CHAPTER V

WESTERN PACIFIC

Youngest Transcontinental Line

The Feather River Canyon, in the California Sierra Nevadas, ranks high among scenic rail lines. It was one of the roughest, toughest stretches of track that was ever spiked down on a mountainside. That was in the old days. Today the rail of the Western Pacific still searches out the wild, breath-taking canyon passage for its pathway, but it is a safe, modern line that for one hundred and twenty miles provides the traveler with a thrill a minute.

The men who pioneered the Western Pacific and the men who have run trains over it since were, and are, a hardy lot. Spanish explorers poked into the Feather River Canyon country in 1820, and, like so many places in California, it carries the name they gave it, though now it is the English version. The Spaniards called it El Rio de las Plumas, because of the great number of wild fowl feathers they found floating down the river. Even today the Feather River country is a favorite haunt of wild ducks and geese, just as it is becoming increasingly popular with the human species of migratory birds.

The Feather River Canyon is largely confined between the towns of Oroville and Portola, California. Oroville stems from the Spanish word for gold, and Portola is a Spanish surname, one Gaspar de Portola, leader of what was called the "holy expedition" to Upper California in 1769. Gaspar de Portola was later the Golden State's first governor. So back and beyond the scenery of the canyon there are legends and traditions that have been in the making for nearly two hundred years.

The Western Pacific, the youngest of the transcontinental lines, was completed in 1909 and transcontinental service was begun the following year. Compared with the older transcontinental roads, the Western Pacific was able to employ many modern engineering techniques, thus meeting the challenge of the mountains with the ability to manufacture easier grades.

It was not until 1934 that the Western Pacific was linked up with the Denver & Rio Grande Western at Salt Lake City, Utah, to make a Colorado–mid-continent route. This hookup was made when the thirty-eight-mile Dotsero Cutoff was opened between Orestod and Dotsero, Colorado. (The name Orestod is simply Dotsero spelled backward.) The Cutoff linked the D.& R.G.W.'s main line, up there on the top of the Rockies, with the great Moffat Tunnel. This effected a route shortening of 175 miles.

God gave the choicest of the Rockies to Colorado, and to California the Sierra Nevadas and Feather River Canyon, and the Western Pacific and the Denver & Rio Grande Western made it possible for the train traveler to enjoy a part of this rich mountain scenery by daylight through the medium of the California Zephyrs.

In days gone by Western Pacific telegraphers and train dispatchers experienced stern adventures in moving trains down the canyon. It was wild and rugged and lonesome, and many an operator walked away from it before he started talking to the crickets.

In 1944, the Western Pacific installed centralized traffic control over some 250 miles of line. A further expansion increased C.T.C. to 360 miles, and when 1950 drew to a close the single track between San Francisco, California, and Gerlach, Nevada, had 438 miles of this modern type of train operation by direct signal indication handling traffic. Indications are that C.T.C. will be in Salt Lake City in late 1951.

Prior to 1944, the Western Pacific was running trains with practically no block signaling. Trains moved by timetable and train order, just as railroad men, for a great many years, figured they were meant to. But there came a day when the time card and so-called "flimsies" were not enough—flimsies being train orders, inscribed on very thin paper because of the necessity of making several copies.

The Western Pacific, confronted with an increased tempo in train movement, had its choice of installing the conventional automatic block type of signal or centralized traffic control. These were men of vision on this rugged Western Pacific, with its Feather River country and inland valleys and deserts, and they chose a modified system of C.T.C., finding that it could be adapted economically to meet traffic requirements, and at the same time dovetail nicely into the general physical characteristics of different subdivisions.

We will first review train movements, traffic volume, and right-of-way contour that the operating problems may be more clearly defined, and then delve into the more intricate details of C.T.C. and its application to this Western Pacific line.

The road runs two passenger trains each way. In connection with other railroads, we have the crack California Zephyr, running between San Francisco and Chicago, and the Zephyrette, triweekly, in operation between San Francisco and Salt Lake City. Freight traffic and the number of freight trains vary on the different subdivisions.

Freight traffic centers at Stockton, California, located ninety-two miles from San Francisco and in the great valley of one of the most productive areas in the world. Stockton has a large freight yard, and here are assembled through trains for the East. Here, too, the arriving westbound trains are broken up for distribution over the rails of the Western Pacific to the San Francisco Bay area and throughout certain portions of the Sacramento and San Joaquin valleys.

At Stockton, the W.P. exchanges considerable traffic with the Santa Fe, and in less volume with the Tidewater Southern and the Southern Pacific lines. Ordinarily, the east-west freight traffic between Stockton and Salt Lake City requires about four to six through trains each way daily. This does not include the local freight trains, or the turn-around runs, which pick up fruit, vegetables, and sugar beets.

Beside the east-west San Francisco-Salt Lake traffic, the

Western Pacific forms part of a north-south link which ties in Oregon and Washington points at a place called Keddie, California. Keddie is in the Feather River Canyon, 189 miles east and north of Stockton, making a junction for trains going to Bieber, California, 112 miles to the north. At Bieber connection is made with an outflung line of the Great Northern which dips south from its east-west line along the Columbia River. This provides the Western Pacific with a north-south route, in conjunction with the G.N., between Seattle-Portland-Spokane, on the north, and San Francisco on the south. Through its interchange with the Santa Fe at Stockton, this north-south route is extended to Los Angeles and other points in southern California.

Two through trains, on an average, are handled over the Western Pacific's north-south route between Stockton and Bieber via Keddie. Around 15 per cent of this traffic is to and from the San Francisco Bay area and the rest is interchanged with the Santa Fe at Stockton.

Including the daily passenger trains and the freight drags on the Salt Lake and Seattle-bound runs, a total of fourteen to sixteen through trains are operated daily on the Stockton-Keddie section.

The distance between Oroville and Portola is 116 miles. This Feather River Canyon section is winding, with a lifting grade eastbound. It is not a heavy grade, being the lightest in the Sierra Nevadas. For fourteen miles out of Oroville the rail ascends at 0.4 per cent; then it becomes 1 per cent all of the way to Portola. Consistently uniform eastward, locomotives can handle trains of uniform tonnage. The Class M-80 power is rated at 2,200 tons, and the M-137 at 4,000 tons. Westward the tonnage is limited only by the capacities of the sidings, which range from eighty-five to ninety-five cars. Curves are almost continuous, with most of them up to six degrees, but a considerable number are between eight and ten degrees, except in a few locations where the spirals have been extended and the curvature slightly exceeds ten degrees.

Train speeds, accordingly, are limited more by curvature than by grades. Between Bloomer, east of Oroville, and Gray's Flat the maximum for the California Zephyr for the fifty-five miles is forty miles per hour, and thirty-five miles per hour for other passenger trains using conventional cars. Limit for freight trains is twenty-five miles, making the average about twenty miles per hour and thirty-five miles per hour for passenger.

Because Feather River Canyon was the tight spot, the Western Pacific decided in 1944 that this would be the first section to be signaled. Power switch machines were placed at sidings, and these switches and the signals at these locations authorizing train movement are controlled by the dispatcher.

From Oroville, the Western Pacific track extends westward through the broad, level Sacramento River Valley and the San Joaquin Valley to Stockton, a distance of 113 miles. The line here is practically level and is tangent for long distances. The few curves are light. For these reasons there was no urgent need to install signaling on this subdivision in 1945. But physical conditions between Stockton and Clinton (Oakland), 84.3 miles, made consideration of signaling on this first subdivision necessary.

In this territory the railroad passes over a range of hills which have a maximum elevation of 750 feet at Altamont. From Stockton the grade is generally ascending up to 0.6 per cent westward for 23.3 miles; then 1 per cent for the 12 miles to Altamont, from which point the grade descends at 0.8 per cent for 26.5 miles down through Niles Canyon. From Niles to Oakland the 22.5 miles lays level. The decision with reference to types of signaling to be installed on this subdivision was based on the reduced volume of traffic as compared with other subdivisions.

About 150 to 175 cars or more are handled over this first subdivision between the Bay area and Stockton westward, and around 175 cars move eastward to the Stockton yard. This is roughly about one third of the traffic handled on the territory extending from Stockton to Keddie. Thus, the scheduled trains on the first subdivision of 93.8 miles include four passenger trains and about four through freight trains. A local freight train is operated each way daily except Sunday, and, in certain seasons, a switch run is operated between Stockton and Carbona and down a branch to Kerlinger and return to Stockton.

Because fewer trains were operated on the first subdivision, the first consideration at that time was to provide complete track-circuit-controlled signaling as a safety measure. Based on the benefits attained through authorizing train movements by signal indication on the Oroville-Portola C.T.C. territory, the Western Pacific inaugurated a study which would create like benefits for the Stockton-Oakland subdivision. However, G. W. Curtis, division superintendent of the Western Division, pointed out that the cost of C.T.C.—over and above that for conventional automatic block—did not seem justified at that time by the number of trains.

The Wabash Railroad had a single-track signaling installation in which the siding switches were operated by hand-throw stands, and the signals at these switches, which were under the control of the dispatcher, displayed aspects to authorize train movements. A committee was sent to look over this installation, and on the strength of the report submitted the Western Pacific decided to adopt this system for the first subdivision.

It might be pointed out, for those not familiar with the usual centralized traffic-control installation, that C.T.C. hookups usually employ siding switches that are thrown by means of electrical forces set in motion by the train dispatcher at the centralized traffic-control cabinet. But in the situation on the first subdivision of the Western Pacific only the signal authorizing train movement came under the hand of the train dispatcher.

The initial costs of this type of installation were not much more than they would have been for straight automatic block. Be it understood, the automatic block offers protection but cannot dispatch trains, not being controlled by the dispatcher. Now let us see how this Wabash system worked out on the Western Pacific's first subdivision.

Train Operation by C.T.C.

The installation on 84.3 miles of line between Oakland and Stockton provided the dispatcher with controlled signals, authorizing train movements as follows: (1) proceed from one siding layout to the next, (2) to enter a siding, (3) to depart from a siding and proceed to the next siding, and (4) stop.

The signals used are the searchlight type. On each station-entering signal and on each leave-siding signal there is a second "unit" which consists of a normally dark lamp, and when lighted this displays a black letter S on a circular white background a little over eight inches in diameter.

At the end of each siding, the main-track station-leaving signal and the leave-siding signal are in line, opposite the clearance point on the siding, as is customary practice. Also, at each siding the station-entering signal is located opposite the fouling point and in line with the other two signals. This practice allows a train, for example, to stop short of the switch and pull into the siding without the confusing procedure of being required to pass a signal indicating "stop."

Further, the location of the station-entering signal permits the elimination of a short track circuit through each switch; hence, one track circuit extends from the leave-siding signal to the approach signal, located a mile and one half distant.

We will take two stations, Midway and Altamont, on the Western Pacific line between Oakland and Stockton for an example of how this particular C.T.C. layout operates. Normally, the main-track westward station-leaving signal at Midway displays a red aspect, indicating, of course, stop. If there is no train between this signal at Midway and the station-entering signal at Altamont, to the west, and if the dispatcher sends out a proper control the signal at Midway will show green, authorizing the train on the main track to proceed to the station-entering signal at Altamont.

If there is a westbound train on the siding at Midway, and the dispatcher is ready for it to depart, he will send out a control which causes the leave-siding signal at Midway to display red over the illuminated S. Then the head brakeman throws the switch, after which the aspect of the signal changes to green, authorizing the train to pull onto the main track. The rear brakeman closes the switch, or returns it to normal, which is the manner of referring to it in centralized traffic procedure.

We now have the train proceeding westward. A mile and one half east of Altamont the train will come to Altamont's "approach" signal. If the signal at Altamont is displaying red the approach signal, naturally, will show yellow. But if the signals at Altamont have been cleared for the train, allowing it to proceed on the main track at normal speed through Altamont, the approach signal will display green.

On the other hand, if this westbound train is to be directed to stop and enter the siding at Altamont, the dispatcher will send out a control which will put the station-entering signal at red, with the lower unit displaying the illuminated S. It follows out that the engine crew of the approaching train will have a "yellow approach" providing advance information. In all railroading, absolute obedience of signal indication is necessary to safety. With C.T.C., there can be no loose interpretation of the meaning of a signal, for that signal is a train order, as imperative as though the engineer and conductor carried written train orders over the signatures of the division superintendent and the train dispatcher. The engineer cannot take liberties with a yellow signal.

Neither the centralized traffic-control machine nor the man operating it can set up a dangerous condition. Any possible threat to safety has to come from the runner at the controls, and that is extremely remote, thanks to the high caliber of our railroad men.

This Western Pacific train approaching Altamont under control will stop clear of the east switch, which the head brakeman will "reverse," or line for the siding. With the train in the siding, the rear-end man will close the switch, or return it to "normal."

If the dispatcher wants our W.P. train to wait here in the siding he simply does not clear the station-leaving signal until such time as he is ready for the train to proceed. If there is reason for direct communication with the crew of the train the dispatcher sends out a control that lights a "call" lamp, located on the side of a relay house, situated in close proximity to each switch. A telephone is located in the relay house at each switch, providing a speedy and effective means of straightening out any problems that arise.

Continued Modernization

To better expedite train movement and promote safety over an increased mileage the Western Pacific decided in 1948 to install signaling on the second subdivision of 113 miles between Stockton and Oroville. It has been pointed out that the area around Stockton is highly productive, and also that there is a very considerable amount of traffic in and out of Stockton, as there is also in and out of Sacramento, the state capital city.

Sacramento has an approximate population of 120,000. About forty to fifty cars are handled daily. For about sixty days during the sugar-beet season the Western Pacific operates a turn-around run out of Stockton to Sacramento and return to Stockton. This picks up about fifty to sixty cars of beets daily. At several points the Western Pacific connects with its subsidiary, the Sacramento Northern Railway, which has trackage through much of the Sacramento Valley and on through the industrial areas on the northern end of San Francisco Bay. The Western Pacific exchanges about sixty to seventy cars daily to Sacramento with the Southern Pacific and the Sacramento Northern. The Western Pacific also interchanges about twenty to twenty-five cars daily at Marysville, California, with the Sacramento Northern.

This 113-mile subdivision is in the broad, flat valleys where the track is level and tangent for long distances. However, because this subdivision is part of not only the east-west but the north-south route we find a larger number of trains in operation. The daily traffic on this second subdivision includes four passenger trains and twelve to eighteen through freight trains, which are, of course, in addition to the local freights and the turn-around pickup trains, which operate as required.

On account of the heavier traffic, the signaling adopted for this subdivision included power switch machines with its C.T.C. setup. The signals at sidings are located in accordance with conventional practice. With certain exceptions, the station-leaving signals have two aspects. There are no intermediate signals in this arrangement, other than the approach signals, such as were mentioned earlier. In general, the signaling is similar to that employed on the first district between Oakland and Stockton.

The station to station as a single block was considered to be the most practical for nearly all blocks in the Stockton-Oroville territory because of the straight, level track, permitting comparatively quick acceleration and sustained high speeds. On a few of the station-to-station blocks, which were more than ten miles long, intermediate automatic signals were installed. This made possible a following train movement, something not provided for in the first subdivision installation.

Control Panel Normally Dark

In drawing the preliminary specifications for the control machine to be used on the Oakland-Stockton installation, the Western Pacific called for the following: (1) all indication lamps to be normally dark, and (2) the "signal-clear" indication to be carried on the track model adjacent to the involved switch.

The opinion held was that the important advantage gained by the normally dark panel was that of the ability to notice a changed condition, as indicated on the control panel, more readily. The reaction of the operators was most gratifying.

This system of indication was arranged by Western Pacific engineers, and it was patterned in part after the system of indication for the Oakland-Stockton machine, which was designed by the Union Switch & Signal Company. It is particularly interesting in view of its introduction of something different.

Above the track diagram, and between each location of controlled signals, there is a blue lamp which is lighted when westbound traffic is established in the corresponding block by the clearing of the westbound signal. This lamp continues to show until the train movement has cleared the block. If the signal is placed to "stop" by lever control, the blue lamp continues to show until the time locking at the field station has expired, and a corresponding indication has been transmitted to the control machine. A second blue lamp, located on the panel below each block, operates in a similar manner for eastward traffic.

On the track diagram the three signals at each power switch layout are represented by a symbol including a green lamp. When a signal on the ground is cleared for a main-track movement in either direction, or for a movement from the siding, the lamp on the panel which corresponds in location with the signal that has been cleared, will be lighted and show steadily. If the lineup is for a train to take siding, this lamp indication starts flashing.

Above each *switch* lever there are three lamps—a green one to the left above the "normal" position, an amber one to the right above the "reverse" position, and a white one in the center. The white lamp above the center of the lever is lighted only when the switch in the field is out of correspondence with the lever. The green, normal, lamp or the amber, reverse, lamp is lighted only after a signal is cleared over the switch or the "OS" track section is occupied.

Above each *signal* lever there is only one white lamp, which is normally dark. When a signal, which has been cleared, is taken away, the lamp above the signal lever is lighted until the time locking interval has expired. This exact notice of the expiration of the time period permits the dispatcher to make other lineups at once.

The track-occupancy lamps on the track diagram are red, and these are normally dark. One lamp represents each OS section at a power switch, and such a lamp is lighted steady when the corresponding switch detector track circuit is occupied, or when the dual-control switch machine lever is in the hand-throw position. One track occupancy lamp is used for each section of the diagram which represents the main track between controlled switches of a siding. In addition, one lamp is used for each section of the diagram which represents the main track between two sidings.

A white lamp, with black letter C, above each code-sending push button is lighted when code is going out, or when code is being received from corresponding field station. A circuit network in the machine prevents code from going out to a clear signal that is not consistent with the position of a switch or in conflict with a signal already cleared. The objective of this feature is to prevent setting up time locking unnecessarily.

Coded Track Circuits

Coded track circuits have done more to advance modern railroad signaling than any other single factor. The coded track circuit was pioneered by the Union Switch & Signal Company, with the first installations being placed in service in 1933 in both electrified and steam-service territory. The original steady-energy track circuits, invented in 1872, have been employed in railway signaling by the Union Switch & Signal Company since its organization in 1881.

A coded track circuit, briefly, is a circuit in which the current fed to the rail is broken into recurring pulses to form a so-called code. A code is made up of "on" period energy pulses, separated by "off" period intervals. The development and modern-day employment of coded track circuits and their use in connection with centralized traffic control were fully described in the Union Switch & Signal Company chapter of my book, *Railroads of Today*.

Now we will examine coded track circuits as applied to the Oroville-Portola, or the Feather River, section of the Western Pacific.

Except for switch-detector sections, short releasing sections for outlying electric locks and the yard area at Oroville and Portola, coded track was used exclusively on the Oroville-Portola installation, completed in 1945.

The successful operation of long track circuits (some over 11,000 feet), the improved broken-rail protection, and the facility of block signal operation without the use of line wires have been the factors which influenced the W.P. to use coded track on all subsequent installations. Where highway crossing protection or interlockings are present in a coded-track controlled block, the Western Pacific uses the conventional coded line-jumper method of getting around the conventional track-circuited section.

As the signal program progressed, the Western Pacific worked with the Union Switch & Signal people in applying new ideas as they concerned coded track circuits and their application to later operational systems. Some affected the overall operation, others were more in the nature of innovations. One of the most important of these changes was providing a means of returning the direction of feed for steady current normally energizing the track circuit to a given direction (westward on the Western Pacific).

In the station-to-station blocks on the Oroville-Portola installation, steady energy is fed into the block behind the train, regardless of direction; therefore, circuits in a block were left feeding eastward or westward, depending on the previous movement. With this arrangement, the discharge on the track cells shifting from "no load," when the circuit was feeding from the opposing end, to over 1.2 amp. when actually feeding the track. As a consequence, the regulation of the charge on the track cells was a real problem. No trouble was experienced in maintaining the proper battery condition in the siding areas where steady energy fed normally in one direction only; and a conclusion was that on future installations the station-to-station block should be arranged in a similar manner. The result was that the Union Switch & Signal Company developed a scheme which has been used successfully on the Western Pacific.

Because of its highly technical nature and the limits of space, we will not attempt to cover it here.

In connection with remote instances where the mechanism or the lamp itself may fail, the signal must be regarded as displaying its most restrictive indication, which is also an operating rule on the Western Pacific, as well as other roads, when any signal lamp remains dark upon the approach of a train that it would normally affect.

Three Control Machines in One Office

The use of carrier equipment on the centralized traffic control code line circuits made it possible to locate the three C.T.C. control machines for all three subdivisions in the division offices at Sacramento.

The carrier equipment is in duplicate at each machine location. Thus, if a set fails, the stand-by set can be brought into service. In case the line relay at the involved field station is released due to an open line or other causes, the stand-by equipment is automatically placed in service. Since the stand-by units are adjusted so as to receive at lower power level and transmit at a higher power level ordinary losses to the carrier circuits are automatically compensated.

In addition to the carrier for control and indication codes, other carrier equipment, known as individual carrier, is used for special purposes, i.e., (1) to transmit indications at twenty-three kilocycles from a rock-slide fence at M.P. 260.94 to Rich Bar; (2) to transmit controls at forty-one kilocycles from Sacramento to release an electric lock on a hand-throw switch at the Campbell Soup spur; (3) to transmit at twenty-seven kilocycles drawbridge indications from San Joaquin River bridge to Lathrop field station; and (4) to transmit "OS" indications at forty-one kilocycles from Radum interlocking to the field station at East End of Livermore.

To reach the subdivisions where they are to operate the C.T.C. conventional D.C. codes and the carrier frequencies are on one two-wire line circuit. West from Sacramento, this circuit is on No. 8 copper wire with plastic weatherproof covering. East from Sacramento to Oroville, this circuit is on No. 6 copper wire; and from Oroville to Portola the circuit is No. 8 bare Copperweld wire.

At some locations, important highways cross the single-track main line of the Western Pacific within one hundred feet of power-operated C.T.C. controlled siding switches. The control circuits for the flashing-light signals at such a crossing are arranged so that the crossing signals do not start to operate until a signal has been cleared for a train movement over the crossing. If a locomotive with cars makes a move to pull over the crossing and then back again, the flashing-light signal will operate because the so-called "stick" relay which controls this function is "knocked down" when the signal for the back-up move is cleared.

To look down a stretch of railroad track, seeing the unchanged ties and rails that have become so commonplace, it is difficult for the layman to understand the advances in rail transportation that have been made. The flashing streamliner, appearing on the scene, indicates the progress made in motive power and in cars. And the signal lights, somehow, are different. The station, perhaps, has come under the airy hand of the modernistic architect. And there is the public-address system, telling you where your car will stop along the platform. Too, someone has told you that when you are aboard the train and speeding along you can telephone your home or your office. But it is not until you have looked inside of a C.T.C. instrument house out along the line or inside of a modern C.T.C. dispatching cabinet that you are fairly confronted with the astonishingly intricate maze of wires and instruments that go to make up the signaling and communication systems of your modern railroad.

We have searched out a little of the mysteries of the centralized traffic control system as applied to train operation on the Western Pacific, and we now turn our attention to general communications.

Communication Facilities

The general offices of the Western Pacific are located in San Francisco. From here communications reach out to Salt Lake City, 928 miles to the east, and to all important points affecting rail service on the line. A tie-in is made with the Denver & Rio Grande Western at Salt Lake where the first link is made with the present transcontinental route.

The modern railroad could not operate without its communication network, no more than railroads could have operated at the turn of the century without the Morse circuit. These communications involve not only train movements but all business associated with rail transportation.

The telegraph key is still clicking in places, but feebly. The telephone long ago began crowding it out for train dispatching and general long-distance communication. Then, back around 1907, the printing telegraph machine entered the picture and has more and more been employed by the modern railroad.

Turning the half-century mark, the Western Pacific had completed extensive communication improvements—improvements that meant the saving of thousands of dollars annually in long-distance telephone calls alone. These modern installations, in addition to long-distance telephone facilities, included printing telegraph circuits between operating headquarters, yards and traffic offices, and the last word in such things as electronic devices on carrier equipment by means of which existing line wires could be used to carry impulses of several high frequencies, such as, for instance, the employment of centralized traffic control line wires for telephone conversations.

Modern railroading would be a far cry from the ultraefficient facility that it is today without these magic electronic devices.

Let's examine for a moment the printing telegraph facilities that reach out from the headquarters' offices of the Western Pacific in San Francisco to the offices of the Santa Fe, the Southern Pacific, the Pacific Fruit Express, the Reservation Bureau, and Oakland. Also this service links the San Francisco offices with Stockton and Sacramento, California, and Elko, Nevada.

Before undertaking the communications improvement program, the Western Pacific made little use of the printing telegraph, and, in consequence, depended on the Morse system for most of its "message traffic." There will never be another age like that of the old telegraph key and sounder for romance and adventure down the path of the "singing wires," but that is gone; the page is dimming, the words are blurred. Never again will we know men and women who gave our nation so much as the telegraphers. Without them there would be no modern railroad story; they were the communication pioneers, and today the last of them are forever signing that wistful "30," which over the years has signaled the finished copy—the end.

Headquarters of the Western Pacific's Eastern Division are located at Elko, Nevada; those of the Western Division at Sacramento, California. In the San Francisco Bay area the Western Pacific serves numerous docks, industries, and warehouses. A branch extends from Niles along the east side of the bay to San Jose and on to a fruit-growing area. At Sacramento and Marysville, California, the Western Pacific connects with its subsidiary, the Sacramento Northern, which serves many towns in the Sacramento Valley, as well as industrial areas in the northern part of the San Francisco Bay area. There is a connection at Stockton with another subsidiary, the Tidewater Southern, which reaches through part of the great San Joaquin Valley.

The principal through route of the Western Pacific is east and west between Salt Lake City and points in California. On this east-west route, from Keddie, California, 281 miles from San Francisco, the Western Pacific has a secondary line extending north 112 miles to Bieber, California, where it connects with the Great Northern for points in Oregon and Washington. Thus the section of the Western Pacific between Stockton and Keddie is part of a north-south route linking Seattle and Portland on the north with San Francisco and through its Santa Fe connections, with Southern California.

The old Morse telegraph system of communications could only handle the most urgent railroad business, with the result that some communications had to be handled by outside commercial companies. No attempt was made to transmit passing reports and train consists in advance of or concurrently with train movements so that the information would be available ahead of train arrivals. Telephone train dispatching was employed on the main line between San Francisco and Salt Lake City, but no through telephone circuits were available between important offices, and many long-distance calls had to be made over commercial lines.

The new communications facilities, on the other hand, were planned with the objective of providing complete and adequate communications, employing printing telegraph for the transmission of all messages, including passing reports and train consists, and making the telephone generally available for conversation locally on the railroad, as well as for long-distance connections between important offices. A "train consist" is a list of cars in a train which shows car initials, numbers, weights, and destination. The "passing report" includes that information plus all further notations on waybills that are necessary for the work of the car-service bureau, as well as of the traffic department in contacting shippers and consignees.

The additional Teletype and long-distance telephone circuits were obtained in various ways, including direct wire, the simplex leg of phone pairs, and by carrier circuits superimposed over existing train dispatching telephone pairs. Except on the direct-wire circuits in San Francisco, all message traffic on the Western Pacific is handled by tape transmitters at the rate of sixty-one words a minute.

It has been the practice since the days of the old Morse circuits to indicate communication offices by letter combinations. So we find the main communications offices of the Western Pacific with the letters "GO." Here we find printers, transmitters with tape reperforators, and transmitters associated with the perforators.

In the GO office all of the Teletype equipment, such as printers, transmitters, reperforators, and incoming printer circuits, is connected to a specially constructed switchboard known as a "switching center." This is handled by an operator with a monitor and send-receive printer.

When a distant office "rings in" the signal lamp on the affected circuit is lighted and there is also a buzzer signal, which provides both a visible and an audible signal to indicate what office is calling. The operator then inserts the monitor in the answer jack and ascertains whether the calling office wishes a printer or wants to be connected through to an office or offices beyond. If the latter is desired the "cut-through" circuits are used and the calling office is cut through to the office desired.

The advantage of this method is that all offices addressed will receive the message as it is being transmitted from the originating office, thus expediting the service as well as eliminating the necessity of reperforating and handling the tape for a second transmission through the facilities of the GO office.

If a line to one or more of the offices addressed is busy at the time of transmission the operator can insert a reperforator into the circuit. This will produce a tape which can be run as soon as the busy circuits are cleared.

A modern railroad has an amazing network of communication facilities. This network is a veritable nerve center of the rail system and it is one of the major factors in helping to speed the traffic of the rails.

There could, perhaps, be no better example of the number of lines required by a railroad than is offered by the Western Pacific, which is comparatively a small railroad. This road has in operation manually operated private branch telephone exchanges in nine cities.

We find San Francisco with 300 lines; Stockton with 60 lines; Sacramento, 100 lines; Oroville, 20 lines; Keddie, 20 lines; Portola, 20 lines; Winnemucca, Nevada, 10 lines; Elko, Nevada, 20 lines; and Salt Lake City, Utah, with 240 lines. These exchanges are at the present time (the fall of 1950) connected by 13 long-distance circuits, which for the most part were created through the installation of single-channel carriers.

Local telephone service between division headquarters and all local stations at which agents are on duty, as well as to the homes of section foremen and signal maintainers, is available through a circuit with selector calling, as is employed in telephone train dispatching. The general telephone facilities, other than train dispatching, includes the P.B.X. at ten cities, the local selector calling lines to all wayside stations, and the long lines to connect the P.B.X. boards. Calls can be handled between any two persons anywhere on the railroad. A great many times train time is saved and important decisions made which affect savings in labor and material—all a result of these modern-day communications which have been applied to a rail line that has fought to the top the hard way, the Western Pacific.

The Zephyr Gets a Bath

Grimed and dusty from the sand and sagebrush miles across Utah and Nevada, the California Zephyr is given a brisk shower upon its arrival at Portola each morning. It departs down the canyon, fresh and clean. The operation requires seven minutes, and it is one of the things passengers remember in connection with their trip.

This special brushless train washer was designed and constructed by the Western Pacific under the direction of T. L. Phillips, a retired chief engineer. The apparatus is very simple, consisting of three sets of curved pipes beside the track. When in position these pipes form half arches, each of which has eight spray nozzles, which are about twenty inches from the car.

When the train starts through the shower curtain the first set of spray nozzles apply a special cleaning solution to the car tops and sides. This is then followed up by two rinsing operations from clear water. Spraying is done through fan-type nozzles which give sufficient pressure to remove, first, the film of grime accumulated during the run, and, second, to completely remove the last vestige of rinsing solution and leave the surface sharp and sparkling.

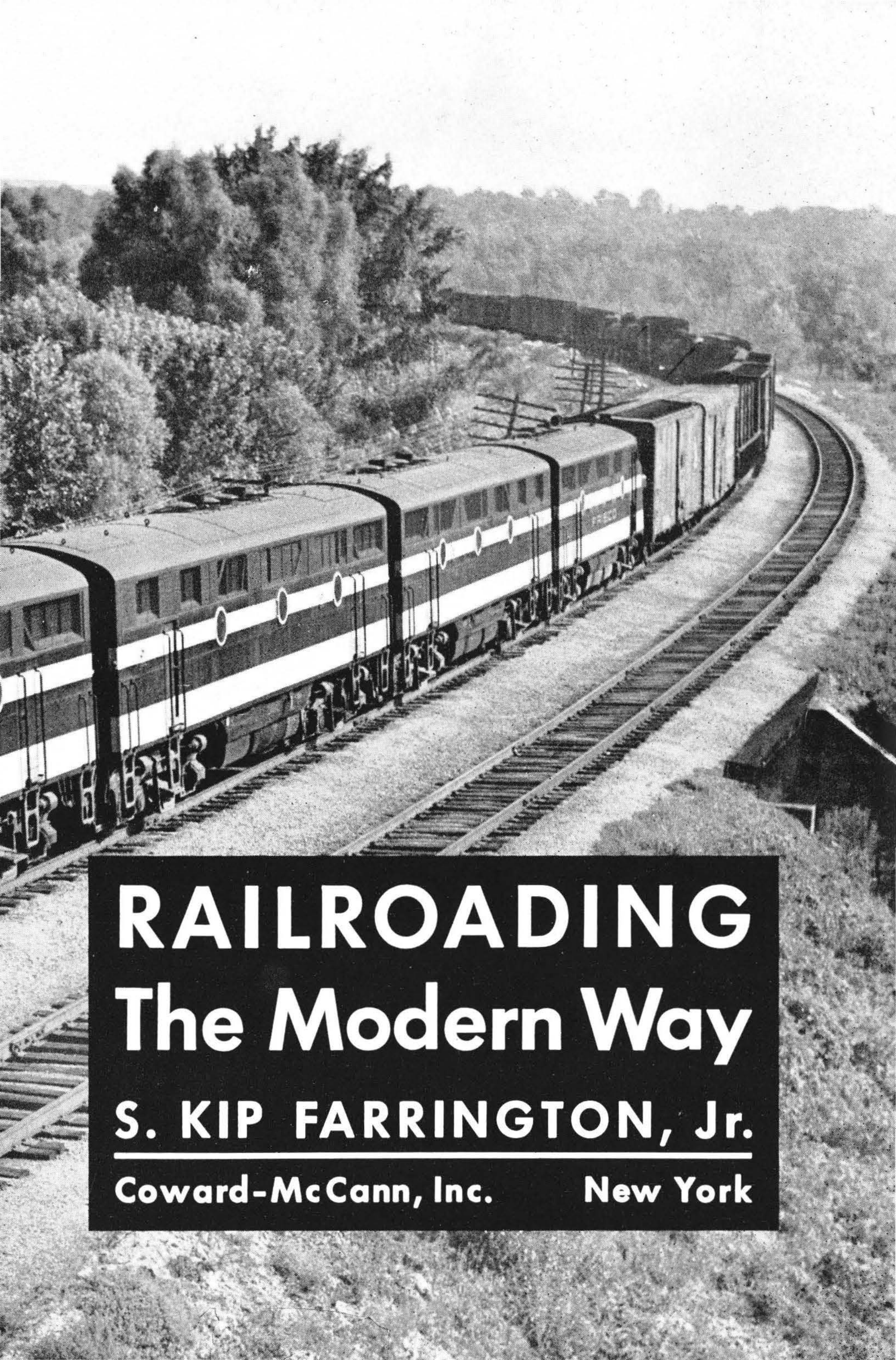
Travelers on board the train usually try to obtain seats in the dome sections for the show. This "Portola shower" is an innovation and a train-freshening process that would have given old-time railroaders a big laugh, if they survived the shock of those Vista-Domes. The old mountain railroaders had troubles enough getting the trains over the road without fussing over their appearance.

We can imagine chattering telegraph sounders up and down the division carrying the word that No. 17, the westbound California Zephyr, was "getting a bath at Portola." It probably would have been charged off to "cabin fever," which meant crazy in the head.

A concrete basin was constructed under the track in the washing area to protect the roadbed. This was provided with suitable drains. A train taking a shower is protected by train signals and floodlights. With all arches in nonoperating position the floodlights go out and the signals display a "lunar white" indication. But with one or more of the shower arches leaving the nonoperating position for the wash operation the six floodlights immediately light up and the signal indication changes to purple.

Only westbound trains are provided with shower facilities for the reason that trains out of Oakland, California, do not require a bath at this point. At the Chicago and Oakland terminals of the run the California Zephyrs get a thorough cleaning with Whiting washers.

Many weird and wonderful tales have come out of the high Sierras since the trek of the forty-niners, but it was left to the Western Pacific Railroad to add a new page for writers to record in connection with the Feather River Route, and President F. B. Whitman and Operating Vice-President Harry Munson, both crack all-around railroad men, are the gentlemen who have put the road to work in the modern way.



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