HISTORICAL OUTLINE
SOUTHERN PACIFIC COMPANY

Prepared by Bureau of News, Development Department, San Francisco, to meet a practically continuous demand from writers, students in schools and colleges, and others interested, for information about the early history and present day activities of the railroad. In the preparation of this outline an effort has been made to provide in convenient form answers to the innumerable questions that have been asked of this department over a period of years.

General description present routes and properties........ 1
Judah and the "Big Four"................................ 5
Central Pacific organized................................ 8
Pacific Railroad Bill.................................... 8
Land Grants................................................ 9
Problems faced by Cent. Pacific.......................... 11
Ground broken at Sacramento............................ 13
First trains operated..................................... 14
Conquest of the Sierra.................................... 15
Construction companies................................... 17
Track laying records..................................... 18
"Last Spike" driven........................................ 20
Pacific Coast expansion.................................. 21
Early California railroads................................. 23
Overland line reaches Oakland......................... 26
S.F. Bay District developments......................... 28
South Pacific Coast Railroad............................. 30
Birth of Southern Pacific................................ 31
San Joaquin Valley line.................................. 33
S.F. and Los Angeles joined............................. 36
Southern California lines................................. 37
Coast Line completed..................................... 42
Across Arizona and New Mexico......................... 44
Sunset Route completed.................................. 46
Pioneer New Orleans road................................. 50
Texas & New Orleans Railroad............................ 53
Houston & Texas Central................................. 54
Lines forming G.H. & S.A................................. 56
S.P. Steamship Lines................................. 59
Shasta Route into Oregon................................. 61
Other Lines in Oregon................................. 67
Cascade and Nodos Lines................................. 70
Re-Organization of S.P.-1884............................ 72
Harriman Regime......................................... 74
Lucin Cut-Off........................................... 76
Bayshore Cut-Off......................................... 77
Lines in Mexico....................................... 79
Arizona & New Mexico lines......................... 80
El Paso & Southwestern................................ 83
Imperial Valley line.................................... 85
Colorado River break.................................... 85
San Diego & Arizona Railway......................... 87
Pacific Mail Steamship Company......................... 88
Pacific Fruit Express Company......................... 88
Northwestern Pacific R.R. Co........................... 89
Electric Railway Lines................................ 91
California-Nevada branch lines......................... 93
UP-SP-CP "Unmerger" Cases............................... 94
Federal Control of Railroads............................ 96
Major Projects since 1920................................. 96
Double Tracking........................................ 97
Terminals, Branch Lines and Bridges.................... 99
Acquisition of New Properties..........................102
Branch Lines on T&NO....................................104
Meeting Motor Vehicle competition....................104

Unless otherwise noted, figures used herein are as of December 31, 1931. Detailed index and bibliography available on request.
SOUTHERN PACIFIC COMPANY

Historical Sketch of the Origin and Development of the Transportation Properties Operated as a Part of the Southern Pacific System

(Written March 1933)

Southern Pacific, pioneer of transcontinental railroads, had its origin in the Central Pacific Railroad Company of California, incorporated June 28, 1861 to build the western portion of a proposed railroad from the Missouri River to the Pacific Coast. Construction was begun at Sacramento, California, on January 8, 1863, following authorization given by Congress in the Pacific Railroad Act of 1862.

The original unit in this transportation system which today extends over 16,877 miles of rail lines (not including the St. Louis Southwestern properties or electric lines) and 5,500 miles of water lines, was built 690 miles over the Sierra Nevada mountains and across Nevada to Promontory, Utah, where the "last spike" was driven May 10, 1869, connecting the Central Pacific with the Union Pacific to give the nation its first transcontinental railroad.

In the sweep of its rail and water lines and the expanse of territory served, Southern Pacific is more truly "transcontinental" than any other railroad system in the country. Over its rail lines extending from the Pacific Coast cities of Portland, San Francisco and Los Angeles, to Houston, Galveston and New Orleans, where connection is made with its own steamships to Baltimore, New York and Boston, the company carries passengers and freight from the Pacific to the Atlantic seaboard. It has the longest north and south route of any railroad on the continent, crossing 25 degrees of latitude in
the distance of 2914 miles from Portland along the west coast of the Pacific to Guadalajara, Mexico.

The Company’s rail lines traverse the agricultural and industrial sections of eight states — Oregon, California, Nevada, Utah, Arizona, New Mexico, Texas and Louisiana — and its water lines touch seaports of three others — New York, Maryland and Massachusetts — making a total area of 1,071,465 square miles served directly by Southern Pacific, or 35.4 per cent of the total area of continental United States. Its acquisition of the St. Louis Southwestern Railway Company (the "Cotton Belt") on April 14, 1932, added 1913 miles of main line to its trackage and brought Illinois, Missouri and Arkansas into the empire it serves.

Measured by its $2,242,355,391 investment in solely owned and affiliated companies, (not including $136,554,619 property investment of the "Cotton Belt" - Dec. 31, 1930) Southern Pacific ranks second among the transportation systems of the United States and is among the first ten of the largest industrial concerns in the country. It is owned by about 56,000 stockholders and in normal times gives employment to about 100,000 men and women.

In addition to the rail and water lines of its main transportation system, Southern Pacific, through its fifty some-odd affiliated companies, has whole or partial ownership in 837 miles of electric lines in California; 88 miles of ferry boat lines in passenger and auto service on San Francisco bay and in car-transfer service near New Orleans; 11,478 miles of motor bus lines operating in eight western and southern states; 561 miles of pipe lines in California; motor truck pick-up-and-deliver service for freight in Oregon and California; refrigerator freight car service operating 41,109 cars; 8,474,749 acres of land; 2,091 town lots; 3,231 acres
of oil land and 92,750 acres of oil land leased and with mineral rights on which 172 wells produced about 1,420,000 barrels of oil in 1931; 21,500 acres of timber land; 31,600 acres of coal and other mineral land; and terminal warehouse and union station properties at Los Angeles, San Francisco, El Paso, Fort Worth, Portland, Ogden and Dallas.

For transcontinental passenger service Southern Pacific has its Sunset Route between San Francisco and New Orleans, with steamship service to New York; its Golden State Route in conjunction with Rock Island between Santa Barbara, Los Angeles, San Diego, El Paso, St. Louis and Chicago; its Overland Route in conjunction with the Union Pacific and Chicago & Northwestern between San Francisco and Chicago; and its Shasta Route between San Francisco and Portland connecting there with the northern and Canadian lines to the East.

Southern Pacific Lines are divided into four main operating units. The Pacific Lines, west of Ogden and El Paso, operating 9124 miles; Texas and Louisiana Lines, east of El Paso, 4670 miles; Mexican Lines, 1370 miles; and the Southern Pacific Steamship Lines, operating 3 passenger and 16 freight steamships over 5500 miles of water lines.

The main and general offices of the company are located in San Francisco, where the president has his headquarters. The financial headquarters are in New York where the chairman and vice chairman of the company have their offices. General offices of the Texas & New Orleans Railroad Company, (Texas and Louisiana Lines) are located in Houston, Texas. The Southern Pacific Steamship Company, general offices are in New York, and the Southern Pacific Railroad Company of Mexico has headquarters at Guadalajara, Mexico.
EARLY RAILROAD PLANS

The story of the early beginnings of this system is the story of the West; the saga of individual initiative and courage that welded a nation with bands of railroad track and fostered the development which built a great western empire.

To an unknown editor in the little village of Ann Arbor, Michigan, belongs the credit for making in 1832 the first suggestion for a railroad that would span the continent from the Great Lakes to the Pacific. At that time less than 100 miles of railroad had been built in the United States during the six years since the first road was operated at Quincy, Mass.

One would think that the benefits of a transcontinental railroad would have been at once obvious to all thinking men, but the idea took root only gradually and met with strenuous opposition. The first plan offered Congress was that of John Plumbe's in 1836. Then came Asa Whitney who advocated a railroad not so much for the purpose of developing the West as to provide a new highway for commerce between the Orient and eastern United States and on to Europe.

Discovery of gold near Sacramento in January, 1848, focused attention on the Pacific Coast region. The arduous overland trip across the plains by oxen or mules, and the long ocean voyage via Panama or around Cape Horn, brought to the early settlers a realization of their isolation from the remainder of the country. A growing sentiment in the West and East favored the building of a transcontinental railroad as a means of binding the nation together.

As early as 1850 the California Legislature urged upon Congress the importance of a Pacific Railroad and in 1853 five parties of army engineers were sent into the West to make surveys, between the 32nd
parallel on the south and the 49th on the north, for a railroad ex-
tending from the Missouri River to the Pacific Coast. Volumes of
data were compiled, but intense factional rivalries among Congressmen
from the North and the South blocked every effort to select a route
for the railroad or provide for its construction.

The Civil War brought need for definite action. With the
south and its claims out of the way, official Washington was of
practically one accord. California must be bound to the Union. The
Pacific Railroad immediately became a military necessity and as a
result construction was authorized in the Pacific Railroad Act of 1862.

JUDAH AND THE "BIG FOUR"

Southern Pacific of today is a monument to the enterprise and
vision of Leland Stanford, Collis P. Huntington, Mark Hopkins and
Charles Crocker, Sacramento merchants known in later years as the
"Big Four", who in 1860 became interested in the plans for the
Pacific Railroad as outlined by Theodore D. Judah, youthful
civil engineer.

Typical of the courage and daring which characterized the
successful exploits of many western pioneers, the four Sacramento
associates launched the gigantic project, unmatched in all the story
of rail transportation, without any one of them ever having been
remotely connected with a construction job of greater magnitude than
the erection of their own store buildings.

They had come to California with the horde of Argonauts from
all corners of the globe in the early years of the "gold rush." All
natives of New York state, they emigrated westward not so much in the
hopes of digging gold from the ground as in reaping fortunes from
business ventures. Their acquaintanceship with each other began in
Sacramento.

Stanford, 38 years old, was a dealer in groceries and provisions; Crocker, 38, had a dry goods store; Huntington, 39, and Hopkins, 47, were partners in a hardware establishment. From this prosaic environment the two hardware merchants became financial geniuses; the weigher of sugar and tea developed into an ultra organizer and political wizard; while the man who stood behind the ribbon counter rose to command men in a campaign of construction which startled the engineering world.

Judah, then 34 years old, and a native of Connecticut, had completed in February, 1856, the 28-mile line of the Sacramento Valley Railroad from Sacramento to Folsom, the first railroad operated in the far west. Possessing, for those days, unusual railroad experience, he was the first advocate of the Pacific Railroad to add practical engineering knowledge to sincere enthusiasm. His plan for a railroad over the lofty Sierra, however, met with ridicule except in rare instances. It was branded as a fantastic dream, or at best a vicious money-making scheme.

Even before the Sacramento Valley railroad was completed Judah turned his attention to other projects, principal among which was the Pacific Railroad. He was in Washington during sessions of Congress in 1855, 1857 and twice during 1859, appearing before the railroad committee in behalf of the transcontinental railroad plan. But slavery and other national issues sidetracked the railroad question at the national capital.

Between sessions Judah took numerous trips into California mountains making preliminary surveys through Donner Pass, Henness Pass, Beckwith's Pass, Tehachapi Pass, and other possible routes for
a railroad over the Sierra. In the fall of 1860 he spent some time in the Donner Pass region in company with Dr. Daniel W. Strong, a mountaineer druggist of Dutch Flat, who had also searched the mountains for a route over which he could build a wagon road to divert some of the emigrant travel through his town. He was of great assistance to the young engineer and it was on a counter in his little drug store that Judah made the first profile maps for the railroad and drew up articles of incorporation for the Central Pacific Railroad Company of California.

Convinced that Donner Pass was the logical route for the railroad and encouraged by the response of residents of the mountain towns in subscribing $46,500 in capital stock, Judah anticipated no difficulty in getting at least $70,000 subscribed in San Francisco and Sacramento which would be sufficient to legally incorporate the company. His hopes were short lived, however. San Francisco capitalists turned a deaf ear to his enthusiastic solicitation. They were getting 2½ to 3½ per cent interest a month on their money and eventual profits from railroad earnings were most uncertain. The stock books remained open for several days but the only subscriber was a former resident of Dutch Flat.

Judah went again to Sacramento where he called a meeting attended by about thirty men, all more or less familiar with the project. Nearly everyone present put his name down for some amount and sufficient stock was soon subscribed to cover statutory minimum for forming the company.

Huntington was among those attending the meeting, but he did not sign for any stock. Not that the railroad failed to interest him. He recognized the project as a gigantic undertaking that
that demanded high finance and careful organization. His business acumen prompted him to be conservative. As he left the meeting he invited Judah to come to his office some time and talk the matter over.

At the conference the next evening Huntington told Judah he would raise the $35,000 to cover the expense of a thorough instrumental survey but reserved promises of further support. Stanford, Hopkins and Crocker, prominent members of the young Republican party of California, then pledged to support the Pacific Railroad, were brought into the enterprise by Huntington.

Four parties of engineers were sent into the mountains during March, 1861, working under Judah's direction and on June 23, 1861, the Central Pacific company was formally organized with capital stock of $8,500,000. Stanford, who had just been elected governor of California, was chosen president; Huntington became vice president; Hopkins, treasurer; James Bailey, a Sacramento jeweler, secretary; Crocker, and Judah, chief engineer. L. A. Booth, D. W. Strong and Charles Marsh were added to the board of directors. There were fifteen names on the original stockholder's list covering 1245 shares. The four associates and Judah, each subscribed for 150 of the $100 shares.

PACIFIC RAILROAD BILL

With the company organized, Judah again went to Washington to urge action on the Pacific Railroad Bill, while Huntington went to New York to try and raise money for the enterprise. The young chief engineer played a leading role in the congressional fight which finally resulted in passage of the bill by the Senate on June 20, 1862. It was signed by President Lincoln on July 1.

This bill, with numerous amendments in subsequent sessions,
incorporated the Union Pacific Railroad Company to begin construction of a railroad and telegraph line westward from the Missouri River and authorized the Central Pacific to build eastward from the Pacific Ocean. A land grant of alternate sections, excluding mineral land, land covered under previous Spanish or Mexican grants, and land under homestead or otherwise preoccupied, was pledged to each company, extending for twenty miles on each side of a 400-foot right of way, plus financial aid in the form of United States bonds issued on the basis of $48,000 per mile for construction in the mountain regions, $32,000 a mile for the area 150 miles or more from base of supplies, and $16,000 per mile for the remaining track laid.

The government bonds, to be issued as specified sections of the railroad were ready for operation, were originally designed as first mortgages on the company's entire property. Through later amendment to the Act, these bonds became subordinate to the railroad's own first mortgage bonds to be issued in the same amount as the United States 30-year 6% bonds. Also the government guaranteed interest on the Central Pacific bonds.

The Central Pacific's debt to the government, including principal and interest, was computed at $53,812,715.48 in February, 1899, and in July, 1908, the railroad made final payment in full to the United States for the financial aid given in building the road.

Lands granted to the Central Pacific under the Pacific Railroad Act and to the California and Oregon Railroad Company (which later company was authorized by Act of July 25, 1866, to build through the Sacramento Valley to the California-Oregon state line) amounted to 11,000,000 acres in northern California, across Nevada and into Utah. Later the Southern Pacific Railroad Company acquired
6,500,000 acres in various sections of central and southern California under provisions of the congressional acts of July 27, 1866, and March 3, 1871, which authorized Southern Pacific to meet the Atlantic & Pacific (Santa Fe) at Needles and the Texas & Pacific at Yuma, both points on the California state line.

The land grants were coveted concessions at the time, but when the obligations imposed on the railroads and other circumstances are taken into consideration it is obvious that the grants cannot be construed as subsidies or donations to the railroad. Most of the rail lines were built through uninhabited and undeveloped regions. Without transportation the great bulk of the government's public land had no value. There had been but comparatively few purchasers at $1.25 an acre. Government land within the Central and Union Pacific land grant zone was at once increased to $2.50 an acre. With the railroad in operation demand for the public domain through which it passed was greatly stimulated and the government's ultimate income from the sale of its lands increased.

In making the land grants the government profited in another manner. All federal passenger and freight business, including transportation of troops, supplies and mail, was to be handled at greatly reduced rates, the exact proportions varying under the different grants. This requirement, which became operative nearly seventy years ago, is still in effect and will continue indefinitely. Over the so-called "land grant mileage" the railroad is obliged to handle government traffic at rates approximately 50 per cent under the regular commercial charge and to carry the mail at 80 per cent of the standard rate. It has been conservatively estimated that the original value of the land grant is repaid to the government every twenty-five years through these reduced transportation charges.
A considerable portion of the land acquired was in desert or mountainous regions, and while some of it furnished earth, timber and stone for use in constructing the rail line, much of it was otherwise practically worthless. More than half of the land acquired still remains unsold and on it the railroad pays heavy taxes.

The land grants were of immediate assistance to the railroad builders only in serving as the basis for mortgages against which ready cash was obtained to help defray construction costs. As the lands later became salable the proceeds were used to pay off the outstanding mortgage land bonds.

For this aid extended by the government the railroad has in reality paid a handsome price and will continue to pay from year to year in reduced rates for all government business moving over the rail lines in the land grant areas.

THE JOB UNDERTAKEN

Notwithstanding the financial aid that could be expected from the federal government, the organizers of the Central Pacific had a formidable task ahead of them. Of this fact they were thoroughly cognizant, and after the passage of the Pacific Railroad Bill, Huntington wired his associates: "'We have drawn the elephant. Now let us see if we can harness him.'"

The country opened by the railroad was then a wilderness. Everything that was known of the region at that time discouraged undertaking such a venture. Mountain roads so steep that "covered wagons" had to be lowered down them by ropes, were still fresh in the minds of emigrants who crossed the plains to settle in the West.

Pick and shovel, black powder, wheelbarrows, and one-horse dump carts, were the only aids to grading. Cutting a way for the
"iron horse" over and through the granite walls of mountain ridges was literally hand carving. There were no power tools of any kind, such as are common on big construction jobs of today; even dynamite was not then in general use. Chinese laborers were swung in baskets over cliffs high above the American River to hew a grade for the track in the mountain side. Tunnels were dug while the region was covered under snow packs often thirty feet deep.

Most of the building materials and all of the rolling equipment had to be shipped 15,000 miles around Cape Horn from the East, a voyage of eight to ten months. At one time the Central Pacific had thirty ships on the high seas loaded with rail, equipment and other materials. White labor was scarce in California, for men were more interested in digging for gold than in working on a railroad.

Judah had estimated the cost of building the first forty miles at $2,420,000, not including cost of rolling stock and other operating equipment. Although each of the four associates was a wealthy man, as wealth was counted in those days, their combined resources were totally inadequate to finance much more than a start in building and equipping the first forty miles, which was necessary under terms of the federal bill, before one dollar was available in government bonds. Financiers refused to risk their money in such a venture.

It is little wonder the world doubted this railroad could be built by four inexperienced country merchants in a land that lacked money, men and materials. In the achievement of the "Big Four" the West and the entire nation has shared.

While capitalists in New York were not interested in the railroad as an investment, they were impressed with the high credit rating held by the Sacramento business men in the commercial world.
And thus, by personally guaranteeing the interest on a limited number of Central Pacific bonds for ten years, the four associates raised enough money to go ahead with construction.

Dismal surroundings failed to dampen the ardor of Sacramento's citizenry when ground was broken for the railroad on Front street near the foot of K street on January 8, 1863. The Sacramento river had flooded its banks and the site chosen for the ceremony was a quagmire. People in buggies and wagons, on horseback and in the balconies of nearby buildings, cheered while Governor Stanford stood on a wagon and shoveled the first dirt into the mud for the railroad embankment.

Crocker resigned as a director of the Central Pacific and organized the firm of Charles Crocker & Co. to handle construction of the railroad. Grading work and building of a trestle across the American River was pushed forward, but the Civil War delayed arrival of materials from the East and it was October 26, 1863, before the first rail was laid. The same sailing ship from around Cape Horn brought the first locomotive, which was named "Governor Stanford". The tiny wood-burning engine was only 50 feet long and made its maiden trip in Sacramento on November 10, 1863.

Judah lived only long enough to see construction actually underway on the railroad that had been his dream and obsession. He left San Francisco by steamer in October, 1863, contracted Panama fever while crossing the Isthmus, and died in New York City on November 2, at the age of 37 on the threshold of a distinguished career. There is perhaps no greater tribute to his genius as an engineer than the fact that the Southern Pacific today follows practically the same line he surveyed over the Sierra in 1860-61.
FIRST TRAINS OPERATED

The first 18 miles of the railroad from Sacramento to Roseville (then Griders) was completed April 26, 1864. Train rides at 20 miles an hour were indeed a novelty and in four days a total of 298 passengers paid $354.25 in the first earnings of the Central Pacific. Little freight was carried until a few weeks later when the first time table was published on June 6, 1864, announcing regularly scheduled freight and passenger service over the 31 miles from Sacramento to Newcastle. Net earnings to November 30 of that year amounted to $47,268.37.

These earnings from local traffic were, however, insignificant in meeting any substantial portion of the huge construction and equipment expense. Money was getting scarcer and scarcer. Although work never came to a complete stop, there were days on end when there was not a cent in the company's treasury. Money raised by Huntington in New York had been exhausted mostly in the purchase of materials and equipment and in the increased cost of their transport around Cape Horn which came with opening of the Civil War.

It was at this time that the builders turned for financial assistance to the communities through which the road would pass. The appeal was answered by the voters of Placer, Sacramento and San Francisco counties, also by the California legislature, in authorizing the purchase of Central Pacific stock or the guarantee of interest on certain of the railroad's bonds. Strong interests opposed this move. The matter was thrown into the courts and it was well into 1865 before the aid, market value of which amounted to less than $2,000,000, was available to the Central Pacific.

This delay proved costly. Construction was slowed up at a
time when every mile of track counted in the future earnings of the company. The winter of 1864-65 was an unusually mild one and if construction could have been continued the Central Pacific might have met the Union Pacific at Cheyenne instead of Promontory. As it was, eleven months passed before the four-mile section between Newcastle and Auburn was opened for traffic on May 13, 1865.

As more money became available, more men were put to work. There was scarcity of white labor and Crocker turned to Chinese coolies. The experiment was so successful that hundreds of orientals were added to the construction gangs. Work went rapidly ahead and by September, 1865, the road was in operation for 55 miles to Colfax. The severe winter of 1865-66 was in marked contrast to the mildness of the previous year. Work on the tunnels was impossible on account of snow, and heavy rains below the snowline made the wagon roads impassable.

The beginning of 1866 saw the fight to overcome the Sierra on in earnest; the most difficult and most costly part of the line had yet to be built. Crocker decided to work the 1659-foot summit tunnel from four faces. This was accomplished by sinking a shaft at the center and working outward toward the entrances. It was a tremendous undertaking. The rock was so hard that seven inches a day was considered good progress. It took the best part of a year to dig the shaft deep enough to begin the laterals, and it was another year from then before the tunnel was completed. Altogether, fifteen tunnels were bored to get the road across the Sierra.

FIGHTING SIERRA SNOW

Working conditions were difficult enough at all times, but in winter it needed superhuman courage and determination to keep things
The winter of 1866-67 was another severe one. Forty-four snow storms brought a total fall of forty feet, with snow averaging eighteen feet deep near the summit. The only work possible was in the tunnels, the entrances to which were kept clear by long snow tunnels. The danger of snowslides harassed the builders in the spring, but through it all, the work went on.

It was above Colfax that workers were lowered in "bosun's chairs" over the cliffs at Cape Horn to cut a grade for the tracks while suspended 2500 feet above the American River. Dutch Flat was reached in July, 1866, and by October the "railhead" was at Cisco, only twelve miles from the summit, but twelve miles of granite so hard that explosives shot out of the hole like a charge from a gun without so much as cracking the rock. Winter again descended on the Sierra and all work was stopped except in the summit tunnel.

Time was pressing. While snows held the Central Pacific at bay in the Sierra, the Union Pacific, which had laid its first rail at Omaha on July 10, 1865, was rapidly advancing westward across Nebraska. Something had to be done or the rival road would reach California state line before the Central Pacific had even conquered the Sierra.

Once again Charles Crocker rose to the occasion. Over 28 miles of tortuous mountain trail, leading from near the summit eastward, he directed the hauling and sLEDging of three locomotives, forty cars and materials for forty miles of track down into Truckee River canyon where light snowfall made grading and track work possible. It was a tremendous but strategic undertaking and made full use of all forces not engaged in tunnel work in the Sierra.

Not before June of the following year, 1867, could the forces at Truckee be brought back into the mountains, where the grade was
still below ten and twelve feet of snow. By midsummer the first locomotive had crossed the divide and in November the line was opened to Summit at an elevation of 7,000 feet. Heavy snows again forced the transfer of construction work to the Truckee region where such good progress had been made that on December 13 the first locomotive pushed its nose over the state line into Nevada. By the end of the year there was only a seven mile gap of difficult construction on the ridges above Donner Lake to be completed before the Truckee work could be used as part of the through line.

The difficulties experienced in keeping the road clear of snow during the winter of 1866-67 presented a problem that had to be overcome before trains could be successfully operated. The answer came in the decision to build snowsheds over the tracks. Construction of these was begun in the spring of 1868 and was completed in the fall of 1869. The expense involved was appalling for it meant the use of 2500 men on the job itself and in the sawmills. More than 65,000,000 feet of lumber was used and the total cost was about $2,000,000.

CONTRACT AND FINANCE COMPANY

Thus far all construction work had been done by the firm of Charles Crocker & Co., with the exception of a few miles between Roseville and Newcastle. Early experience with individual contractors had been most unsatisfactory. Crocker had been unsuccessful in interesting outside capital in his construction company and when the line reached the Truckee country finances from government bonds and county aid were exhausted in the expensive mountain construction.

In order to continue the work the Contract and Finance Company
was organized October 28, 1867. Huntington in New York and Stanford in California tried without success to interest capitalists in stock of the new construction company. It was apparent to the Sacramento men that they would have to carry on with their own resources. Together with Judge E. B. Crocker, brother of Charles and attorney for the Central Pacific, the "Big Four" subscribed for equal shares in the construction company, which was to be paid for its work in stock and bonds of the railroad and certain amounts of cash. In the end the associates held some $52,000,000 in securities, which were without value at the time, and had assumed between three and four millions of company debt. This company was dissolved in 1874 after having built other sections of the railroad's lines in California. It was succeeded by the Western Development Company and in turn by the Pacific Improvement Company, incorporated November 4, 1878.

Back in the Sierra, the year of 1868 ushered in a campaign of feverish activity with Charles Crocker, now general superintendent, announcing a construction program of a "mile of track every working day." The race with the Union Pacific was on in earnest. Track was laid above Donner in the early spring and on April 3, 1868, the first train was operated into Truckee. The Sierra was now at the builders' backs. On June 19 operations were begun to the little settlement of Reno, which townsite had been staked out by the Central Pacific surveyors.

TRACK LAYING RECORDS

The remaining distance to Promontory was over a comparatively flat country that offered none of the difficulties encountered in the mountains. A rail laying program was begun which has never since been equaled. Crocker's "pets", as the 14,000 Chinese coolies
were dubbed, together with the 2000 whites and about 6000 teams, responded with superhuman efforts. Canvas towns sprung up and lived but a few days as the "rail-head" was moved steadily eastward. The Union Pacific was pushing westward at an equal pace and in thirteen months laid 555 miles of track across Wyoming and Utah.

Both companies were awake to the future advantages in the way of traffic revenue to be gained from each additional mile of their respective lines. Neither would agree where the tracks should join and for many miles the grading crews, far in advance of the track layers, worked within a few yards of each other. Keen rivalry existed among the men in the two railroad camps.

One day the Union Pacific laid six miles of track. The Central Pacific followed with seven. This was bettered by the rival camp and brought the boast from Crocker that his boys could lay ten miles of track in a day. It is said that Thomas C. Durant, vice president of the Union Pacific "covered" Crocker's wager of $10,000.

Crocker and J. H. Strobridge, construction superintendent, made careful plans. Ties were laid several miles in advance and materials were hauled ahead to strategic points. April 28, 1869, was the day. While a number of officers of both companies, including Gen. C. I. Dodge, chief engineer of the Union Pacific, several newspaper correspondents, and workers from the rival camp, looked on in amazement, the Central Pacific men laid ten miles and 56 feet of track in a little less than twelve hours, a feat that has never been approached. The job was so perfectly organized that the eight Irish rail handlers, backed by a small army of "coolies" and other laborers, each with his particular assignment, laid the track at a rate of 144 feet a minute.
That day's performance brought the two rail lines within a few miles of Promontory, near the northern shore of Great Salt Lake, which location has been designated by the government as the junction point.

"LAST SPIKE DRIVEN"

Driving the "last spike" in the 2000-mile rail highway for the "iron horse" between the Sacramento and Missouri rivers, was the occasion for a great national ceremony on May 10, 1869, with the stage set in the barren hills of northern Utah. Special trains brought officers of both railroads with statesmen and other dignitaries from the East and the West. They were joined at Promontory by some 500 railroad workers and settlers of that region. Gold and silver spikes were presented by delegates from California, Nevada, Arizona and other western states. Four companies of the 21st Infantry and a regimental band were there from Fort Douglas. Telegraph connection had been made so that the taps of the hammer on the last spike would send a click-click-click over the wires to telegraph offices throughout the nation.

All was in readiness about noon. Prayer was offered by Rev. John Todd of Pittsfield, Mass. Short addresses were made by Vice President Durant and Sidney Dillon, director and later president of the Union Pacific. Governor Stanford, the only Central Pacific officer president, added a few remarks and then started to tap the last spike into the tie. Each tap of the hammer was repeated through telegraph on the bell of the capitol at Washington, D. C., and on the great fire bell in San Francisco. The signal "done" was received at the national capital at 2:47 p.m., which was about 12:45 at Promontory.
The first passenger train from Omaha to Sacramento was run May 12, 1869, and three days later regular through transcontinental freight and passenger service was inaugurated. Passengers continued on from Sacramento by river steamer to San Francisco.

To establish its terminal at Ogden, the Central Pacific purchased about 47 miles of line from the Union Pacific and leased a remaining section of 5 miles, gaining the entrance sought into the Great Basin of the Salt Lake country.

Cost of building the 690 miles of railroad and telegraph line from Sacramento to Promontory, and purchase of the mileage on to Ogden, has been given various estimates, ranging as high as $71,000,000. It was the conclusion of the United States Pacific Railroad Commission in 1887 that the cost did not exceed $36,000,000; which was probably a conservative estimate. Records of the Contract and Finance Company were lost, making it impossible to determine the actual cost.

PACIFIC COAST EXPANSION

The task of the "Big Four" did not end with the ceremony at Promontory. The associates found themselves deeply in debt, with a heavily mortgaged road on their hands and only blocks of unsalable stock to show for the investment of their entire fortunes and nine years of strained and unremitting labors. At that time they would gladly have sold out at any price, Huntington declared in later years. Traffic did not materialize as expected. In the very month the Central Pacific was completed, the Suez Canal opened to ships of the world, diverting commerce that would have come to the Pacific Coast. Nevada’s mining industry, in one of its glorious heydays when the
road was being built, hit "no pay" dirt in that year and did not recover for many months.

There was but one course for the four Sacramento associates to follow. They must make their stock valuable by making the railroad pay. This they set out to do even before the "last spike" was driven in Utah by expanding their lines so as to promote development of the Pacific Coast and Southwest states. This move was also prompted by the necessity of protecting their own interests against the rival railroad companies that sprung up at the close of the Civil War and sought government authority to build.

This expansion, in the most part, was carried on by three major companies. To the Central Pacific the "Big Four" added the Southern Pacific Railroad Company and the California and Oregon Railroad Company, both acquired from their original incorporators during 1868. Under the banner of one company or the other, the Stanford-Huntington group launched its widespread program of construction and acquisition. The fall of 1869 found the transcontinental railroad extended from Sacramento to San Francisco Bay while at the same time graders and track layers were pushing out of Marysville northward into the Sacramento Valley on the road headed for Oregon. On the last day of the same year construction was begun in the northern end of San Joaquin Valley on the line to be built southward through central and southern California, with Los Angeles and the Colorado River the objectives. The Coast Line was moving steadily forward south of Gilroy in 1871 and in 1873 feverish construction was underway in Los Angeles County.

During the eighteen years beginning 1870, the main arteries of the present Southern Pacific system were completed and the end of
1887 found three of the Sacramento associates (Hopkins died in 1878) directing the operations of some 4000 miles of main lines extending from Portland to Los Angeles and New Orleans, and from San Francisco to Ogden, with the company's own steamship lines plying between New York, New Orleans and Havana. There had also been organized in 1884, under the laws of Kentucky, the present Southern Pacific Company with capitalization of $100,000,000 to operate under one corporate management all of the transportation properties.

EARLY CALIFORNIA RAILROADS

A brief resume of the various early railroad enterprises on the Pacific Coast separate from those of the Central Pacific, is necessary for a proper understanding of the course followed by the "Big Four" in developing their vast transportation organization.

On the day the "last spike" was driven in the transcontinental line, there was less than four hundred miles of railroad in operation in the entire West, aside from the main line of the Central Pacific. Los Angeles was without railroad service and not a mile of railroad was in operation in Oregon, except for a few miles of portage road along the Columbia River.

The first railroad operated in California was the Sacramento Valley line from Sacramento to Folsom, 22 miles, built by Judah and opened for operation on February 22, 1856. The builders of this road intended to extend the line into the middle west either through the Nevada mining region or by way of the Sacramento valley and Marysville but by the time Folsom was reached, the company's finances were exhausted and it took all the earnings to carry the debts. The road extended into the rich "Mother Lode" placer mining region of the
Sierra foothills and several miles of track was laid over "a roadbed of gold". At one time the railroad did a large business, making connection with twenty-one stage coach lines. The road from Folsom to Shingle Springs, 26 miles, was opened in June, 1865. Before 1870 the properties were acquired by the Central Pacific. It was not until March 29, 1868, that trains were operated to Placerville.

Marysville became a center of railroad activity in 1857. Failure of the Sacramento Valley company to build that far resulted in the incorporation of the California Central Railroad Company on April 21, 1857, to complete the line from Folsom. The road was opened to Lincoln, via Junction (now Roseville) October 13, 1861. Construction from that point was carried on by the Yuba Railroad Company and in the latter part of 1866 was in operation to a point about seven miles from Marysville. Rains damaged the road to such an extent that operation was discontinued until September, 1868.

Meantime the Central Pacific had acquired the Yuba company in 1867 and the California Central in 1868. The portion of the road between Folsom and Roseville was abandoned in 1868 and on June 1, 1869, the Central Pacific began operation of trains over its own main line out of Sacramento to Marysville.

There was also organized at Marysville in 1857, the San Francisco and Marysville Railroad as the first company in the group later headed by the California Pacific Rail Road Company, incorporated Jan. 10, 1865, which became a strong competitor of the Central Pacific in central California. Construction was begun on the "Cal-P" line at Vallejo in December, 1866. On Jan. 15, 1870, when trains were first operated across the Sacramento River bridge this company, with its affiliated lines, had 113 miles of railroad in operation between
Vallejo, Calistoga, Knights Landing and Sacramento, with the steamer "New World" plying between Vallejo and San Francisco. The extension from Knights Landing to Marysville was completed in March, 1870.

Supported by English capital, the California Pacific was re-organized in May, 1871, with the intention of extending its line from Davis (then Davisville) north through the Sacramento Valley into Oregon and Idaho with a terminus at Ogden. Branch lines were also contemplated in the 943-mile project and a fleet of Sacramento river steamers was purchased from the California Steam Navigation Company.

Meager earnings from local traffic, heavy maintenance expense due to washouts, and a shaky financial structure, influenced the California Pacific backers to sell out to the Central Pacific. The agreement was made about August 1, 1871, after which time the railroad and steamship properties were operated under supervision of the Central Pacific. The corporate name was maintained until 1898.

ROADS IN SAN FRANCISCO REGION

With the opening of the year 1869, three railroads were operating in the San Francisco bay region, in addition to the California Pacific. A line from San Francisco to San Jose, 50 miles, first projected in 1849 and later built by the San Francisco and San Jose Railroad Company, incorporated August 18, 1860, was opened for traffic on January 16, 1864. Construction had been started in May, 1861, and on October 18, 1863, the first train out of San Francisco was operated from the terminal at 18th and Valencia streets to Mayfield.

Soon after the line was opened for traffic, the San Francisco freight and passenger terminal was established on Brannan street between 3rd and 4th streets. About two years later the passenger station
was moved to Market and Valencia where it remained until 1875 when the station was opened on Townsend between 3rd and 4th, near the site of Southern Pacific’s present terminal which was completed in 1914.

Before the San Francisco road was opened to San Jose, the San Francisco and Oakland Railroad Company, incorporated October 21, 1861, began operation on September 2, 1863, of its combination rail and ferry service from Broadway in Oakland along Seventh street to Oakland Wharf and thence by ferry boat to the Davis street landing between Broadway and Pacific wharfs in San Francisco. The ferry steamer "Contra Costa" made six trips each way daily. To meet competition of a rival ferry line, the railroad built a bridge (later filled in) across San Antonio creek and extended its service to the town of San Antonio (now East Oakland) on September 28, 1864.

During October, 1865, the Oakland railroad came under the same management as the San Francisco and Alameda Railroad Company, commonly known at the time as the "Encinal Road", incorporated March 25, 1863. This company operated a ferry and rail service from the Davis street landing in San Francisco to Alameda Wharf at the foot of Pacific street (since abandoned) thence along what is now Lincoln avenue in Alameda to Hayward. Construction on the 15-mile rail line was begun on June 23, 1864. By October 25 the line was completed as far as High street in Alameda and service was begun to San Francisco with the steamer "Sophie McLane". The line was opened to San Leandro on March 1, 1865, and to Hayward on the following August 24.

CENTRAL PACIFIC REACHES OAKLAND

It was over these "local lines" in Oakland and Alameda that the Central Pacific inaugurated the first transcontinental rail service to San Francisco bay in the fall of 1869. Construction from
Sacramento through Stockton and Niles Canyon was carried on by the Western Pacific Railroad Company (no connection with the present railroad of that name), which had been incorporated December 13, 1862, by the same group interested in the San Francisco and San Jose railroad. It was their intention to bring the projected transcontinental railroad directly into San Francisco by way of San Jose.

In an agreement made October 31, 1864, and ratified by Congress on March 3, 1865, the Central Pacific assigned to the Western Pacific the land grant and other rights held under the Pacific Railroad Act for construction of the rail line between Sacramento and the Pacific Ocean, San Jose being designated as the western limit of the land grant area. Construction on the grade was commenced at San Jose in January, 1865. The first twenty-mile section to a point near Vallejo's Mill (now Niles) was not completed until October, 1866. The contractor, Charles McLaughlin, encountered financial difficulties and the work stopped until the properties were taken over by the Central Pacific about June 8, 1867, and construction resumed from Brighton, at a junction near Sacramento, in April, 1868. The road was opened for traffic to Stockton on August 14, 1869, and to San Jose on September 6, 1869.

Meantime the Central Pacific had in August, 1868, purchased a controlling interest in the Oakland and Alameda "local lines". Arrangements were completed for terminals at both Oakland and San Francisco and on September 6, 1869, the San Francisco bay region greeted its first transcontinental rail service when two Central Pacific trains from Sacramento brought "overland" passengers into Alameda over a connection at Melrose with the newly built Western Pacific road north of Niles. Regular service began the following day with two
trains each way daily between Alameda Wharf and Sacramento. Ferry service was handled by the new steamer "Alameda".

That portion of the main line between Melrose and connection with the Oakland "local" was completed late in October and on November 8 there was great rejoicing in Oakland when the first overland passenger trains came into the city along Seventh Street and went on to the re-constructed Oakland Wharf where connection was made to San Francisco with the "elegant" new ferry boat "El Capitan", which had been placed in service in July, 1868. Operation of "overland" passenger trains to Alameda pier was discontinued.

The last section of the transcontinental railroad in Oakland was completed late in 1870 when the line between East Oakland along First Street to the wharf was opened for traffic. The famous two-mile Oakland Long Wharf was first used on January 16, 1871, with the car-transfer ferry "Thoroughfare" (first boat of that name) handling freight to Second Street Wharf in San Francisco. The Oakland and Alameda "local lines" were connected September 29, 1873, over the first railroad bridge across the estuary (Alameda Creek) at Alice Street, and Alameda Wharf at the foot of Pacific Street was abandoned. The "El Capitan" and "Alameda" alternated in making trips every half hour from Long Wharf to San Francisco.

LATER DEVELOPMENTS IN BAY DISTRICT

The first San Francisco "ferry building" came into existence on September 4, 1875, when the Oakland ferry boats started landing at Central Pacific's new passenger station on East Street (now Embarcadero) between Market and Clay, which date marked abandonment of the Davis Street ferry landing. Market Street wharf was used by the
railroad for its steamers operating on the Sacramento river and to the California Pacific rail terminal at Vallejo. During 1877 three new slips were built at the foot of Market street to which location the Central Pacific terminal building was moved, remaining there until the present Ferry Building was built in 1896.

To provide a shorter route with less grades than the original line between Sacramento and Oakland through Niles Canyon, the Central Pacific opened its new line on December 23, 1879, extending from West Oakland along the shore of the bay to Port Costa, where the ferry "Solano" transferred passenger and freight trains across Carquinez Straits to Benicia, from which point connection was made with the former California Pacific line at Suisun and thence into Sacramento. From Port Costa connection was made with the company's San Joaquin Valley line on September 8, 1878, when service was begun from Tracy through Martinez to Oakland Pier.

Berkeley was given its first train service on August 16, 1876, over the line from Oakland Pier to the University and Shattuck Avenue station by way of Stanford and Adeline streets. The line from Shellmound to Delaware street (West Berkeley) was opened January 15, 1877, and the extension from University Avenue to Berryman's station (now Vine Street) was opened July 1, 1878.

Construction of the present Oakland Pier terminal was begun in June, 1879. The fill, or "Mole", was extended about a mile and a quarter, with provision for four tracks and a carriage way over the first 4800 feet, widening to 280 feet for accommodation of 12 tracks, ten of which were within the large terminal building at the end. The new passenger terminal and train shed was opened January 22, 1882 after which the Long Wharf extension was used exclusively for freight
traffic until its abandonment in 1918-19.

During this time the narrow-gauge South Pacific Coast Railroad (incorporated March 25, 1876) was being constructed by James C. Fair and his associates from Alameda to Santa Cruz via Newark and San Jose. It was the intention to continue the line down the Salinas Valley, across the Coast Range into the San Joaquin Valley and ultimately meet the Denver & Rio Grande, which at that time was building its narrow gauge line toward the Pacific Coast.

Construction of the South Pacific Coast line was carried on under various corporate names. A wharf was built at Alameda Point and on June 1, 1878, rail and ferry service was inaugurated from San Francisco to Newark, about 25 miles. The company had three steamers, the "Newark", "Bay City" and "Garden City", operating to a slip at the foot of Market Street in San Francisco. The company also had a landing at Dumbarton Point near Newark. Through train service to Santa Cruz was begun May 15, 1880. A bridge across San Antonio Creek (the Estuary) to Webster Street in Oakland was opened for traffic May 30, 1881. Later the line was extended to 14th and Franklin streets for service beginning October 1, 1886. A trestle-pier built from the south bank of the creek had been placed in operation March 14, 1884, which trestle was later filled in to become the present Alameda Pier. The various narrow gauge properties were consolidated under the South Pacific Coast Railway Company on May 23, 1887, and on the following July 1 were acquired by the Southern Pacific Company. The line north of Wright was changed to standard gauge during 1906 and after April 28 of that year the trains were operated to Oakland Pier. Remaining track was standard gauged during 1907.
Local interurban travel of Oakland, Berkeley and Alameda in connection with ferry service to San Francisco, was handled by steam trains prior to electrification of those lines, which work was begun in March 1908. The electric trains were placed in service on all local lines between December 23, 1911, and February 1, 1912, with exception of the extension from Melrose to San Leandro which began operation some months later.

BIRTH OF SOUTHERN PACIFIC

From the very inception of congressional plans for a transcontinental railroad the name of Southern Pacific was considered an appropriate one for the company that would undertake to build such a road. This was particularly so of those persons favoring a route through the southern states. Actual adoption of the name, however, fell to the group of Californians who incorporated the Southern Pacific Railroad Company on December 2, 1865.

This company, first capitalized at $30,000,000, was organized by some of the men who had during the previous year opened the line from San Francisco to San Jose. T. G. Phelps of San Francisco was the first president. Authorized by Congress in 1866 to build the California portion of the Atlantic & Pacific (Santa Fe) line and to receive the government land grant, the company immediately became Central Pacific’s most serious rival in the western transportation field. On January 3, 1867, a map was filed with the government designating the road proposed to be built from San Francisco through the Santa Clara, San Benito and San Joaquin valleys to the Colorado River.

Ownership of the San Francisco & San Jose line was acquired - 31 -
late in March, 1868. It was then rumored that the Central Pacific had gained control of the Southern Pacific and its franchises, which reports were branded as false by Leland Stanford in a statement made on March 6, 1868. Control was actually acquired, however, some time between March and September for on the 25th of the latter month, C. P. Huntington transmitted Southern Pacific's annual report to the Secretary of the Interior, indicating Central Pacific's close relationship with the company. This alliance became a matter of official record on October 12, 1870, when a new organization of the Southern Pacific Railroad Company was effected.

On April 21, 1868, ground was broken at the 4th street station of the railroad in San Jose for extension of the Southern Pacific and on March 13 the following year train service was begun to Gilroy. It was the intention to build the railroad through Pacheco Pass into the San Joaquin Valley, but the cost of construction and operation over the mountainous section of the Coast Range, also the uncertainty of local traffic developing on the far western slope of the valley, halted further work on the road over that route after it was opened to Tres Pinos on August 12, 1873.

When Southern Pacific was authorized by Congress in 1871 to meet the proposed Texas & Pacific line at or near Yuma on the Colorado River, capitalization of the company was increased to $70,000,000. At the same time plans were definitely announced for construction into southern California beyond Mojave and for a branch line to Salinas, with possible extension through other counties along the coast. This latter line was opened to Pajaro (Watsonville Junction) on Nov. 27, 1871; to Salinas on Nov. 1, 1872; and to Soledad, 140 miles south of San Francisco, on Aug. 12, 1873. All construction was then suspended.
west of the Coast Range and Southern Pacific joined forces with the Central Pacific in the San Joaquin Valley.

SAN JOAQUIN VALLEY LINE

Only the most optimistic hopes could have prompted the "Big Four" to build into the San Joaquin Valley. The great, broad plain was then practically an untouched empire. Then looking over the proposed route, Stanford and Hopkins, with their engineers rode on horseback for miles and miles without seeing any signs of habitation except an occasional sheep herder's cabin. Visalia and Bakersfield were the only towns of importance, and they were little more than villages. Fresno, Modesto, Merced and other present-day prosperous cities of the valley remained to be staked out and founded by the railroad builders who visioned the great area dotted with thriving towns and its rich acreage cultivated by thousands of farmers and orchardists. These were only hopes, however, and it took courage to build a railroad into such a raw country. There were no land grants or government loans to aid in construction north of Goshen. From the latter point on to the Colorado River, work was carried on under the Southern Pacific grants obtained in the Acts of 1866 and 1871, but there were no construction loans such as the Central Pacific had in building to Promontory, Utah.

Construction was begun at Lathrop, on the main line of the Central Pacific between Sacramento and Oakland on Dec. 31, 1869. Trains were first operated on regular schedule to Modesto on Nov. 8, 1870; to Merced Jan. 25, 1872; to Fresno May 28, 1872; to Goshen Aug. 1, 1872; to Delano July 14, 1873; and on Nov. 10, 1874, regular train service was begun to Sumner (East Bakersfield). Here the
builders reached the end of 230 miles of comparatively easy construction through the valley. Ahead of them towered the Tehachapi mountains.

During later years various branch lines were built in the San Joaquin Valley. The "West Side" line was opened from Tracy to Newman on July 1, 1888, and to connection with the main line at Fresno on July 1, 1892. Along the route of the original Southern Pacific survey a line was opened from Goshen through site of the later cities of Hanford and Lemoore, to Huron on Feb. 1, 1877, and to Alcalde, near the later location of Coalinga, in July, 1886. The surveyed line between Alcalde and Tres Pinos was never built and the land grant was forfeited. A line from Stockton through Oakdale to Merced, over a portion of the railroad built by the Stockton and Copperopolis company to Milton in 1870-71, was opened for traffic Feb. 2, 1891. The "Porterville Branch" was opened from Fresno through the present cities of Reedley, Dinuba and Exeter to Porterville on July 1, 1888, and to connection with the main line at Famoso on Dec. 24, 1890. The branch from Galt to Ione, in the mining district of Amador County, was opened Dec. 3, 1876; and the branch from Lodi to Valley Spring, originally narrow gauge, was placed in operation during 1882-83. The line from Fresno, through Clovis to Friant, was opened Jan. 20, 1892.

OVER THE TEHACHAPI

Returning to the original construction with the "rail-head" at Sumner, the town established by the railroad near Bakersfield -- at this date (November 1874) about 150 miles of track remained to be laid over the Tehachapi and San Fernando mountains to complete the
through rail line between San Francisco and Los Angeles. In this distance the engineers under Wm. Hood and Col. George E. Grey encountered heavy mountain construction that rivaled the difficulties overcome in the Sierra. Rising from the floor of the San Joaquin Valley, the Tehachapi Pass was scaled at an elevation of 4025 feet by a line of track that swerved back and forth up the mountain side through eighteen tunnels and looped over itself in a remarkable stroke of engineering genius to climb 2734 feet around gradual curves on a 2.2 per cent grade in a distance of only 28 miles.

Hood spoke of his famous "loop" as being merely a "common-sense plan", yet this ingenious method of gaining elevation in short distance was the talk of the engineering world. Travelers over the winding, crooked road have never ceased to wonder how it was planned and built. Resembling two large circles drawn with a giant compass, the loop was tunneled into the side of a ridge, twisted around the crest of a peak and back over the tunnel, quickly gaining an elevation of 77 feet and bringing the line into position for easy grades to the summit. It is not uncommon sight to watch powerful locomotives of today pulling a long string of freight cars over the loop with the train circling over itself.

Grading was begun out of Sumner in the winter of 1874 and April 26 trains were in operation to Caliente at the foot of the mountains. Here the terminal remained for more than a year while construction went forward over the Tehachapi. Stage coaches "bridged" the 98 miles over the wagon road to the "rail-head" then 22 miles north of Los Angeles. The rail and stage journey between San Francisco and Los Angeles was then cut to 33 hours. The railroad was opened to Tehachapi July 10, 1876, and to Mojave August 8.
While more than 3000 Americans and Chinese worked with hundreds of horses and dump carts in the Tehachapi mountains, a force equally as large was piercing the San Fernando range, just north of Los Angeles, with a 6975-foot tunnel, then the second longest railroad bore in the United States. Softness of the earth and the abundance of water encountered, combined to make the tunnel building a gigantic job. Work, begun March 27, 1875, was pushed night and day. Shafts were sunk and the mountain sides attacked from four faces. The headings met July 14, 1876, and tracklaying was pushed into Soledad canyon where connection was made with the line completed over the Tehachapi.

LOS ANGELES AND SAN FRANCISCO JOINED

Driving of the "last spike" in the first rail line to connect San Francisco and Los Angeles was the occasion for a celebration at the little station of Lang September 5, 1876. Special trains brought prominent persons from both cities. A track laying race between crews from the north and the south was staged as a special event, the result of which gave the southern delegation a chance for cheers. The spike was driven by Charles Crocker, president of the Southern Pacific, who was introduced as "the man who has superintended the construction of more miles of railroad on the face of the globe than any other person living or dead." Leland Stanford, president of the Central Pacific, was among those present. A banquet in the evening at Union Hall in Los Angeles, concluded the festivities.

Regular train service was inaugurated between the two cities September 6, with an Express train making the 484-mile run in about 25 hours, while the schedule of the Emigrant train (combination of
passenger and freight cars) varied from 35 to 44½ hours.

Los Angeles was a sleepy, little Mexican city in the early '70's. Emigrants to the West during the "gold rush" days did not linger long at the little pueblo and in 1870 there was a population of only 5614. In deciding on a final route for the railroad it was seriously considered leaving Los Angeles several miles to the West of the main line. Trade of the little city was being well served by the steamers and sailing ships from San Francisco, also the best and cheapest route for the railroad between Mojave and Yuma was through the Cajon and San Gorgonio passes of the San Bernardino mountains to the Colorado River, with a branch line to Los Angeles.

The Los Angeles pueblo was not soundly asleep, however. Mingled with the complacent Spanish and Mexican population was a gradually growing group of enterprising American business men. They realized full well that it was time for the "iron horse" to take the place of the stage coach and freighting teams as a means of bringing travelers and trade into the city. In the face of strong disapproval from the farmers, who feared the coming of railroads would ruin the market for wheat, barley and oats, these business men set about their plans with the result that by the opening of 1876 Los Angeles boasted of five railroads. These were not separate companies, nevertheless the lines radiated from the city in five directions, which was somewhat of a distinction for a California city at that date. Trains were operating to the harbor at Wilmington, 22 miles; to Santa Monica wharf, 13 miles; to Anaheim, 30 miles; to San Fernando, 22 miles; and to Colton, 58 miles.

FIRST LOS ANGELES RAILROAD

The pioneer railroad in southern California was the line from
Los Angeles to Wilmington built by the Los Angeles and San Pedro Railroad Company. Originally launched in 1861, the opposition of farmers and local stage coach lines delayed action and it was not until Feb. 18, 1868, that the company was formally incorporated. Los Angeles County was to subscribe $150,000 and the city $75,000 to the capital stock of the railroad company. An election was held on March 24 after a "hot" campaign of four days. The city voted 297 for the railroad and 245 against, while the remainder of the county stood 403 for and 427 against, giving the railroad the slim majority of 23 votes.

John G. Downey was the first president of the company. Ground was broken at Wilmington on Sept. 19, and by the following Jan. 14 the "San Gabriel", first locomotive to turn a wheel in southern California, had made its maiden trip. Early in August, 1869, fifteen miles of rail had been laid. Stage coaches met the trains and carried passengers into Los Angeles, but the "horse flesh" line to San Pedro remained the faster. Tomilson's stages reached town 31 minutes ahead of the combination rail-stage service from Wilmington. Work was started August 15 on the first railroad station in Los Angeles located on Alameda street at Commercial, and on October 26 the last rail was laid in the 22-mile line. Everyone was invited to take a free ride to the harbor and that night a dedication ball was held in the new station. Two trains began daily operation in each direction November 1.

Los Angeles county then turned its attention to getting a transcontinental railroad. There were two likely connections - the Southern Pacific and the Texas & Pacific. One company was already headed toward Los Angeles through the San Joaquin Valley, while the
other had not yet started its construction in faraway Marshall, Texas. The inducement offered the transcontinental companies was the stock held by Los Angeles county and city in the railroad to Wilmington plus cash of about $600,000. Southern Pacific proposed to build fifty miles of its main line into the county and also a branch line to Anaheim. The Texas & Pacific promised to extend its main line into Los Angeles from the terminal it intended to establish at San Diego.

SOUTHERN PACIFIC WINS ELECTION

The proposition was put to the voters Nov. 5, 1872. Although this was during the memorable presidential campaign between Grant and Greeley, the railroad question of far more importance locally. Mass meetings, bonfires, processions, and other demonstrations that characterized heated elections at that time, were held during the campaign. Southern Pacific was given an overwhelming majority of 1,018. Twenty-six votes that there be no railroad at all.

Southern Pacific started work promptly. The Los Angeles and San Pedro line was extended from the station on Alameda street to Naud Junction, from which point one road was built north to San Fernando, 22 miles, and the other east to Spadra, 29 miles. Trains began operating over these routes January 21, 1874. The Anaheim line was extended from Florence, on the Wilmington road, and was opened for traffic Jan. 14, 1875.

About this time the Los Angeles and Independence Railroad Company came into existence to build a line into the mining region of Inyo county. The company was incorporated January 8, 1875. Senator John P. Jones was the first president. Construction on the wharf was
began in April and on December 1 the railroad was in operation from
Santa Monica to the Los Angeles station located near what is now
Sixth and San Pedro streets. The company was financially unable to
extend the road on through Cajon Pass to Independence or to a pro-
posed connection with the Utah Southern then building from Salt Lake
City. June 4, 1877, the road was leased to Southern Pacific.

Meantime, the Southern Pacific main line had, on July 16, 1875,
been opened to Colton, a new town named in honor of one of the
company's vice presidents. The seventy-mile section through San Gor-
gonio Pass to Indian Wells (now Indio) was opened for traffic May 29,
1876. The west bank of the Colorado River was reached May, 20, 1877,
but delay in completing arrangements with military authorities for
laying tracks across the reservation at Fort Yuma held up completion
of the bridge, and it was September 30 before trains were operated
into Yuma.

SOUTHERN CALIFORNIA LINES

Before continuing with the original line over the Sunset Route
from Yuma to New Orleans, a brief sketch will be given of the con-
struction carried on by Southern Pacific in southern California and
the central coast counties up to completion of the present Coast
Line between Los Angeles and San Francisco.

Santa Ana was as far south as Southern Pacific extended the
road it once proposed to build to San Diego. Trains were first oper-
ated to Santa Ana Dec. 17, 1877. The line to Tustin, branching from
this road near Anaheim, was opened Sept. 15, 1888. An extension from
Santa Ana to Newport Beach was opened during 1890 and to Smeltzer in
1900. A line from Anaheim to Los Alamitos was completed in October
1896. San Gabriel Valley was tapped by a line from Studebaker to Whittier, opened March 16, 1888, and the new city of Long Beach was given its first rail service February 20 the same year. During 1881 the pioneer railroad to Wilmington was extended to the rapidly growing port at San Pedro.

In June, 1893, Southern Pacific took over operation of the San Gabriel Valley Rapid Transit Company's lines which had earlier in the year been reconstructed to standard gauge. From a point on Aliso Street on the east side of Los Angeles river, this company's line was opened for traffic to Monrovia August 21, 1888. A branch from Alhambra to Pasadena was in operation on October 30, 1895, and the Monrovia line was extended to Duarte in January 1896. The line between Los Angeles and Shorb was sold to an interurban railway company in 1904.

The branch from the main line at Bassett was opened to Covina December 31, 1895; to San Dimas on the following March 7; to Lordsburg April 20; and to Pomona August 22. The branch from Ontario was opened to Chino February 17, 1891, and to Pomona May 1, 1896. The narrow gauge Southern California Motor Road, opened from San Bernardino to Colton in November 1888, and to Riverside during the following year, was sold to Southern Pacific in March, 1893, and an entirely reconstructed line was re-opened to Riverside May 11, 1898. The line opened by the San Bernardino and Redlands Railroad Company between those two cities August 17, 1888, was taken over by Southern Pacific March 14, 1892, and an extension to Crafon was put in operation the same day. The line was abandoned about 1916.

The famous Santa Monica Long Wharf, abandoned in recent years,
was built during 1892 and December 31 that year a short extension from the original terminal of the Los Angeles and Independence railroad at the foot of Colorado street in Santa Monica, connected the wharf with the line into Los Angeles.

Southern Pacific has had several passenger stations in Los Angeles. June 16, 1877, the original station on Alameda and Commercial streets was abandoned for more commodious quarters on San Fernando street. In 1883 a new station and hotel building was erected on San Fernando street not far from the present freight station. The Arcade station on Alameda street, on the site of the present Central Station, was formally opened with a grand ball December 31, 1888. The building and terminal yards occupied a portion of the Wolfskill property on which had been planted one of the first orange orchards in Los Angeles county. The present station was completed in July, 1915.

The line from Mojave to Needles, now a part of the Santa Fe, was originally built by Southern Pacific under provisions of the Atlantic and Pacific Act of 1867. Construction was begun at Mojave in February 1882, and July 1 of the following year the 242-mile road was opened for traffic to Needles. The Atlantic and Pacific (Santa Fe) had reached the Colorado River about 12 miles below Needles in May, and after constructing a bridge, connection was made with the Southern Pacific line at Needles August 9. The line to Mojave, since purchased by the Santa Fe, was taken over for operation by that company under contract of lease and purchase dated Aug. 20, 1884.

COAST LINE COMPLETED

Santa Barbara greeted its first railroad trains August 19, 1887.
Practically the entire population of the little city was at the station at the foot of State street to welcome the prominent visitors who came by special trains from San Francisco, Los Angeles and other California cities. A parade and banquet were features of the celebration. The line into the city was a branch from the main line of the Southern Pacific at Saugus. Trains were in operation to Santa Paula February 8, 1887; to Ventura May 18; and to Carpinteria July 1. From Santa Barbara the road was extended north to Ellwood December 31 where "rail-head" remained until the Coast Line was completed.

As previously mentioned, Southern Pacific had stopped work at Soledad in 1873 on its line south of San Francisco through the coast counties. Construction was resumed in the spring of 1886 and by July 20 the line was in operation to King City; to San Miguel October 18; to Paso Robles October 31; and to Templeton November 16. Heavy construction was encountered in the Santa Lucia mountains where six tunnels and the famous "horseshoe curve" were built. Trains were operating into San Luis Obispo May 5, 1894. Two years later, August 18, the road was opened to Surf. Here the railroad touched the shore of the Pacific. Fifty-six miles of difficult construction skirting the coast brought the rails of the Coast Line together at Ellwood and March 31, 1901, trains were operated through from San Francisco by way of Santa Barbara and Saugus to Los Angeles. That portion of the present Coast Line between Santa Barbara and Burbank was opened to traffic through Oxnard March 20, 1904.

Several important branch lines had been extended from the main Coast Line prior to 1900. The Monterey and Salinas narrow gauge line opened in October 1874, was acquired by the Southern Pacific during
1880 and a portion of it rebuilt to standard gauge to complete the line from Castroville (now Del Monte Junction) to Monterey, which was placed in operation early in 1880. The portion of the former narrow gauge into Salinas was abandoned. The extension from Monterey to Pacific Grove was opened August 1, 1889. The Santa Cruz branch, originally a narrow gauge road opened May 18, 1876, between Watsonville (formerly Pajaro) and Santa Cruz, was acquired by the Southern Pacific and changed to standard gauge during 1884.

ACROSS ARIZONA AND NEW MEXICO

Returning to the main line construction at Yuma in 1878: It was at this point that Southern Pacific, under terms of the congressional act of 1871, was to meet the Texas & Pacific. But when the California company's rails reached the Colorado river, work on the proposed connecting line was at a standstill in Texas, hundreds of miles away. The Texas & Pacific, headed by the fiery leader, Col. Tom Scott, suffered in the financial panic of 1873, while Southern Pacific was able to weather the storm through the adroit direction of Huntington. Scott sought financial assistance from Congress. This move was opposed by Huntington, and the two staged a battle of words and tactics in Washington that aroused attention of the nation. Huntington convinced the congressional railroad committee that his company was in a position to build the road without government aid and won the privilege for Southern Pacific to continue construction through the Southwest until connection could be made with the Texas & Pacific.

Work was resumed at Yuma November 19, 1878. A momentary boom
followed the operation of trains, April 28, 1879, into Maricopa, named after the stage station of Maricopa Wells, located about seven miles north. But the bubble soon burst and by the summer of 1887 the town's buildings and its name were moved four miles further east along the railroad. Beyond Maricopa the railroad constructed probably the longest curve in the world, five miles in length, with a ten-minute curvature. East of this curve is a 47-mile tangent, being the longest piece of straight track on Southern Pacific lines. Casa Grande was reached May 19, 1879. Work was delayed during the summer and it was March 17, 1880, before the tracks reached Tucson. Three days later the arrival of the first passenger train was greeted by a military salute of 38 guns. The banners of all nations fluttered from the outer walls of the ancient pueblo. President Charles Crocker drove another of the "last spikes" for which he was becoming famous.

The railroad was opened to Benson June 22, 1880. A military escort accompanied the construction forces as protection against the Apache Indians then on the warpath under Chief Geronimo. Built through the present location of Willcox, the railroad was opened to Lordsburg October 13, 1880; to Deming December 15; and to the Rio Grande River at El Paso May 19, 1881, a distance of 560 miles from Yuma. In succeeding years Southern Pacific built and acquired 1771 miles of additional main line trackage in Arizona and New Mexico, the greater portion of which was included in the original properties of the Arizona Eastern, acquired by Southern Pacific in March, 1907, and the El Paso & Southwestern, which came under Southern Pacific management through consolidation in November, 1924. A brief history of these lines will be given later on.
SUNSET ROUTE COMPLETED

When Southern Pacific reached El Paso, the Texas & Pacific was past Dallas, building westward at a fast pace in the hope of checking its rival's drive into the country west of the Pecos River. This situation developed a track laying program that came close to matching the one staged twelve years before when the Central Pacific and Union Pacific raced to a connection north of Great Salt Lake in Utah. Several of Southern Pacific's construction bosses, including J. H. Strobridge and James Campbell, were men who had for almost twenty years been laying rail for the "Big Four". They were thoroughly schooled in organizing men and materials for fast work and welcomed another big railroad "push".

In the mountainous country southeast of El Paso there was only one logical route for a railroad into the valley of the Rio Grande. The first company to lay its rails through the pass would have undisputed right of way west from Sierra Blanca to El Paso. It was for this advantage that the track layers waged their battle. The work went forward with a frenzy. The Chinese "coolies" had been promised a bonus if they reached Sierra Blanca ahead of the Texas & Pacific. The objective was won Nov. 25, 1881, and the bonus went to hundreds of laborers and construction bosses.

Meantime, executives of the two companies had reached an agreement settling the dispute over right-of-way. This was the famous Huntington-Gould agreement of Nov. 26, 1881, which made provision for joint use by Texas & Pacific of the Southern Pacific line between Sierra Blanca and El Paso, and for dismissal of land suits pending
against the latter company. Jay Gould had at that time succeeded
Tom Scott as head of the Texas & Pacific.

Between El Paso and San Antonio construction was carried on
under the name of the Galveston, Harrisburg & San Antonio Railway
Company. It was over the lines of this company, and others, in which
Huntington had purchased interest after 1874, that Southern Pacific
completed its through route from the Pacific Coast to New Orleans.
The GH&SA built from Houston into San Antonio in February 1877, where
the terminal remained until the line was continued to meet the
Southern Pacific forces building that portion of the GH&SA east of
El Paso.

From El Paso eastward there were only small villages in the
first few miles of the Rio Grande basin and then only stage stations
and small military posts for 250 miles to what is now Marathon. From
there to Del Rio, about 200 miles, the country was entirely uninhab-
ited south to the Mexican Border and for a great distance northward.
It was in this region that "Law West of the Pecos" later held sway.
From Del Rio to San Antonio, 169 miles, the country was sparsely
settled with only a few very small towns.

Construction was not difficult over this route except for the
portion west of Del Rio along the limestone cliffs of Rio Grande
canyon to Devil's River. The bridge across the Pecos, near its con-
fluence with the Rio Grande, was not completed until late in 1882.
It was two and a half miles west of the bridge that the two con-
struction forces met early in January 1883, and on January 12 the
"last spike" was driven by Col. Thomas W. Pierce, president of the
GH&SA, establishing the "Sunset Route" from the Pacific to the Gulf.
The first through passenger trains between San Francisco and New Orleans left those cities February 5, 1883, marking the inauguration of regular service over the new 2479-mile route.

The point of junction was 247 miles from San Antonio and 400 miles from El Paso, with the nearest station at Painted Cave. A section of 25 miles on which this memorable spot was located, was abandoned when a re-location of the line over the present high bridge across the Pecos was opened for traffic in March, 1892. This bridge is one of the most remarkable railroad structures in the United States. Rising 326 feet above low water of the Pecos, it is the fourth highest bridge in the world. The original length of 2180 feet was shortened to 1515 feet during 1910 when the whole structure was reinforced to take care of heavier trains and equipment.

LINES IN TEXAS AND LOUISIANA

Southern Pacific's lines in Texas and Louisiana, totaling 4670 miles, (not including the "Cotton Belt") represent the acquisition and consolidation of numerous separate companies, two of which had portions of their lines in operation long before either the Central Pacific or Southern Pacific were organized in California. The main stem of the Sunset Route between El Paso and New Orleans was built by four companies, or their predecessors, - the Galveston, Harrisburg & San Antonio, eastward to Houston; the Texas & New Orleans, Houston to Orange; the Louisiana Western, from Orange to Lafayette; and the Morgan's Louisiana & Texas Railroad and Steamship Company into New Orleans. These companies formally came under management and control of the Southern Pacific Company under lease of
February 10, 1885, and at the present time are operated, together with other affiliated lines in the two states, under the corporate name of the Texas & New Orleans Railroad Company, following federal and state authorization given in 1927.

The pioneer company in this 4670-mile system was the Buffalo, Bayou, Brazos & Colorado Railroad, now a part of the GH&SA, which began its existence February 11, 1850, at Harrisburg, a settlement near Houston on Buffalo Bayou. Construction was begun at Harrisburg in 1851 and December 1855, trains were in operation, 30 miles, to the Brazos river opposite the village of Richmond. This was the first railroad operated west of the Mississippi. The diminutive equipment included a few coaches with single trucks of four wheels, which had been used as horse cars in street railway service. A bridge was built across the Brazos and early in 1860 the line reached Alleyton on the Colorado river, 80 miles from Harrisburg. It was not until 1866 that the road was extended a short distance across the river to Columbus. January 24, 1870, the property was sold by trustees of a mortgage to Col. Thomas W. Pierce and on July 27, 1870, it came under management of the new Galveston, Harrisburg & San Antonio Railway Co. organized by Pierce and his associates for the purpose of building to San Antonio. Construction was resumed April, 1873. Schulenberg was reached in December that year; Waelder in the summer of 1874; Kingsburg in 1875; Marion in the spring of 1867; and San Antonio February 1877. The first train was operated into that city on February 5 and two weeks later a monster celebration was held, participated in by Governor R. V. Hubbard and more than 250 prominent visitors who arrived by special train from Galveston, Houston and other cities.
During 1877 the general offices of the company were moved from Harrisburg to Houston and the shops were moved in 1888.

PIioneer Road out of New Orleans

The far-eastern section of the Southern Pacific system had its origin in the New Orleans, Opelousas & Great Western Railway Company organized by public spirited citizens of New Orleans in 1852. The original plan was to build from the west bank of the Mississippi, opposite the city, westward through Lafayette, across Texas to El Paso, thence to Mazatlan, Mexico, on the Pacific Ocean. G. W. R. Bayley was appointed chief engineer in 1853 and the ambitious project was referred to as "Bayley's Dream."

Work began at Algiers, across the river from New Orleans, August 27, 1852. Track had been laid to Lafourche November 6, 1854; to Bayou Terrebonne September 1, 1855; and October 1 that year the first train out of Algiers was run to Tigerville, now Gibson, 66 miles from New Orleans. Regular passenger and freight service was established to that point two weeks later where connection was made with small craft plying the Boeuf, Atchafalaya and Teche rivers. The original wide gauge, as was common with many early southern railroads, was five feet six inches and it was 1872 before it was reduced to the standard of four feet eight and a half inches. The swamp areas were a great hindrance to construction, more than 700 men being continuously employed during the summer of 1855 to build 12 miles across the Chacahoula swamp. The road was opened to Brashear, now Morgan City, April 12, 1857, where the terminus remained for 21 years.

During the Civil War this pioneer railroad experienced hectic
times. With the steamboat "Ceres" transporting passengers across the Mississippi and with barges handling the freight, business was being conducted "as usual" until the Federal fleet reached the city April 25, 1862. Two of the barges were destroyed by New Orleans citizens for fear they would fall into the hands of the Federals, ending the railroads freight business. May 1 the Federals took over the road and its equipment. Sections of it were recaptured by the Confederates. Considerable track was torn up and several bridges burned. Later the damage was repaired by the Federals and the property returned to its owners in February 1866.

The war experience left the "Opelousas Railroad" with a financial burden it was unable to carry and July 31, 1869, the property was sold at foreclosure to Charles Morgan, who had for some years been operating a fleet of small sidewheel steamers from New Orleans and the railroad terminal at Brashear to ports on the Gulf of Mexico. A few weeks before his death in 1873 he sold his railroad and steamship properties to the newly incorporated Morgan's Louisiana & Texas Railroad and Steamship Company which company was acquired by the Southern Pacific in 1885.

Extension of the railroad from Brashear to Lafayette was begun in the summer of 1878, about the time a serious epidemic of yellow fever scourged the state. Julius Kruttscnitt, late chairman of the Southern Pacific Company, then a young civil engineer, was in charge of construction. His ability and courage in pushing the work forward in spite of fever and swamp difficulties, marked him for future advancement. The line to Lafayette was opened May, 1880. A bridge across Berwick's Bay in the Atchafalaya river was ready February 4,
1881. Replaced by the present bridge in 1908, it was for many years one of the most noted bridges in the South. The extension from Lafayette through Opelousas to Washington was completed May 1881, and from there to a connection with the Texas & Pacific at Cheneyville May 1882, from which point the T&P tracks were used into Alexandria.

The Louisiana Western Railroad Company was incorporated March 30, 1878, to build from Lafayette westward to the Texas & New Orleans at Orange. An "Extension" company of the same name was chartered to construct the portion of the road in Texas. The two companies met at the Sabine river about July, 1881, and as soon as a bridge was completed the through line from Houston to New Orleans was opened for traffic.

Branch lines in Louisiana were completed as follows: To Thibodeaux from the main line, in 1879; an extension to Napoleonville, April, 1899. To Raceland from the main line, May, 1882, and to Lockport June, 1905. To St. Martinsville May, 1892. New Iberia to Avery Salt Mine, June, 1883. Baldwin to Cypremort, August, 1884, extended to Week's Island February, 1903. St. Martinsville Junction to Armaudville, May, 1899, extended to Pt. Barre February, 1907. Bayou Sale to South Bend, June 1909. Lafayette to Baton Rouge, January 15, 1911. New Iberia to Abbeville, November 1892. Midland to Eunice, September 1894, extended to Mamou, January 1908. Midland to Gueydan, October 1895, extended to Abbeville, May 1902, giving through line to New Iberia. Mallard to Lake Arthur during 1903. Lake Charles to Fulton in 1906, acquiring extension to De Ridder from the Louisiana & Pacific. Schrieber to Houma built by the
pioneer New Orleans, Opelousas & Great Western some time prior to 1878. Milton branch through Davids purchased from Franklin & Abbeville company in October 1924.

TETEX AND NEW ORLEANS COMPANY

The Sabine & Galveston Bay Railroad & Lumber Company, incorporated September 1, 1856, changed its name to the Texas & New Orleans Railroad Company December 24, 1859. During 1858-61 the company built a line, five and one-half foot gauge, from Houston to Orange, 105 miles. The terminal remained there until the Louisiana Western built to Orange in 1881. Before that date connection between the railroad and New Iberia was carried on by river steamboats. This company's line from Beaumont to Sabine was originally built early in the Civil War as a means of preventing the Federals from capturing the Houston-Orange line. Later the branch was abandoned and entirely rebuilt by the East Texas Railway during 1880.

The T&NO was hard hit during the Civil War. Most of the time the line between Houston and Orange was not in operation. Few records are available covering that period. Service was resumed for a time during 1865-66 until the Trinity River bridge at Liberty was damaged. Trains were again in operation just prior to 1870 between Houston and West Liberty. During 1871-72 the property was purchased at foreclosure by John T. Terry and on July 16, 1875, a new company of the same name was organized. The road was rehabilitated and service resumed from Houston to Orange October 16, 1876.

Charter of the Sabine & East Texas was acquired by the T&NO in

- 53 -
October 1882, which company, originally the East Texas, was re-organized in 1881 with the intention of building north from Beaumont through Logansport to Shreveport. The road was opened Beaumont to Rockland March 1882, where the terminal remained until June 1902 when it became part of a through route from Dallas formed by a grouping of lines and new construction from Kaufman via Nacogdoches to Rockland. The line from Dallas to Kaufman was opened by the Texas Trunk August 1881. A re-organization of the company extended the line to Cossett December 1883. Several receiverships followed and November 1899 the property was sold to the T&NO.

The branch of the T&NO from Nome to Sour Lake was opened July 1, 1903, to serve a new oil district. July 1908 the branch to Port Arthur was completed. The branch from Gallatin to Rusk was opened April 1909; the one from Rockland to Turpentine acquired 1914; and the short branch from Houston to Clinton down Buffalo Bayou, now the splendid Houston Ship Channel, originally built in 1876, was acquired by the T&NO June 1896. During 1926-27 the company erected at Clinton a complete system of terminals, warehouses and docks, at a cost of more than one million dollars, which is the present port of Southern Pacific's line of steamships.

HOUSTON & TEXAS CENTRAL

Of the six major original corporations now comprising Southern Pacific's system in Texas, none is more closely connected with the progress and prosperity of the state, particularly the north and central portions, than the Houston & Texas Central. Organized September 1, 1856, this company acquired as its nucleus the Galveston
& Red River Railway, originally chartered in 1848, which began construction at Houston January 1853, with Denison the ultimate destination. The line was opened to Hempstead June 1858, and to Millican March 1860, where the terminal remained for several years.

In April 1861, property and franchises were sold at foreclosure and a new company of the same name incorporated April 3, 1862. This company was the first in Texas to emerge from the financial difficulties following the Civil War. Work was begun at Millican February 1867, and operation to Bryan opened in August. Construction continued steadily and July 1872, trains were operated into Dallas. The extension to Denison was completed March 1873.

During August 1870 the H&TC acquired the Washington County line which had been opened from Hempstead to Brenham October 1860, and December 1871, the road was in operation to Austin. The H&TC purchased the property of the Austin & Northwestern August 22, 1901, which company had been incorporated in 1881 and built a line from Austin to Burnet. During 1888 the extensions were made to Marble Falls and to Llano. The road from Burnet to a connection with the Santa Fe at Lampasas was completed February 19, 1902.

The line from Bremond through Waco to Ross, built by the Waco & Northwestern between August 1871 and the fall of 1872, was acquired by H&TC February 4, 1873. Independent companies built the line from Garrett to "Maxahachie 1879, and to Fort Worth December 1886, which property was sold to H&TC August 22, 1901.

Construction of other lines of the H&TC follows: Loop line from Eureka to Stella, completed July 1914, connecting rails of H&TC.
divisions with the main stem of Southern Pacific; branch from Hutchins to Lancaster completed 1890; June, 1914, H&TC bought line from Hearne through Glass to Stone City, originally built 1891 and rebuilt 1901 by Hearne & Brazos Valley Railway. To provide a shorter route between Dallas and San Antonio agreement was made in 1911 with the San Antonio & Aransas Pass for joint use of that company's tracks between Flatonia and Giddings; line from Giddings to Stone City completed September 1913, giving faster service to Dallas and Fort Worth. Line between Mexia and Navasota opened December 16, 1906.

LINES FORMING THE G.H.& S.A.

The second oldest company in the Galveston, Harrisburg & San Antonio system is the San Antonio & Mexican Gulf Railroad chartered September 5, 1850, to build from San Antonio southeast to Port Lavaca on Matagorda Bay of the Gulf of Mexico. Work was not begun until 1856 and April, 1861, twenty-eight miles was in operation from Port Lavaca to Victoria. Opening of the Civil War stopped construction. Confederate troops destroyed the line during 1863 but it was rebuilt by the Federals in 1865-66. The company was reorganized as the Gulf, Western Texas and Pacific May 23, 1873, to receive a state grant of sixteen sections of land for each mile of track constructed. The extension from Victoria to Cuero was opened March 3, 1873. The entire property was sold under foreclosure to Charles Morgan in 1877 and was acquired by the GH&SA August 8, 1905. During 1888-89 the line from Victoria to Beeville was completed.

The New York, Texas & Mexican Railway, incorporated November
17, 1880, built from Rosenberg, on the GH&SA, to Victoria, and opened the line to traffic October 1882. Branches were completed from Wharton to Van Vleck, September 1900; Van Vleck to Hawkinsville, February 1903; to Bay City and Markham, March 1903; and from Markham to Tres Palacios on Matagorda Bay in June, 1903. The entire property was sold to the GH&SA July, 1905.

The San Antonio & Gulf Shore Railway Company was incorporated December 1893 to complete the originally contemplated line from San Antonio to a connection at Cuero with the road from the Gulf. Track was constructed to Cibolo January 1895. The company went into receivership and was reorganized as the San Antonio and Gulf Railway which company opened the line to Stockdale. The property was sold to the GH&SA August 1905 and March 1907 the road was in operation to Cuero.

The line between Houston and Galveston had its origin in the North Galveston, Houston & Kansas City company incorporated May 1892, which opened the road from North Galveston to Virginia Point on the mainland shore of Galveston Bay in January 1893. The property passed through two receiverships and February 1895 was purchased by the La Porte, Houston & Northern which company opened a line May 12, 1896, from Magers, on the outskirts of Houston, to Galveston. The property was purchased by GH&SA in September 1905.

Southern Pacific's line between Houston and Shreveport, La., a distance of 232 miles, is a combination of two corporate properties - the Houston East & West Texas, incorporated March 11, 1875; and the Houston & Shreveport, incorporated September 9, 1891 (originally the Gulf, Shreveport & Kansas City of 1883). Work was begun
at Houston July 4, 1876, and December 1885, the narrow gauge line was opened to the Sabine river near Logansport. The line was joined there by the narrow gauge constructed by the Louisiana company from Shreveport. The entire properties came under control of the Southern Pacific May 8, 1893, and during the following year the track was changed to standard gauge.

The San Antonio & Aransas Pass was chartered August 28, 1884, for the purpose of giving San Antonio access to a deep water port. In its final completed form it included 729 miles of main road with terminals at San Antonio, Houston, Corpus Christi, Waco, Rockport, Falfurrias, Lockport and Kerrville. Construction began at San Antonio in May, 1885. In November the following year the road was operated to the port at Corpus Christi; to Rockport July 1886; to Houston December 1886; to Kerrville August 1887; Skidmore to Alice May 1888; Shriner to Lockport August 1889, and Yoakum to West Point November 1887 as the first section of a proposed line to Waco completed to Lexington in December 1889 and to Waco in June 1891 using the line built during the previous year between Waco and Lott.

Construction of the SA&AP line into the valley of the lower Rio Grande was begun from Alice in January 1904. By June of that year the road was opened to Falfurrias where the terminal remained for twenty-three years. The Galveston, Harrisburg & San Antonio was given permission by the Interstate Commerce Commission in May 1925 to lease the properties of the SA&AP and to resume construction south of Falfurrias. The line was opened for traffic to Edinburg, McAllen and Harlingen in February 1927, and November 14 that year the entrance into the terminus at Brownsville on the Rio Grande was
celebrated with the driving of a "golden spike."

The Eagle Pass branch of the GH&SA from Spofford, completed November 1882, is important as the United States gateway into Mexico, connecting at the Mexico city of Piedras Negras with the former Mexican International Railway built by Collis P. Huntington and now a part of the National Railways of Mexico. The branch from Harwood to Gonzales was completed by the Gonzales Branch Railroad August 1882, and was acquired by the GH&SA September 1905. The branch to La Grange was built during 1880-81, and the one to Damon Mound was completed March 1918.

SOUTHERN PACIFIC STEAMSHIP LINES

Southern Pacific's fleet of steamships, connecting with the company's rail lines at New Orleans and Galveston, is a development of the old Morgan Line, one of the oldest of America's shipping concerns. The line was originated by Charles Morgan in the late forties and operated from New Orleans to Brashear (later Morgan City) and Mobile, with the service being gradually extended to Texas and Mexican ports. The early red colored sidewheelers were necessarily of very light draft to enable their navigation of the shallow coastal waters.

At the close of the Civil War, as previously stated, Morgan purchased the pioneer "Opelousas Railroad" which then operated from New Orleans to Brashear, and greatly extended his steamship services. By the end of 1873 his fleet consisted of 21 steamers plying between New Orleans, Mobile, Morgan City, Galveston, Corpus Christi, Brownsville, and Houston (or Clinton). Service was begun to Havana
July 4, 1873, and Morgan's fleet soon became one of the most important factors in commerce on the Gulf, his ships later making several Mexican and South American ports on regular sailings.

Four screw steamers, the "Lone Star", "Algiers", "Morgan City" and "New York", each of about 2300 tons gross, were placed in freight service between New Orleans and New York in 1876. Other ships were built or chartered as business increased and after the lines became a part of the Southern Pacific "Sunset Route" in 1885, passenger service was added to New York. Then the Galveston Terminal was completed in 1902, freight service was established between that port and New York. The original docks and wharves at Algiers, across from New Orleans, were abandoned in 1903 when the steamship terminal was transferred to the new facilities on the New Orleans side of the river. At New York the company's shipping is handled from five large piers on North River.

The "Dixie", newest addition to the company's fleet, made its first trip out of New York January 23, 1928. The $2,500,000 passenger and freight steamship is 445 feet long with gross tonnage of 6100 tons. The "Creole", commissioned June, 1907, and the "Nomus" commissioned December 1906, are the other two ships in passenger service. Sixteen freight steamers and more than fifty barges constitute the remainder of the company's floating equipment in service of the steamship company.

With this foregoing sketch of the Texas and Louisiana rail properties and the steamship company, we again turn our attention to the Pacific Coast to follow the course of the company's Shasta Route completed December 1887 from San Francisco to Portland, which
was the final major construction project of the Stanford-Huntington-Crocker group.

SHASTA ROUTE INTO OREGON

From Marysville north through the Sacramento valley of California, and from Portland south through the Willamette, Umpqua and Rogue River valleys of Oregon, the 630-mile main line of Southern Pacific was built, in most part, by the Oregon & California Railroad Company and the Central Pacific during 1868-1887. Construction in Oregon was carried on by the former company as successor to the pioneer Oregon Central, while the road in California was completed by the Central Pacific after its acquisition of the California & Oregon Railroad Company. Incorporated June 30, 1865, by a group of Californians, the latter company remained at a standstill until it was taken over by the "Big Four" during 1868.

Construction of the railroad between the two states was authorized by Act of Congress July 25, 1866. The California & Oregon Railroad Company received a land grant in California of alternate sections extending 20 miles on each side of the track. A similar grant in Oregon to the Oregon & California Railroad Company, also a grant from Portland to McMinnville received under Act of May 4, 1870, was revested in the government by Act of Congress June 9, 1916, following United States Supreme Court decision of a suit instituted in 1908. An accounting suit provided for in the Act was settled April 28, 1926, and the government paid the railroad $2.50 an acre for the land it was entitled to under the two Oregon grants. The grant to
the California & Oregon Railroad Company in California was not involved in the litigation.

The few miles of road south of Marysville to the Central Pacific main line at Roseville (Junction) previously acquired by the "Big Four" were added to the re-organized California & Oregon company and construction was resumed north from Marysville October 13, 1869. The company in Oregon was then building south from Portland. Trains were operated to Chico July 2, 1870, in which year the project was taken over under the name of the Central Pacific proper and the California & Oregon company went out of existence. Tehama was reached August 28, 1871; Red Bluff December 6, 1871; and Redding September 1, 1872. There the terminus remained for almost twelve years, while the builders of the line in Oregon struggled out of financial difficulties that for a time threatened to prevent further construction.

Railroads were projected in Oregon as early as 1850, but it was 1863 before substantial headway was actually made. In that year Simon G. Elliott came to Oregon representing California men interested in building a railroad between the two states. His efforts to raise funds for a survey met with little response except in southern Oregon where the settlers and residents of the little inland towns anxiously sought better means of transportation.

Later in the same year Elliott headed a surveying party north from Marysville, locating a line over practically the same route now followed by Southern Pacific. He was met at Yreka by George Belden, a civil engineer of Portland, and together they made surveys over the Siskiyou mountains, reaching Jacksonville in October.
Meantime Joseph Gaston had become interested in the railroad project and succeeded in organizing the California and Columbia River Railroad Company at Jacksonville in 1863. While the company lived but a few months, it had the distinction of being the first in Oregon to make real progress in advancing the railroad. In the same year the first California & Oregon Railroad Company was organized at Yreka in northern California. Neither Jacksonville nor Yreka were ever favored with the main line of a major railroad, but in 1863 they were important towns on the wagon road over which produce and supplies were transported by freighting teams, pack horse or stage coach between the steamboat termini on the Willamette and Sacramento Rivers.

Elliott, backed by prominent men of Salem, Albany, Eugene and other communities on the east side of Willamette Valley, continued the railroad survey north from Jacksonville keeping east of the river, while Gaston and his group of Portland supporters, made their survey through Corvallis and Dayton on the west side of the river. The intense rivalry of the two groups provided many lively episodes in Oregon's early railroad history.

Gaston organized the Oregon Central Railroad Company in September 1866, which became commonly known as the "west side" company. This company was designated by the state legislature, October 1866, as the one to receive the federal land grant. It was contended later that Gaston's company was not legally organized at the time / its right to the land grant was contested by the Oregon Central "east side" company organized by Elliott and the Salem group
in April 1867. There ensued a struggle for supremacy, centering in the state legislature, which was won by the "east side" company in October 1868, after Ben Holladay, colorful westerner fresh from financially successful exploits with Pony Express, Overland stage coach and steamship enterprises, cast his lot with the "east side" group.

Prior to this the two companies "broke ground" for their railroads amid impressive ceremonies. The "west siders" launched their project on the outskirts of Portland April 15, 1868. The "east siders" held a demonstration the next day across the river in East Portland, when a small gang of Chinese laborers started the railroad grade. The auspicious beginnings were merely gestures. Gaston was without substantial finances and much of the support promised him failed to materialize when the "west side" company lost the federal land grant. The "east side" made but little progress until the aggressive Holladay stepped into the breach to complete the first twenty-mile section to Parrot Creek on Christmas Day 1869. His superhuman "eleventh hour" struggle against flood waters placed the road in operation in time to save the land grant, and definitely establish the "east side" company as the winner in the state's great railroad battle.

THROUGH THE WILLAMETTE VALLEY

Before construction was resumed the following year, Holladay had reorganized his company March 16, 1870, as the Oregon & California Railroad Company; had frustrated an attempt of B. J. Pengra to get a land grant for a railroad from Astoria across the state to a connect-
ion with the Central Pacific near Humboldt in Nevada; had arranged for the sale of mortgage bonds to German and English capitalists; and had acquired control of Gaston's "west side" Oregon Central Company.

New passenger coaches of "elegant design with seats upholstered in crimson plush," were placed in service September 29, 1870, when the "east side" road was opened to the Fair Grounds near Salem. The railroad was a great attraction at the state fair, the arrival or departure of a train being watched by hundreds of people who never saw that style of "wagon" before. December 8 the road was in operation to Albany; to Harrisburg, June 25, 1871; and to Eugene October 15, when the 345-mile stage coach journey to the terminus of the railroad in California at Red Bluff was cut to five days.

The railroad reached Roseburg December 3, 1873. There construction halted for eight years. Holladay failed financially. Money acquired by sale of bonds in advance of construction was spent with reckless abandon. Traffic revenue from the sparsely settled region was not sufficient to meet expenses of operation and when bond interest could not be met in 1873, Holladay was forced out and the property taken over by the German bondholders.

Prior to this, Holladay had resumed construction out of Portland on the "west side" line. The first train was operated to Hillsboro December 23, 1871, and November 3, 1872, to St. Joseph, a town established by Holladay on the Yamhill river and long since abandoned. There the terminus remained until January 25, 1880, when the line was completed to Corvallis, by way of McMinnville, after Holladay had
been deposed. The line from Albany to Lebanon was opened Oct. 1880.

Henry Villard came to Oregon in July, 1874, to manage the "east side" and "west side" companies in behalf of the bondholders. In the succeeding decade he accomplished more than any one man before his time, or possibly since, in the advancement of Oregon’s transportation interests. His principal activities aside from those connected with the later Southern Pacific lines, were with steamships on the Pacific Coast; river boats on the Columbia and Willamette; and railroad construction along the Columbia river and elsewhere in the Northwest. The magnitude and audacity of some of his undertakings startled the financial world. Yet, even Villard had limitations and in the end he gave way to other railroad builders.

Construction of the Oregon & California was resumed from Roseburg in June, 1881. Trains were operated to Glendale May 13, 1883; to Grants Pass, December 2; through Medford to Phoenix, February 25, 1884; and to Ashland, May 4. It was at this point that Villard’s regime crashed, due principally to his Northern Pacific and Oregon Railway & Navigation company exploits. The Oregon & California was forced into receivership January 19, 1885, with Richard Koehler as manager, and July 1, 1887, the properties were acquired under lease by the Southern Pacific.

Construction of the California portion of the railroad had been resumed at Redding in April 1883, and extended to Delta, September 1, 1884; to Dunsmuir, August 23, 1886; to Montague, February 8, 1887; and to Colas, just north of the Oregon boundry, June 1. Heavy work was encountered in crossing the Siskiyous. An elevation of 4135 feet.
was reached after passing through summit tunnel, 3108 feet, the longest of 16 bores. Track was laid over curvatures reaching up to 14 degrees on a maximum grade of 3.3 per cent. One hundred miles of curved track was built in a distance of 171 miles, where there are a total of 31,700 degrees of curvature causing a train to make 88 complete circles in traveling that distance. Between Redding and Ashland the Sacramento River is crossed 17 times.

Southern Pacific completed the Oregon construction south of Ashland December 17, 1887. Charles Crocker drove another "last spike" as a feature of a ceremony staged at the south end of the railroad yard at Ashland. Regular passenger and freight service was immediately established between San Francisco and Portland.

**OTHER LINES IN OREGON**

During the years the Oregon & California was building its line south from East Portland, several other railroad companies made their appearance in the state, which properties later became a part of the Southern Pacific. Most important of these independent companies was the Oregonian Railway which built a system of narrow gauge lines during 1878-82 totaling 180 miles. The road extended from Dundee along the west side of the Willamette valley to Sheridan, Dallas and Airlie, and on the east side of the river from Ray's Landing through Woodburn, Silverton and Brownsville to Coburg. The company was promoted by William Reid and was financed in its early stages by Scotch capitalists. The proposal to build into Portland from Dundee was halted when Villard acquired control of the enterprise in 1881, and was not completed until July 1888 after the
property had gone into receivership. The narrow gauge lines were acquired by Southern Pacific during 1890-92 and were re-constructed to standard gauge during 1890-93.

Col. T. Egerton Hogg was another of Oregon's early railroad promoters. He proposed to make Yaquina Bay the principal seaport of the Northwest and the terminus of a railroad extending across the state to a connection with the Union Pacific or the Central Pacific transcontinental lines. He built a 141-mile line from Yaquina through Corvallis and Albany to Idanha during 1885-89. It was succeeded by the Corvallis & Eastern, December 1897. The enterprise was never a profitable one and went into bankruptcy. Southern Pacific acquired the property in 1907.

Louis Gerlinger built a short line from Dallas to Falls City and Black Rock in 1903-05. It was extended to Salem in 1909 and taken over by Southern Pacific, June 1911.

The J. D. Spreckles interests (Coos Bay, Roseburg and Eastern) operated a line from Marshfield to Myrtle Point in 1893 to serve its coal properties, and proposed an extension eastward across the state by way of Roseburg to connect with the Union Pacific at Ontario. The rail and coal properties went into receivership in 1900 and June 1906 were acquired by the Southern Pacific. Meantime, the latter company had organized the Oregon Eastern, August 1905, to build the long projected line eastward from Eugene along the middle fork of the Willamette over the Cascade mountains to a connection with the Oregon Short Line (Union Pacific) at Ontario. At the same time the Oregon Western was organized to build from Drain, on the main line a
few miles north of Roseburg, to a connection with the Spreckles' road on Coos Bay. This company graded twenty miles out of Drain and partially built a tunnel, but all further work stopped after September 1907. Coos Bay was later reached by the Southern Pacific line from Eugene opened through North Bend to Marshfield, April 5, 1916. Construction had been originally started by the Willamette Pacific, incorporated June, 1911.

Announcement of the electrification of the Willamette Valley branches was made by Southern Pacific in 1912, operation and construction to be handled through the Portland, Eugene & Eastern, incorporated November 25, 1907. The "west side" and Newberg branches were ready for electric service June 13, 1914. The PE&E constructed the Canby-Molalla and Eugene-Monroe lines in 1913. Also purchased the line Sheridan to Willamina, opened November 1907; the Corvallis to Monroe line built by Corvallis & Alsea River company 1909-10; the Willamette Falls line and electric lines in the cities of Salem, Albany and Eugene to Springfield. Electric train operation over these lines was abandoned June 15, 1930.

The Beaverton & Willitsburg company was organized by Southern Pacific, November 1906, to build from Beaverton to Cook and from Oswego to Willitsburg, including a bridge across the Willamette. Work was begun September 1907 and the line opened July 1910. The short line from Independence to Monmouth was opened August 1900.

Promoted by E. E. Lytle, the Pacific Railway & Navigation company was incorporated October 13, 1905, to build from Portland to Astoria by way of Hillsboro, with a branch line to Tillamook and
Nehalem bays. Southern Pacific acquired an interest in the project during 1906. Construction was commenced at Hillsboro, November 1905, and at Tillamook, October 1906. Line from Hillsboro to Buxton opened late in 1906. Difficulty in obtaining funds stopped work and it was January 1, 1912, before entire road was in operation. The proposed extension to Nehalem Bay and Astoria was never built.

CASCADE AND MODOC LINES

Completion by Southern Pacific in 1927 of its Cascade Line from Eugene through Klamath Falls to Black Butte, California, and its Modoc Line in 1929 from Klamath Falls through Alturas, California, to connection with the main Overland Route at Fernley, Nevada, provided Oregon with the short-cut route to the East first projected by B. J. Pengra in 1867 and later considered by Huntington and Harriman.

As previously mentioned, the Oregon Eastern had been organized by Southern Pacific in August 1905, to build eastward from Eugene across the Cascades. The original intention was to connect with the Union Pacific but the litigation that brought about a separation of the Southern Pacific and Union Pacific properties, caused a change in the routing as well as delayed construction. Work was begun at Natron, near Eugene, August 1909. The line, commonly known as the Natron Cut-Off, was opened to Oakridge, May 1912.

The California portion of the Cascade Line had its origin in the California Eastern, incorporated July, 1905, to reconstruct a logging road built by the Weed Lumber Company during 1903-05 from
Weed to near Grass Lake, and to extend the line to Klamath Falls. The road was opened for traffic to Klamath Falls May 1909, and to Kirk, September 1912. There the work stopped until September 1923. The new 270-mile route over the Cascades, including a change of line around Mt. Shasta from Black Butte to Grass Lake, was opened to traffic April 17, 1927. This route had lighter grade, less curvature and is 23 miles shorter than the original route through Roseburg and Ashland, now known as the Siskiyou Line.

The 251-mile Ho-Jooc Line, opened for traffic September 14, 1929, created through building from Klamath Falls to Alturas and rehabilitating the former narrow gauge Nevada-California-Oregon road from Alturas to connection with the Fernley Branch at Wendel, gave Oregon a new transcontinental route to the East 210 miles shorter than the original one through Sacramento Valley. The N-C-O company was organized 1880 to build from Reno through Beckwith Pass into California, and in 1887 reorganized with a line projected to The Dalles, Oregon. The road was extended as finances permitted, reaching Alturas 1906 and Lakeview 1912, where the terminus was established. In 1917 a portion of the road, including the terminal at Reno, was sold to the Western Pacific. Southern Pacific purchased the line from Wendel to Lakeview, May 1926. The road rebuilt to broadgauge was opened to Alturas, November 1927, and to Lakeview, September 1928.

Southern Pacific acquired partial ownership in the Oregon, California & Eastern from Robert E. Strahorn, builder of the line, July 22, 1927. This company was incorporated October 6, 1915, embracing a project to build 423 miles of standard gauge road in
Oregon connecting the Southern Pacific, Union Pacific and Nevada-California-Oregon. The road was completed from Klamath Falls to Sprague River, August 1923, and to Bly, April 30, 1929, giving total of 65 miles.

RE-ORGANIZATION OF SOUTHERN PACIFIC

The Southern Pacific Company (present corporation) was incorporated in Kentucky by Act of the General Assembly approved March 17, 1884. Organization of the company, with $100,000,000 capital stock, was effected August 14. Stanford became president and Huntington vice president. Together with Charles Crocker and Timothy Hopkins, representing the Mark Hopkins estate, they held meetings in New York during the summer and fall of that year perfecting plans for the new company to take over operation of the various properties controlled by the four associates.

As a personal venture, Huntington had acquired control of the Chesapeake & Ohio during 1869 and in succeeding years had expanded that railroad from Newport News, on Chesapeake Bay, to Memphis. His California associates did not care to join him in this venture, nor were they agreeable to his suggestion at the New York meetings in 1884 that the Chesapeake & Ohio be included with Southern Pacific in the creation of a railroad under one management from the Pacific to the Atlantic.

Prior to the re-organization, all of the constructed and acquired rail lines had been operated under lease by the Central Pacific, but the gradual expansion of Southern Pacific made it the stronger company, which influenced the selection of that name for
the new company. Southern Pacific Company executed a lease for the
Southern Pacific Railroad Company properties, February 10, 1885, and
for the Central Pacific Railroad Company lines, February 17. The
"omnibus lease" agreements, effective for 99 years from April 1,
1885, included all other properties of common control.

At the time of the re-organization, the associates held about
30 per cent of the Central Pacific stock, and practically all of the
Southern Pacific Railroad Company stock, for which there had been
almost no market. Huntington was elected president of Southern
Pacific Company April 9, 1890, and Stanford became chairman of the
executive committee, a newly created position.

During these years much attention was given Central Pacific's
probable ability to meet payment in 1895 of the first of the govern-
ment bonds loaned for construction of the original line east from
Sacramento. The Thurman Act of 1878 specified a muchly debated
sinking fund plan for retirement of the bonds, and in 1887 President
Cleveland appointed the Pacific Railroad Commission to investigate
affairs of the railroads that had received federal aid. The govern-
ment was frankly pessimistic about receiving payment, and anticipated
that Central Pacific Railroad Company would go into receivership.
July, 1898, a commission was appointed to negotiate an agreement with
the railroad for settlement of the debt, as distinct from effecting
a foreclosure of the mortgage. The plan finally adopted February 16,
1899, called for organization of a new Central Pacific Railway Co-
pany to take the place of the former "Big Four" company, and the
issue by that company of $125,000,000 in bonds, all of which were guaranteed by the Southern Pacific. Stock of the new Central Pacific was taken by the Southern Pacific. Through this endorsement by Southern Pacific the Central Pacific debt of $58,813,000 was paid in full July, 1908.

Southern Pacific has a remarkable record among major railroads in never having gone through receivership or never having defaulted a financial obligation.

HARRIMAN REGIME

The turn of the twentieth century ushered in a new regime for the Southern Pacific. Collis P. Huntington, last survivor of the "Big Four", died August 13, 1900. Hopkins died March 29, 1878; Crocker, August 14, 1896; and Stanford, June 21, 1893. With Huntington's passing the reins of Southern Pacific fell to Edward H. Harriman. The period of pioneering and construction was followed by an era of development and expansion.

As president of the Union Pacific, Harriman had sought to purchase the Central Pacific line from Ogden to San Francisco as part of his plan for a strong transcontinental line. Southern Pacific would not sell and the only recourse was for Harriman to acquire control of the entire Southern Pacific system. This opportunity came with Huntington's death, when Harriman set about negotiating for the 20 per cent of stock held by the Huntington estate. Southern Pacific stock was also bought in the open market and by March 1901, the Union Pacific held 750,000 shares, or about 38 per cent of Southern Pacific's capital stock which was sufficient for
control of the company. By June 1911, this interest was increased to 1,266,500 shares, or 46 per cent of the outstanding stock.

Southern Pacific was in itself the greatest transportation system in the world in 1900. After acquisition by Union Pacific it became part of a system of about 18,500 miles of rail lines extending from Los Angeles, San Francisco and Portland to Omaha, Kansas City and New Orleans, with steamships of Morgan Line on the Atlantic and Gulf, and those of the Pacific Mail plying between Pacific ports and the Orient.

Charles M. Hays was president of Southern Pacific during 1900-01, until the position was taken by Harriman September 26, 1901, who was also chairman of the executive committee. Julius Kruttschnitt, first as vice president and general manager at San Francisco and later as director of maintenance and operations, with headquarters in Chicago and then New York, was chosen by Harriman to carry out the gigantic plan of reconstruction and development. William Hood, as chief engineer, supervised construction and engineering. J. C. Stubbs became director of traffic at Chicago.

The vast skeleton system built by the "Big Four" in the face of inconceivable difficulties, was whipped into shape and transformed into an efficient and profitable transportation unit under Harriman's direction. Aside from the $127,000,000 spent in its reconstruction and re-equipment, during his administration, another $114,513,000 went for extensions, such as new lines and branches either built or bought outright.
LUCIN CUT-OFF

Immediate attention was given a three-year program of rehabilitating 373 miles of the distance between Reno and Ogden, at a cost of about $18,000,000. The old line was completely abandoned in most instances, saving 50 miles and greatly reducing grades and curvatures. The most important single piece of construction was the Lucin Cut-Off across Great Salt Lake to replace the original Central Pacific line around the north end of the lake through Promontory, the memorable spot where the "last spike" was driven in the first transcontinental railroad.

The cut-off project extended 103 miles from Lucin to Ogden, including 32 miles across the lake, 12.9 miles being devoted to trestle. Work was begun March 17, 1902; steel and piles were received during the summer; and November 13, 1903, the tracks from the east and west shores met near the center of the lake. Although maximum depth of the lake was only 32 feet, the undertaking was a tremendous one. The bottom of the lake was treacherous and unstable, and there were times when it seemed the fills and trestles would be swallowed up in the mud. Completion of the job was formally celebrated November 26, 1903, and March 8, 1904, the line was opened for traffic. In comparison with the old line north of the lake, the cut-off saved 44.77 miles, 3,919 degrees of curvature and 1,515 feet of vertical grades, or a grade reduction of from 90 to 20 feet per mile. Original cost was $8,358,833. In recent years one train a week operates over the old line between Corrine and Lucin. At the
present time 20 miles of the cut-off over the lake has been double
tracked and the trestle has been filled in for a mile.

Rehabilitation was not confined to the Central Pacific lines,
but extended throughout the Southern Pacific system and included
$41,000,000 in new locomotives, freight cars and other equipment.
Heavier rails were laid on 4481 miles of track, 27,000,000 new cross
ties were substituted for old, 1000 miles of track were reballasted
with heavier material, 30 miles of wooden trestles were replaced
with earth embankments or structures of steel and concrete, $7,000,-
000 was spent in new sidings, $14,000,000 for new terminal facilities
and $2,000,000 in building second track main line.

BAYSHORE CUT-OFF

The most important single piece of construction on the main
line, and one of the most expensive pieces of railroad ever built,
was the Bayshore Cut-Off, 9.81 miles between San Francisco and
San Bruno, completed at a cost of almost a million dollars a mile.
The cut-off replaced the old line built in 1863 over the San Bruno
hills through Colma, shortening the distance 2.65 miles, reducing
maximum grade from 15% to less than 16 feet per mile, and eliminat-
ing nearly 600 degrees of curvature. The project begun October 1904,
involved extensive grading, building of bridges, and boring five
tunnels with a total length of nearly 10,000 feet. The new line was
opened for traffic December 8, 1907. Total cost, including right
of way for the four-track road, was $9,273,055. It provided
Southern Pacific with adequate terminal facilities and easy access
to the heart of San Francisco.

Completion of the final link in the Coast Line between Montalvo and Burbank was another expensive piece of construction, the most difficult unit being the 7369-foot Chatsworth tunnel. The Montalvo cut-off was opened for traffic March 20, 1904, at a cost of $2,424,911.

The expenditure of $20,000,000 on the Lucin, Bayshore and Montalvo cut-offs may seem extravagant for improvements in only three places, but the savings in operating expenses made possible by these betterments was equal to from eight to ten per cent on the money invested in them.

Extensive installation of automatic block signals was begun during Harriman's administration. In 1901 Southern Pacific had about 50 miles of these signals on its 9000 miles of tracks. This was extended to nearly 3000 miles at a cost of $2,835,000. The installation has continued in recent years and at the present time Southern Pacific has more mileage equipped with automatic block signals than any other railroad in the world. On the company's Pacific Lines alone the movement of every train has automatic block signal protection over more than 4700 miles of main trunk lines. Supplementing this protection, more than 270 miles are equipped with automatic train control or signal dispatching system. All of which are important factors in the company's safety record on the Pacific Lines of thirteen consecutive years without the fatality of a passenger in a steam-train accident.
LINES IN MEXICO

One of the most ambitious projects undertaken by Harriman, after having been "sold" the idea by Epes Randolph, was the extension of the Southern Pacific lines in Mexico. Under the terms of a reciprocal lease with the Santa Fe, July 15, 1893, Southern Pacific took over operation of the New Mexico & Arizona Railroad Company line from Benson to Nogales, and the Sonora Railway line from Nogales to Guaymas, originally built by the Santa Fe and opened to traffic July 1882. December 27, 1911 these properties were acquired from Santa Fe in exchange for the line built by Southern Pacific from Needles to Mojave, and June 30, 1912, title was transferred to the Southern Pacific Company of Mexico.

Construction of the road along the west coast of Mexico to a junction with the National Railways of Mexico at Guadalajara, was begun at Empalme, near Guaymas, August 1905. Work was started north from both Mazatlan and Guadalajara in 1907. The line from Empalme 117 miles south to Navojoa was completed May 22, 1907, and the through line from Empalme to Mazatlan was opened February 5, 1912. The revolutionary period 1910-20 halted further construction and also made operation of the completed road extremely difficult. During nine years (1912-21) the 105-mile section Acapulco to Tepic, could be operated for only five months.

The Southern Pacific Railroad Company of Mexico was incorporated June 1909, which company has since carried on all the company's construction and operations in that country.
An agreement covering new construction and re-habilitation of sections of the railroad damaged during the revolutions, was reached by the Southern Pacific and the Mexican government March 3, 1923, and two days later work was begun at La Quemada on the 103-mile gap to Tepic. Much of this section was in mountainous territory involving heavy construction, particularly through the volcanic formations of the Barrancas. Thirty-two tunnels were bored, with total length of 25,000 feet. On one section of the work more than 4000 Mexican laborers were employed, using baskets slung on their backs and secured by a cord over the forehead to carry dirt away from the excavations. The last bridge was completed at Salsipuedes April 15, 1927, and two days later trains were operated over the 1095-mile through line to Guadalajara, where connection was made for Mexico City.

The line from Naco into the rich mineral district of Cananea was built 1901, and the one between Del Rio and Nogales, during 1907-08. The Tonichi branch was built 1907-10, and the Alamos branch 1907. S. P. of Mexico also operates the line from Agua Prieta (Naco) to Nacozari, acquired with the El Paso & Southwestern in 1924. Headquarters of the Southern Pacific of Mexico were moved from Tucson to Guadalajara in 1927.

ARIZONA AND NEW MEXICO LINES

Closely connected with the lines in Mexico are the Southern Pacific properties in Arizona and New Mexico, some of which were
acquired or built during the Harriman regime. The first to come into the Southern Pacific fold was the Arizona Eastern. This company had its origin in the Maricopa and Phoenix Railroad Company opened between those two cities July 4, 1887. There was no further construction in Salt River Valley until the Phoenix, Tempe and Mesa built its line from Tempe to Mesa in 1895. The Phoenix and Eastern, backed by Santa Fe interests, began work from Phoenix February 1902, with El Paso as the proposed destination. The road was completed as far as Winkleman December 1904. Meantime the Arizona Eastern Railroad Company had been organized February 16, 1904, with plans to build through a portion of the same territory as the Phoenix and Eastern. One of the "wars" that frequently featured railroad construction in the early days, developed between the forces of the two companies in Gila Canyon. Litigation followed which resulted in an agreement with the Santa Fe whereby Southern Pacific acquired all the capital stock of the Phoenix and Eastern. From March 13, 1907, to March 1, 1910, it was operated under the presidency of Epes Randolph, after which it was leased to the Arizona Eastern. The extension to Christmas was completed in 1909.

Randolph had been sent to Arizona by the Southern Pacific in 1902 as president and general manager of the Arizona and Colorado and its connection into Mexico, the Cananea, Yaqui River and Pacific Railroad. It was the intention to build from the border town of Naco into the mining region of Cochise county, thence through the New Mexico coal fields into Colorado. Construction did not follow this plan, however. The first section from Cochise on the Southern
Pacific main line was opened to Pearce in 1902. Seven years later it was extended to Kelton and Gleeson. The 24-mile line opened 1909 from Kelton toward Naco was later abandoned.

"POW-WOW" WITH APACHE INDIANS

Headquarters of this company were moved from Naco to Tucson July, 1903, and from that date was begun the gradual acquisition of the various lines that later comprised the Arizona Eastern. The Maricopa and Phoenix road was acquired in that year, and in 1904 the Gila Valley, Globe and Northern came under Randolph's supervision. The latter company, incorporated January 24, 1894, opened the line from Bowie to Fort Thomas May 1, 1895. Construction on to Globe remained at a standstill for some time while William Garland, president of the company, carried on negotiations with the Apache Indians for permission to lay tracks across San Carlos reservation. A "pow-wow", unique in the annals of western railroads, was held on the reservation October 27, 1896, between the Indian chiefs, representatives of the railroad and government agents. Unanimous approval of the Apaches could not be obtained. Their dickering, in the most part utterly childish, displayed some bits of shrewdness and they held out for certain concessions that brought an end to the conference. A second "pow-wow" was held February 8, 1896, when an agreement was reached, whereby the Indians received $8,000 in cash and other considerations, including free rides on the trains for thirty years. The railroad was opened to Globe December 1 of that year and
an extension to the new mining camp of Miami was completed in the fall of 1909. A nineteen mile section of the original line was re-located on higher ground during 1928 to make way for the artificial lake in Gila River formed by the erection of Coolidge Dam.

Other construction of the Arizona Eastern, which was consolidated with Southern Pacific's Pacific Lines November 8, 1924, included the branch from Phoenix to Hassayampa, built 1910; the line from Chandler Junction to Casaba built 1911; and the branch from Avondale to Litchfield built 1920. The extension of these branch lines from Picacho to Pozo Junction and from Hassayampa to Wellton, completed in July, 1926, gave Southern Pacific a second main line across Arizona and New Mexico in connection with the previously acquired El Paso & Southwestern system.

The line between Tucson and Nogales, connecting with the Southern Pacific of Mexico, was completed June 19, 1910. First section of the road was built by the Twin Buttes Railroad Company between Twin Buttes and Sahuarita to Tucson, July 1906. The section from Sahuarita to connection with the former New Mexico and Arizona line at Calabasas was built after Southern Pacific bought the property in 1910.

EL PASO & SOUTHWESTERN PROPERTIES

The El Paso & Southwestern system of 1139 miles which was operated by Phelps Dodge & Company interests until consolidated with Southern Pacific November 1, 1924, had its origin in the Arizona and Southeastern line opened May, 1883, to haul ore and other traffic from Copper Queen mine at Bisbee to a connection with the Sonora
Railway extension at Fairbank. This line was built from Fairbank to Benson on the Southern Pacific main line in January 1895. Development of the copper mining industry brought about the transfer of smelters to the newly formed city of Douglas to which point the EP&S&W extended its line in 1901.

The through line from Benson via Fairbank and Douglas was opened to El Paso June 20, 1903, by the El Paso & Southwestern, which had been incorporated June 25, 1901, to continue railroad building for Phelps, Dodge & Company. The line from Deming through Hermanas to Douglas was opened June 30, 1902. The branch from Lordsburg to Clifton was originally a narrow gauge road completed by the Arizona Copper Company January 1884. Under the name of the Arizona and New Mexico Railway this mining company reconstructed the line to standard gauge and opened an extension through to Hachita in January 1903. The mining and rail properties of the Arizona Copper Company were purchased by the Phelps, Dodge interests in 1920.

Grades of the EP&S&W main line into Bisbee were later found too heavy for economic operation and as a result the line was relocated during 1903-04 from Lewis Springs through Naco and Osborn to Forrest Junction, passing Bisbee eight miles to the south. The main line from Fairbank to Tucson was opened November 25, 1912. The extension from El Paso to Tucumcari was part of a line completed February 1902 to a connection with the Rock Island at Santa Rosa. The property was acquired by the Charles R. Eddy syndicate and the line from Tucumcari to Dawson completed January 31, 1903. These properties
were acquired by the EP&SW in 1905. The branch from Alamogordo to Russia was completed July, 1905, and the one from Carrizozo to Captain October 1899.

IMPERIAL VALLEY LINE - COLORADO RIVER BREAK

Construction of Southern Pacific's line into Imperial Valley was begun by the Imperial & Gulf Railway at Old Beach (later Imperial Junction and now Niland) and opened from the main line to Imperial, April 10, 1903. Work was then carried on by the Inter-California, incorporated June 15, 1904, and completed to Calexico, June 29, 1904. The 52-mile section in Mexico was opened from Calexico to Andrade and connected with the main line at Araz Junction, July 24, 1911. The Holton Inter-Urban Railway, acquired by Southern Pacific, June 30, 1925, opened the line from El Centro to Holtville, October 1904, and later operated under lease the line from El Centro to Seeley, completed by Southern Pacific August 29, 1910. The branch Calipatria to Westmorland was in operation May 21, 1917; from Calipatria to Sandia, March 1, 1924; and Sandia to Holtville, June 20, 1930.

The Colorado River, unruliest of western torrents, went on a rampage during flood periods of 1905-06. Cutting away from its natural course into a new channel, the river poured millions of gallons of water into the valley, threatening to inundate a million or more acres of rich land and make homeless about 10,000 persons. The river was finally turned back into its channel and the valley saved, but only after weeks of fight in which Southern Pacific wrote
into California's history one of its most stirring chapters.

In November, 1905, the river began its flow into Salton Sea, where the valley dips in places 287 feet below sea level. The railroad was forced to rebuild 40 miles of its tracks between Mecca and Imperial Junction (Niland) to reopen the line March 1, 1906. Assistance was given the California Development Company and when the river was harnessed November 6, 1906, Southern Pacific had spent nearly $2,000,000 on the job that was only temporarily finished. In December 1906 the Gila River sent more flood waters into the Colorado, causing another break that widened to 1100 feet with a maximum depth of 40 feet. At the urgent appeal of President Theodore Roosevelt, Southern Pacific again went to the rescue of the valley. Unless the river was controlled, the government stood to lose projects and lands valued at nearly a billion dollars.

The railroad got on the job December 20. A 90-foot trestle was built across the torrent. Three times within a month these piles were ripped and swept away and the trestle partly or wholly destroyed. The pile drivers were kept everlastingly at it and January 27 the trestle was finished for the fourth time and dumping began. It was then a case of putting rock into the break faster than the river could carry it away. For three weeks normal operations over 1200 miles of the railroad's main line were practically tied up. Some 3000 flat cars of rock were hauled from distances as far as 480 miles. Rock was handled faster than it had ever been handled before. About 80,000 cubic yards were dumped in 15 days.
and February 11, 1907, the river was again shut out of the valley.

During the 52-day fight Southern Pacific spent more than another million dollars. In spite of appeals to Congress by President Taft and succeeding administrations, it was not until April 1, 1930, that the railroad, after instituting suit in 1905, received a check from the government for $1,012,665 as payment for the work done at request of President Roosevelt.

SAN DIEGO & ARIZONA RAILWAY

Connecting with the Imperial Valley line at El Centro to form a transcontinental route terminating at San Diego, is the San Diego & Arizona Railway. Opened for traffic December 1, 1919, after a period of construction extending over twelve years, this 200-mile railroad has 44 miles of line in Mexico between Tiajuana and Tecate. Construction was begun in 1907 following agreement of joint ownership negotiated by Harriman for Southern Pacific with John D. and A. B. Spreckels. Difficult and costly construction was met in Carriso Gorge, one of the scenic wonders of the West, where a broad grade was finally obtained by blasting through solid rock along the ragged edge of the mountain side. Seventeen tunnels were necessary in the eleven mile stretch that cost close to $4,000,000. Cost of the whole line was about $18,000,000. Engineering problems and financial difficulties at the opening of the World War, made progress slow until a new construction agreement was reached with Southern Pacific in October 1916. In order that work could be continued, the road was released from Federal control during the war, the only company

- 87 -
in the country to receive such permission. The section from Seeley to El Centro was operated under lease from the Southern Pacific. Properties and operations of the company were transferred February 1, 1933, to a new company, the San Diego & Arizona Eastern, the capital stock of which is owned solely by Southern Pacific.

PACIFIC MAIL STEAMSHIP LINES

To gain the traffic advantage of controlling a large steamship company operating in the Pacific, Southern Pacific acquired December 1900 about 51 per cent capital stock of the Pacific Mail Steamship Company. In connection with the transcontinental rail line, the ships of this company were operated from Pacific Coast ports to Panama, Honolulu and the Orient. Southern Pacific disposed of its stock December 1915, following passage of the La Follette Act prescribing certain steamship regulations. Earlier in the railroad's history, Huntington organized the Occidental and Oriental Steamship Company.

PACIFIC FRUIT EXPRESS COMPANY

Pacific Fruit Express Company was incorporated December 6, 1906, with Southern Pacific and Union Pacific taking equal shares of it's capital stock. The company was organized to provide the cars and refrigeration service for perishable traffic originating on the lines of Southern Pacific and Union Pacific, and is the largest operator of refrigerator cars in the world. The company's first 6600 cars were received during 1907. At the present time, (March 1933), PFE owns 38,077 freight refrigerator cars and 298 express refrigerator
cars. Since January, 1923, the company has also handled operations of the Western Pacific "reefers" now totaling 2733 cars. At Roseville, California, the company has the largest ice manufacturing plant in the world. About 125 regular and emergency icing stations are located at frequent intervals along the routes of the three major railroads the company serves.

NORTHEASTERN PACIFIC RAILROAD COMPANY

Northwestern Pacific Railroad Company was formed January 6, 1907 through joint ownership arrangement between the Southern Pacific and Santa Fe, consolidating a group of short rail lines in the north coast counties of California. Both major companies had previously acquired interest in certain of the properties and each planned to build extensions from their own main lines to tap this region in which is located the only large area of commercial redwood timber in the world. The purpose of the new company was to provide for constructing and operating the links that would weld the various properties in one through route extending from Sausalito and Tiburon on San Francisco Bay north through Santa Rosa and Ukiah to Eureka and Trinidad. Such joint agreement saved the two major companies the heavy capital expenditure of building their own independent lines.

Companies included in the consolidation were: Eureka & Klamath River, with a line from Samoa to Trinidad via Arcata; San Francisco and Northwestern, with a line from Arcata through Eureka to Shively, with branch to Carlotta; the Fort Bragg & Southeastern, Albion to Wendling; the California Northwestern and the San Francisco & North
Pacific (pioneer Peter Donohue road), extending from Tiburon through Santa Rosa, Ukiah and Willits to Sherwood, with branches to Glen Ellen, Donohue, Sebastopol, Guerneville and Napa, and ferry boats from Point Tiburon to San Francisco; and the North Shore with narrow gauge main line from Sausalito to Cazadero, and standard gauge interurban electric lines, by use of third rail, between Sausalito, Mill Valley, Fairfax and San Rafael, and ferry boats from Sausalito to San Francisco.

The Santa Fe had already acquired interest in the San Francisco and Northwestern and the Fort Bragg and Southeastern, while the Southern Pacific had acquired interest in the balance of the properties. The six companies combined to give the new Northwestern Pacific a total of 404 miles. The connecting link of about 100 miles between Willits and Shively, was opened to traffic November 15, 1914.

Direct connection is made with Southern Pacific lines at Santa Rosa and Schellville. Full ownership of the property was acquired by Southern Pacific from the Santa Fe, January 17, 1929. Portions of the road were abandoned during 1930 and 1933, these being between Point Reyes and Monte Rio, Korbelex and Trinidad, and Willits to Sherwood. The company now operates 409 miles of rail lines and three ferry boats between Sausalito, Tiburon and San Francisco.

PETALUMA AND SANTA ROSA RAILROAD COMPANY

Petaluma and Santa Rosa Railway (electric) was constructed in 1904, primarily for handling suburban passenger business and local freight between Petaluma, Santa Rosa, Sebastopol and Forestville.
Later, by arrangements for through routes and joint rates with trunk line carriers its local business was replaced by through service. Passenger service was discontinued in 1932. The Petaluma and Santa Rosa was acquired by Northwestern Pacific Railroad Company, with whose lines it connects at Petaluma, Santa Rosa and Sebastopol, in March 1932. It is 32 miles long.

ELECTRIC RAILWAY LINES

Aside from the electric lines operated by the Northwestern Pacific and in the interurban service at Oakland, Berkeley and Alameda, Southern Pacific owns six electric railway companies operating 732 miles of lines in California. The properties have been acquired over a period of years for the primary purpose of serving as "feeders" to the Southern Pacific steam lines. The companies, with mileage are: Pacific Electric, 561 miles; Fresno Traction, 28 miles; Peninsula Railways, about 12 miles; San Jose Railroad, 28 miles; Stockton Electric, 14 miles; and Visalia Electric, 44 miles.

With its network of lines radiating from Los Angeles to points in southern California, the Pacific Electric operates the largest interurban electric railway system in the world. The company was organized 1902 by Henry E. Huntington, nephew of Collis P. Huntington, who invested extensively in southern California after selling his large holdings of Southern Pacific stock to the Union Pacific. The pioneer electric lines opened to Santa Monica and Pasadena were added to his system and in 1903 half ownership in the property was sold to
Southern Pacific. The lines were managed by a board of directors elected jointly by Southern Pacific and the Huntington associates until November 1, 1910, when Southern Pacific acquired full ownership, disposing of its 45 per cent stock interest in the urban lines of the Los Angeles Railway Company. The present Pacific Electric Railway Company was organized September 1, 1911.

Peninsula Railway, incorporated June 30, 1909, originally connected San Jose, Saratoga, Los Gatos, Campbell, Cupertino, Monta Vista and Palo Alto. Train service aside from passenger and freight operations in San Jose and immediate territory was abandoned March 11, 1933, motor buses being substituted between San Jose, Palo Alto and intermediate points.

Stockton Electric, incorporated December 29, 1891, operates within the city and immediate territory.

San Jose Railroads, incorporated December 23, 1909, serve the cities of San Jose and Santa Clara, and adjacent country.

Fresno Traction, incorporated September 22, 1903, operates in Fresno and vicinity.

Visalia Electric, incorporated April 22, 1904, operates freight service between Exeter, Woodlake, Redbanks and Lemon Cove in Tulare County.

Joint ownership with the Santa Fe and Western Pacific was acquired by Southern Pacific, January 1928, in the Central California Traction Company, operating a 56-mile electric line in passenger and freight service between Stockton, Lodi and Sacramento. Intercity
passenger service over the line was discontinued February 6, 1933.

CALIFORNIA AND NEVADA BRANCH LINES

The Sacramento Southern was incorporated by Southern Pacific July 8, 1903, to build southward from Sacramento through a productive fruit and vegetable region. Construction was started January 1906, and the line opened to Walnut Grove, 23 miles, March 1912. The terminus remained there until October 15, 1929, when a nine-mile extension was opened to Isleton, including a movable span bridge across Georgiana Slough. During 1931 the line was extended three miles further to the Mokelumne River.

The branch from Barber to Sterling, in Sacramento Valley, was built for Southern Pacific by the Chico & Northern and was opened to traffic June 30, 1904.

Construction on the Fernley Branch was begun June, 1912, and opened for traffic to Susanville, October 15, 1913; and to Westwood, September 1, 1914.

The Rumsey Branch was opened from Elmira through Vacaville and Winters to Rumsey, July 1, 1888. The section from Elmira to Winters had been completed by the Vaca Valley Railroad Company Aug. 26, 1875.

During 1891 Southern Pacific completed the San Ramon branch from Avon to San Ramon, and in 1908-09 the extension to the main line at Radum, near Pleasanton, was opened to traffic.

The line from Santa Rosa to connection with the old California Pacific at Napa Junction was completed June 20, 1888.
In March, 1900, Southern Pacific acquired stock of the Carson & Colorado Railroad Company, incorporated May 10, 1880. This company was operating a narrow gauge line in Nevada from Moundhouse (junction with Virginia & Truckee) through Hawthorne to Candelaria, opened March, 1882, and the extension to Keeler, California, opened August 1883. The Nevada & California Railway Company was organized April, 1905, to take over the property and complete a through line of about 400 miles from Hazen, on the Central Pacific, to Mojave, on the Southern Pacific, which line might eventually be used as a short-cut to the East for traffic out of southern California. During 1905 the narrow gauge was changed to standard from Moundhouse to Mina and a third rail laid from Mina to Tonopah Junction. The connection between Hazen and Churchill, on the former narrow gauge, was completed and the rehabilitated line opened September, 1905. A change of line put Hawthorne on a branch. The line from Hazen to Fallon was opened January 10, 1907. Construction was begun at Mojave February 24, 1908. The new line was opened to Cantil, June 1908; to Searle, October 1908; and to connection with the narrow gauge at Owenjo, October 22, 1910. The entire property when conveyed to Central Pacific in 1912 included 322 miles of standard gauge and 156 miles of narrow gauge lines.

UNION PACIFIC-SOUTHERN PACIFIC-CENTRAL PACIFIC UNMERGER CASES

The Sherman Anti-Trust law, effective July 2, 1890, was the basis of two suits brought by the United States government contending that Union Pacific's control of Southern Pacific through majority
stock ownership was in violation of the law, and also that Southern Pacific's similar control of Central Pacific was illegal. The first suit involving the Union Pacific-Southern Pacific was begun February 1, 1908, and, in reversing a lower court's decision, the United States Supreme Court, December 2, 1912, held that the ownership of $126,650,000 stock of the Southern Pacific by the Union Pacific was in contravention of the Sherman Act. Arrangement for disposal of the stock and divorce of Union Pacific from management of the Southern Pacific was approved by the court June 30, 1913.

Edward H. Harriman died September 9, 1909, and Robert S. Lovett became chairman of the executive committee and president of Southern Pacific. William Sproule was elected president, September 25, 1911, and January 13, 1913, Julius Kruttschnitt was elected chairman of the executive committee.

The government's suit against Southern Pacific to force it to sell all its stock in the Central Pacific was begun February 11, 1914. The United States District Court decided in favor of the railroad March 9, 1917, and the government appealed to the United States Supreme Court, which rendered its decision against Southern Pacific, May 29, 1922. Meantime, Congress had passed the Transportation Act of 1920 which conferred power upon the Interstate Commerce Commission to authorize any carrier to acquire control over another carrier by lease or stock ownership, such control being relieved from operation of the Sherman Law. Southern Pacific appealed to the Interstate Commerce Commission in October 1922 and after an extended hearing, the Commission approved Southern Pacific's control of the Central Pacific,
as being "in the public interest", February 6, 1923. On appeal by
the Department of Justice, the Circuit Court of Appeals concluded
June 11, 1923, to uphold the Interstate Commerce Commission decision,
and in August that year the government announced it would take no
further appeal.

FEDERAL CONTROL OF RAILROADS

Federal control of all railroads and steamship lines in the
country extended from December 28, 1917, to 12:01 A.M. of March 1,
1920. Wm. Sproule was named district director for the United States
Railroad Administration, July 11, 1918, with supervision of all lines
west of Ogden, Salt Lake City, Albuquerque and El Paso, and south of
Ashland, Oregon, in the Central Western Region. W. R. Scott became
federal manager in the same territory for both the Southern Pacific
and Western Pacific lines.

SOME DEVELOPMENTS SINCE 1920

With return of the railroad properties to independent manage-
ment in 1920, Southern Pacific began another period of development
and expansion, which, in expenditures and improvement of facilities,
equaled that of the Harriman regime. During the period 1923-29
Southern Pacific had more new construction in hand than any other
railroad in the country. Four major projects, dealt with elsewhere
in this article, completed at an aggregate cost of $76,000,000, were:
Natron Cut-Off (Cascade Line), $39,000,000, including expenditures
- 96 -
dating from 1906; new line Klamath Falls to Alturas and N-C-O rebuilt to standard gauge, $9,000,000; new main line in Arizona through Phoenix, $14,000,000; and completion of the Mexico line, $14,000,000.

Work was also resumed during 1923 in double tracking the main line over the Sierra. This project was begun in 1906 and when work was suspended in 1914, pending decision of the Southern Pacific-Central Pacific "unmerger" case, 197 miles of second main track had been completed at various points in the 686 miles between Sacramento and Ogden. The new Summit tunnel of 10,326 feet, longest on Southern Pacific lines, was completed during 1925 in connection with the second-track program, and August 1, 1924, agreement was made with the Western Pacific for joint use of that company's line for 178 miles between Alazon and Weso in Nevada. By the end of 1930 about 307 miles of second track had been completed, leaving only 201 miles of single track over the 774-mile route from Oakland to Ogden.

Thirty-five miles of double tracking has been completed over the Tehachapi mountains in the 68 miles between Bakersfield and Mojave, 30 miles of which was completed 1922-23, about three miles in 1928, and the balance in 1929. Between San Jose and Watsonville Junction, 21 miles of double track was completed during 1927-30 giving total of 68 miles in the 100 miles from San Francisco to Watsonville Junction.

During the period 1921-32 new rail was laid over 3708 track miles on the company's Pacific Lines, and ballast renewals amounted
to 10,120,000 cubic yards, these figures being exclusive of new
color build. Since 1921 heavy work has been carried on in raising
and widening the Rambo, Saline and Bagley fills on the cut-off across
Great Salt Lake. An extensive program of enlarging tunnels and re-
placing timber linings and portals with concrete was carried on in
the Sierra Nevada and Tehachapi mountains during 1921-24.

Creosote treatment for ties, structural timbers and piles,
has become an important phase of maintenance and construction. More
than $1,100,000 has been spent during recent years in the erection
and remodeling of three creosoting plants on the company's Pacific
Lines. The original timber treating plant constructed at West
Oakland 1887-88 was replaced by a modern plant in 1928. Plants were
completed at Wilmington, California, in 1923, and at Eugene, Oregon,
in 1927. Additional facilities were installed at the Alamagordo,
New Mexico plant during 1926.

Three new wharves, with trackage and warehouses, were built
on the south side of Oakland Pier 1921-22, to replace the abandoned
Long Wharf. Also during 1921 a six-story reinforced concrete termi-
nal warehouse, 825x100 feet, was completed in San Francisco on the
channel between Third and Fourth Streets. The Los Angeles Union
Terminal Company, occupying 19 acres in the wholesale produce and
fruit district of that city, was acquired by Southern Pacific during
1920.

Outstanding among the passenger stations built since the end
of Federal control, are: Glendale, 1924; Ogden Union station, 1924;
Sacramento, Reno and Yuma, 1926; Stockton, 1930; and the Southern Pacific-Santa Fe union station at Phoenix, 1924. A new freight station was completed at Bakersfield, 1927 and at Reno during 1931.

There were completed during 1931, ten grade separation projects at various points on the company's lines, one of the most important being at Seventh Street, Oakland, California, opened September 5. Twenty more were completed during 1932, thirteen being in Texas where work was being continued on four other separations.

For the purpose of eliminating scale-forming impurities from the water used in locomotive boilers, 52 water treating plants were completed on the company's lines during 1930-32, and work was underway on five additional plants.

TERMINAL YARDS, BRANCH LINES AND BRIDGES

A 400-foot span steel bridge was constructed across the Colorado river at Yuma during 1923, at a point about 1300 feet upstream from the original crossing. Involved in this change of line was a new terminal yard and double tracking 6 miles west of Yuma to junction with the Inter-California at Araz Junction. These terminal changes were progressively constructed and completed during 1928.

Considerable trackage and related facilities were added 1922-23 to the extensive new Taylor Yard and freight classification terminal at Los Angeles. A third unit, consisting of subways, additional trackage, station and office buildings, was completed during
1926, and an engine terminal at the yard was completed 1929-31. Nearly 250 miles of track is included in Taylor Yard. June 1, 1931, a new double track line on the east side of the river in Los Angeles was opened for traffic, relieving traffic congestion by moving freight trains around the business district of the city.

A new freight classification yard, costing $1,200,000, and PFE icing station were completed just west of Fresno during 1929-30. In conjunction with these facilities, a new freight line of 14 miles was placed in operation early in 1930 from Kerman to Biola Junction, which involved about 6 miles of new construction.

During 1925-26-27 considerable trackage and other terminal facilities were added at Roseville, where the Pacific Fruit Express Company completed its car repair shops and storage track extensions in 1927. An extensive freight yard terminal was constructed at Santa Clara, California, during 1926, with additional facilities completed 1928-29. Construction on a large terminal yard at Eugene, Oregon, was begun 1923 and the last unit completed during 1928.

An expensive line change within the city of San Jose, Calif., was announced in 1928, a new route through the city being necessary due to expiration of a former franchise. The new line of 5.64 miles extending from College Park to Lick station, involves the construction of eight grade separations and the erection of a new station. Ultimate cost of the project is estimated at $3,236,848. Actual construction was delayed pending settlement of property matters. The first subway at Park Avenue was opened September 11, 1931, and the
second at The Alameda, April 26, 1932. Work has been commenced on a viaduct over the tracks at San Carlos Street.

A fourteen-mile branch from Knights Landing Junction, California, along the west side of Sacramento River to Boyer, was opened to traffic June 15, 1929. An extension to the Lodi (California) Branch from Valley Springs to North Fork, 8.14 miles, was in operation January 20, 1926, and an additional four miles to Kentucky House was purchased April 28, 1929. The Arvin Branch, near Bakersfield, Calif., owned jointly by the Southern Pacific and Santa Fe, was opened from Magunden to Arvin, 17 miles, August 25, 1923. A four-mile branch from Richgrove, near Porterville, California, to Jovista was opened May 31, 1923.

The Martinez-Benicia double-track bridge across Suisun Bay, 35 miles from San Francisco, was opened for traffic October 15, 1930. Construction had begun on the superstructure in May, 1929. The 5603-foot bridge is the longest and heaviest railroad bridge west of the Mississippi. The entire project, including about six miles of track approaches, was completed at a cost of about $12,000,000. With the bridge in service, operation of the world’s two largest car-transfer ferry boats (Solano and Contra Costa) was abandoned between Port Costa and Benicia, eliminating a costly operation.

In conformity with a plan adopted December 1, 1920, for segregation of the California oil properties from the railroad properties of Southern Pacific, a new company, known as Pacific Oil Company, was organized with the railroad company subscribing for the entire capital stock. This company purchased 259,000 acres of land from the
railroad and also acquired the 50.48 per cent of Associated Oil Company stock held by the railroad. Pacific Oil was absorbed by the Standard Oil Company of California in 1926. For some years Southern Pacific carried on oil drilling activities through the East Coast Oil Company in Mexico, and at the present time its most active interest is in the Rio Bravo Oil Company with properties in Texas and Louisiana.

A new contract for the handling of express matter over the company's line was effected March 1, 1929, with the new Railway Express Agency, Inc., which had been organized December 7, 1928, to take over the express contracts for most of the railroads of the country, formerly held by the American Railway Express Company. The new company is owned by the railroads participating in the plan.

Operation of steamers on the Sacramento River, a service acquired with the old California Pacific Railroad properties in 1871, was abandoned by Southern Pacific, January 15, 1930.

Bonita Dam, in White mountains, 26 miles from Carrizozo, New Mexico, was completed June 1931, to provide a dependable water supply for train and other railroad operations. The dam is 92 feet high, has storage capacity of 384 million gallons, and cost $770,000, including cost of lands and water rights.

ACQUISITION OF NEW PROPERTIES

The 16-mile narrow gauge line of the Lake Tahoe Railway and Transportation Company, opened between Truckee and Lake Tahoe, May 1, 1899, was leased October 16, 1925, and the road rebuilt to standard
gauge opened for traffic May 1, 1926.

The Clackamas Eastern was acquired by Southern Pacific May 26, 1930. The 13-mile line of the former Portland Southern was rehabilitated from Clackamas and opened June 1, 1930, with a four-mile extension to connect with logging road being built by Mollala Lumber Co.

During 1930 Southern Pacific acquired the entire outstanding capital stock of the Inter-California Southern. The 43-mile line of this company within the Republic of Mexico, extends from the Imperial Valley line at Fascalitos southeast into a rich agricultural region and was opened for traffic October 30, 1931.

Southern Pacific-Golden Gate Ferries, Ltd., began operations on San Francisco bay May 1, 1929. This company, in which Southern Pacific has 50.12 per cent stock interest, operates 27 boats in auto ferry service between San Francisco, Oakland, Berkeley, Alameda, Richmond, Vallejo, Sausalito and Tiburon, handling the auto boats formerly operated by Southern Pacific, Northwestern Pacific, Golden Gate and Monticello Steamship Company.

Joint ownership of the Richmond Belt Railway Company (California) was acquired with the Santa Fe, August 30, 1932, the two companies having previously operated the six-mile industrial line under lease.

Acquisition of the St. Louis Southwestern Railway (Cotton Belt) was concluded by Southern Pacific April 14, 1932. The company was incorporated January 16, 1891, as a reorganization of the St. Louis Arkansas & Texas, sold under foreclosure. With St. Louis as the northern terminus, the "Cotton Belt" operates 1913 miles of lines in
Illinois, Missouri, Arkansas, Louisiana and Texas, making various connections with Southern Pacific lines, particularly at Shreveport, Corsicana, and Dallas.

The Dayton-Goose Creek Railway was acquired for the Texas & New Orleans company, May 1, 1926, extending from Baytown to Dayton, Texas, a distance of 25 miles. The Texas Midland was also acquired for the same company April 1, 1923, with its 125-mile line from Ennis to Paris, Texas. A four-mile extension of the Houma (Louisiana) Branch was completed during 1930, involving the erection of a 228-foot draw bridge over the Inter-Coastal Canal. A new 300-foot steel swing draw span was completed over Buffalo Bayou, at the head of Houston Ship Channel, during 1930, permitting the use of heavier power and maximum loading of cars between Houston and Galveston. A five-mile extension from the Lockport Branch in Lafourche Parish, Louisiana, was completed February 1931, during which year enlarging and remodeling of roundhouse facilities was completed at Ennis, Texas, principal terminal on the Dallas division. A seven-mile extension from the Eagle Pass Branch was opened January 3, 1933, to the southerly end of Quemado Valley in Texas.

MEETING MOTOR VEHICLE COMPETITION

To meet the steady development of automobile and motor bus competition the Southern Pacific Motor Transport Company was organized April, 1927. The company began with motor coach operations over interurban routes in California and gradually extended its activities to substitution of motor bus service for steam and electric train
service over a considerable number of branch lines in California, Oregon and Arizona. Interstate service was also begun between San Francisco and Portland, and between Los Angeles and El Paso, involving purchase of several independent lines. Pacific Transportation Securities, Inc., was organized January 1, 1929, to consolidate Southern Pacific motor bus operations with those of its principal competitors, i.e., Pickwick and California Transit lines in the territory west of Salt Lake City and El Paso, and south of Portland. Southern Pacific owns a one-third interest in the consolidated company. Name of the new company was changed to Pacific Greyhound Corporation, April 1, 1930. The Southland Greyhound Lines, in which Southern Pacific acquired a one-third interest, December 31, 1929, operates between El Paso and Lake Charles, Louisiana. These two companies were in 1932 operating over 9,596 miles of bus routes. The Pacific Electric, which began operation of motor buses as "feeders" in 1922, now operates buses over 646 miles of local and interurban routes in Los Angeles and vicinity.

Through the agency of the Pacific Motor Transport Company, Southern Pacific provides shippers and receivers of less-than-carload freight with store-door pick-up-and-deliver service in a rapidly expanding territory. Originally incorporated as the Pacific Electric Motor Transport Company, October 13, 1928, experimental service was begun March 1929, to certain points between Los Angeles and Santa Barbara. Shipments are handled to and from freight stations by local transfer companies, or draymen, under contract arrangements. By the
end of 1932 operations of the PMTCo had been extended intrastate quite generally in California, Oregon, Arizona and Nevada. The question of filing tariffs for interstate traffic is being considered. Permits have been obtained to substitute highway truck service for steam train service between certain points, providing earlier freight deliveries and effecting substantial operating economies.

Southern Pacific Transport Company, performing similar pick-up-and-delivery freight service, began operations in Texas on August 1, 1930, and in Louisiana on April 16, 1932. In the latter state motor trucks are operated on 1336 miles of highways, which has made possible considerable reduction in branch line train service.

###