Railroads at work

The Railroads

For more than a century, Americans young and old have been fascinated by the excitement and glamor that are part of the railroad tradition — the power of locomotives, the pleasant thrill and sense of adventure inspired by the sound of a train whistle in the distance, the sight of endless rails stretching to the horizon, the mystery of far-off places.

This romance of railroading and, in late years, an increased awareness of the essential nature of railroads, have stimulated a tremendous interest in railroad history, equipment, organization, services, operations, and so on. This booklet is designed to help meet that interest among school children.

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Railroads at Work

A Picture Book of the American Railroads in Action

EIGHTH EDITION

▶ **TO TEACHERS** — This booklet is designed for the use of pupils engaged in a study of transportation, and may be obtained in quantity for that purpose. It is keyed to the *Teacher's Kit for a Study of Railroad Transportation* which is available *only to teachers.*

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School and College Service

ASSOCIATION OF AMERICAN RAILROADS
TRANSPORTATION BUILDING • WASHINGTON 6, D. C. • 1960

THE GOLDEN SPIKE CEREMONY

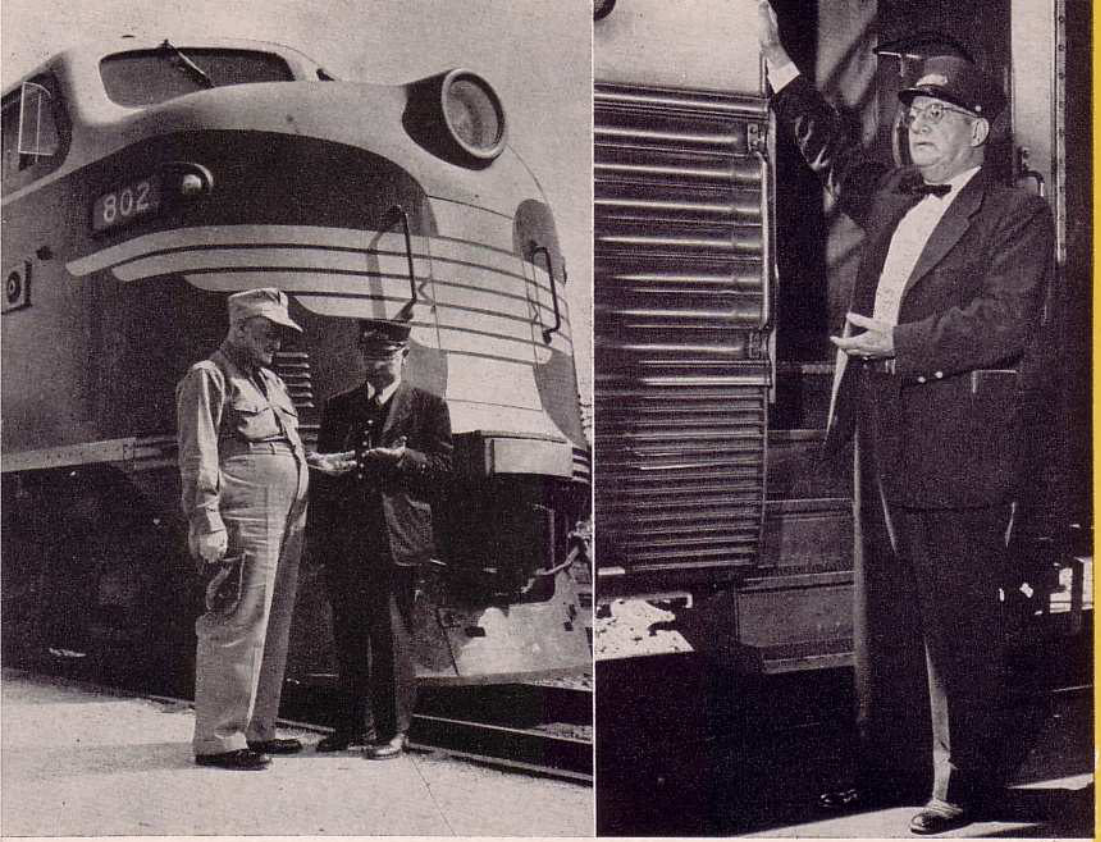
[2] One of the great events in American history was the completion of the first chain of railroads to the Pacific Coast. This picture was taken in 1869, a few minutes after the Golden Spike was driven at Promontory, in the mountains of northern Utah. A locomotive from Sacramento and a locomotive from Omaha touched "noses" to symbolize the new bond between East and West. The event was celebrated from coast to coast.

Railway transportation brought the Atlantic and Pacific regions within a few days' travel of each other. The time has now been shortened to less than three days.

[3] This passenger train is pulled by an electric locomotive. On the roof of the locomotive are two steel frames, called pantographs. The one at the front end is folded. The one at the far end is opened. The top part touches the overhead wires which are charged with electricity. The locomotive draws electricity from the wires.

Electric locomotives carry no coal and very little water. Thus, they do not need tenders. They can go forward or backward with equal ease. They do not have to be turned around.

ELECTRIC PASSENGER TRAIN



TRAINS RUN ON SCHEDULES

[6] Every train must arrive at each station and meet and pass other trains according to schedule. All train crew members must carry watches that keep correct time.

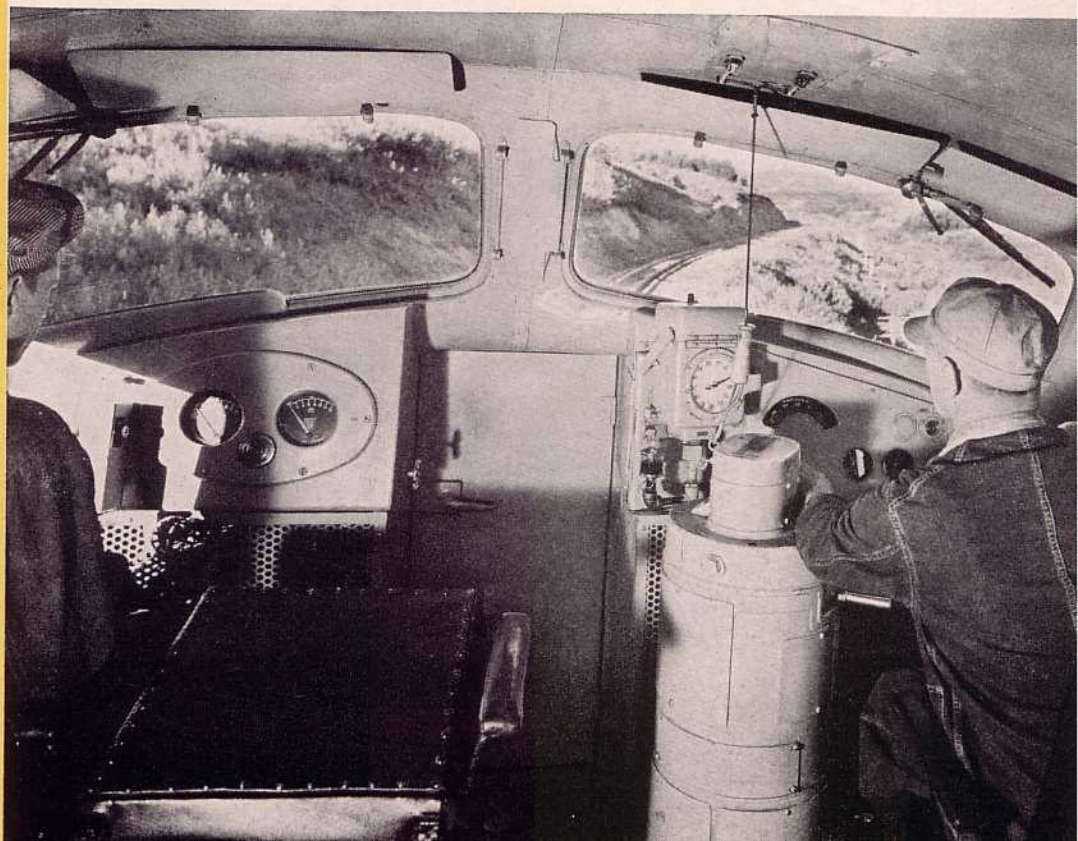
In the left-hand picture, the conductor and engineer are comparing the time of their watches before starting their "run." When it is time to start, the conductor signals to the engineer and then steps aboard.

The conductor is in charge of the train. It is his job to carry out all orders concerning the movement of his train. He is in charge of taking up tickets, collecting fares, and calling out stations. He is usually helped by one or more members of the train crew.

[7] Ever since there were trains, boys have been wishing they could be locomotive engineers. The engineer sits in the cab and runs the big engine. By means of various controls and levers, he can start the locomotive, make it go fast or slow, bring it to a stop, or make it go forward or backward.

This picture shows an engineer in the cab of a Diesel-electric engine. The engineer must have good eyesight and steady nerves. He must know train rules and signals. When out on a run, he must keep constant watch to make sure the track is clear.

LOCOMOTIVE ENGINEER IN THE CAB



IN A PASSENGER COACH

[8] This is a passenger car—sometimes called a day coach. Air conditioning keeps the inside of the car cool in summer, warm in winter, and comfortable at all times. This car has double windows and thick walls to shut out noise. It has seats with backs which can be raised or lowered. Racks are provided for traveling bags and other personal belongings.

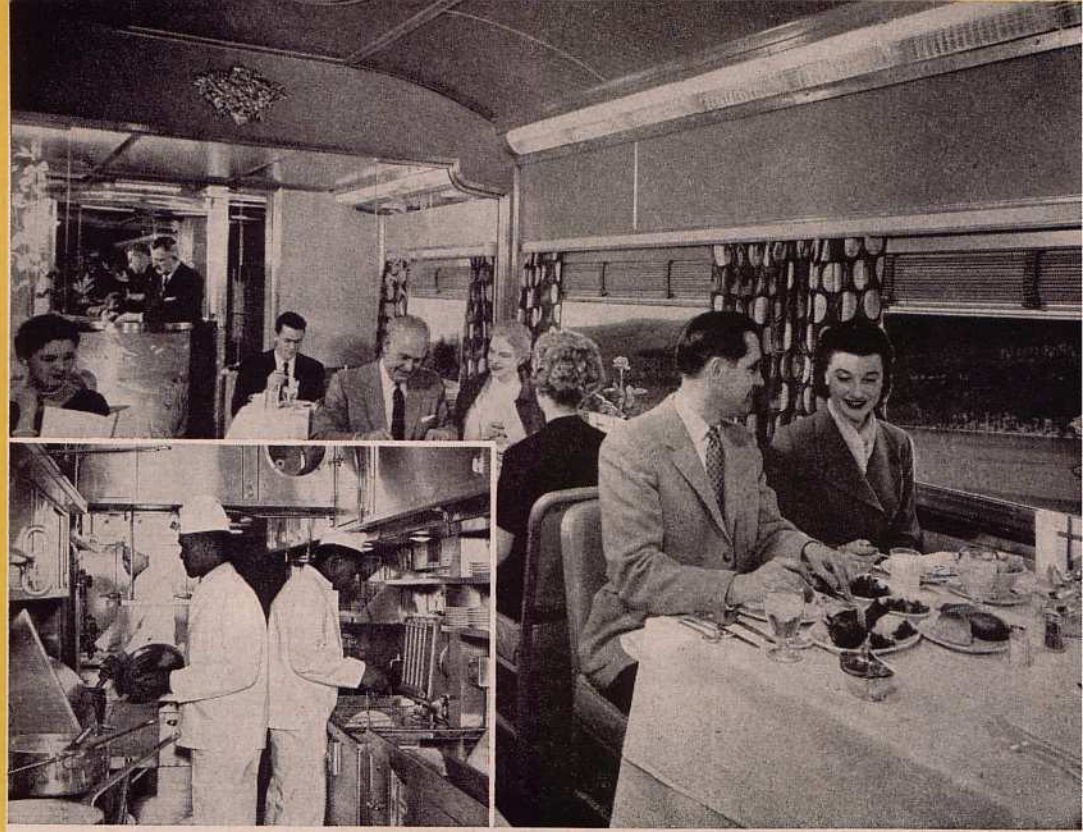
The porter is placing a passenger's bag in one of these racks. After the train starts, the conductor will go through the cars and take up the tickets.

Some trains have cars with glass-enclosed observation domes which afford passengers a roof-top view of the passing scenery.

[9] Many passenger trains have dining cars where travelers may eat breakfast, luncheon, or dinner. A steward is in charge. He ushers his guests to their tables. White-coated waiters take the orders to the dining car kitchen. Here the food is placed on plates, picked up by the waiters, carried to the tables on large trays, and served.

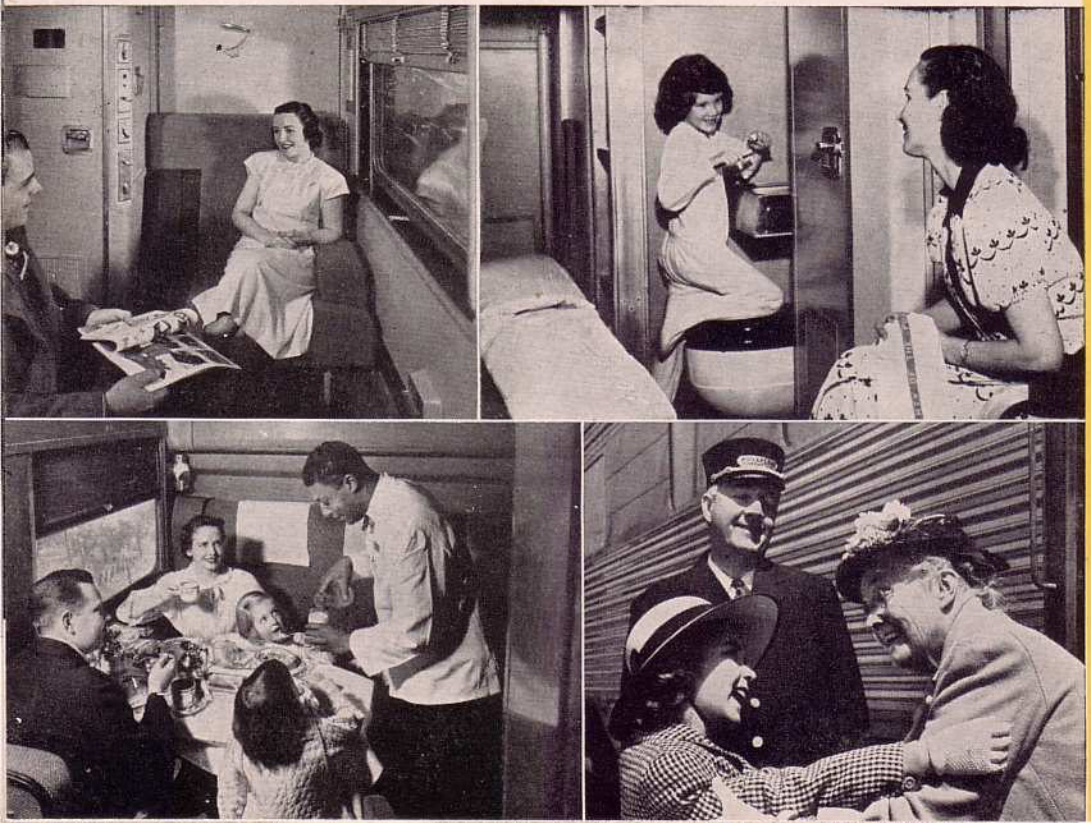
The dining car kitchen is long and narrow. It is fitted with stoves, work tables, cupboards, and refrigerators. There is a place for everything and everything must be in its place.

The head cook, who is called the chef, is directly in charge of the dining car kitchen. As many as three assistants may help prepare the food.



MEALS ARE SERVED IN THE DINING CAR

TRAVELING IN THE PULLMAN CAR

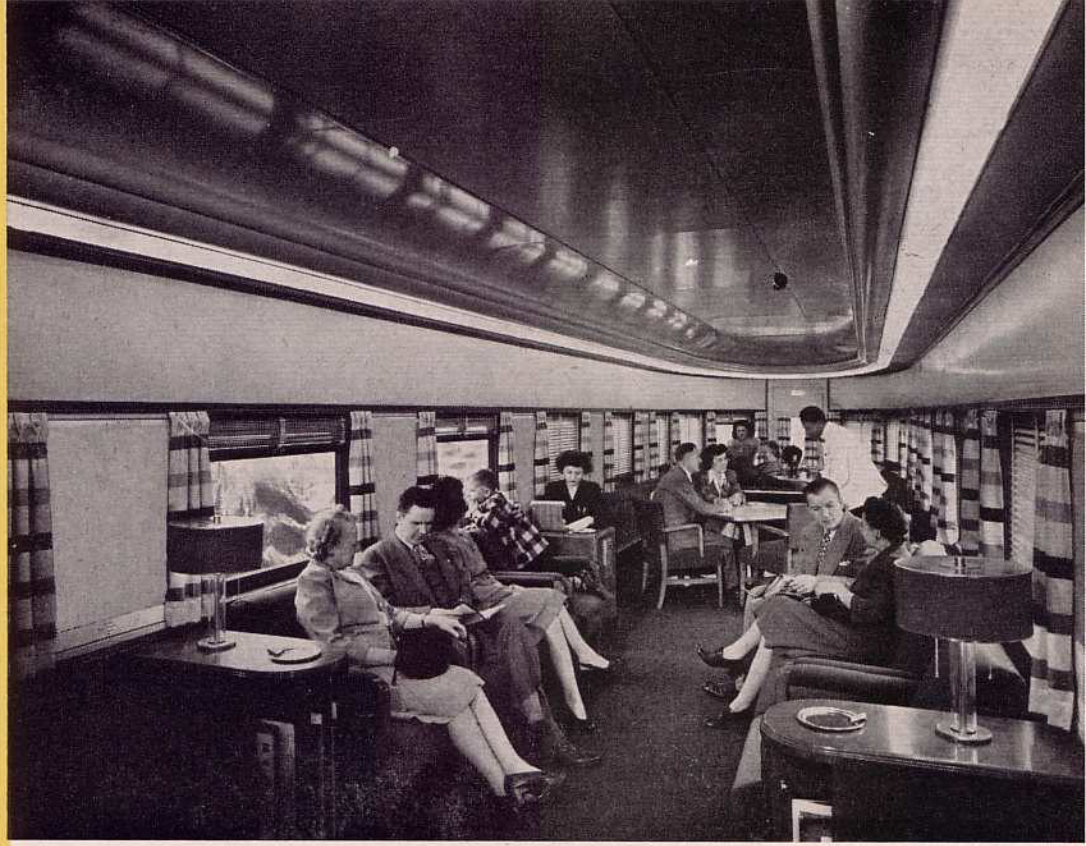


[10] The railroads and The Pullman Company provide parlor cars and sleeping cars for persons who like to travel in extra comfort and enjoy a night's sleep. One may purchase a reserved seat, lower berth, upper berth, section, roomette, bedroom, duplex roomette, duplex single room, compartment, or drawing room.

The upper-left picture shows a bedroom arranged for daytime travel. In the upper-right picture, the little girl is getting ready for bed in a compartment. In the lower-left picture, a family of four has a meal served in their drawing room. In the lower-right picture, a young traveler is greeted as she leaves the train.

[11] Many passenger trains carry observation or lounge cars like the one in the picture. These cars are fitted with soft carpets, comfortable chairs, and sofas. They are the "living rooms" of trains.

An observation car is attached to the rear of the train. Large windows afford an excellent view of the passing scenery. In the car are tables for playing games or for refreshments, a writing table, and racks containing the latest magazines. Stationery and sometimes scenic post cards are provided free of charge by the railroad company. Many observation and lounge cars are equipped with radios.



RELAXING IN THE OBSERVATION CAR

PASSENGER TERMINAL FACILITIES

[12] Passenger trains begin and end their runs in passenger terminals. After passengers have been discharged and express, mail, and baggage unloaded from an incoming train, the cars are taken to the yards. There, engines and cars are cleaned and inspected. In some terminals, automatic washers clean the outside of the cars as the train passes between revolving brushes.

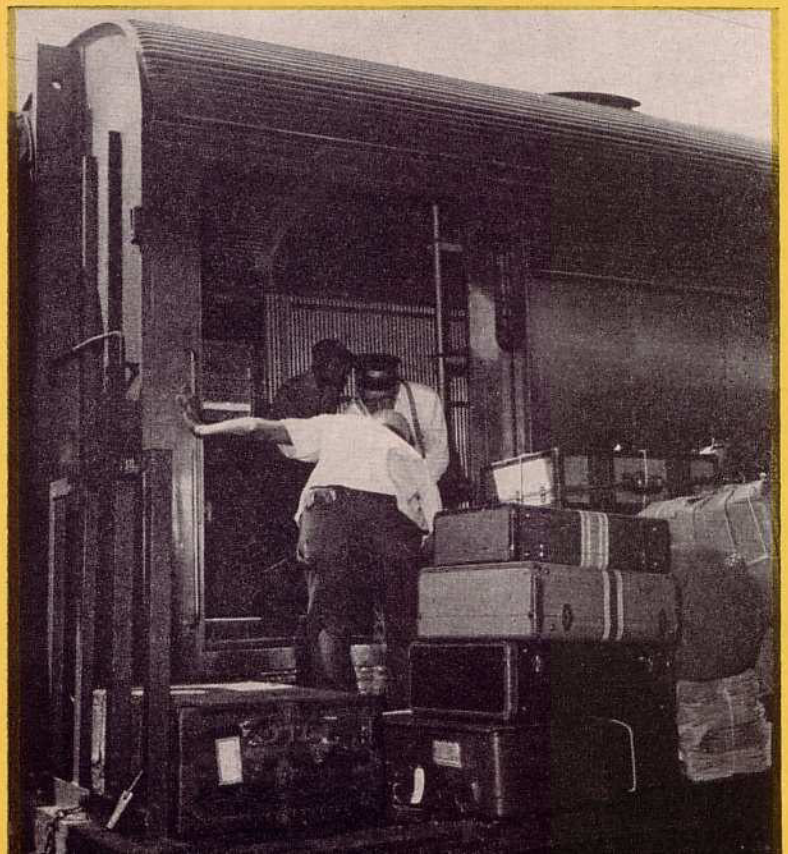
Passenger terminals have platforms for loading express, mail, and baggage. There are fuel and water stations for locomotives. The passenger station, engine terminal, various tracks, switches, signals, shops, and storehouses are all part of the passenger terminal.

[13] The baggage car is the storeroom of the train. It carries baggage for the passengers and business mail for the railroads. The man who checks baggage in the station is the baggage agent. The man who looks after the baggage car on the train is the baggageman.

You may take along trunks and handbags on your trip. You may keep one or more handbags in the passenger car. Those not needed during the journey and all trunks are carried in the baggage car.

Some railroads make a slight charge for checking baggage; others carry baggage free, within certain weight and size limitations.

LOADING THE BAGGAGE CAR



THE RAILWAY POST OFFICE CAR

[14] The mail crane (see larger picture) enables a train to pick up a mail pouch without stopping or slowing down. The mail bag is attached to the crane just before the train is due.

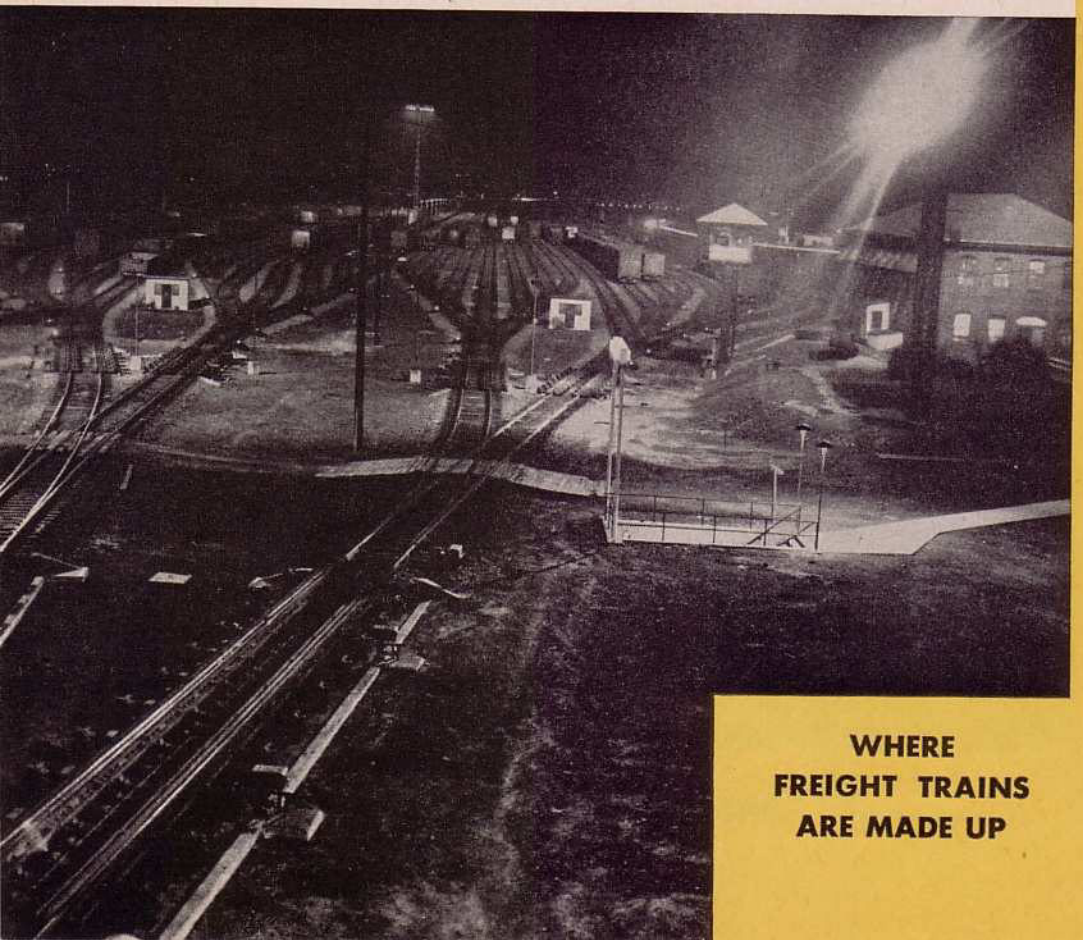
In the door of the post office car is a steel catcher arm. A postal clerk swings the catcher arm out so that when it passes the crane it snatches the mail bag.

In the smaller picture, railway postal clerks are sorting mail in a post office car. These clerks are very skillful in handling mail. They know hundreds of railway mail routes. They receive and put off pouches of mail at nearly every station where there is a post office. Most of our mail comes by rail.

[15] The Railway Express Agency handles about 500,000 pieces of express daily — over 180 million pieces a year. Some of these shipments are for short distances only; others are for points hundreds or thousands of miles away.

The Agency carries all sorts of things — in packages, boxes, bags, barrels, and other containers. Shipments include gems, works of art, money, toys, films, medical supplies, fresh food, flowers, animals — in fact, anything which requires special attention or quick delivery. Express service uses passenger and express trains. It also uses airplanes, steamships, and, for collecting and delivering express, some 13,500 motor trucks.

UNLOADING EXPRESS SHIPMENTS



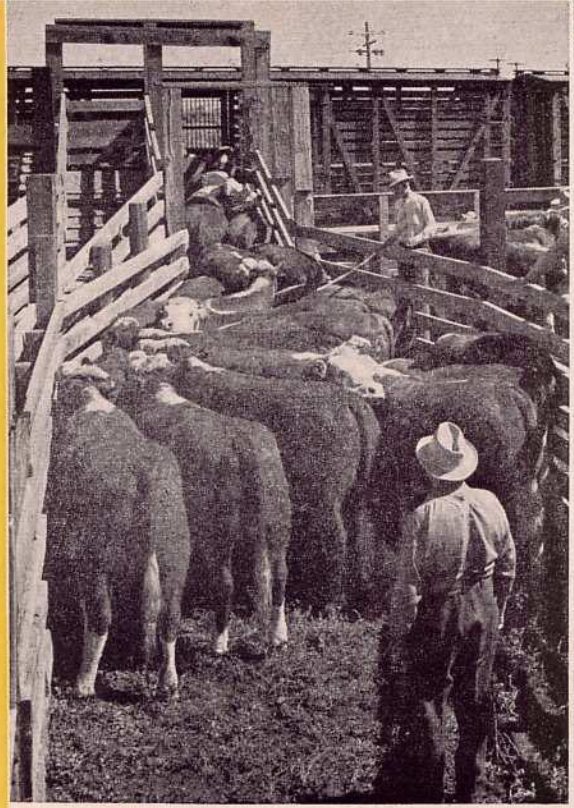
WHERE FREIGHT TRAINS ARE MADE UP

[16] The freight yard is a busy place. Here, cars are sorted and made up into trains. A freight train starts its run from one freight yard and completes its run in another yard many miles away.

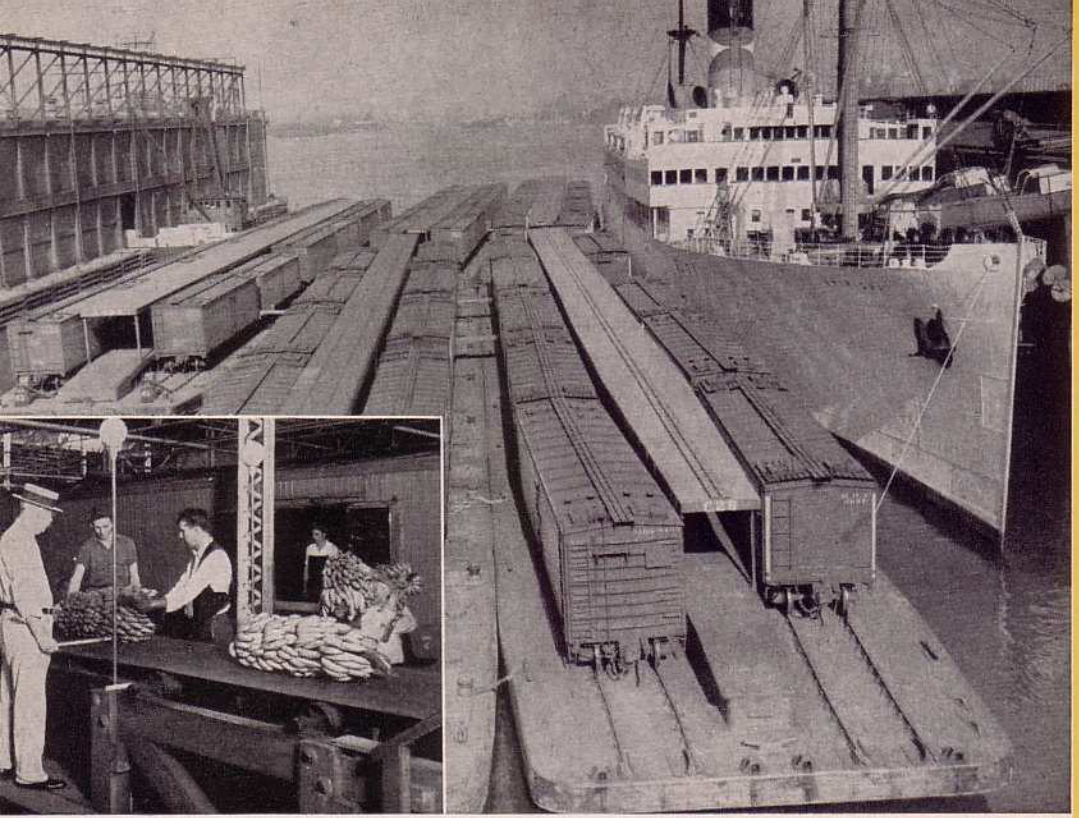
Freight trains bring us most of the foods we eat, the fuel we burn, the clothes we wear, and the materials that are used in the construction and repair of our homes, streets, bridges, and public buildings. Freight trains help keep our factories supplied with the things they need, and carry the products of the factories to distant markets. They form a link between farms and markets, forests and mills, mines and factories, and between factories and retail stores.

[17] Railroads carry thousands of cattle, calves, hogs, sheep, and lambs from the farm to the stockyards in large cities. They travel in cars made with slat sides to give the animals fresh air. On their way to stockyards, they are fed, watered, and rested by attendants who travel with them.

At the stockyards, the livestock are prepared for market. Fresh meats are chilled or frozen in meat-packing plants. Then they are shipped in refrigerator cars long distances without spoiling. Poultry, dairy, and other food products are often shipped in the same cars.



LIVESTOCK AND MEAT ON THE WAY TO MARKET



BANANAS COME BY SHIP AND RAIL

[18] Bananas travel thousands of miles to reach our tables. Most of the bananas we eat grow in Central America, South America, and the West Indies. They are shipped over little railroads to the seaports; by steamships to our ports; then by railroads to cities and towns all over the United States.

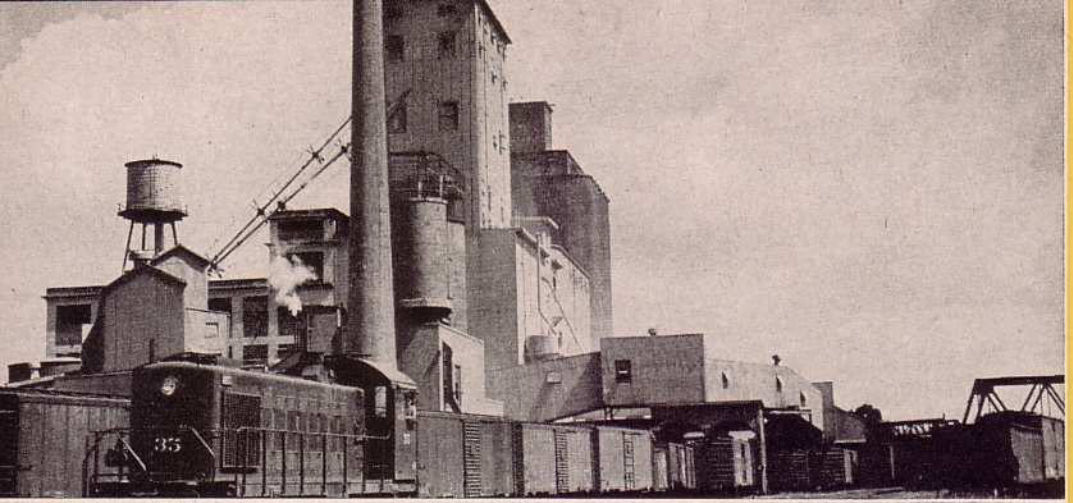
Sometimes bananas are unloaded from a steamship to refrigerator cars on large car floats, or "lighters," as seen in the larger picture. The floats are then towed to a dock, their tracks are connected with railroad tracks and the cars are hauled away to a freight yard where a banana train is "made up." Sometimes one ship will bring enough bananas to fill two or more trains.

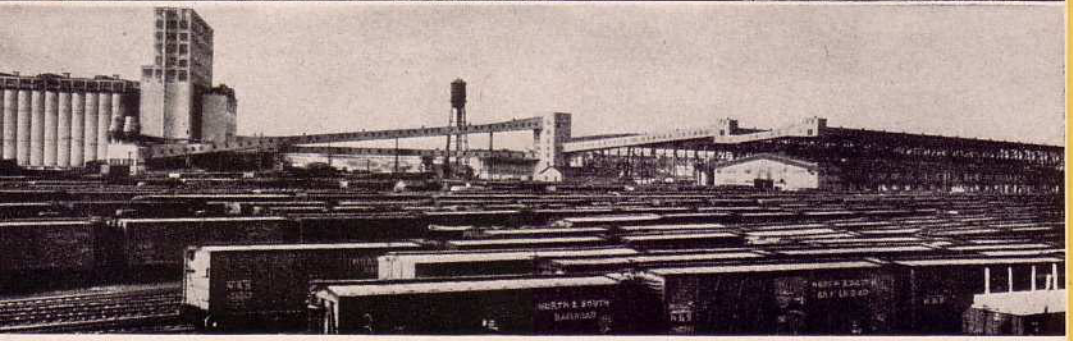
[19] Refrigerator cars serve the same purpose as refrigerators in our homes. They keep fresh fruits, vegetables, dairy products, meats, fish, and other foods cold, so they will not spoil on the way to market.

The men in the picture are putting ice into refrigerator cars. A moving chain belt brings cakes of ice to the icing platform. The men then drop them through trap doors, called hatches, into bins or bunkers. The floor and walls of the car are insulated so that when the doors and hatches of the car are closed, the ice will keep the interior of the car cold.

In cold weather, refrigerator cars are used without ice to carry some perishables which might freeze in ordinary box cars.

ICING THE REFRIGERATOR CARS





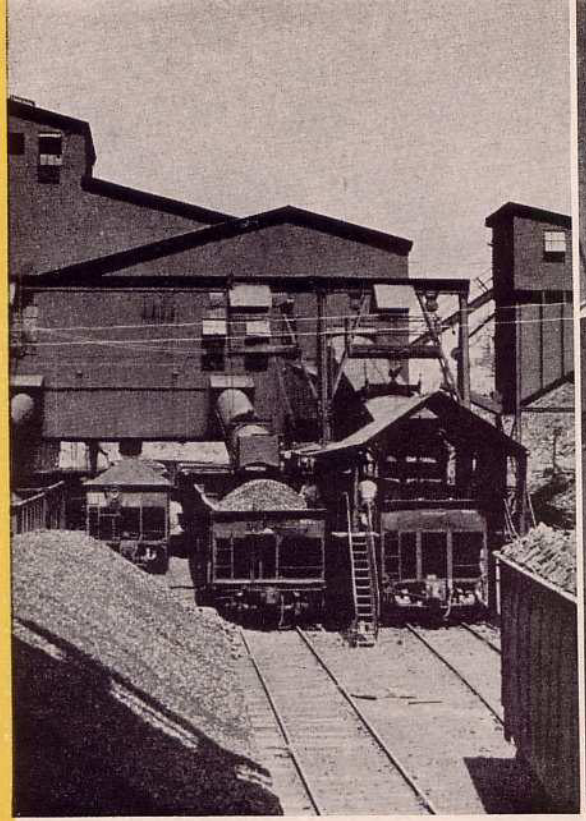
GRAIN GOES TO MARKET

[20] Nearly all towns in the grain-producing areas have tall grain elevators. These country elevators are located on the railroad so that grain can be loaded directly into freight cars. Farmers bring wheat and other grains to the country elevator. The grain is lifted into bins by conveyors. From the bins it is poured or blown into freight cars through large tubes.

Freight cars take the grain to the terminal elevators in the city. There it is cleaned, dried, and graded. Then it may be loaded again into freight cars and taken to a mill in another city to be made into flour, cereals, or other grain products.

[21] Several sizes of coal are being loaded into hopper cars at the mine, in the left-hand picture. Railroads take the coal to coal yards in cities and towns, to factories and mills, to railroad coaling stations, and to seaports and lake ports.

Years ago, a large crew of men worked for days to unload coal or ore from cars into a ship. Now, a dumping machine is used. This machine lifts a loaded coal car high above the track. The car is turned over and the coal falls through a chute into the ship's hold. The dumping takes only about a minute.



CARRYING COAL FROM MINE TO SHIP

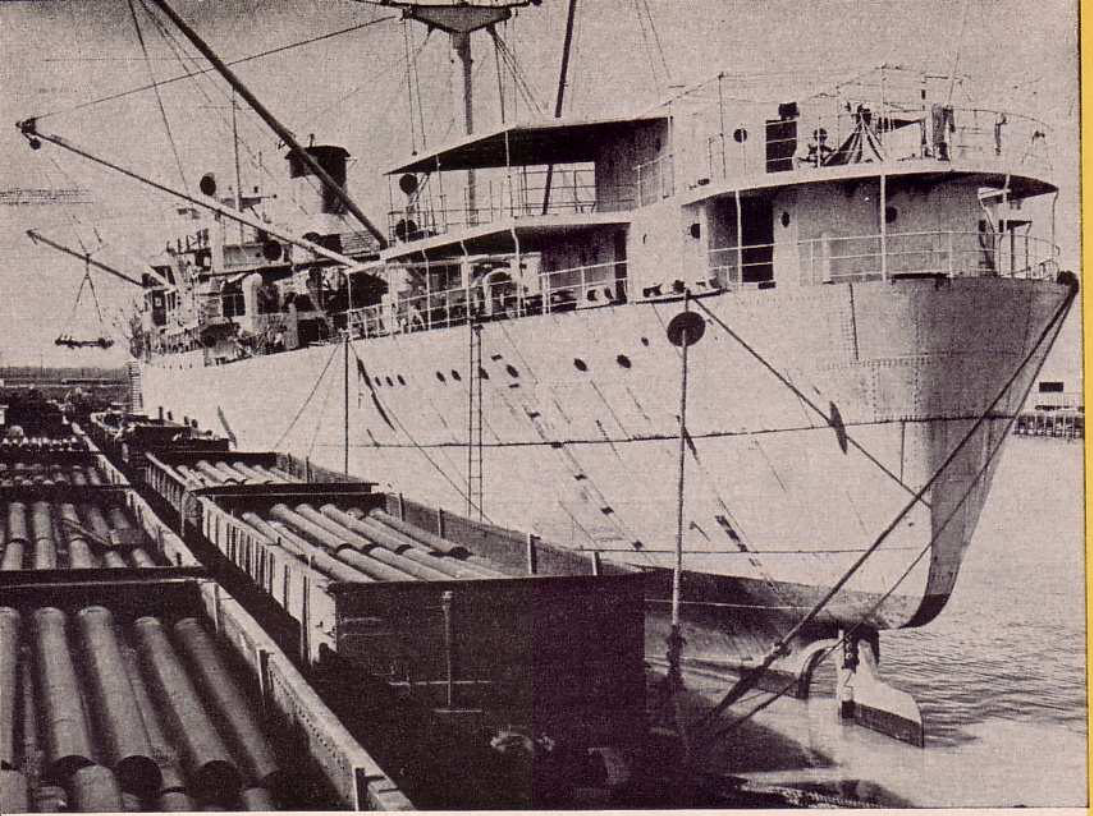
FOREST PRODUCTS MOVE BY RAIL

[22] The forest industry is a large user of transportation. After trees are felled and trimmed in the forest, they are taken to the mills. Then the lumber and products of the mills must be taken to the places where they are needed. Railroads take things from where they are produced and deliver them to places where they are needed.

Railroads themselves are large buyers and users of forest products. They buy crossties, telephone and telegraph poles, bridge timbers, piling, fence posts, and lumber for buildings, platforms, docks and wharves, box cars, and other uses.

[23] Nearly every important factory or mill is located on a railroad. The railroad and the factory work together. Railroads bring fuel and raw materials to the factory and take the manufactured products to markets. To make one article—such as a bicycle, a sewing machine, a motion-picture projector, or a television set—dozens of different materials are needed, and these may come from places many miles away. Often the parts are made in factories in different cities and assembled in another place. Railway transportation makes this possible. Tracks usually run directly into a factory where cars can be loaded and unloaded conveniently.

FACTORIES ARE FED RAW MATERIALS BY TRAINS



RAILROADS SERVE THE SEAPORTS

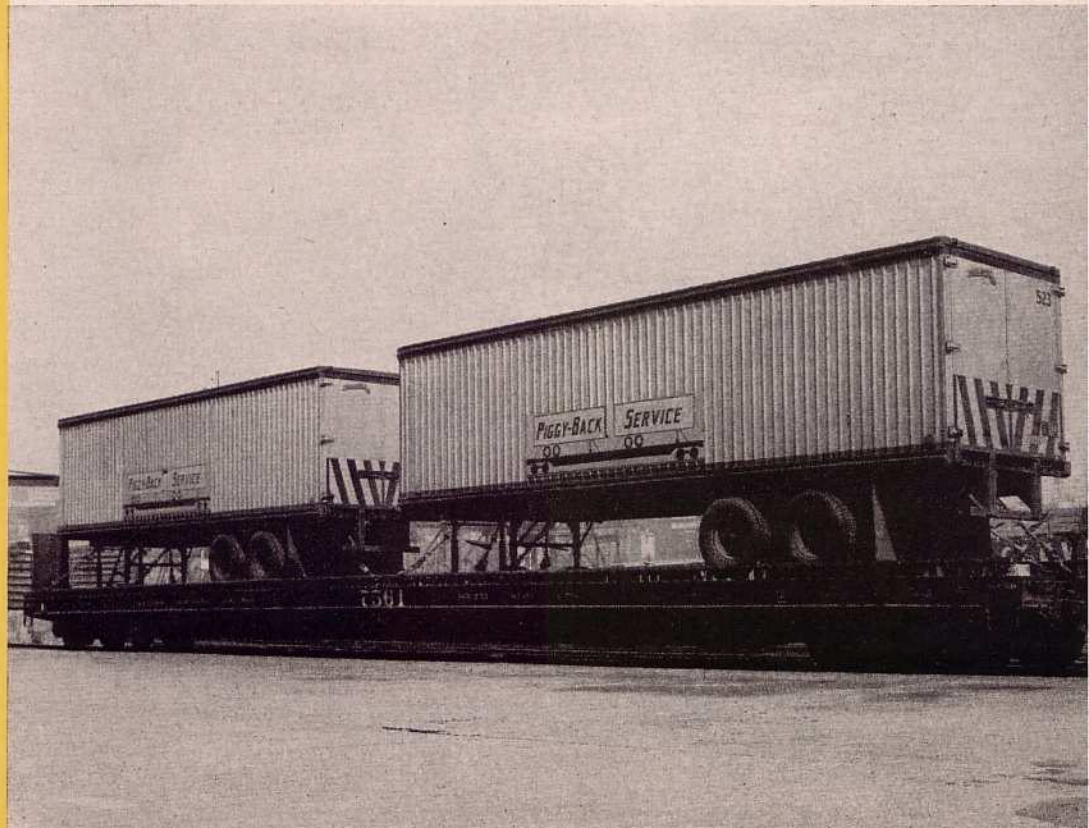
[24] The United States trades with nations all over the world. Thousands of ships are employed to carry the products of our farms, forests, mines, and factories to other lands and to bring the many things we need from other countries. Many trainloads of freight arrive and depart at our seaports each day.

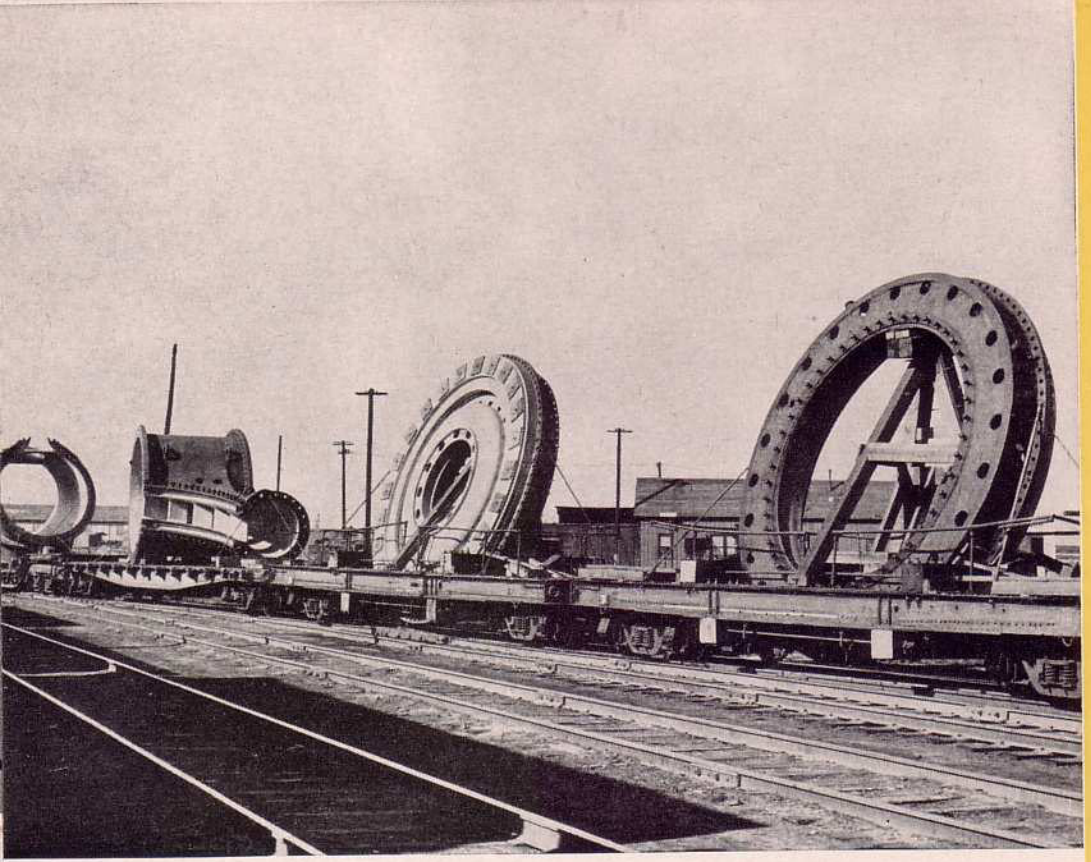
This picture shows cast iron pipes being loaded from gondola cars on a railroad dock into a ship's hold for export to another country. At railroad docks, freight is transferred from ship to car or from car to ship. At every seaport the railroads have freight yards and warehouses. Many railroads have their own docks and other buildings.

[25] Today, more and more motor-truck trailers are being transported by rail, many on overnight runs, in what is known as trailer-on-flat-car or "piggyback" service. Trains of specially equipped flat cars are used to transport the highway trailers on fast schedules between large cities. Only a few minutes are required to load a trailer onto a waiting flat car and to anchor it securely. When the flat car arrives at its destination, the trailer is unloaded and hauled away to complete its journey.

Railroads also use their own and hired trucks to maintain pick-up and delivery service to and from the doors of factories, stores, and other places of business.

TRAILER-ON-FLAT-CAR SERVICE





RAILROADS CARRY "ANYTHING, ANY TIME"

[26] The picture shows some of the extra-large and heavy shipments carried by railroads. Railroads are equipped to handle every kind of shipment — big or little — from bobby pins to battleship turbines. The heaviest freight shipment carried to date weighed 803,000 pounds. The tallest shipment stood 28 feet above the rails. Railroads have carried single shipments of more than 208 feet in length.

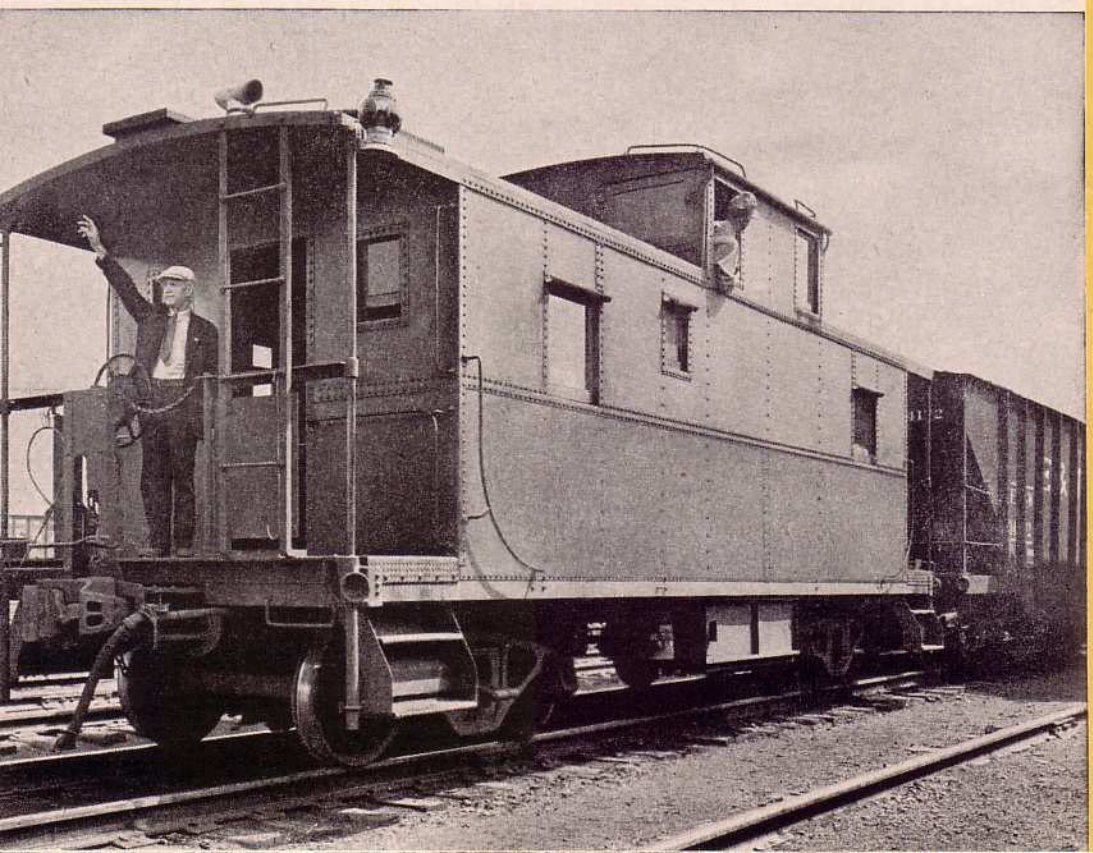
Among the many big shipments moved by train are engines and turbines, giant guns for the Army and Navy, and generators. Heavy machinery for mines, factories, steel mills, and other plants is regularly handled by railroads.

[27] A train crew is made up of a conductor, engineer, fireman, and one or more brakemen. On a passenger train the baggageman is also a member of the train crew.

The brakeman assists the conductor. He sees that everything needed for the trip is in place on the train. On local freight trains he helps to load and unload freight at stations. He also helps to set out and pick up cars along the way. The brakeman in the picture is signalling the engineer to back up so that the couplers, or two "hands," will meet and close in a firm grip, holding the cars together.

THE COUPLERS' "GRIP"

CABOOSE



[28] At the end of each freight train is a caboose, with its little watchtower, or cupola. The caboose is the office of the freight train. Here the conductor has a desk where he keeps freight tickets or waybills and other papers, and prepares a report showing the origin, destination, and contents of the train.

In the cupola, the brakeman keeps a careful watch on the long train of freight cars ahead and watches for signals from the head-end brakeman, engineer, or fireman. The caboose has a stove, lockers for clothing, and places for flags, lanterns, and emergency tools. Some cabooses have bay windows on the side for observation instead of cupolas.

[29] Many persons wonder how it is possible for each railroad to keep constant track of its wandering freight cars. This is done by an elaborate, nation-wide system of checks and reports. As soon as a freight car leaves its own railroad and moves onto the rails of another railroad, the agent at the junction point reports the interchange movement to the Car Record Office of his railroad. Thus, by daily reports, the Car Record Office is kept informed of the progress of the car. Through these offices and a car's waybills, a car or shipment can be quickly located at any time.

KEEPING TRACK OF FREIGHT CARS

LITTLE "TRAIN" TRANSFERRING FREIGHT

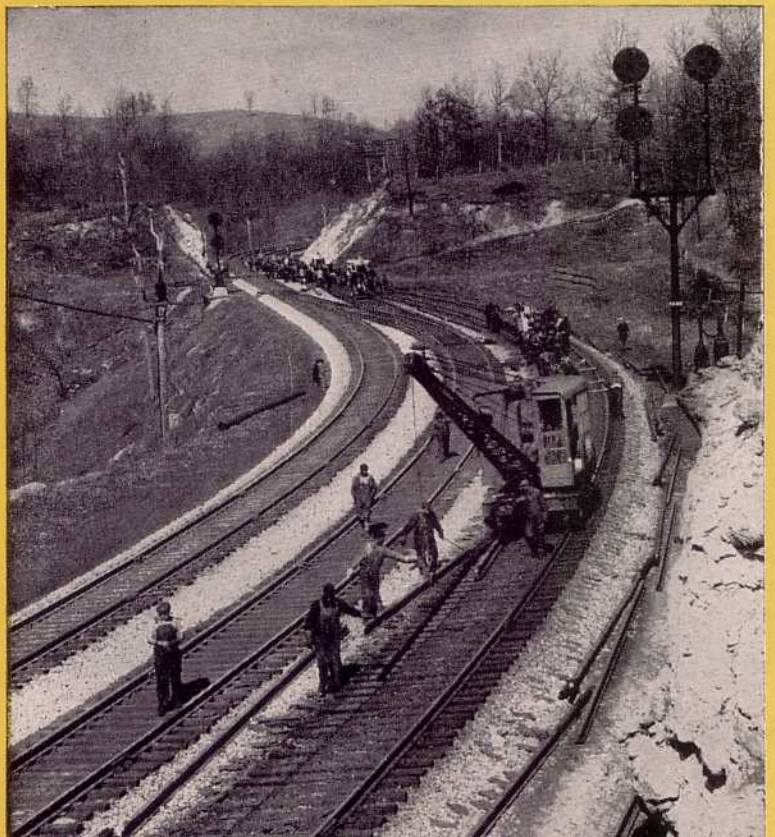
[30] There are stations for freight as well as for passengers. The size of a freight station depends upon the amount of business handled. This large freight station platform is just as high as the freight car floor. A little "train" pulled by a small power truck moves freight from the cars into the station. Sometimes they take the freight to another platform where it is loaded into delivery trucks, for transportation to the persons or companies to whom it is addressed. Many of the things which we buy in stores come through our local freight station.

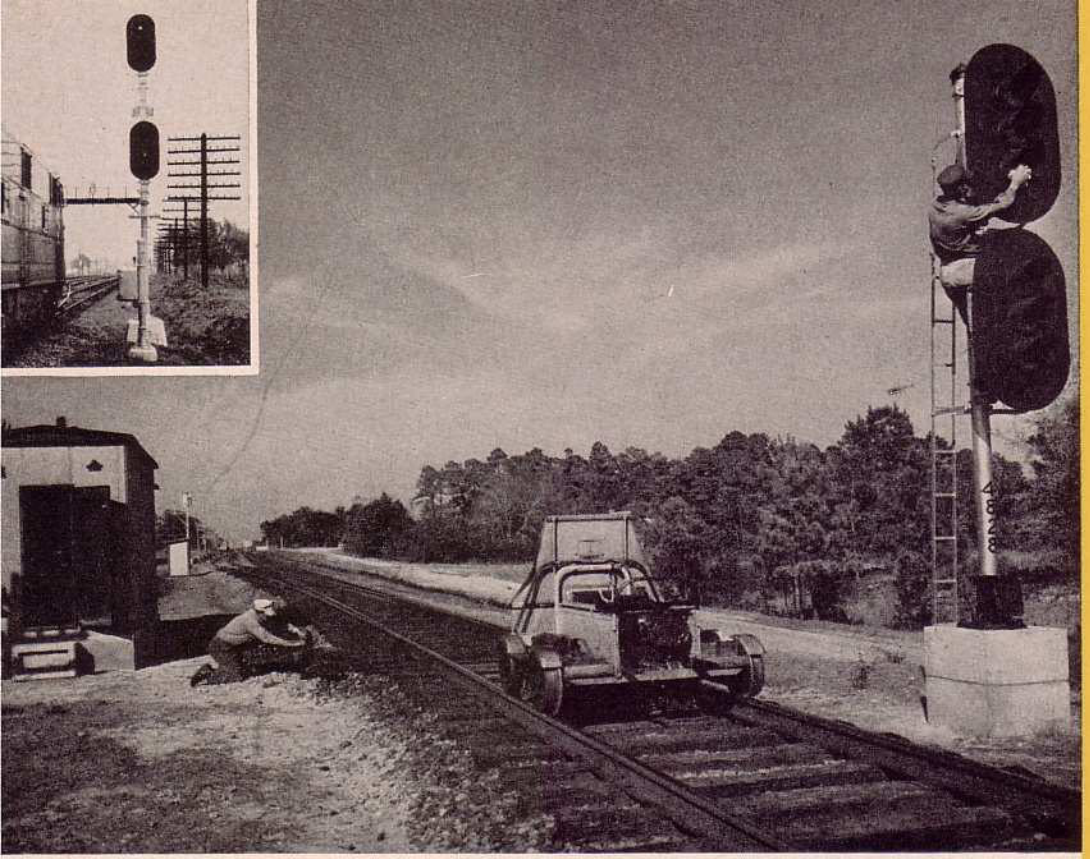
[31] With a locomotive crane to do the heavy lifting, the men are taking up old and worn rail and laying new rail in its place. In this and many other ways, the railroad keeps its tracks in good condition.

With the help of modern machines, groups of men, called section crews, replace crossties, spikes, and other parts of the track when the old ones wear out.

Our railroads have many crews of workmen whose job it is to keep tracks, bridges, trestles, tunnels, telephone and telegraph wires, and signals in good condition, just as roundhouse and shop workers keep locomotives and cars in good condition.

TRACK REPAIRMEN AT WORK



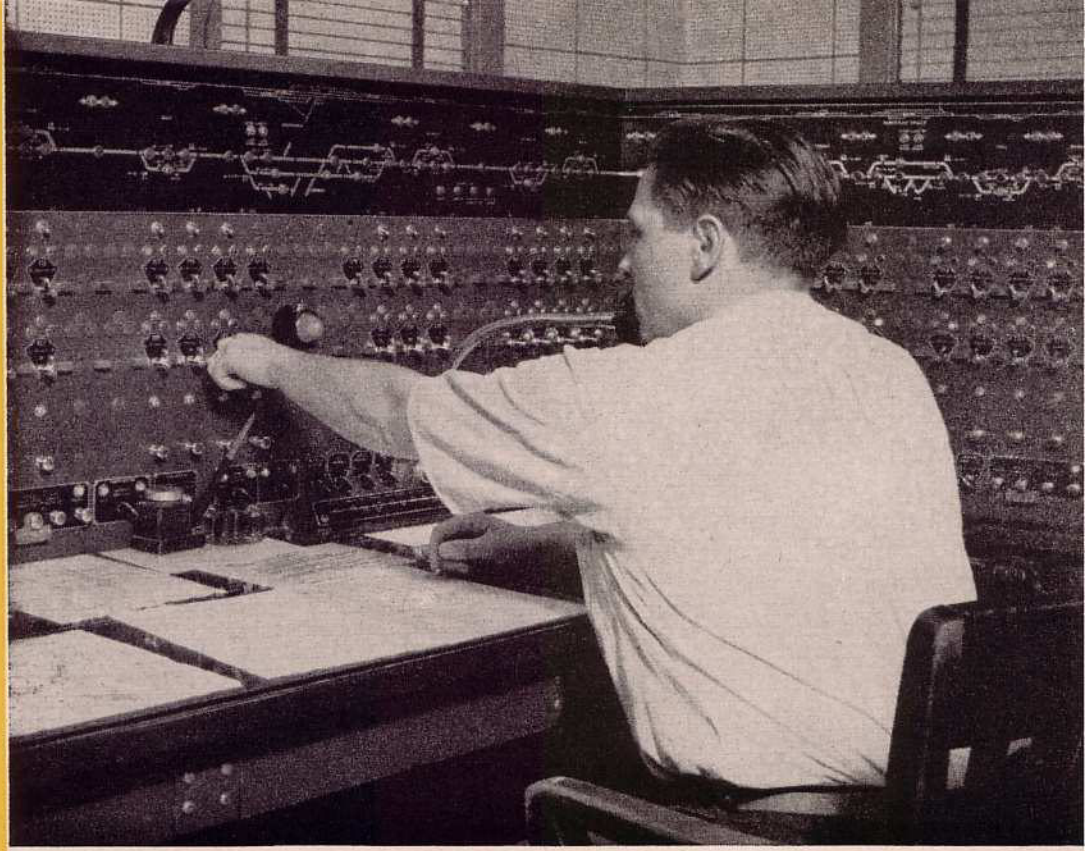


SIGNALS FLASH THEIR MESSAGES

[32] Signals help to make the railroad train the safest form of transportation. Men who run the trains know the language of signals. Some signals, like those in the pictures, have messages for the eye. Some, like the locomotive whistle or bell, have messages for the ear. Signals tell the locomotive engineer when to stop, go slow, or go ahead at regular speed. Some signals are operated electrically from signal towers or stations. Many others are operated automatically by electric current flowing through the rails. On some railroads, lights flash on a small panel in the engine cab. These are called cab signals and give the same message as those beside the track.

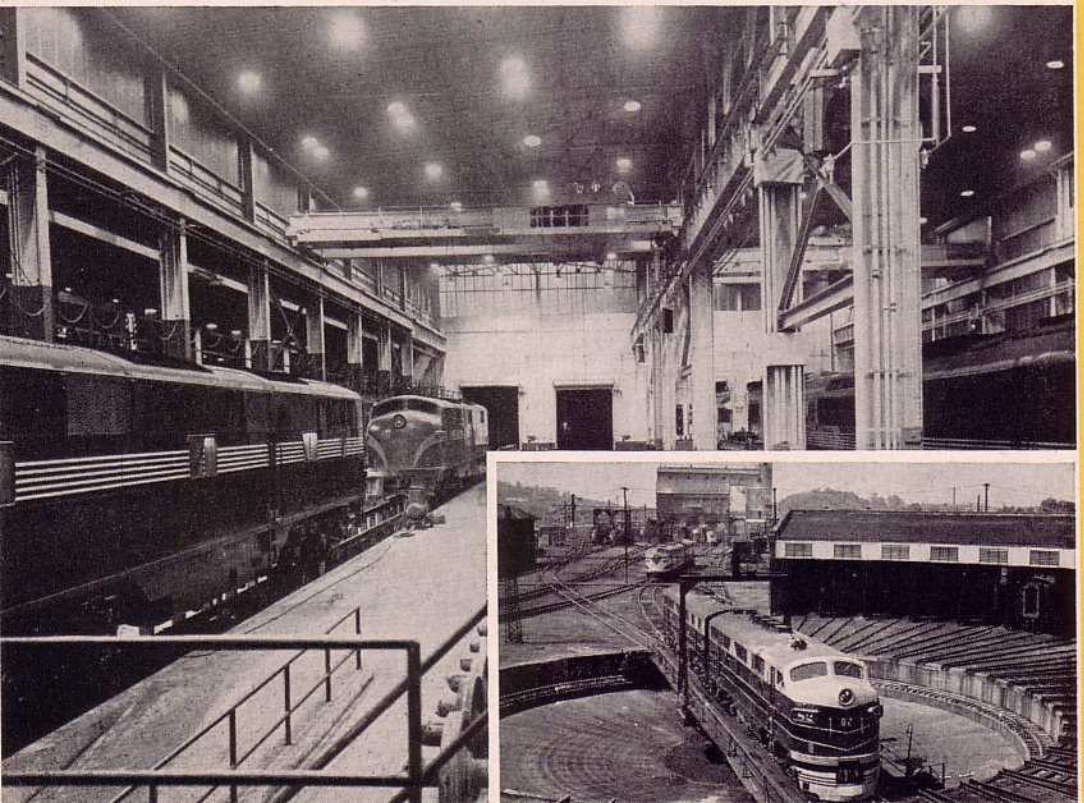
[33] The train dispatcher controls the movements of trains. On the large sheet before him, he keeps an up-to-the-minute record of every train running on his division or district. If he directs trains to meet at a certain place, they must do so. In this way, trains arrive, depart, meet, and pass, safely and without confusion.

Some dispatchers direct train movements by telephone, telegraph, or by radiotelephone. Others use control machines which set signals and switches over many miles of track. This method is called centralized traffic control or C.T.C. The picture shows the dispatcher at the control panel of a C.T.C. machine.



TRAIN DISPATCHER

IN THE LOCOMOTIVE SHOP



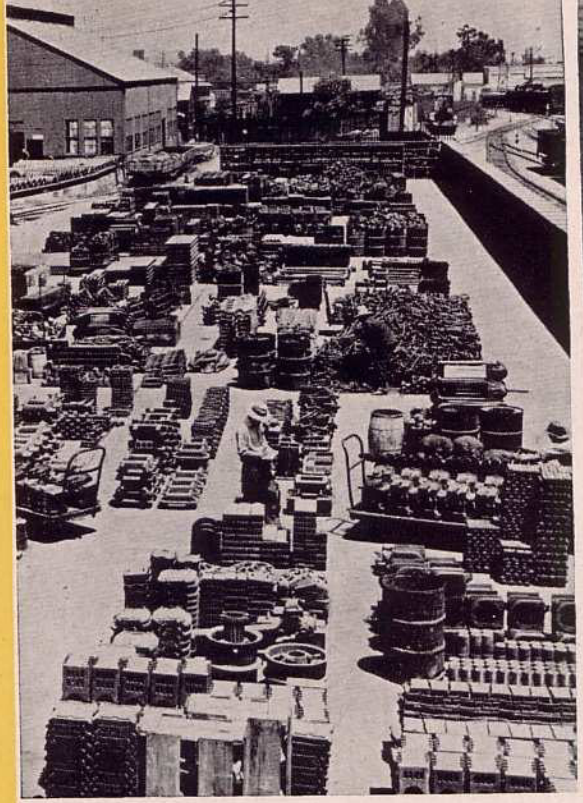
[34] When a locomotive needs many repairs, it is taken to a big railroad shop. There, skilled mechanics repair or replace tubes, axles, wheels, brakes, or other worn-out parts, give it a fresh coat of paint, and make it almost as good as new. In the larger shops are huge overhead electric cranes which can pick up and carry a huge locomotive from one end of the shop to the other.

The smaller picture shows a turntable and roundhouse. Locomotives come to the roundhouse for cleaning and for light repairs. The turntable is used for turning a locomotive around.

Railroads also have shops for repairing freight and passenger cars.

[35] Railroads buy thousands of different items — and these purchases are made in many cities and towns throughout the country. Railroads use fuel, tools, and machines. They use iron and steel products, forest products, and a wide variety of manufactured goods. The railroad storehouse resembles a big hardware store where everything is neatly kept on shelves, as seen in the right-hand picture.

Storage yards are used to keep the big, bulky things such as rails, pipes, springs, and wheels. The left-hand picture shows how these supplies are kept outside in neatly stacked piles.



RAILROAD MATERIAL YARD AND STOREHOUSE

IN A RAILROAD OFFICE

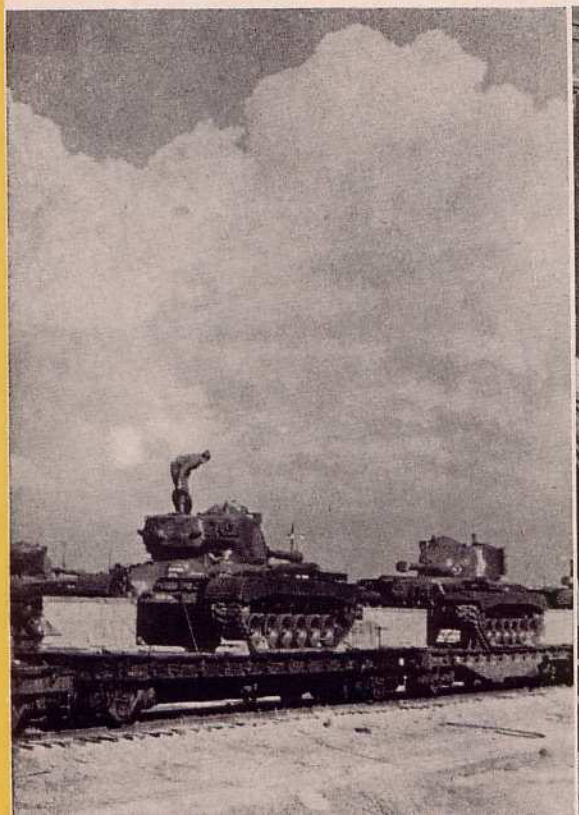
[36] The larger the railroad, the more offices it will have. The main office handles the work of the executive officers. In addition, each railroad has offices scattered in cities and towns along its line. Some railroads have offices in cities not on their lines, to sell railroad services. Every railroad has much office work.

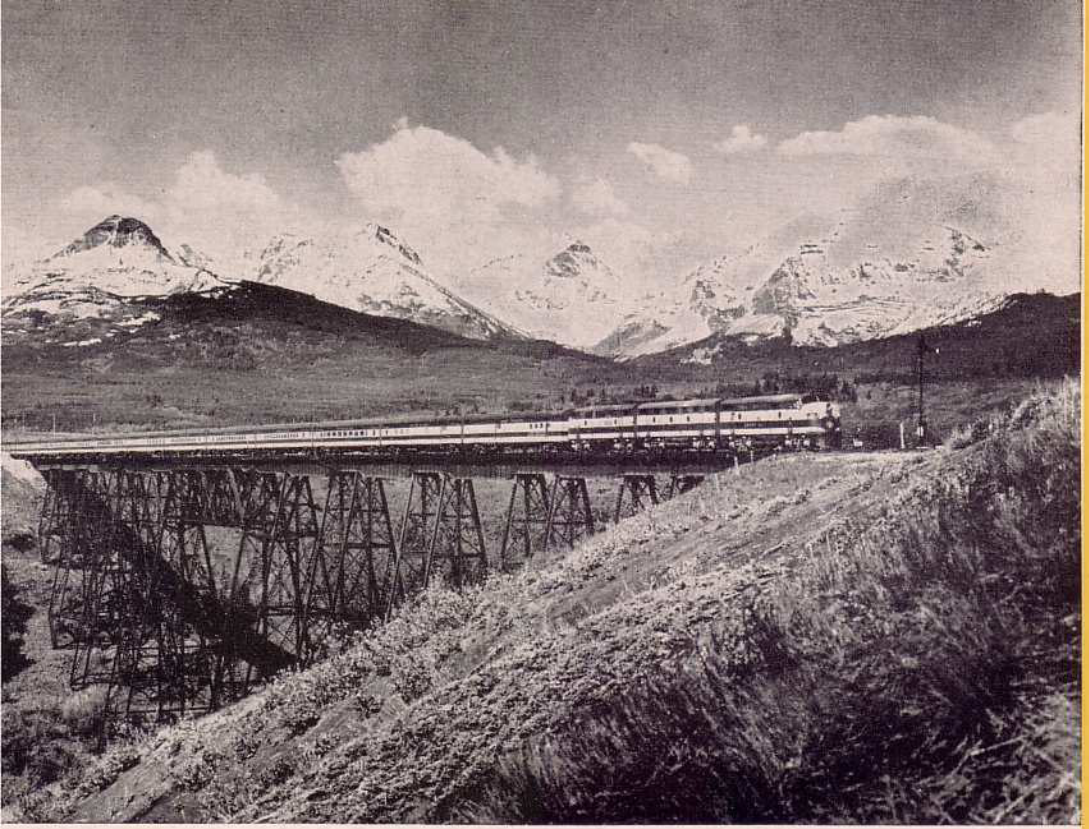
Modern machines are in wide use in railroad offices throughout the country. For example, the employees in this picture are busy at accounting machines, calculators, card sorters, and punch card machines. With these machines it is possible to do many things, from writing pay checks to making out purchase orders for supplies.

[37] This nation could not defend itself successfully without railroads. In peace and in war, our government maintains an Army, a Navy, and an Air Force. The railroads are expected to be prepared at all times to carry military personnel and their equipment where and when needed. During World War II, the railroads carried nearly all military personnel, to and from camps, seaports, homes, and recreational areas.

Only railroads are equipped with special cars to transport heavy war goods such as tanks, big guns, steel for battleships, engines, boilers, turbines, and many other things. In wartime, railroads are the vital life lines of the nation.

SOLDIERS AND MILITARY EQUIPMENT MOVE BY RAIL





SPANNING STREAM AND VALLEY

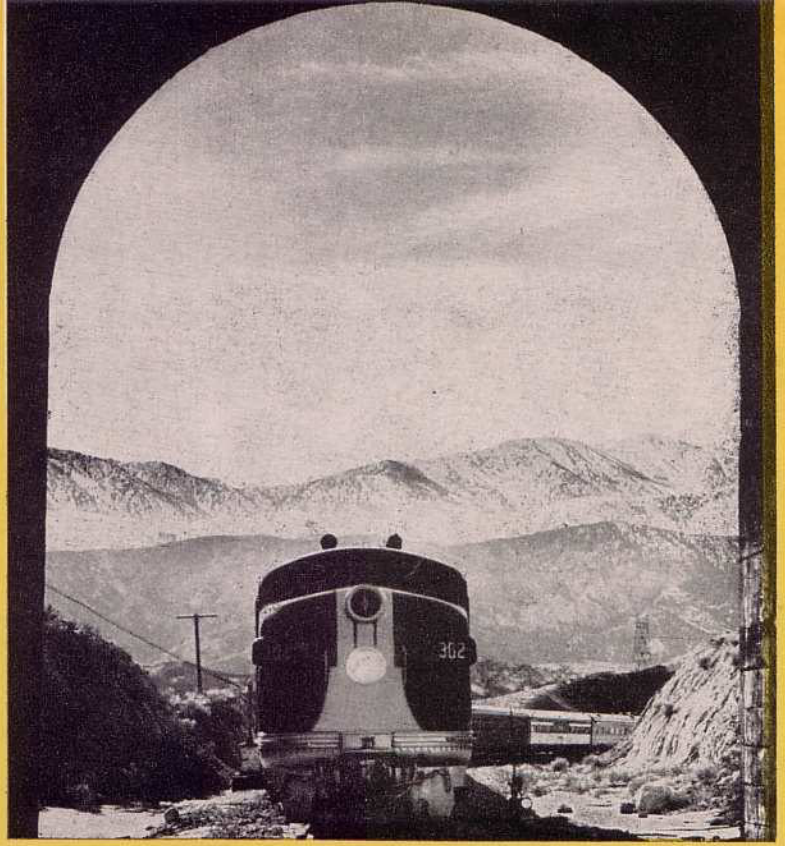
[38] Bridges make it possible for trains to cross rivers and valleys and to run from one city to another by more direct routes.

There are more than 190,000 railroad bridges of all kinds and sizes in the United States. The longest is twelve miles in length. Most are made of concrete and steel. The principal kinds of bridges are *deck plate girder, deck truss, through truss, suspension, cantilever, viaduct, and trestle.*

The "legs" of the bridge are called *piers.* The section between two piers is called a *span.* The "floor" of the bridge where the tracks are located is called the *deck.*

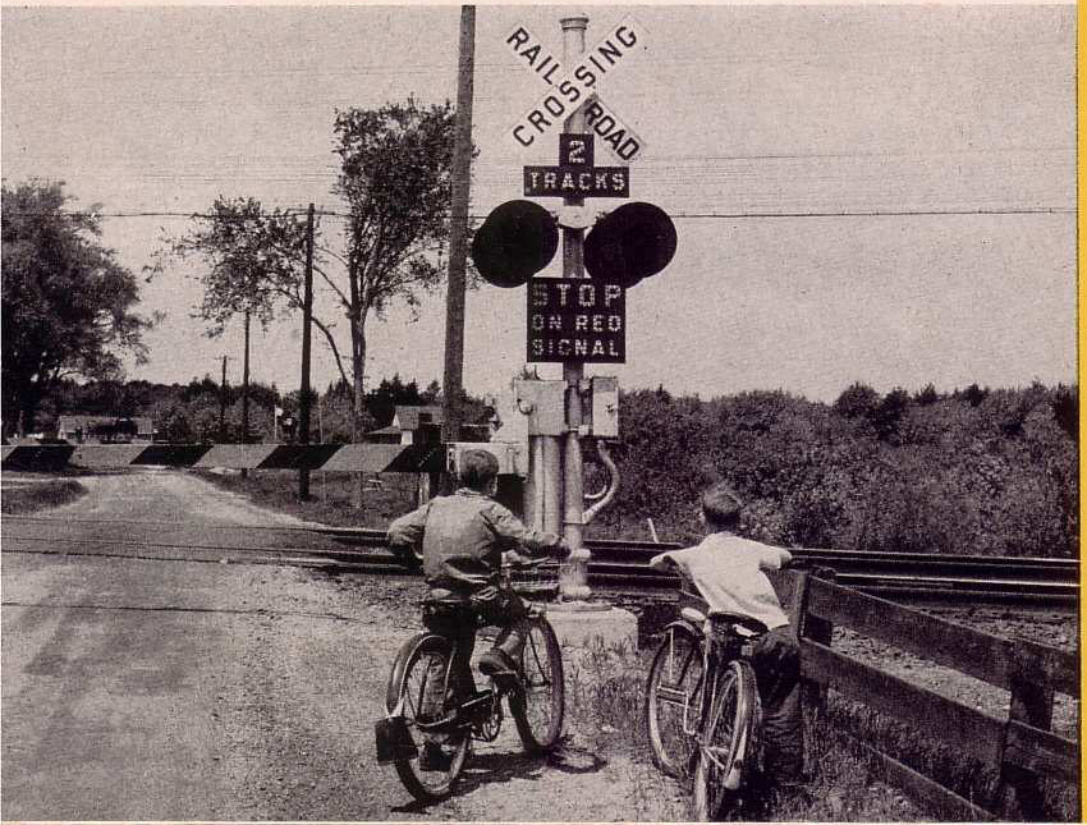
[39] Tunnels carry railroads below the surface of the earth. Like the bridge, the tunnel permits trains to run between cities by a more direct route; to pass through mountains, instead of around them; and to travel at a more level grade than would otherwise be possible. Tunnels also enable trains to pass under cities, rivers, and harbors.

There are more than 1,400 railroad tunnels in the United States. They range from 30 feet to nearly eight miles in length. Some tunnels are built for one railway track only. Others are built for two or more tracks.



TRAIN ENTERING A TUNNEL

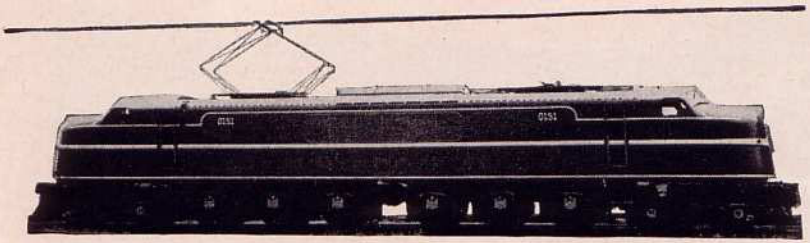
WHERE WE "STOP, LOOK, AND LISTEN"



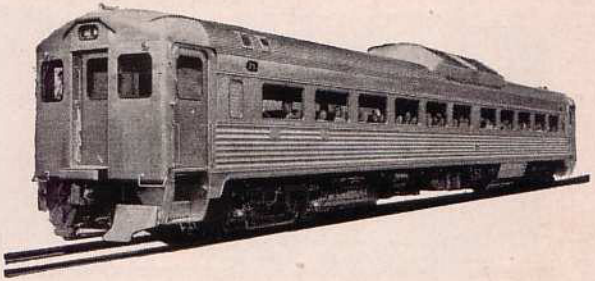
[40] The sign on the right informs motorists and pedestrians that this is a railroad crossing with two tracks. It tells them that they should stop on the red signal light.

Where traffic is heavy, crossings are protected by watchmen, or by gates, bells, flashing red lights, or other devices. When the train approaches a crossing, the engineer or fireman sounds the whistle, bell, or air horn — a warning to those on the highway.

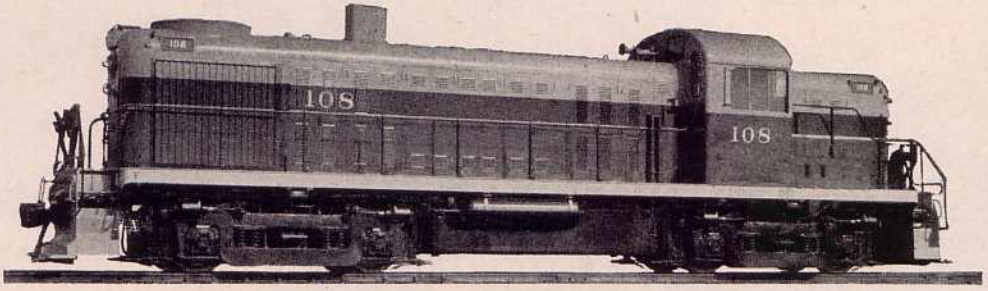
We should remember that the only safe way to cross a railroad track is to *stop, look,* and *listen.* If a train is coming from either direction, we should wait until it has passed before crossing the tracks.



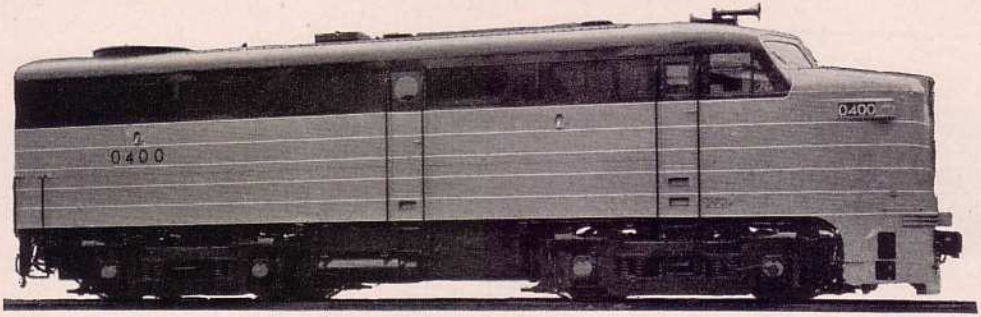
Electric Locomotive



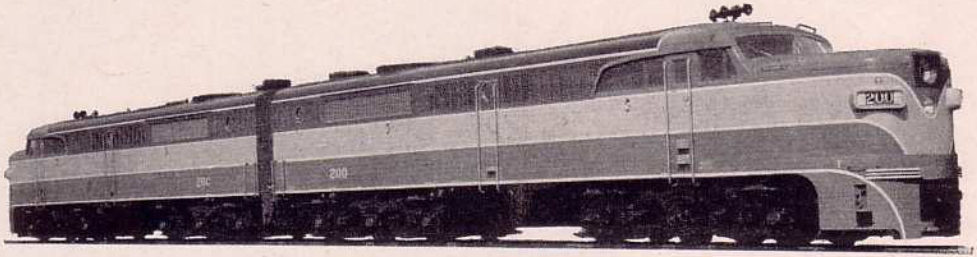
Diesel Rail Car



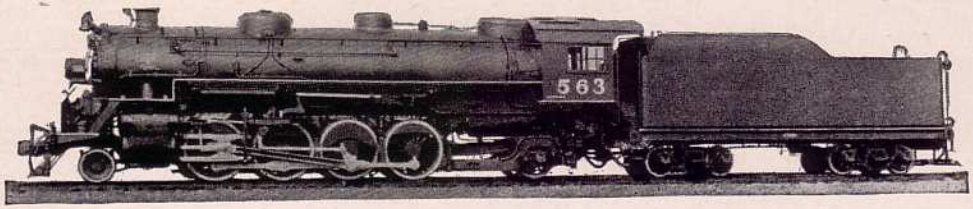
Diesel Switcher



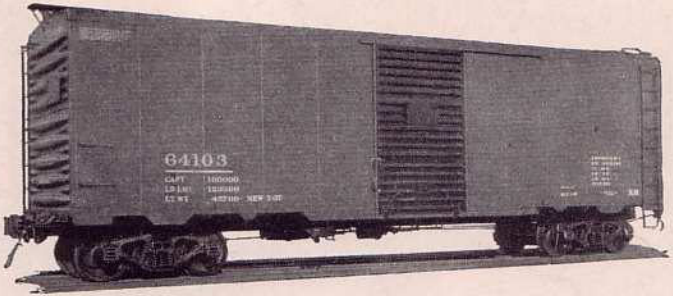
Single-unit Diesel



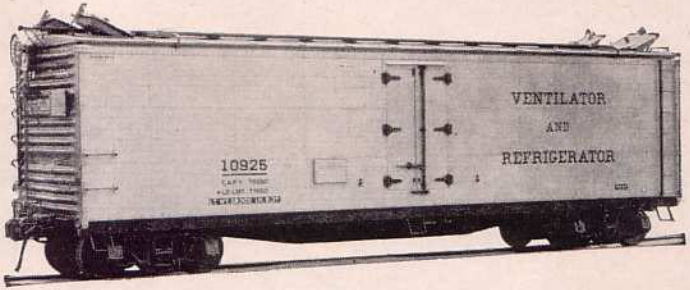
Two-unit Diesel



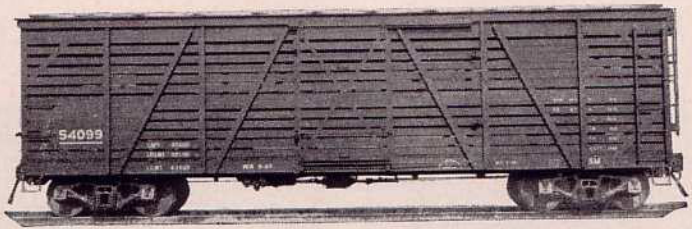
Steam Locomotive



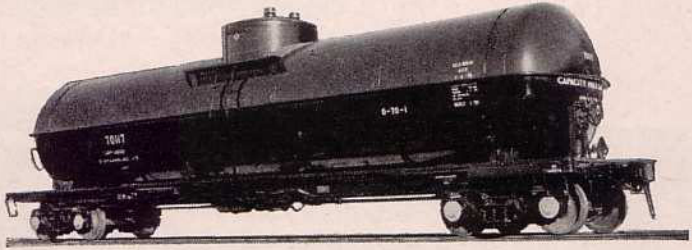
Box Car



Refrigerator Car

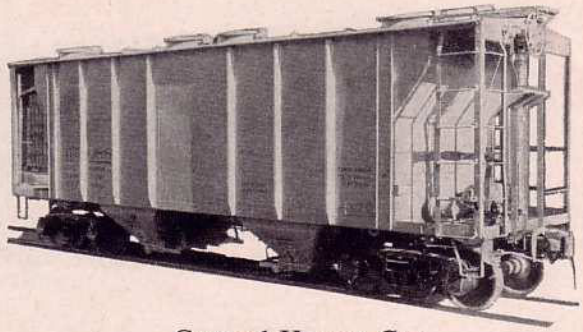


Stock Car

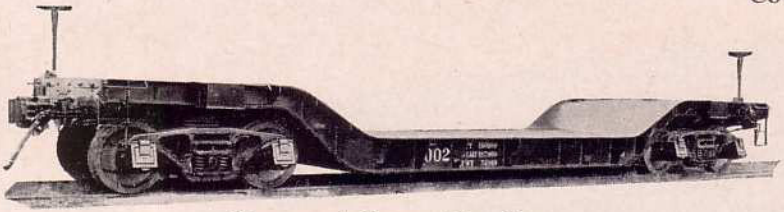


Tank Car

Flat Car

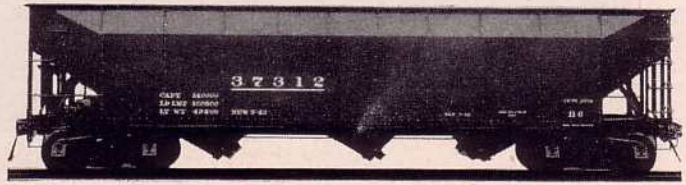


Covered Hopper Car

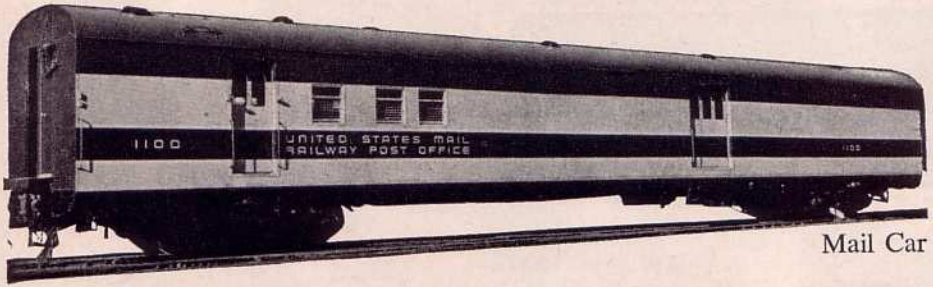


Depressed-Center Flat Car

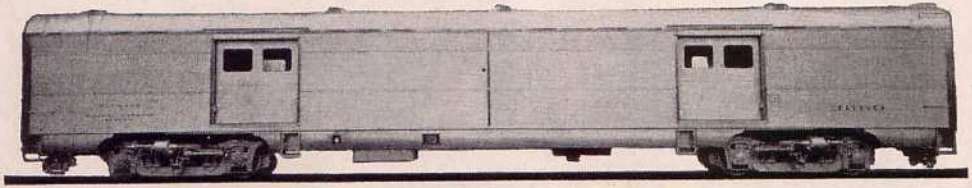
Gondola Car



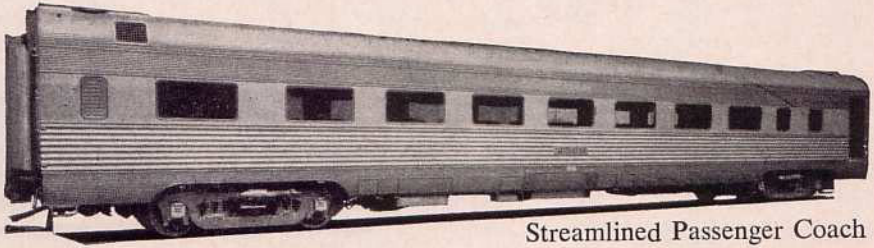
Open-Top Hopper Car



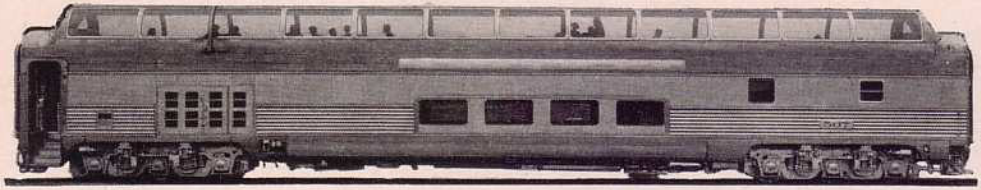
Mail Car



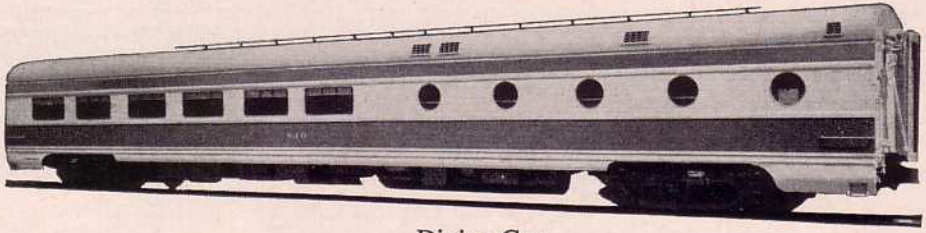
Baggage and Express Car



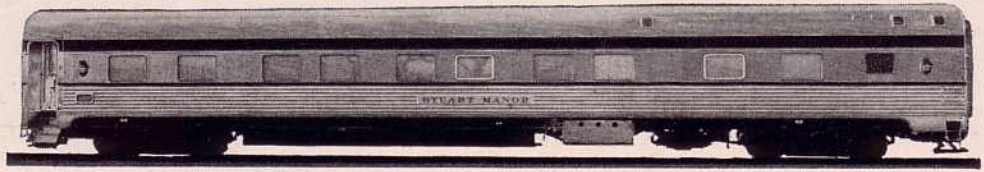
Streamlined Passenger Coach



Dome Car

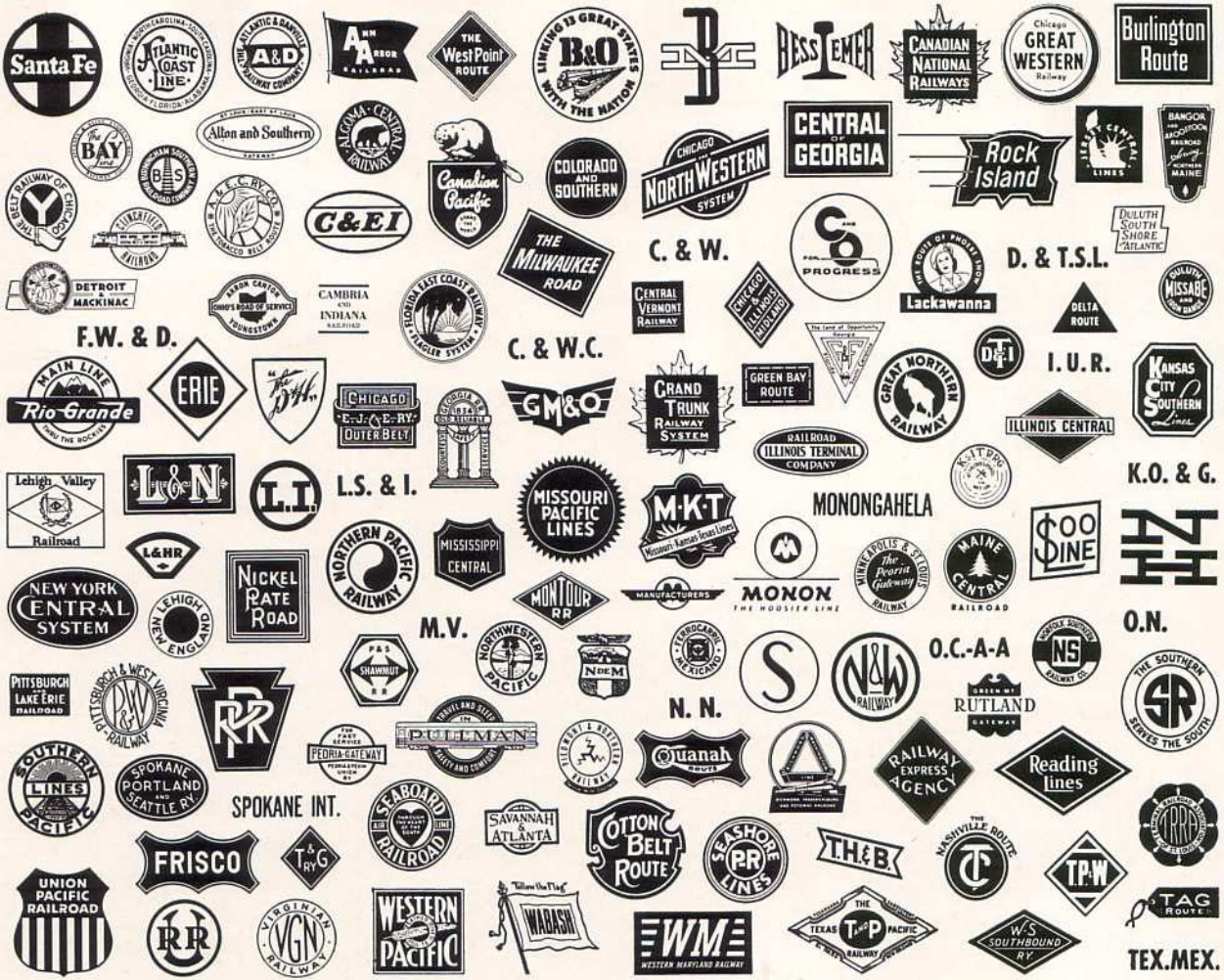


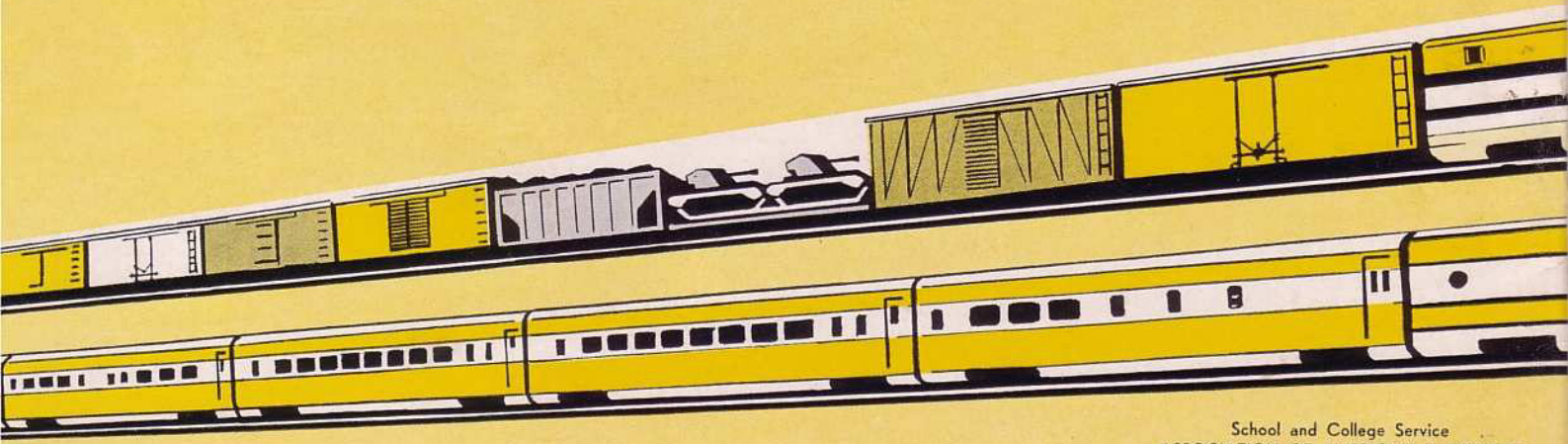
Dining Car



Sleeping Car

D. B.—300 M—1-60


Santa Fe
Atlantic Coast Line
A&D
Ann Arbor Railroad
The West Point Route
B&O
Linking 13 Great States With The Nation
Bessemer
Canadian National Railways
Chicago Great Western Railway
Burlington Route
The Bay
Alton and Southern
Algoma Central Railway
Canadian Pacific
Colorado and Southern
Chicago Northwestern System
Central of Georgia
Rock Island
Bangor and Aroostook Railroad
Maine
Y
Detroit Mackinac
C&EI
The Milwaukee Road
C. & W.
Duluth South Shore Atlantic
Lackawanna
D. & T.S.L.
Missabe Iron Ranges
Aliquippa Railroad
Cambria and Indiana
Florida East Coast Railway
Flagler System
Central Vermont Railway
Chicago Illinois Midland
Delta Route
F.W. & D.
C. & W.C.
Main Line Rio Grande
Erie
Chicago E.J.&E.Ry. Outer Belt
GM&O
Grand Trunk Railway System
Green Bay Route
Great Northern Railway
I. U. R.
Kansas City Southern Lines
Illinois Central
Railroad Illinois Terminal Company
K.O. & G.
Lehigh Valley Railroad
L&N
L.I.
L.S. & I.
Missouri Pacific Lines
M-K-T Missouri-Kansas-Texas Lines
Monongahela
$oo Line
Northern Pacific Railway
Mississippi Central
L&HR
Nickel Plate Road
New York Central System
New England
Montour RR
Manufacturers
Monon The Hoosier Line
Minneapolis & St. Louis Railway
Maine Central Railroad
M.V.
O.N.
Pittsburgh Lake Erie Railroad
P&W Railway
Pennsylvania Railroad
Shawnut
Northwestern Pacific
NdeM
Ferrocarril Mexicano
O.C.-A-A
Norfolk Southern Railway Co.
Green Mt. Rutland Gateway
The Southern Serves The South
N. N.
Pullman
Peoria Gateway
Quanah Route
Railway Express Agency
Reading Lines
Southern Pacific Lines
Spokane Portland and Seattle Ry
Spokane Int.
Seaboard Railroad
Savannah & Atlanta
Cotton Belt Route
Seashore Lines
T.H.&B.
Nashville Route
T.P.W.
TRRA
Union Pacific Railroad
Frisco
T&P Ry
Western Pacific
Wabash
WM Western Maryland Railway
Texas T&P Pacific Railway
W-S Southbound Ry
TAG Route
Tex.Mex.
IRR
VGN Virginian Railway



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