerator cars are engaged in research or vehicle design, including work on thickness and placement of insulation materials

in walls and ceiling, and systems for air circulation in the body unit. Efficiency of equipment used for loading and unloading grain, feed, and flour in trucks and rail cars is being studied by several machinery manufacturers. New types of grooved flooring and synchronized power lifts are being developed by another equipment manufacturer to make possible unitized loading of rail cars and truck-trailers. The USDA estimates annual expenditures for research in these areas by industrial concerns and industry-related organizations to be equivalent to approximately 35 professional man-years.

Work is being done by several box manufacturers and their associations on methods of palletizing shipments of fruit and vegetables, and on the development of pallet boxes of sizes, strength, and types of construction suitable for this use. Annual expenditures are estimated to be equivalent to approximately ten professional man years.

### USDA-Industry Cooperative Research

Virtually all the USDA research work in the area of transportation equipment and loading methods is done with industry cooperation or participation. The Transportation Research Branch of the USDA reported that in a two-year period, 1961-62, it had the benefit of active cooperation in its projects by 12 trade associations, 27 equipment manufacturers, and 12 industries of allied nature, as well as many shippers and receivers of agricultural products.

The Association of American Railroads has for many years carried on a physical research program for the benefit of its members and a number of railroads and railroad equipment manufacturers conduct physical research and development activities. However, measured in dollars, the railroad industry's total research and development effort leaves much to be desired. All told, the estimated amount of railroad physical research (including that of railroad suppliers) does not exceed \$30 million per year. This represents only 0.3 percent of railroad gross revenue. By contrast, many industries contend they must spend 1 to 5 percent of their gross revenue on research just to stay in business.

### Non-physical Research Interest

There is a notable increase in interest among the railroads in non-physical research. A number of railroads have set up marketing and rate research groups, and an industry task force has been working on a cost research program. A group of railroads is sponsoring a systems study of railroad operations by Battelle Memorial Institute. An objective of this study is to design a mathematical model of freight operations. Such a model, it is hoped, will enable the researcher to feed in proposed changes in equipment or schedules and determine the over-all effect on the system, thus making possible a quick

evaluation of proposed schedules and comparisons of various possible alternatives.

The United States Chamber of Commerce, state and local chambers of commerce, and port authorities compile data and conduct research on transportation as related to the industrial and economic development of their areas. Private research organizations, such as Brookings Institution, Public Affairs Institute, Stanford Research Institute and Battelle Memorial Institute have also been active in various phases of transportation research.

### TRANSPORTATION RESEARCH OF STATE EXPERIMENT STATIONS

In 1962, transportation and storage research was in progress in most of the state agricultural experiment stations. These stations were devoting about 17 professional man-years to research on the economics of transportation and expected an increase to 31 man-years in this area of research within five years. They were devoting 68 professional man-years to preservation of product quality in transit and in storage, directed toward improvement of post-harvest handling to minimize bruising and toward control of micro-organisms causing deterioration. Projected programs indicate a continuation of this research, with more emphasis upon basic aspects of cause and control of product deterioration.

There is some state experiment station activity in transportation research under coordinated regional projects seeking to determine the flow of commodities from surplus to deficit areas. This research has developed data on trends in transportation methods and practices, commodity movement by mode of transportation, and relative transportation costs for exempt and non-exempt carriers. Primary concentration as to commodity is upon grain and livestock and their products. The trend in research design is toward the development of models and principles which will guide future development of agricultural transportation.

#### Quotable Quote

*"It is estimated that anywhere from 50-80% of men now in transportation positions with carriers, shippers, and government agencies lack much of the experience, the training, the insights, and the skills to deal creatively with the complex transportation problems that lie ahead. . . . we must place greater emphasis on the in-service training of men already in transportation posts."*

*Eliezer Krumbein  
Director of Education  
The Transportation Center at  
Northwestern University*

## TRANSPORTATION RESEARCH BY U. S. DEPARTMENT OF AGRICULTURE AND OTHER FEDERAL AGENCIES

A classified and annotated bibliography was issued by the U. S. Department of Agriculture in June, 1961, covering selected materials on transportation of agricultural commodities in the United States published during the decade 1949-1959.<sup>4</sup> This report contains sections dealing with the various modes of transportation, regulation and legislation, statistics, freight rates, shipping containers, refrigeration and temperature control, equipment utilization, transportation of specific agricultural commodities, and a listing of other bibliographies on related subjects.

The Extension specialist interested in investigating a specific phase of agricultural transportation will find this bibliography a useful starting point. Other aids to such investigation are cited in the final section of this handbook.

### USDA Research Summary

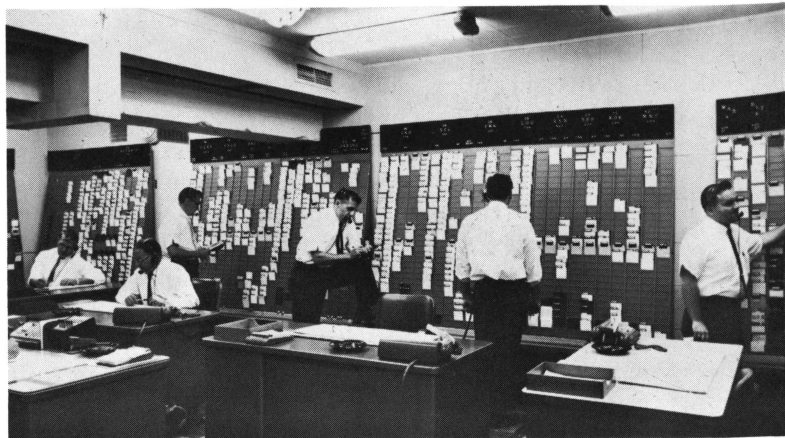
A summary report on agricultural transportation research issued by the USDA in December, 1962, lists publications presenting results of USDA and cooperative research issued within the past two years.<sup>5</sup> It also describes activities currently under way or projected for future undertaking.

Through the Marketing Economics Division of the Economic Research Service and the Management Services Division of the Farmer Cooperative Service, the USDA conducts a continuing program of research related to the economics of transportation. Recent projects in this field deal with the impact of transportation on marketing; transportation policy and regulations; transportation rates and costs; the annual transportation bill for domestically produced foods; statistical and financial data on exempt for-hire truckers, domestic inland waterway carriers, and ocean carriers; and transportation technology.

The Transportation and Facilities Research Division of the Agricultural Marketing Service is engaged in a long-term program aimed at achieving better and lower-cost transportation service through improvement in the efficiency and utilization of equipment; development and use of efficient facilities, improvement of services, and streamlining of operations by development of better methods and practices.

<sup>4</sup>Larson, Nellie G. and Schumaier, C. P., *Transportation of Agricultural Commodities in the United States*, a Bibliography of Selected References, 1949-59. Miscellaneous Publication No. 863, Economic Research Service, U. S. Department of Agriculture, Washington 25, D. C.

<sup>5</sup>*Transportation and Storage Research of the United States Department of Agriculture and Cooperating Agencies*, December 14, 1962. U. S. Department of Commerce, Washington, D. C. 84 pp.



*Card system allows dispatchers to know the exact location of every piece of equipment. —American Trucking Assns. photo*

The Agricultural Marketing Service, through its Market Quality Division, also conducts a continuing program of applied and basic research in the maintenance of quality of agricultural products as they move through distribution channels. This program utilizes horticulturalists, plant physiologists, bacteriologists, chemists, engineers, and entomologists located at 16 points throughout the United States.

### ICC Publishes Results

The Interstate Commerce Commission, Civil Aeronautics Board, Federal Aviation Agency, Bureau of Public Roads, Army Corps of Engineers and Defense Traffic Management Service all collect data and carry on research programs related to their particular areas of transportation responsibility. ICC economic research is the responsibility of the Commission's Bureau of Transport Economics and Statistics. Reports of research results which are considered to be of general interest are published by this Bureau and are available upon request. The other agencies mentioned above published similar reports dealing with transportation matters within their jurisdiction.

Some of the studies sponsored by the Small Business Administration dealing with business organization and management will be of special interest to Extension specialists working with transportation firm management problems. The Small Business Administration has published two surveys of university business and economic research projects in progress or completed during the period 1957 to 1963, some of which will be of interest to the transportation specialist. (See Chapter 7, Section IV) The U. S. Census Bureau's 1963 Census of Transportation represents a long step forward in filling gaps in transportation data. This Census is a series of five related surveys to measure (1) commodity flows from manufacturing plants by all means of transport, (2) passenger travel by all means of transport (including private automobile), (3) inventory and use of trucks and combina-



*The teletype room at a modern truck terminal provides a communications link between terminals. —American Trucking Assns. photo*



*Machines in this communications center receive train consist information and punch the data on paper tapes for transmission. —Illinois Central Railroad photo*

tions, (4) report of activities of for-hire trucking companies not subject to the ICC reporting requirements, (5) report of activities of for-hire bus carriers not subject to ICC reporting requirements.

The Bureau of the Census is also developing an extensive analytical card and tape file of citations of transport data published by both government and non-government sources, coded in terms of the nature of the data content, coverage, frequency, and primary sources, to help researchers find data on selected topics, and to define and identify current gaps and duplication of data collection.

The Department of Commerce is making a study of transportation which will attempt to coordinate all the transportation research taking place within the agencies of the Federal government.

### TAA Research Survey

The Transportation Association of America has issued a survey of current transportation research projects under way throughout the United States by academic personnel, independent research organizations, government agencies, and business concerns.<sup>6</sup> Based upon a comparison of three successive surveys made in 1957, 1959, and 1962, this report concludes that no sizeable increase occurred in transportation research activity during this period, but that there was a notable change in the number of projects which came within the policy category, or which dealt with subjects of sufficient importance that the results could affect policy decisions. The report also notes as particularly important, the growing recognition by Federal government agencies of the need for this type of research, and their growing appreciation

<sup>6</sup>*Transportation Research*; Third Edition; Transportation Association of America, 1710 H Street, NW, Washington 6, D. C.; December, 1962.

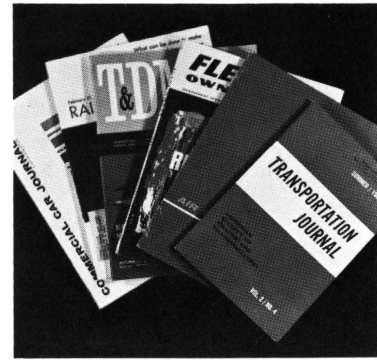
of the great potential benefits of such research. Especially encouraging was the reporting of more research projects employing advanced analytical techniques, including the use of computers.

Usable research results may be found, of course, in fields other than those directly related to transportation problems. From the vast fund of available technical knowledge and methodology it is necessary to sort out those items which have promise of contributing to the advance of transportation management know-how. One leading transportation researcher comments that there are 20 or more years of research achievements in a multitude of fields which remain unexploited by the transportation industry. He points out that there are backlogs of research and of technological developments in chemistry, electronics, physics, mathematical analysis, and other areas which only need to be dug out and applied to produce most gratifying results in the transportation field.

### Fund of Knowledge Awaits Use

While there are important gaps in which transportation research is lacking, there is also a substantial fund of useful research results waiting to be adequately evaluated and applied. In this area of evaluation, interpretation, and application, through the demonstration firm technique and through other available educational methods, Extension marketing and transportation specialists can perform a greatly needed service in helping to accelerate innovation and progress toward improved service and cost reduction in transportation. To be fully effective, the transportation specialist must continually keep abreast of the new developments in research; indeed, he should be close enough to the researchers to serve as a resource person in their work, helping to provide the field liaison and feedback which is needed to make the expenditure of research resources most useful in terms of practical results.

# Sources of Transportation Information



Since many agencies, firms, associations, universities, and other organizations are involved in transportation, sources of information and research publications are scattered.

This section presents a *partial* list of sources which may be helpful to transportation and marketing specialists.

## I. Government Agencies

Interstate Commerce Commission-Washington 25, D. C.  
Bureau of Transport Economics and Statistics  
Bureau of Accounts, Cost Finding Section  
Office of the Secretary

U. S. Department of Commerce-Washington 25, D. C.  
Bureau of Census, Transportation Division  
The Under Secretary of Commerce for Transportation  
Bureau of Public Roads  
Office of Business Economics, National Economics Division

Civil Aeronautics Board-Washington, D. C.  
Office of Carrier Accounts and Statistics

Department of the Army-Washington, D. C.  
Corps of Army Engineers, Waterborne Commerce Branch  
U. S. Army Transportation School, Fort Eustis, Virginia

U. S. Department of Agriculture-Washington 25, D. C.  
Farmer Cooperative Service, Management Services Division  
Agricultural Marketing Service  
Transportation and Facilities Research Division  
Market Quality Research Division  
Economic Research Service, Marketing Economics Division.

State Departments of Agriculture  
State Public Service or Public Utility Commissions.  
State Industrial Development Commissions  
State Departments of Commerce

## II. Business and Trade Associations

American Management Association  
1515 Broadway, New York 36, New York  
Chamber of Commerce of the United States  
Transportation and Communication Department  
1615 H. Street, NW, Washington 6, D. C.

National Association of Frozen Food Packers  
919 18th Street, NW, Washington 6, D. C.

National Association of Refrigerated Warehouses  
1210 Tower Building, Washington 5, D. C.

State and local Chambers of Commerce  
United Fresh Fruit and Vegetable Association  
777 14th Street, NW, Washington 9, D. C.

## III. Farm Associations

American Farm Bureau Federation,  
13th Street, NW, Washington, D. C.

National Grange  
1616 H. Street, NW, Washington 6, D. C.

National Council of Farmer Cooperatives  
1616 H. Street, NW, Washington 6, D. C.

Regional and Commodity Agricultural Organizations.

## IV. Transportation and Traffic Associations

Air Transport Association of America  
1000 Connecticut Avenue, NW, Washington 6, D. C.

American Society of Traffic and Transportation  
22 West Madison Street, Chicago 2, Illinois

American Trucking Associations  
1616 P. Street, NW, Washington, D. C.

American Waterways Operators, Inc.  
1025 Connecticut Avenue, Washington 6, D. C.

Association of American Railroads  
17th and H. Street, NW, Washington, D. C.

Associated Traffic Clubs of America  
815 Washington Building, Washington 5, D. C.

Local Traffic and Transportation Clubs

Automobile Manufacturers Association  
Motor Truck Division  
320 New Center Building, Detroit 2, Michigan  
Delta Nu Alpha Transportation Fraternity, Inc.  
Suite 222A, 15017 Detroit Bldg., Cleveland, Ohio

Regional, State and Local Warehousemen's and  
Cartage Associations

Private Truck Council of America, Inc.  
711 14th Street, NW, Washington 5, D. C.

National Industrial Traffic League  
909 Sheraton Building, Washington 5, D. C.

Motor Freight Bureaus

National Committee for Motor Fleet Supervisor Training  
c/o Institute of Public Safety, Engineering C.  
Pennsylvania State University,  
University Park, Pennsylvania

Railway Progress Institute  
38 South Dearborn Street, Chicago 3, Illinois

Railway Systems and Management Association  
163 East Walton Street, Chicago, Illinois

Regional Associations of Railroads

Regional Shipper-Motor Carrier Conferences

Shipper Advisory Councils

State and Local Motor Carrier Associations

Transportation Association of America  
1710 H Street, NW, Washington 6, D. C.

Truck-Trailer Manufacturers Association  
710 Albee Building, Washington 5, D. C.

## V. Bibliographies and Special References

*A Survey of University Business and Economic Research Projects, 1957-1961*

Small Business Administration  
Washington, D. C. January, 1961. 642 pages.

*A Survey of University Business and Economic Research Projects, 1959-1963*

Small Business Administration  
Washington, D. C. April, 1963. 690 pages.

Compilations of faculty and doctoral research projects in business and economics completed or in progress in university schools of business and departments of economics during the academic years 1957 through 1963.

*Current Literature in Traffic and Transportation* (monthly)  
Northwestern University

The Transportation Center, Evanston, Illinois

Nelson, Nellie G. and Schumaier, C. P.

*Transportation of Agricultural Commodities in the United States; A Bibliography of Selected References, 1949-1959.*

United States Department of Agriculture, Economic Research Service, Miscellaneous Publication No. 863.  
June 1961.

This annotated bibliography lists other bibliographies, recent research and other publications on agricultural transportation and physical distribution.

*Monthly Checklist of State Publications.*  
Library of Congress, Washington, D. C.

Stufflebeam, George T.

*The Traffic Dictionary* (4th Edition)

Simmons-Boardman Publishing Corp.; N.Y., 1950. 292 pages.

*Transportation Research; A Survey of Current and Potential Transportation Research Projects.* Third Edition.

Transportation Association of America,  
1710 H. Street, NW, Washington, D. C.  
December, 1962. 50 pages.

United States Congress, Senate Committee on Commerce, *National Transportation Policy*, Special Study Group on Transportation Policies in the U. S., 87th Congress, 1st Session, Report No. 445, (Washington: Government Printing Office, 1961). 732 pages.

This "Doyle Report" identifies fundamental problems of transportation and offers recommendations concerning them.

United States Congress, Senate Committee on Commerce, *Decline of Regulated Common Carriage*, Hearings before Sub-Committee, 87th Congress, 1st Session, March 22-23, June 27-28, and August 30, 1961. (Washington: Government Printing Office, 1962), 282 pages.

Purpose: To determine the causes and extent of the relative decline of regulated carriers as against other types of carriage and to evaluate the resulting effect upon the adequacy of our national transportation system.

## VI. Periodicals in Transportation and Physical Distribution

*Air Cargo* (monthly)

1001 Vermont Avenue, NW, Washington 5, D. C.

*Air Transportation* (monthly)

10 Bridge Street, New York 4, New York

*American Aviation* (formerly Airlift) (monthly)

1001 Vermont Avenue, NW, Washington 5, D. C.

*Business Week* (weekly)

330 West 42nd Street, New York 36, New York

*Commercial Car Journal* (monthly)

Chestnut & 56th Street, Philadelphia 39, Pennsylvania

*Distribution Age* (monthly)

Chestnut & 56th Street, Philadelphia 39, Pennsylvania

*Fleet Owner* (monthly)

330 West 42nd Street, New York 36, New York

*Frozen Food Age* (monthly)

366 Madison Avenue, New York 17, New York

*Handling and Shipping* (monthly)

812 Huron Road, Cleveland 15, Ohio

*International Teamster, The International Brotherhood of Teamsters* (monthly)

25 Louisiana Ave., NW, Washington 1, D. C.

*Marketing and Transportation Situation* (quarterly)

Economic Research Service,

U. S. Department of Agriculture, Washington 25, D. C.

*Marketing Information Guide* (monthly)  
Business and Defense Services Administration  
U. S. Department of Commerce, Washington 25, D. C.

*Materials Handling Engineering* (monthly)  
812 Huron Road, Cleveland 15, Ohio

*Modern Materials Handling* (monthly)  
221 Columbus Avenue, Boston 16, Massachusetts

*Modern Railroads* (monthly)  
20 North Wells Street, Chicago 6, Illinois

*National Defense Transportation Journal* (bi-monthly)  
1612 K Street, NW, Washington 6, D. C.

*Quick Frozen Foods* (monthly)  
1776 Broadway, NY 19 NY

*Railway Age* (weekly)  
30 Church Street, New York 7, New York

*Traffic Management* (monthly)  
201 North Wells Street, Chicago 6, Illinois

*Traffic World* (weekly)  
815 Washington Building, Washington 5, D. C.

*Transport Economics* (monthly)  
Interstate Commerce Commission  
Bureau of Transport Economics and Statistics  
Washington 25, D. C.

*Transport Topics* (weekly)  
1424 16th Street, NW, Washington 6, D. C.

*Transportation and Distribution Management* (monthly)  
815 Washington Building, Washington 5, D. C.

*Transportation Journal* (quarterly)  
American Society of Traffic and Transportation, Inc.  
22 West Madison Street, Chicago 2, Illinois

*Trucking Business* (formerly Power Wagon)  
Hitchcock Building, Wheaton, Illinois

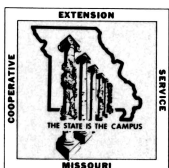
Various regional periodicals dealing with transportation, materials handling, warehousing, containerization and packaging, and other phases of physical distribution.

*Welded rail is a new concept in track installation. For the "ribbon rail" shown, 37 normal 39-foot rails are welded*

*together to make a continuous rolling surface ¼ mile long.*  
—Illinois Central Railroad photo







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