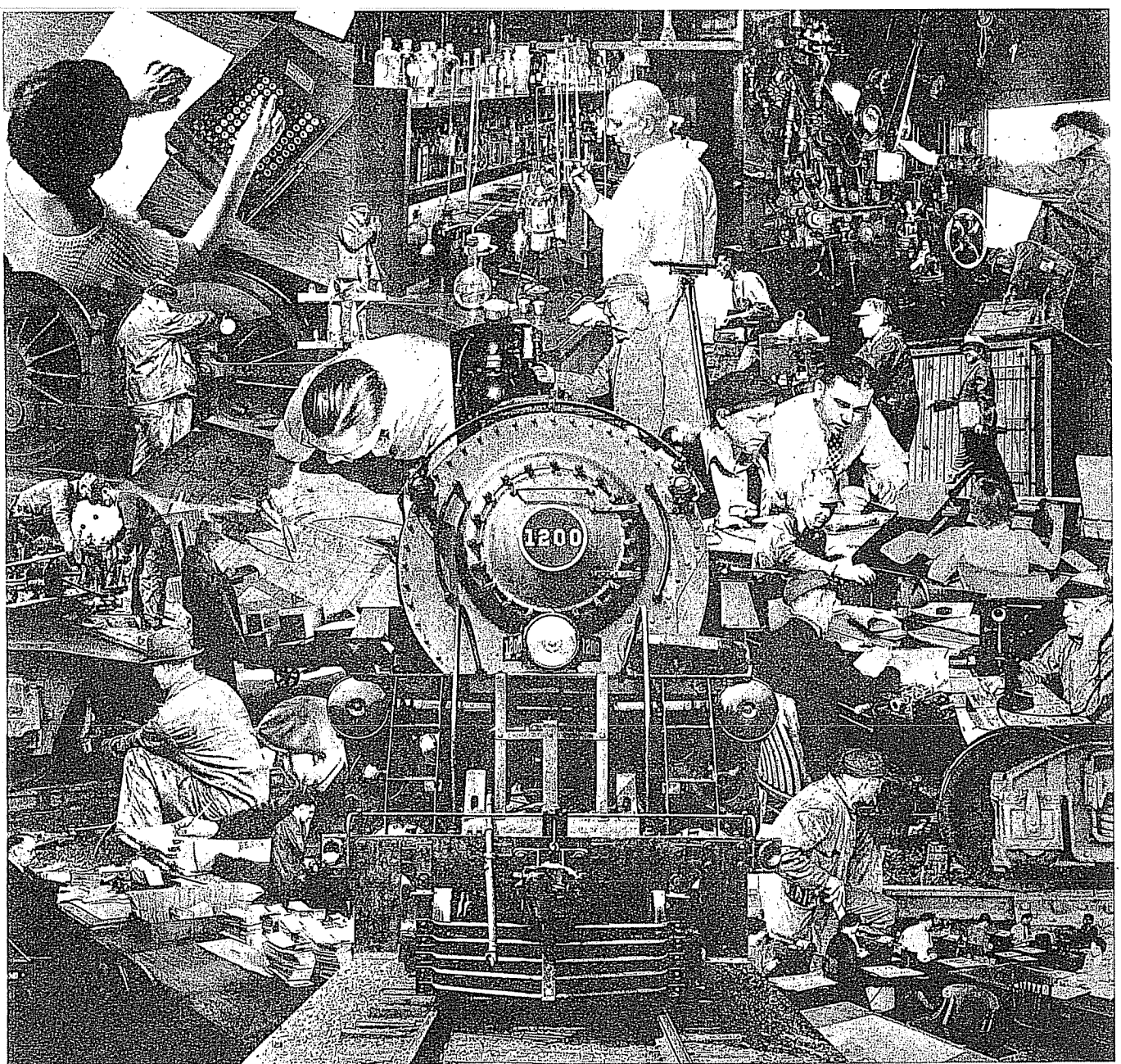


THE RAILROAD STORY



*SCIENCE, RESEARCH,
TRANSPORTATION MUSEUM
Baltimore and Maryland*

RAILROAD PROGRESS



P R E F A C E

The story of the scientific progress of our railroads is, in many ways, the story of the political, social, and economic progress of our Nation. Railroads opened vast areas for settlement and development, and welded together all parts of our great country.

The Railroad Story emphasizes the scientific development of American railroads. This book answers thousands of requests from junior and

senior high schools for authentic, up-to-date material on this subject.

The Railroad Story is made available by the Association of American Railroads and has been prepared from data and pictorial aids furnished by that organization. The book was written for school use by the editors of American Education Publications and staff members of the Association of American Railroads.



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School and College Service

ASSOCIATION OF AMERICAN RAILROADS

Transportation Building, Washington 6, D.C.

RAILROADS—NERVE SYSTEM OF AMERICAN TRANSPORTATION

Science and Many Thousands of People Keep the Railroads Working Constantly for Us.

MARTHA WILSON thought her father would never answer the phone. When she heard his "hello," she almost shouted into the phone in her excitement.

"Dad, Dad, I've won it!"

"Won what, Martha?"

"The science scholarship! Now, I can take that college chemistry course. And Dad, I get a trip to Washington to receive the award."

"That's wonderful, Martha!" said her father. "When do you go?"

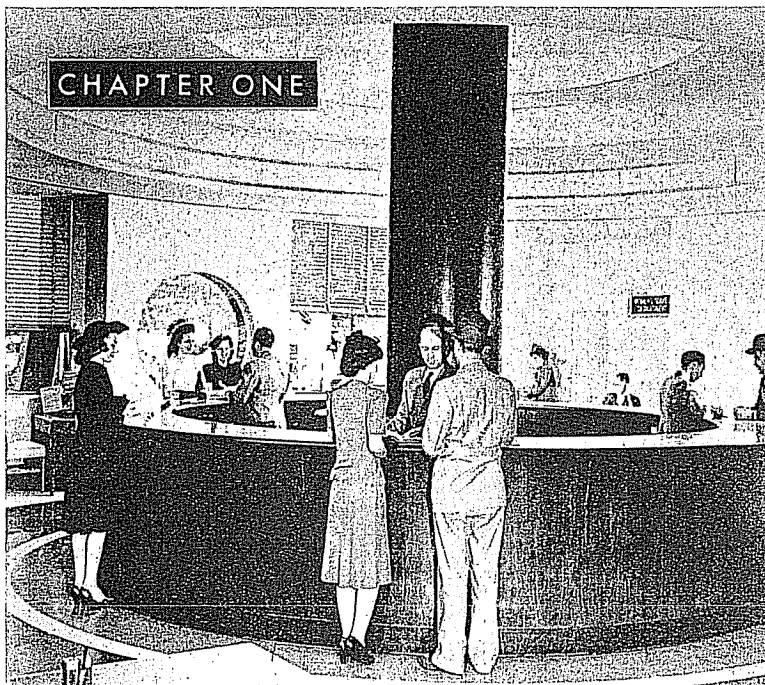
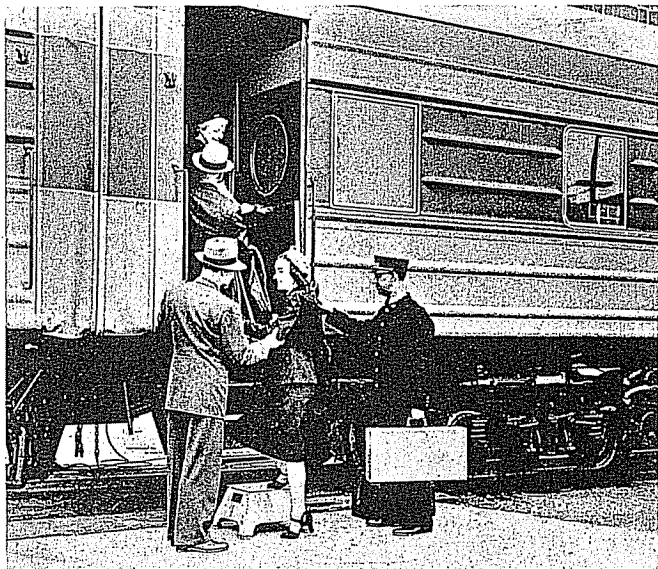
"Next week. I'm going by train."

"Good! Traveling by train, you'll have a chance to see what a great country we have."

"Of course. I've always dreamed about taking a long train trip."

"Well," said her father. "Why don't you drop in at the city ticket office and see Bill Driggs, the passenger agent? I know you'll have a lot of questions. He can give you the information."

It's always a thrill to board a fast passenger train.



City ticket offices help passengers plan their journeys.

Railroading Uses Many Sciences

That afternoon, the passenger agent explained the timetables and fares to Martha. "It's a long trip from Seattle to Washington, D. C. We've filled in this long ticket because you'll be traveling on more than one railroad. And here are your Pullman tickets. They take care of your 'hotel room' on wheels. Some of our tickets, such as those for Seattle to Spokane, or even Seattle to Chicago, are already printed, because a lot of people take those trips."

"You must have quite a system to keep track of all these tickets and fares and schedules," said Martha.

"Yes," replied Mr. Driggs, "we do have a system and we think it's a good one. Railroading is a business, of course, but it's more than that. It's an art. And it uses many sciences. Every piece of equipment and every method used by the railroads is the result of careful research, testing, and experience."

"Schedules, tickets, rates and fares, advertising, and a hundred other items must be prepared," continued the passenger agent. "It takes the work of engineers, accountants, writers, printers, clerks, and many others to do this big job of transportation. And we haven't even put you on the train yet!"

"My goodness," said Martha, "I feel like a special kind of person."

"Well, you are, really," said Mr. Driggs. "You're a customer of the greatest transportation system in the world. Nearly 225,000 miles of railroad line stretch between our cities and villages. Much of it has two, three, or more parallel tracks. Another 117,000 miles of track are in our yards and sidings. All this track adds up to a lot of mileage—more than 400,000 miles, in fact. The railroads are the Nation's nerve system and its life-blood; too. And don't forget that they're run by people—about a million and a quarter people."

Railroads Supply the Nation

Martha had a new interest in railroads. On the way to the station, she and her parents drove past freight yards, warehouses, and loading platforms for freight, mail, and express.

She saw everything from small packages to huge crates and machinery being loaded and unloaded. She saw refrigerator cars being iced. She even saw several dogs in crates on a baggage loading platform.

"I guess the railroads carry about everything, don't they, Dad?" she asked.

"Yes, they handle the country's biggest job of transportation, and that includes millions of passengers every year."

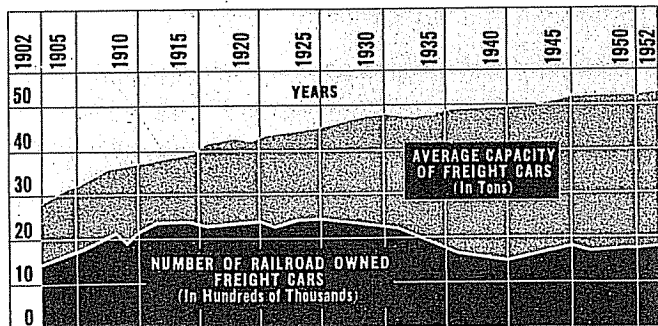
"I noticed a lot of new passenger cars on the track," said Martha.

"Yes, those cars you saw are the latest passenger equipment."

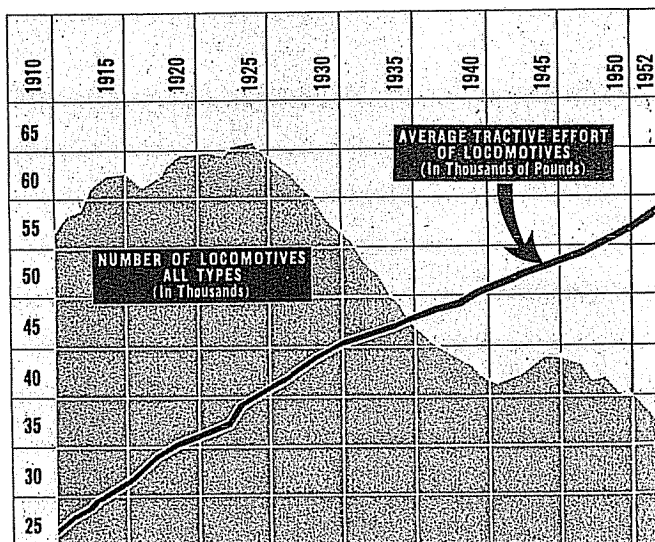
"But passenger service is only 14 per cent of the railroads' job," he went on. "The other 86 per cent is carrying freight. The freight service really keeps our Nation supplied. I wouldn't have a job if the railroads didn't bring supplies into our plant and take out the finished products."

The station swarmed with people. Martha thought about what the passenger agent had told her. "Peo-

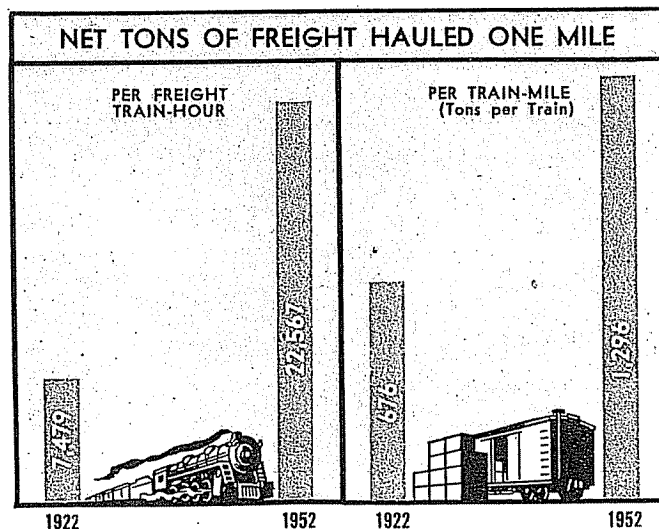
BELOW—The number of freight cars has varied, but the average capacity of these cars has steadily increased.



BELOW—We now have fewer locomotives, but their average tractive effort (pulling power) is much greater today.



BELOW—In the last 30 years, the speed and efficiency of handling rail freight have been more than doubled.





LEFT—Attractive, air-conditioned lounge and observation cars offer railroad passengers luxury and comfort. **FAR LEFT**—Meals in the dining car are an enjoyable feature of a railroad journey.

ple, ideas, and science," Martha thought, "make all this possible." Then, aloud, she said, "Just for fun, Dad, I may make a list of the railroad jobs I see."

"That would keep you busy during the whole trip," said her father. "Right now, we must take you to the train."

A red cap had already taken Martha's luggage to the train. A porter showed her to her roomette.

"This is your private hotel room on wheels," explained her father. "You can ride to Washington in comfort and safety. Remember that the porter and conductor will help you at any time."

Martha waved good-by to her father from the window. The train glided smoothly out of the station. At last, she was on her way!

People Make a Journey Possible

Martha didn't think about her list of railroad jobs until the next day. A lot of people, she decided, must be busy buying and taking care of supplies for this train alone. The porter kept her supplied with soap and clean towels. Her bed had been made with fresh sheets, a blanket, and pillow cases. The food in the diner was fresh and appetizing.

Then, she remembered all the people working at the station. She had seen red caps, ticket sellers, and gatemen. On the train were the conductor and the brakemen, the engineer and fireman, the Pullman conductor and the sleeping car porters, the dining car steward and the cooks and waiters. There was also a hostess in the coach section of the train. Martha had seen all those people. There must be more, she thought.

The conductor added to her list. "Did you notice the crew of workmen along the tracks back there? They work on the roadway all the time. Others check the signal system. Why, some railroads even have sailors working for them. They handle the tugs

and freight barges that railroads have in harbors."

"There's a lot of equipment in the trains themselves," Martha added. "Air conditioning, for instance. I can regulate the temperature in my roomette, whether it's hot or cold outside. Do the railroads manufacture all this equipment?"

"Some of it," replied the conductor, "and they buy some. In fact, some manufacturers make nothing but railroad equipment. If you should put all the manufactured items on your list, you'd have to print it in a book. And the money railroads must spend for that equipment! It amounts to about a billion dollars a year."

Ideas Build Railroad Progress

"Today, the railroads do a better job than ever before, and they are doing it with fewer locomotives and cars," said the conductor. "That's because the railroads have developed new, improved engines and equipment. Every kind of modern power, new metals, new machines, electronics, better ways of doing jobs—all these things have gone to work for the railroads."

"I'm certainly learning a lot about railroads," said Martha.

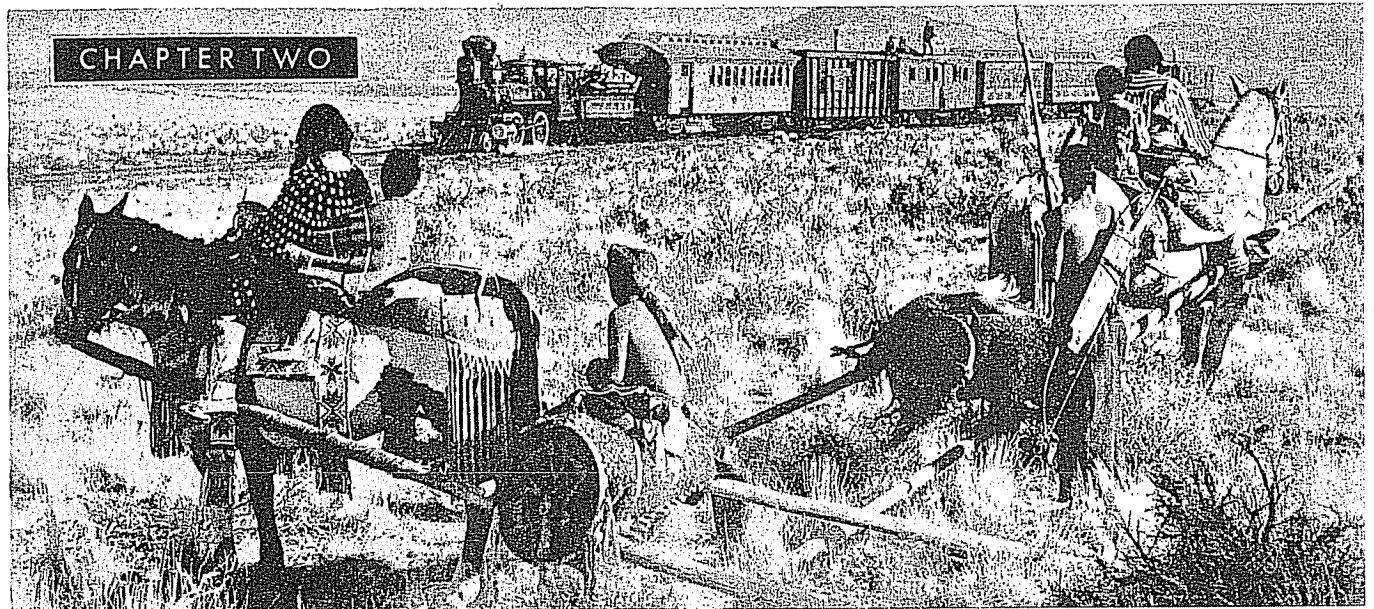
"Railroads are a perfect example of people working together to bring about constant improvements. The work goes on so steadily, though, that most people don't realize it," the conductor continued.

"We take the railroads for granted, you know. But right now, I'll bet there are hundreds of scientists working on new machines and ideas for the railroads—ideas that may help to build equipment more efficiently, devices that may add strength to a spring under a car. They're tested and put to work to give you greater safety and comfort."

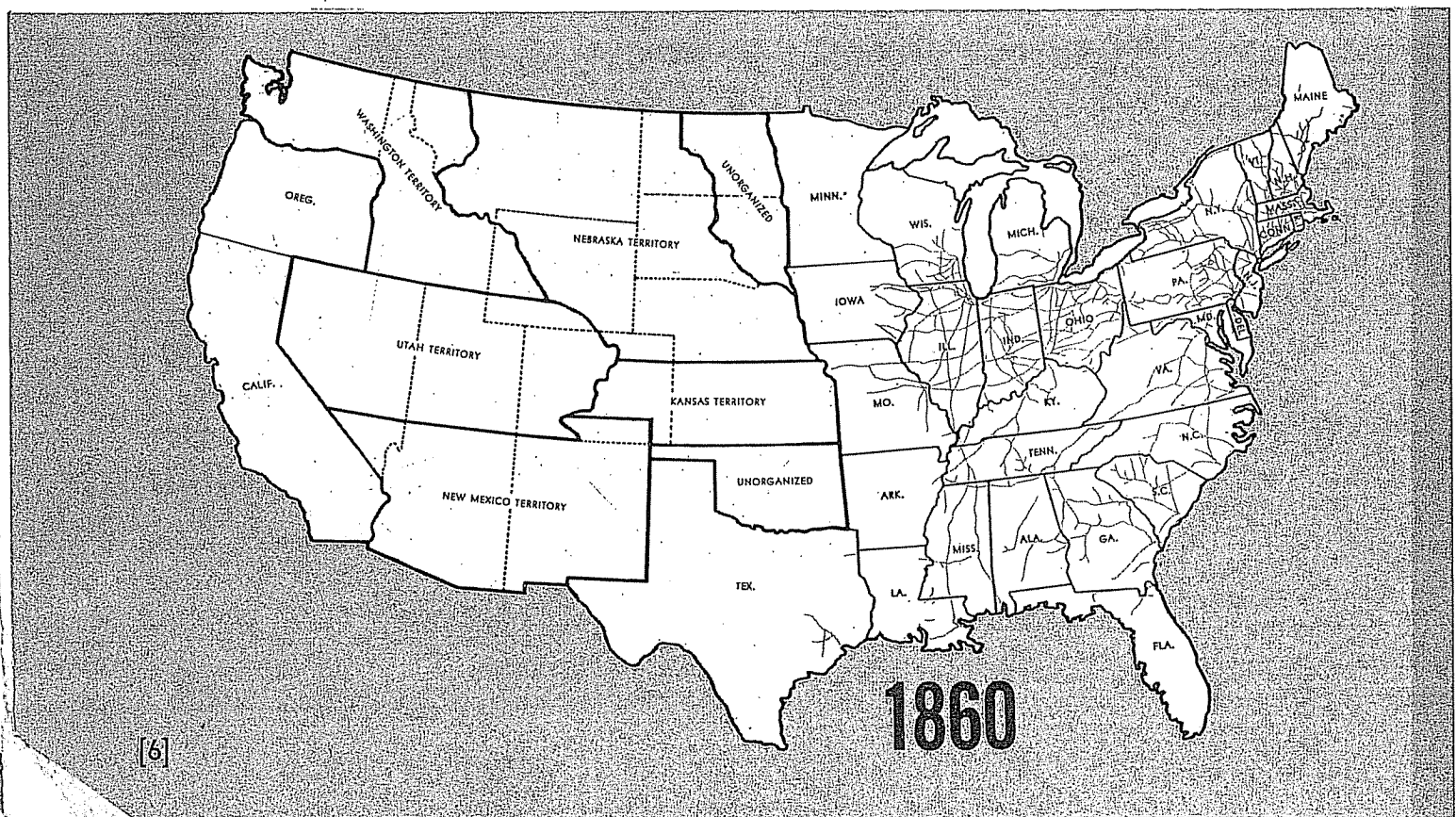
"I begin to see what the passenger agent and my Dad were talking about," said Martha. "I'm getting some real education in applied science on this trip."

RAILROADS WELD THE NATION

The History of Railroads Is a Story of American "Know How" and Steady Scientific Progress.



ABOVE—Railroads helped open the West for settlement and development. Railroads united all parts of our great country.
BELOW—Railroads spread rapidly in the East from 1830 to 1860 and began to push westward. The map shows this growth.



AN Indian chief watched from the top of a hill. He did not like what he saw before him in the broad valley below. Hundreds of white men were busy shoveling dirt onto a roadbed. On this roadbed, the workmen placed logs crosswise. Not far away, other workmen fastened long strips of iron to these logs, making a "trail" for engines and cars to run upon.

"If the white man builds his iron trail through the Indian's land," the chief thought, "more white men will follow. They will kill the buffalo. They will destroy our hunting ground. My people must fight to keep the puffing iron horse from crossing their land."

The Indians did fight. But, to the men building the railroad to the Pacific, Indians were only one problem. The builders had to lay track across vast plains and deserts and through the Rocky Mountains. Equipment and supplies had to be carried long distances. Sometimes, extreme cold weather delayed construction. But, despite these troubles, the rails went down with ever-increasing speed. One line had started building westward from Omaha, Nebraska. Another road had started eastward from Sacramento, California. As the gap between the two construction forces narrowed, the railroad building became a feverish race. Each company tried to outdo the other in miles of track built.

Finally, on May 10, 1869, the two roads were joined at Promontory, north of Great Salt Lake, in Utah. The last spike, made of California gold, was driven into the tie. The road, chartered in 1862, was completed. Railroads spanned the continent!

Railroads Start a Westward Movement

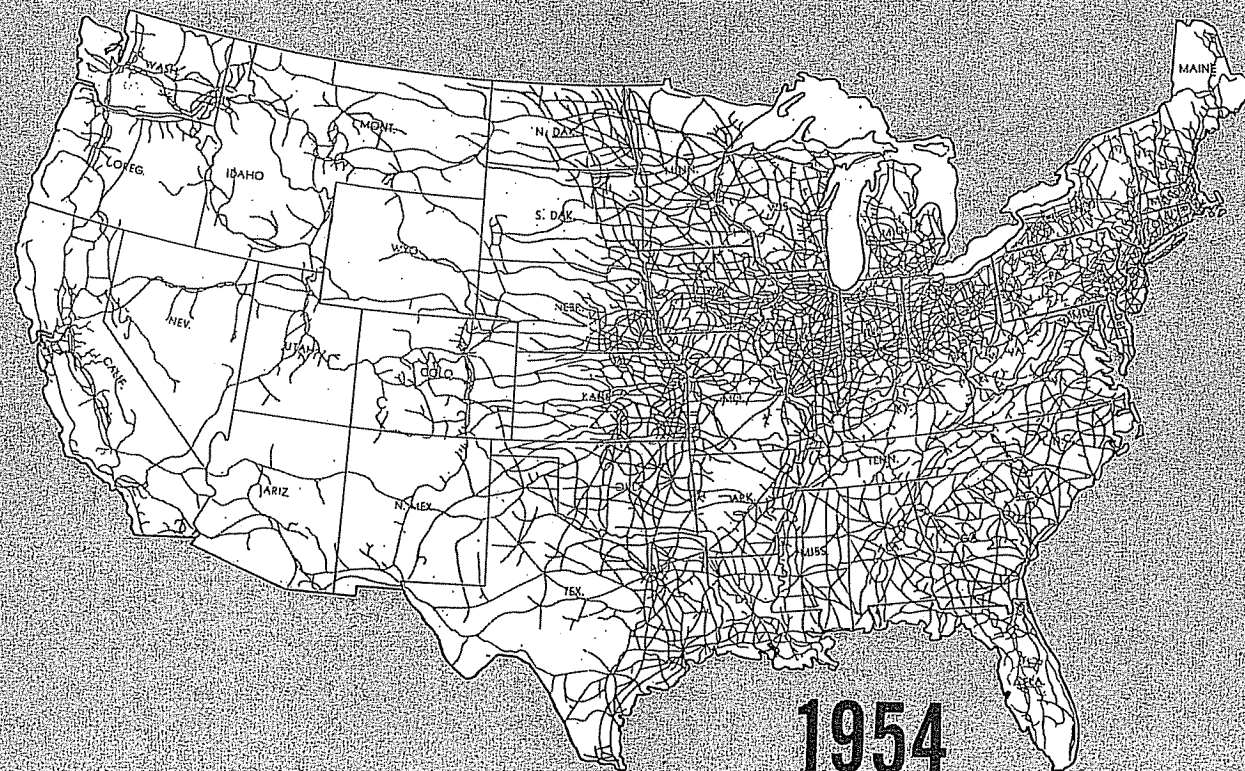
The Indian was right when he reasoned that the white men's railroad would bring more people. Railroads had started along the Atlantic seaboard in the early 1830's. By 1860, railway mileage in the United States had increased to 30,626 miles. (See the map on page 6.)

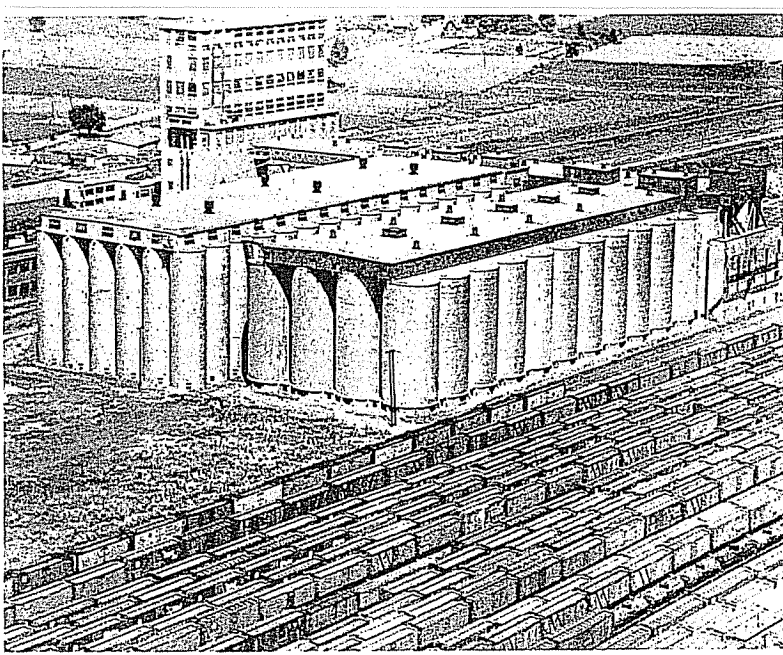
Many pioneer railroads which were to become the modern links between the East and Midwest were being built in the 1830's. The railroads created new markets and industries. Farms were brought closer to the cities. Farmers could now spend more time farming. They didn't have to make all their own clothing and supplies.

The railroads were gradually extended to the Missouri River. During these years, from 1830 to 1860, the population more than doubled.

By 1885, three more railroads had reached the Pacific Coast. In the next twenty-five years, four more roads were completed. In the same period, the vast areas between the Mississippi and the Pacific were laced with a network of lines. By the early

Railroads are transportation arteries for our Nation. Over 40,000 trains carry people, mail, express, and freight daily.





Railroads are a vital part of the vast grain trade.

years of the twentieth century, all sections of the country were served by rail.

Wherever railroads were built, cities, towns, industries, farms, and ranches were developed along the routes. Millions of acres of land were put under cultivation. The western frontier soon disappeared.

War Uncovers a Railroad Problem

Up to 1860, the greater part of railroad growth had taken place in the North. During the War Between the States, these railroads gave the North a great advantage. But both North and South discovered they had a common railroad problem—the gauge of the tracks, or distance between the rails.

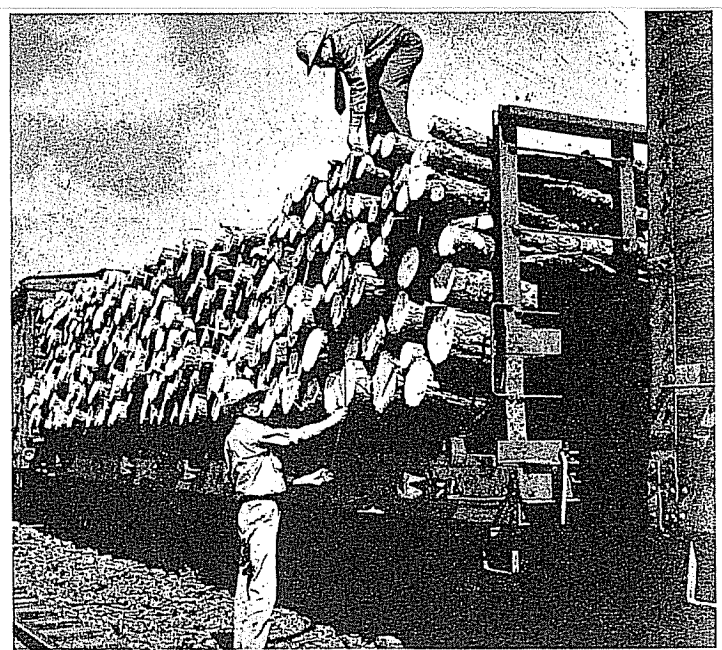
Early railroads had run only short distances. Usually, the tracks were laid between two cities which were fairly close together. The gauge of one railroad was usually different from that of another. Thus passengers would ride to the end of the line, then look for another railroad to take them farther.

The War Between the States showed the need for a standard gauge everywhere. Too much time and money were spent in moving goods and people from one railroad to another. The growth of western railroads made a standard gauge even more necessary.

The railroads finally made the change to a standard gauge of 4 feet, 8½ inches in 1886. It was a big job. Not only tracks, but also locomotives and cars, had to be changed. Today, a railroad car of one railroad can run on the tracks of any other railroad on the North American Continent.

The Nation Changes to Railroad Time

Standard Time came about through the joint efforts of the railroads. Before 1883, almost every town in the United States had a different “time”—



Railroads carry all kinds of forest products to mills.

“sun time,” or “local time.” Around Chicago, for example, the time of the passage of the sun across the meridian varied one minute for every thirteen miles, east and west.

You can imagine the mix-up caused by the use of so many varying local times! For instance, one railroad used Philadelphia time, which was five minutes slower than New York time and five minutes faster than Baltimore time. A great many different railroad times were used.

To end the confusion of local times, the railroads adopted four time zones as the standard. At noon, November 18, 1883, these four standard time zones were put into effect throughout the United States. With only a few minor changes, they still govern our time today. The railroads brought about this standardization. Not until thirty-five years later—in 1918, during World War I—did Congress pass the Standard Time Act.

The Air Brake Is Invented

Early railroads had trouble stopping their trains. Brakemen running from car to car set the brakes by hand. Stopping the train took much time.

George Westinghouse, soon after his discharge from the Union Army, went to work to invent an air brake. His idea was to use the pressure of compressed air to set the brakes. Westinghouse patented his air brake in 1869.

In 1870, the Master Car Builders' Association (now the Mechanical Division of the Association of American Railroads) began a series of air brake tests which have continued to this day. In 1872, Westinghouse developed an automatic triple-valve air brake which was a real improvement over his