CHAPTER VII

UNION PACIFIC LOOKS AHEAD

Western Development—Retarder Yards

Before the Union Pacific has completed its postwar program the road will probably have spent as much as the system cost. From its inception, the Union Pacific seemed destined for greatness, and in 1949, 80 years after the driving of the Golden Spike, this pioneer of the old U. P. Trail stands out as a lusty stalwart among the rail giants of the West.

It is characteristic of the West that when there is a job to be done no time is wasted on dubious scenting of the wind for weather signs. Men simply roll up their sleeves and proceed to the business at hand. They have conquered time, distance, mountains, rivers and deserts. If these Western Railroads seem to swagger and strut a little, they have every right to; if they seem a bit heady and boastful, they have good cause.

The old Union Pacific of the seventies had faith in the growth of the West. The Union Pacific under the late E. H. Harriman foresaw continued westward expansion and began rebuilding the railroad shortly after the turn of the century. In the present postwar railroad era the Union Pacific is once more rebuilding and modernizing this great railway system under the able leadership of its president, A. E. Stoddard, and E. Roland Harriman, chairman of the Union Pacific board of directors, and a son of E. H. Harriman.

The Union Pacific serves 13 great Western states—California, Oregon, Washington, Idaho, Nevada, Utah, Montana, Wyoming, Colorado, Nebraska, Kansas, Iowa and Missouri—and since V-J Day some $200,000,000 has been authorized or spent for new equipment and fixed facilities to handle the increased flow of passengers, materials and finished products to and from the nation's newest, fastest-growing industrial areas.

With the end of World War II, students of history in America became increasingly aware of two things:

(1) American industry, divorced from the over-populated East, has gone West and could be counted upon to stay there.

(2) If that is true, some safe, certain lifeline must be found not only to keep it there but to link it even closer to the populous Eastern and Midwestern markets.

Union Pacific officials, with the experiences of the war years, had long planned for just such an eventuality. The result was that when the fighting was over the Union Pacific was ready with a long-range program designed to protect the future of the newly industrialized and increasingly agriculturalized West.

As always, there were railroad critics complaining loudly that the railroads were not progressive and still belonged to the horse-and-buggy days. The Board of Directors of the Union Pacific wasted no time replying to such carping but went ahead, sleeves rolled up, and took immediate action on the following program:

(1) Ordered an institutional advertising campaign in the nation's trade press pointing out the industrial advantages of the West. (Since the end of World War II, more than one thousand new industries have been located on UP lines.)

(2) Began placing orders for additional freight, refrigerator, and passenger cars.

(3) Started a purchasing program that resulted in complete "Dieselization" of the railroad's entire main line from Salt Lake City, Utah, to Los Angeles, California.

(4) On November 15, 1947, the Union Pacific had 272 Diesel units with a total of 358,980 horsepower. On that date the UP Board made railroad history when they ordered an additional 181 Diesel power units.

(5) Began a long-range construction program that resulted in construction of a new freight classification yard at Pocatello,

Idaho, and another at North Platte, Nebraska, to speed the flow of freight.

(6) Ordered construction of a new tunnel through the Wasatch Mountains at Aspen, Wyoming, which will eliminate the only section of single-track line between Omaha, Nebraska, and Salt Lake City.

(7) Ordered further centralized traffic control installations to provide faster, safer transportation.

(8) Instigated a new livestock dispatch service, eliminating the usual stop for feed, water and rest at Las Vegas, Nevada, and putting in livestock in Los Angeles from Ogden, Utah, in slightly more than 30 hours.

(9) Placed Union Pacific's entire fleet of five "Cities" streamliners into daily service between Chicago and Los Angeles, San Francisco, Portland, and Denver, and between St. Louis and Denver.

(10) Insisted that the problem of safer delivery of freight be solved by the employment of a container engineer whose job it is to see that all freight is properly packaged to cut down losses.

(11) Instituted an educational travel program designed to interest America's vast traveling public in the natural wonders of the West.

(12) Ordered an all-out effort to keep the railroad's service not only abreast of but also ahead of continued development of the Pacific Northwest, California, Idaho and other states served by the road.

(13) Demanded that all of this be accomplished by an ever-increasing vigilance against accidents through the installation of new safety devices and operation of an exhibition car in which not only the railroader but the public, as well, be given lectures on safety and railroad operation.

(14) Ordered the purchase of new type, high-speed 133-pound rail for use in a continuing program of track replacement of the road's main lines.

The Union Pacific believes the West is in for a long period of prosperity. Cheering words, indeed, and there seems little doubt but that the prophesy will be fulfilled. Certainly, great things are forecast in this West the railroads built.

It sounds wonderful, you say, but what has actually been done? It is easy to spend money on paper, and $200 million is real money.

Let us see how some of this money was spent: $2 million and one-half went into the classification yard at Pocatello, Idaho; $3 million and one-half was spent for the retarder yard at North Platte. When it is finally completed the Aspen Tunnel will have cost $8 million. Contracts had been let on seven UP construction projects in seven states in the spring of 1948 for $6,686,500.

Orders for the purchase of 50 new chair cars and 50 new all-room sleeping cars of lightweight construction were authorized in February, 1948, at a total cost of about $12 millions.

Some of the construction program included 59 miles of centralized traffic control between Los Angeles and Riverside, California, together with the extension of passing tracks and additional second main track; 110 miles of new color light signals between Ogden, Utah, and McCammon, Idaho, and the extension of passing tracks; 21.5 miles of new track from Fort Hall, Idaho, to a phosphate deposit at Gay, Idaho; automatic cab controlling circuits and new color lights between Laramie and Green River, Wyoming; the relocation and extension of tracks in the Nampa, Idaho, yards; Diesel oil storage facilities installed in nine cities; main line track changed at Strong, Bloom and Black Rock, Utah, and Farrier, Nevada, to eliminate sharp curves and their accompanying speed restrictions.

These are a few of the projects which will keep the Union Pacific well up in the forefront of the railroad modernization movement that is blazing the trail of "Railroads of Today."

The Union Pacific has 9,800 miles of railroad, plus all of its train and equipment, which adds up to a staggering figure. But that is not all. "The Union Pacific," says John Bridge in the *Wall Street Journal* of October 20, 1947, "operates more than a railroad. It owns or controls bus lines, hotels, oil and coal fields. Income from Union Pacific's non-railroad operations normally covers its fixed charges.

"Since 1937 when oil was first discovered on Union Pacific's lands, income from oil and gas operations has become the most important part of the company's 'other income.' Its oil operations are currently at record levels, running ahead of the $6.6 million net income from this source in 1946."

The same article points out that normally Union Pacific is the fifth U. S. railroad in total revenues from railway operations; adding that in the past few years it had been one of the top three railroad companies from the standpoint of net income.

During the war years, the UP spent $414 millions for maintenance and equipment to handle the war traffic, including the largest steam locomotives in the world, the giant 4-8-8-4 mallet types designed for mountain work, the well-known "Big Boys."

Late 1948 found the Union Pacific with about 1,200 passenger cars, more than 50,000 freight cars, more than 1,000 steam locomotives and around 417 Diesel units, with deliveries being maintained as this is written.

We find an example of the growth and development of the Union Pacific in the modern classification yard at Pocatello, Idaho. This yard was built as a 28-track classification yard. Looking to the future, the classification layout was planned for 40-track capacity. The Pocatello yard was completed in the fall of 1947, and before the fall of 1948 had rolled around it had expanded its classification facilities to their full 40-track capacity.

Modern Yard at Pocatello

In the good old days, which happily are gone beyond recall, it was claimed by the boomer fraternity that the qualifications required of a switchman applying for a job at Pocatello Yard largely depended on his ability to throw a ball switch with his feet while rolling a cigarette. If, in those days, a seer had told a switchman that the crystal ball indicated a future yard layout that included power switches, car retarders in place of "hump riders," teletype machines, talk-back speakers, radio telephone connections in the cabs of the Diesel switch engines, and inspection pits under the tracks, the switchman would, and not without reason, have declared that the crystal-gazer was crazy in the head.

But today these things are realities at Pocatello yard for the reason that, to expedite traffic, the railroads must employ every last wrinkle that science can develop to maintain their position in the transportation parade. The track is heavier; trains are faster; communications are far-reaching and positive, with this centralized traffic control performing feats that make the old-timer bat his eyes in amazement. An added piece of wizardry is the modern railroad yard.

Pocatello, Idaho, is a rail crossroads, a Union Pacific junction that finds lines converging from four directions. To the east, a line reaches to Granger, Wyoming, to tie in with the east-and-west main route of the road between Omaha, Nebraska, and Ogden, Utah. To the west, the rails extend through Boise, Idaho, to Portland, Oregon, and Seattle, Washington, with connections to Spokane, Washington. North of Pocatello, the track finds its way to Butte, Montana, and to the south there is the line to Ogden, Salt Lake City, Utah, and Los Angeles, California. This far-flung network originates a tremendous volume of products, moving into the hub at Pocatello. Foremost of these products are fruits, vegetables, lumber, phosphate and live stock from all parts of Washington, Oregon and Idaho. Moving into these territories are manufactured products and coal.

A large percentage of trains arriving at Pocatello must be classified and made up into new trains for departure. The traffic, of course, has its seasonal peaks, ranging up to 2,200 cars daily.

Switching once handled in two flat yards at Pocatello finally became entirely inadequate to meet the increasing demands. Delays and congestion of this rail traffic became serious, a condition that the Union Pacific set about correcting through the expenditure of more than two million and a half dollars. The plans that came off the drafting tables of the engineering department included a new gravity yard of a uniformly high capacity and designed to classify and make up trains with a minimum of delay.

A river had to be moved, a hump built, grades calculated, floodlights installed, an electrical apparatus engineered into the layout and a general all-around remodeling and enlarging of plant and facilities had to be accomplished. This included 600,000 cubic yards of grading and the laying of 35 miles of track, involving a 14-track receiving yard, a 28-track classification yard, and an 11-track departure yard. Then there was a car repair yard and new tracks for yard engine fueling. The receiving yard tracks range in length from 2,025 feet to 6,310 feet. The departure yard tracks range from 4,640 to 6,245 feet in length.

The car repair yard has five tracks and is located to the south of the lead between the classification yard and the departure yard. South of the repair tracks are five caboose tracks about 820 feet long. A run-around track for freight trains is located to the north of the yards, and the double-track main line for passenger trains is to the south of the yards.

The original flat switching yards now form the new receiving yard. From the east end of this yard, eastward for about two miles, the construction on the present fill is all new. This area incorporates 75 additional acres. Four bends of the Portneuf river channel, totaling about three-quarters of a mile, were filled. Also several sections of new channel were dug. The entire yard area was graded to a level of six feet above record high water.

Culverts 30 to 40 inches in diameter provide for the necessary cross drainage. New 131-pound rail was laid for the new passenger tracks. All rail switches, frogs and turnouts in the retarder area are of 131-pound material. The rail of other yard tracks is 100-pound.

Two groups of eight tracks extended down the center of the original 28-track classification yard. To either side a space was left sufficient to accommodate six tracks each when additional tracks were required. Beyond these spaces, along each side of the fill, there was a group of six tracks. The reason for locating the latter six-track groups at the edges of the area, instead of adjacent to the two central groups, was that this procedure permitted the installation of tracks and switches in their permanent locations in the sections down the incline, making possible the subsequent addition of the two future groups without changes except the insertion of two switches in the main leads.

The classification tracks were thus arranged in groups, rather than being connected to ladders, which makes it possible for one car retarder for each group to be used to apply the final retardation for cars going to any of the tracks in each group. Sufficient area was available for length of tracks as required for various classifications without the necessity of using lap switches and, therefore, short ladders were used. The yard tracks are spaced on 14-foot centers, providing for a pathway between cars. The original 28 tracks placed in service had capacities ranging from 24 to 42 cars.

The Pocatello hump yard grade descends at about 0.2 per cent throughout the receiving, classification and departure yards. From the east end of the receiving yard a grade of 2 per cent ascends to the crest, the elevation of which is about 15 feet above that at the clearance points of the turnouts to the classification tracks. When cars are being pushed over the crest at the usual speed of about four miles per hour, the section of 4 per cent grade down the incline serves to accelerate the speed promptly, thus lengthening the separation between cars or cuts to allow space and time in which to operate the switches. From the bottom of this 4 per cent incline the grades were designed at gradually reducing percentages to about 0.2 per cent after passing the clearance points on the turnouts on the respective classification tracks.

Let us say now that a lightweight car, such as an empty stock car, has been dropped over the crest. This car will roll to the classification track at a speed of at least five miles per hour, even against the wind. For loaded cars or empty cars traveling too fast, the retarders are used to bring the speed to about three or four miles per hour as these cars leave the last retarder on each route. The 0.2 per cent grade on the classification tracks is just about right, under favorable conditions, to keep heavy cars moving without gaining speed. At the far end of each track there is 250 feet of ascending 0.4 per cent grade, which reduces the speed short of a hand skate placed on the track to hold the first car.

The power switch machines and car retarders—of the electro-pneumatic type—and the control machines were furnished by the Union Switch and Signal Company.

As the cars are pushed toward the crest from the receiving yard they pass a location at which men on each side use pressure equipment to shoot a stream of warm oil into the journal boxes. This aids the car to accelerate quickly when moving down the incline. Sheet-metal pans are provided to catch excess oil. Moving up to the crest, the cars to be humped past car inspection pits which house men who inspect the cars. At this point a concrete passageway about three feet wide and seven feet high extends through the fill. From this passageway a door leads to the inspection pit beneath the track where the car inspector sits looking through shatterproof glass windows, which face both up and down the track.

This inspector checks brake beams and other equipment. An automatic wiper, operated by air pressure, removes rain or snow from the glass. A steel roof covers the inspection pit between the windows at a level of two inches above the top of the rail. Ordinarily the inspector watches the running gear as it approaches but if he wants to take a second look he can turn around and glance through the opposite window. Floodlights sharply illuminate all equipment beneath the car.

In a pit at each side of the track there is an inspector who watches the wheels and trucks. These pits are glass-enclosed to prevent dirt from falling in the eyes of the inspector. Between the edge of the pit and the rail a mirror enables the inspector to watch for cracks in wheel flanges and possible flaws in journal boxes.

These side pits form the foundation walls for two individual inspection houses which are 22 feet high and six feet by 12 feet, the 12 feet being parallel with the rails. In the space in the upper section of each structure a car man looks through an opening, making an inspection of car roofs, running boards, grab irons and brake wheels.

When any of the five men on duty at this inspection station see a defect they use "talk-back" loud-speakers to announce the defect. The car foreman on the ground then marks the car and determines whether or not it must be switched to the repair tracks. If so, he informs the car-retarder foreman at the crest office, and he changes the switch list and informs the retarder operators accordingly.

About 100 feet in advance of the inspection pits there is a device which is actuated by any defective equipment hanging below standard clearance where it might strike the glass of the inspection pit. When this detector operates, a red lamp is lighted in the pit to warn the inspector to leave the pit. A special alarm is also given on the control panel in the office of the retarder foreman at the crest. He then uses his radio and signals to direct the engineman to stop the string of cars being pushed.

The Diesel-electric switching locomotives in the Pocatello yard are equipped with radios, which operate on two frequencies, the selection being made by the position of a toggle switch on the panel in the cab. These two frequencies represent two fixed stations, one of which is the yard office and the other is the building at the crest of the hump which is occupied by the retarder yardmaster and the switch foreman.

On the desk of the yardmaster in the yard office building near the departure yard there is a panel by means of which the yardmaster can connect his microphone and loud-speaker to any one of the 60 talk-back speakers, located at various places throughout the yard where men are working. On the desk of the switching foreman in the building at the crest there is a panel with indication lamps and toggle switches for the control of the two-way talk-back intercommunication between this office and the men in the car inspection pits, as well as the men in the three car-retarder towers. Also included in this system is a large outdoor speaker by means of which the foreman can issue instructions to the men who uncouple cars. The radio equipment here makes possible two-way conversation with the engineman in the locomotive which is pushing cars. The foreman, further, has a lever for controlling the signals which direct the pushing operation. Green indicates "push at normal speed"—about four miles per hour—while yellow indicates "push slower." Red, of course, is for *stop*, and flashing red for "back."

An important part of this arrangement is the fact that exact duplicates of these signal-control levers, radio equipment, and talk-back panels are located on the desk of the retarder yardmaster, who has his office on the second floor of the crest building, directly above the office in which the switch foreman works.

This duplication was provided so that the retarder yardmaster can direct operation of crews when they are in the receiving yard, and also that he can speak directly to the car inspectors and the men in the retarder control towers, as well as to the foreman.

When the yardmaster wants to talk to the foreman of a switch crew he operates his panel key corresponding to the talk-back location nearest the crew. He presses his foot switch and calls the name of the foreman into his microphone; then releases his foot switch. If within 75 feet of the talk-back the foreman can hear the call, and the talk-back device will pick up his reply when he is 25 to 40 feet away from it. When the conversation is finished the yardmaster returns the key, corresponding to that talk-back location, to its normal position. If, however, the foreman being called does not answer, the yardmaster connects his microphone to a set of three large "paging" speakers, located in the general area where the foreman should be. The paging speakers are located on 50-foot poles and can be heard several hundred feet. When the foreman hears his name booming out he goes to the nearest talk-back to answer.

When a yard foreman wants to call the yardmaster he pushes a button on the mast of a talk-back speaker. This sounds a buzzer and lights a lamp adjacent to the key corresponding to that field location. To answer the call the yardmaster throws that key and steps on his foot switch. Thus this loud-speaker system permits the yardmaster to keep in touch with activities throughout the yard, and to issue instructions as they are required. This yardmaster, however, does not have supervision of the operation of the classification yard, this work being under the direction of the retarder yardmaster, who is located in the second floor of the building at the crest of the hump.

To keep the classification yard in operation as much of the time as possible two or more yard crews may be assigned to the work of pushing cars out of the receiving yard and over the hump to the classification tracks. Each of these crews consists of a foreman, an engineman, a fireman, and one or more men to throw switches, pull pins, etc. As each string of cars is ready for classification, the foreman of the crew involved goes to the office of the building on top of the hump and takes charge of the operation.

While trains are on their way to Pocatello from the last "in-advance" subdivision point, teletype equipment is used to transmit information concerning the consist of the train. This is received on a reperforator tape printer in the general telegraph office at Pocatello. The operator at the telegraph office runs each tape through a tape transmitter which operates page-type printers located in the retarder yardmaster's office in the second floor of the building at the crest of the classification yard, and also in each of the three retarder control towers and the general yardmaster's office. The printer in the retarder yardmaster's office makes two copies. He marks these lists to indicate the cuts of cars and the tracks to which they are to be classified. One copy of this list goes to the switch foreman of the crew that is to push the train onto the hump so that this foreman can direct his pin-puller. Also, the retarder yardmaster uses the intercommunication system to direct the men in the retarder towers to mark their lists to indicate the cuts and tracks.

An underground pneumatic tube was installed in the Pocatello yard to carry waybills from an office in the receiving yard to the yard office, a distance of 8,800 feet. A cartridge enclosing the waybills is pushed through the tube by air pressure, the movement being aided by pumping air out of the other end of the tube. About three minutes are required to transmit a cartridge.

The steel carrier tube is four inches in diameter. It is polished inside and was assembled from 20-foot lengths with square ends. Joints were made with six-inch sleeves, using a sealing compound. To reduce the possibility of moisture collecting in the tube it is enclosed in a fiber casing, impregnated with asphalt. The joints are taped and sealed. Where the tube passes under a track both the tube and casing are run through an eight-inch steel pipe. The tube is located a minimum of 30 inches below the surface of the ground. In order to repair defects quickly 14 manholes were installed.

The Pocatello yard is floodlighted throughout. Five 100-foot steel towers are located as required. Each tower has from nine to ten or more 1,500-watt floodlight units. Two towers near the crest illuminate the area down the incline through the switches and retarders. Other towers at the far end of the classification tracks illuminate this area so the retarder men can see where the cars are going. Floodlights located on buildings or special poles light the repair tracks, oil stations and other points. Illumination at ground level in the retarder area is 0.5 foot-candles and in the classification track area from 0.1 to 0.2 foot-candles.

Two important facilities in the yard are a 150-ton Fairbanks-Morse track scale and a 680-barrel tank for fuel oil to service the Diesel-electric switch engines.

The new Pocatello yard was constructed under the jurisdiction of W. C. Perkins, chief engineer of the Union Pacific, and J. A. Bunjer, now assistant chief engineer, who was resident engineer on the project. Installation of signals, power switch machines and retarders was under the direct supervision of L. D. Dickinson, general signal engineer, and G. R. Van Eaton, superintendent of telegraph, had charge of the design and installation of the communication facilities.

The Pocatello yard of yesterday served its purpose and old-time boomers remember it well. But times have changed. The boomer is gone with the chuffing steam switch engine to that realm of memory, the railroad Valhalla, while the Union Pacific has built at Pocatello, Idaho, a living monument to the Railroads of Today.

North Platte Yard

The second big modern retarder yard completed by the Union Pacific in 1948 was the one at North Platte, Nebraska. This yard follows the same general pattern as the Pocatello yard just described.

North Platte is 281 miles west of Omaha, Nebraska, on the UP's double-track main line. Previously, the yard facilities there consisted of 20 tracks on which cars were classified by the conventional flat-switching method. The new yard is five miles long and is divided into four major sections—a receiving yard, the incline, the classification yard, and a departure yard. It is designed for classifying both eastward and westward traffic.

Construction of the North Platte yard was in line with the UP's policy of modernizing its facilities and of consolidating classification work at fewer terminals, reducing detention and permitting an increase in the average tons per train. With respect to eastward movements, the classification of traffic at North Platte for the Council Bluffs, Iowa, and Kansas City, Missouri, gateways, and further classifying of cars for delivery to connecting lines, has resulted in reducing switching at the latter points and expediting deliveries to connecting roads.

In handling westward traffic at North Platte separate classifications are made for Colorado, the Southwest, the West and the Northwest, thereby reducing the amount of switching required at other terminals.

One of the most notable features of the yard is its network of communications, which would astound our old-time railroad man. A teletype system links the general yardmaster's office, the retarder yardmaster's tower, the three control towers, and the offices of the Pacific Fruit Express, located at the yard. Switch lists are transmitted by teletype from Grand Island, Nebraska, for trains from the East, from Hastings, Nebraska, for trains from the South, from Cheyenne, Wyoming, for trains from the West, and from Julesburg, Colorado, for trains from Colorado. These switch lists are received in the general telegraph office at North Platte on typing reperforators and are retransmitted to various points in the yard.

This intercommunication system is truly amazing. It includes for the yardmaster's use 110 two-way, talk-back Racon speakers located at advantageous points throughout the yard. In connection with this system there are 23 Western Electric paging speakers divided into four groups covering various sections of the yard.

A separate intercommunicating and paging system is operated from the retarder yardmaster's tower. This system embodies four Racon speakers, two at each end of the classification yard, and four Western Electric paging speakers, two of which are placed at each end of the classification yard. A third intercommunication system provides a hook-up between the general yardmaster's office, the retarder yardmaster's tower, the three control towers for the classification yard, the locker rooms, and the inspection pit on the approach to the crest.

Eight Diesel switch engines at the yard are equipped with Motorola two-channel, two-way radio apparatus. For communicating with these locomotives there are two fixed radio stations. One of these, KBVH, is located in the retarder yardmaster's tower, with a triple skirt antenna mounted on the top of the tower. In the other fixed radio station, KBVI, the controls are located in the tower of the general yardmaster's office.

The antenna for this station is mounted on a 100-foot light tower about 200 feet from the yard office, and the radio equipment is contained in a steel case at the base of the tower. By manipulating a switch on the panel of the radio set in each locomotive the set may be made to operate on the frequency of either of the radio stations, depending on whether the locomotive is working under the supervision of the retarder yardmaster or the general yardmaster.

Eleven 100-foot steel light towers illuminate the incline, classification, and departure yards for night operations. The capacity of the North Platte yard, which is five miles in length overall, is 4,200 cars, divided into a 1,200-car receiving yard, a 1,400-car classification yard and a 1,600-car departure yard.

Aspen Tunnel

The Union Pacific's first Aspen Tunnel, a single-track 5,900-foot bore through a spur of the Uintah Mountains, a part of the Wasatch Range, was completed in 1901. The second Aspen Tunnel, built to eliminate a tight-throated bottleneck in the UP's 1,026-mile double-track main line between Omaha, Nebraska, and Salt Lake City, Utah, is scheduled for completion in 1949.

For close to 50 years the road was needle-threading east and westbound trains through the old Aspen Tunnel by control, but at about the time these lines will appear in print another Aspen Tunnel will be carrying double-track traffic through its 6,700-foot bore. By that time some 187,000 cubic yards of shale and sandstone will have been removed, 53,000 cubic yards of lining concrete poured, and 5,000 tons of reinforcing steel will be in, the rail laid—and that will be about the last of $8,000,000, the price of this new Aspen tunnel.

In these pages we will look at a river being "sidetracked" on the New York Central, a bridge being built on the Santa Fe, the ironing out of the right-of-way on the Great Northern, and here we'll examine briefly a little of the detail of driving a tunnel —the longest tunnel on the Union Pacific.

Aspen Tunnel is located between the stations of Aspen and Altamont, just east of Evanston, Wyoming, at which point the right-of-way reaches a little better than a 7,000-foot elevation and goes through the mountain around 460 feet below the rim. The new tunnel is north of and roughly parallel to the old tunnel.

This is pretty rough country and was tough country in the old days, with many pitched battles between citizens and desperadoes. In fact, in one of these battles the *Frontier Index*, a newspaper which followed the building of the Union Pacific, was destroyed in the notorious town of Bear River.

Summers are cool, up there, and winter snows often block the road to Evanston. Before the tunnel was started a town of sorts had to be built, including living quarters, mess halls, shops, first-aid station, construction offices, and facilities to take care of a trailer village. An old passenger coach was even provided for a school room, with desks in place of seats.

Twelve miles of road had to be built and a lot of equipment moved in. When the tunnel gangs were ready to attack the mountain, the equipment included a three-deck drill carriage, called a "Jumbo," two mucking machines, four narrow-gauge electric locomotives, two narrow-gauge Diesel locomotives, 45 narrow gauge muck cars, two drag lines, one standard-gauge, 20-ton gas locomotive, a 840-horsepower stationary Diesel power plant, three stationary air compressors, a portable air compressor, bulldozers, a fleet of trucks, machine and blacksmith shop equipment, and a mountain of explosives, drills and shovels.

The work went ahead 24 hours a day, six days a week. A tunnel bore progresses in "bites." The Jumbo is trundled to the tunnel face and drillers nip out "pigeonholes." Into these explosives are tamped. Then the "shooting" begins. The number of shots varies, but generally the objective is to loosen the face to a depth of six or seven feet. After the shooting, the muckers move in and the loose rock and earth is raked back and funneled into the dump cars by a mucking machine. A narrow-gauge track leads out to a dump half a mile or so from the tunnel mouth.

Shoring up the roof and sides of the tunnel with heavy timbers and steel ribs follows closely on the work of the men attacking the tunnel face. Then comes the installation of concrete forms, the placing of reinforcing steel; then the pouring of the cement.

Finally there is the laying of the track, the spiking down of the steel, and a train goes rumbling through. And No. 6 of the Union Pacific's 14-point postwar modernization program has been checked off. This railroad's traffic vice president, Ambrose Seitz, is also one of this country's top traffic experts, and is a real go-getter all the way. So it is no wonder the U.P. handles the volume of business they do.

CHAPTER XXIV

THE NEW U.P. TRAIL

C.T.C.—Roller Bearing Stock Train

The Union Pacific was quick to seize upon centralized traffic control, the magic train dispatcher, as a means of speeding train movements across the mountains and deserts of its vast Western Empire when traffic congestion threatened single-track train operation during World War II. Aided by the Union Switch and Signal Company, manufacturers of C.T.C. equipment, the road planned its first installation on the Third Subdivision of the California Division between Las Vegas, Nevada, and Yermo, California, a distance of 171 miles.

The project ran across some of the wildest country in the West, but it provided a means of smashing a serious rail bottleneck. Another wartime C.T.C. installation on the Union Pacific was in the rugged eastern Oregon country between Huntington and La Grande, a division point. This project was later extended to Pendleton.

Postwar C.T.C. installations include 207 miles of track between Lynndyl, Utah, and Caliente, Nevada. To handle this district the Union Pacific installed the latest type Union Switch and Signal Company C.T.C. machine at Salt Lake City. This cabinet measures 17½ feet from end to end. Another machine, 15 feet in length, dispatches trains over the 118-mile stretch between Salt Lake City and Lynndyl.

These new machines were the first in the country to include a profile of the territory controlled on the board. The profile arrangement assists the dispatcher by keeping constantly in front of him an indication of the grades in his district. The profile is placed just below the track plan and together they brief the physical characteristics of the territory the board is serving.

The 156 miles west from Lynndyl to Uvada is interesting desert country, with grades ascending at varying degrees, from 0.4 to 1.6 per cent. West of Crestline summit the grade drops to Caliente, Nevada. The territory between Uvada and Caliente is very rough mountain country.

The 124 miles from Caliente to Las Vegas is controlled by a C.T.C. machine at Las Vegas, as is the machine for the Third Subdivision from Las Vegas to Yermo, an installation which was described fully in my book, *Railroads at War.*

The district from Caliente to Las Vegas is one of the toughest in the country, and always reminds me of railroading through a rock pile. It is up and down over and along river beds. The right-of-way through Rainbow Canyon is very interesting and picturesque. There is practically no population at all between Las Vegas and Caliente and the difference in temperature is amazing. This variance of temperature is further marked as the grade climbs to Crestline, 34 miles east of Caliente. In some places this grade is 2.2 per cent.

The entire California Division is scheduled to come under C.T.C. operation. The further speeding of traffic between Salt Lake City and Los Angeles has been accomplished through a postwar Dieselization program which has placed Diesel power on all California Division trains.

The majority of freight trains are handled by 6,000-horsepower motors. These handle about 5,000 tons single, and they make good time over districts that, with steam power, required helpers. For instance, three helpers were formerly used from Caliente east to Crestline, and two on the pull west from Uvada to Crestline. Train movements from Lynndyl to Milford average about 35 every 24 hours, and between Milford and Caliente about 30 every 24 hours.

The Union Pacific has a very interesting operation out of the branch at Lund, Utah, where ore is brought from Iron Mountain on the Cedar City Branch and is hauled to Provo, Utah, for the

Utah and Bingham smelters. One Diesel will handle 11,000 tons between Lund and Milford.

The Cedar City Branch out of Lund is also the gateway to Bryce Canyon, Zion National Park and the north rim of the Grand Canyon. This is a rugged and extremely interesting C.T.C. operation and is handled by the C.T.C. machine in Salt Lake City. There is no finer dispatcher's office in the country than the one at Salt Lake, a glass-enclosed and completely modern one. Another excellent dispatcher's office is located at Pocatello, Idaho, the Union Pacific's great railway hub. Also, here we find the new Pocatello Yard, which has been described in another chapter. This office controls the fine C.T.C. installation from Pocatello to Glens Ferry on the Idaho Division of the mainline.

Pocatello is the gateway to the great state of Idaho, which is almost entirely served by the Union Pacific. Approximately 2,200 persons are employed by the U.P. here, including a number of supervisory officials for the South-Central District of the road, for it is here that the Omaha-Portland transcontinental line intersects with the Los Angeles-Butte, Montana, service. All passenger, mail and freight transfers are made here for points east, west, south and north. It is headquarters for the Idaho Division, that is run by one of the finest superintendents I've ever met. Pocatello is a tourist and vacation center and a gateway to the fabulous Yellowstone National Park, to the incomparable Sun Valley, and the Craters of the Moon National Monument.

Motor Car Signal Men

Two men are vitally important to the efficient functioning of a centralized traffic control installation. One is the dispatcher, the man seated before the control panel of the C.T.C. machine and the other is the signal maintainer, the man out on the line with his motor car.

The first principle of centralized traffic control is safety, absolute "authenticity" of every train movement. This is the guiding principle behind all railway signaling. C.T.C. is simply a vastly expanded interlocking system of signaling and power switch control and so coordinated that it is impossible for the operator to set up a conflicting movement.

With C.T.C. the same safety feature applies. For instance, should it happen that the control levers on the dispatching cabinet were mistakenly or carelessly moved, the signals at all locations affected would be placed in their most restrictive positions, and if these restrictive positions were obeyed there would be no collision or derailment. Traffic simply would come to a halt.

There have been, however, rare occasions when a signal on a C.T.C. installation has shown a "false proceed." A "false proceed" signal may be caused by improper circuit connections, fused or shorted circuits, failure of gravity devices due to rust (and sometimes ice) and sandy or rusty rails. For these reasons it is important that experienced signal men be constantly on guard.

At headquarters in Omaha, Nebraska, a general signal engineer is in charge of installations and maintenance of the Union Pacific's vast signal system there. Assistant signal engineers are in charge of the various districts. Then come division supervisors and their maintenance and construction forces.

Probably one of the toughest districts for signal maintainers is the Huntington-Reith C.T.C. district on the U.P. The day maintenance of control apparatus and power equipment is in charge of a general maintainer at La Grande, Oregon. This position is also covered by a night man. When failures occur, these men direct the field maintainers. A field maintainer at La Grande, working up the grade to Kamela, to the west, goes over his territory on his motor car daily.

This maintainer makes a careful check of all switches, signals, batteries and the various houses full of intricate instruments at the ends of each passing track. Nothing is overlooked in his effort to keep the C.T.C. installation functioning perfectly.

These men take pride in their work, in accomplishing difficult assignments in all kinds of weather. They include the finest type of railroaders and too little has been written of the signal maintainer. The man working out of La Grande faces bitter winter weather in the Blue Mountains as he patrols to Kamela. There are no tops or sides on these motor cars, no protection against storms or bitter cold. Meacham, a few miles beyond Kamela, is the coldest spot in Oregon and temperatures of 50 degrees below zero have been recorded here.

Railroading in the best Union Pacific tradition, the signal maintainer performs faithfully and well his job of helping to keep the trains moving safely and on time.

Rock slides in the canyons of the Blue Mountains have always been a serious maintenance problem. A slide not only may cause damage to the track but it also may start suddenly in front of a train. No amount of patrolling could solve the problem entirely. Slide-detector fences, which were tied in with the automatic block signals, provided a safety feature of great value. When sliding earth broke the wiring on a slide-detector fence it caused the automatic signals to display the same danger indications that would have resulted from track occupancy by a train.

With C.T.C., the slide protection afforded is much the same, but has the advantage that a slide is immediately recorded on the panel of the C.T.C. machine. The dispatcher can then immediately notify the track and signal forces and direct them to the place where the slide has occurred.

The Blue Mountains are a wild heavily-timbered country with many 2.2 per cent grades. The peaks rise sharply and swift mountain streams rush along beside the tracks at many points. For scenic beauty this portion of the Union Pacific equals anything in the West. I have seen 15 elk in one herd from No. 12's engine.

Helper engines are used to the summit from both directions. Returning helpers from the summit interfered with train movements before the installation of C.T.C. Now, however, the dispatcher brings the helpers down without delay to mainline movements.

Not exactly a part of centralized traffic control, but closely associated with it and contributing much to its success in the Blue Mountains, are the motor car indicators. These are essentially the same as the indicators used on the Plains Division of the Santa Fe, which we described in another chapter.

These indicators keep signal and track forces informed concerning the location of trains. Indicators are located at headquarters houses of the men who use track motor cars, and at switches, automatic signals and on sharp curves where view of the track is obstructed.

The indicator is a miniature semaphore signal, housed in a case with a glass front. Its operating mechanism is an electromagnet. A pair of wires on the pole line forms the control circuit which makes frequent connections with the track circuit. Thus the presence of a train is revealed by the position of the semaphore. If the arm is in a horizontal position it indicates that a train is approaching and the motor car must be kept off the track. A 45-degree position indicates a clear track and that there is time for the motor car to reach the next indicator or a safe point ahead.

Hand in hand with the motor car indicators are adequate telephones for maintenance forces to use in reaching the dispatcher. Good, solid set-offs for the motor cars are provided along the line. The runways slope away from the rails, which aids in the motor car removal.

Inspection Cars

The Union Pacific operates some of the finest inspection cars to be found on American railroads. They are called "B" cars because they have Buda motors, and all of them are so numbered. They operate with a clutch and have four speeds; throttle and spark levers are mounted in place of a steering wheel. These cars have large windows forward and to the rear, and a desk for roadmasters and maintenance men to write on if they are looking toward the rear end. Snowplows are on the pilots, and they can accommodate seven people.

This is a typical trip with one of the "B" cars:

Lv. Ketcham, Sun Valley, running as	
X B24 East	12:40 P.M.
Pass Hailey	12:55
Pass Bellevue	1:02
Ar. Priest	1:20
Back in on spur for Extra 561 East to clear us.	
Pass Richfield	1:55
Ar. Shoshone	2:12
Wait at Shoshone for First No. 18 to leave and follow No. 18 to Pocatello.	
Lv. Shoshone	3:05
Lv. Minidoka	4:02
Lv. American Falls	4:35
Ar. Pocatello	5:07 Two minutes in back of First No. 18, following his yellow block all the way.

These "B" cars will run 60 miles an hour on the mainline with great ease. They ride with amazing smoothness and they are invaluable to Union Pacific men who want a close look at the right-of-way. Passengers riding the U.P. may be assured that the track receives close attention at all times by officials and maintenance forces in these exceptionally able inspection cars—the finest the author has ever ridden.

Sun Valley

The world-famous Sun Valley is located 69 miles north of Shoshone, Idaho, on the Union Pacific mainline, and it is reached by a first-class branch line with good track and excellent roadbed.

This greatest of all United States winter resorts is situated at an elevation of more than 6,000 feet amid the towering peaks of the Sawtooths. Sun Valley is more than a winter resort—it is an all-year vacation land that is attracting world-wide attention. It offers matchless conditions for winter sports; the deep, powdery snow is ideal for skiing; the slopes are treeless. Even in mid-winter it is possible to ski stripped to the waist because of the summer-like warmth of the sun.

Skiers are whisked to the tops of the four most popular ski runs by powered ski lifts. The more inaccessible summits are reached by snow tractors. Tobagganing, dog-sledging, ski-joring, ice skating, riding in reindeer-drawn sleighs, and swimming in the famous outdoor, warm-water pools are other popular sports at Sun Valley in the winter months.

In summer Sun Valley presents a combination of vacation attractions probably found nowhere else on earth. There is dancing and ice skating on open-air plazas, pack trips through little-explored wilderness areas, rodeo contests, some of the finest game fishing in the world, swimming, golf, tennis, skeet and trap shooting, horseback riding, and many other thrilling activities. Life at Sun Valley at all seasons is glamorously gay with the easy informality of the West.

The unusual and abundant variety of big game near Sun Valley makes this region one of the finest hunting grounds in North America in the autumn. There is good duck and pheasant shooting; also dove shooting. There is even an open season for Hungarian partridges, and in 1948 there was a two-day sagehen season in this great outdoor state.

Sun Valley's Challenger Inn, which is open all year, is built in picturesque resemblance to a European mountain village. There is a motion picture theater, shops, a post office, night club, restaurants, game rooms, and an open-air swimming pool. One of the nice things about the Challenger Inn is that it is run for people of more moderate means. A wonderful staff, headed by able E. P. Rogers, Sun Valley's general manager, provides every comfort one could possibly wish for.

Sun Valley Lodge, one of America's finest resort hotels, is open during the winter, early spring, and the mid-summer season.

Sun Valley was established as a vacation center following a report by Count Felix Schaffgotsch, Austrian sportsman. Count Schaffgotsch toured Western America for the Union Pacific in search of a sportsman's paradise. He found it at Sun Valley, Idaho. W. A. Harriman went ahead and developed it.

It is truly one for the book—one for *Railroads of Today*—to see a railroad operating a vacation dreamland like this beautiful mountain valley of the Sawtooths.

Idaho is a land of scenic grandeur; it is rich in natural resources. Many mine products come out of Idaho. The state annually ships some 30,000 carloads of fine potatoes. A large amount of livestock and forest products move to market on the rails of the Union Pacific. Ore is shipped from Butte, Montana, to the great smelters in the Salt Lake City district. Coal in amazing quantities is shipped from the mines of Utah to the northwest. Few railroads in any state have so many branch lines reaching out to serve shippers, passengers, and communities.

A lot of passenger business comes out of cities like Lewiston, Payette, Nampa, Twin Falls, Boise, the state capital, and many others. Fast freights travel the line of the Utah Division extending south from Butte and Idaho Falls. All of this traffic funnels through Pocatello and its great and modern retarder yard.

The Union Pacific serves the greatest of all of our National Parks—Yellowstone. Through-sleepers are operated between Chicago and West Yellowstone's rail gateway, and the Park may be reached conveniently and easily over other routes and various connecting lines from anywhere in the United States.

A lot of pioneer history is wrapped up in Idaho, a lot of scenery—probably more natural scenery outside of the car window or within easy access by rail than any similar area in the world.

Building the West It Helped to Pioneer

The Union Pacific is building for a greater West. The road has done everything possible to eliminate obsolescence. The men at the head of the U.P. realized long ago that they could not meet the cost of new facilities while continuing to maintain lines, terminals, and stations that had outlived their usefulness. Light traffic lines that could not be operated profitably were discontinued and provided with highway service. Perhaps one of the most important postwar considerations, in view of the then existing shortages and the high cost of replacements, was the determination to make better utilization of available equipment.

This meant the elimination of all barriers to faster, more continuous train operations. In other words, the Union Pacific was determined to revolutionize operating methods. This began with the introduction of a substantial percentage of Diesel motive power and the reassignment of steam locomotives. Other changes included improvements in roadway and track, the reduction of curvature, the installation of centralized traffic control over long stretches of single-track, concentration of the classification of freight cars, fewer terminals, new and ultramodern hump and retarder yards, and the equipment of such yards with every device that would build greater efficiencey into the plant.

In one year after this modernization program began, the Union Pacific had increased the average tons per train by about 15 per cent, and at the same time increased the average freight tonnage per train-hour by nearly 20 per cent—the latter reflecting both increased tons per train and time consumed, thereby being the highest in the history of the Union Pacific for the month of May, 1948, and perhaps the highest of any other railroad.

Among other technological developments which have aided in the U.P.'s postwar program have been improvements in communication facilities, such as complete telephone installations providing instant communications between all terminal points; the substitution of teletype for the telegraph, thus speeding all types of reports, and the very substantial use of radio, particularly in directing yard switching activities. Various mechanical devices in the clerical departments have been effective in reducing costs in that direction.

In the hope of reducing to a minimum claims for loss and damage to shipments, the Union Pacific people have campaigned constantly and nationally for better packing of shipments, for greater care by employees of the railroad and for container engineers to assist and instruct shippers in packing methods. Officials constantly are instructing employees how to improve switching operations and methods of handling cars and goods at freight terminals to avoid damage.

The Union Pacific's revolutionary modernization program has received the fullest cooperation from labor. The legislative bodies also have been helpful in the passage by Congress of the

Reed-Bullwinkle Bill, a fine contribution to the stability of the railroad industry and the general economic picture.

Roller Bearing Stock Train

For the past ten years there has been a very heavy movement of stock to the California markets. This includes cattle, sheep, and hogs. The movement has grown to a place of importance equal to that of shipments for the East through midwestern stockyards and feeding grounds.

California continues to grow by leaps and bounds, and with its enormous increase in population it is only natural that the consumption of meat and meat products should rise in proportion. All of the railroads serving California have been aware of this situation and the Union Pacific has risen to the situation in a comprehensive and practical manner.

The U.P. began by converting 300 friction-bearing stock cars to Timken roller-bearing equipped cars. This was in March, 1947. The cars also were equipped with Twin-Cushion Draft Gears and painted yellow. In October of that year 500 more stock cars were similarly equipped. These 800 cars were placed in a livestock pool and were assigned to the Los Angeles stock run, just about the hottest thing around.

The livestock shipments mostly originate on the Butte line of the Utah Division, with some moving in from the Idaho Division and some coming through from Wyoming. These cars of stock are consolidated and classified in North Yard at Salt Lake City, where the stock is rested and watered for the last time before starting for Los Angeles.

The run of some 790 miles is made in about 27 hours. Big freight Diesels pull the train—No. 299, the *Stock Special.* The fast-flying stock train leaves North Yard, Salt Lake, at 10:30 A.M. Crews change at Milford, Utah, at 3:50 that afternoon. At 11:15 P.M. both engine and train crews change again at Las Vegas, Nevada. The crew that take over there run through to Yermo, California, arriving at 5:45 A.M.

This red ball schedule is almost always bettered, and it is rare indeed that the livestock train pulls in late. Credit C.T.C., the Diesel locomotive, and Timken roller bearings, plus a fine roadbed and some real railroaders, from officials down.

The stock train is highly respected the entire length of the U.P.'s California Division, and it gets rights over everything except first-class trains. The *Stock Special* leaves Yermo at 6:15 A.M., climbs Cajon Pass and is through San Bernardino and Riverside by 11:20 A.M. every day, with a 1:30 arrival and delivery that afternoon at the Los Angeles Union Stock Yards.

The livestock train usually consists of 65 to 75 cars and a second section is run almost every day. The average time for the entire run is usually about 30 miles per hour. I have ridden the train several times and we have been on No. 37, the Pony Express's block all the way to Milford and sometimes to Caliente, Nevada.

This solid yellow train, behind a big yellow Diesel, rushing across the mountains and deserts with its valuable cargo, is a beautiful sight—a modern fast freight, the last word in motive power, on today's U.P. trail.

In connection with this livestock move, the Santa Fe also operates a daily stock train, the Hog Special, from Amarillo, Texas, through Belen, New Mexico, to Los Angeles.

There is no question that plenty of fine cattle, sheep, and hogs that formerly made their last trip eastward through the cold country north to the Minneapolis gateway are now having a warmer ride to Southern California. The U.P. has spent over a million dollars in car improvements alone to see that they have it.

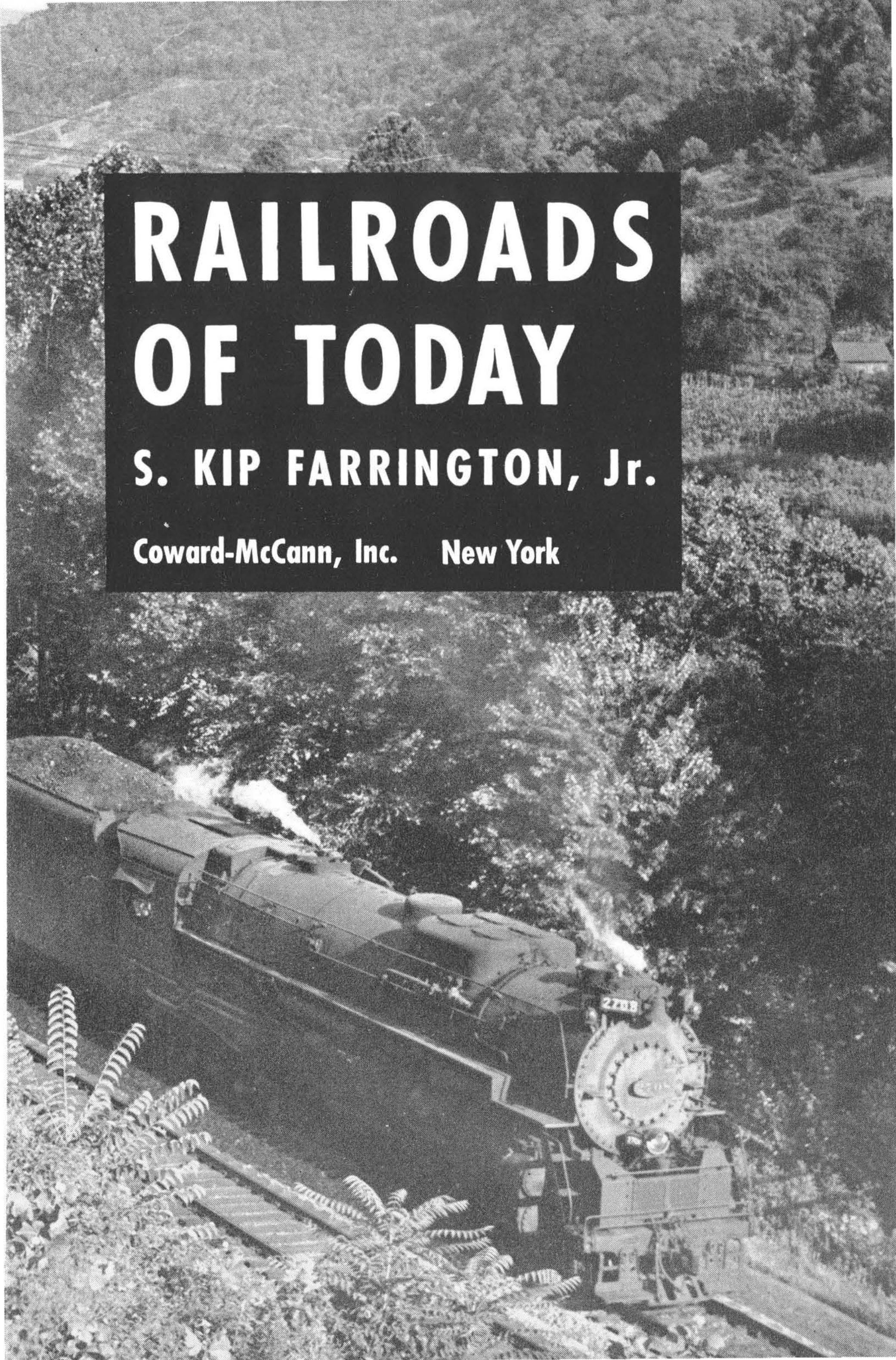
Personally, I feel that the Union Pacific's fine board chairman, E. Roland Harriman, is deserving of high commendation for the things he has accomplished. Through his efforts, a great railroad has become even greater, due to the intelligence and foresight of its president and board of directors, in improving, maintaining and constantly strengthening the railroad plant. However, Mr. Harriman would be the last person to take any credit for it.

The Union Pacific Railroad, planned by Lincoln to unify the nation, is today dedicated to the development of the West that it helped to pioneer.

RAILROADS OF TODAY

S. KIP FARRINGTON, Jr.

Coward-McCann, Inc. New York



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