



PDHonline Course C749 (10 PDH)

**The TRANSCONTINENTAL Railroad
UNITING the United States**

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2020

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Part 1

Manifest Destiny

Coast-to-Coast

“Manifest Destiny not a boost meant we’d expand from coast-to-coast”
 RE: children’s rhyme. In the nineteenth century “Manifest Destiny” was the widely held belief in the *United States* that American settlers were destined to expand throughout the continent. It would encompass the largest acquisition of territory by the United States and was used as justification for the 1846-48 war with *Mexico*. Though many Americans embraced the concept of national expansion, some saw it as a straight-forward conquest of territory (for commercial and/or strategic gain) while others saw it as a moral mission (i.e. bringing civilization to an uncivilized expanse).






Left: painting by artist *John Gast* entitled: "American Progress" (ca. 1872). It is an allegorical representation of the modernization of the new west. In it, *Columbia* - a personification of the *United States* itself, leads civilization westward with the pioneers, stringing telegraph wire as she sweeps west (she holds a school book). In the scene, the various stages of economic activity of the west's early settlers are highlighted as are the evolving modes of transportation.

7


California or Bust

8

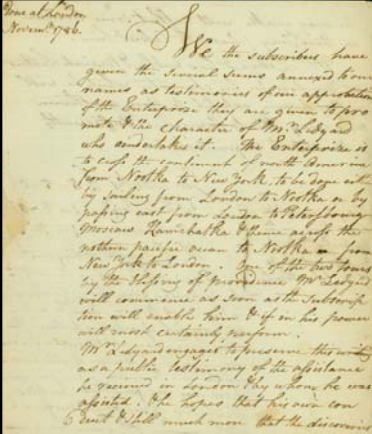


A 145-year old myth that *California* was an island (based on a mistaken 1602 journal entry by Spanish explorer *Father Antonio de la Ascension*) was still widely believed well into the mid-18th Century. European cartographers first portrayed the west coast of *North America* as an island in 1622 (on a small map on the title page of Antonio de Herrera's "Descripcion de las Indias Occidentales"). Many major publishers (especially in *Great Britain* and *Holland*) quickly accepted this erroneous conclusion. Despite the fact that *Father Eusebio Kino* had confirmed (during his explorations of the American Southwest from 1698 to 1701) that *California* was indeed not an island, this error continued to be depicted in many of even the best cartographer's maps until as late as 1747 when *King Ferdinand VI* of *Spain* issued a royal edict declaring *California* part of the mainland of *North America*. One of the last maps still illustrating this myth about the topography of *California* was published in 1745 by the well known *London* engraver and mapmaker *Richard William Seale* (above, L&R) entitled: "A Map of NORTH AMERICA, With the European Settlements & whatever else is remarkable in ye WEST INDIES from the latest and best Observations."

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Thomas Jefferson is given credit for being the first person to take action towards the opening of a route between the east and west coasts of the *United States*. While Jefferson was in *France* in 1779 (as *American* envoy), he met *John Ledyard* (left) who had been with *Captain Cook* on his voyage around the world. In the course of the famous circumnavigation, they visited the coast of *California*. Out of this acquaintance grew an expedition under Ledyard that was to cross *Russia* and the *Pacific* to *Alaska*. From *Sitka* (in *Russian Alaska*), they where to board a *Russian* trading vessel and journey to the *Spanish-Russian* settlement on *Nootka Sound* (on the *California* coast). From there, they were to proceed east across the continent, returning to *New York City*. Through Jefferson's efforts, the expedition was outfitted and begun in 1787. The *Russian* government had promised its support, but when the party had crossed *Russia* and were within two-hundred miles of the *Pacific*, Ledyard was arrested by order of *Empress Catherine* thus, the exped-¹⁰ition came to an ignominious end in 1788.




Left: caption: "First page of Mr. Ledyard's subscription for his trip to cross the continent of *North America* from *Nootka* to *New York*, November 1786." Ledyard went to *Egypt* soon after the *Russia-Pacific* expedition came to an end. He died in *Cairo* on January 10th 1789, at the age of thirty-eight.

11


The Far West

12



“...for sending an exploring party to trace the Missouri River to its source, to cross the highlands and follow the best route thence to the Pacific Ocean”
 RE: in 1801, *Thomas Jefferson* became POTUS. Upon his recommendation, in 1803 Congress made an appropriation for an expedition to the *Pacific Ocean*. This expedition (1804-1806) would become known as the “*Voyage of Discovery*” and was led by *Meriwether Lewis* (left) and *William Clark* (right).

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“...The object of your mission is to explore the Missouri River and such other streams as by their course would seem to offer the most direct and practicable communication across the continent for the purpose of commerce...”
Thomas Jefferson, POTUS
 RE: excerpt from his “*Letter of Instruction*” to *Lewis & Clark*. This successful expedition brought to light much information relative to the west and proved conclusively the feasibility of an overland crossing. As well, it demonstrated the resources of the country the expedition had traversed. As a result, the “*Far West*” became the Mecca of fur trappers and traders. Commencing with the *Astoria Settlement* in 1807, for the next forty years (until the opening of the *Oregon Immigration* in 1844), these frontiersmen were practically the only white men to visit these distant territories outside of missionaries such as the *Rev. Jason Lee* and *Dr. Marcus Whitman* (who established mission stations in *Oregon* in 1833 and 1835 respectively).

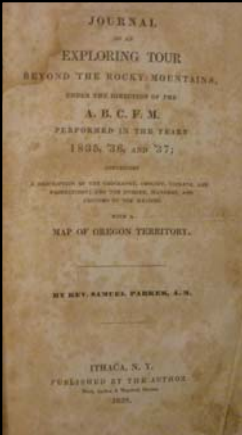
14

In 1819, *Robert Mills of Virginia* suggested, in a publication entitled: “*Internal Improvements in Maryland, Virginia, and South Carolina*,” the advisability of connecting the head of navigation of one of the principal streams entering the *Atlantic* with the *Pacific* ocean by a system of steam propelled carriages. Given that this publication was issued before there was even one mile of steam railroad in the entire world, it was indeed a bold and prophetic recommendation (but not very practicable, at the time). In 1832; in a weekly *Ann Arbor, Michigan* newspaper (*The Emigrant*) appeared what was probably the first suggestion in print on the advisability of a transcontinental RR. The article suggested the advisability of building a line from *New York City* to the mouth of the *Columbia River* by way of the south shore of *Lake Erie* and *Lake Michigan*, crossing the *Mississippi River* (between 41 & 42 North Latitude), the *Missouri River* (at about the mouth of the *Platte River*) thence to the *Rocky Mountains* (near the source of the *Platte*), crossing them, and down the valley of the *Columbia* to the *Pacific Ocean*. It further suggested that it be made a national project, granting three million acres to the company organized for the purpose of constructing it. No name was signed to the article, but it is highly probable that it was written by *S.W. Dexter*, editor of the newspaper.

15

A Not So Far Distant Time

16



“There would be no difficulty in the way of constructing a railroad from the Atlantic to the Pacific Ocean...and the time may not be so far distant when trips will be made across the continent as they are now to Niagara Falls to see Nature’s wonders”
 Rev. *Samuel Parker*
 RE: excerpt from his journal. Parker was a Presbyterian minister, who was sent by the missionary board of his church to investigate and report on the mission situation in the far Northwest and to suggest a plan for Christianizing the native Indians. In 1835, he traveled west with the *Whitman Party*, which crossed the continent to *Oregon*. Upon his return (in 1838), his journal was published (left), suggesting the building of a transcontinental RR.

17

“Premising the length of the road would be three thousand miles and the average cost ten thousand dollars per mile, we have thirty million dollars as the total cost, and were the United States to engage in its construction, three years time would be amply sufficient...At the very moderate rate of ten miles an hour, a man could go from New York to the mouth of the Columbia River in twelve days and a half.”
 Dr. *Samuel Bancroft Barlow*
 RE: at about the same time Rev. Parker’s journal was published, Dr. Barlow - a practicing physician in *Greenville, Mass.*, commenced writing newspaper articles advocating a transcontinental RR and outlining a plan for its construction. Though he lacked intimate knowledge concerning the cost and operations of railroads, his bold proposition contemplated a railroad from NYC to the mouth of the *Columbia River*. By the late 1830s, railroads were being successfully built and operated in the east thus, it appears the idea of a transcontinental RR occurred to several people simultaneously.

18

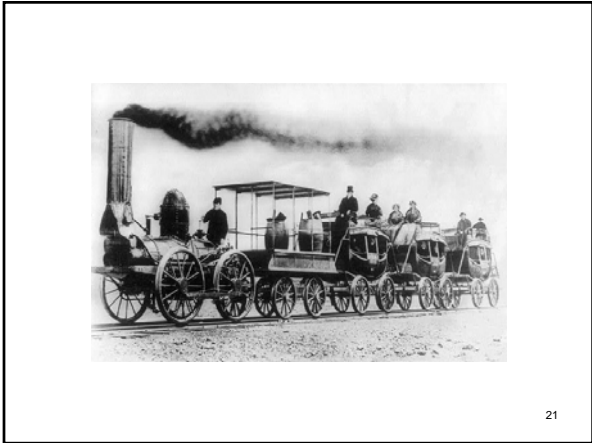
The True Pacific Route

19

PROPOSAL
FOR
A CHARTER TO BUILD
A
RAILROAD
FROM
LAKE MICHIGAN TO THE PACIFIC OCEAN,
BY
DR. HARTWELL CARVER.

WASHINGTON:
PRINTED BY J. AND H. S. BERRY.

Another transcontinental RR enthusiast was Dr. Hartwell Carver (grandson of explorer Jonathan Carver). His proposition was to build a railroad from Chicago (on Lake Michigan) to the "South Pass" with two branches from there; one to the mouth of the Columbia River and the other due west to California (South Pass received its name from being south of the mountain pass then in general use). Ironically, his "True Pacific Route" was formulated without any knowledge of the route's geography and, as it turned out, was the best possible route and the one followed by the Union Pacific Railroad and affiliated lines. Carver's proposition was to build the RR via a private corporation who were to receive a grant of land for their right-of-way (for the entire distance) with the privilege of taking from public lands material to be used in construction of the RR with the further privilege of purchasing from the U.S. Government eight-million acres of selected lands at \$1.25 per acre (payable in the stock of the company). Carver's road was to be laid on stone foundations and equipped with sleeping, dining and salon cars. At the time of his writings (1835) there were 790 miles of railroads in operation in the U.S. 20



21

Hartwell Carver would spend the best years of his life and a sizable fortune endeavoring to further his project. However, great opposition to his plan arose from the proposed diversion of the public lands and the stock feature. Neither Congress nor the public took kindly to the idea of the Federal Government exchanging public land for stock in a private corporation.

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Another proposition was put forth by civil engineer John Plumble of Dubuque, Iowa (left), who suggested (at a public meeting held in Dubuque in March 1838) that a railroad be built from the Great Lakes to the Columbia River. His plan contemplated an appropriation from Congress of alternate sections of the public lands on either side of the right-of-way. The company was to be capitalized at \$100 million (with twenty million shares offered at \$5.00/share). Twenty-five cents per share was to be "paid-down" (to provide a fund to commence operations) and subsequent assessments (of a like amount) were to be paid as the money was needed until the full amount had been "paid-in." One hundred miles was to be constructed each year and the whole line completed in twenty years. 23

Father of the Pacific Railway

24

All of the aforementioned transcontinental RR propositions were, more or less, visionary and advanced by men with little or no capital. They did however have the effect of awakening public interest in the idea and, ultimately, paved the way for a more feasible plan. The question of a *Pacific Railway*; its practicability, earnings and long-term effects were constantly debated in the court of public opinion. By 1844, a NYC merchant named *Asa Whitney* became enthused by the idea of a transcontinental RR. To that end, he devoted all his energies, time and fortune to it while attracting many supporters. At first, he advocated Hartwell Carver's plan, but became convinced it was not feasible. Thus, he developed a plan of his own. He proposed that Congress should give to him, his heirs and assignees, a strip of land; sixty-miles wide (with the railroad in the center) from a point on *Lake Michigan* to the Pacific coast. He proposed to colonize this strip by selling the land to immigrants from *Europe*. From the proceeds, he would build the line retaining whatever surplus there might be after its completion as his profit. Whitney was a hard worker and articulate speaker and well versed in the statistics and arguments in favor of his scheme. He traveled the country making speeches and garnering support wherever he went. The legislatures of *Maine, New Hampshire, Vermont, Rhode Island, New Jersey, Connecticut, New York, Maryland, Ohio, Indiana, Illinois, Michigan, Tennessee, Alabama* and *Georgia* all endorsed his grand plan.

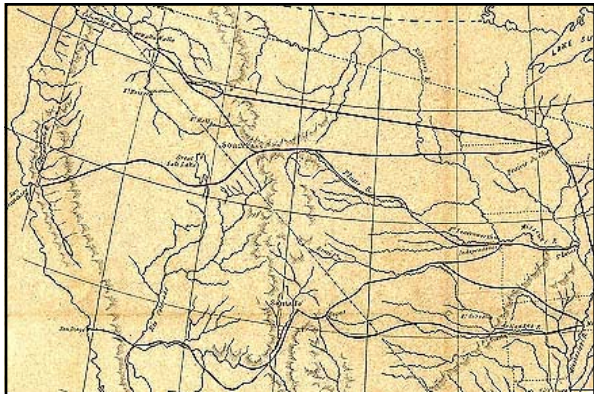
25



"Authorizing Asa Whitney, his heirs or assigns, to construct a railroad from any point on Lake Michigan or the Mississippi River he may designate, in a line as nearly straight as practicable, to some point on the Pacific Ocean where a harbor may be had"

RE: title of a bill brought before Congress in 1848 as a result of the findings of the *Senate Committee on Public Lands* which recommended Whitney's proposition to build a railroad from the shores of *Lake Michigan* to the Pacific coast. For his earnestness in pursuing his dream, *Asa Whitney* (left) would earn the title: "Father of the Pacific Railway."

26



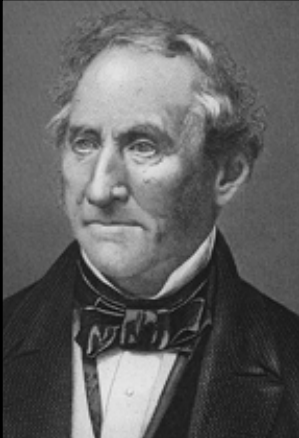
Above: Asa Whitney's 1849 map of proposed routes for his *Pacific Railway* 27

All Matters Western

28

Whitney's road was to be six-foot gauge, sixty-four pound rails. The Federal Government would establish tolls and regulate the operation of the line. Whitney was to be the sole owner and receive a salary of \$4K per year for managing it. The proposition was debated for days in the *Senate* and then was tabled on a vote of twenty-seven to twenty-one. The opposition dwelt largely on the length of time Whitney would require to build the line. The argument was made that if he could colonize and sell a million acres per year, this would only provide funds enough to build one-hundred miles. Consequently, two-thousand miles would require at least twenty years to build. The defeat of the bill was largely due to the opposition of Senator *Thomas Hart Benton* of *Missouri* - a staunch advocate of westward expansion. He opposed the power and capital it would put in the hands of one man: *Asa Whitney*. He characterized the scheme as a project to give away an empire that was larger in extent than eight of the original states with an ocean frontage sixty miles long with contracting powers and patronage exceeding those of the POTUS.

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Upon the defeat of Asa Whitney's scheme, *Thomas Hart Benton* (left) brought forward (in 1849) his own scheme for a "Great National Highway," extending from *St. Louis* to *San Francisco* - "straight as may be practicable," with branches to *Oregon* and *Mexico*. The Federal Government would grant a strip one-mile wide, so as to: "provide room for every kind of road, railway, plank, macadamized, and electric motor, or otherwise constructed where not so practicable or advantageous." Funds for its construction were to be provided by the sale of public lands. This proposal had significant currency since it was proposed by the recognized Senate leader in "All Matters Western."

30

Never!

31




"Shall we who have beaten them in clipper ships, swift steamers and other useful notions yield to the palm of building the longest railroad on the American continent? Never!"

John C. Fremont, U.S. Senator
 RE: by 1853, Great Britain was planning a 1,600-mile long railway out of Halifax, Nova Scotia. The distance to California by way of Cape Horn was more than the entire circumference of the globe (on the latitude of San Francisco). The other route, across the Isthmus of Panama, equaled the distance from Washington D.C. to Peking, China. Senator Fremont (left) implored Congress to act and make the transcontinental RR a reality lest Britain make the claim of having the longest railroad in North America.

"...The people of the western frontier were at that time exposed to frequent incursions of the Indians. The country was exceedingly fertile, but the markets were so distant that the productions were an encumbrance rather than a profit to the farmer, and vast tracts of rich agricultural lands were suffered to remain an unbroken waste. The action of the government attracted public attention, and awakened private enterprise. Canals were projected, and then followed railroads, until every part of that country, which was but a few years ago called the 'far west,' has been brought within three or four days' communication with the cities on the seaboard, giving a new impulse to commerce, increasing the value of property, and relieving the frontiers from all the dangers of a hostile foe. No better example can be given of the benefits resulting from the construction of railroads, to both public and private property, than that of the Illinois Central railroad. On the line of that road the public lands had been offered for sale many years without finding a purchaser, and were at last reduced to the lowest minimum price, twelve and a half cents per acre. Even this reduction was not sufficient to induce their sale; but after the government had given away one-half to assist in building the road, the other half was very readily sold for two dollars and fifty cents per acre. Similar results have followed the building of nearly every other railroad in the country, although in many instances, as in this, the roads came in direct competition with river and canal transportation. A railroad across the continent would open up a vast extent of country to settlement, and much of what is now believed to be sterile and barren will, no doubt, as in California, be found to yield bountifully to the agriculturist..."

RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856) 33



THE FINEST FARMING LANDS

WHEAT CORN COTTON FRUIT & VEGETABLES

EQUAL TO ANY IN THE WORLD!!!
MAY BE PROVED

At FROM \$8 to \$12 PER ACRE

Near Markets, Schools, Railroads, Churches, and all the Conveniences of Civilization.

1,200,000 Acres, in Farms of 40, 80, 120, 160 Acres and upwards, in ILLINOIS, the Garden State of America.

The Illinois Central Railroad Company offers, ON LONG CREDIT, the best and fertile PRairie Lands lying along the whole line of their Railroad, 700 MILES IN LENGTH, upon the most favorable Terms, for enabling Farmers, Merchants, Mechanics and Workmen to make for themselves and their families a competency, and a HOME! They can sell THEIR OWN, as well appear from the following statements:

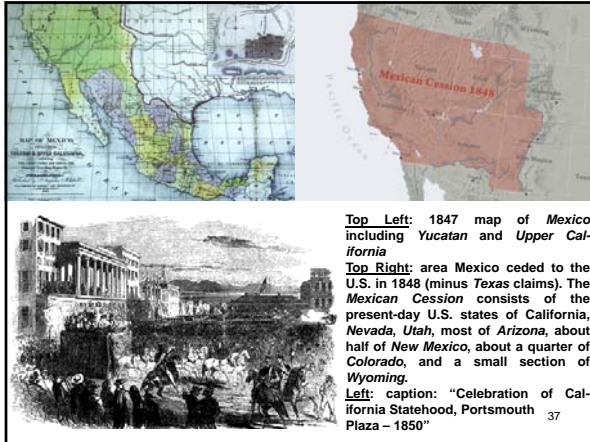
34

Up until the year 1848, whereby Mexico ceded California (per the terms of the Treaty of Guadalupe-Hidalgo), the only U.S. territory on the Pacific coast was Oregon and Washington. The acquisition of California, followed very shortly by the gold discovery at Sutter's Mill and the consequent influx of people, gave that state a large population and furnished a potential business for a transcontinental RR. The prospective volume of transcontinental passengers before the inclusion of California into the Union was, at best, guesswork. With a growing population of three-hundred thousand in California, practically all of eastern origin and affiliation, the situation became materially changed and the necessity of railroad communication became blatantly obvious. President/s Pierce, Buchanan and Lincoln, in several messages to Congress, strongly recommended its construction and found support on both sides of the aisle. The matter had, by now, been thoroughly discussed and debated (both in and out of Congress) and the whole country was convinced of the advisability of its construction. All that was needed now was a leader and a feasible plan. From 1850 to 1860, the question competed with that of the abolition of slavery in public interest. Survey after survey was undertaken by the Federal Government and private parties. Senator Benton was first to introduce a resolution seeking the appropriation of sufficient funds to pay for a survey (in 1851). 35

"A vast extent of country was to be accurately surveyed, and numerous lines, thousands of miles in extent, to be examined; and it is hardly, therefore, to be hoped that such data can be collected as will satisfactorily answer the question proposed. But it is confidently believed that much information will be added to the stock previously possessed, perhaps enough to determine the practicability of the proposed enterprise...The information which has been received from the parties now in the field is too limited and imperfect...When the reports of these parties shall have been received, or at the date prescribed by Congress, it is my purpose to submit a condensed statement and map, exhibiting all the reliable information possessed, with profiles annexed of all instrumental surveys which have at any time been made...To ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean."

Jefferson Davis, U.S. Secretary of War

RE: excerpt from: "Report of the Department of War" (to POTUS Franklin Pierce, 1853). With the signing of the Treaty of Guadalupe Hidalgo in Mexico City on February 2nd 1848, which ended the Mexican-American War, the boundaries of the United States were extended west to the Pacific Ocean. The treaty granted the U.S. more than 525K square miles of former Mexican territory that includes present-day Arizona, California, Western Colorado, Nevada, New Mexico, Texas and Utah. With the discovery of gold in California the following year and its admission to the Union as a state in September 1850, the question of building a Pacific Railway - for both commerce and national defense - was no longer a question of "if" but, rather, "when?" Thus, on March 3rd 1853, Congress authorized the expenditure of \$150K by the War Department to conduct extensive: "explorations and surveys...to ascertain the most practicable and economical route for a railroad from the Mississippi River to the Pacific Ocean." Within two months, the surveys of five potential routes by parties of U.S. Army topographical engineers were underway. 36

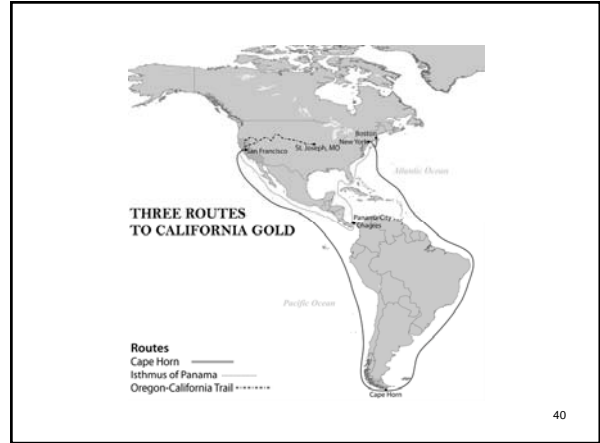


38

"The necessity that exists for constructing lines of railroad and telegraphic communication between the Atlantic and Pacific coasts of this continent is no longer a question for argument; it is conceded by everyone. In order to maintain our present position on the Pacific, we must have some more speedy and direct means of intercourse than is at present afforded by the route through the possessions of a foreign power. The importance of our Pacific possessions is felt in every pursuit and in every relation of life. The gold of California has furnished the merchant and trader with a capital by which enterprises have been undertaken and accomplished which were before deemed impracticable. Our commercial marine has been nearly doubled since 1848; internal improvements have been pushed forward with astonishing rapidity; the value of every kind of property has been doubled; and the evidences of prosperity and thrift are everywhere to be seen. The security and protection of that country, from whence have emanated nearly all these satisfactory results, is of the greatest importance; and that can be accomplished only by direct and easy communications through our own territories. Railroads will effect this. At present, we are forced to resort to a very circuitous route by sea, through the tropics and across the continent, at the most sickly point in the torrid zone. Should a war break out between our country and any other maritime nation, or should a difficulty arise with one of the petty Spanish-American States through which these routes lie, our communications would be interrupted, and the unity of our confederacy actually broken up..."

RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

39



40

"...These lands are now totally without value, no matter how fertile they may be, and to the government worthless. By giving away one half for the construction of the proposed roads, the government will thereby attach a value to the remainder; and whatever that value may be, will be the amount the government is gainer by the transaction...From the results of the surveys authorized by Congress, we derive, at least, the assurance that the work is practicable; and may dismiss the apprehensions which, previously, we could not but entertain as to the possibility of defending our Pacific territory through a long war with a powerful maritime enemy. The judgment which may be formed as to the prospect of its completion, must control our future plans for the military defense of that frontier; and any plan for the purpose which should leave that consideration out of view, would be as imperfect as if it should disregard all those other resources with which commerce and art aid the operations of armies...Beyond the direct employment of such a road for military purposes, it has other relations to all the great interests of our confederacy, political, commercial, and social, the prosperity of which essentially contributes to the common defense...the additional resources which it would develop, and the increase of population which must attend upon giving such facility of communication to a country so tempting to enterprise, much of which, having most valuable products, is beyond the reach of market."

RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

41

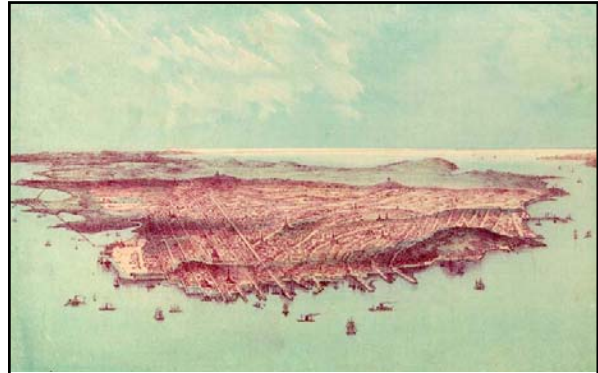
Best Route West

42

"...That, in selecting a route for this line, regard should be had to the geographical position of the thirty-one States of the Union relatively to each other as they are now formed and settled; and also to other lines of railway now leading to the Mississippi valley. By an examination of the map of the United States and tracing the different lines of railroad thereon designated, the converging termini of these roads will be found to be at a point on the Missouri river, somewhere between the parallels of thirty-nine and forty-one degrees of north latitude and from such a point the road, should be commenced at this end, and follow the most direct and practicable route to San Francisco. The harbor of San Francisco is acknowledged to be the best on the Pacific coast; and that port is now the great center of all the commercial relations of our western coast. The Columbia river at the north will in time become a point of importance as a commercial port for the inhabitants of Oregon and Washington Territories, and at the south we have the port of San Diego, with a good harbor but less capacious than either of the others. It is believed, however, that no route can be made generally satisfactory, under the present state of things, which does not contemplate San Francisco as the terminus on the west, and at the east some point sufficiently central to accommodate the greatest amount of population and business enterprise. In this instance, as in all others of a like nature, the same rule of action should be observed which lies at the foundation of all success, namely, a due regard to the great centers of commercial enterprise and industry. Keeping this idea in view, it will be at once conceded that, other things being equal, this road, if built at all, should be built through such districts as will be most likely to concentrate the largest amount of population in the shortest time. The explorations and surveys, reports of which accompany the report of the Secretary of War, are sufficient to decide upon what route the road should be built..."

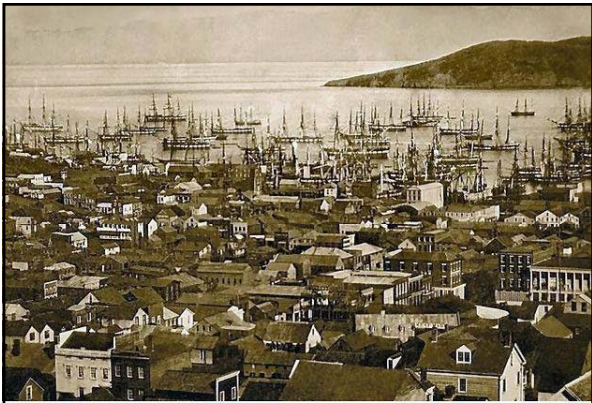
RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

43



Above: caption: "Bird's-Eye View of San Francisco"

44



Above: one of the earliest photos of San Francisco. Ships in the harbor and Yerba Buena Island (after the Gold Rush began, ca. 1851)

45

"...There are undoubtedly preferences according to sectional localities; but, if only one road is to be built, the weightiest arguments would unquestionably tend to a decision in favor of a route which, if practicable, will accommodate the greatest amount of the busy population of the country. The determination of a route for a railroad is not always to be governed by the facility or cheapness with which it may be constructed. If such were the case, many roads would be built in favorable localities where there are but limited means for their support..."

RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

46



"...Profile No. 1 is of the most northern line, commencing at St. Paul, and terminating either at Vancouver, or Columbia river, or Seattle, in Port Discovery, on Puget's sound. Profile No. 2 is of a line commencing at Westport or mouth of Kansas river, passing through South Pass, and terminating at the same point as No. 1. Profile No. 3 is of a line commencing at Council Bluffs, and going through the Cheyenne and Bridger's Passes of the Rocky mountains, and near Salt Lake, across the Great Basin, through Madeline Pass and Sacramento valley, to Benicia, in San Francisco bay. Profile No. 4 is of the central route, through Sangre do Christo and Coo-che-to-pa Passes to the Great Basin, where the route was abandoned as impracticable. Profile No. 5 is of a cross-route from Independence, Missouri, to El Paso del Norte. Profile No. 6 is of a route from Fort Smith, passing near Santa Fe, and terminating at San Pedro. Profile No. 7 is the southern route, from Fulton, through El Paso, El Dado, mouth of the Gila, and Gorgonia Pass, to Martinez, on an arm of San Francisco bay, opposite Benicia. Profile No. 8 is a spur of the last-named route, commencing at Indianola, Texas, a harbor on the Gulf of Mexico..."

RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

47

"...The information contained in the report and estimates furnished by the Secretary of War would lead to the rejection of all these routes, except the 1st, 3d, and 7th - that is to say, the routes of the 47th, 41st, and 32d parallels of latitude. On profile No. 2 there is no estimate or report, the minutes seeming to be made up by former reports not combined with the late surveys or explorations.

Profile No. 4 is left unfinished, and is declared impracticable.

Profile No. 5, a cross-line, is not suitable for the road in question.

Profile No. 6 is considered as too expensive, and is objectionable on the score of high grades.


...The profiles of all these routes exhibit only the lines of average grades. Undoubtedly many undulations will occur in construction which are not at present represented. An analysis of what is given is shown in the following table...

	Total length of road.					Maximum grade.	
	Miles.	Miles.	Miles.	Miles.	Miles.	Feet.	
Profile No. 1, northern line...	2,025	1,761	964	20	116	3.5	204
Profile No. 2, central line...	1,968	1,747	864	71	6	3.6	155
Profile No. 3, southern line...	2,096	1,657	919	101	141	3.5	183
Profile No. 7, southern line...	2,029	1,661	879	119	87	7.0	172

...On an examination of this table, the extraordinary proportion existing among all the lines of somewhere about eight-five per cent, of the length of each, consisting of gradients of thirty feet per mile and less to a level, will be apparent..."

RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

48



“...The map and profiles accompanying the Secretary’s report indicate five distinct routes from the Mississippi valley to the Pacific ocean...”

RE: excerpt from: “Report of the Select Committee on the Pacific Railroad and Telegraph” (August 1856)

Left: caption: “Map of routes for a Pacific railroad, compiled to accompany the report of the Hon. Jefferson Davis, sec. of war. G. K. Warren, Lt. top. engr. 1855.” Map of the U.S. (west of the Mississippi) showing the relationship of the proposed railroad routes.

49

“...Profile No. 1, of the northern line, is very favorable, and must be allowed to be superior to all the others, both in its grades and the small sum of ascent and descent. Were there no other questions to be taken into consideration, this route would certainly be preferable to all the others as regards facility of construction. The objections to it are, its high northern latitude, leaving almost the whole United States territory to the south of it; its requiring a tunnel at Cadotte Pass four and a half miles in length; its terminating in a remote corner of the country at a great distance from the commercial center of the Pacific coast; and its high cost as given in the Secretary of War’s report. Profile No. 2 represents a line terminating at the same points as above, is longer than that of No. 1, and is more objectionable on account of its grades, thirty-eight miles of which rate from sixty to ninety feet per mile and one hundred and sixteen miles rate from ninety to three hundred and twenty-four feet per mile...”

RE: excerpt from: “Report of the Select Committee on the Pacific Railroad and Telegraph” (August 1856)

50

“...Route No. 3, the central route, as respects grades is second only to No. 1, and is greatly superior to any of the others. It has seventy-one miles, rating from sixty to ninety feet per mile, and only six miles above ninety feet per mile, the maximum grade being one hundred and twenty-five feet per mile; but that grade is only three miles and sixteenths of a mile in length. Besides, the whole of this extreme high grade is concentrated at the western pass of the Sierra Nevada mountain, and may probably be modified so as to be reduced to a rate of ninety feet per mile, or less. Indeed, it is stated in the report that a new, and apparently more feasible, route has been discovered since the report of Lieutenant Beckwith was made. The total rise and fall in this line is twenty-nine thousand one hundred and twenty feet...”

RE: excerpt from: “Report of the Select Committee on the Pacific Railroad and Telegraph” (August 1856)

51

“...Profile No. 6, continued to San Francisco bay, by the western portion of profile No. 7, shows one hundred and forty-one miles’ length of gradients ranging above ninety feet per mile, with a maximum grade of one hundred and eighty-three feet per mile for three and a half miles, and a total cost of \$169,000,000. Profile No. 7 represents the southern route two thousand and thirty-nine miles from Fulton to San Francisco bay. As respects grades, this line is much inferior to that of profile No. 3, the central line. There are one hundred and twelve miles having grades varying from sixty to ninety feet, and thirty-seven miles with grades above ninety feet per mile, to which must be added a maximum grade of one hundred and seventy-three feet per mile for a distance of seven miles and two-tenths of a mile. These high grades are distributed occasionally throughout the length of the line, rendering it necessary to stock a large portion of the whole length of the road with the heaviest and most expensive locomotives. Of the grades above ninety feet per mile on this route, we have those of 91, 93, 94, 95, 108, 115, 119, 132, 155, and 157 feet per mile, besides the maximum of one hundred and seventy-three feet per mile. The total rise and fall upon this line is forty-two thousand nine hundred and thirty-four feet...”

RE: excerpt from: “Report of the Select Committee on the Pacific Railroad and Telegraph” (August 1856)

52

And the Winner is...

53

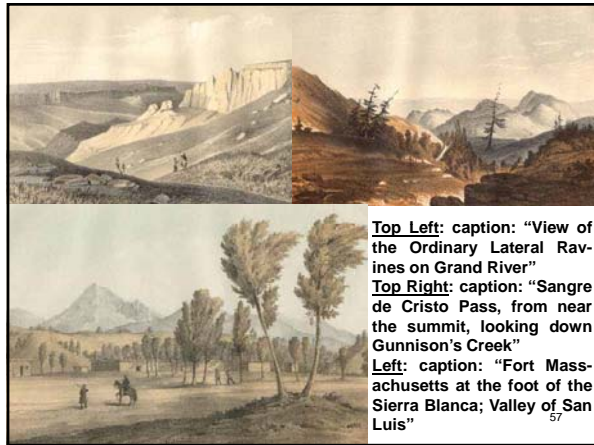
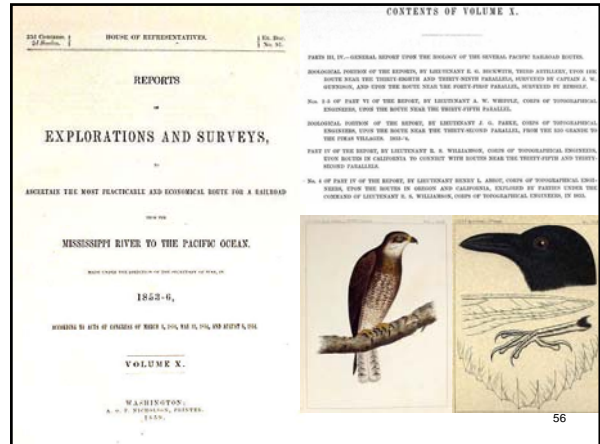
“...Admitting that each of these three routes is suitable for the purpose of constructing a good and sufficient railroad, it must also be admitted that, as regards gradients, the northern line is superior to the other two; and as regards expense, the southern line is superior to the others. The manner of estimating, however, is open to criticism...The Secretary of War objects to the northern line because it runs so near the territory of a powerful foreign government...the central line is the shortest between the two great commercial cities on the Atlantic and Pacific coasts...The northern line does not accommodate the State of California at all without an addition of about 580 miles parallel to the seacoast to carry the line to San Francisco bay. Objection has been made in some quarters to northern and central lines on account of the deep snows common to high northern latitudes...Taking a broad view of the whole matter, the construction, the condition when built, the amount of population to be accommodated, and the amount of moving population to support the road, added to various other considerations not here enumerated, there would seem to be no question as to the vast preponderance of the reasons in favor of the central line...”

RE: excerpt from: “Report of the Select Committee on the Pacific Railroad and Telegraph” (August 1856)

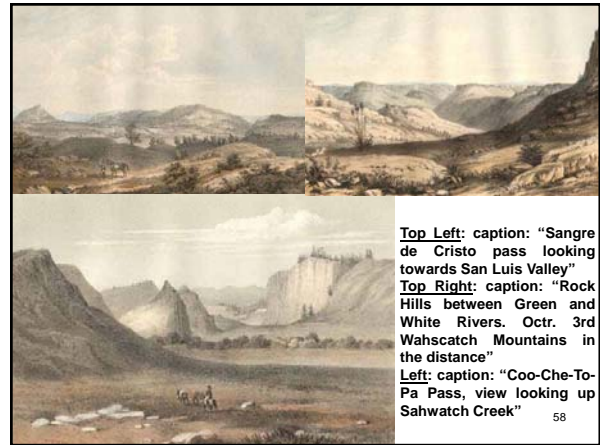
54



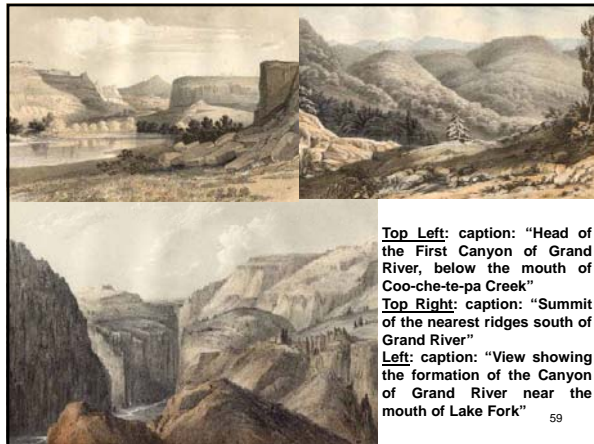
The "Pacific Railroad Surveys" (published from 1855-61 by the U.S. Government Printing Office in Washington, D.C.) included extensive investigation of wildlife along the routes studied. Color lithographs by John Mix Stanley (from sketches by R.H. Kern) were included in the twelve volume "Pacific Railroad Survey Reports" (left T&B). Each volume was broken down as follows:
VOLUME I: The introductory volume;
VOLUME II: The Kansas-Colorado-Utah route;
VOLUME III: The 35th parallel route, along with the Ethnographic report;
VOLUME IV: The botanical report on the 35th parallel route;
VOLUME V: The first Southern California volume;
VOLUME VI: The California / Oregon report;
VOLUME VII: The second Southern California volume;
VOLUME VIII: The first volume of the Zoology report;
VOLUME IX: The second volume of the Zoology report;
VOLUME X: The third volume of the Zoology report;
VOLUME XI: The map volume, and;
VOLUME XII: The Northern route report, along with the summary



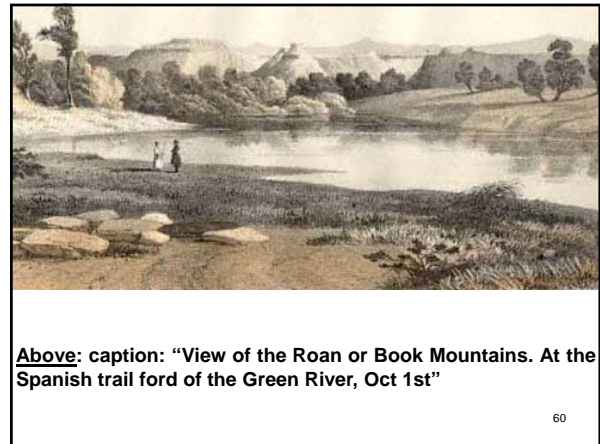
Top Left: caption: "View of the Ordinary Lateral Ravines on Grand River"
Top Right: caption: "Sangre de Cristo Pass, from near the summit, looking down Gunnison's Creek"
Left: caption: "Fort Massachusetts at the foot of the Sierra Blanca; Valley of San Luis"



Top Left: caption: "Sangre de Cristo pass looking towards San Luis Valley"
Top Right: caption: "Rock Hills between Green and White Rivers. Octr. 3rd Wahsatch Mountains in the distance"
Left: caption: "Coo-Che-Topa Pass, view looking up Sahwath Creek"



Top Left: caption: "Head of the First Canyon of Grand River, below the mouth of Coo-che-te-pa Creek"
Top Right: caption: "Summit of the nearest ridges south of Grand River"
Left: caption: "View showing the formation of the Canyon of Grand River near the mouth of Lake Fork"



Above: caption: "View of the Roan or Book Mountains. At the Spanish trail ford of the Green River, Oct 1st"



Top: caption: "A Cotton Wood Grove"
Bottom: caption: "Camp Red River"



61



Top: caption: "Fort Union, and distribution of goods to the Assiniboines"
Bottom: caption: "Blackfeet Indians - Three Buttes"



62



Top: caption: "Fort Benton"
Bottom: caption: "Herd of Bison Near Lake Jessie"



63



Top: caption: "Humboldt Pass"
Bottom: caption: "Franklin Valley"



64




Above: caption: "West End of Madelin Pass June 26th, 1854 at 8 am, from a peak overlooking Madelin Creek. Mount Shasta at the distant left. Sacramento River descending through Round Valley in the distant center."
Left: caption: "Mount Shasta and the Pitt River 25 miles south of Mt. Shasta Northern California"



65

"...A further survey, however, for a final location will be necessary, and this, it is believed, could be best accomplished by a mixed commission of engineers. One-half of this commission should consist of gentlemen in the employ of the United States government, and the other half should be taken from the most eminent of the profession, who have heretofore been employed upon railroads and public works by corporations. In the appointment of commissioners to superintend and take charge of the construction of the work, there should be appointed, in connection with the Secretary of War, a board of directors, or commissioners, consisting of not less than five, nor more than thirteen, practical, experienced men - men who have been engaged heretofore on works of a like kind. A portion of this board should be constantly on duty on the line of road. Propositions should then be called for, and 200 miles of road at each end be placed under contract simultaneously, and the further progress should be as rapid as prudence and circumstances would permit..."
RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

66



Left: caption: "Map of the territory of the United States from the Mississippi River to the Pacific Ocean; ordered by Jefferson Davis, Secretary of War to accompany the reports of the explorations for a railroad route. Compiled from authorized explorations and other reliable data by G.K. Warren...under the direction of W.H. Emory in 1854 and of A.A. Humphreys 1854-1855-1856-1857. Drawn by E. Freyhold. Engraved on stone by J. Bien. Washington, D.C., War Dept., 1858."

67

"...For the purpose of meeting the expenditure necessary to carry on this work on the part of the government, an appropriation of one hundred millions of dollars should be made by Congress, to be supplied in the following manner, namely. That all surplus money in the United States Treasury, after defraying the ordinary current expenses of the government, should be appropriated to this use; and, that, if necessary, bonds of the United States government, having thirty years to run, and bearing five per cent. interest, should be issued in such annual amounts as the requirements of expenditure on the work might demand. For the redemption of these bonds at maturity, the public lands of the United States, not otherwise appropriated, should be set apart; and from and after the first of July, 1857, a sinking fund should be established for this purpose, to be made up of the avails of these lands as rapidly as they are disposed of..."


RE: excerpt from: "Report of the Select Committee on the Pacific Railroad and Telegraph" (August 1856)

68


"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of constructing a wagon road, a railroad, and a telegraphic line of communication from a point on the Missouri river, between the thirty-ninth and forty-first degrees of north latitude, (said point to be finally determined as hereinafter provided,) to the Pacific ocean, at or near the city of San Francisco, in the State of California, the sum of one hundred millions of dollars shall be, and is hereby appropriated..."

RE: excerpt from: "A BILL to provide for the construction of a wagon road, a railroad, and a telegraphic line of communication from a point on the Missouri river, between the thirty-ninth and forty-first degrees of north latitude, to the Pacific ocean, at or near the city of San Francisco, in the State of California" (1856)

69



Left: this C. Everett Johnson painting depicts the August 1859 meeting between Abraham Lincoln and Grenville Dodge in Council Bluffs, Iowa. On this hot day, on the porch of the Pacific House Hotel, Lincoln asked Dodge his opinion of the best route for a transcontinental RR. Also in 1859, the "mile-high" city of Denver, Colorado was founded (as a result of the "Pike's Peak Rush"). More isolated and unprotected than even far-off San Francisco, it was seen as a potential half-way point of a Pacific Railway.




Above: bird's-eye view of Denver (ca. 1881)

70

A House Divided

71



"Previous to 1850 by far the greater portion of railroads constructed were in the States bordering the Atlantic, and...were for the most part isolated lines, whose limited traffics were altogether local...The internal commerce of the country was conducted almost entirely through water lines, natural and artificial, and over ordinary highways. The period of settlement of California marks really the commencement of the new era in the physical progress of the United States. The vast quantities of gold it produced imparted new life and activity to every portion of the Union, particularly the western States, the people of which, at the commencement of 1850, were thoroughly aroused as to the value and importance of railroads."

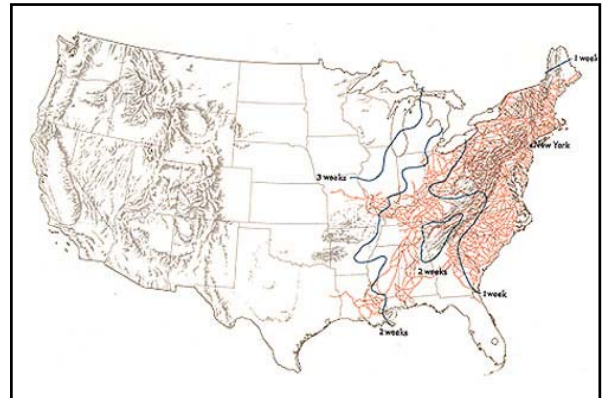
Joseph C.G. Kennedy, Superintendent of the 1860 Census

RE: excerpt from his report to Congress

72



Above: caption: "Canal Era, 1825-1860" 73

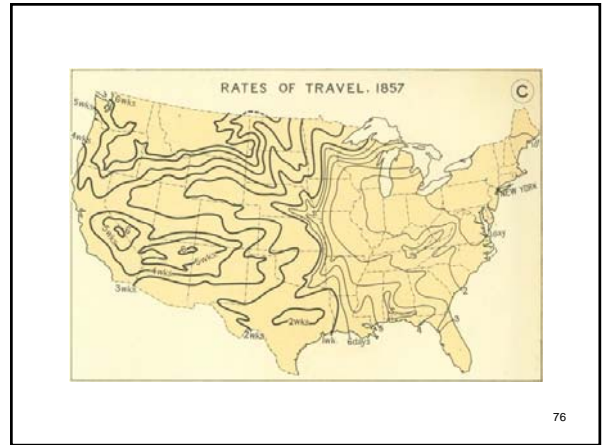


Above: caption: "Roads and Travel Times, 1830" 74



Left: caption: "Map showing in five degrees of density, the distribution, within the territory east of the 100th Meridian, of the population of the United States, excluding Indians not taxed. Compiled from the returns of population at the eighth census (1860)"

75



76

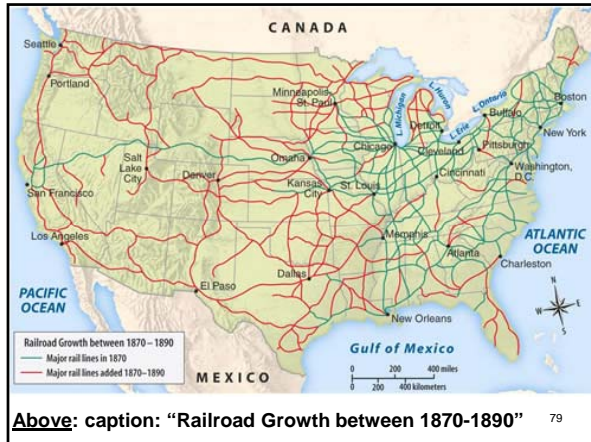


Left: the first railroads and tracks were financed by local governments and private investors in towns and cities along waterways. They were often built to provide links where a canal was impractical. These short-distance lines helped communities tap potential markets in the surrounding countryside. Extension and connection of these lines soon provided uninterrupted transportation over longer distances. In 1840, the United States had almost three-thousand miles of track. By 1860, mileage had been multiplied ten-fold. A network of thirty-thousand miles linked most of the nation's major cities and towns. Most lines were relatively short and there was no standardized track width (a.k.a. "gauge")

77

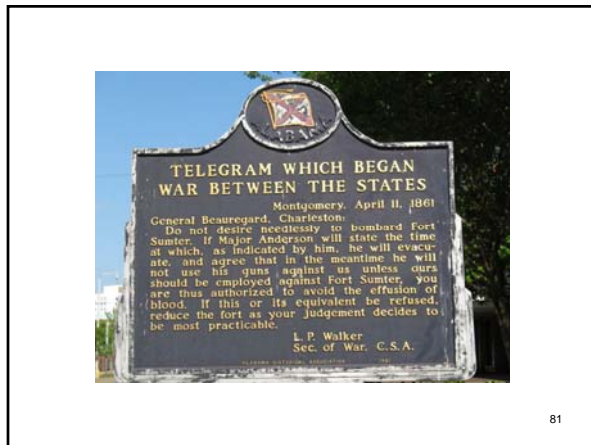


78



Given the tenor of the times, the question of slave and/or free state entered into the debate over the route for a transcontinental RR. "You shall not build through free soil," stated the southern interests in Congress while northerners proclaimed: "we won't permit it to run through the slave states." Compromise was impossible under the circumstances thus, it was not until the southern opposition had been eliminated from Congress (by their secession from the Union in April 1861) was any legislation/action possible. War had come making an overland route to the Pacific Ocean a strategic military necessity. The Central Pacific Railroad (CPRR) had been well organized and was straining at the leash to get started. On the other hand, the Union Pacific Railroad (UPRR) was more diffuse in its personnel and interests. Consequently, the operations of the CPRR would commence first. The outcome of the War Between the States was yet to be decided on the battlefield.

80



By the beginning of hostilities in April 1861, the Federal Government was straining to what seemed the breaking point; their credit and resources to carry on the war and, as a government enterprise, the building of a transcontinental RR appeared to be an impossibility. Yet, the Unionists on the Pacific coast still demanded better communication even after the many defeats of the Union Army in the field. Even so, most northerners were convinced of its necessity. In effect, it had resolved itself into a question of ways and means. Government surveys had demonstrated the existence of five feasible routes through or over the Rocky Mountains:


- Northern Trail (Profile No. 1)
- Mormon Trail (Profile No. 2)
- Buffalo Trail (Profile No. 3)
- Thirty-fifth Parallel Trail (Profile No. 6)
- Southern Trail (Profile No. 7)

82

- The estimate for the Northern Route (from St. Paul, MN to Vancouver, BC, by way of the upper Missouri River) was 1,854 miles, at a cost of \$117,121,000 (subsequently increased by the War Department to \$130,781,000);
 - The estimate for the Mormon (a.k.a. "Middle") Route (from Council Bluffs, Iowa to San Francisco, CA, by way of the South Pass and Salt Lake City, Utah) was 2,032 miles, at a cost of \$116,095,000;
 - The estimate for the Buffalo (a.k.a. "Central") Route, from Old Westport (Kansas City), Missouri to San Francisco (by way of John C. Fremont's Cochetopa Pass of the southern Colorado Rockies) was 2,080 miles, at a cost deemed "impracticable" (thus fell from grace Senator Thomas Hart Benton's favored scheme);
 - The estimate for the Thirty-fifth Parallel Route (from Fort Smith, Arkansas to San Pedro CA, by way of the Texas "Panhandle," northern New Mexico and northern Arizona across to Needles, CA, at the Colorado River) was 1,892 miles, at a cost of \$169,210,255, and;
 - The estimate for the Southern Route (from Fulton, Arkansas at the Red River of southwestern Arkansas to San Pedro, by way of central Texas and southern Arizona) was 1,618 miles, at a cost of \$68,970,000.
- 83

Prima Fascia

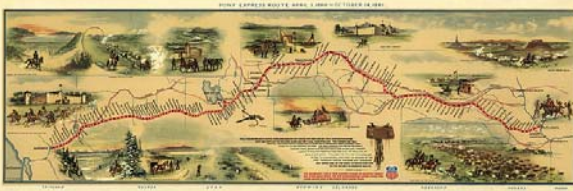
84



CENTRAL PACIFIC
RAILROAD COMPANY

ORGANIZED: JUNE 28, 1861

Civil Engineer *Theodore D. Judah* had explored the *Sierra Nevada Mountain Range* for a railroad route out of and into *California*. He had addressed a railroad meeting in *San Francisco* in September 1859, attended by delegates from *Washington Territory, Oregon* and *California*. The meeting had called upon Congress to note that the stages by the *Oregon* and *California Trails* had been operated regularly; summer and winter, and that *California* was prepared to welcome an incoming railroad at the state line with another railroad. Judah appeared before Congress and in June 1861, the "Central Pacific Railroad of California" was incorporated.



Congress then adopted, nearly unanimously, the "Middle Route" (a.k.a. "South Pass" and/or "True Pacific" Route). For years, this had been the route of fur traders and trappers, immigrants, the *Overland Stage Coach* and the *Pony Express*. The prevailing wisdom being that if these various interests had agreed to this being the shortest and best route, it was *prima facie* evidence that there were good reasons for their decision. It was incontrovertible that it was the shortest route that reached the desired territory. Congress' decision was reinforced by numerous government surveys.

Above: map of the 1860 *Pony Express* route by *William Henry Jackson*

"I could have told you fellers all that in St. Louis an' saved you the expense of bringin' me here. Thar's whar you fellers can cross with your road, an nowhar else without more diggin' an' cuttin' than you think of."

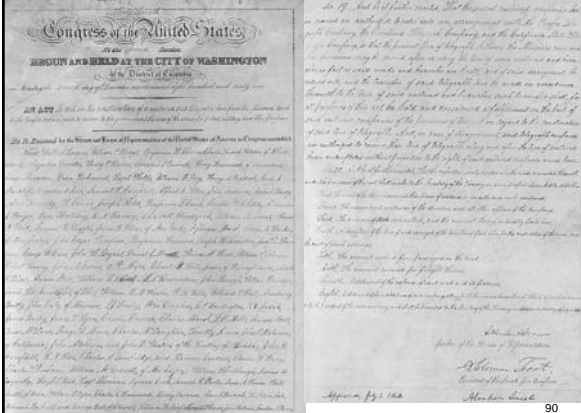
Jim Bridger

RE: Bridger – a legendary trapper, trader, scout and Indian fighter, was brought in to *Denver, CO.*, by the UPRR's engineers to ask his advice on the best route to cross the *Rocky Mountains*. Denver was considered to be of great importance as an intermediate traffic point in the journey by rail to the Pacific. For three years, surveys were conducted through the Rockies seeking to find a viable route across. Altitudes of over eleven-thousand-feet, with snow and sharp grades (necessitating tunnels from two to six miles long) confounded the UPRR engineers. The alternative was to turn directly north again (from Denver) and double-back to the *Laramie Plains of Wyoming*. North of Denver there were two-hundred miles of mountain chain, ranging from the snowy heights of *Berthoud Pass* at 11,500-feet (the pass advocated by the Denver-route enthusiasts) to the eight-thousand-foot elevations of the *Black Hills* (the three passes through the Black Hills contained an extent of almost unknown country of one-hundred and thirty miles length. With a bit of charcoal, Bridger drew on a piece of paper an outline of the impenetrable range. Denver realized a direct route through the Rockies was not feasible and, instead, planned for a connection with the main line route of the UPRR.

The Curtis Bill

"An Act to aid in the construction of a railroad and telegraph line from the Missouri River to the Pacific Ocean and to secure to the United States Government, the use thereof for postal, military, and other purposes."

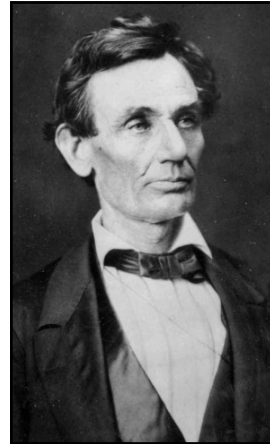
RE: title of the Bill creating the UPRR. Authored by Congressman *S.R. Curtis of Iowa*. It was known as the "Curtis Bill." The bill passed the Senate on June 20th 1862 by a vote of thirty-five to two and became law on July 1st 1862. In addition to creating the *Union Pacific Railroad Company*, it also authorized the *Central Pacific Railroad Company* to build a railroad from *Sacramento* to the eastern boundary of *California*, where it was to connect with the UPRR. The bill also recognized a company chartered by the legislature of *Kansas* under the name of the *Leavenworth, Pawnee and Western Railway Company* (later known as the *Kansas Pacific Railway*). This latter line was to be built from *Leavenworth* west to a junction with the UPRR at or near the hundredth meridian (about 250 miles west of *Omaha, Nebraska*). The principal features of the bill were the creation of a "Board of Commissioners" consisting of one-hundred and fifty-eight commissioners to represent the interests of the Federal Government, to be named by the Secretary of the Interior. The Curtis Bill which, in reality, constituted a charter, also provided that the gauge of the road and its eastern terminus be determined by the POTUS.



Above & Left: the *Pacific Railway Act of 1862*

"I give no grudging vote in giving away either money or land. I would sink \$100,000,000 to build the road, and do it most cheerfully, and think I had done a great thing for my country. What are \$75,000,000 or \$100,000,000 in opening a railroad across the central regions of this Continent, that shall connect the people of the Atlantic and Pacific, and bind us together? Nothing. As to the lands, I don't begrudge them."
 Senator Henry Wilson of Massachusetts

91



"I, Abraham Lincoln, President of the United States, do upon application of said Company (The Union Pacific Railroad) designate and establish such first above named point on the western boundary of the state of Iowa east of and opposite to the east line of Section Ten in Township fifteen, north of range thirteen, east of the sixth principal Meridian in the territory of Nebraska. Done at the city of Washington this 7th day of March in the year of our Lord 1864. Abraham Lincoln."

RE: the first move towards the construction of the Pacific Railway was the selection of an eastern terminus which, by the charter, was left to the POTUS. This was fixed by President Lincoln on December 2nd 1863 and was officially announced on March 7th 1864.

Left: an early print of this Alexander Hester image hangs in the UPRR museum. Taken in 1860 as a campaign photograph, it shows a beardless Lincoln (much as he looked when he had his initial meeting with Grenville Dodge in Council Bluffs, Iowa, in 1859). Dodge and Lincoln, after a chance introduction, discussed the possibilities of a transcontinental RR.



Above: a 56-foot tall "Golden Spike" was erected in Council Bluffs, IA (in 1939) to mark the eastern terminus of the UPRR
 Left: vintage postcard of the Golden Spike monument

93

"To lay out, locate, construct, furnish, maintain and enjoy a continuous railroad and telegraph, with the appurtenances...shall commence at a point on the one hundredth meridian of longitude west from Greenwich, between the south margin of the valley of the Republican River and the north margin of the valley of the Platte River, in the territory of Nebraska, at a point to be fixed by the President of the United States, after actual surveys; thence running westerly upon the most direct, central and practicable route, through the territories of the United States, to the western boundary of the territory of Nevada, there to meet and connect with the line of the Central Pacific Railroad Company of California...The track upon the entire line of railroad and branches shall be of uniform width, to be determined by the President of the United States, so that, when completed, cars can be run from the Missouri River to the Pacific coast; the grades and curves shall not exceed the maximum grades and curves of the Baltimore and Ohio Railroad (116-feet to the mile and radius of 400-feet to the mile); the whole line of said railroad and branches and telegraph shall be operated as one connected continuous line...A continuous line of railroad, ready for use, from the Missouri River to the navigable waters of the Sacramento River, in California, by the first day of July, eighteen hundred and seventy-six."

RE: Congressional authorization of the "Board of Commissioners of the Union Pacific Railroad and Telegraph Company"

94

The *Central Pacific Company of California* was to build east from the Pacific coast at or near *San Francisco* to the eastern boundary of *California* and there meet and join the UPRR and form one continuous line with it. The CPRR was required to complete fifty miles of road within the first two years after assent to *The Pacific Railway Act*, and fifty miles each year thereafter. The UPRR was required to complete one-hundred miles of road and telegraph west from the border of *Iowa* within the first two years and one-hundred miles-per-year thereafter. The connection at the *Nevada-California* boundary was to be made within twelve years, or before the first day of July, 1874. There were other provisions, including penalties for non-completion according to specifications and for defaults in payments of principal and interest.

95

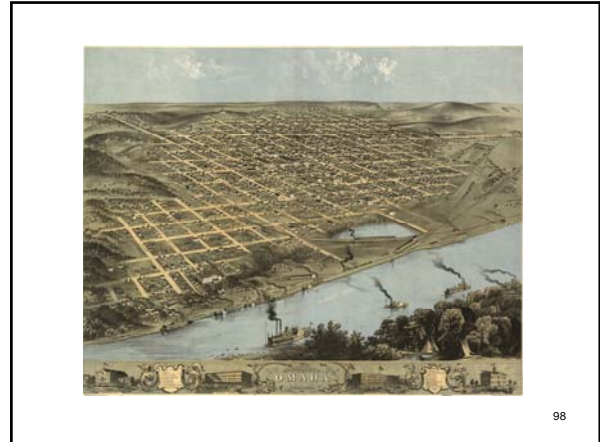
Make One the People

96

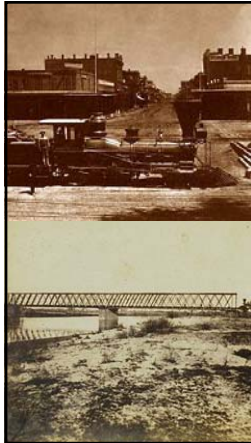


Top: the city of *Omaha, Nebraska* was not much more than a village when it was selected as the eastern terminus in December 1863. It would be another year-and-a-half before the first rail was laid near the *Missouri River* on July 10th 1865. The UPRR commenced at a point on the hundredth meridian west of *Greenwich, England*, between the valley of the *Platte River*, to the north, and the valley of the *Republican River*, to the south. Branch lines (known as the "Iowa Branch") ran from this point to the *Missouri River*. To the west, the UPRR was to extend to the eastern border of *California*, where it was to connect with the CPRR.

Bottom: the UPRR's headquarters was located in the former *Herndon House*, Omaha's first major hotel. This photograph was taken in 1870. Note the large sign (highlighted): "General Offices - Union Pacific Railroad Company." 97



98



At *Sacramento*, the starting point of the CPRR, the road was located on an embankment, which formed a levee that protected the city from the flood waters of the *American River* - one of the broadest streams flowing from the *Sierra Nevada* range. About three-and-a-half miles from the initial point, the river (flowing due west) was crossed by the largest bridge on the entire line. At the crossing point the *American River* is about 700-feet wide, with wide bottom lands on both sides that flood in times of high water.

Top: caption: "J Street, from the Levee"

Bottom: caption: "American River Bridge" 99



100



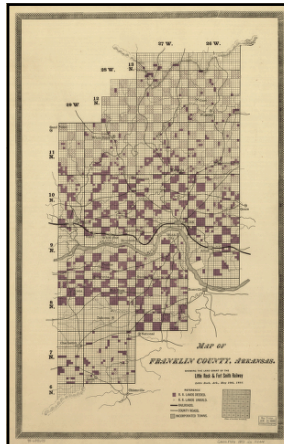
As first built, the bridge over the *American River* consisted of two spans covering a distance of 400-feet. In addition, there was a trestle approach on the south (*Sacramento*) side of 2,196-feet and one on the north side of 2,890-feet (over the bottom lands of the river). The total length of trestle was thus 5,086-feet, making the total length of the bridge 5,486-feet (over a mile long). Trusses of the bridge were simple *Howe* trusses where all members (including the lower chord) were made of timber. Only the vertical members were made of iron (above). The original bridge was founded on pile piers that were later replaced by stone masonry piers. The stone piers rested on piles that had been driven into the bed of the river, cut-off below low water and covered with a timber grillage. 101

The first bridge was destroyed by fire a few years after it was completed.

The *Central Pacific Company of California* was entitled to a right-of-way, through public lands, of two-hundred-foot width on either side of their tracks and the privilege of taking earth, stone, timber and other material from the public lands adjacent. The Federal Government pledged to dispossess the native Indian tribes and, with it, their title to the land along the entire route. This provision was considered necessary considering the fact that the government had entered into a contract to deliver land that it did not actually own. As a subsidy, vacant lands within ten miles on either side of the line (for five alternate sections per mile) were granted (with the exception of mineral lands). As further financial assistance, the government would lend thirty-year bonds (at 6% interest) as follows:

- on 150 miles of mountain construction - \$48K per mile;
- on construction to the base of the mountains - \$16K per mile;
- on the construction through the basin between the *Rocky Mountains* and the *Sierra Nevada Range* - \$32K per mile.

The whole amount of the loan could not exceed \$50 million. Government dispatches, troops, mails, munitions etc. were to be forwarded at fair rates not in excess of rates charged to private parties and the compensation agreed to would be credited by the government upon the payment of the CPRR's indebtedness to it. Permission was also given to utilize, if desired, the already existing telegraph line. All rails and iron used in the construction were required to be of American origin. 102



Both the CPRR and UPRR received 400-foot right-of-ways plus ten square miles of land for every mile of track built. However, the land was **NOT** ten contiguous square miles of land. Instead, it was ceded in a "checkerboard" pattern (leaving Federal land in between). In a 20-mile wide land grant, the companies ended up with ten square miles of land on each side of the track. The federal government's plan was that the railroads would sell their land to pay for the construction of the rail lines.

Left: this 1893 map of *Franklin County, Arkansas* shows the typical checkerboard pattern of railroad land grants. The dark shaded areas were granted to the *Little Rock & Fort Smith Railway Company*.

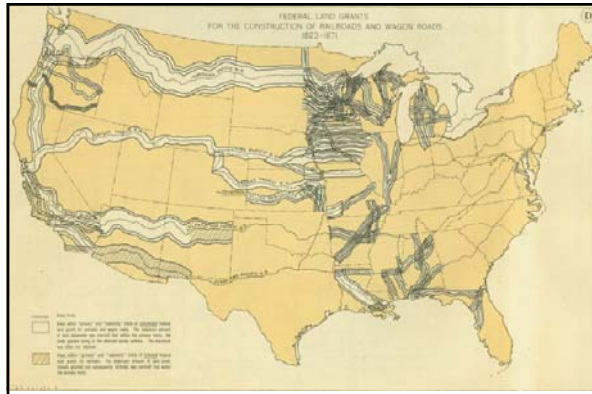
103

Despite this apparent governmental generosity, there were several serious flaws with the land-grant plan:

- few people wanted to buy any of that land until after the rail lines were constructed;
- on all of the land, severe problems existed with the Native American inhabitants who were upset, to say the least, at being dispossessed of their ancestral lands, and;
- most of the land was located in barren parts of western states where it was very difficult and/or impossible to establish commercial venues (i.e. farms and/or ranches)

Despite these flaws, from 1850-1871, the railroads received more than seventy-five million acres of public land - an area more than one tenth the size of the entire *United States* and larger in area than the *State of Texas*.

104

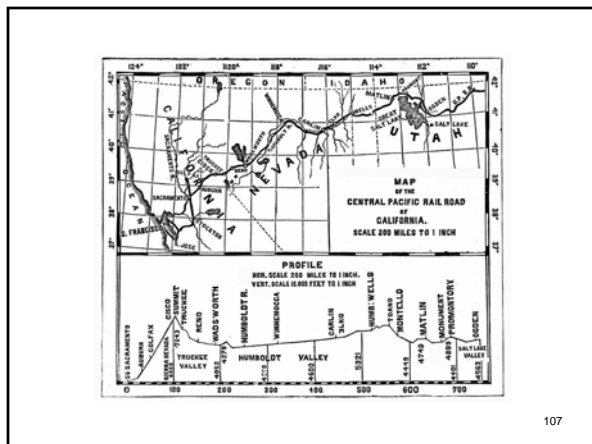


Above: caption: "Federal land Grants for the Construction of Railroads and Wagon Roads, 1823-1871"

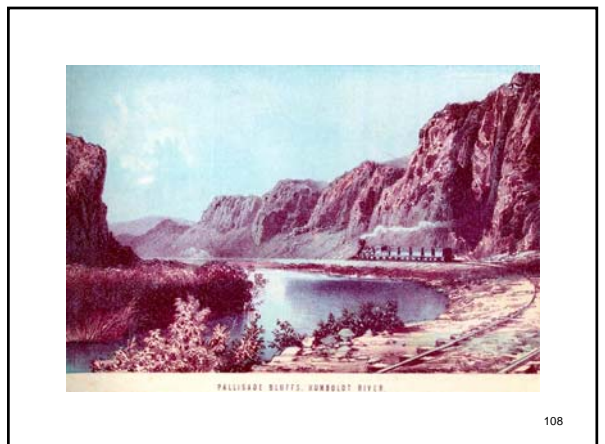
105

The *Sierra Nevada* mountain range in *California* begins at *Arcade Creek*. In the vicinity of *Rocklin*, granite is encountered, but the road for seventy miles up the mountains to a point near *Cisco* runs mostly in gravels, sedimentary rocks, slates, cemented gravels and volcanic rocks of various types. From *Cisco* to the summit and down the eastern slope of the range, the rock is a hard *granodiorite*. In the vicinity of *Truckee*, there are glacial deposits, but between *Truckee* and *Verdi* a canyon is encountered where the river runs through a lava flow for about ten miles. Through *Reno* and the *Truckee Meadows*, the construction was straightforward, but when passing over the *Virginia Range* the road had to follow an open canyon to *Wadsworth* (at the "Big Bend" of the *Truckee River*). From *Wadsworth* to *Ogden*, the road was built over the desert which, at places, borders the *Humboldt River*. In this distance of five-hundred and fifty miles, there were a few stretches of difficult construction; the most troublesome being at *Palisade Canyon*, where for some twelve miles the line was built beside the river between basalt cliffs. In the sections across *Nevada* and *Utah*, the country was similar to the terrain where the UPRR crossed the *Wyoming Basin*. It was here that great progress was made during 1869.

106



107



108

Something Must Be Done

109

When the *Curtis Bill* passed Congress and received President Lincoln's signature in 1862, there was a well organized company (the CPRR) to take charge of the western-end of things. However, the eastern-end was not as fortunate. *Thomas C. Durant* had, along with a few associates, taken on a prominent role but no real organization of the UPRR existed. Under the charter there were one-hundred and fifty-eight persons named who, together with five to be appointed by the Secretary of the Interior, were to constitute a "Board of Commissioners" to establish a preliminary organization, open books for the subscription of stock and to call a meeting of the stockholders to elect a Board of Directors as soon as two-thousand shares had been subscribed and \$10 per share paid in. When the Board of Directors had been elected, the duties of the Board of Commissioners were to cease and it was to be terminated. The company, properly organized, would follow established precedents; stockholders would hold annual meetings, elect a Board of Directors and adopt bylaws and rules for the conduct of its affairs. The Directors were not to be not less than thirteen in number; two to be added to their number by appointment of the POTUS. The Board of Directors would elect the officers of the company and exercise overall supervision.

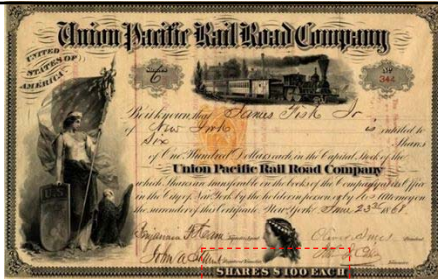
110



The Board of Commissioners met in Chicago in September 1862, electing *William Butler Ogden* (left), President and *H.V. Poor*, Secretary (stock subscription books were opened as well). There was no urgency on the part of financiers to subscribe to the stock and it was only owing to a few public-spirited men taking two thousand shares that the UPRR's charter did not lapse. In October 1863 (when the necessary stock had been subscribed), a meeting of the stockholders was held in NYC at which a Board of Directors were to be elected. However, a strange situation confronted them; there was no man or group of men capable of assuming control (although there was no lack of those aspiring to do so). These "wannabee" candidates were viewed as either lacking in the necessary capital or not in command of the confidence of those who had it. ¹¹¹

Something had to be done, and fast. Accordingly, thirty men of prominence were elected to the position of Directors (some of them without their knowledge and some declined to serve). The UPRR was organized on October 30th 1863. *John A. Dix*, who was elected president, had been a member of the president's cabinet and later served as a general in the Union Army. Though he was a man universally respected, he did not seek the position and he gave notice that he had neither the time nor inclination to give active attention to the company's affairs. Thus, the burden was assumed by the vice-president elect: *Thomas C. Durant*. The \$218K the \$10 per share called for by the charter (on subscription of two-thousand one-hundred and eighty shares) had been paid in, but additional funds were not obtainable. This resulted in an amendment to the charter being passed by Congress: "The Supplementary Act of 1864."

112



Even after the passage of the *Supplementary Act of 1864*, the UPRR was still regarded as an unpromising investment for the reason that investors could not feel any assurance that they or their representatives would have any voice in the management of the affairs or control of the company. The capital of the UPRR was fixed by the supplementary act at \$100 million (one million shares at \$100 per share, above). Consequently, any investor holding over \$50 million in company stock would have a controlling interest. Until it was determined who would be in control, investors shied away. Under the charter, the subscription books had to remain open until the completion of the road, making it possible for outsiders to wait until the road was near completion and then step in and buy large subscriptions, thus acquiring control. ¹¹³

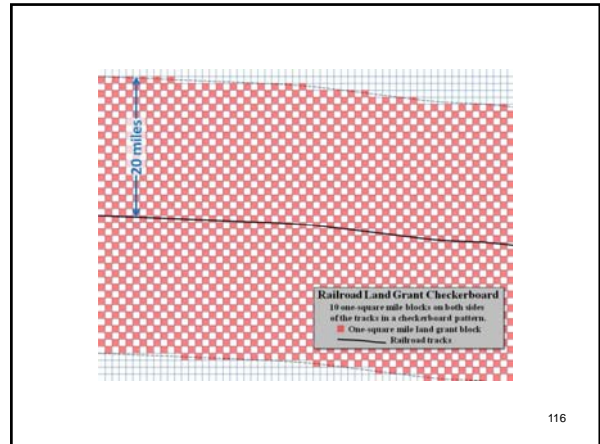
"A strong corporation...able to withstand the loss of business and other casualties incident to war and still to perform for the Government such reasonable service as might under such circumstances be demanded. It was the purpose of Congress in all this to provide for something more than a mere gift of so much land, and a loan of so many bonds on the one side, and the construction and equipment of so many miles of railroad and telegraph on the other."

RE: the *Supplementary Act of 1864*, passed by both Houses of Congress in June 1864 and signed by President Lincoln on July 2nd 1864, insured both the UPRR and CPRR against failure. By amending the *Pacific Railway Act of 1862*, the land grants were increased to ten sections per mile, within twenty miles on either side of the tracks; effectively doubling the area to 12,800 acres per mile.

114



115



116

The Union Pacific Railroad Co.
Offer a limited amount of their
FIRST MORTGAGE BONDS,
Having thirty years to run, and bearing annual interest, payable on the first days of January and July in the city of New York, at the rate of
SIX PER CENT. IN GOLD,
NINETY CENTS ON THE DOLLAR.
At the current rate of premium on Gold, these Bonds pay an annual interest on their present cost of
NINE PER CENT.
And it is believed that on the completion of the road, like the Government Bonds, they will go above par. The Company intend to sell but a limited amount at the present low rate, and retain the right to advance the price at their own option.
Subscriptions will be received in New York by the
CONTINENTAL NATIONAL BANK, No. 7 Nassau Street;
CLARK, DODGE & CO., BANKERS, No. 51 Wall St.;
JOHN J. CISCO & SON, BANKERS, No. 33 Wall St.;
HENRY CLEWS & CO., BANKERS, No. 22 Wall St.;
And by Banks and Bankers generally throughout the United States, of whom maps and descriptive pamphlets may be obtained. They will also be sent by mail from the Company's Office, No. 20 Nassau St., New York, on application. Subscribers will select their own Agents in whom they have confidence, who shall be responsible to them for the safe delivery of the Bonds.
JOHN J. CISCO,
TREASURER, NEW YORK.

Vastly important to both companies was a new provision in the *Supplementary Act of 1864* that authorized the companies to issue their own bonds in amounts equal to the government bonds (both to be released on the completion of twenty instead of forty miles of road). These bonds would be secured by first liens upon the roads, thereby converting the government bonds into second mortgages. Of slightly less importance was the provision that authorized the issuance of the government's \$32K and \$48K bonds in amounts of two-thirds the total when any twenty miles of road between the eastern base of the *Rocky Mountains* and the western base of the *Sierra Nevada* had been prepared for the track. The remaining one-third would be paid upon approval of the completed twenty miles. However, this advance would not apply to the UPRR west of the *Great Salt Lake* on more than three-hundred miles beyond the fully completed continuous track.
Left: advertisement for shares in the UPRR, *Harper's Weekly*, August 1867

117

Furthermore, the *Supplementary Act of 1864* extended by one full year the time limit by which the first stretches had to be completed. The CPRR was required to build only twenty-five miles per year thereafter and was given four years in which to reach the *California* state boundary. Right-of-way was reduced from two-hundred to one-hundred-feet on either side of the tracks, but private property could be condemned and obtained for the purpose of building the road and coal and iron was allowed to be taken from land otherwise exempted as mineral lands. Transportation and telegraph service for the government would be paid for one-half in cash, one-half by credit upon the bond loan. The two companies could unite in all road building with the failure of one company to meet the conditions not invalidating the other. As well, the CPRR could now build one-hundred and fifty miles beyond (east) of the *California* border in order to meet the UPRR. Three government inspecting commissioners would be appointed for each road and five government directors would serve on the UPRR board; visit all portions of the line, sit-in on meetings and periodically report to the Secretary of the Interior. The UPRR capital stock was placed at one million shares of \$100 each (instead of 100K of \$1000 each); the subscription books would be kept open until all the stock had been subscribed to. Save for the one-hundred and fifty mile limit on the CPRR, it was considered, at the time, an extraordinarily generous act.

118

UNION PACIFIC LAND GRANTS
For Sale by the UPRR
4,000,000 ACRES TO SELECT FROM
PIONEER, RESERVEE
BALANCE PAID BY PURCHASERS OF UNION PACIFIC LANDS
A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.

Not more than two-hundred shares of the capital stock of the UPRR was to be held by any one person. Right-of-way through public lands was granted with the privilege of taking therefrom, without charge; earth, stone, lumber or any other material necessary for construction purposes. The UPRR was granted every alternate section of land (as designated by odd numbers) to the amount of five sections per mile on each side of the road within the limits of ten miles, not sold, reserved or otherwise disposed of by the Federal Government and to which a pre-emption or homestead claim had not been made (up to the time the road was finally located, mineral lands being an exception). All lands thus granted, not sold or disposed of three years after the line was completed, were to be sold by the government at not to exceed \$1.25 per acre, the proceeds to accrue to the UPRR.

119

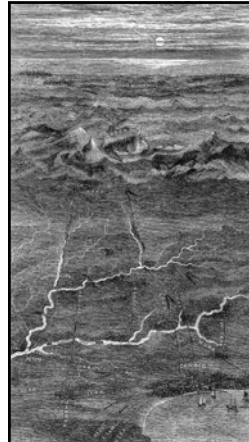
None but American iron was to be used for the rails. As fast as sections of forty-miles were completed and accepted by the Board of Commissioners, \$1K bonds of the *United States* (bearing 6%, interest payable in thirty years) were to be issued to the UPRR. Issuance of the government bonds was based on \$16K to the mile; for the distance east of the *Rocky Mountains*, and \$48K to the mile; for one-hundred and fifty miles for the mountain portion of the line. Three-fourths of these bonds were to be delivered to the UPRR as the sections were accepted, the remainder to be retained by the Federal Government until the entire line was completed. The road was to be completed within twelve years; the first one-hundred miles within two years. Five percent of the net earnings, together with the entire amount accruing on transportation furnished the government, was to be applied to the payment of these bonds, including principal and interest.

120



Two years solicitation (starting in 1862) had only resulted in bond subscriptions to the amount of only \$2 million. An appeal was made to Congress resulting in the *Supplementary Act of 1864* which allowed two-thirds of the bonds to be available to the two companies as soon as grading was complete. Another revision reduced to one-half (from three-quarters) the earnings on government business withheld to meet the bonds. The UPRR was also authorized to maintain a ferry across the *Missouri River* at *Omaha* as a means of communication with the *Iowa* lines until such time as they could construct a suitable bridge.

Above: caption: "Map of the Union Pacific Railroad and its Connections" 121

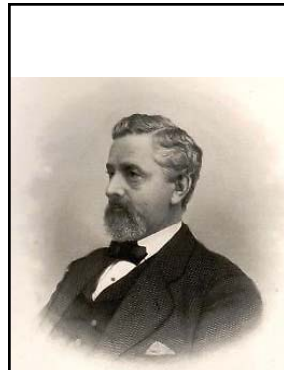


Coupled with these favorable amendments were two provisions that would, eventually, work against the interests of the UPRR. One of them permitted the *Kansas Pacific Railway* to connect with the UPRR at any point the KPR saw fit, at or east of a point fifty miles west of *Denver, CO.* (instead of at the *Hundredth Meridian*). This created a competitor instead of a feeder. Secondly, the CPRR was allowed to build one-hundred and fifty miles further east instead of stopping at the *California* state line. This resulted in a race as to which company could cover the most ground involving both in much additional, needless expense. With the charter amended by the *Supplementary Act of 1864*, the UPRR, which had thus far not done any significant work, commenced active construction. The initial eastern point had been fixed at *two-hundred and forty-seven miles west of Omaha* (at the *Hundredth Meridian*). In 1866, *Congress* authorized commencement at *Omaha* without reference to this fact.

Left: caption: "Bird's-Eye View of the Pacific Railroad, from Chicago to San Francisco" 122

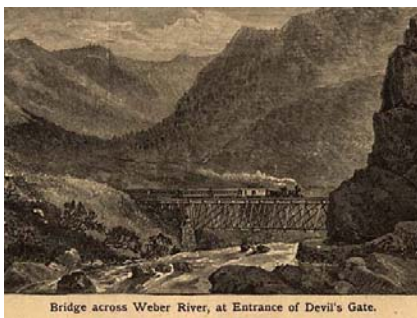
The *Pacific Railway Act of 1862* stated that the standards of the *Baltimore & Ohio RR* had to be used to construct the transcontinental RR was, by its nature, subjective rather than objective (due to the differences in topography, climate etc.). For this reason, in 1865 Secretary of the Interior *James Harlan* appointed a board made up of government commissioners, directors and representatives of the two companies. A circular was sent out to prominent railroad engineers, including; Major *General M.C. Meigs*, *John B. Jervis*, *George Lowe Reid*, *Ashbel Welch*, *Benjamin H. Latrobe*, *G.A. Nicholls*, *W.W. Evans*, *Philip S. Justice*, *J.L. Williams* (a U.S. Government Director) and *Silas Seymour* (a consulting engineer to the UPRR). Engineers from the eastern states favored solid, permanent construction (i.e. stone bridges) but, on the whole, there was general agreement on construction methodology.

123



Despite the general consensus among the advisory board, *Silas Seymour* (left) advocated a road built on rails resting upon longitudinal timbers instead of upon wooden cross-ties (a method long abandoned). He also favored wooden *Howe* truss bridges, stating that he had never been in favor of iron bridges for railroads. The weight of locomotives suggested by the advisory board ranged from twenty to forty tons (weight was limited by the carrying capacity of the fifty to sixty-five pound iron rails then available). By comparison, today's steel rails are double these weights and locomotives weigh ten to fifteen times more than was deemed safe in 1865. Steel rails made by the Bessemer process were coming into use at the time and the possibility of using them was discussed, but they were, unfortunately, not adopted.

124



Bridge across Weber River, at Entrance of Devil's Gate.

125



126



The advisory board brought in recommendations on location, grades and curves, embankments, excavations, mechanical structures, ballasting, crossties, rails, sidings, rolling stock, and buildings. It recommended that grades and curves should be adapted to the terrain. While grades of 116-feet to the mile (2.2%) had been used on the B&ORR (with curves of a minimum radius of 400-feet), the situation in the *Platte* and *Kansas Valley/s* was such that grades should not exceed 30-feet per mile. The roadbed itself was not be less than 14-feet wide (at the grade line). Excavation in long cuts were to be 26-feet wide and in shorter cuts, 24-feet wide (to allow room for side ditches). Earth slopes were to be a ratio of 1.5-to-1 base-to-rise (rock slopes could be steeper).

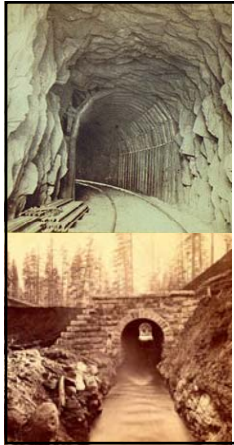
Top caption: "Train on Embankment"
Bottom caption: "Bank and Cut"

127



Homer Cut—85 feet deep and 80 feet long—Sierra Nevada Mountains, C.F. R. R.—From photograph.

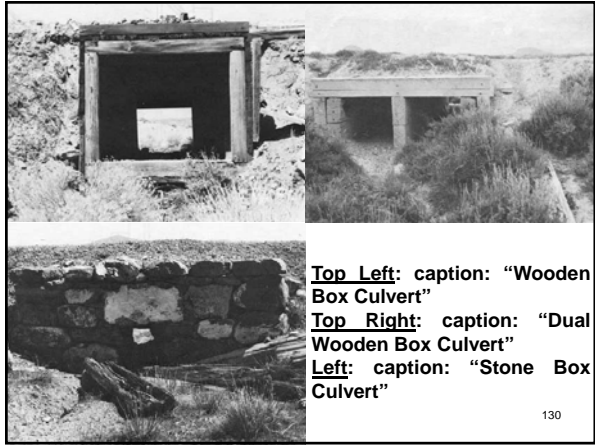
128



Tunnels in rock were to be made for double track, but this recommendation was never enforced. Culverts were to be of stone or brick, but could be made of wood and replaced later with permanent materials. Bridges were to be built of stone, iron or wood (at the discretion of the railroad company). Ballast was to be of broken stone or gravel, twelve to fourteen inches thick with crossties of oak or other suitable timber. If made of softwood (i.e. *Cottonwood*), they were to be treated by the "Burnetizing Process." The ties were to be 6-inches thick by 8-feet long laid 2,400 to the mile.

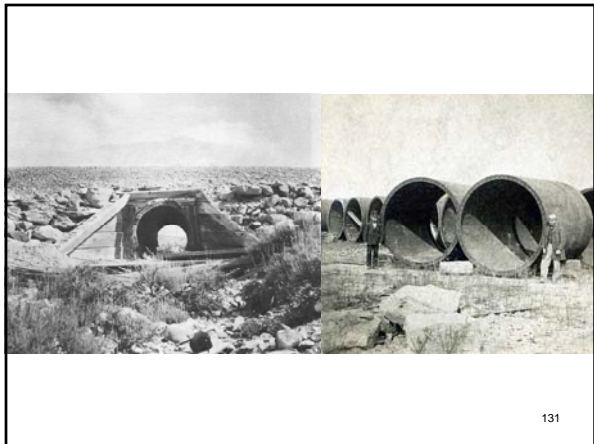
Top caption: "Tunnel No. 12"
Bottom caption: "Culvert at Canyon Creek"

129

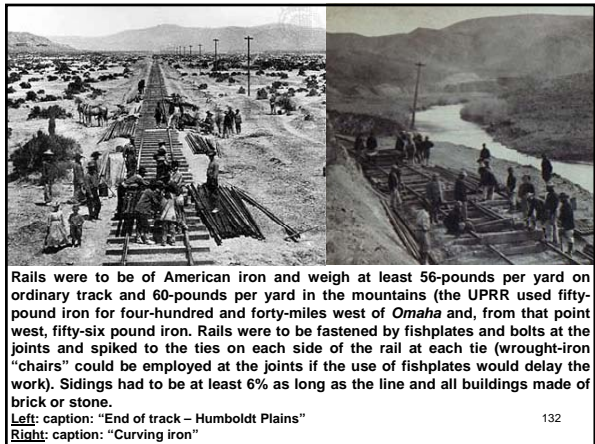


Top Left caption: "Wooden Box Culvert"
Top Right caption: "Dual Wooden Box Culvert"
Left caption: "Stone Box Culvert"

130



131



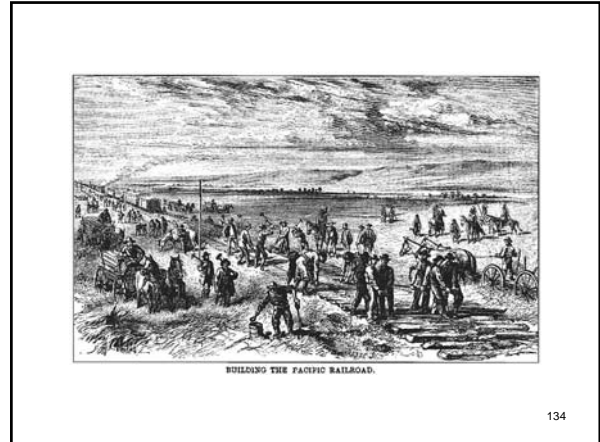
Rails were to be of American iron and weigh at least 56-pounds per yard on ordinary track and 60-pounds per yard in the mountains (the UPRR used fifty-pound iron for four-hundred and forty-miles west of *Omaha* and, from that point west, fifty-six pound iron. Rails were to be fastened by fishplates and bolts at the joints and spiked to the ties on each side of the rail at each tie (wrought-iron "chairs" could be employed at the joints if the use of fishplates would delay the work). Sidings had to be at least 6% as long as the line and all buildings made of brick or stone.

Left caption: "End of track - Humboldt Plains"
Right caption: "Curving iron"

132



133



134

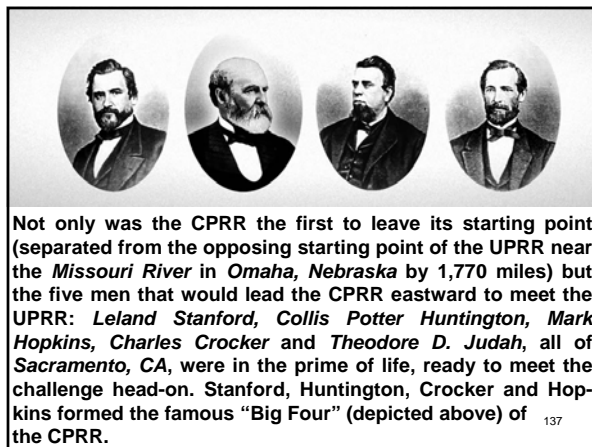
Part 2

The Way East

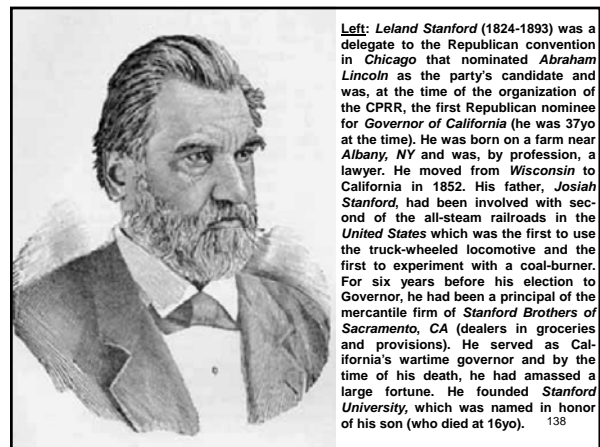
135

Five Men

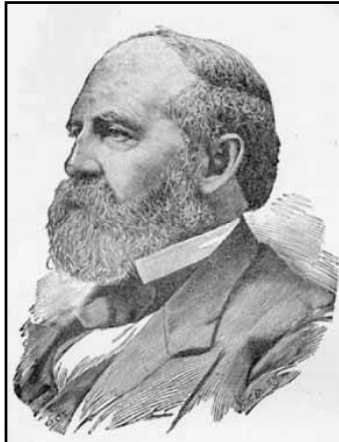
136



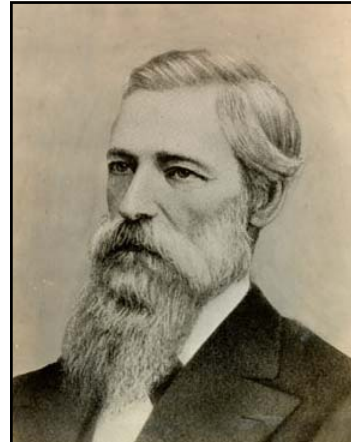
137



138



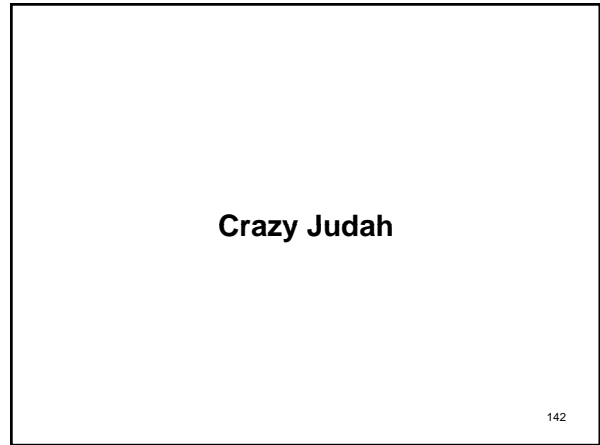
Left: Collis Potter Huntington (1821-1900) was born a "Connecticut Yankee." He was a '49er and, at the time of the launching of the CPRR, was senior member of the hardware and miners supply firm of Huntington and Hopkins of Sacramento, CA. His name is synonymous with the Southern Pacific Railroad, of which he became president. The name "Huntington" (via his nephews) was attached to other noteworthy enterprises in both Southern California and in the east. He was tenacious of purpose and a master at business dealings. His motto was: "I do not work hard. I work easy." 139



Left: Mark Hopkins (1813-1878) was born in New York State and traveled overland from Michigan to San Francisco. He had studied law and, in Sacramento, was known as a very conservative but capable businessman. For twenty years, he was Huntington's partner in the mercantile firm of Huntington & Hopkins. Hopkins' conservatism would make him the dependable arbiter to whom was referred the final decision upon debated matters. Huntington said of Hopkins: "I never thought anything finished until Hopkins looked at it." 140



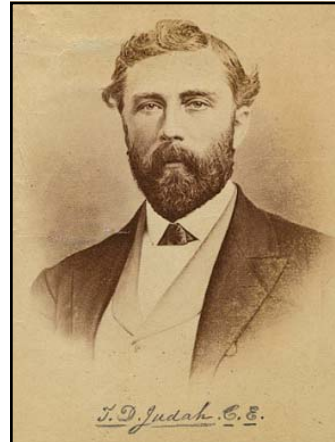
Left: Charles Crocker (1822-1888) was born in Troy, NY. He came from a family with a strong work-ethic and started working in early childhood. After arriving in California in 1850 and trying his hand at mining, he opened the leading dry-goods store in Sacramento. In 1860, he was elected to the state legislature on the Republican ticket. He was self-motivated, hard-driving, ambitious and a natural-born leader of men. 141



Crazy Judah

142

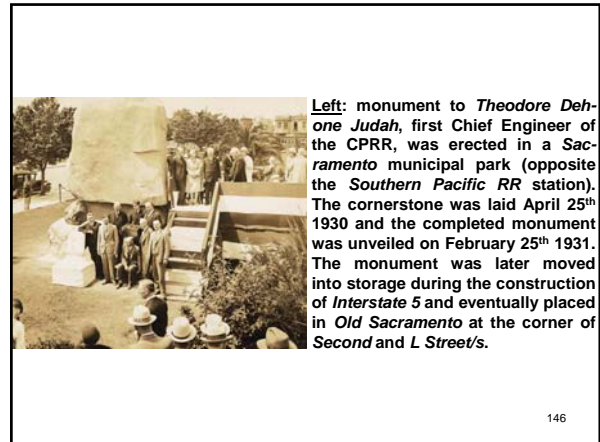
Theodore Dehone Judah (1826-1863) was born in Bridgeport, Connecticut. After graduating from the Rensselaer Polytechnic Institute in Troy, NY, he began his career as a civil engineer working on construction of the Niagara Gorge Railroad and helped build the Erie Canal, but his dream was to construct an American railroad that would span the continent. Proponents called it "the most magnificent project ever conceived." While opponents derided him as "Crazy Judah," almost single-handedly he advanced the debate from questions and skepticism to a specific, well-detailed financial and geographic plan which was published in 1857 and widely distributed to financiers and politicians. In 1860, Judah met with Crocker, Hopkins, Huntington and Stanford, convincing them to establish the Central Pacific Railroad. Still, despite a nationwide railroad boom and a growing consensus that the project would be profitable, major funding was impossible to find. Judah was sent to Washington D.C. to lobby for passage of the Pacific Railroad Bill. As the CPRR's Chief Engineer, Judah had surveyed the route over the imposing Sierra Nevada Mountains. Just months after construction of the CPRR finally began in 1863, Judah departed for NYC via Cape Horn, where he hoped to meet with railroad baron "Commodore" Cornelius Vanderbilt to secure more funding for the project. He became ill as the ship briefly docked at the Isthmus of Panama. Judah died on November 2nd 1863 at the age of thirty-seven, shortly after arriving on the east coast. His assistant Samuel Skerry Montague, was promoted to Chief Engineer upon Judah's untimely death, seeing Judah's vision through to completion. 143



Theodore Judah (left) called a public meeting of Sacramento citizens to discuss his railroad project. Instead, C.P. Huntington invited him to come to his store to discuss, privately, the "Conquest of the Sierra." After several meetings at the Huntington and Hopkins store, the Central Pacific Railroad Company of California, (capitalized at 85K shares at a par value of \$100 per share) was organized on June 28th 1861 and incorporated under the laws of the State of California. Its name was derived from "The Central Overland California and Pike's Peak Express Company." 144



145



146

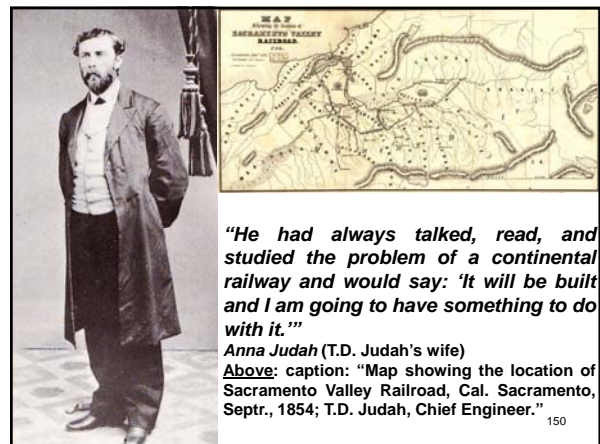


Inscription (on Plaque): "That the West May Remember Theodore Deh-one Judah, Pioneer Civil Engineer and Tireless Advocate of a Great Transcontinental Railroad – America's First – This monument was erected by the men and women of the Southern Pacific Company, who, in 1930, were carrying on the work he began in 1860. He convinced four Sacramento merchants that his plan was practicable and enlisted their help. Ground was broken for the railroad January 8, 1863, at the foot of K Street, nearby. Judah died November 2, 1863. The road was built past the site of this monument over the lofty Sierra – along the line of Judah's survey – to junction with the Union Pacific at Promontory, Utah where on May 10, 1869, the 'Last Spike' was driven." 147

Leland Stanford was chosen to be president of the newly formed CPRR, a position that he held for thirty years (he simultaneously served as president of the SPRR). *C.P. Huntington* was chosen to be vice-president and *Mark Hopkins* was chosen to be treasurer. Among the directors was attorney *Edwin B. Crocker*, brother of *Charles Crocker* (Edwin later served as the CPRR's attorney). The principal stockholders subscribed to the extent of one-hundred and fifty shares each. *Theodore Judah* was appointed Chief Engineer. Judah arrived from the east in 1854 as engineer for the *Sacramento Valley Railroad* which succeeded in building from *Sacramento* east to *Folsom*, some twenty-two miles distant, at a cost of \$60K per mile. He was an active enthusiast on the subject of a railroad over the *Sierra Nevada* range, gaining an intimate knowledge of the terrain from some twenty surveys he personally conducted - the CPRR was fortunate to have him. Besides his thorough knowledge of the *Sierra Nevada*, he knew the ways of *Washington D.C.* and its legislative methods (he had been there several times in the interests of *California* railroad schemes seeking land grants from the Federal Government). He was personable, highly intelligent, knowledgeable and scrupulously honest. A cash fund of \$35K (furnished by the few initial stockholders) kept Judah in the field on behalf of the CPRR until fall. On October 1st 1861, Judah made his final report upon routes. 148

It Will Be Built

149



The Dutch Flat Route

151

Judah's recommendation was the "Dutch Flat Route" - the continuation of the popular immigrant and '49er trail from the *Platte Trail* and the *Great Salt Lake*, up the *Truckee River* and over the *Sierra Nevada* by way of *Donner Pass*. This demanded an ascent of seven-thousand-feet in not more than seventy miles. But he had found a long unbroken spur extending from the Donner Pass down along the north-side of the *American River* leading into the *Sacramento Valley*. Its maximum grade would not exceed one-hundred and five-feet per mile and there were no mountain rivers nor canyons to cross (except a small tributary of the *Bear River* a short distance above *Dutch Flat*). The eastern slope could be descended by two convenient ravines on the south-side of *Donner Lake* (site of the tragic *Donner Party* catastrophe of 1846-1847). The *Truckee River* on the opposite slope might be reached (eleven miles from the summit) by grades not greater than those of the western slope. The passage of the *Truckee* through the eastern summit ridge (or secondary ridge) of the *Sierra Nevada* offered a practicable exit (via a 40% grade) to the *Truckee Meadows*. The distance from *Sacramento* to the *Truckee* was only one-hundred and twenty-three miles and to the *California* state line, about one-hundred and forty miles. From *San Francisco*, the distance to the state line was two-hundred and seventy-six miles.

152



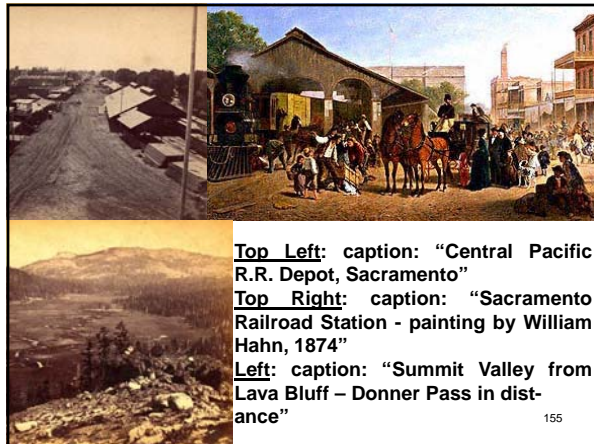
153



Left: caption: "Green Valley and Giant's Gap - American River. 1,500 feet below Railroad"

Right: caption: "View on the American River"

154



Top Left: caption: "Central Pacific R.R. Depot, Sacramento"

Top Right: caption: "Sacramento Railroad Station - painting by William Hahn, 1874"

Left: caption: "Summit Valley from Lava Bluff - Donner Pass in distance"

155



Left: caption: "Dutch Flat, Placer County - 67 miles from Sacramento"

Right: caption: "Dutch Flat, Placer County - Main Street"

156



Left: caption: "Forest View, near Dutch Flat, Placer County"
Right: caption: "Bear River Valley – You Bet and Mines in the distance"

157



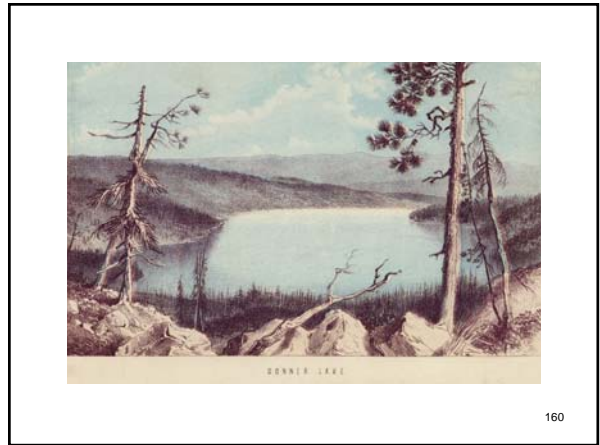
Left: caption: "Summit of Sierras – 8,000 to 10,000 feet altitude"
Right: caption: "Donner Peak in Winter – Summit of Sierras"

158

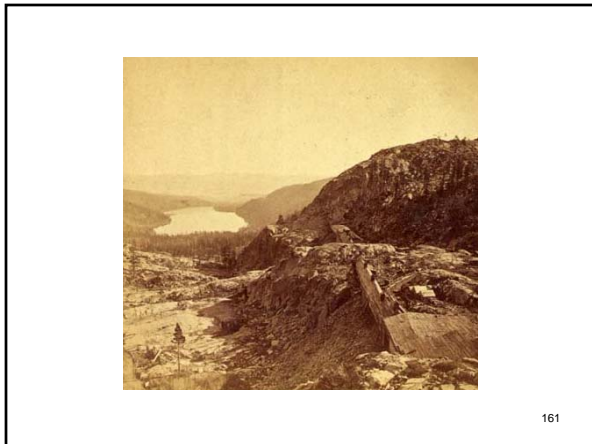


Left: caption: "Scene near Donner Pass – Table Peak in the distance"
Right: caption: "Donner Lake, with Mt. Lincoln in distance"

159



160



161



162



Left: caption: "Teams on the Summit, Dutch Flat and Donner Lake Wagon Road, Placer County"
Right: caption: "Teaming down the Summit on the Donner Lake"

163

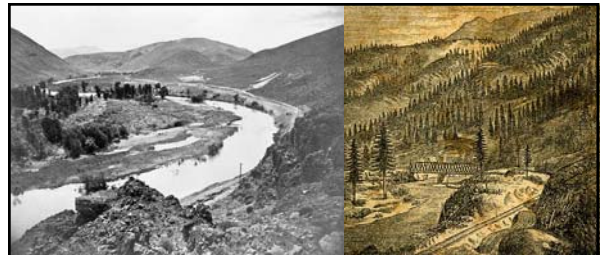


Left: caption: "Giant's Gap – 2,500 feet perpendicular"
Right: caption: "Eagle Gap, on the Truckee River"

164

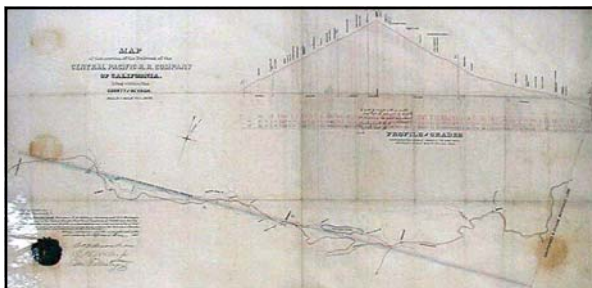


165



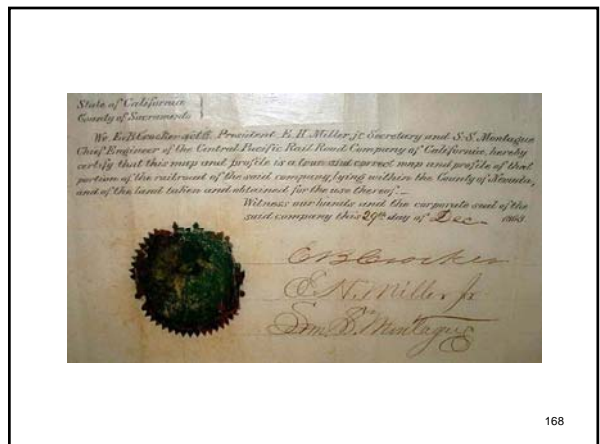
Left: caption: "Looking West from Red Bluffs, Lower Canyon of Truckee River"
Right: caption: "STATE LINE, 276 miles from San Francisco – Altitude 5,130 feet"

166



Above: this map represents the final location of the CPRR through Nevada County, California and a portion of Placer County. It was signed and sealed with the CPRR copper seal on December 29th 1868 by E.B. Crocker (Acting President - Stanford was unable to attend the signing), E.H. Miller Jr. (Treasurer) and Samuel S. Montague (Chief Engineer).

167

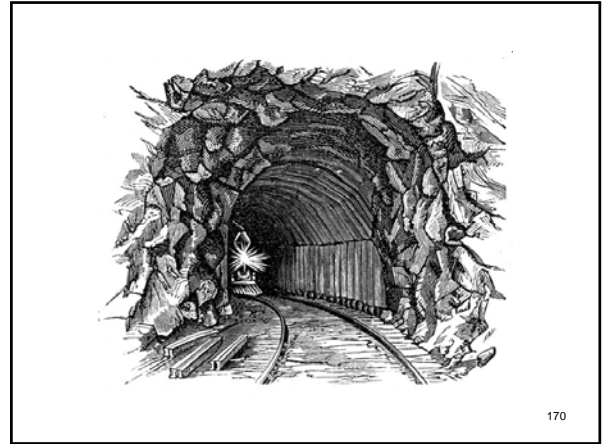


168

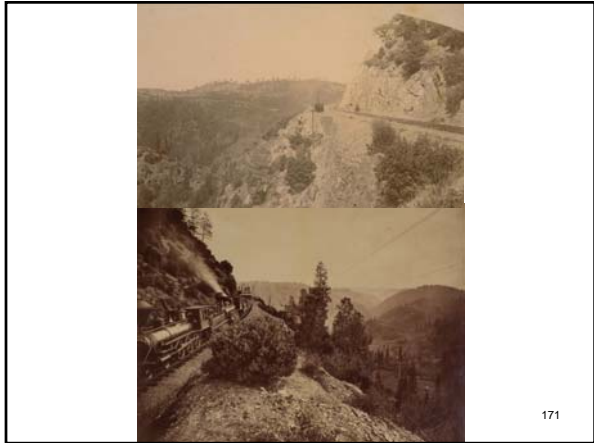


Judah's report estimated that eighteen tunnels would be required, most of them over one-thousand-feet long but none over fourteen-hundred-feet long and all in solid granite (left), thus little timbering would be required. He foresaw no trouble with snow since the route was mainly "side hill line" (on the flanks of slopes where snow slid-off). By studying the moss-line on the trees and from the testimony of mountaineers, the greatest depth of un-drifted snow on the summit was about thirteen-feet, but if snow-plows were set to work after each storm the road could be kept open all winter. The snow in any quantity was confined to a stretch of about fifty-five miles; from Dutch Flat (forty miles west from the summit) to a point less than half that distance east from the summit. His cost estimate (for the 140 miles from Sacramento to the eastern state boundary) came to \$12,500,000 (slightly over \$89K per mile). Construction near the summit would run up to \$150K per mile, whereas the initial construction out of Sacramento would call for about \$50K per mile.

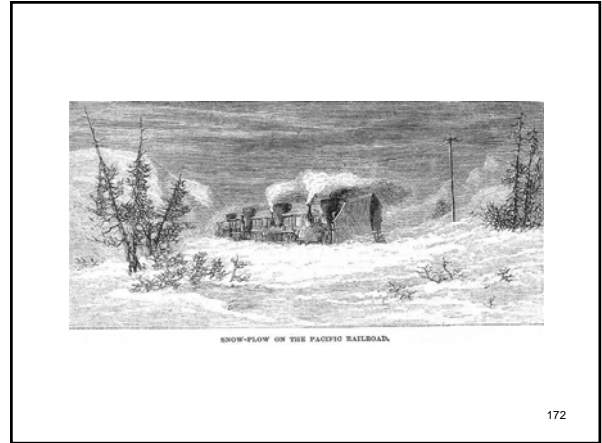
169



170



171

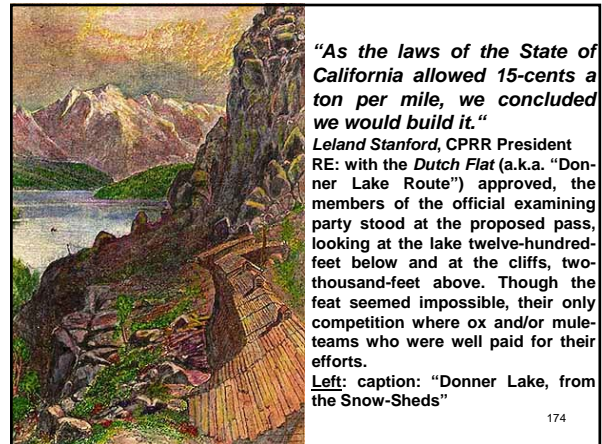


SNOW-PLOW ON THE PACIFIC RAILROAD.

172



173

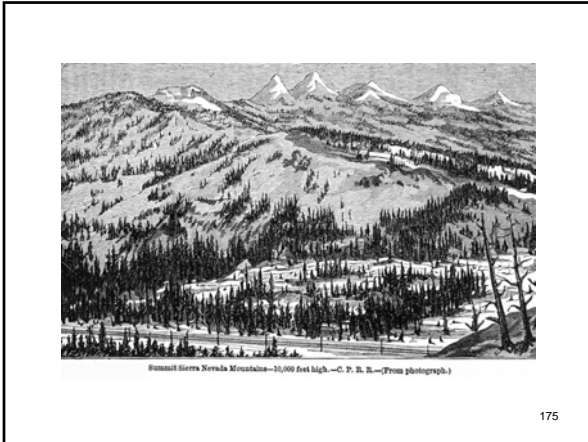


"As the laws of the State of California allowed 15-cents a ton per mile, we concluded we would build it."

Leland Stanford, CPRR President RE: with the Dutch Flat (a.k.a. "Donner Lake Route") approved, the members of the official examining party stood at the proposed pass, looking at the lake twelve-hundred-feet below and at the cliffs, two-thousand-feet above. Though the feat seemed impossible, their only competition were ox and/or mule-teams who were well paid for their efforts.

Left: caption: "Donner Lake, from the Snow-Sheds"

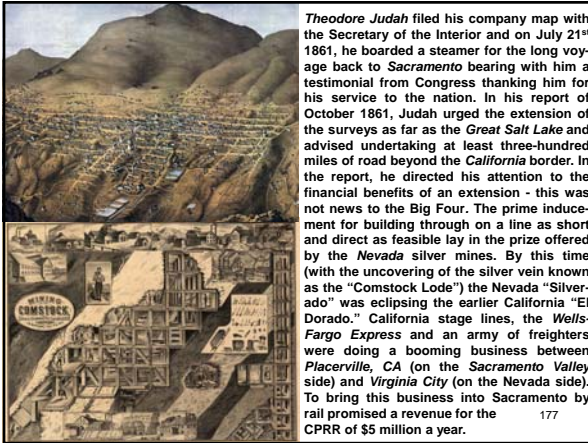
174



175



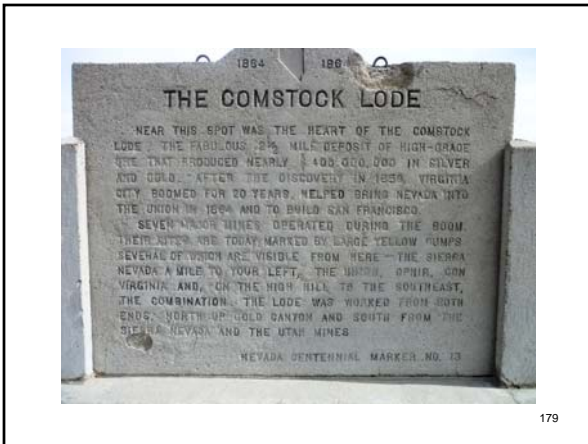
176



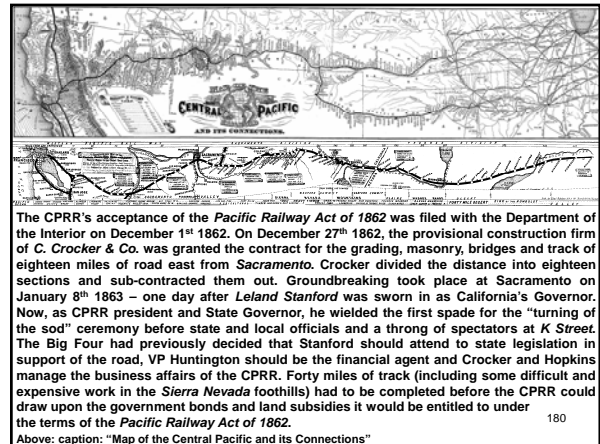
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178



179



180

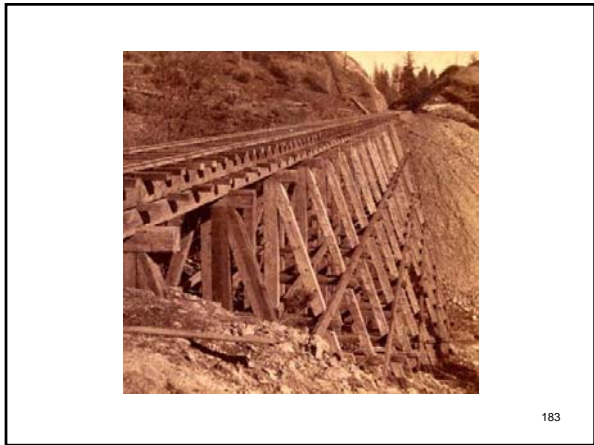
On the open plains east of the *Sacramento Valley* and from *Reno* eastward to *Promontory*, no clearing or grubbing was necessary. On the slopes of the *Sierra Nevada* (especially in the center portion), the line passed through dense forests where trees 100 to 150-feet in height were common (brush was also abundant). In some sections, the cost of cutting trees and brush and grubbing out stumps was an item of considerable expense. For eighteen miles eastward from *Sacramento* to *Roseville*, grading was light (the road was located over the flat-lands of the *Sacramento Valley*). Beyond *Roseville* (then called "Junction," where the line crossed the railroad leading northward from *Folsom*) the grading work became heavier and from *Newcastle* (thirty-one miles from *Sacramento*) to a point near *Truckee* (a distance of nearly ninety miles), grading work was the heaviest. In order to keep within the defined grades, deep cuts and high fills were essential over most of the distance. *Bloomer Cut* (west of *Auburn*) was about 800-feet long and 65-feet in average depth. It had to be blasted through a mass of cemented gravel. Higher in the mountains, the excavation was through stained earth and shale or sandstone. Beyond *Emigrant Gap*, granite was encountered. Wide ravines were passed by trestles that were afterward filled. In the upper region, a succession of tunnels was required. From *Truckee* eastward the work was lighter (except in the two canyons of the *Truckee River*). On the plains of *Nevada* and *Utah* the grading was all light, except for rock work in narrow canyons. All earth work was done manually with pick and shovel by laborers who loaded the material in wheelbarrows or on one-horse wooden dump carts.

181



Left: caption: "View at Newcastle – 31 miles from Sacramento"
Right: caption: "Trestle near Station"

182

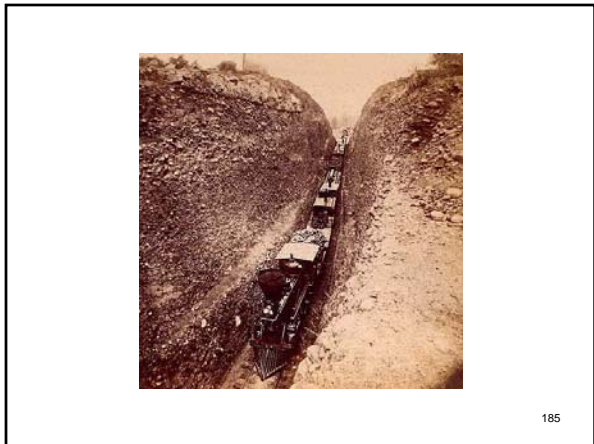


183



Left: caption: "Approaching Bloomer Cut from the West"
Right: caption: "Bloomer Cut, looking East – 800 feet long and 65 feet high"

184

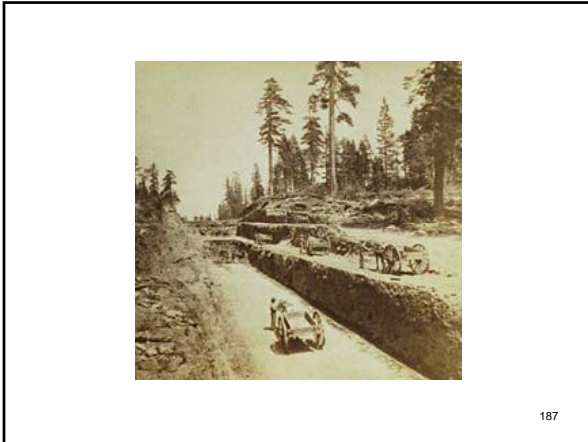


185



Above: caption: "Bank and Cut at Sailor's Spur. 80 miles from Sacramento."

186



187



Left: caption: "Laborers and Rocks, near opening of Summit Tunnel"

Right: caption: "Summit Tunnel, before completion. Western Summit – altitude 7,012 feet."

188



Left: caption: "Truckee River below Truckee Station"

Right: caption: "Depot at Truckee – 119 miles from Sacramento"

189



Left: caption: "Emigrant Gap – Looking West from the Tunnel"

Right: caption: "Emigrant Gap Tunnel, Wall and Snow Covering"

190



Left: caption: "Pleasant Valley, looking East. Lower Canyon of Truckee River."

Right: caption: "View near the State Line – Truckee River"

191

Competition is a Sin

192

Although the CPRR was a native *California* enterprise, it became apparent early-on that little moral and/or financial assistance could be expected from California's growing population. The opposition to the road that delayed railroad projects through the 1850s was still in place and determined to undermine the CPRR. The *San Francisco* press (subsidized by rival business interests) tried hard to kill the CPRR by adverse commentary. The *Wells-Fargo Express Company* (under President *Louis McLane*) foresaw serious competition in the CPRR and although *McLane* was on the Board of Commissioners appointed for the UPRR, he had a conflicting interest and felt bound to serve his company's self-interest in opposing the CPRR. Other vested interests such as the *California Stage Company* (with the *Nevada* silver mines and the overland business out of *Salt Lake City*) viewed the CPRR as a dangerous rival. The *Pioneer Stage Road* between *Virginia City* and *Placerville* was a lucrative toll road, bringing its owners \$693K in 1862 alone. The cross-country *Overland Stage* saw itself doomed by the realization of a *Pacific Railway*.

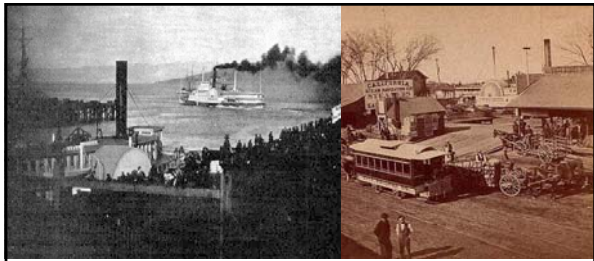
193

CALIFORNIA
STEAM NAVIGATION CO'S
 LINE TO

SAN FRANCISCO.
 LOWEST RATES & QUICKEST TIME!
 THE NEW AND ELEGANT PASSENGER STEAMERS
CAPITAL, YOSEMITE,
 Capt. E. A. POOL, Capt. A. FOSTER,
 LEAVE SACRAMENTO
FOR SAN FRANCISCO
 Daily, on arrival of Eastern Trains,
 Affording Passengers an opportunity of enjoying the magnificent scenery of the
 Bay of San Francisco.
 Returning, LEAVE SAN FRANCISCO DAILY, at 4, P. M.
 Calling at all intermediate points and voyaging with all Trains.
 Steers and flags.
 These beautiful Steamers are provided with luxurious State Rooms
 and furnish a sumptuous table.
 B. M. HARTSHORNE, Pres't.

The *Pacific Mail Steamship Company* (which handled the Panamanian Isthmus traffic) and the *California Steam Navigation Company* (which plied the waters of *San Francisco Bay* and the *Sacramento River*) joined the ranks of the opposition as well; the former opposed to the transcontinental short-cut, the latter fearing the entry of the rails into *San Francisco* proper. The *Overland Telegraph* did not welcome the wires adjoining the tracks upon which government and commercial messages would be sent. As well, freight contractors and their more than ten-thousand employees were vehemently opposed to the CPRR for fear of losing their livelihood.

194



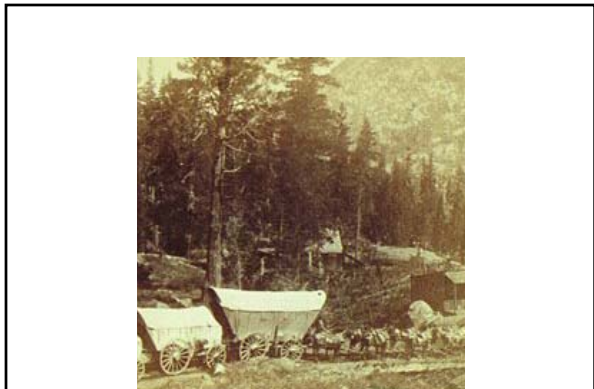
Above: from the *Broadway Wharf* of the "California Steam Navigation Company" in *San Francisco* (left), the side-wheeler *Yosemite* departs. At right, it has arrived at the *Sacramento* wharf of the CSNC. Steamboats not only provided a fast and reliable mode of transportation for passengers and freight, but also provided a pleasant way of seeing the scenic *California* countryside.

195

"The road will end high in the air and nowhere else. You will bury your whole fortune in the snow of the Sierra."

RE: warning from a friend to *Leland Stanford*. Out of doubt - real or imagined, that the CPRR would ever be able to finance a road across the *Sierra Nevada*, the project was dubbed "The Dutch Flat Swindle" by the press. Even those friendly to the enterprise began to express their doubts upon the barrage of negative publicity. VP *Huntington* testified before Congress stating that the mercantile credit of himself and his CPRR colleagues was seriously impaired by their connection with the venture. Despite the commercial interest's opposition, *Nevada's* legislature offered a prize of \$3 million in bonds for the first railroad to connect the then Territory with the Pacific. From a decadent mining camp, *Placerville, CA* had grown to be a prosperous, bustling market town on the *Nevada-California Highway* for the rumbling six-horse stagecoaches, long pack-trains and toiling foot-travelers. All this steady traffic between mines and market amounted to \$13 million in 1863. The *Dutch Flat Route* of the CPRR would, ultimately, relegate *Placerville* to its former status as a backwater.

196



197



When the CPRR had completed only thirty miles, the *San Francisco & Washoe RR* (whose track was now thirty-eight miles in length) was to pass from the *Sacramento River's* head-of-navigation, through *Placerville* and on to *Reno, Nevada*. When *Nevada* became a state in 1864, the first state legislature solicited Congress to grant \$10 million in bonds to the SF&WRR. Though the SF&WRR's tried its best to defame the *Dutch Flats* route as impossible and questioned the integrity of the late *Theodore Judah*, the effort failed due to the CPRR's progress and Congress' lack of desire to fund a simultaneous *Pacific Railway* project.

Above: caption: "Section of a California railroad map showing the 'San Francisco and Washoe Railroad' running through Lake Tahoe"

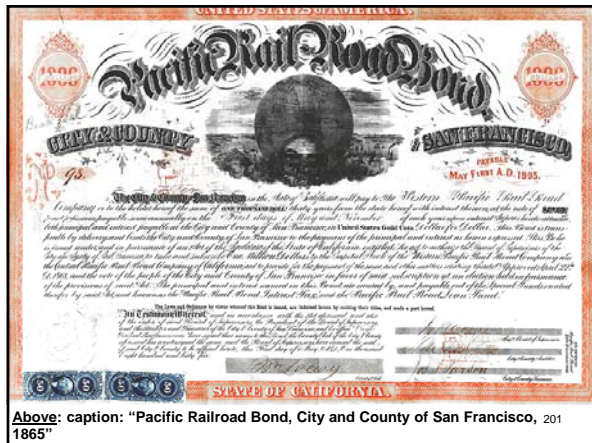
198



199

Chief Engineer Judah estimated the cost of the first fifty miles at \$3.25 million, or an average of \$65K per mile (exclusive of rolling stock). By the laws of the *State of California*, ten shares or \$1K per mile had to be subscribed to on the line across the state (calculated at 138 miles) before construction of the road could be commenced. The initial sale of the capital shares in California was meager, but sufficient to meet the law. Out of the total eighty-five thousand shares offered, one-thousand five-hundred and eighty shares were subscribed to by the CPRR officers and a few friends. War conditions were rendering money scarce and investors cautious. In *San Francisco*, an all-day promotion yielded the sale of only ten shares of stock. On paper there was available, at most, only \$158K (\$125K in the treasury). Northern Californians with capital resources declined the invitation to invest in the CPRR. As such, *C.P. Huntington* solicited his many acquaintances in eastern financial circles. Thus, Huntington spent the major portion of his time in the east; a month in NYC, then ten days in California, then back again. A six-thousand mile round trip, repeated over and over again (at first by stagecoach only) on behalf of the CPRR.

200



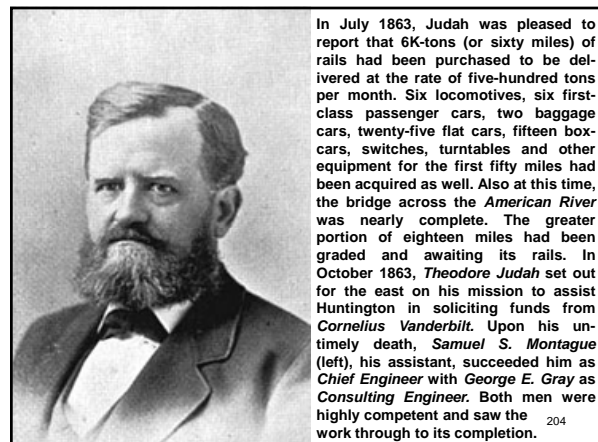
Above: caption: "Pacific Railroad Bond, City and County of San Francisco, 201 1865"

Eastern Investors: "Huntington, we do not want to go into it; but if you will guarantee the interest on these bonds for ten years we will take them."
C.P. Huntington: "I will guarantee them, because if the *Central Pacific* ever stops short of completion *C.P. Huntington* will be so badly broken that you will never spend any time picking him up."
 RE: commercial leaders in both NYC and Boston refused to take an interest in the CPRR's bonds, alleging that the risk was high and the profits remote. By pledging the credit of himself and his associates to the amount of \$250K, VP Huntington was able to contract for the delivery of the iron and other equipment for building and operating fifty miles of road. Eventually, he enlisted the brokers and bankers *Fisk & Hatch*, who specialized in government bonds. They acted as the CPRR's financial agents in the east. When they failed in 1874, they owed the company over \$830K. However, their vigorous backing in its early days had made all the difference between success and failure for the CPRR.

202

Despite the setbacks, under Republican auspices legislation in favor of the CPRR had been forthcoming. By the Acts of 1863/64, the *State of California* and various counties were authorized to exchange bonds for company stock in the amount of \$1.65 million. The company was authorized to issue \$12 million worth of bonds at 7% interest. Secured by mortgage, the interest on the first \$1.5 million was to be borne by the state treasury. The *San Francisco* city and county subscription of \$600K was held up for several years and was finally discounted after much litigation. However implacable San Francisco was towards helping finance the CPRR, the remainder of local subsidies was forthcoming. By June 1st 1863, the CPRR's books showed total stock subscriptions of 7,115 shares, with \$210,930 paid in. The vast majority of the stockholders were from *Sacramento*. Thus, the first thirty miles of the CPRR were built with California funds extended by the personal efforts of *C.P. Huntington* in the east. *Leland Stanford* would later testify that, for a period of seventeen days, there was not a penny to be found in the CPRR's treasury. Now, with adequate funding in place, the CPRR could concentrate on the important work of building the road.

203

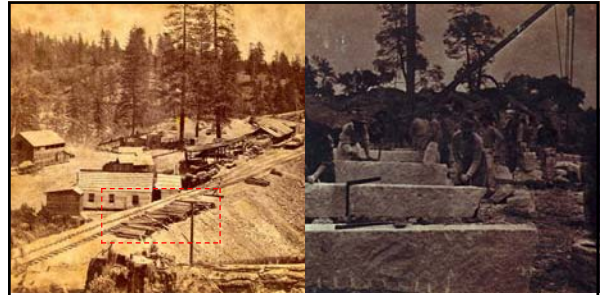


In July 1863, Judah was pleased to report that 6K-tons (or sixty miles) of rails had been purchased to be delivered at the rate of five-hundred tons per month. Six locomotives, six first-class passenger cars, two baggage cars, twenty-five flat cars, fifteen box-cars, switches, turntables and other equipment for the first fifty miles had been acquired as well. Also at this time, the bridge across the *American River* was nearly complete. The greater portion of eighteen miles had been graded and awaiting its rails. In October 1863, *Theodore Judah* set out for the east on his mission to assist Huntington in soliciting funds from *Cornelius Vanderbilt*. Upon his untimely death, *Samuel S. Montague* (left), his assistant, succeeded him as *Chief Engineer* with *George E. Gray* as *Consulting Engineer*. Both men were highly competent and saw the work through to its completion.

204

Iron for the track (in accordance with the *Act of 1862*) was manufactured in American mills in the east. Heavier rail (60-pounds/yard) was used on the mountains where the height of the rail section was raised in order that the head would be above the snow. Ties and timber for bridges was cut from native forests. Redwood ties (from the coastal mountain range) were brought by steamer to *San Francisco* and were used from *Sacramento* to the summit. Henceforth, native lumber (sawed in mills at *Verdi* and elsewhere on the eastern slope of the mountains) was used. All of this timber was of a durable quality that made special treatment unnecessary. The number of ties varied from 2,260 to 2,640 per mile (depending upon alignment and grade). Some forest timber was hand hewn, but most was sawed. Stone of good quality for culverts, bridge piers and building foundations was found along the CPRR's line through the mountains. For the long stretch across *Nevada* and *Utah*, stone (for replacement of temporary structures) could be brought from quarries along the part of the line that had already been built. Track ballast was usually obtained from pits along the line (up the *Sierra Nevada* and down the *Truckee River* there was an ample supply). Across the deserts, material from the excavations was used as ballast. It generally consisted of coarse sand and gravel washed down from the nearby mountains.

205



Left: caption: "Redwood ties aside track waiting for shipment from mill"

Right: caption: "Masons cut stone at Rock Quarry"

206

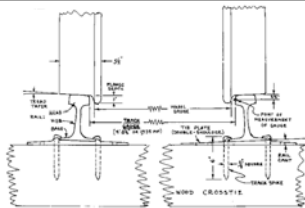
The Question of Gauge

207

"Be it enacted by the Senate and House of Representatives of the United States in Congress assembled, that the gauge of the Pacific Railroad and its branches through its whole extent from the Pacific Coast to the Missouri River, shall be and hereby is established at four feet, eight and one-half inches."

RE: law enacted by Congress establishing the gauge of the transcontinental RR. The question of the gauge (width) of the track was another important matter that occupied the attention of Congress (the gauge had been left for the POTUS to decide). There was a divergence of opinions as to the best gauge for railroad tracks. At the time, the *Erie and Ohio & Mississippi Railroad/s* used a six-foot gauge. The *California* legislature had fixed five-foot as the gauge in that state while the principal eastern roads (including the *Baltimore & Ohio, New York Central* as well as the *Chicago & Iowa Line/s*) were "standard gauge" (four-feet eight and one-half inches from centerline-to-centerline of rails). A committee of *Parliament* had settled on five-feet three inches as the gauge in *England*. President Lincoln had announced that he was in favor of the five-foot gauge and CPRR had ordered their equipment to match that width. The influence of the standard gauge roads (as well as the preference of the UPRR) threw the balance in favor of standard gauge. Thus, on March 2nd 1863, Congress passed one of the shortest laws in its history.

208



"Many persons no doubt have stood and looked down a railroad track and wondered how such an out of the way measurement as 4 ft. 8-1/2 in. came to be adopted as our standard railway gauge. It would seem that the responsibility for the choice of this measurement rests with George Stephenson, of locomotive fame. While inspecting some portions of the Roman wall through which chariots used to be driven, he discovered that deep ruts had been worn in the stone. Upon measuring the distance between them he found it to be in the neighborhood of 4 ft. 8-1/2 in., and not doubting that the Romans had adopted this gauge only after much experience, he determined to use it as a standard in the construction of his railroads. From that time on this measurement has been the standard gauge in England and the United States."

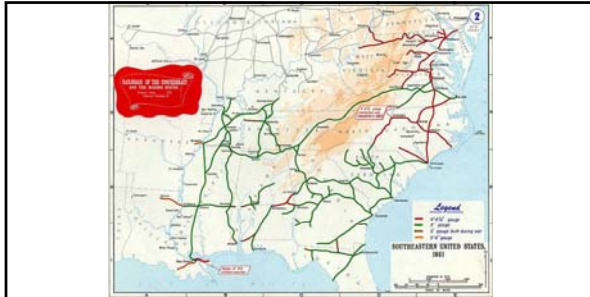
Popular Mechanics, 1905

209

Above: caption: "Section showing Standard Gauge railroad track dimensions"

The only standard gauge in the U.S. is a defacto 4'- 8½" (as recommended by the A.R.A. committee on standard wheel and track gauges in October 1896). *Great Britain*, on the other hand, has a true standard track gauge of the same dimensions because it was mandated by an *Act of Parliament* (in 1846) that all railroads should be built to the same gauge as the *Stockton & Darlington RR* - England's (and the world's) first public rail line to use locomotives. *America* had a multiplicity of gauges at the beginning of the *Civil War*, but the modern standard was most common in *New England* and 5'-0" was the standard in the South. During the course of the war, as a railroad was captured by one side or the other it would often be torn up by the retreating side and then rebuilt at the desired gauge by the victors. Some lines changed hands and gauges more than once during the conflict. After the war, economic pressures were put on the southern lines to change, but it wasn't until 1886 that representatives of these lines agreed to the change. All of the lines were re-gauged on May 31st and June 1st of that year in a massive effort (huge crowds turned out throughout the south to watch). Most of *Canada* made a voluntary changeover in 1880, followed by *Mexico*. When the *Louisville & Nashville RR* finally changed gauge in 1901, roughly 82% of North American roads had been "standardized."

210

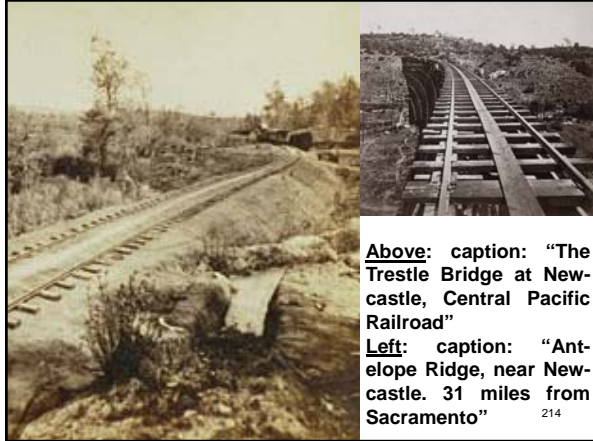


Above: caption: "Map of main railroads of confederacy 1861, showing gauges." After the Civil War, the economic recovery of the South depended on renewed trade with the North and moving goods westward via the existing railroad network. However, tracks in the South had been, for the most part, built with a five-foot gauge (whereas the majority of tracks in the North were standard gauge). After much planning, over a concentrated two-day period in the summer of 1886, the width of thousands of miles of railroad track (and the wheels on thousands of rail cars) in the South was reduced by three-and-one-half inches. 211

The Challenge Before Them

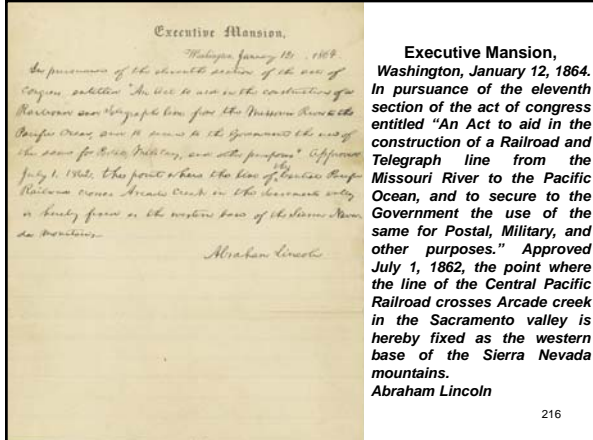
212

By the summer of 1864, the CPRR had completed the road only to *Newcastle, CA*, thirty-one miles distant. The eighteen months since the letting of the first construction contract had been a struggle of nerve against time, but by now the CPRR was ready to meet the challenge before them. Under the terms of the *Supplementary Act of 1864* (which revised in their favor the terms of the original *Pacific Railway Act of 1862*), the CPRR had a land grant of 12,800 acres per mile. It also had the creation of marketable bonds in sums of \$96K, \$64K and \$32K per mile (besides the many state and county subsidies). With a bonus of \$96K per mile for one-hundred and fifty miles of mountain work, the CPRR was anxious to get to the Sierra Nevada's foothills. The question became: where did the *Sierra Nevada Mountains* start, east of *Sacramento*, on the line of the CPRR? With thousands of dollars at stake, President Lincoln's only recourse was geological maps and the advice of experts. 213



Above: caption: "The Trestle Bridge at Newcastle, Central Pacific Railroad" Left: caption: "Antelope Ridge, near Newcastle. 31 miles from Sacramento" 214

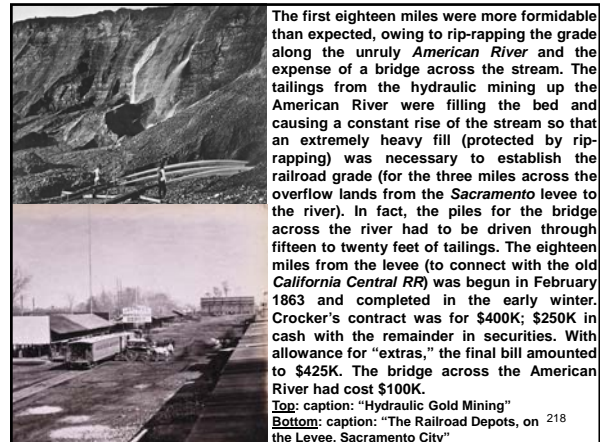
"The point where the line of the Central Pacific Railroad crosses Arcade Creek in the Sacramento Valley is hereby fixed as the western base of the Sierra Nevada Mountains"
 Abraham Lincoln, POTUS
 RE: by a decision of the *California Supreme Court*, the Sierra Nevada's western foothills were determined to terminate thirty-one miles east from *Sacramento*. Despite the controversy, all state survey authorities agreed that the transition point crossed *Arcade Creek*. Thus, on January 12th 1864, by the stroke of a pen, the base of the *Sierra Nevada Mountain Range* was moved twenty-four miles westward, towards *Sacramento*. Thus, the \$96K per mile bonus for mountainous work was extended from one-hundred and fifty miles to one-hundred and seventy-four miles. It was a fortunate turn of events for the CPRR, though the \$32K per mile allotted for desert terrain (on the eastern slope) would later prove inadequate. 215



Executive Mansion, Washington, January 12, 1864. In pursuance of the eleventh section of the act of congress entitled "An Act to aid in the construction of a Railroad and Telegraph line from the Missouri River to the Pacific Ocean, and to secure to the Government the use of the same for Postal, Military, and other purposes." Approved July 1, 1862, the point where the line of the Central Pacific Railroad crosses Arcade creek in the Sacramento valley is hereby fixed as the western base of the Sierra Nevada mountains. Abraham Lincoln 216



217



The first eighteen miles were more formidable than expected, owing to rip-rapping the grade along the unruly *American River* and the expense of a bridge across the stream. The tailings from the hydraulic mining up the American River were filling the bed and causing a constant rise of the stream so that an extremely heavy fill (protected by rip-rapping) was necessary to establish the railroad grade (for the three miles across the overflow lands from the *Sacramento* levee to the river). In fact, the piles for the bridge across the river had to be driven through fifteen to twenty feet of tailings. The eighteen miles from the levee (to connect with the old *California Central RR*) was begun in February 1863 and completed in the early winter. Crocker's contract was for \$400K; \$250K in cash with the remainder in securities. With allowance for "extras," the final bill amounted to \$425K. The bridge across the American River had cost \$100K.
Top: caption: "Hydraulic Gold Mining"
Bottom: caption: "The Railroad Depots, on the Levee, Sacramento City" 218



Left: caption: "The Levee and Central Pacific Railroad Freight Trains, Sacramento"
Right: caption: "Central Pacific Railroad Company. Freight Engine."

219

The Hop-Along Method

220

Once the junction with the old *California Central RR* was reached (present-day *Roseville, CA*), the CPRR determined to build the road up to *Newcastle*, some thirty-one miles distant. Progress was made by the "Hop-Along Method." While seeking a *path of least resistance*, the abilities of the CPRR's engineers and surveyors were put to the test in trying to obtain easy grades and curves among the *Sierra Nevada* foothills. Beyond *Newcastle*, the CPRR laid a wagon-road from *Dutch Flat* (west of the summit) across to *Carson Valley* in the *Nevada* mining district. By this road (which aroused accusations in the press and on street corners that *Dutch Flat* was to be the CPRR terminus) traffic would be attracted to the CPRR. Realizing its potential success, the CPRR began to buy its outstanding stock. By government consent, it assigned its subsidy rights to the *Western Pacific RR* in order to utilize that line (which was then under construction) as its branch from *Sacramento* to *San Francisco*.

221

DUTCH FLAT WAGON ROAD.

This new route over the Mountains, by way of Dutch Flat and Donner Lake, can now be traveled by Teams without load, and will be open for loaded Teams.

JUNE 15th, 1864.

XIV. 123

The Shortest, Best and Cheapest Route to Washoe, Humboldt and Reese River.

The grade going East at no place exceeds ten inches to the rod, and it is wide enough for Two Teams to pass without difficulty. All teams coming West, without load, can travel the New Road FREE OF TOLL, until further notice. All those taking loads at Sacramento, the terminus of the Central Pacific Railroad, three miles from Auburn, can travel the New Road going East, Free of Toll, up to July 1, 1864.

Teams starting from Virginia City will take the Henness Pass Road to Ingram's, at Sardine Valley, where the New Road turns off to the left.

CHARLES CROCKER.
Proprietor of the Co.

RENO, June 6, 1864

Left: advertisement for the opening of the "Dutch Flat Wagon Road." On June 15th 1864, the Big Four opened the *Dutch Flat and Donner Lake Wagon Road*. Taking about a year to build and costing about \$300K, this toll-road was opened over much of the route the CPRR would use over *Donner Summit* (to carry freight and passengers and other cargo to and from the ever advancing end of track and over the *Sierra Nevada* to the gold and silver mining towns of *Nevada*). As the CPRR advanced, their freight rates (with the combined rail and wagon shipments) became much more competitive. The volume of the toll-road freight traffic to *Nevada* was estimated to be about \$13 million per year as the *Comstock Lode* boomed. Getting just part of this freight traffic would help pay for the road's construction. When the CPRR reached *Reno*, it retained the majority of all *Nevada* freight shipments. Subsequently, the price of goods in *Nevada* dropped significantly.

222

DUTCH FLAT AND DONNER LAKE WAGON ROAD.

Commencing at Dutch Flat, in Placer county, sixty miles from the city of Sacramento, the Dutch Flat and Donner Lake Wagon Road follows the general course of the Pacific Railroad line along the "divide" or water shed between the Yuba and American rivers in nearly a direct line, without descending grade, to the summit of the Sierra Nevada mountain at the Donner Lake Pass, and by a descending grade, to the Truckee river, a distance of forty and a half miles—thence across the Truckee river and over an undulating plain, a distance of fifteen miles, to Inglish's Station, on the Henness Pass Wagon Road, and distant from Virginia City twenty-nine miles—making a total distance by this route of 144½ miles from Sacramento to Virginia City.

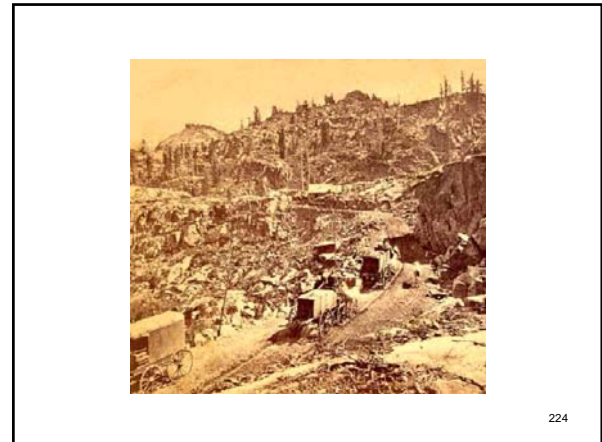
The road bed in rock cuts and mountain-side excavations is in no place less than sixteen feet in width, and is nearly all twenty feet wide, affording ample room for two loaded teams to pass each other. The ascending grade over the mountain in no place exceeds ten inches to the rod.

The road has been constructed during the past year, giving employ to from 300 to 500 men for more than six months, under the direction of Henry Polly, General Superintendent, at an aggregate cost of about \$200,000, and by competent judges who have passed over the road it is said to be superior to any mountain road of equal length in the State.

The California Stage Company will early in the Spring put on a daily line of stages to run over this route from Auburn to Virginia City, in connection with the Pacific Railroad from Sacramento.

Above: caption: "Stage-coach from Idaho at the Central Pacific Railway"
Left: article from the *Sacramento Union* (dated January 1st 1864) concerning the "Dutch Flat and Donner Lake Wagon Road"

223



The gross receipts of the CPRR, when it had reached *Newcastle* in July 1864, were \$121,679.10 and, with the extension of the rails, would steadily mount. The sub-contractors had been paid largely in cash or its equivalent. *Charles Crocker* had been paid by three-eighths stock and bonds, five-eighths cash or its equivalent. Gold was the only medium of business on the west coast and, during the *Civil War*, it was at a premium. The buying power of currency dropped to as low as forty-two cents on the dollar, with its high mark being eighty-three cents. There was a time when it took three dollars worth of greenbacks to obtain one dollar in gold and the government currencies bought only forty cents in gold. The issuance of the government bonds was long delayed with the first issue, in the amount of \$1,258,000, dated May 12th 1865. With the depreciation of currency, the CPRR was due to lose over \$7 million on the government issued bonds.

225

One Way or the Other

226

Practically everything save for the ties, timber and masonry had to be shipped from the east around *Cape Horn* or transferred across the *Isthmus of Panama*. For the least expensive method of transporting goods (around the Horn in clipper ships) the delivery took six months. Having been limited to use American iron only, the CPRR found the price inflated rapidly, with the situation aggravated by war conditions. For the first fifty miles of rails (or 5K-tons), the CPRR paid \$115 per ton. The average cost-per-ton asked for iron rails at the eastern mills during the construction of the CPRR was \$91.70 per ton, as compared with \$55.00 per ton in 1861 (pre-war). Freight rates via the Horn averaged \$17.50 a ton while via the Isthmus, the rates mounted to over \$50 per ton. As well, insurance rates increased from 2.5% to 17%. However ominous the financial situation and cost of material and equipment, by early July 1864 (when the UPRR had yet to lay a rail out of *Omaha*) the CPRR had opened thirty-one miles of track to *Newcastle* requiring an initial climb of nearly one-thousand-feet (in the seven-thousand-feet of rise to the snowy summits of the *Sierra Nevada* which lay seventy miles distant).

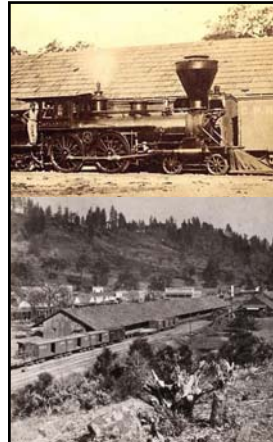
227

Left: caption: "Ships at the Central Pacific wharf, San Francisco"
Right: caption: "Rail for the Central Pacific RR loaded onto flatcars at San Francisco wharf"

228

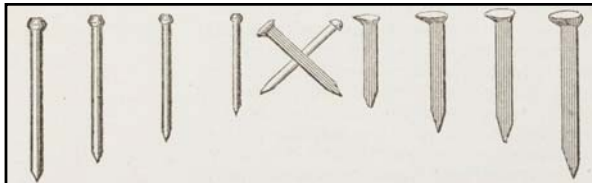
The first ten engines cost \$191K; the second ten \$215,000K. These were small locomotives of twenty to thirty-tons each. Before the war, the cost of rolling stock would have been reduced by a third, with \$10K as a top price on a locomotive. By the *Isthmus* route, freight rose as high as \$8,100 for a single engine. A rush order for two engines across the Isthmus resulted in an expense of \$37,796 for one and \$37,710 for the other. On a shipment of eighteen engines, the freight charges alone were \$84,466.80. The engines arrived at *San Francisco* "knocked-down" (disassembled). They were transferred (a.k.a. "lightered"), like all other material and equipment, for shipment by boat up the *Sacramento River* and were assembled at the Sacramento shops. With the termination of hostilities in April 1865, prices were relieved somewhat. In 1868, thirty-eight locomotives cost \$418K (or \$11K each). Passenger coaches cost \$3,500 each; flat-cars \$600/each and hand-cars \$150/each. All payments were in gold at a premium of \$1.65 paper for \$1.00 in gold.

229



Top: caption: "Locomotive 'Atlantic' at Colfax"
Bottom: caption: "Freight Depot at Colfax. Central Pacific Railroad"

230



During the war, rail spikes cost six and one-half cents per pound (as compared to two and one-tenth cents post-war); fish-plates rose from \$1.90 to \$6.50 per hundred pounds (as compared to \$1.70 post-war); bar-iron was \$110 to \$115 per ton (as compared to \$40 to \$45 per ton post-war). Telegraph arms (in thousand piece lots) cost about eighteen cents each; insulators cost plus thirty-cents each; brick cost \$30 per thousand; rough lumber \$40 to \$90 per thousand board-feet. Once the "timber belt" was crossed, the cost of ties mounted progressively to \$1.25, \$2, \$4, \$6 and up to as much as \$8 each. The UPRR suffered likewise by the inflated war prices and by the restrictions of trade during the war, but the CPRR was particularly helpless since *California* manufactured no iron and little of anything else. The CPRR always had at least \$1 million worth of material in shipment by the hazardous water route and, at times, \$3 million in transit at one point in time. Delays were frequent, owing to storm, calm and wreck and the *Federal Government* commandeered, at will, material and equipment for its own use in prosecuting the war. Material and/or equipment had to be ordered a full year in advance.

231

Above: caption: "A variety of spikes including flat, grooved, and cylindrical"

The Next Thirteen Miles

232

Once *Newcastle* was reached in early July 1864, the work stopped. It was a discouraging period for the CPRR. County bonds were being held up, suits were pending and Grant suffered a devastating defeat at *Cold Harbor*. Labor was discontent and gold was quoted at \$2.90; greenbacks at thirty-five cents. Crocker's eighteen miles to *Newcastle* had not daunted him nor his faith in the CPRR. Now, he prepared to bid for the construction of the next thirteen miles. Other contractors bidding the work alleged that Crocker had an unfair advantage over them. Thus, he was awarded only two miles (in fact, the most difficult); he took the contract and the risk. The other eleven miles were apportioned among several bidders, but it did not work out well. At the time, labor was scarce and independent forcing contractors to outbid each other for manpower. Consequently, labor costs rose sharply. Inevitably, there were strikes, delays and quarrels. The Board of Directors decided that to contract the construction out by stretches of one or two miles would so disorganize the labor market that the inflated wage burden would prove ruinous to the CPRR's fragile finances. In just nine miles more the next twenty-mile division would be completed entitling the CPRR to their government subsidy (the *Supplementary Act of 1864* provided for a two-thirds subsidy payment upon the graded line in advance of the rails). As such, Crocker was authorized to proceed. For these reasons, the bulk of the remaining eleven miles reverted to *Charles Crocker* to complete.

233

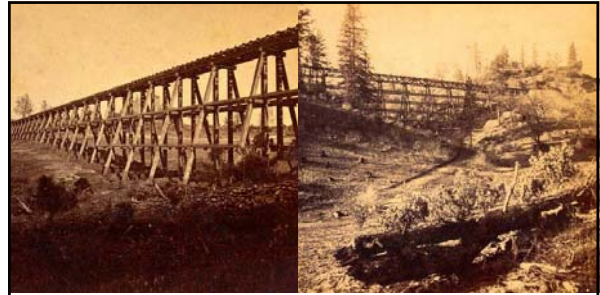
On May 10th 1865, the CPRR's tracks reached *Auburn* - five miles from *Newcastle*. One month later they reached the historic emigrant station of *Clipper Gap*, seven miles further along the line (forty-three miles from *Sacramento*). Now forty miles had been completed. The subsidy due the CPRR was long overdue, but the future had brightened. The *Civil War* had ended in a Union victory thus, northern industries were freed from war exigencies and an easier money market was foreseen. On March 3rd 1865, Congress passed the *Act of 1865* which permitted the CPRR and UPRR to issue their bonds upon one-hundred miles of their grade, superstructure and so forth for one-hundred miles in advance of their continuously completed line. Such an extension of borrowing power greatly strengthened the resources of both companies. From that date on, the CPRR was able to employ their bonds to good effect, with the road mortgaged for the next one-hundred miles.

234



Left: caption: "Auburn Depot, Altitude 11,385 feet. 36 miles from Sacramento"
Right: caption: "Road East of Station, at Auburn"

235



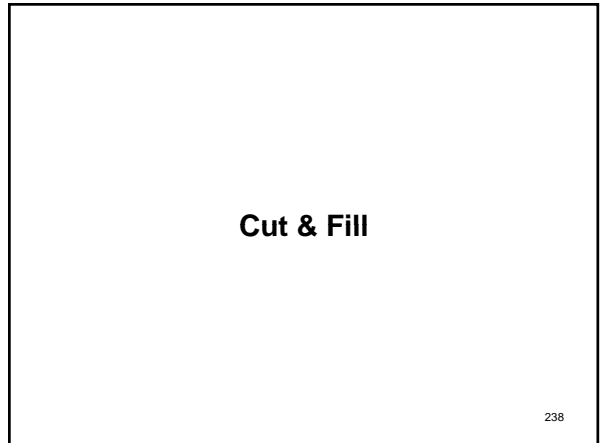
Left: caption: "Trestle near Station, at Auburn"
Right: caption: "Trestle in Clipper Ravine, near Clipper Gap"

236



Left: caption: "Trestle Bridge, Clipper Ravine, near view"
Right: caption: "View above Clipper Gap, Placer County"

237



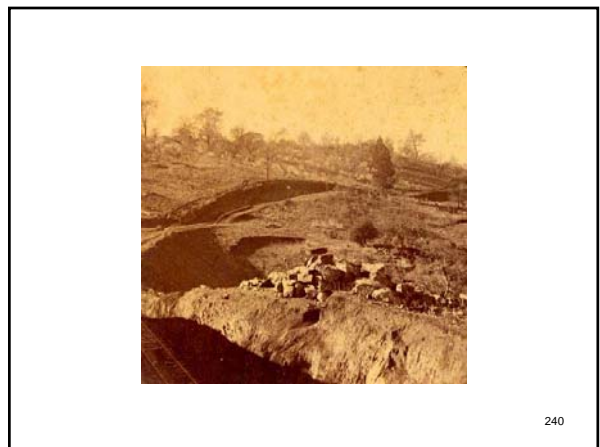
Cut & Fill

238



Left: caption: "Building Through the Forest - C.P.R.R., Sierra Nevada Mountains, 1864." Hills and/or ridges in front of the road bed would have to have a flat-bottomed, "V"-shaped cut to get the tracks past (the nature of the material determined the slope and how much material would have to be removed). Ideally, these cuts would be matched with valley fills that could use the "spoil" to bring the road-bed up to grade (a.k.a. "cut & fill" construction). At the time, there was no heavy equipment that could be used to make the cuts and/or haul it away to make the fills. The only options were to dig it out manually by pick and shovel, haul the spoil by wheelbarrow and/or horse/mule cart or blast it loose. To blast a V-shaped cut, several holes were drilled (up to 20-feet deep), filled with black powder and the material blasted away. Unfortunately, the explosive technique often blew most of the potential fill material down the hillside, making it unusable as fill.

239



240



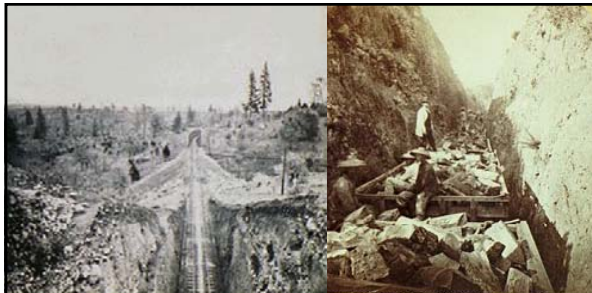
Left: caption: "Tangent below Pino. 23 miles from Sacramento."

Right: caption: "Heath's Ravine Bank. 60 feet high."

241



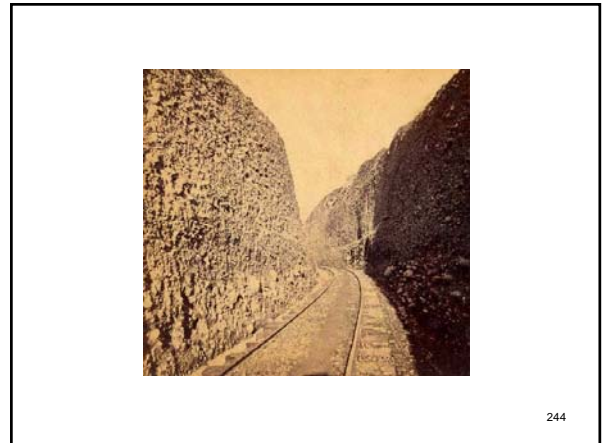
242



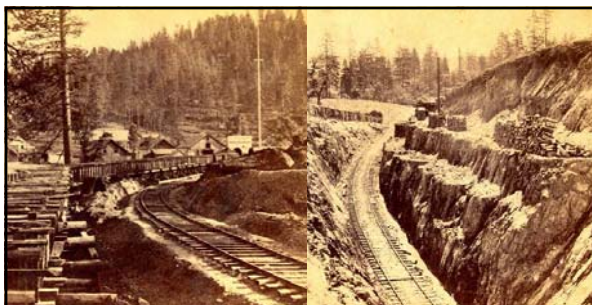
Left: caption: "Bloomer Cut"

Right: caption: "Wood Train and Chinamen in Bloomer Cut"

243



244



Left: caption: "Gold Run and Railroad Cut"

Right: caption: "Deep Cut at Trail Ridge. Length 1,000 feet."

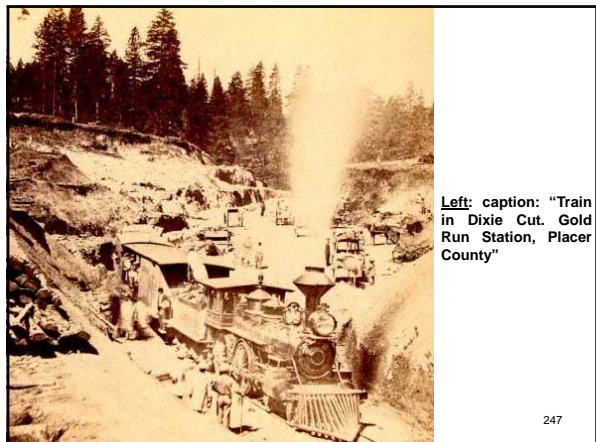
245



Left: caption: "Cut through 'Dixie Spur.' 64 miles from Sacramento."

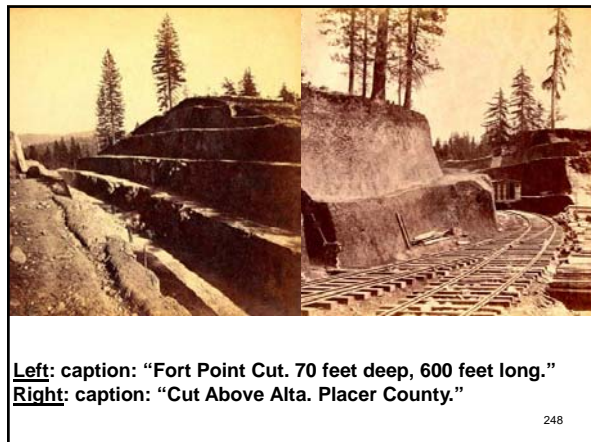
Right: caption: "Hornet Hill Cut – west of Gold Run. 50 feet deep."

246



Left: caption: "Train in Dixie Cut. Gold Run Station, Placer County"

247



Left: caption: "Fort Point Cut. 70 feet deep, 600 feet long."
Right: caption: "Cut Above Alta. Placer County."

248



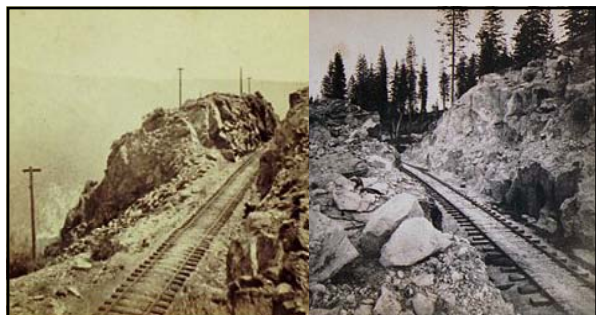
Left: caption: "Hog's Back Cut. 60 feet deep. 2 miles above Alta."
Right: caption: "Grading the Central Pacific Railroad – Sailor's Spur and Fill. 12 miles above Alta, Placer County."

249



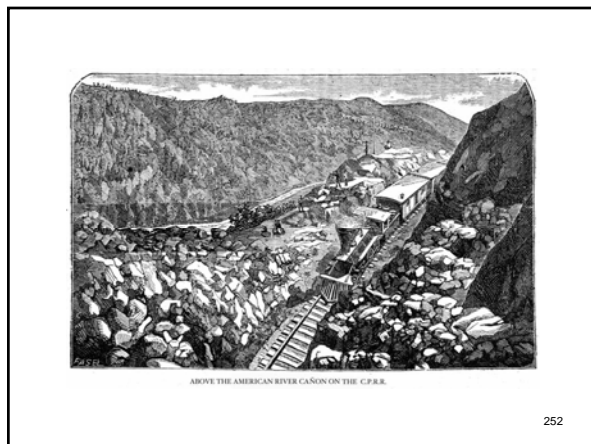
Left: caption: Alta from the North, Altitude 3,935 feet, 69 miles from Sacramento"
Right: caption: "The Huntington at Alta, Placer County"

250



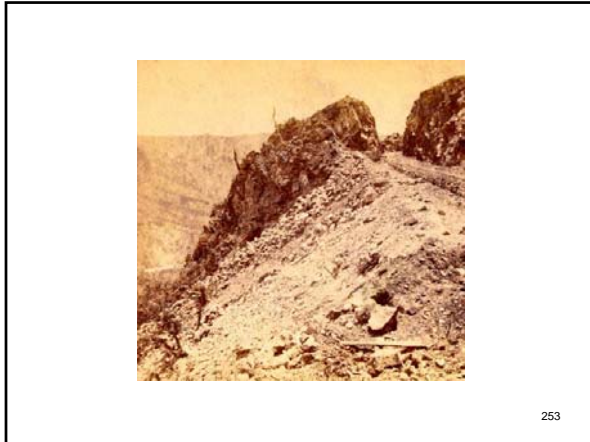
Left: caption: "Rock Cut above Alta. American River 2,000 feet below"
Right: caption: "Sandstone Cut near Alta"

251

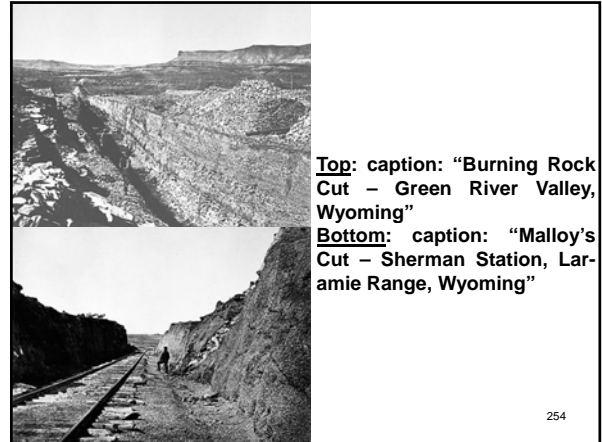


ABOVE THE AMERICAN RIVER CAÑON ON THE C.P.R.R.

252



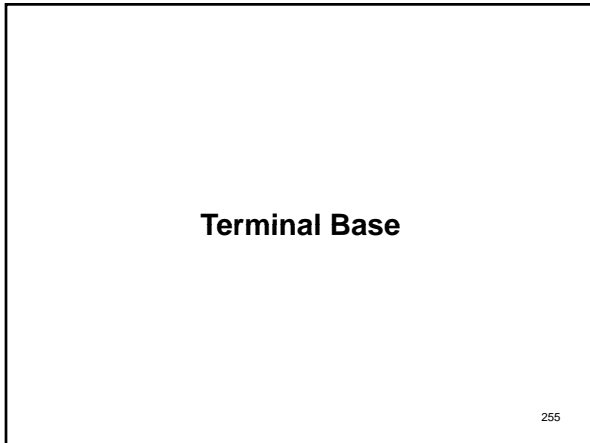
253



Top: caption: "Burning Rock Cut – Green River Valley, Wyoming"

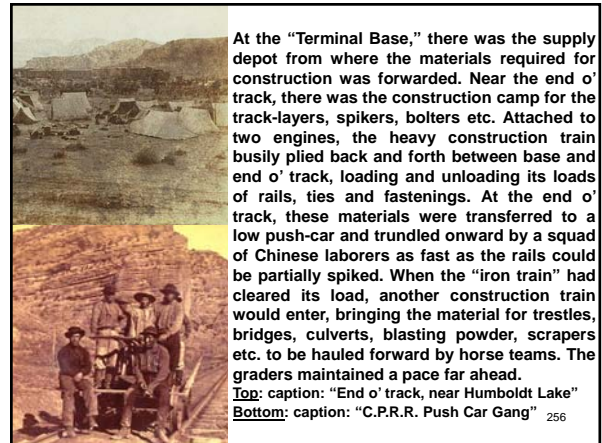
Bottom: caption: "Malloy's Cut – Sherman Station, Laramie Range, Wyoming"

254



Terminal Base

255



At the "Terminal Base," there was the supply depot from where the materials required for construction was forwarded. Near the end o' track, there was the construction camp for the track-layers, spikers, bolters etc. Attached to two engines, the heavy construction train busily plied back and forth between base and end o' track, loading and unloading its loads of rails, ties and fastenings. At the end o' track, these materials were transferred to a low push-car and trundled onward by a squad of Chinese laborers as fast as the rails could be partially spiked. When the "iron train" had cleared its load, another construction train would enter, bringing the material for trestles, bridges, culverts, blasting powder, scrapers etc. to be hauled forward by horse teams. The graders maintained a pace far ahead.

Top: caption: "End o' track, near Humboldt Lake"

Bottom: caption: "C.P.R.R. Push Car Gang" 256

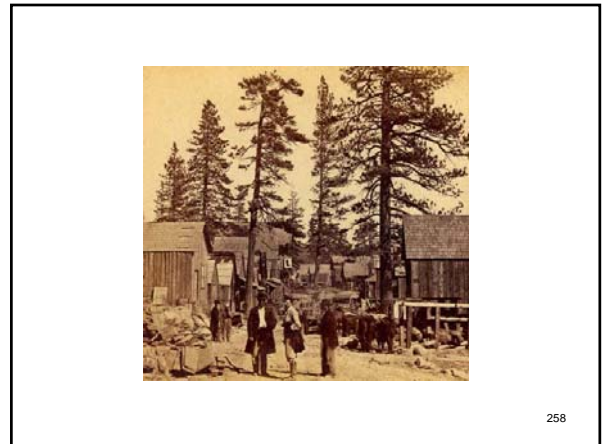
256



Left: caption: "Teams Waiting for Freight From the Central Pacific Railroad at Cisco"

Right: caption: "Freight Depot at Reno. 154 miles from Sacramento."

257




258

A Team Effort

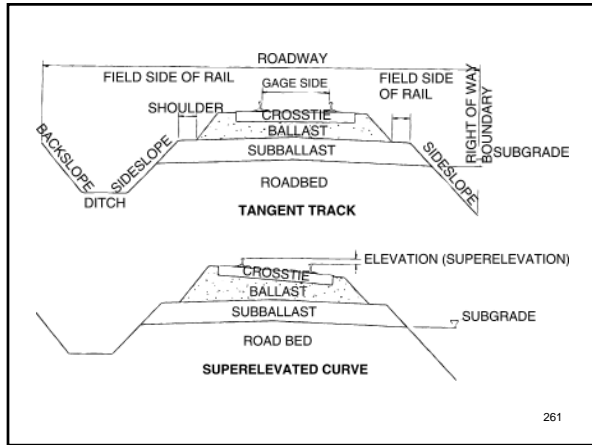
259

THE AMERICAN RAILROAD BALLAST UNLOADER CO. Office, 30 Hall Block, TOLEDO, O.




In advance of the track layers, surveyors (in consultation with engineers) determined where the line of track would be placed along a road-bed. The graders then prepared the roadbed, dug or blasted through hills, filled in washes, built trestles, bridges or culverts across streams or valleys, made tunnels (if necessary) and laid down the wooden ties. Ties were typically unloaded from mule-drawn wagons and placed on the track ballast and leveled to get the roadbed ready for the iron rails. The actual track-laying gang would then lay the rails on the previously laid ties positioned on the roadbed, drive the spikes and bolt the fishplate (coupling) bars to each rail. The heavy rails were often kicked-off the flatcars and carried by gangs of men on each side of the rail to where they were to be laid. The rails just in front of the rail car would be placed first, measured for the correct gauge (with "gauge sticks") and then secured to the tie with spike mauls. The fishplates connecting the ends of the rails would be bolted on and then the flatcar pushed by hand to the end of the rail and the process repeated. After a flatcar was unloaded, it would usually be hooked to a small locomotive and pulled back to a siding in order that another flatcar could be advanced to end o' track. Where wagon transport was easier, the rail cars would be brought to end o' track by locomotive, unloaded and the flatcar returned immediately to a siding for another loaded car of either ballast or rails (temporary sidings were often installed to expedite track laying operations). Track ballast was placed between the ties as they progressed. Where a proper roadbed had previously been prepared, the work progressed rapidly.


Above: period advertisement for "The American Railroad Ballast Unloader Co."



261

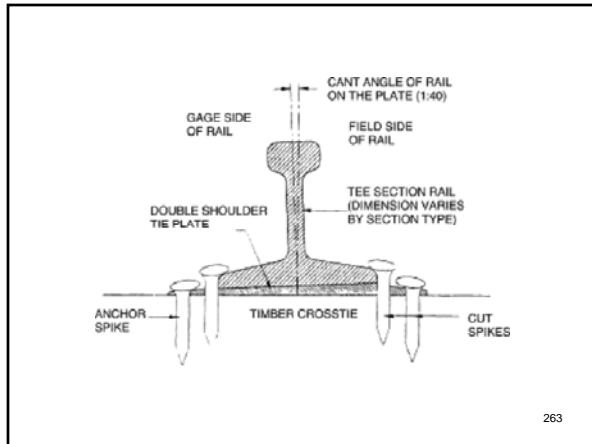


Top: caption: "Railroad track spirit level in place indicating five inches of super-elevation between the inside and outside rails of a curve"



Bottom: caption: "Standard Gauge Track Spirit Level to Super-elevate Rail on Curves"

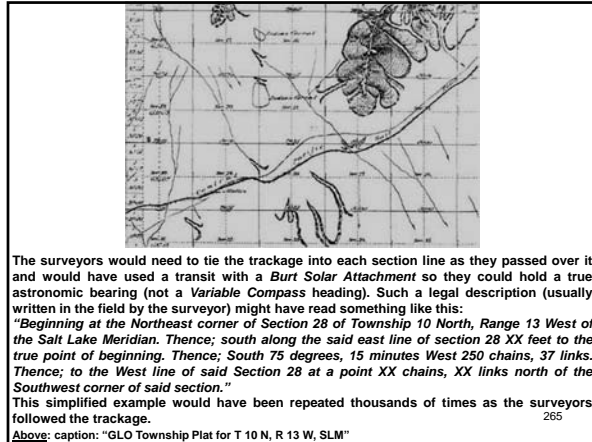
262



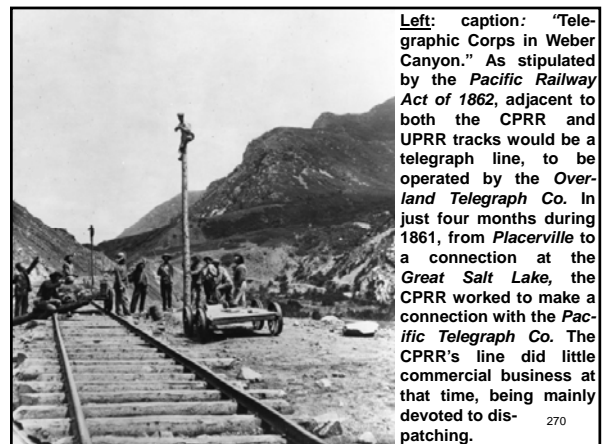
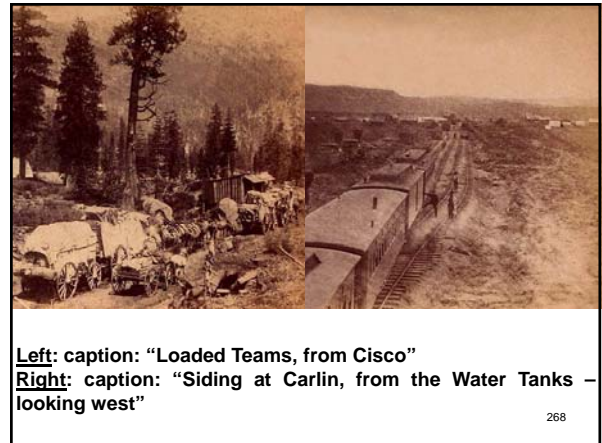
263

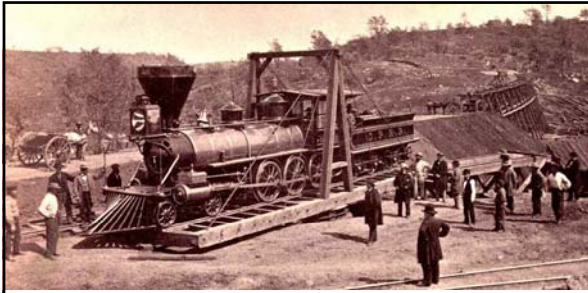
By 1864 most of the states through which the trans-continental RR would pass had been surveyed by the contract surveyors of the *General Land Office*. These GLO surveyors were responsible for marking the land into the "United States Rectangular System" (inclusive of ranges, townships and sections). They marked the sections and quarter sections on the ground, drew plats and made topographic notes of the ground they passed over. By 1848, a comprehensive "Manual of Instructions" had been issued to all contractors detailing how they were to conduct these public land surveys. The CPRR and UPRR surveyors tasked with this specialized survey work would have had a different set of skills (as compared with the engineering-oriented surveyors working miles ahead of the graders). They would have been versed in the Manual of Instructions, the public land system and cadastral plating. Most probably, they would have followed laid trackage (since this would have been the most permanent alignment).

264

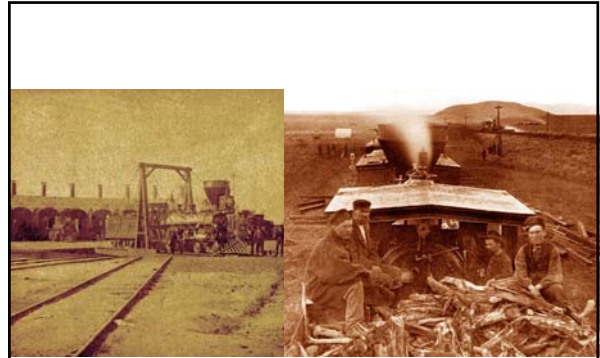


Simultaneously, another gang would distribute telegraph poles and wire parallel to the grade. Cooks prepared meals and clerks handled the accounts, records, payroll etc. using the telegraph line to relay requests for materials and supplies or communicate with supervisors. Typically, the workers lived in camps built near the work site. Supplies were ordered by the engineers and hauled by rail (to be loaded on horse-drawn wagons if they were needed ahead of the end o' track). Work camps were moved when end o' track (a.k.a. "rail-head") moved a significant distance. Almost all of the roadbed work had to be done manually using shovels, picks, axes, two-wheeled dump carts, wheelbarrows, ropes, scrapers, etc., (only black powder was initially available for blasting). Carts pulled by mules, and horses were the only labor saving devices available at the time. Lumber and ties were usually provided by independent contractors who cut, hauled and sawed the timber as required. Necessary supplies included food, water, ties, rails, spikes, fishplates, nuts and bolts, track ballast, telegraph poles, wire, fire wood, coal and water (for the steam locomotives).

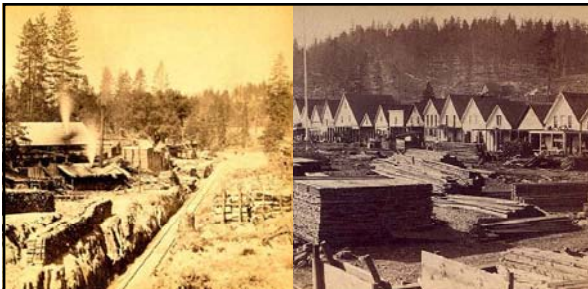




Above: caption: "CPRR locomotive on turntable." The wooden ties were cut by "sawyers" (sub-contractors) from timber logged by lumberjacks on forested property that was granted to the CPRR (in alternate sections of land over the *Sierra Nevada* - six-hundred and forty acres to a section). Some independent loggers cut and delivered ties cut from their own logging sites under separate contracts. Despite the fact that the land grants included no Redwood trees, Redwood ties were preferred because of their inherent decay resistance. Most of the early CPRR locomotives used wood for fuel, thus their cone shaped spark-arresting exhaust stacks (the UPRR used extensive coal deposits located along their right-of-way, thus their smoke stacks were cylindrical in shape). 271



272



Left: caption: "Sawmill and Cut East of Cape Horn. 59 miles from Sacramento."

Right: caption: "Scene at Truckee. Nevada County."

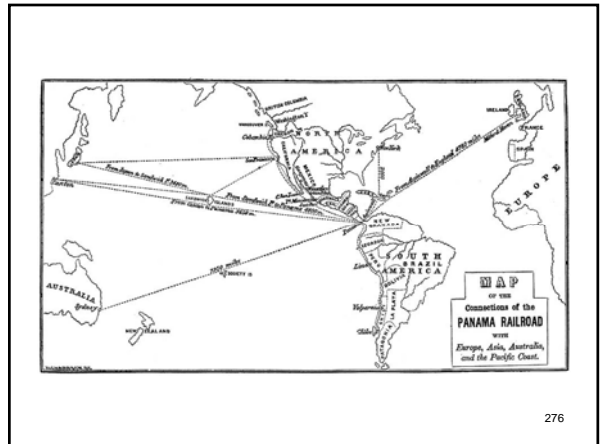
273

The Long and Short of It

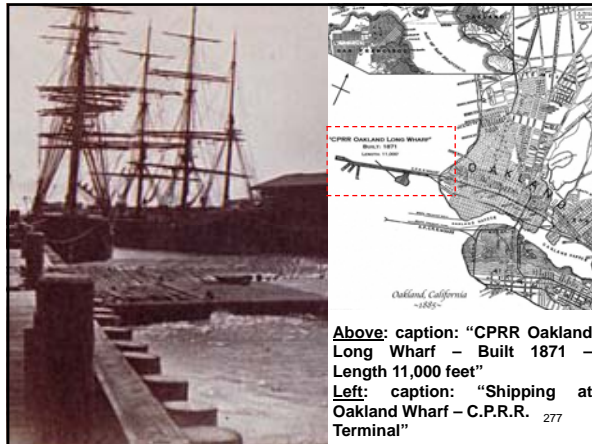
274



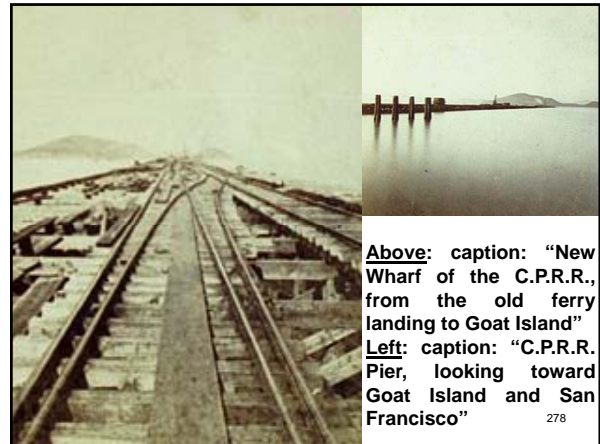
Tracks, spikes, telegraph wire, locomotives, railroad cars, supplies etc. were imported from the east on sailing ships that sailed eighteen thousand miles (in about a two-hundred day trip) around *Cape Horn* at the tip of *South America* (a.k.a. "the Magellan Route"). Some freight was put on the faster "Clipper" ships which could make the voyage in about one-hundred and twenty days. Many passengers and high priority freight were shipped over the newly completed (1855) *Panama Railroad* (left) which crossed the *Isthmus of Panama*. With the use of paddle steamers, this short-cut reduced the travel time to about forty days. Essential supplies were typically offloaded at the *Sacramento* docks. 275



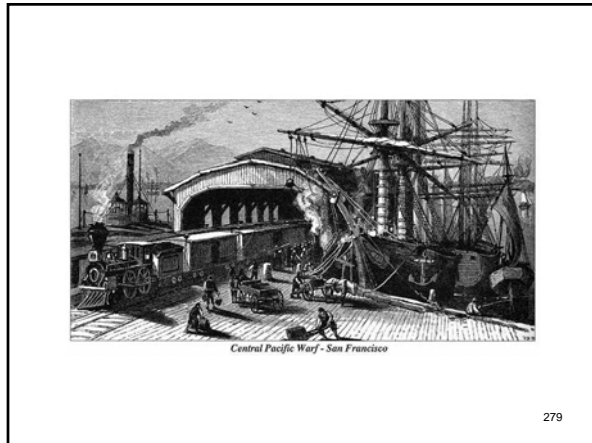
276



Above: caption: "CPRR Oakland Long Wharf - Built 1871 - Length 11,000 feet"
 Left: caption: "Shipping at Oakland Wharf - C.P.R.R. Terminal" 277

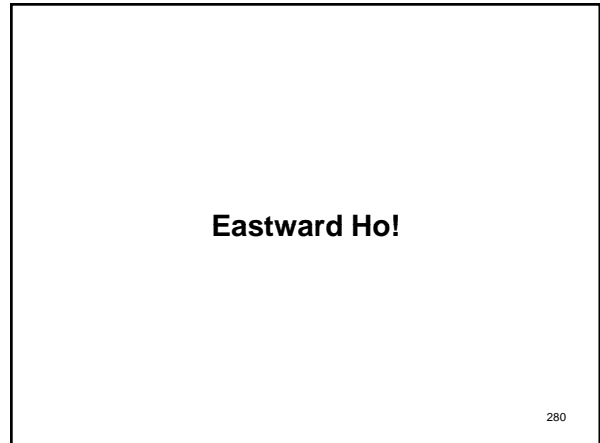


Above: caption: "New Wharf of the C.P.R.R., from the old ferry landing to Goat Island"
 Left: caption: "C.P.R.R. Pier, looking toward Goat Island and San Francisco" 278



Central Pacific Warf - San Francisco

279

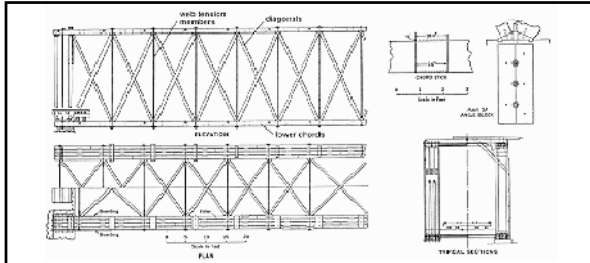


Eastward Ho!

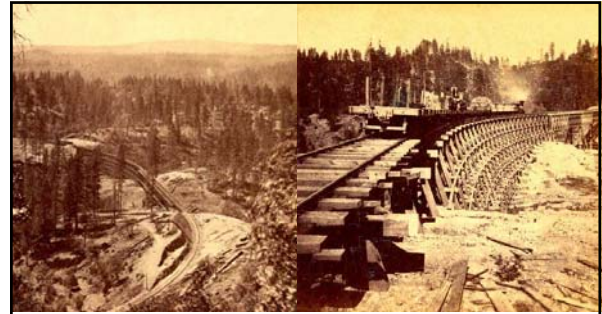
280

The construction contract from *Clipper Gap* eastward had, by resolution of the CPRR Board of Directors on June 4th 1865, been assigned to *Charles Crocker & Co. Illinois Town* (present-day *Colfax, CA*) eleven miles distant now beckoned as the next terminal base. The country ahead had been changing rapidly; from the winding but gradually ascending right-of-way, the survey was leading into the main foothills of the *Sierra Nevada*. CPRR engineers characterized the route up from *Newcastle* as one of the most difficult on the line. It took the CPRR a year to get from *Newcastle* to *Clipper Gap*, just twelve miles apart (a large portion of this lost time was due to delays caused by finance and/or labor issues). Although the rise in these twelve miles was only eight-hundred feet, much of this distance demanded sweeping detours and prolonged grades. At an elevation of 2,242-feet above seal-level, a climb of 500-feet from *Clipper Gap* was required to reach *Colfax*. After two months effort, on September 10th 1865 the eleven miles were completed. 281

Most of the bridges on the CPRR line were erected with a truss-span having trestle approaches at one or both ends. At *Long Ravine*, there were three *Howe* trusses with a combined length of 428-feet. Others of this type (with truss spans exceeding 100-feet) were the bridges at *Lower* and *Upper Cascade Creek* (each with spans of 204-feet); at *Cold Creek* (truss-span of 126-feet); at *Little Truckee* and at *Prosser Creek* (each with spans of 105-feet); the first, third, fourth, and fifth crossing of the *Truckee River* (with spans of 150-feet); the first crossing of the *Humboldt River* (span of 129-feet) and the second crossing of the *Humboldt* (span of 150-feet). All of these truss-spans were of the *Burr* type (popular with engineers at the time), which is the same as a *Howe* truss but with a wooden arch in addition (built alongside the trusses from end-to-end and abutting upon the piers or abutments). All of these bridges rested upon stone masonry piers (usually on rock sides of the river or canyon). 282

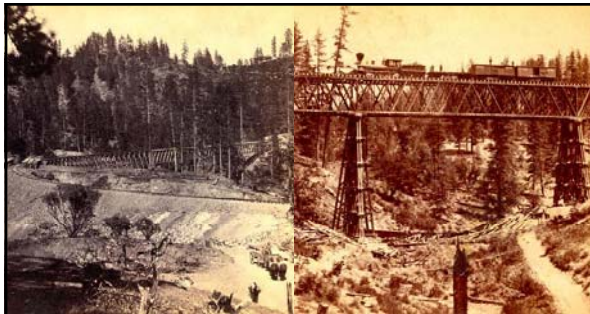


Above: caption: "Howe Truss Railroad Bridge." William Howe was granted a patent in 1840 for the Howe Truss, which was a very popular design for bridges for many years. Constructed mostly of wood, it used iron rods for web-tension members. In 1844, Thomas W. Pratt was granted a patent for the Pratt Truss, which used iron rod diagonals and timber verticals. The development and use of iron in these bridges soon led to the use of iron lower chords and other components, followed by combination bridges consisting of iron diagonals and timber lower chords (used as compression members). In 1859, Howard Carroll built the first all-wrought-iron bridge for railroad use, beginning a slow decline in the use of timber bridges. 283



Left: caption: "Long Ravine Bridge"
Right: caption: "Long Ravine Bridge, near Colfax"

284



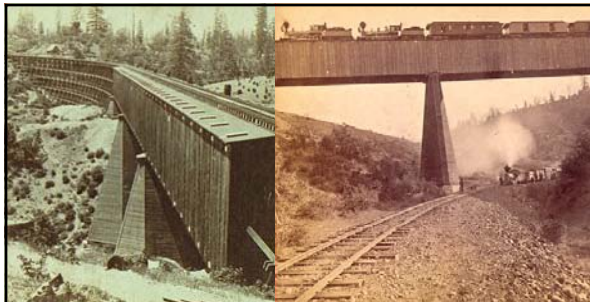
Left: caption: "Long Ravine Bridge from the West. Length 1,050 feet."
Right: caption: "Long Ravine Bridge from below. 150 feet high."

285



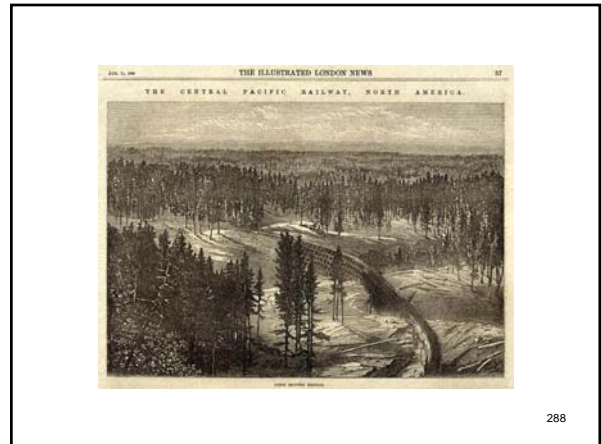
Left: caption: "Long Ravine Bridge – 120 feet high, 878 feet long"
Right: caption: "Long Ravine Bridge, overhead view"

286

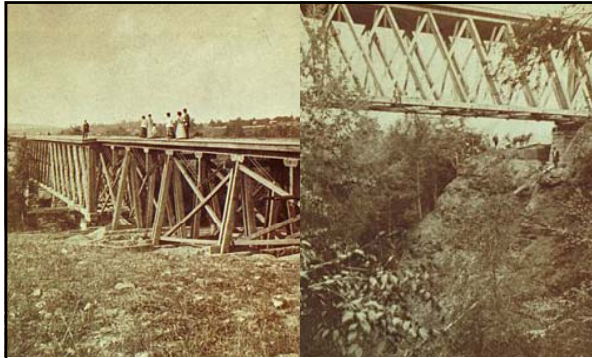


Left: caption: "Long Ravine Bridge – 120 feet high, 878 feet long, near view"
Right: caption: "Long Ravine Bridge near Colfax"

287

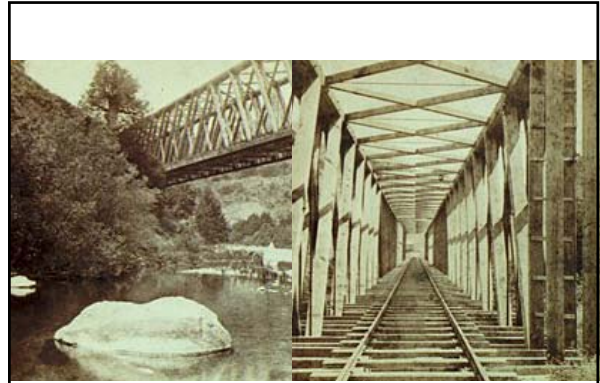


288

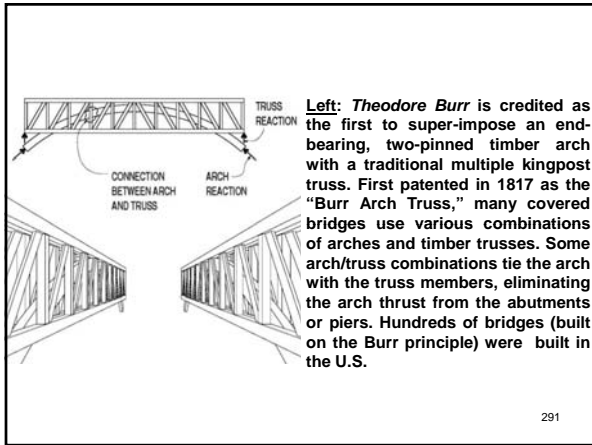


Left & Right: caption: "R.R. Bridge over Gravel Run Gorge"

289

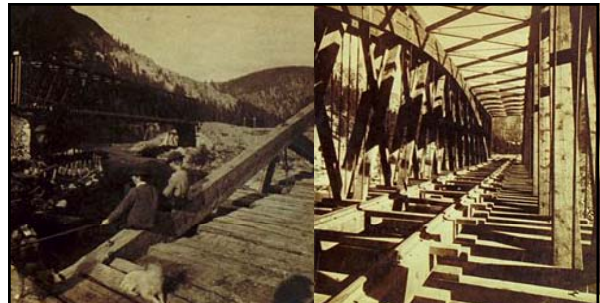


290



Left: *Theodore Burr* is credited as the first to super-impose an end-bearing, two-pinned timber arch with a traditional multiple kingpost truss. First patented in 1817 as the "Burr Arch Truss," many covered bridges use various combinations of arches and timber trusses. Some arch/truss combinations tie the arch with the truss members, eliminating the arch thrust from the abutments or piers. Hundreds of bridges (built on the Burr principle) were built in the U.S.

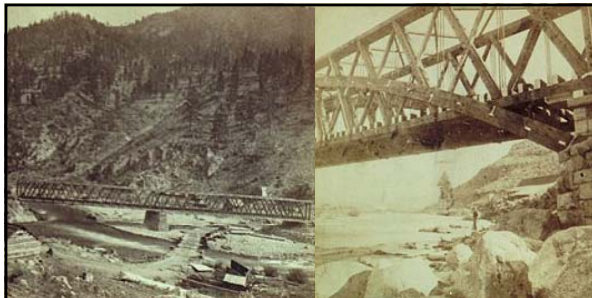
291



Left: caption: "First Crossing of the Truckee River. 133 miles from Sacramento."

Right: caption: "Interior of Bridge over First Crossing of the Truckee River"

292



Left: caption: "Second Crossing of Truckee River, near Camp 24"

Right: caption: "Fourth Crossing of the Truckee River"

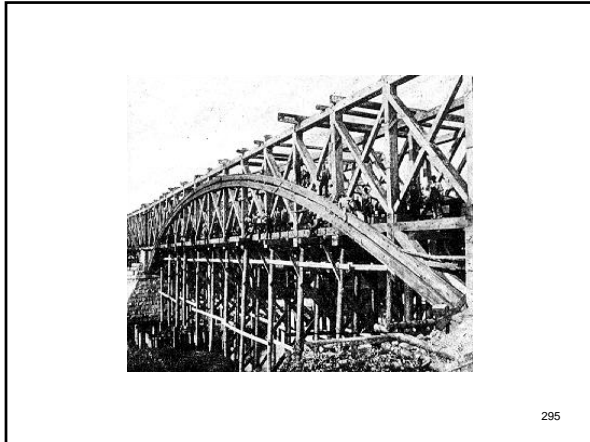
293



Left: caption: "Upper Cascade Bridge, above Cisco"

Right: caption: "Lower Cascade Bridge"

294

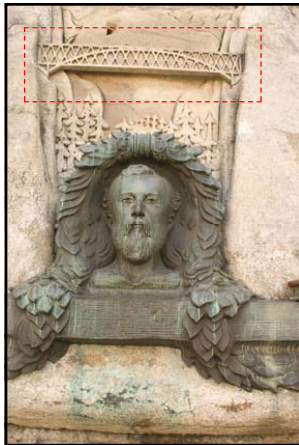


295



Opening Truckee River, six miles east of Reno, C. P. R. R.

296

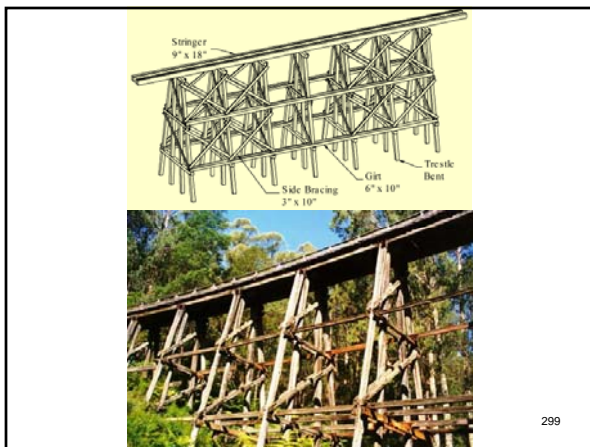


Left: the Theodore D. Judah Memorial in Old Sacramento, CA. Above the bust of Judah, carved in stone, is a Burr Truss bridge (highlighted).

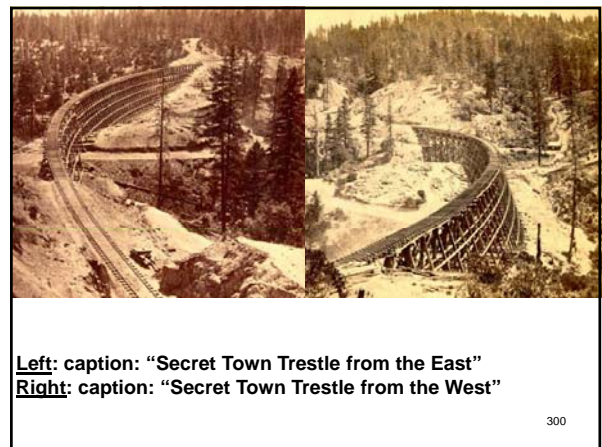
297

Additionally, there were numerous trestles made with bents (left) spaced about sixteen-feet apart (with wooden stringers spanning the space between on which the ties of the track rested). The bents rested upon stone masonry foundations and were made of four posts; one on the bottom, two inclined and one as a cap at the top. Longitudinal girts connected the several bents (which were sometimes in two or more stages). In some cases (i.e. where the track was high above a gully), the trestles were made up of short spans of trusses (about forty-feet in length). An example of this combination was the *Secret Town Trestle* where there were 280 lineal-feet of forty-foot spans and 820 lineal-feet of trestle; a total of about 1,100-feet of timber structures with a maximum height of ninety-feet. There were originally a number of long, standard-type trestles crossing low places or ravines. Among these (on the ascent of the *Sierra Nevada*) were: *Newcastle* (528-feet long); *Auburn* (416-feet long); *Station* (450 & 568-feet); *Station 470* (near *Lovells Gap* - 496-feet); *Clipper Gap* (464-feet); *Clipper Ravine* (450-feet); and *Butte Canyon* (48-feet). The height of the trestles varied to a maximum of seventy feet.

298

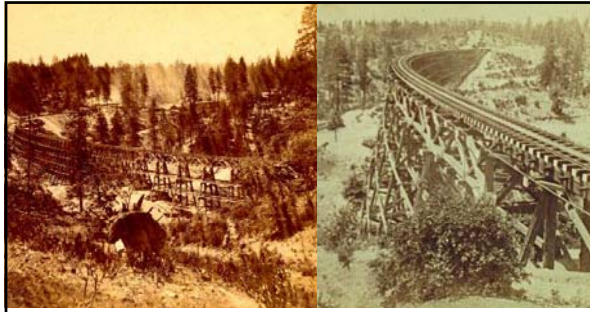


299



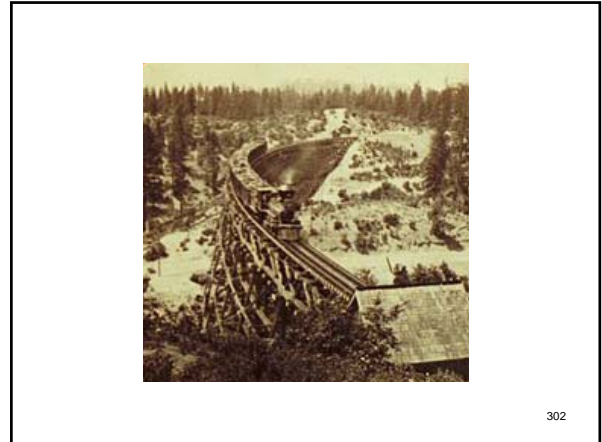
Left: caption: "Secret Town Trestle from the East"
Right: caption: "Secret Town Trestle from the West"

300

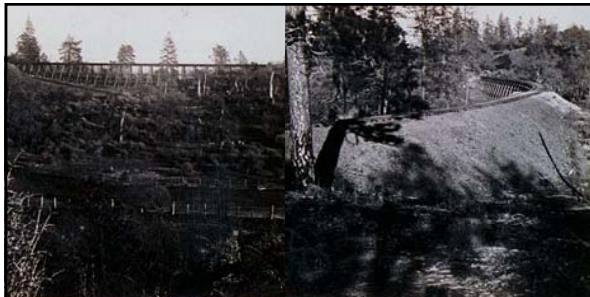


Left: caption: "Secret Town Trestle"
Right: caption: "Side View of Secret Town Bridge – 1,100 feet long, 95 feet high"

301

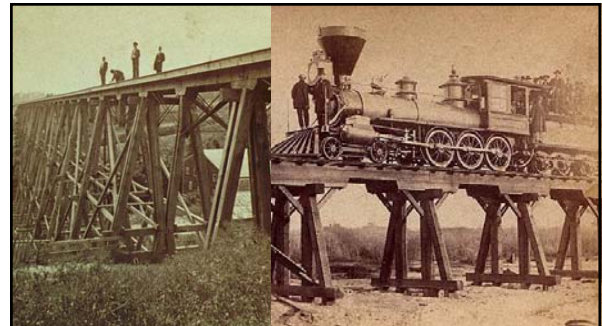


302



Left: caption: "Trestle near Lovell's Ranch"
Right: caption: "Road and Trestle, Lovell's Ranch"

303



Left: caption: "R.R. Trestle over Big Stream Gorge"
Right: caption: "Central Pacific Railroad – Locomotive on the Trestling"

304

With the exception of the bridge over the *American River* at *Sacramento*, bridge spans were of moderate size on the CPRR. However, over the *Sierra Nevada* the location of the line was such that long, high trestles were often necessary. They were employed as an economy measure on the initial construction (they speed-up the progress of the road). For a number of years after the opening of the road to traffic, the work of filling the canyons crossed by wooden trestles was carried on (the time for the fill-ins was determined by the condition of each wooden trestle). Where fills were made across small water courses, culverts made of cut-stone were generally used. At the time the road was nearing completion, culverts had been built on 375 miles of the line. They were usually of stone (some were of brick) and all were laid in hydraulic cement. The bottoms were paved and some (of large size) were made to be used as cattle crossings. On the line across the desert (where stone could not be easily obtained) short trestles were built in place of culverts. 305



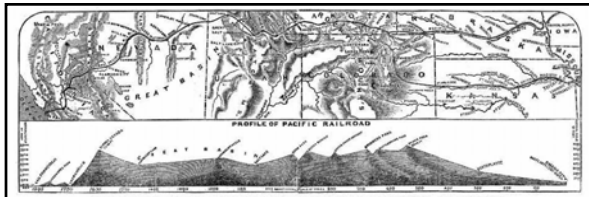
Above: caption: "Trestle Work – Promontory Point, Salt Lake Valley, Utah" 306

In the Black

307

For the year 1865, twenty-three miles had been completed. The CPRR's gross earnings (all in gold) for May 1865 were reported at \$740 per day; for June 1865 they had increased to \$1,080 per day. Passenger rates were ten-cents per mile; freight rates fifteen-cents per ton per mile. *Dutch Flat*, where the CPRR's wagon-road was opened to tap the *Placerville-Virginia City* stage and freighting road, lay only thirteen miles distant from the line. In total, the CPRR's gross earnings for 1865 was \$405,591.95; net earnings \$282,233.44. By the deduction of \$150K for interest and \$105K for a sinking fund, there was left, "carried to profit and loss" (in this case profit) \$27,233.44. The construction work for the year (the twenty-three miles of track-laying and about fifty miles of grading) brought into the CPRR's coffers over \$3.2 million. The construction up to that time, from *Sacramento* eastward, totaled over \$5.5 million; the total cost of the road, over \$6.25 million. There were additional assets; county bonds, materials etc. of almost another \$1 million. Thus, the CPRR annual report for 1865 showed the company operating "in the black" after completing fifty-four miles of track. The tide had turned with the closing of the *Civil War* in April 1865 with a Union victory; securities were rising in market value and funds were forthcoming. The campaign of *C.P. Huntington* in the east (ably assisted by brokers *Fisk & Hatch*) was winning subscriptions for both the government currency bonds and the company bonds in *NYC, Boston* and even in *Europe*.

308



"Many a time I would have given anybody largely out of the money that I had if they would have taken the work off my hands and assured me that they would have built the road...I have done many things that I did not do for profit. I did them in order that the road should be a success. California was full of people that wanted to come East, including women and children. That point had its weight with us. It is very well to sneer at that, as people of small minds will; but it had its influence on us, and a very large influence. A railroad would give people a means of crossing the continent comfortably in six days and on land, instead of spending twenty to thirty days on the ocean, with all the inconveniences of such a voyage."

C.P. Huntington, CPRR VP

309



Above: caption: "Map detail from Samuel Bowles, *Across the Continent*, 1865." Note that the planned transcontinental RR route (as envisioned in 1865) went south of the *Great Salt Lake* (via *Salt Lake City*).

310

High Sierra

311

"...oft-repeated slander that the road was designed to be only a feeder, and added, over the signature of President Stanford, that both the Government and company bonds were appreciating since the close of the Rebellion; that few company bonds had yet been offered; and that with the proceeds of the Government bonds and certain loans, and by the privilege of its own first mortgage bonds covering 100 miles in advance, the company is fully warranted in considering itself able to overcome the Sierras as rapidly as possible, and in undertaking the work beyond."

CPRR Board of Directors
 RE: statement issued in response to perceived slanderous attacks on its ability/desire to continue on now that they were about to be confronted by the snows and gorges of the "High Sierra." Skeptics (in abundance) asserted that the CPRR would rest contented with the traffic diverted by the wagon-road from the *Nevada* silver fields. Rival interests vigorously circulated the statement of a reputable engineer that further progress of the CPRR through the mountains by the *Judah* survey would require an expenditure of from \$250K to \$300K per mile.

312

From the first thirty miles in the *Sacramento Valley* and the short sections (over which the sub-contractors had undermined one another by hiring labor away from each other at inflated wage rates) to the *High Sierra* country, the improved finances of the CPRR and the need for thousands (rather than hundreds) of workmen changed the situation dramatically. *Charles Crocker* solved the labor problem by looking across the Pacific, to *China*. Native labor was extremely independent; after all, why should an able-bodied man labor at a dollar or two dollars-a-day when he might earn four dollars-a-day at the docks or in the mines? The spirit of "El Dorado" was kept alive by the discovery of rich silver veins of *Nevada*. In the hills, a man might still strike it rich with the swing of a pick or scoop of a shovel. Track work on the CPRR was very often an entree to other, higher paying employment. During the "White Pine Craze," two-thousand laborers were shipped across the *Sierra Nevada* to *Humboldt Wells*. Only one-hundred stuck around. In the spring of 1865, at *Auburn*, Crocker met a wage-strike among the Irish laborers by directing *J.H. Strobbridge* (his construction superintendent) to hire some Chinese in their place. They were set to work, much to the dismay and consternation of the Irish. The Chinese performed so well and, given the pressing need for labor, Crocker put out a call for five-thousand Chinese laborers.

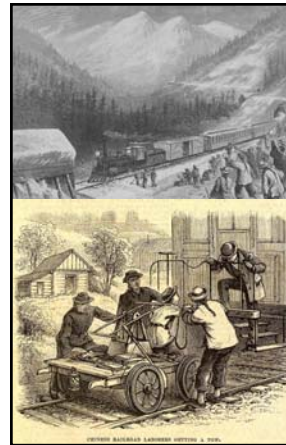
313

Crocker's Pets

314

"Quiet, peaceable, industrious and economical - ready and apt to learn all the different kinds of work required in railroad building...as efficient as white laborers. Without them it would be impossible to complete the western portion of this great National highway within the time required by the acts of Congress."
Leland Stanford, CPRR President
 RE: despite the protests leveled against the invasion of "Yellow" labor, in the fall of 1865 Crocker had approximately three-thousand Chinese at work under white bosses, mainly Irish. In the beginning, for \$26/month (later for \$30 and then \$35/month) they arrived from *Sacramento* and *San Francisco* in their basket hats, blue blouses, flapping pantaloons, and imperfect English to face heat and cold, storm and toil and the curses of the displaced "native" workmen who labeled them "Crocker's Pets." They worked out so well and made such a positive impression on the CPRR board that Crocker was planning to employ even more, imported from *China* directly, if/when occasion demanded it. Once shown what needed to be done and how it should be done, the Chinese laborer adapted quickly; earnest in their effort and hard working. Prior to their mass employment with the CPRR, Chinese labor had been confined to the mines of the west. Though not as proficient with horse teams as the Irish, with a pick, shovel and spade they worked as industriously as an army of ants. To the Chinese laborers "Mistuh Clockee" (Crocker) was their general. Under the spur of his forceful presence they shuttled back and forth, like thoroughly drilled companies of soldiers. To the visitors along the grade the sight of the lines of pig-tailed figures diligently removing rock and earth, trundling their wheelbarrows or the countless groups squatting while eating their bowls of rice and pork, was an unflinching curiosity.

315



"Make Masons out of Chinamen? Did they not build the Chinese wall, the biggest piece of masonry in the world?...Wherever we put them, we found them good, and they worked themselves into our favor to such an extent that if we found we were in a hurry for a job of work, it was better to put Chinese on at once."
Charles Crocker

"Chinese are faithful and industrious workers and, under proper supervision, some become skillful in the performance of their duty. Many of them are becoming very expert in drilling, blasting and other departments of rock work"

S.S. Montague, CPRR Chief Engineer
 Top: caption: "Chinese workers greet a CPRR train high in the Sierra Nevada"

Bottom: caption: "Chinese Railroad Laborers Getting a Tow" 316

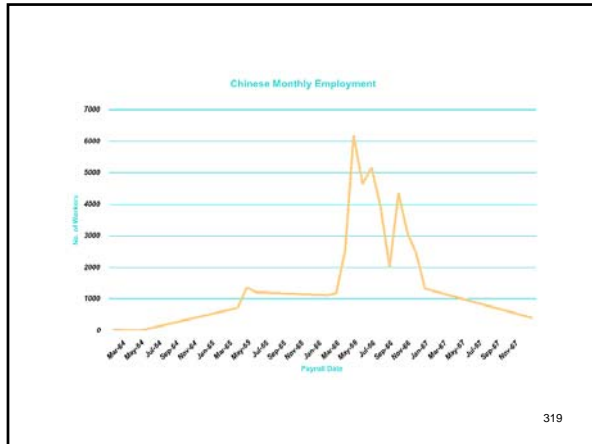
Celestials

317

"The United States of America and the Emperor of China cordially recognize the inherent and inalienable right of man to change his home and allegiance, and also the mutual advantage of the free migration and emigration of their citizens and subjects respectively, from one country to the other, for the purposes of curiosity, of trade, or as permanent residents."

RE: treaty between the U.S. and *China*, proclaimed July 28th 1868. The Chinese were commonly referred to, at the time, as "Celestials" (China was then known as the "Celestial Kingdom"). Despite the concerns expressed by *Charles Crocker* and others that the Chinese were too small in stature (typically averaging about fifty-eight inches tall and weighing one-hundred and twenty pounds), spoke only rudimentary or no English and lacked railroad-building experience, they proved their worth immediately. Most Chinese workers were represented by a Chinese "boss" who translated, collected salaries, kept discipline and relayed orders from an American General Supervisor. When more workers were needed, they were imported from *Kwangtung Province* which was, at the time, experiencing the violence and suffering caused by the *Taiiping Rebellion* (besides its endemic poverty). Most *Celestials* planned on returning to *China* with their saved wages when the CPRR was completed. They received between one and three dollars per day; the same as unskilled Caucasian workers. However, workers imported directly from *China* sometimes received lower wages. After paying for food and lodging, a Chinese workman could save +\$20.00/month; a small fortune by Chinese standards of the day.

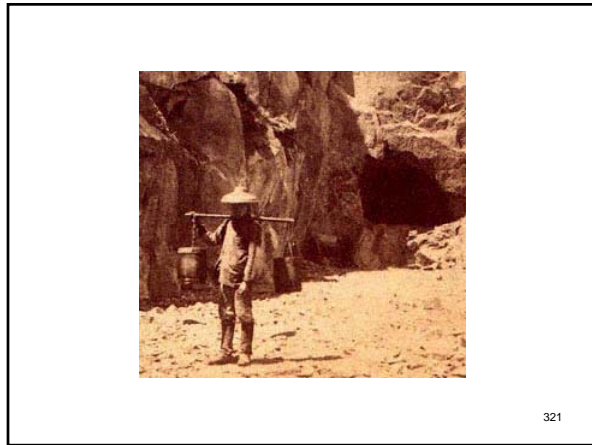
318



PAY ROLL, NO. 100, for month of March, 1865									
General and Special, Chinese, Irish, French, German, Italian, Spanish, Portuguese, and other nationalities									
NAME	STATUS	NO.	DATE	AMOUNT	REMARKS	NAME	STATUS	NO.	DATE
Ch. Wong	Chinese	1001	3/1	28.00	Per diem				
Ch. Wong	Chinese	1002	3/1	28.00	Per diem				
Ch. Wong	Chinese	1003	3/1	28.00	Per diem				
Ch. Wong	Chinese	1004	3/1	28.00	Per diem				
Ch. Wong	Chinese	1005	3/1	28.00	Per diem				
Ch. Wong	Chinese	1006	3/1	28.00	Per diem				
Ch. Wong	Chinese	1007	3/1	28.00	Per diem				
Ch. Wong	Chinese	1008	3/1	28.00	Per diem				
Ch. Wong	Chinese	1009	3/1	28.00	Per diem				
Ch. Wong	Chinese	1010	3/1	28.00	Per diem				
Ch. Wong	Chinese	1011	3/1	28.00	Per diem				
Ch. Wong	Chinese	1012	3/1	28.00	Per diem				
Ch. Wong	Chinese	1013	3/1	28.00	Per diem				
Ch. Wong	Chinese	1014	3/1	28.00	Per diem				
Ch. Wong	Chinese	1015	3/1	28.00	Per diem				
Ch. Wong	Chinese	1016	3/1	28.00	Per diem				
Ch. Wong	Chinese	1017	3/1	28.00	Per diem				
Ch. Wong	Chinese	1018	3/1	28.00	Per diem				
Ch. Wong	Chinese	1019	3/1	28.00	Per diem				
Ch. Wong	Chinese	1020	3/1	28.00	Per diem				
Ch. Wong	Chinese	1021	3/1	28.00	Per diem				
Ch. Wong	Chinese	1022	3/1	28.00	Per diem				
Ch. Wong	Chinese	1023	3/1	28.00	Per diem				
Ch. Wong	Chinese	1024	3/1	28.00	Per diem				
Ch. Wong	Chinese	1025	3/1	28.00	Per diem				
Ch. Wong	Chinese	1026	3/1	28.00	Per diem				
Ch. Wong	Chinese	1027	3/1	28.00	Per diem				
Ch. Wong	Chinese	1028	3/1	28.00	Per diem				
Ch. Wong	Chinese	1029	3/1	28.00	Per diem				
Ch. Wong	Chinese	1030	3/1	28.00	Per diem				
Ch. Wong	Chinese	1031	3/1	28.00	Per diem				
Ch. Wong	Chinese	1032	3/1	28.00	Per diem				
Ch. Wong	Chinese	1033	3/1	28.00	Per diem				
Ch. Wong	Chinese	1034	3/1	28.00	Per diem				
Ch. Wong	Chinese	1035	3/1	28.00	Per diem				
Ch. Wong	Chinese	1036	3/1	28.00	Per diem				
Ch. Wong	Chinese	1037	3/1	28.00	Per diem				
Ch. Wong	Chinese	1038	3/1	28.00	Per diem				
Ch. Wong	Chinese	1039	3/1	28.00	Per diem				
Ch. Wong	Chinese	1040	3/1	28.00	Per diem				
Ch. Wong	Chinese	1041	3/1	28.00	Per diem				
Ch. Wong	Chinese	1042	3/1	28.00	Per diem				
Ch. Wong	Chinese	1043	3/1	28.00	Per diem				
Ch. Wong	Chinese	1044	3/1	28.00	Per diem				
Ch. Wong	Chinese	1045	3/1	28.00	Per diem				
Ch. Wong	Chinese	1046	3/1	28.00	Per diem				
Ch. Wong	Chinese	1047	3/1	28.00	Per diem				
Ch. Wong	Chinese	1048	3/1	28.00	Per diem				
Ch. Wong	Chinese	1049	3/1	28.00	Per diem				
Ch. Wong	Chinese	1050	3/1	28.00	Per diem				

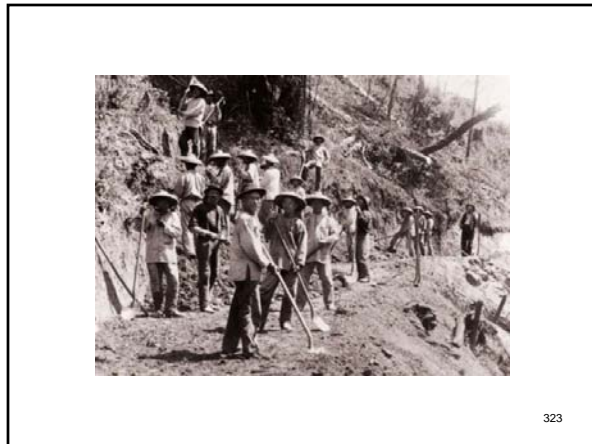
The first "Celestials" were hired in 1865 at approximately \$28 per month to do the very dangerous work of blasting and laying ties over the treacherous terrain of the High Sierras. They lived in simple dwellings and cooked their own meals, often consisting of fish, dried oysters and fruit, mushrooms and seaweed.

320



Upon the completion of the CPRR, many of the Chinese workers moved on to other railroad construction jobs including with the Central and Southern Pacific Railroad/s. Some returned to China with their savings while others sent to China for wives and settled in various western communities as miners, laundrymen and restaurateurs. Many settled in "Chinatowns" in various cities. However, the majority who remained in the U.S. settled in the San Francisco Bay area, Sacramento, Marysville and elsewhere along the Pacific coast. In the coming years, governmental restrictions would be placed on Chinese (a.k.a. "Mongolian") immigration and employment.

322

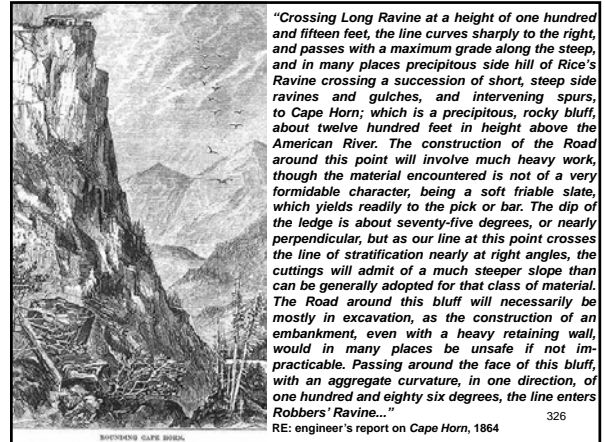


The CPRR's end o' track remained at Colfax, while the grading, trestling, bridging and tunneling were pursued vigorously along the surveyed route to the east. Three regular trains per day were running between Colfax and Sacramento. Along the grades five-thousand men and six-hundred teams were at work by October 1865. By the end of the year there were seven-thousand Chinese, at \$30/month (not including room and board); 2,500 native (white) laborers, at \$35 a month (including room and board). They were housed in tents, caves, dugouts and board shacks and supplied by wagons from the base at Colfax. From the base to the summit (Donner Pass) was approximately fifty miles. Early in the spring of 1866, work commenced on the assault of "Cape Horn."

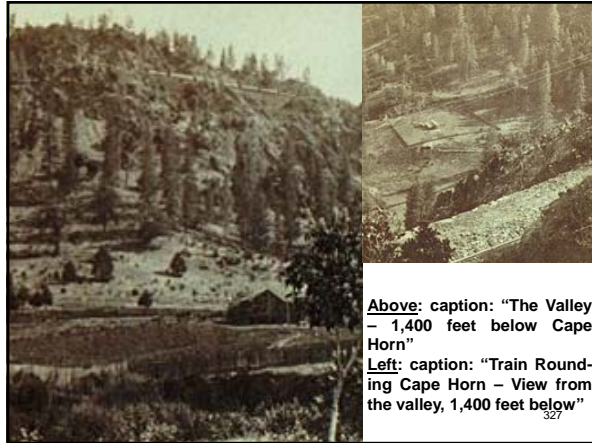
324

Rounding the Horn

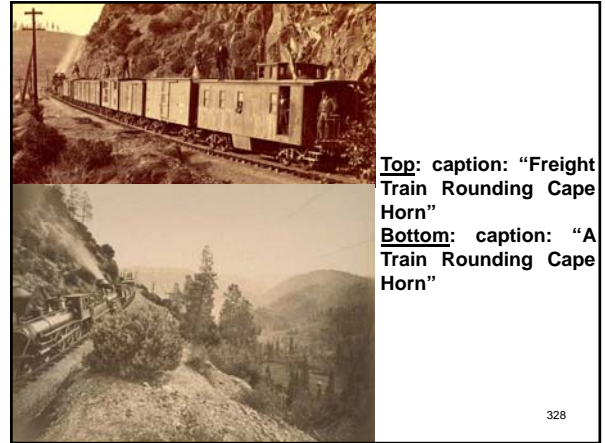
325



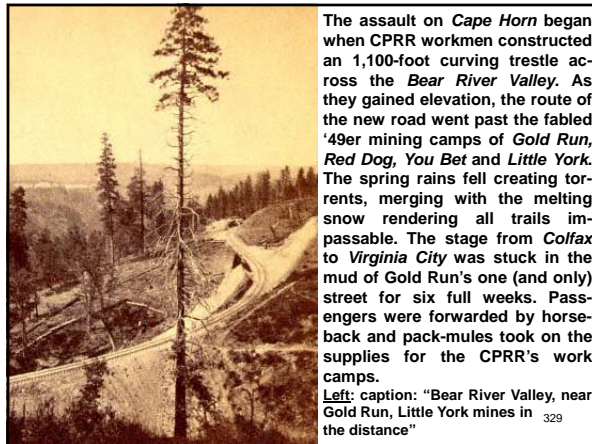
326



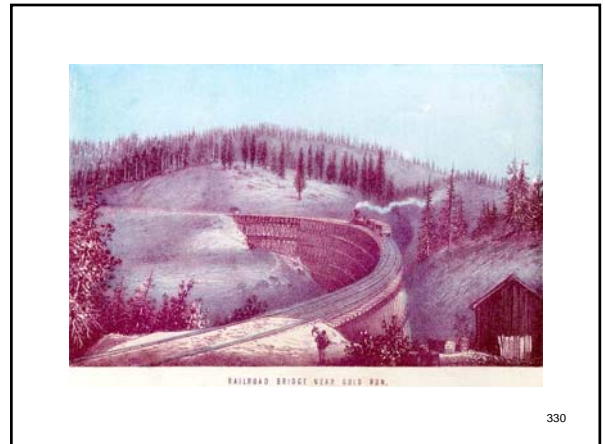
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328



329

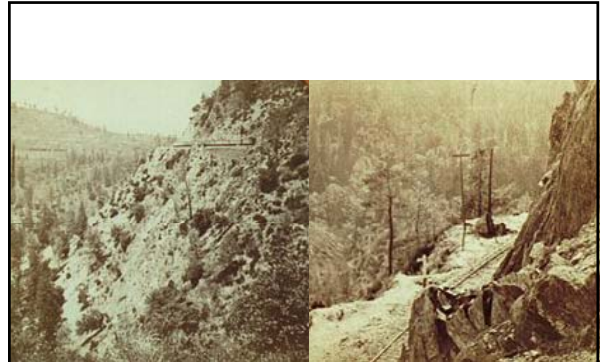


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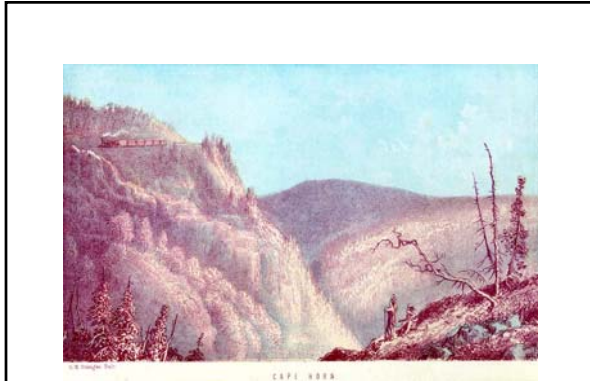


Left: caption: "Cape Horn, Altitude 3,500 feet"
Right: caption: "Rounding Cape Horn"

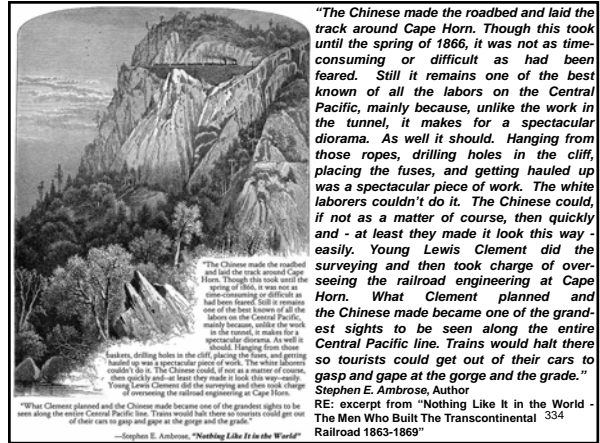
331



332



333

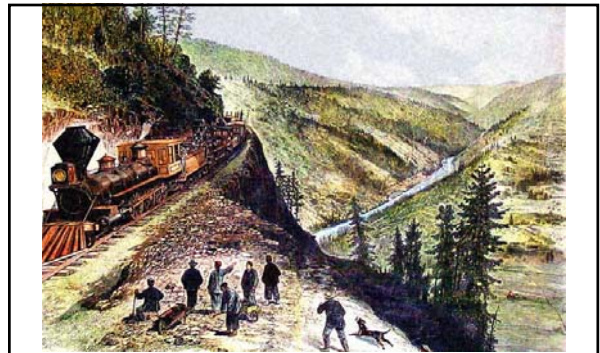


"The Chinese made the roadbed and laid the track around Cape Horn. Though this took until the spring of 1866, it was not as time-consuming or difficult as had been feared. Still it remains one of the best known of all the labors on the Central Pacific, mainly because, unlike the work in the tunnel, it makes for a spectacular diorama. As well it should. Hanging from those ropes, drilling holes in the cliff, placing the fuses, and getting hauled up was a spectacular piece of work. The white laborers couldn't do it. The Chinese could, if not as a matter of course, then quickly and - at least they made it look this way - easily. Young Lewis Clement did the surveying and then took charge of overseeing the railroad engineering at Cape Horn. What Clement planned and the Chinese made became one of the grandest sights to be seen along the entire Central Pacific line. Trains would halt there so tourists could get out of their cars to gasp and gape at the gorge and the grade."
Stephen E. Ambrose, Author
RE: excerpt from "Nothing Like It in the World - The Men Who Built The Transcontinental" 334
Railroad 1863-1869"



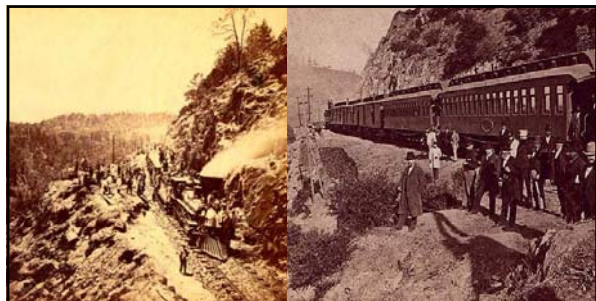
Left: caption: "Cape Horn and Railroad from the West. High above ravine 1,400 feet."
Right: caption: "American River and Canyon from Cape Horn - river below railroad 1,400 feet"

335



Above: caption: "EXCURSION TRAIN ROUNDING CAPE HORN AT THE HEAD OF THE GREAT AMERICAN CANYON, WITH A VIEW OF THE SOUTH FORK OF THE AMERICAN RIVER, WHERE GOLD WAS FIRST DISCOVERED IN 1848. Frank Leslie Transcontinental Excursion Train, hand-colored engraving, New York, Frank Leslie's Illustrated Newspaper, April 27, 1878."

336

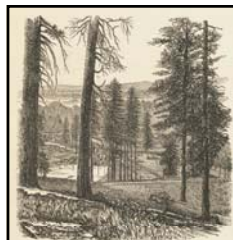


Left: caption: "Excursion Train at Cape Horn, 3 miles above Colfax"
Right: caption: "Overland Train coming 'round Cape Horn'"

337



338



"Thus practically refuting the slanders which had been heaped upon the company by its enemies in their oft-repeated declaration that Dutch Flat was to be the terminus of the road"

CPRR

RE: by May of 1866, the track was winding its way around *Cape Horn*. On the *Fourth of July*, it was into *Dutch Flat* and the first train carried a patriotic excursion to *Sacramento*. That same celebratory day, the opposing headings in the *Grizzly Hill Tunnel*, ten miles beyond and 508-feet long, met.

Top: caption: "The Central Pacific Railroad crossing Dutch Flats"

Bottom: caption: "Dutch Flat Mining Camp, 1865 - just before the Central Pacific built through"

339



Left: caption: "Horse Ravine Wall and Grizzly Hill Tunnel"
Right: caption: "Grizzly Hill Tunnel from the North"

340



No. 116—WEST PORTAL, TUNNEL NO. 1, C. P. R. R.

341

Heroine of the Central Pacific

342

"Why, I used to go up and down that road in my car like a mad bull, stopping along the way wherever there was anything amiss, and raising Old Nick with the boys who were not up to time."

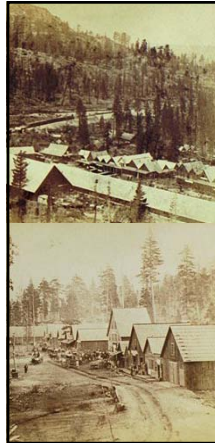
Charles Crocker

RE: to keep up the progress, the timber, masonry, iron, dirt etc. needed to be delivered on time for the bridges, trestles, grading and fills along the route. *J.H. Strobridge*, the superintendent in charge of the field work, lived at end o' track. From *Newcastle* to the finale at *Promontory Summit*, his wife accompanied him earning for herself the title: "Heroine of the Central Pacific." In its progress eastward and upward, the CPRR erected stations and water-tanks, put in its sidings, established saw-mills for ties and timbers and founded new towns.

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Cisco

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At an elevation just shy of six-thousand feet above sea-level, *Cisco* (named in honor of *John J. Cisco*, assistant treasurer of the *United States*) was just fifteen miles from *Dutch Flat*. It was reached on November 24th 1866 while the famous "Emigrant Gap" of the '49ers lay eight miles behind. By a rock tunnel of three-hundred-foot length, the rails of the CPRR passed through the divide down which the immigrant wagons had pitched headlong, retarded only by ropes. From *Cofax* the road had climbed 3,400-feet in twenty-eight miles. Of this distance, 2,286-feet had been gained in twenty-three miles. The grades had averaged almost 2% or 91-feet of vertical rise to-the-mile (a grade of 116-foot vertical rise-to-the-mile had been required for three miles running). From *Cisco*, the summit was fourteen miles distant, with a rise of 1,131-feet to the highest point (7,042-feet above sea-level). At *Cisco*, the snow remained into May. Beyond, it gathered twelve to sixty-feet deep and the drifts persisted from one year to the next. For nine months, *Cisco* would serve as the terminus of the CPRR.

Left: caption: "C.P.R.R. Depot at Cisco - General View" 345
Right: caption: "Cisco, Placer County. 92 miles from Sacramento."

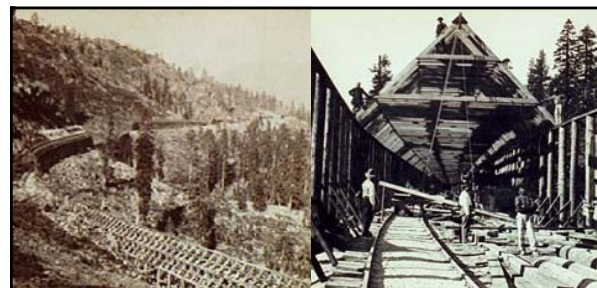


346



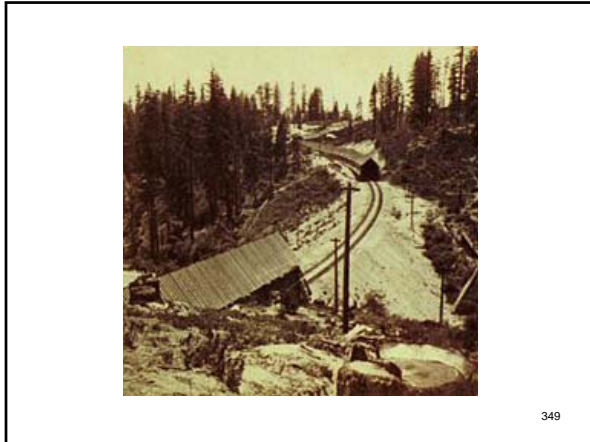

Left: caption: "Cisco in Winter - Altitude 5,911 feet"
Right: caption: "Locomotives in the Snow - at Cisco"

347



Left: caption: "Snow Covering, below Cisco"
Right: caption: "Constructing Snow Cover"

348



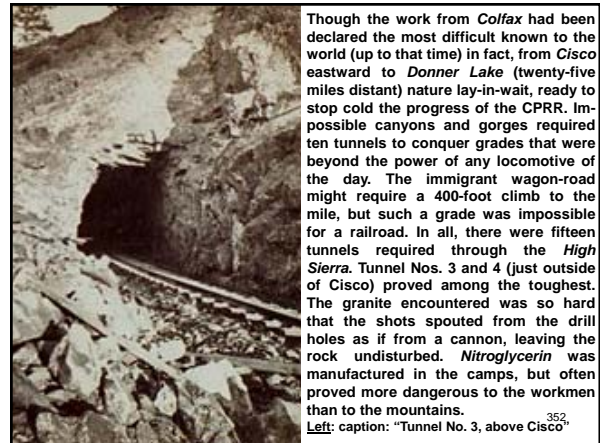
349

Records for the year ending December 31st 1866 revealed a construction expense of \$8,290,790 for the twenty-eight miles achieved by the CPRR that year. The payments covered considerable grading, grubbing, blasting and bridging. The total cost of road and equipment (for the ninety-two miles achieved to-date) was entered as \$17,750,000. The earnings (both gross and net) for the year were twice those of 1865.

350

Break Out the Nitro

351

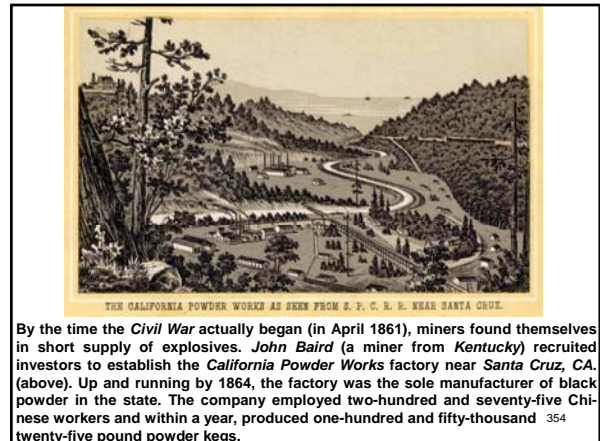


Though the work from Colfax had been declared the most difficult known to the world (up to that time) in fact, from Cisco eastward to Donner Lake (twenty-five miles distant) nature lay-in-wait, ready to stop cold the progress of the CPRR. Impossible canyons and gorges required ten tunnels to conquer grades that were beyond the power of any locomotive of the day. The immigrant wagon-road might require a 400-foot climb to the mile, but such a grade was impossible for a railroad. In all, there were fifteen tunnels required through the High Sierra. Tunnel Nos. 3 and 4 (just outside of Cisco) proved among the toughest. The granite encountered was so hard that the shots spouted from the drill holes as if from a cannon, leaving the rock undisturbed. Nitroglycerin was manufactured in the camps, but often proved more dangerous to the workmen than to the mountains.

352
Left: caption: "Tunnel No. 3, above Cisco"

Nitroglycerine was a new product in 1866. Discovered by Italian chemist Ascanio Sobrero in 1847 and perfected as a blasting agent by Alfred Nobel in the early 1860s, nitroglycerin was not widely known by the general public until accounts of accidental explosions appeared in newspapers. In its pure liquid form, the chemical was extremely volatile. On April 3rd 1866, seventy crates of nitroglycerin exploded onboard the California-bound steam-ship *European* in *Aspinwall, Panama*, killing fifty people. Two weeks later, a nitroglycerin explosion at the *Wells Fargo* office in *San Francisco* killed fifteen people. Two days later, six workers were killed along the CPRR line in the *Sierra Nevada* while transporting nitroglycerin. Following the San Francisco explosion, the *California* state legislature banned the transport of liquid nitroglycerin, forcing CPRR workers to use black powder exclusively as their sole blasting agent. Made from a mixture of saltpeter, charcoal and sulfur, black powder is produced by pulverizing and mixing the ingredients, then rolling and pressing the material into cakes that are then dried into explosives for specific applications. Black powder was first brought to California in the late 1840s when miners used the explosive in their search for gold. At that time, there were no local factories producing black powder. The '49ers relied on powder shipments from eastern U.S. and/or Euro-pean suppliers. As the *Civil War* loomed, it became a coveted commodity and the once reliable shipments became scarce as the potential adversaries stockpiled black powder for the coming war.

353



By the time the *Civil War* actually began (in April 1861), miners found themselves in short supply of explosives. *John Baird* (a miner from *Kentucky*) recruited investors to establish the *California Powder Works* factory near *Santa Cruz, CA*. (above). Up and running by 1864, the factory was the sole manufacturer of black powder in the state. The company employed two-hundred and seventy-five Chinese workers and within a year, produced one-hundred and fifty-thousand twenty-five pound powder kegs.

Despite the volatile nature of the chemical, construction workers found that nitroglycerin had several advantages over black powder:

- it required fewer and shallower holes than blasting with black powder;
- its debris required less clean-up time, and;
- nitroglycerin worked when wet (unlike black powder)

But its most significant advantage was its blasting power. In the *Summit Tunnel*, nitroglycerin enabled construction crews to increase their progress from 1.18 to 1.82 feet-per-day with progress in some areas (at the bottom of the tunnel) increasing from 2.51 to 4.38 feet-per-day. A new, safer version of nitroglycerin became available in 1867 when *Alfred Nobel* licensed his dynamite manufacturing process to a U.S. manufacturer. In August 1867, *Julius Bandmann* incorporated the *Giant Powder Company* and began manufacturing dynamite on March 19th 1868; too late to be of use by the CPRR. Following the completion of the transcontinental RR, Howden continued his work with nitroglycerin for *California Powder Works* which had begun to focus its resources on dynamite production. Howden developed a brand of dynamite the company named "Black Hercules," which utilized black powder as an absorbing agent for the nitroglycerin. Giant Powder (licensee of Nobel's dynamite patent) sued California Powder for patent infringement, but ultimately lost the court battle.

355

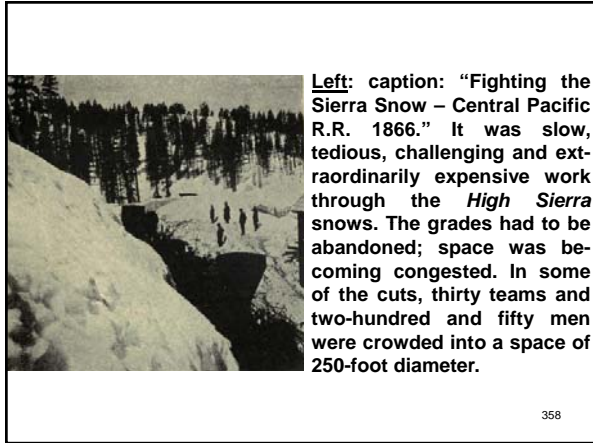


The Winter of '67

356

The winter of 1866-67 closed in with uncommon severity. Storm succeeded storm, with snowfall measuring between fifteen and eighteen-feet and drifts measuring up to forty-feet deep. The CPRR put its crews to work, calling on every available man. By now, with the influx of Chinese, the CPRR's workforce was ten-thousand strong with half engaged in shoveling snow. The ground had to be kept bare for the roadbed and the ballast along the fills had to be kept clear from top-to-bottom until sheds were erected or drains put in, otherwise the bases of the embankments would settle in the thaws. On the right-of-way through the timber, the choppers and grubbers worked in snow up to their knees and waists. An avenue 200-feet wide had to be cleared and the stumps "grubbed" (by pick and powder) to a width of twenty-feet. Trees of four, six and eight feet diameter were encountered. Three-hundred men labored ten days to clear a mile with the cost approached \$5K per mile. Under the giant stumps were placed from two to ten kegs of black powder; the explosive result mingling earth and wood in a myriad of dust and splinters when set-off. Cuts were filling-in as the snow gained upon the workmen. The tunnel men had to excavate through from twenty to one-hundred-feet of drift before they reached the face of the cliff. They burrowed like gophers, sending to the surface the rock debris after each round of blasts.

357



Left: caption: "Fighting the Sierra Snow – Central Pacific R.R. 1866." It was slow, tedious, challenging and extraordinarily expensive work through the *High Sierra* snows. The grades had to be abandoned; space was becoming congested. In some of the cuts, thirty teams and two-hundred and fifty men were crowded into a space of 250-foot diameter.

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"...These storms, forty-four in number, varied in length from a short snow squall to a two-week gale, and in depth from a quarter of an inch to ten feet - none less than the former number being recorded, nor had we occasion to note any greater than the latter. This, the heaviest storm of the winter began February 18th at 2 P.M. and snowed steadily until 10 P.M. of the 22nd, during which time six feet fell...It snowed steadily until March 2nd, making ten feet of snow and thirteen days of storm. It is true that no snow fell for five days, but it drifted so furiously that in time the snow tunnel at the east end of Tunnel No. 6 had to be lengthened fifty feet...The storms were grand. They always began with a fall in the barometer and a strong wind from the southwest...The thermometer was rarely below twenty degrees at the beginning of a storm, and usually rose to thirty-two degrees before its close so that the last snow would be damp and heavy, sometimes ending in a rain. The storms ended and clouds were scattered by cold winds blowing over the eastern range of the Sierra Nevada; these raised the barometer and dropped the temperature at once. The lowest temperature of the winter was from a wind of this sort, five and a half degrees above zero..."

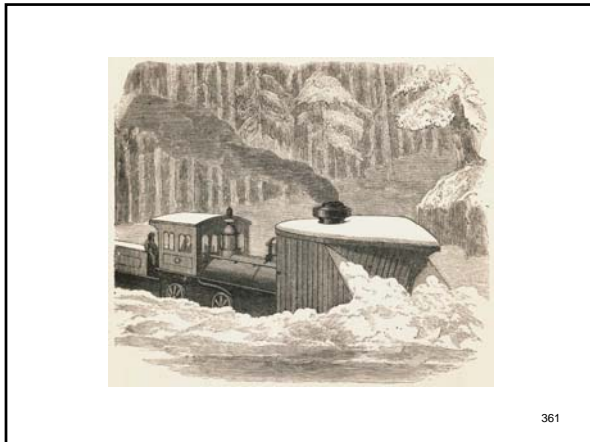
John R. Gillis, Author

359

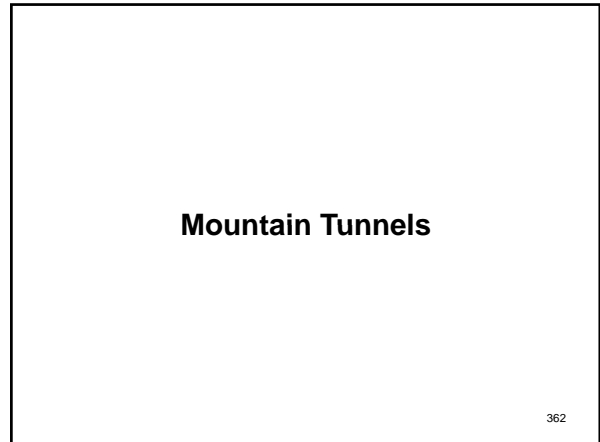
"...Snow slides or avalanches were frequent. The storm winds being always from the southwest, form drifts or snow wreaths on the northeast crests of hills. When these become too heavy, which is generally towards the close of the storms, they break off, and in falling start the loose snow below. This slides on the old crust. I never knew of a slide from the ground. Near the close of one storm, a log house with board roof, containing three Scotchmen, brothers, and sub-contractors with their gang, some fifteen or sixteen men in all, was crushed and buried up at day-break. The storm ended at noon. Towards evening a man coming up the road missed the house and alarmed the camp, so that by six o'clock the men were dug out. The bulk of the slide had passed over and piled itself up beyond the house, so that it was only covered fifteen feet deep. Only three were killed, the bunks were close to the log walls and kept the rest from being crushed. Most of them were conscious and strange to say, the time had passed rapidly with them, although about fourteen hours under the snow...(The snow slides) were so frequent across the trail leading to Tunnel No. 9, some fifteen or twenty Chinamen were killed by a slide about this time. The year before, two road repairers had been killed and buried, too, by a slide, and their bodies were not found until spring..."

John R. Gillis, Author

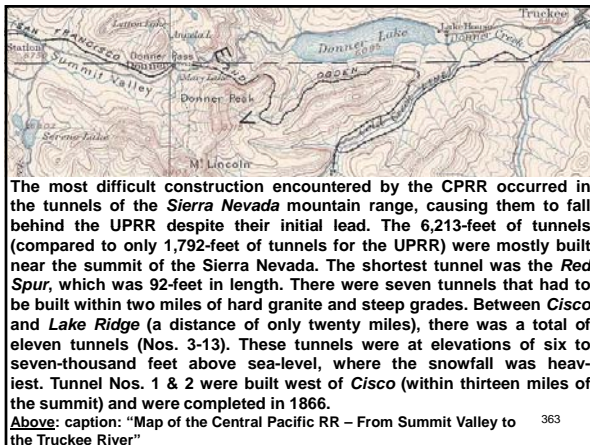
360



361



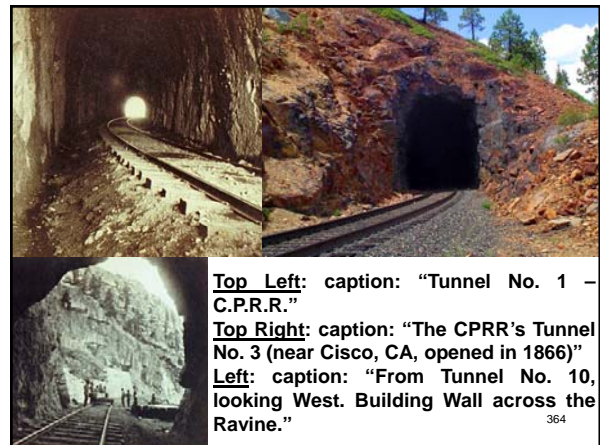
362



The most difficult construction encountered by the CPRR occurred in the tunnels of the Sierra Nevada mountain range, causing them to fall behind the UPRR despite their initial lead. The 6,213-feet of tunnels (compared to only 1,792-feet of tunnels for the UPRR) were mostly built near the summit of the Sierra Nevada. The shortest tunnel was the *Red Spur*, which was 92-feet in length. There were seven tunnels that had to be built within two miles of hard granite and steep grades. Between *Cisco* and *Lake Ridge* (a distance of only twenty miles), there was a total of eleven tunnels (Nos. 3-13). These tunnels were at elevations of six to seven-thousand feet above sea-level, where the snowfall was heaviest. Tunnel Nos. 1 & 2 were built west of *Cisco* (within thirteen miles of the summit) and were completed in 1866.

Above: caption: "Map of the Central Pacific RR - From Summit Valley to the Truckee River"

363



Top Left: caption: "Tunnel No. 1 - C.P.R.R."

Top Right: caption: "The CPRR's Tunnel No. 3 (near Cisco, CA, opened in 1866)"

Left: caption: "From Tunnel No. 10, looking West. Building Wall across the Ravine."

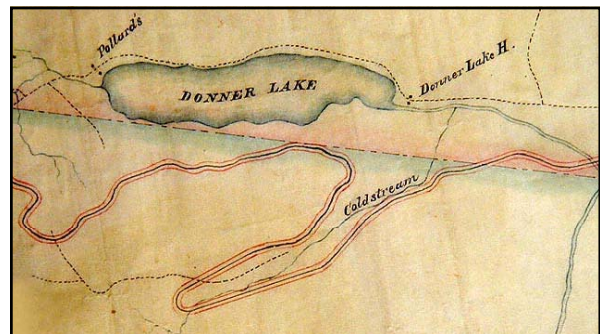
364



Left: caption: "Crested Peak and Tunnel No. 10. Eastern slope of Western Summit."

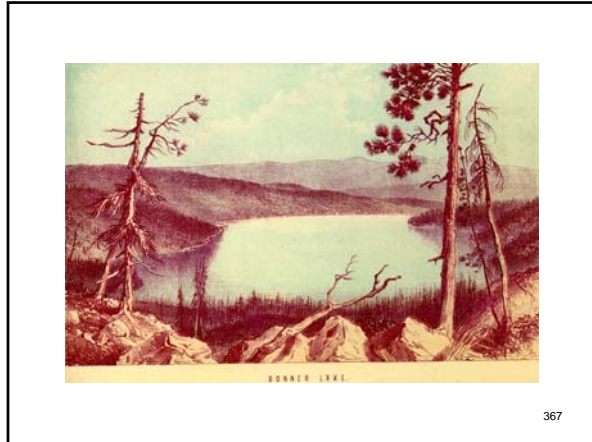
Right: caption: "Tunnel No. 15, looking East toward Nevada"

365



Above: caption: "Detail of Sierra Summit and Donner Lake"

366

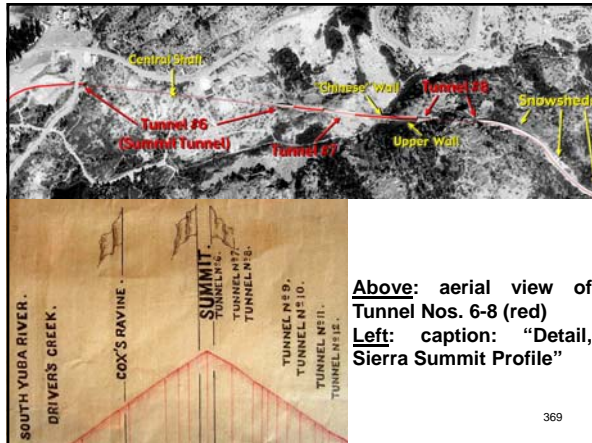


367



Although snowstorms often made the route through Tunnels Nos. 8 & 9 (on *Donner Peak*) impassable, the most challenging and longest tunnel was *Summit Tunnel* (No. 6) built one-hundred and five miles from *Sacramento*. It was built parallel to and 400-feet north of *Donner Pass* and is 1,659-foot long and 124-feet below the surface.

Above: caption: "Map of the Central Pacific RR - From Summit Valley to the Truckee River - Summit Tunnel Area Detail" (tunnels highlighted) 368



Above: aerial view of Tunnel Nos. 6-8 (red)

Left: caption: "Detail, Sierra Summit Profile"

369

Transport of supplies by wagons (and even by pack trains) grew precarious as winter progressed. Crocker shipped a third of the force to the rear (to wait for spring), concentrating instead on the tunnel work for the time being. Sheltered inside from the snow and freezing cold, the men could keep at it all winter long. For their sleeping and eating quarters, crude cabins were erected. Until the *Summit Tunnel*, with its 1,659-foot length (exclusive of approaches) was opened, no CPRR train could meet the expectant CPRR's *Eastern Division*, waiting on the other side of the divide. Assistant Engineer *Lewis M. Clement*, in charge of this division, saved time by sinking an adit shaft at the halfway point thus creating two new tunnel headings (the heading at either end of the tunnel had begun in August 1866). The adit shaft (sunk at the exceedingly slow rate of seven-inches per day) pierced the tunnel's crown on December 12th 1866. On December 19th 1866, it was deep enough to commence the lateral headings. Thenceforth, the Chinese drilled and blasted both ways from the middle to meet their peers boring inward from the ends.

370



Left: caption: "Summit Tunnel, before completion; Western Summit - altitude 7,012 feet"

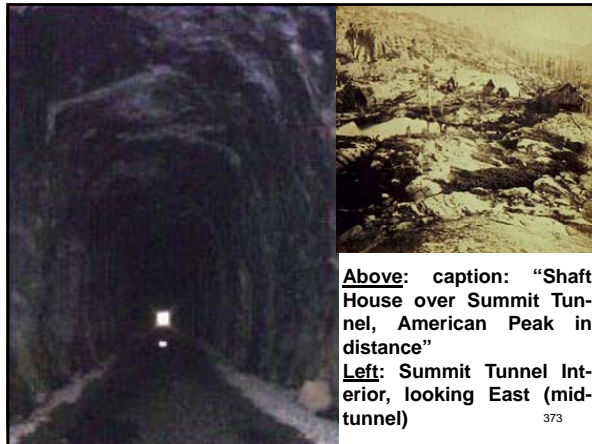
Right: caption: "Summit Tunnel - Eastern Portal. Length 1,660 feet"

371



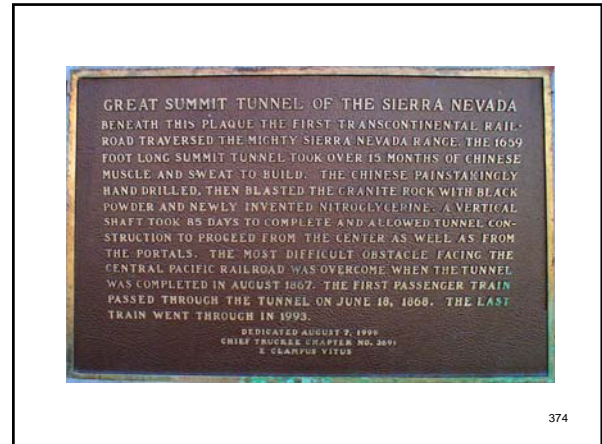
Left: the vertical central shaft of the CPRR's *Summit Tunnel* (a.k.a. Tunnel No. 6) at *Donner Summit* which allowed drilling and excavation to be carried out on four faces simultaneously. The 125-foot deep shaft provided four working faces, speeding-up progress significantly. With much difficulty, the steam engine of an old locomotive was brought up the wagon-road and used as a winch driver to help remove loosened rock from the four working faces. A winter camp was established. However, the trail down from the camp grew so dangerous (due to snow-slides) that all work was stopped. The slides carried away camps and crews. In the spring of 1867, the frozen corpses of laborers were revealed as the snow level dropped; still upright, their tools frozen in their hands. The *Summit Tunnel* was a year in the making, complete by August 1867.

Right: Caption: "Cover over the central construction shaft, Summit Tunnel No. 6" 372

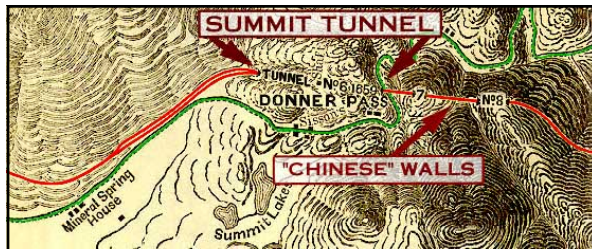


Above: caption: "Shaft House over Summit Tunnel, American Peak in distance"
Left: Summit Tunnel Interior, looking East (mid-tunnel)

373

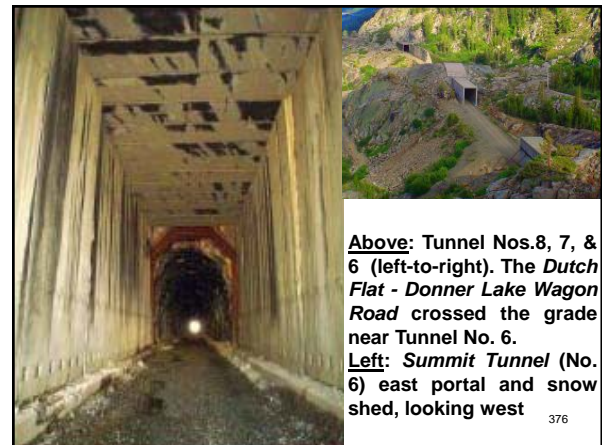


374



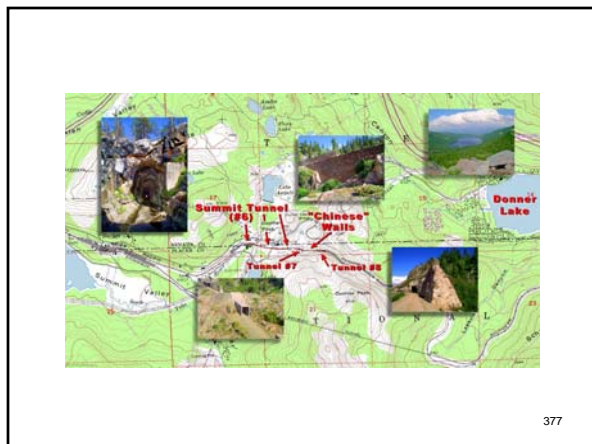
Above: this detail from the contour map of CPRR tunnels (1883) shows where the original 1844 *Emigrant Wagon Route* (green line) was crossed by the tracks of the CPRR (red line) at the east portal of the *Summit Tunnel* (No. 6). Just beyond this spot (between tunnel Nos. 7 and 8) are the so-called "Chinese" Walls which were built to support the grade created to fill in the deep ravine between these two tunnels.

375

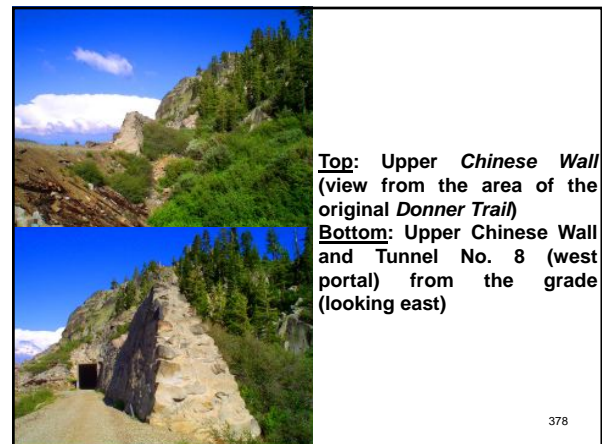


Above: Tunnel Nos. 8, 7, & 6 (left-to-right). The *Dutch Flat - Donner Lake Wagon Road* crossed the grade near Tunnel No. 6.
Left: *Summit Tunnel* (No. 6) east portal and snow shed, looking west

376

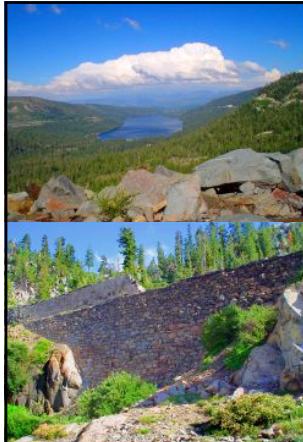


377



Top: Upper *Chinese Wall* (view from the area of the original *Donner Trail*)
Bottom: Upper *Chinese Wall* and Tunnel No. 8 (west portal) from the grade (looking east)

378



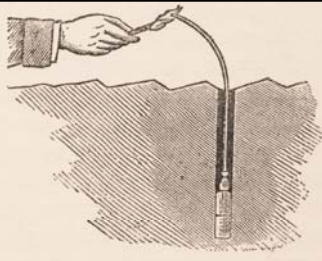
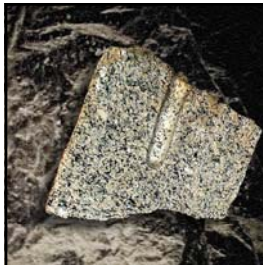
Top: Donner Lake seen from outside the snow shed (just east of Tunnel No. 8)

Bottom: the Chinese Wall which fills the ravine between Tunnels Nos. 7 & 8 (through which the Donner Trail once passed)

379

The CPRR's powder bill came to \$54K a month during the height of the winter tunnel work. The price per keg had risen from the normal \$2.00/keg to \$5.00/keg and continued to increase. The eastern market had been consuming all available black powder production due to federal government arsenal demands during the prosecution of the war (prices rose to as high as \$15/keg). Between twelve and fifteen kegs were used in a single blast and consumption had reached 500/kegs per day. Daily progress in the headings ranged from nine-inches to 2.75-feet; in clearing the bottom (invert), from 1.5 to 5-feet. The blasts were so powerful they shook the mountains to their foundations. One volcanic explosion alone disturbed 3K-tons of granite which scattered like shrapnel. The cross-section of a tunnel face was a 16-foot wide by 16-foot high oval with an 11-foot vertical wall (nearly all CPRR tunnels used the same parameters). Progress on the Summit Tunnel had sped up to over 1.5-feet per day (per face) when the newly discovered nitroglycerin was applied (nitroglycerin was used to deepen the tunnel to the required 16-foot height after the four tunnel faces met). Depending on the material the tunnels penetrated, they were left unlined or lined with brick, rock walls or timber and post. Some tunnels were designed to curve in the middle (to align with the track-bed curvature). Despite this complication, nearly all the different tunnel center lines met within about two-inches.

380



Left: sample of hand-drilled granite. To excavate a tunnel, one worker held a rock drill on the granite face while one or two others swung eighteen-pound sledgehammers to sequentially hit the drill which slowly advanced into the rock. Once the hole was about ten-inches deep, it would be filled with black powder, a fuse set and then ignited from a safe distance. Nitroglycerin (which had just been invented) was only used to help construct Summit Tunnel - the longest of the CPRR's fifteen tunnels (1,659-feet).

Right: detonating explosives often required workers to manually light a fuse. A hole was drilled into the rock and then it was filled with either black powder or nitroglycerin. Accidents from short fuses and/or unexploded charges were common and all too often, loss of life was the result.

381



Top: large block of granodiorite excavated from Tunnel No. 8 (with hand drilled blasting holes)

Bottom: rusted "pear" rail and block of hand drilled granodiorite (near the covered construction shaft)

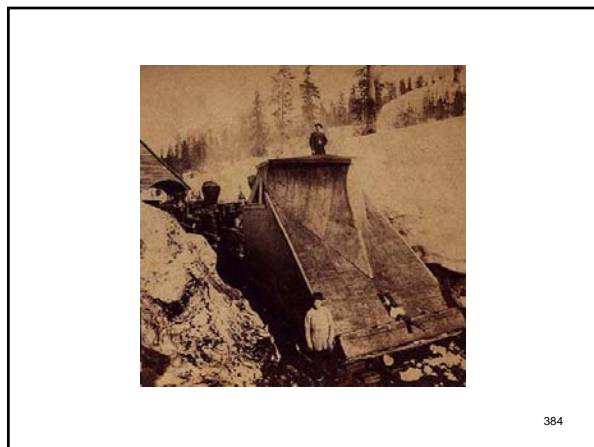
382



The tracks into Cisco from the west were kept open by a constant procession of snow-plows bucking the drifts with the force of six and twelve engines. Long ox-teams, aided by men with shovels, broke the trail as best they could to the camps above. In one storm, nine-feet of snow fell making the work extremely arduous. Pack trains of mules bearing the supplies toiled back and forth. As the snowfall increased and the working space became more crowded, Crocker loaded his surplus laborers, including their tools and supplies, on ox-sleds and sent them forward to prepare the way through the Truckee River canyons near the Nevada state line, twenty-eight miles distant. He followed this initiative with a reinforcement of forty miles of track equipment; rails, ties, fastenings etc., requiring forty freight cars and three locomotives. For the twenty-four miles from Cisco to Donner Lake, ox-teams and sleds hauled these supplies up to the summit through snow eighteen-feet deep on the level, forty to sixty-feet deep in the drifts, then over and down again to the lower, more open country near the base of the eastern slope of the Sierra Nevada range. Here the loads were transferred to wagons and mud-skids and log-rollers for the four mile trip to the Truckee. Unhampered by snow, the men worked efficiently, preparing the way for the rails to come.

383

Above: caption: "Detail, Cisco and Boundary between Placer and Nevada Counties, California"



384

The *Overland Stage* line was now connecting with the CPRR at *Cisco* and the freight business between *Sacramento* and the *Nevada* mines - by way of both *Dutch Flat* and *Cisco*, had developed to the satisfaction of the CPRR's directors. Not content with the one-hundred and fifty miles of leeway beyond the *California* boundary, the CPRR now projected its road to pass twenty-one miles north of *Virginia City*, resolving to make the goal of the road the *Salt Lake Valley* - six-hundred miles beyond the *California* state line. This goal had been on the minds of the Big Four from the get-go. As soon as the UPRR had begun its journey west, the CPRR's founders realized that mining was, at best, a "boom & bust" enterprise. *Nevada* and its silver mines might prove a lucrative feeder, but also a transitory one. The record had shown that railroads thrive most securely upon agriculture thus, the CPRR looked to the fertile *Mormon* lands of the *Salt Lake Valley* as a stable source of income.

385



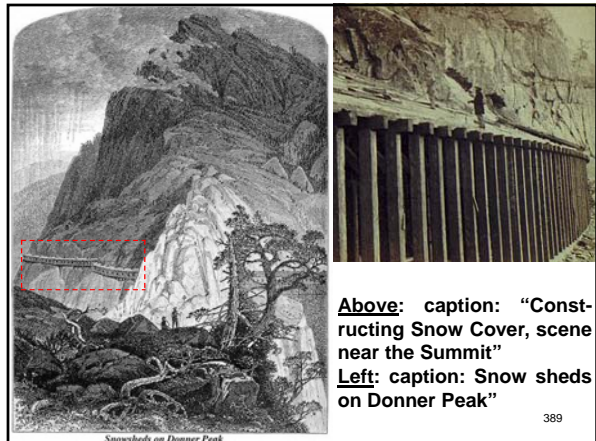
386

Sheds & Galleries

387

Freight and passengers from both *Nevada* and *California* were transferred across the gap between the *Truckee River* and the CPRR's "Section 108." The rails out of *Cisco* had been hastily laid, without ballast. This section of track was abandoned and the transfer lengthened to the twenty-three miles between the *Truckee River* and *Cisco*. During the winter of 1866-67, the grading was pushed twenty miles into *Nevada*, beyond *Reno*. Early in the spring of 1867, the mountains behind (to the west) were again assailed. The whole sixteen miles of abandoned track had to be cleared by hand for the hard-packed, ice-cemented drifts defied the snow plows. Crocker's Pets worked shoveling the thirty-foot accumulations from the ravines in the seven-mile gap. In fact, the entire CPRR labor force was engaged in fighting the stubbornly lingering snow. Meanwhile, the UPRR was coming on strong. In May of 1867, the CPRR's tracks entered *Reno*. On June 15th 1867, the mountain gap had been bridged by the iron rails of the CPRR. Unforeseen by *Theodore Judah*, snow sheds had to be built in order to defeat the snows of the *Sierra Nevada* in winter. Miles of them remained to be erected before the road could be operated continuously. Thirty-seven out of forty miles had to be roofed over with snow sheds (twenty-three miles in one stretch alone) at a cost of \$10K to \$30K per mile.

388

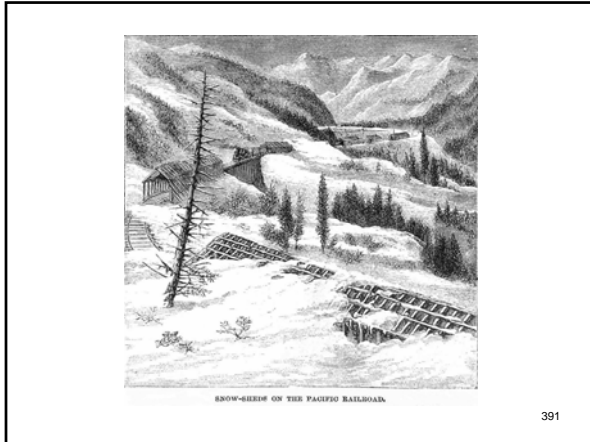


Above: caption: "Constructing Snow Cover, scene near the Summit"
Left: caption: "Snow sheds on Donner Peak"

389

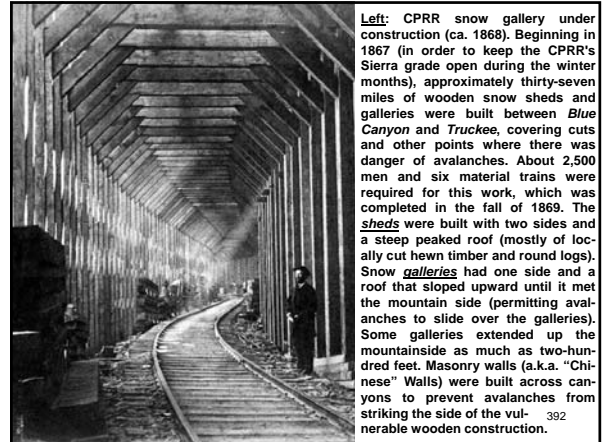


390



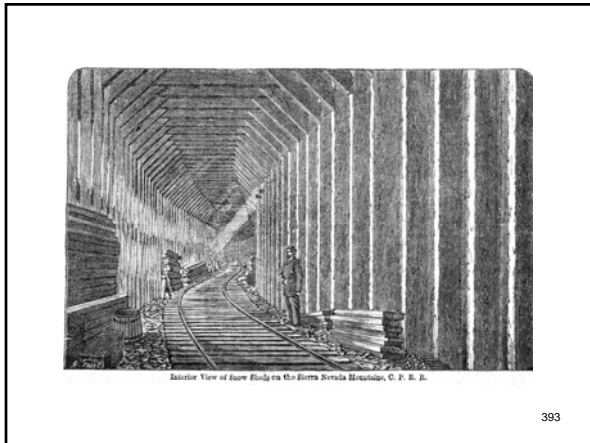
SNOW-SHEDS ON THE PACIFIC RAILROAD.

391



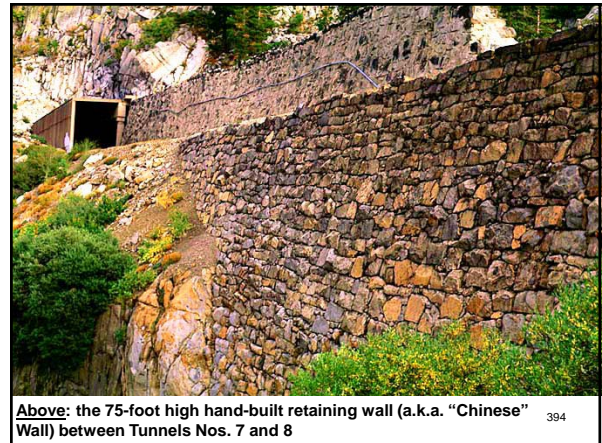
Left: CPRR snow gallery under construction (ca. 1868). Beginning in 1867 (in order to keep the CPRR's Sierra grade open during the winter months), approximately thirty-seven miles of wooden snow sheds and galleries were built between *Blue Canyon* and *Truckee*, covering cuts and other points where there was danger of avalanches. About 2,500 men and six material trains were required for this work, which was completed in the fall of 1869. The *sheds* were built with two sides and a steep peaked roof (mostly of locally cut hewn timber and round logs). Snow *galleries* had one side and a roof that sloped upward until it met the mountain side (permitting avalanches to slide over the galleries). Some galleries extended up the mountainside as much as two-hundred feet. Masonry walls (a.k.a. "Chinese" Walls) were built across canyons to prevent avalanches from striking the side of the vulnerable wooden construction.

392



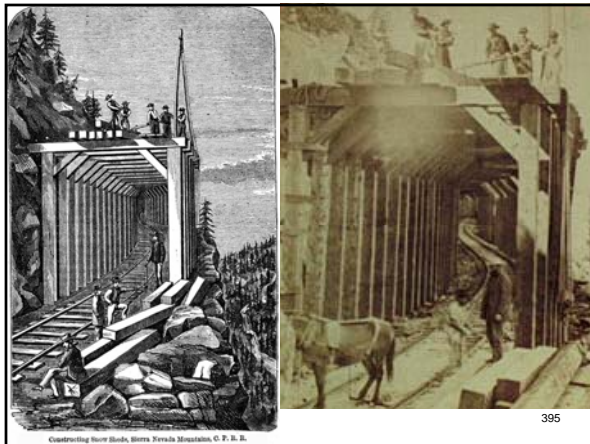
Interior View of Snow Shed on the Sierra Nevada Mountains, C. P. H. B.

393



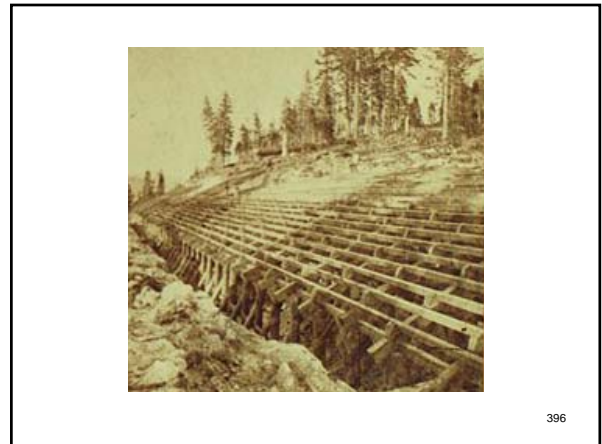
Above: the 75-foot high hand-built retaining wall (a.k.a. "Chinese" Wall) between Tunnels Nos. 7 and 8

394

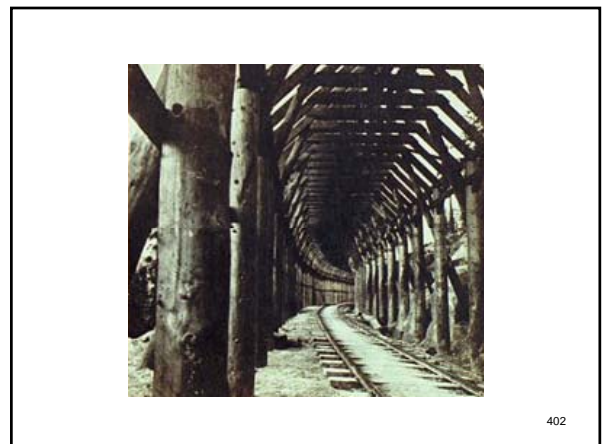
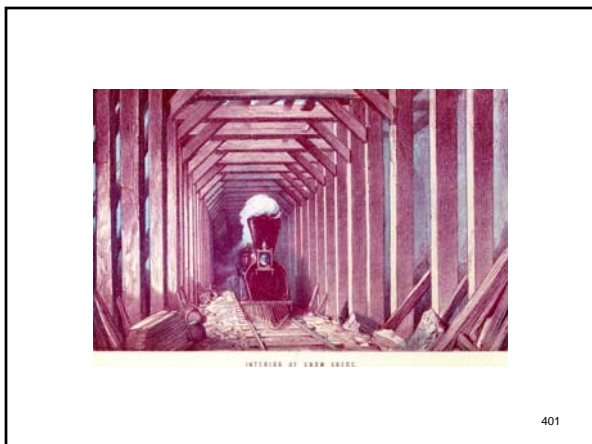
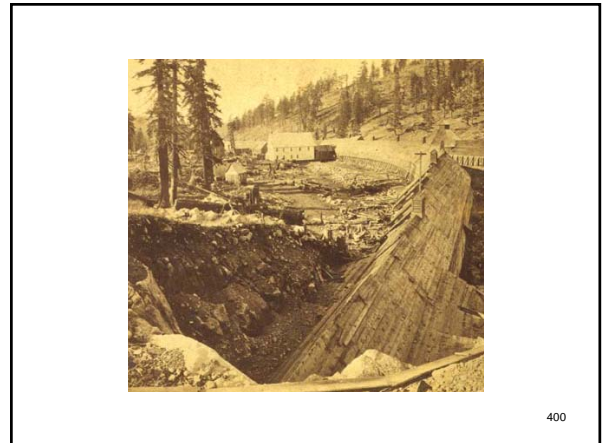
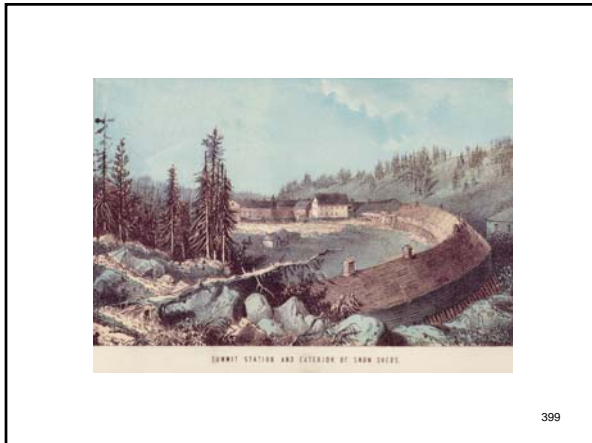
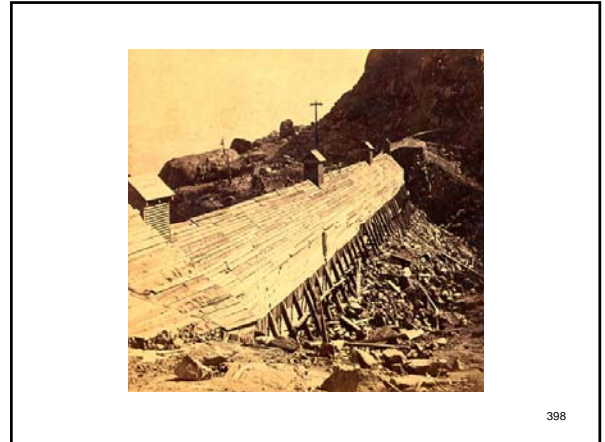
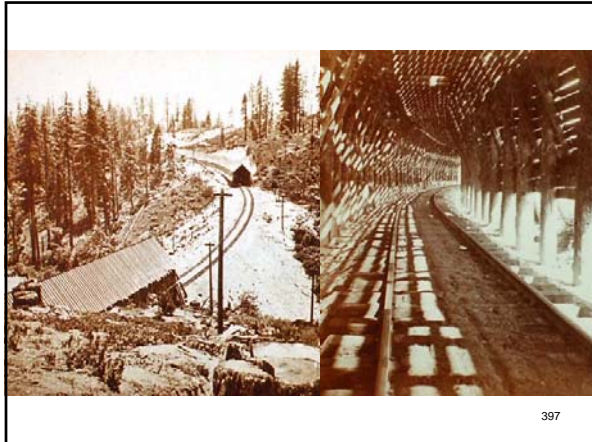


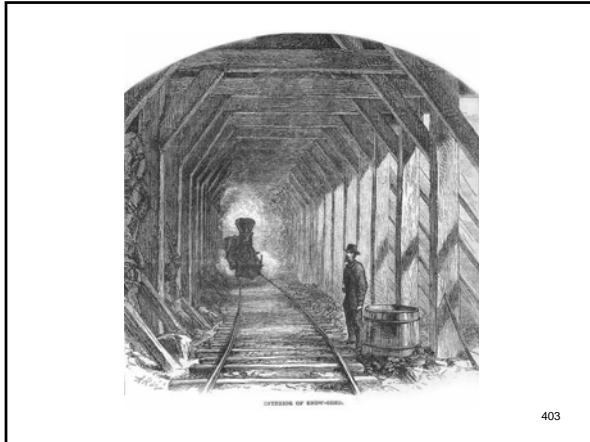
Constructing Snow Shed, Sierra Nevada Mountains, C. P. H. B.

395

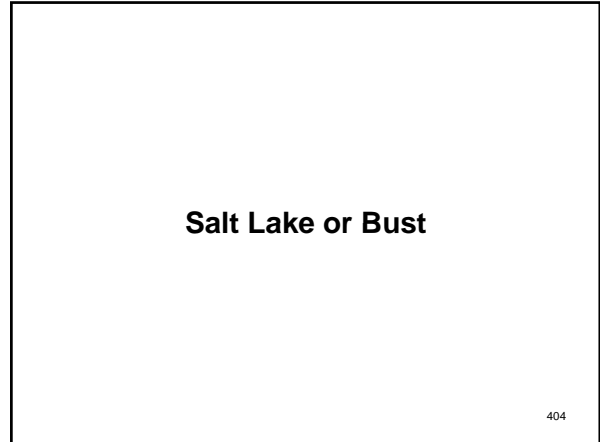


396





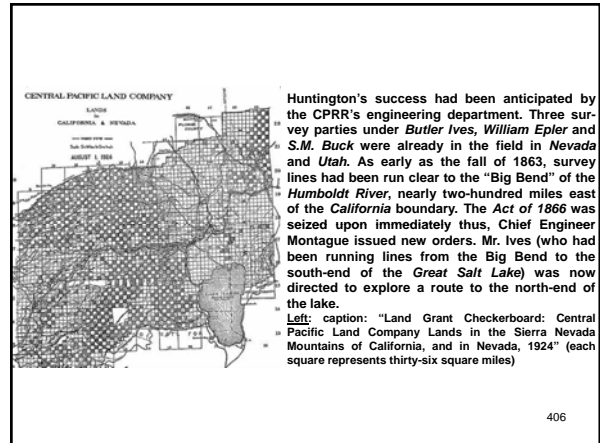
403



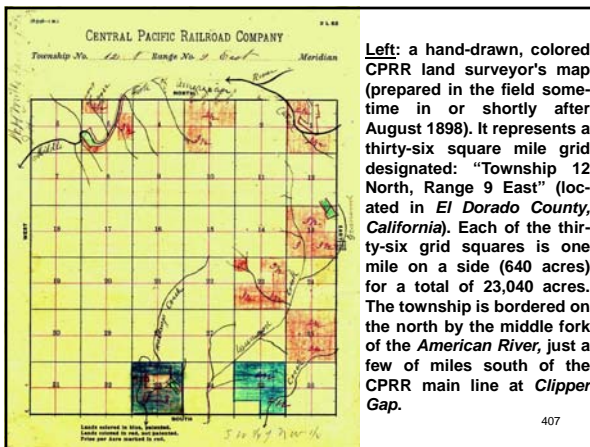
404

"In 1866 I went to Washington. I got a large majority of them (the votes) without the use of one dollar. We still had our means and wanted to get every vote, so I went into the gallery for votes - one head after another. I examined the face of every man, and I am a good judge of faces. I examined them carefully through my glass. I didn't see but one man I thought would sell his vote."
 C.P. Huntington, CPRR VP
 RE: Huntington and his three partners were determined to remove the one-hundred and fifty mile limitation which would leave the CPRR stranded in the Nevada desert and at the mercy of the UPRR. The result of Huntington's campaign was the Act of 1866, which, among other things, amended the Supplementary Act of 1864 by authorizing the CPRR: "to locate, construct, and continue their road eastward, in a continuous completed line, until they shall meet and connect with the Union Pacific Railroad."

405

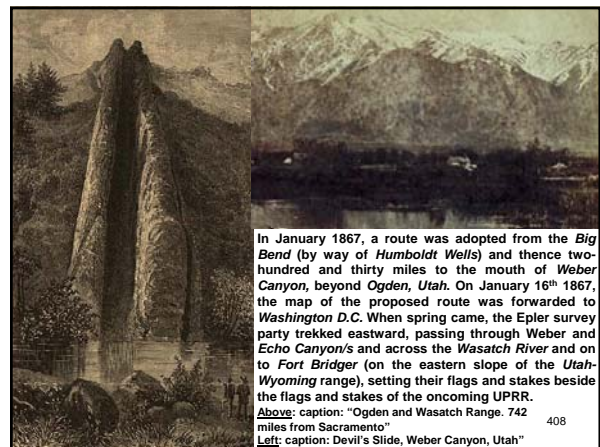


406



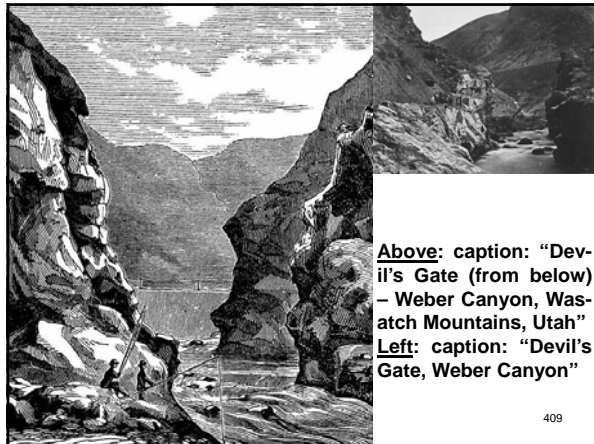
Left: a hand-drawn, colored CPRR land surveyor's map (prepared in the field sometime in or shortly after August 1898). It represents a thirty-six square mile grid designated: "Township 12 North, Range 9 East" (located in El Dorado County, California). Each of the thirty-six grid squares is one mile on a side (640 acres) for a total of 23,040 acres. The township is bordered on the north by the middle fork of the American River, just a few of miles south of the CPRR main line at Clipper Gap.

407



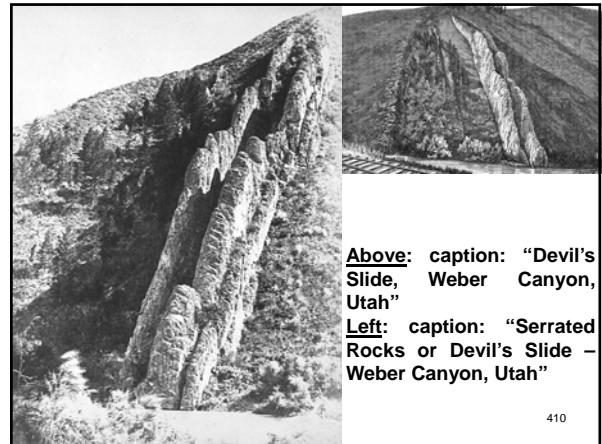
In January 1867, a route was adopted from the Big Bend (by way of Humboldt Wells) and thence two-hundred and thirty miles to the mouth of Weber Canyon, beyond Ogden, Utah. On January 16th 1867, the map of the proposed route was forwarded to Washington D.C. When spring came, the Epler survey party trekked eastward, passing through Weber and Echo Canyon's and across the Wasatch River and on to Fort Bridger (on the eastern slope of the Utah-Wyoming range), setting their flags and stakes beside the flags and stakes of the oncoming UPRR.
 Above: caption: "Ogden and Wasatch Range. 742 miles from Sacramento"
 Left: caption: "Devil's Slide, Weber Canyon, Utah"

408



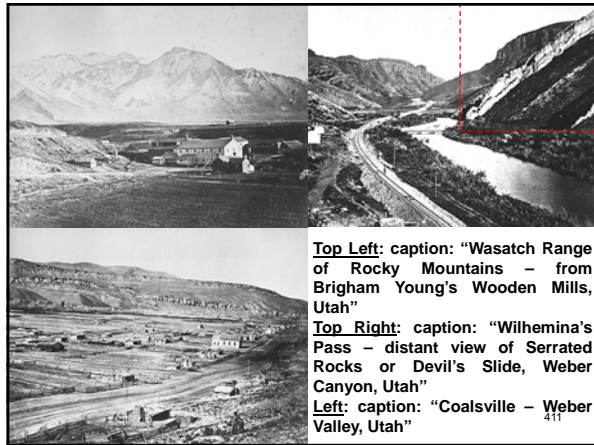
Above: caption: "Devil's Gate (from below) - Weber Canyon, Wasatch Mountains, Utah"
Left: caption: "Devil's Gate, Weber Canyon"

409



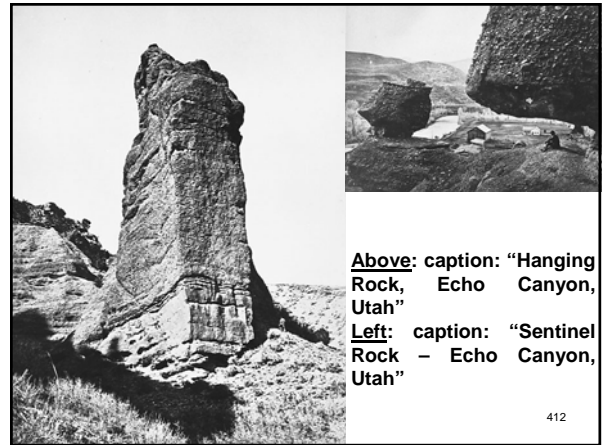
Above: caption: "Devil's Slide, Weber Canyon, Utah"
Left: caption: "Serrated Rocks or Devil's Slide - Weber Canyon, Utah"

410



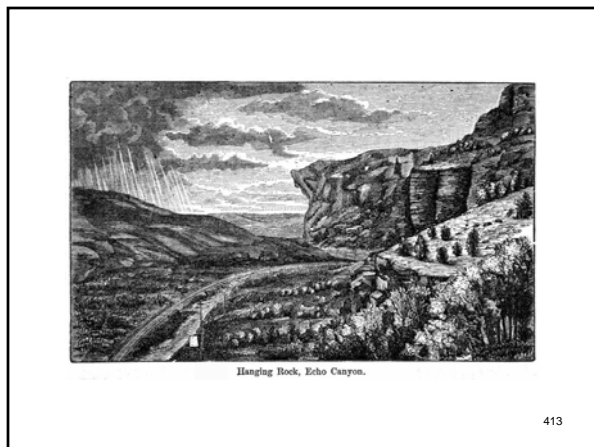
Top Left: caption: "Wasatch Range of Rocky Mountains - from Brigham Young's Wooden Mills, Utah"
Top Right: caption: "Wilhemina's Pass - distant view of Serrated Rocks or Devil's Slide, Weber Canyon, Utah"
Left: caption: "Coalsville - Weber Valley, Utah"

411

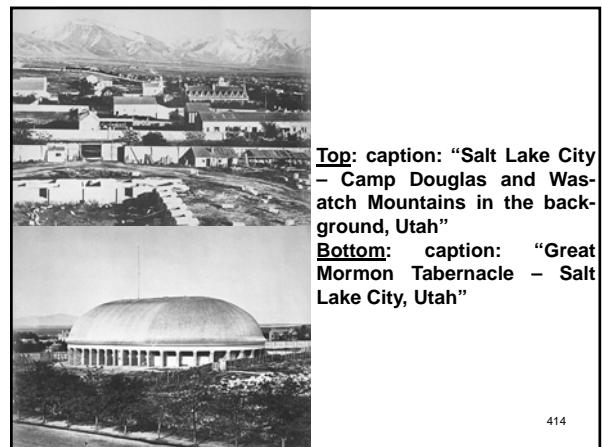


Above: caption: "Hanging Rock, Echo Canyon, Utah"
Left: caption: "Sentinel Rock - Echo Canyon, Utah"

412

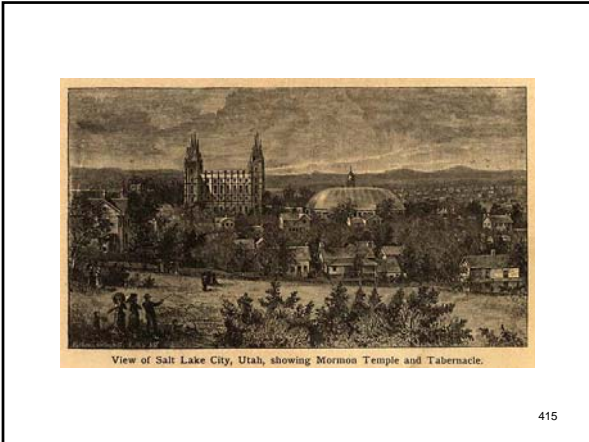


413



Top: caption: "Salt Lake City - Camp Douglas and Wasatch Mountains in the background, Utah"
Bottom: caption: "Great Mormon Tabernacle - Salt Lake City, Utah"

414



View of Salt Lake City, Utah, showing Mormon Temple and Tabernacle.

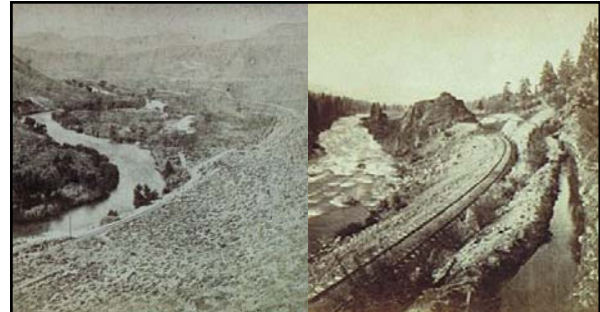
415

It Ain't Over 'til It's Over

416

The UPRR, which was setting a pace of over one mile of track per day by this time, had boasted that it would meet the struggling CPRR at the *California* line. It was not to be. Crocker turned loose an army of eleven-thousand Chinese, two-thousand five-hundred Irish and one-thousand teams, recalling his advance workforce from the upper *Truckee River* back into the *High Sierra*. With every pick, spade, crowbar, scraper and plow available, he launched a fresh attack on the tunnels and grades. The monthly powder bill swelled to more than \$64K. Sixty-feet of snow had to be shoveled by hand out of the winter-locked ravines to reach the grade. During blasting, a fragment of rock weighing two-hundred and forty pounds was hurled two-thirds of a mile across *Donner Lake*. In August 1867, daylight shone through *Summit Tunnel* from one end to the other (a.k.a. "holed through") thus allowing the first locomotive to cross the great divide. Below, at the upper *Truckee*, the tracks were being built both ways simultaneously. In early December 1867 they cut-through the *California* boundary and on December 13th 1867, an east-bound construction engine poked its nose across the *Nevada* state line into *Utah*.

417



Left: caption: "Truckee River and Railroad at Lime Point, Sierra Nevada Mountains"

Right: caption: "View near Verdi, Truckee River"

418

The road for the one-hundred and thirty-eight miles across *California* had cost \$23,650,000 in cash and convertible paper (rather than Judah's estimate of \$12.5 million – nearly double). As convertible, at thirty-cents and fifty-cents, the paper brought the actual outlay down to about \$14.3 million in gold. The total receipts for the year ending December 31st 1867 was in excess of \$1.4 million, in which over \$1 million was from freight and \$332K from passenger traffic. The net balance-to-profit, on the books, was \$870K. The CPRR was well on the road to profitability. Enormous quantities of iron had been piling up at the summit awaiting release and the snow sheds were being constructed, despite the high cost. Backed by solid finances, an abundance of human energy in their Chinese labor force and with 500-tons of iron per day filling fifty cars pulled by ten locomotives pouring down the eastern slopes of the *Sierra Nevada* for the front, the CPRR advanced along the lower *Truckee River* toward the *Valley of the Humboldt*.

419



Left: caption: "Truckee River below Truckee Station, looking toward Eastern Summit"

Right: caption: "Truckee River, approaching the Eastern Summit"

420

At the close of 1867, end o' track had moved on from *Cisco* sixteen miles, over the divide and two miles down. In the *Truckee* region, the rails stretched twenty-four miles, into *Nevada*. Between end o' track and beginning of track there was a gap of seven miles (in the *Donner Lake* country). The surveyed line was so difficult to access (it was on a 116-foot downgrade) that horses could barely keep their footing. Chief Engineer Montague declared that the tracks would find their way despite the difficulties, the only question being cost. In reality cost, at this stage of the game, was of secondary concern. The UPRR was already in the *Black Hills* of *Wyoming* – five-hundred and fifty miles from its initial point in *Omaha, Nebraska*. The UPRR's published maps extended its line to the *California* boundary and it had built two-hundred and forty miles in 1867 against the CPRR's forty. The UPRR was promising five-hundred miles more of road and entry into *Ogden, Utah* by 1868.

421



422

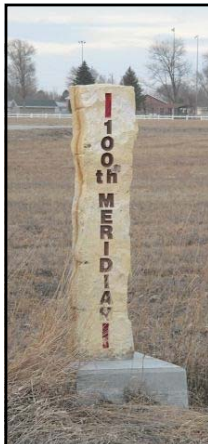
Part 3

The Way West

423

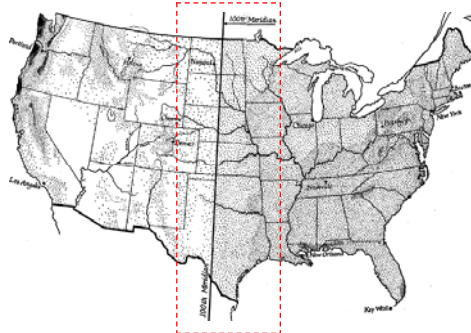
The Road Must be Built

424



With the funds available, a contract was entered into on May 1st 1864 with *Hubert M. Hoxie* to build the first hundred miles of the UPRR. This contract was later extended to cover from *Omaha* to the 100th Meridian (left, a distance of two-hundred and forty-seven miles) on October 3rd 1864. By the contract's terms, Hoxie was to receive securities with a par (face value) of \$50K per mile. Sidings were to be not less than 6% of the main line. Station buildings, water-tanks and equipment was to be furnished by Hoxie at the value of \$5K per mile. Previously, Hoxie had been in the employment of the company in charge of the ferry between *Omaha* and *Council Bluffs*. Everything was still held at war prices; iron, ties, lumber, provisions etc., while currency and the government bonds on which the UPRR was relying for payment were greatly depreciated in value. As well, the scarcity of manpower (due to the prosecution of the war) inflated labor costs.


425



426

On October 7th 1864, assignment was made to a company composed of VP Durant and six others (all stockholders of the UPRR). The capital of this simple partnership consisted of \$400K. However, the members of the firm were unable or unwilling (owing to the immense personal liability involved) to put up additional funds and some other action was necessary. Durant and his associates purchased the charter of a *Pennsylvania* corporation (of limited liability and elastic powers) known as the "Pennsylvania Fiscal Agency." Durant changed its name to the "Credit Mobilier of America." Subscribers of the \$2,880,000 of UPRR Stock were given the option of either exchanging UPRR stock for that of the *Credit Mobilier*, sell their UPRR stock to the Credit Mobilier or turn it back to the UPRR and have it redeemed. By this action, the stockholders of the Credit Mobilier became the sole holders of the UPRR stock. In March 1865 the Hoxie contract was reassigned to the Credit Mobilier. Past experience with individual contractors had demonstrated that they could not be relied upon. Consequently, all contracts for the construction and equipping of the UPRR line were handled by the Credit Mobilier who sub-contracted the work with firms and/or individuals.

427




Despite the reorganization and owing to their inability to raise funds, it appeared as though the two companies (UPRR and *Credit Mobilier*) would fail. There was no sale for the first mortgage bonds of the UPRR and the government bonds were only worth sixty-five cents on the dollar. *Thomas C. Durant* (top) and his associates were not men of wealth nor did they command the confidence of such men. Thus, the company was forced to sell some of its rolling stock to pay its outstanding debts. It was at this point that *Oakes Ames* (bottom) entered the scene, being persuaded to do so by President Lincoln who sought to enlist his well-known executive ability and capital in the enterprise. Through the efforts of Ames and his associates, the paid-up subscriptions were increased to \$2.5 million. The first (original) contract (made with Hoxie and assigned to Credit Mobilier) for a hundred miles had been extended to cover up to the 100th Meridian. The line to that point was completed on October 5th 1866.

428



429



"Ames, take hold of this; and if the subsidies provided are not enough to build the road, ask double and you shall have it. That road must be built, and you are the only man to do it; and you take hold of it yourself. By building the road you will become the remembered man of your generation."
 Abraham Lincoln, POTUS
 RE: Lincoln sought out *Oakes Ames*, a member of Congress from *Massachusetts*, recognizing in him a man with the means and inclination to promote an enterprise of national importance

430

The second contract made by the UPRR was with a Mr. Boomer for one hundred and fifty-three and thirty-five hundredths miles from the 100th Meridian west, at the rate of \$19,500 per mile (for that part of the distance east of the *North Platte River*) and \$20K per mile west of the river (bridges, station buildings and equipment to be supplemental costs). This contract was also assigned to the *Credit Mobilier*. After fifty-eight miles were completed, problems arose among the stockholders of the Credit Mobilier. Through court action, VP Durant compelled suspension implementation of the third construction contract (made March 1st 1867) with *J.M. Williams*, who had assigned it to the Credit Mobilier. This covered two hundred and sixty-six and fifty-two hundredths miles (commencing at the 100th meridian) at the rate of \$50K per mile. For a time all work came to a standstill, injunctions preventing the completion of on-going or the making of new contracts.

431

Finally, a compromise was reached between the two factions; Durant and his associates on one side and the Ames interests on the other. Under this accommodation, a fourth contract was made with *Oakes Ames* for which he was to receive from \$42K to \$96K per mile (or \$47,915,000 for six hundred and sixty-seven miles) commencing at the 100th Meridian. This was, at the time, the largest contract ever made by one individual. It was later transferred by Ames to seven trustees acting for the *Credit Mobilier* (*Oakes* and his brother *Oliver Ames* included). This last contract carried the line to nine hundred and fourteen miles from *Omaha*. The fifth contract was made with *J.W. Davis* at \$23,400,000 (for one hundred and twenty-two miles) and was in turn assigned to the same seven trustees for completion. The UPRR would turn over, as payment for the work (as soon as it was complete) bonds, stock and/or cash to the Credit Mobilier or its trustees.

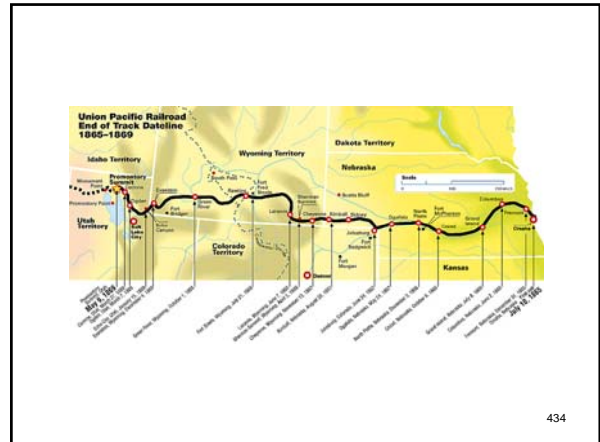
432

A great incentive was given to the UPRR by the *Supplementary Pacific Railroad Bill of 1864* to put down as much track mileage as possible as quickly as possible. The following table shows the rate of construction:

- Ground broken at Omaha - December 2nd 1863;
- Work commenced at Omaha - Spring, 1864;
- 11 Miles completed to Gilmore - September 25th 1865;
- 40 Miles completed to Valley - December 31st 1865;
- 47 Miles completed to Fremont - January 24th 1866;
- 50 Miles completed - March 13th 1866;
- 100 Miles completed - June 2nd 1866;
- 247 Miles completed to the 100th Meridian - October 5th 1866;
- 305 Miles completed - December 31st 1866;
- 414 Miles completed to Sidney, Wyo. - August, 1867;
- 516 Miles completed to Cheyenne, Wyo. - November 13th 1867;
- 573 Miles completed to Laramie, Wyo. - May 9th 1868;
- 745 Miles completed - December 31st 1868;
- 1033 Miles completed to Ogden, Utah - March 8th 1869;
- 1086 Miles completed to Promontory, Utah - April 28th 1869;
- Formal connection made - May 10th 1869;
- Regular train service commenced - July 15th 1869, and;
- Completed according to Judicial decision - November 6th 1869

The daily progress made was wired east and published in the principal newspapers. Thus, in the *Chicago Tribune* items appeared in every issue such as: "One and nine-tenth miles of track laid yesterday on the Union Pacific Railroad."

433



434

Mere Baby Work

435

"...mere baby work...Three hundred men will grade it as fast as the iron can be laid...It is a shame all this section is not finished and running already. From here to Salt Lake, over the Rocky Mountains, there are apparently no greater obstacles to be overcome than your Western Road from Springfield to Albany, the Erie and the Pennsylvania Central, have triumphantly and profitably surmounted..."

The Springfield Republican, Spring 1865
 RE: on a map of the route of the UPRR from Omaha - clear to the main range of the *Rocky Mountains*, the seven-hundred mile distance; over apparently level ground, appeared to be an easy feat to accomplish. The CPRR was obliged to overcome seven-thousand feet of mountain rise in just one-hundred miles whereas the UPRR had five-hundred miles in which to overcome a gradual rise of five-thousand-feet (and fifty miles more of leeway in which to attain the summit of the *Black Hills*, two-thousand-feet higher). This appeared inconsequential, to some, as compared with the rise of two-thousand feet in twenty miles accomplished by the CPRR.

436

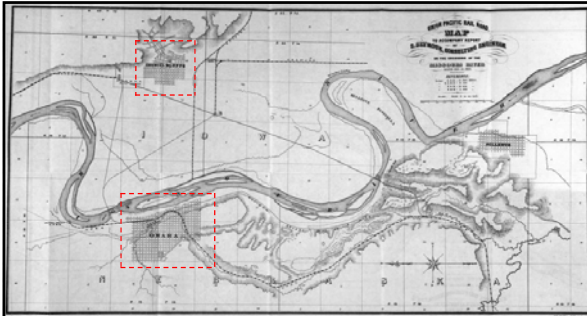
"To undertake the construction of a railroad, at any price, for a distance of nearly seven hundred miles in a desert and unexplored country, its line crossing three mountain ranges at the highest elevations yet attempted on this continent, extending through a country swarming with hostile Indians, by whom locating engineers and conductors of construction trains were repeatedly killed and scalped at their work; upon a route destitute of water, except as supplied by water-trains, hauled from one to one hundred and fifty miles, to thousands of men and animals engaged in construction; the immense mass of material, iron, ties, lumber, provisions and supplies necessary to be transported from five hundred to fifteen hundred miles - I admit might well, in the light of subsequent history and the mutations of opinion, be regarded as the freak of a madman if it did not challenge the recognition of a higher motive."

Oakes Ames, 1867

437

Starting Point

438



Above: this early map of Omaha (from 1866) shows the original UPRR route and was used to help determine where to build a bridge to cross the Missouri River. Eleven months behind the CPRR, the UPRR's leaders were feeling the pressure to get the work started. Thomas C. "Doc" Durant exerted his influence to make Omaha rather than Council Bluffs, Iowa, the actual starting point of the UPRR. 439

Upon learning of President Lincoln's decision, the citizens of Omaha arranged to break ground for the UPRR and to properly celebrate the commencement of the work and, especially, the selection of their city as the eastern terminus. The spot selected for the initial point was near a former Ferry Landing. The ceremonies were commenced by asking the divine blessing on the enterprise in a prayer by the Reverend T.B. Lemon, Pastor of the First Methodist Church in Omaha. The Reverend asked that the road make one the people of the east and west; that it result in peopling the waste places of the west and that it might lend security to those already on the frontier. The first earth was then removed by Governor Alvin Saunders of Nebraska Territory. Congratulatory messages were received from different parts of the country and speeches were made. The great day culminated in an evening banquet. 440



"...Four thousand years ago the Pyramids were started, but they simply represented the vanity of man. The Chinese wall was grand in conception, but built to break the tide of invasion. The Suez Canal was gigantic, but how limited all those things appear in comparison to this enterprise...The Pacific Railroad is the nation, and the nation is the Pacific Railroad. Labor and capital shake hands today. The lion and the lamb sleep together. Here in the West are the representatives of labor and in the East are those of capital. The two united make the era of progress..."

RE: excerpts from the speech made by George Francis Train (a celebrated UPRR promoter) during the groundbreaking ceremony in Omaha for the eastern terminus of the UPRR

Left: memorial (in Council Bluffs) to President Lincoln's selection of the eastern terminus 441

Much of the preliminary work in the way of reconnaissance, surveying and locating was done under governmental auspices previous to 1860, mostly by officers of the army's Corps of Engineers. All of their reports and surveys were by action of Congress given to the UPRR, thus saving them significantly in both time and money. In addition to the government surveys, the UPRR performed investigations and surveys of their own before deciding upon the route to be followed through the Rockies. In the report of the U.S. Government directors for 1866, they referred to the following ten routes as having been investigated during the preceding year by the company:

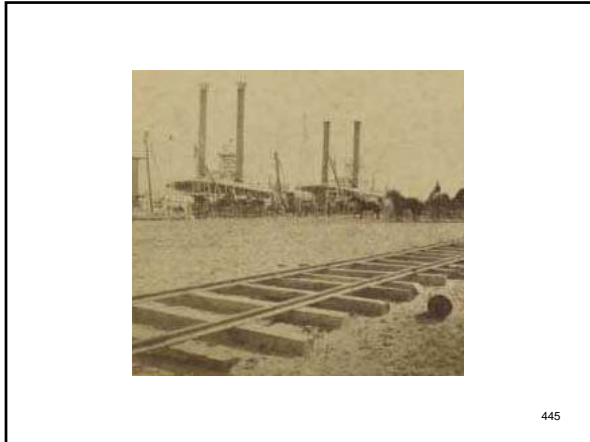
- 1st - via South Platte River and Hoosier Pass;
- 2nd - via Platte River and Tarryall Pass;
- 3rd - via North Fork of South Platte River;
- 4th - via Berthoud Pass;
- 5th - via Boulder Pass;
- 6th - via Cash le Poudre-Dale Creek and Antelope Pass;
- 7th - via Evans Pass;
- 8th - via Lodge Pole Creek, Cow Creek and Evans Pass;
- 9th - via Lodge Pole Creek and Cheyenne Pass, and;
- 10th - via Lodge Pole Creek and South Pass.

The first seven of these routes included Denver, CO en-route. Considered essential by the UPRR it was, however, reluctantly abandoned. 442

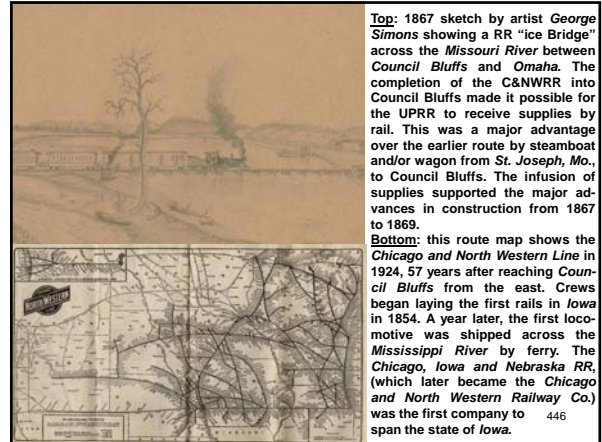
The Ox-Bow Route

443

In February 1864, work was begun on the first hundred miles (commenced within the corporate limits of Omaha). The line was originally located directly west from Omaha, but after \$100K had been spent, it was abandoned on account of the hills and consequent heavy grades. Two new lines were surveyed; one to the north and then west and the other south (nearly to Bellevue, Kansas) and then west. This latter route was called the "Ox-bow Route" and was finally selected by the UPRR. The ties for this section were Cottonwood from the Missouri River bottom lands. Over one million of these ties had been delivered and given a preservative treatment known as the "Burnettizing Process" (impregnation with zinc). However, it was found that the treatment was ineffective and for the balance of the road hardwood (oak) ties from Michigan, Indiana and even as far east as Pennsylvania were used; some costing as much as \$2.50 per tie. For the mountain section, ties of local growth were used effectively. As well, at this time there was no railroad completed into Omaha from the east. The Chicago & North Western RR ran its first train into nearby Council Bluffs on January 17th 1867. Consequently, all supplies (other than those coming to them via the Missouri River) had to be transported by wagon from Des Moines, Iowa - one-hundred and thirty-three miles distant. On the Missouri River, the UPRR had in service six large steamboats carrying supplies and material for construction from Kansas City, MO (where there was railroad connection with the east by way of the Hannibal & St. Joseph RR and the Missouri Pacific RR). Everything had to be brought in, the country being destitute of even stone and lumber. On the bright side, the flat, level country enabled rapid progress in grading operations. 444



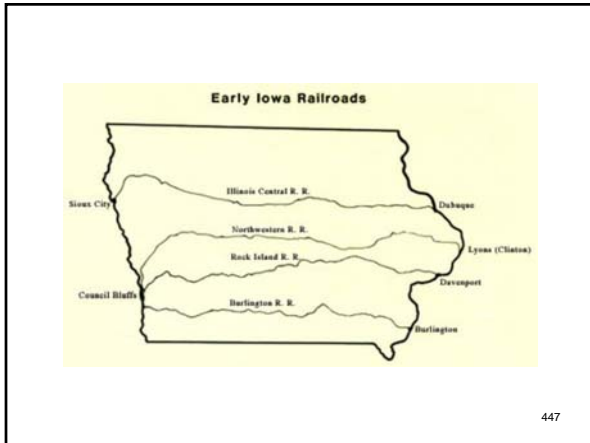
445



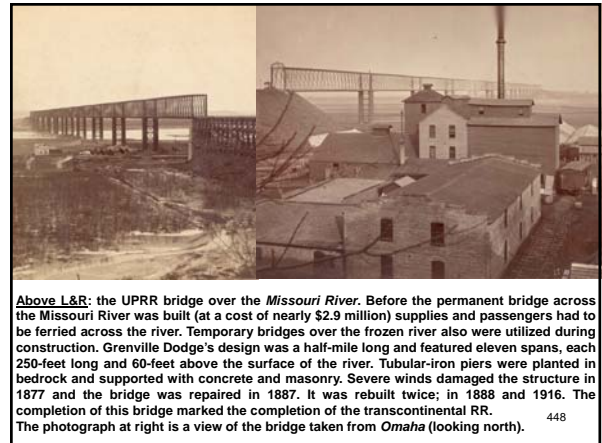
Top: 1867 sketch by artist George Simons showing a RR "ice Bridge" across the Missouri River between Council Bluffs and Omaha. The completion of the C&NWRR into Council Bluffs made it possible for the UPRR to receive supplies by rail. This was a major advantage over the earlier route by steamboat and/or wagon from St. Joseph, Mo., to Council Bluffs. The infusion of supplies supported the major advances in construction from 1867 to 1869.

Bottom: this route map shows the Chicago and North Western Line in 1924, 57 years after reaching Council Bluffs from the east. Crews began laying the first rails in Iowa in 1854. A year later, the first locomotive was shipped across the Mississippi River by ferry. The Chicago, Iowa and Nebraska RR, (which later became the Chicago and North Western Railway Co.) was the first company to span the state of Iowa.

446



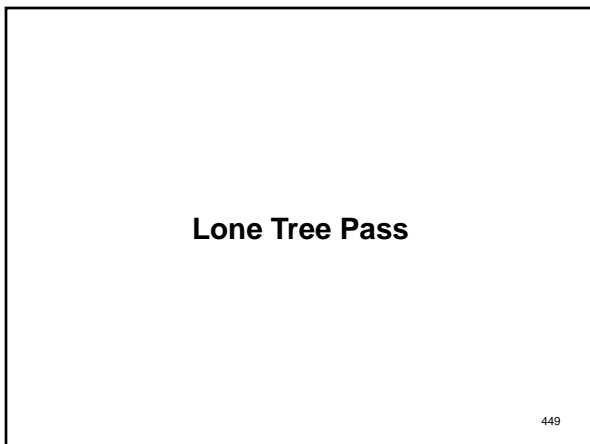
447



Above L&R: the UPRR bridge over the Missouri River. Before the permanent bridge across the Missouri River was built (at a cost of nearly \$2.9 million) supplies and passengers had to be ferried across the river. Temporary bridges over the frozen river also were utilized during construction. Grenville Dodge's design was a half-mile long and featured eleven spans, each 250-feet long and 60-feet above the surface of the river. Tubular-iron piers were planted in bedrock and supported with concrete and masonry. Severe winds damaged the structure in 1877 and the bridge was repaired in 1887. It was rebuilt twice; in 1888 and 1916. The completion of this bridge marked the completion of the transcontinental RR.

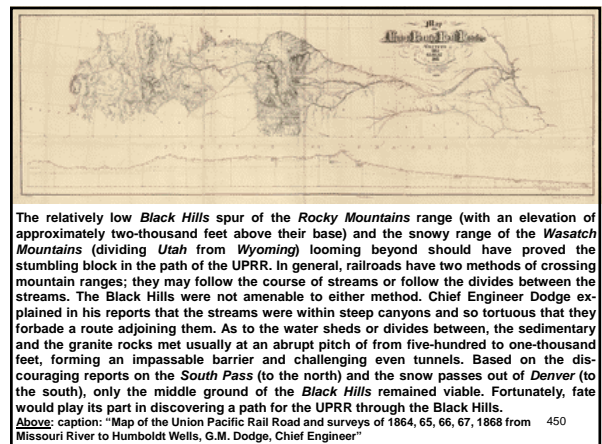
The photograph at right is a view of the bridge taken from Omaha (looking north).

448



Lone Tree Pass

449



The relatively low Black Hills spur of the Rocky Mountains range (with an elevation of approximately two-thousand feet above their base) and the snowy range of the Wasatch Mountains (dividing Utah from Wyoming) looming beyond should have proved the stumbling block in the path of the UPRR. In general, railroads have two methods of crossing mountain ranges; they may follow the course of streams or follow the divides between the streams. The Black Hills were not amenable to either method. Chief Engineer Dodge explained in his reports that the streams were within steep canyons and so tortuous that they forbade a route adjoining them. As to the water sheds or divides between, the sedimentary and the granite rocks met usually at an abrupt pitch of from five-hundred to one-thousand feet, forming an impassable barrier and challenging even tunnels. Based on the discouraging reports on the South Pass (to the north) and the snow passes out of Denver (to the south), only the middle ground of the Black Hills remained viable. Fortunately, fate would play its part in discovering a path for the UPRR through the Black Hills.

Above: caption: "Map of the Union Pacific Rail Road and surveys of 1864, 65, 66, 67, 1868 from Missouri River to Humboldt Wells, G.M. Dodge, Chief Engineer"

450

"If we save our scalps I believe we have found the crossing of the Black Hills."

General Grenville Dodge

RE: comment to his scout. In the spring of 1865, while returning from the Powder River Campaign, Dodge had left his column (accompanied by a small escort) at Lodge Pole Creek (east of the Black Hills) in order to explore along the range itself. The Sioux cut him off from the column and drove him to a long ridge bisecting the flank of the hill. He and his escort, leading their horses and using their rifles, fought the Sioux off, at the same time making what time they could down the ridge (in order to signal to the troops on the plains below). It was almost dusk when a rescue party arrived. In rejoining the column, they all continued down the ridge to the plains below. Dodge was well aware that for two years the engineers of the UPRR had been looking for a crossing of the Black Hills. He marked the foot of the grade by a lone tree and, upon assuming the duties of Chief Engineer twelve months later, one of the first things that he did was to instruct Assistant Engineer James Evans to find "Lone Tree Pass" and run a line up the ridge. The result was the establishment of a ninety-foot grade, extending almost unbroken from near Cheyenne to the plateau atop the Black Hills. Lone Tree Pass was renamed "Evans Pass," leading to the highest point on the UPRR's line. The discovery of this pass, by chance, had solved a vexing problem for the UPRR.

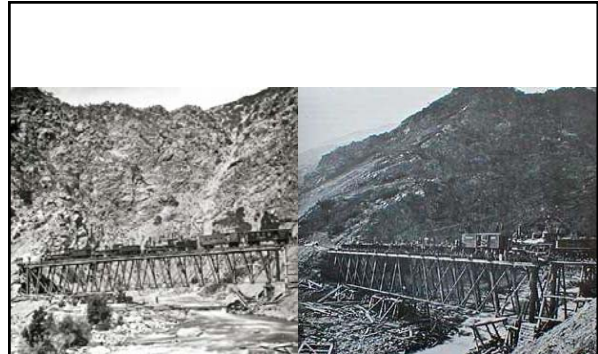
451

For Expediency's Sake

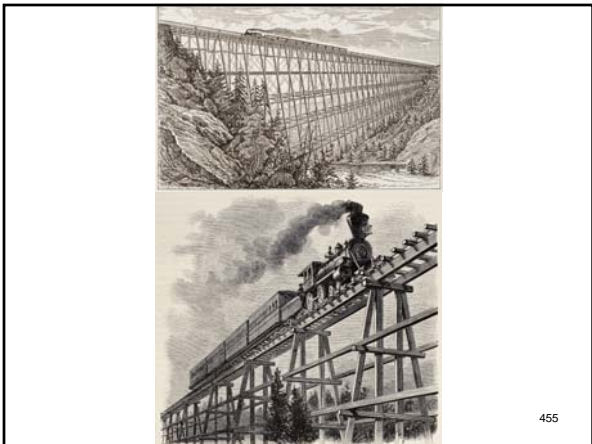
452

The UPRR would require over six million ties which were laid down on the basis of twenty-four hundred ties to the mile on the plains, twenty-six hundred and forty through the mountains and twenty-five hundred west of Laramie. Lumber for bridges and building came from Minnesota and Wisconsin, except in the far west where native lumber was used. To a great extent, temporary trestles of timber were used - to be replaced later by more permanent culverts of stone. In some places where the piles were replaced by masonry, it was necessary to tear out the stone and put in piles again (the stone work would wash out much quicker than did the wooden piles during the spring floods). The bridges were mostly uncovered Howe wooden trusses, with stone or wooden abutments. Where the span was short, wooden trestles on piles were used. No pretense was made to ballast the track as the construction work progressed. The ties were laid on the grade with just enough dirt on them to keep them in place. Speedy construction was considered of primary importance. Ballasting could be done after the track was down at a significant savings in time and money. Another reason for deferring the ballasting of track as well as the masonry work was the inability to handle the necessary supplies. Every available steam engine and all equipment were kept in constant use hauling construction materials and supplies to the railhead.

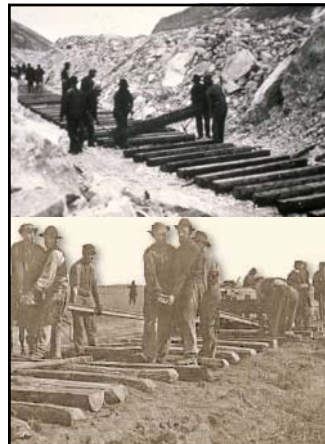
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454



455



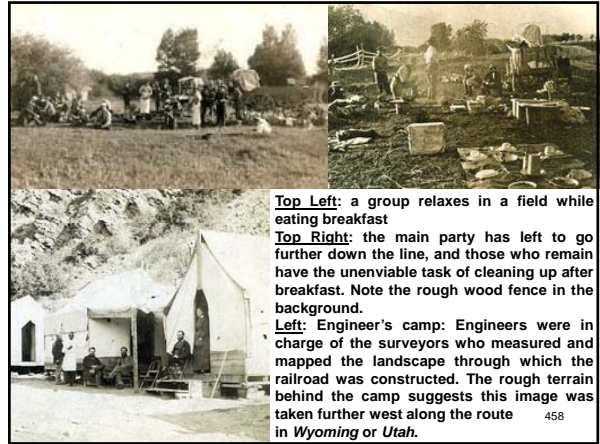
Track grading was mainly achieved by manual labor. Pick and shovel and wheelbarrow reinforced by teams and scrapers were the means used. Where rock was encountered, hand drills, black powder and, occasionally, nitroglycerine were relied upon to blast the rock which was very much in demand for masonry work. The graders worked as much as two-hundred miles ahead of the track. They were housed in tents and all supplies for their sustenance and material used by them were necessarily hauled from the several terminal points. This resulted in the employment of an army of teamsters and freighters. The expense of hauling water and supplies for the army of laborers was enormous. In fact, it was later determined that this cost more than the actual work of grading the entire line.

456



Top: an overview of one of the main UPRR camps as the line pushed west. The presence of crude wood buildings in addition to tents suggests more infrastructure is being sent to this point, which indicates a longer stay for a larger number of residents.
Bottom: this photograph depicts a classic scene along the construction of the transcontinental RR. Workers lay track while horse-drawn carriages bring supplies alongside.

457



Top Left: a group relaxes in a field while eating breakfast
Top Right: the main party has left to go further down the line, and those who remain have the unenviable task of cleaning up after breakfast. Note the rough wood fence in the background.
Left: Engineer's camp: Engineers were in charge of the surveyors who measured and mapped the landscape through which the railroad was constructed. The rough terrain behind the camp suggests this image was taken further west along the route in Wyoming or Utah.

458



459



"There are now some two hundred men employed on the work and a like number of horses and oxen, together with two excavating machines that are doing the work of many men. It is confidently expected that this Section (the first forty miles) will be ready to be laid with rails by June 1st, next."
 RE: excerpt from a report of one of a government inspector (made in 1864, when the grading had progressed approximately twenty miles out from of Omaha). Though commendable under the circumstances, with nearly twelve-thousand men engaged and track being laid up to ten miles a day by 1868, by comparison it seems insignificant. Grading was commenced in July 1864 and track-laying in the spring of 1865.
Left: T.C. Durant at end o' track in Nebraska Territory, 1866

460



461



Walking Gold Pieces

462

"The buffalo didn't belong to anybody. If you could kill them, what they brought was yours. They were walking gold pieces...Was I not lucky that I discovered this quick and easy way to fortune? I thought I was...The thing we had to have, we businessmen with rifles, was one shot kills. We based our success on the overwhelming stupidity of the buffalo, unquestionably the stupidest game animal in the world...If you wounded the leader the rest of her herd, whether it was three or thirty, would gather around her and stupidly 'mill'...All you had to do was pick them off one by one...I once took 269 hides with 300 cartridges. Adventurous? No more than shooting a beef critter in the barnyard...It was a harvest. We were the harvesters..."

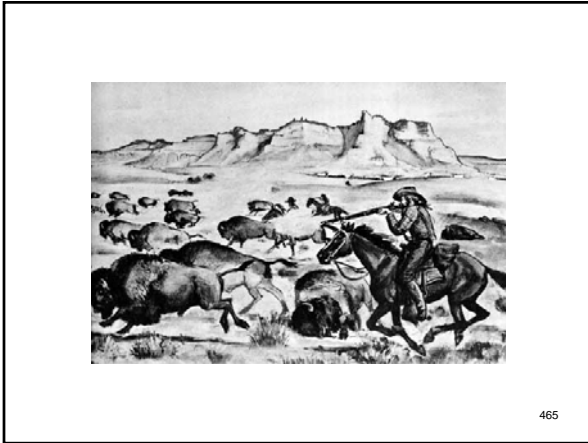
Frank H. Mayer, Buffalo Hunter

463



Left: caption: "Buffalo Bill Cody, 1903." Born William Frederick Cody, "Buffalo Bill" earned his nickname after being named as chief buffalo meat provider for the Kansas Pacific Railroad (a branch of the UPRR). Cody is known to have killed 4,280 head of buffalo in seventeen months. Buffalo provided a cheap, readily available source of food for the UPRR's army of laborers. Thus, the Buffalo of the Great Plains were killed by the thousands by professional hunters like Cody for this purpose.

464



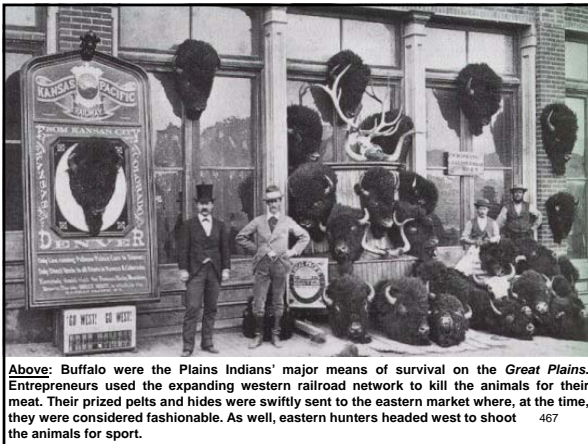
465



"...One by one we put up our buffalo rifles...left the ranges. And there settled over them a vast quiet...The buffalo was gone...Maybe we served our purpose in helping abolish the buffalo; maybe it was our ruthless harvesting of him which telescoped the control of the Indian by a decade or maybe more. Or maybe I am just rationalizing. Maybe we were just a greedy lot who wanted to get ours, and to hell with posterity, the buffalo, or anyone else, just so we kept our scalps on and our money pouches filled. I think maybe that is the way it was."

Frank H. Mayer, Buffalo Hunter

466



Above: Buffalo were the Plains Indians' major means of survival on the Great Plains. Entrepreneurs used the expanding western railroad network to kill the animals for their meat. Their prized pelts and hides were swiftly sent to the eastern market where, at the time, they were considered fashionable. As well, eastern hunters headed west to shoot the animals for sport.

467

A Wound in the Heart

468

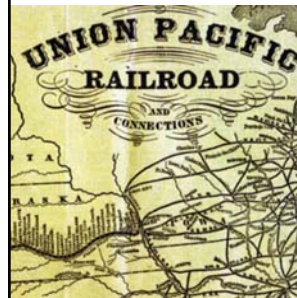


"It would be hard to imagine anything more deeply hurtful than the loss of something ineffably sacred. One can only guess and imagine. We can't know what that is now. But certainly confusion, first of all, I suppose. Why is this happening? Why are you killing the buffalo? We do that, of course, but we do it in order to survive and we do it in a sacred manner. But this wholesale slaughter must have been first confusing, and then - you know - a devastation. A wound in the heart that we cannot conceive of now."
469
N. Scott Momaday, Native American

The Moist East and the Arid West

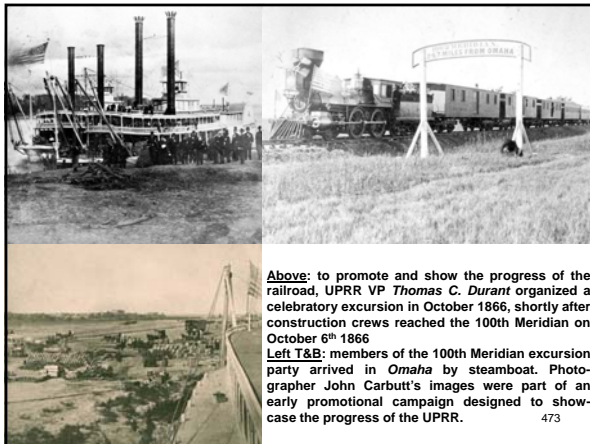
470

By September 25th 1865, eleven miles of the line were finished and in November 1865, an excursion train was run from Omaha to the end o' track; fifteen miles distant to *Sailing's Grove*. Durant arranged for about twenty distinguished gentlemen to accompany him on the first inspection trip, included amongst them was *William Tecumseh Sherman* who was suitably impressed. Despite expectations, it took a full year to complete the first forty miles (the lack of rail connections east of Omaha caused serious expense and delay). Those in charge of the work were, at that time, inexperienced and funds were scarce. With the credit of the UPRR not yet firmly established, an average rate of progress (during the first twelve months) of only one-mile per week was realized. Another reason for the slow progress was the scarcity of labor during the *Civil War*. The territories along the route lacked surplus workmen, but with the end of hostilities and disbandment of both the Confederate and Union armies, the situation changed dramatically. Large numbers of ex-soldiers drifted west, glad to find steady work for good wages. Also, many newly freed slaves headed west with the coming of the war's end. In his annual report for 1866 the Secretary of the Interior stated that, out of fifteen hundred laborers employed on the UPRR, three hundred were negroes who performed their assigned duties faithfully and well, recommending legislation for the employment of more freed slaves on the work.
471

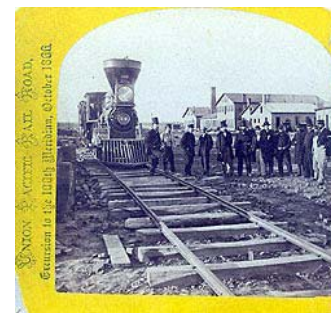


Left: UPRR route map showing the railroad's progress through Nebraska. UPRR crews reached an important milestone when they passed the 100th Meridian near Cozad, Nebraska Territory. This guaranteed the railroad the irrevocable right to continue westward (as stipulated in the *Pacific Railway Act of 1862*). In October 1866, Durant hosted a "100th Meridian Excursion," inviting a group of reporters and politicians to take note of the event. In 1879, the U.S. Geological Survey officially established the 100th Meridian to mark one-hundred degrees of longitude west of *Greenwich* as the boundary between the "moist east and the arid west."

472



Above: to promote and show the progress of the railroad, UPRR VP *Thomas C. Durant* organized a celebratory excursion in October 1866, shortly after construction crews reached the 100th Meridian on October 6th 1866
Left T&B: members of the 100th Meridian excursion party arrived in *Omaha* by steamboat. Photographer *John Carbutt's* images were part of an early promotional campaign designed to showcase the progress of the UPRR.
473



474



Left: when the last participant had departed (after the 100th Meridian excursion), construction crews pressed on through North Platte (Lincoln County, NE) to milepost 305 (the crews spent the winter of 1866 in North Platte). The images at left (T&B) show the UPRR bridge over the North Platte River (at North Platte).

475

Military in Character

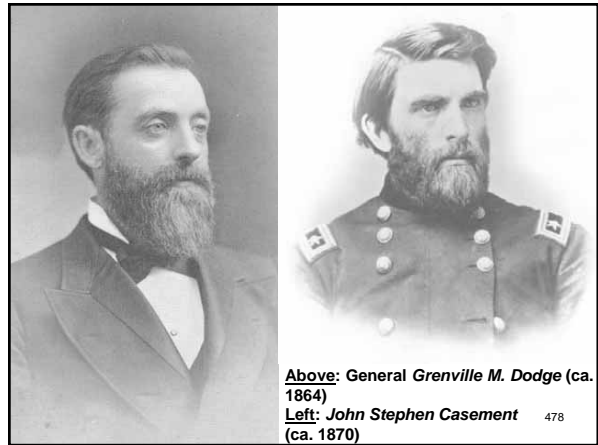
476

"The work was military in character and one is not surprised to find among the superintendents and others in charge, a liberal sprinkling of military titles. Surveying parties were always accompanied by a detachment of soldiers as a protection against Indians. The construction trains were amply supplied with rifles and other arms and it was boasted that a gang of track-layers could be trans-muted into a battalion of infantry at any moment. Over half of the men had shouldered muskets in many a battle."

Grenville M. Dodge, UPRR Chief Engineer

RE: excerpt from an 1888 speech. Among the UPRR officials there were many who were formerly army officers. Chief Engineer Dodge had been a General, Silas Seymour - the Consulting Engineer, had been a Colonel and the head of the track-laying force - John Stephen Casement, had also been a General.

477



Above: General Grenville M. Dodge (ca. 1864)

Left: John Stephen Casement (ca. 1870)

478



Above: caption: "Union Pacific Construction Train, 1868." John Stephen "Jack" Casement's famous "City on Wheels" supply trains put everything the crews needed at their fingertips. The trains included specially laden cars with exactly enough materials to lay one mile of track. It was this efficient management of men and supplies that enabled UPRR crews, under the Casement brothers (John and Daniel), to lay up to two miles of track per day.

479

"The whole organization of the road is semi-military. The men who go ahead (surveyors and locators) are the advance guard, following them is the second line (the graders) cutting through the gorges, grading the road and building the bridges. Then comes the main body of the army, placing the ties, laying the track, spiking down the rails, perfecting the alignment, ballasting and dressing up and completing the road for immediate use. Along the line of the completed road are construction trains pushing 'to the front' with supplies. The advance limit of the rails is occupied by a train of long box-cars with bunks built within them, in which the men sleep at night and take their meals. Close behind this train come train loads of ties, rails, spikes, etc., which are thrown off to the side. A light car drawn by a single horse gallops up, is loaded with this material and then is off again to the front. Two men grasp the forward end of the rail and start ahead with it, the rest of the gang taking hold two by two, until it is clear of the car. At the word of command it is dropped into place, right side up, during which a similar operation has been going on with the rail for the other side, thirty seconds to the rail for each gang, four rails to the minute. As soon as a car is unloaded, it is tipped over to permit another to pass it to the front and then it is righted again and hustled back for another load. Close behind the track-layers comes the gaugers, then the spikers and bolters. Three strokes to the spike, ten spikes to the rail, four hundred rails to the mile. Quick work you say, but the fellows on the Union Pacific are tremendously in earnest."

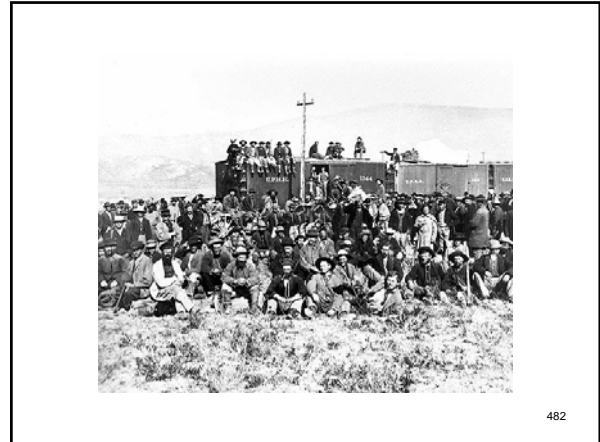
RE: a newspaper reporter's account of the military precision of the work in progress 480



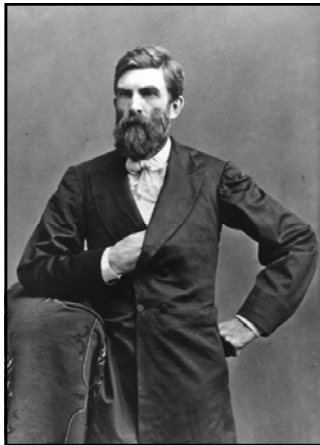
Left: caption: "Grading Outfits Going to the Fore, Union Pacific Railway, 1867"

Right: this image captures a wagon train moving through Echo Canyon, Utah, bringing supplies to the grading crews far ahead of the end of track. The completed grade can be seen at the lower right of the image (highlighted).

481



482



Left: UPRR Chief Engineer Grenville Dodge, ca. 1868. Dodge earned a degree as a Civil Engineer and at one time worked as a surveyor for the Mississippi & Missouri RR. During the Civil War, he served under General/s W.T. Sherman and U.S. Grant, helping to repair damaged or destroyed southern railroads. Several times, T.C. Durant urged Dodge to leave the army and join the UPRR, but Dodge would not leave until he felt he had fulfilled his sworn duty. His other condition was that, as Chief Engineer, he have absolute control of all construction. From 1853 onward, the transcontinental RR was never far from his thoughts, even while serving as a field commander on the Great Plains. This experience would serve him well as Chief Engineer of the UPRR.

483



"They could lay from one to three miles of track per day as they had material"

Grenville Dodge, UPRR Chief Engineer

RE: by mid-1867, UPRR crews worked seven days a week and twelve-to-sixteen hours per day. Before long, workers were laying a mile or more a day. Over three-hundred thousand tons of iron rails would be required to construct the UPRR.

484



"...Thirty seconds to each pair of rails; two rail lengths to the minute, three blows to each spike, ten spikes to a rail, 400 rails and 4,000 spikes and 12,000 blows to a mile. To every mile some 2,500 ties - say 2,400 at the outset, 2,650 on the grades - at \$2.50 each, delivered. The roadbed is ever calling for more and more..."

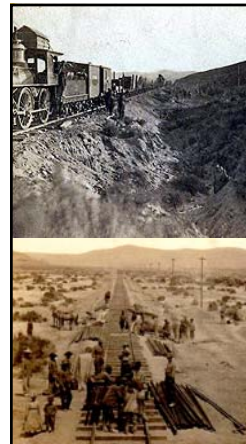
Re: excerpt from "Building the Pacific Railway"



Top: an early version of Jack Casement's "City on Wheels" (located between Cozad and North Platte, NE). The photograph shows how horses were used to bring rails to the end of track.

Bottom: still photograph from Director John Ford's epic western about the building of the transcontinental RR: "The Iron Horse" (1924). In this scene, a soldier stands guard as a work crew lays down a rail

485



"...The boarding-train was shoved up-track by the engine at its rear. The first construction train pulled in, halted noisily, and dumped its thunderous load. The construction train backed out; the boarding-train pulled out to clear the way for the charge of the iron-truck hauled by rope and galloping horse with a shrieking urchin astride. Forty rails were tossed aboard; the iron-truck rumbled full speed to end o' track, passing another truck, tipped aside to give it right of way. The rail squads, five men to a squad, were waiting on right and left; two rails were simultaneously plucked free, to the truck's rollers, and hand after hand were run out to the ties. 'Down!' signaled the squad bosses, almost in one voice. The end of each rail was forced into its chair. The chief spiker was ready; the gauger stooped; the sledges clanged - and another pair of rails had been set and the truck rolled forward over the preceding pair, interrupting the busy hands of the bolters..."

RE: excerpt from "Building the Pacific Railway"

Top: caption: "Unloading ties and iron, on line of railroad track"

Bottom: caption: "Laying rails in the desert"

486

"We witnessed here the fabulous speed with which the line was built. Through the two or three hundred miles beyond were scattered ten to fifteen thousand men in great gangs preparing the road-bed with plows, scrapers, shovels, picks, and carts, and among the rocks, with drills and powder were doing the grading as rapidly as men could stand and move with their tools. Long trains brought up to the end of the track, loads of ties and rails the former were transferred to teams and sent one or two miles ahead and put in place on the grade, then spikes and rails were reloaded on platform cars and pushed up to the last previously laid rail and with an automatic movement and celerity that was wonderful, practiced hands dropped the fresh rails one after another on the ties exactly in line. Hugh sledges sent the spikes home, the car rolled on and the operation was repeated; while every few minutes the long heavy train behind sent out a puff of smoke from its locomotive and caught up with its load of material the advancing work. The only limit to the rapidity with which the track could thus be laid was the power of the road behind to bring forward material."

RE: newspaper reporter's account. The description applies to the later period of construction on the UPRR when the large labor force had become thoroughly organized and the work systematized.

487



Above: caption: "Westward Across the Plains, 1866.' An excellent sketch of the Union Pacific R.R. in construction through Nebraska." 488

"I have just read with intense interest your letter of the 14th. Although you wanted me to keep it to myself, I believe you will sanction my sending it to General Grant for his individual perusal, to be returned to me. It is almost a miracle to grasp your proposition to finish to Fort Sanders this year, but you have done so much that I mistrust my own judgment and accept yours."

William Tecumseh Sherman, January 1st 1867

RE: by the end of 1866, Chief Engineer Dodge was preparing for a dash to New Fort Sanders, two-hundred and eighty-eight miles distant across the Black Hills (at the south-end of the Laramie Plains). He announced his plan in a letter to his friend and confidant; General W.T. Sherman. Sherman replied, in kind, from St. Louis at the beginning of 1867.

489



Above: caption: "Laramie Valley – from Shepherd Mountain, Wyoming" 490

After wintering in Omaha, the surveying parties that had been recalled to headquarters for revisions to their maps headed out for the "Indian Country" during the first week of March 1867. They were delayed for six weeks; held snowbound at North Platte. However, the survey parties that had wintered at Salt Lake City left earlier (on April 1st 1867). Surveys of the mountain and desert region had just commenced when Assistant Engineer L.L. Hills was killed by Indians six miles east of Cheyenne. Final locations had yet to be established through the most difficult portion of the projected route; from the high plains of southeastern Wyoming (at that time Nebraska Territory); over the Black Hills of the Laramie Plains, the Red Desert and the Bitter Creek region; over the Wasatch Mountain Range and on to the Great Salt Lake. By summer, the exploration of the route extended across the Black Hills (by way of Sherman Summit) through the length (one-hundred and fifty miles) of the Laramie Plains, on through the Bitter Creek Desert beyond, across the Wasatch Range to Salt Lake City and then, by a northward circuitous route, to the Wind River and the "Sweetwater Country" of the South Pass and thence back to the outgoing trail in the Bitter Creek Desert. Once past the Black Hills, a natural highway awaited the UPRR. Native coal beds would solve the fuel problem and, for tie and bridge timber, mountain streams provided a natural highway down which they might be floated to the line itself. Up on the Black Hills, the grading operations would provide a perfect ballast of disintegrated granite.

491



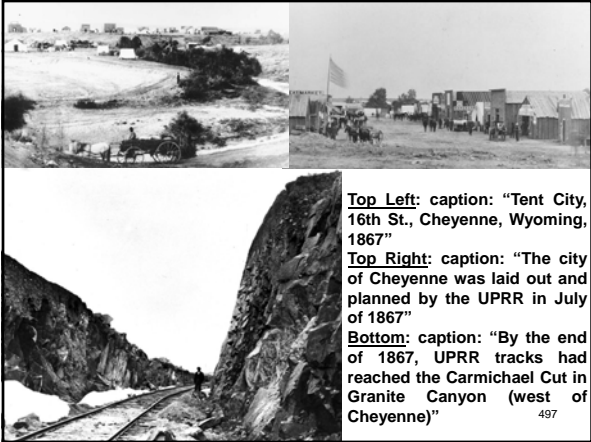
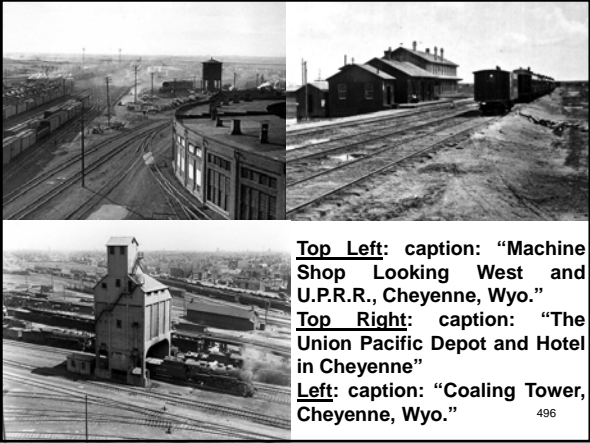
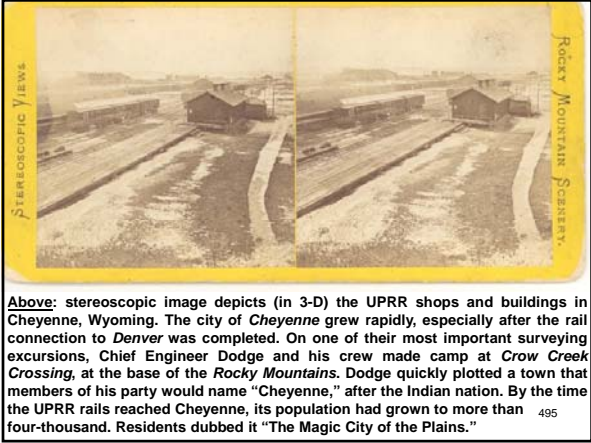
492

The Magic City of the Plains

493

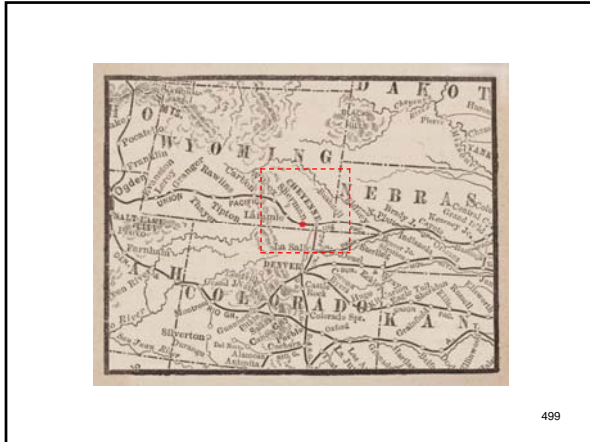
Located just thirty-five miles from *Evans Pass* (with a connection to *Denver* via the *Denver Pacific Railway*) and at 6,070-feet above sea-level, *Cheyenne* was chosen to become a major railroad center by the UPRR and was equipped with extensive railroad yards and maintenance facilities (its location made it a good base for snowplows to help clear the tracks of winter snow and/or help haul heavy freight over *Evans Pass*). The UPRR's junction with the DPR (with its connection to *Kansas City, Kansas/Missouri* and the railroads east of the *Missouri River*) made Cheyenne the junction of two major railroads. Cheyenne later became Wyoming's largest city and the capital of the new state of *Wyoming*.

494

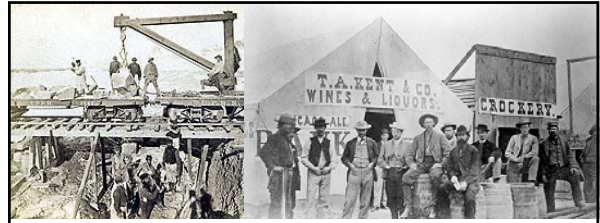


The grade to *Cheyenne* did not exceed thirty-five feet (vertical rise) to the mile. On November 13th 1867, the UPRR tracks entered Cheyenne. The first passenger train from the east followed the next day, welcomed by the residents with banners, a brass band and speeches. The town of *Julesburg* – former end o' track in June 1867, moved up to the new terminal at Cheyenne, leaving only a station house and litter behind to mark the town that now faded from prominence. From Cheyenne, (6K-foot elevation) the road would climb to *Sherman Summit* (elevation 8,262-feet) through *Evans Pass* for thirty-two miles on an easy grade not exceeding ninety-feet to the mile. From the summit, it was down to open country and on through the rolling *Laramie Plains*. Cheyenne was to be an important point as the junction from which the *Denver Pacific RR* was to connect with the UPRR. The ascent of the *Black Hills* beckoned. By December 1867, the UPRR was high up on *Evans Pass* (at 8K-feet) and end o' track halted ten miles short of the coveted *Sherman Summit*. *Old Fort Sanders* (the 570 mile-post and goal of the year 1867) was just thirty miles distant. By year's end, the UPRR had laid-down two-hundred and forty miles of track. From *Sherman Summit*, the mountains and desert lying between the summit and the *Salt Lake Valley* was a distance of about five-hundred miles. The CPRR had yet to build some six-hundred miles further (mainly a straight-run across desert terrain). The *Sierra Nevada* now lay behind them conquered. For the UPRR, tough mountain work in the snowy ranges lay ahead.

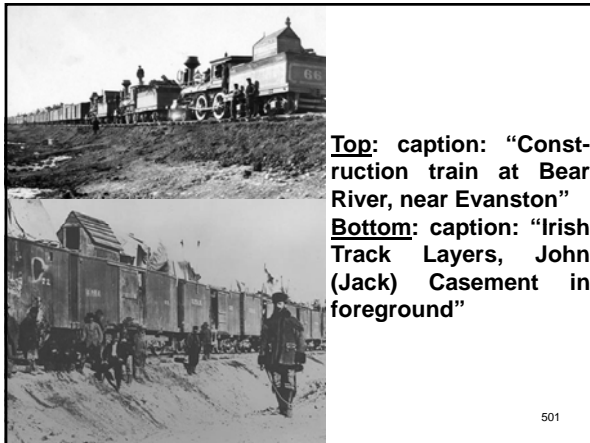
498



499



The UPRR established many townships along their route west as the railroad followed the *Platte River* across *Nebraska Territory* - *Fremont*, *Elkhorn*, *Grand Island*, *North Platte*, *Ogallala* and *Sidney*. After crossing the *North Platte River*, the UPRR followed the *South Platte River* west into what would become *Julesburg, Colorado* (before turning northwest along *Lodgepole Creek* into *Wyoming*). In the *Dakota Territory* (*Wyoming*), the new towns of *Cheyenne*, *Laramie*, *Rawlins* (named after Union General *John Aaron Rawlins*) *Green River* and *Evanston* (named after UPRR surveyor *James Evans*) were established (as well as many fuel and water stations). The *Green River* was crossed with a new bridge (left) and the new town of *Green River* constructed there after the tracks reached the *Green River* on October 1st 1868. It would be the last significant river crossing by the UPRR. On December 4th 1868, the UPRR reached *Evanston*, having laid almost three-hundred and sixty miles of track in 1868. By 1871, *Evanston* became an important train maintenance town, equipped with facilities to carry out extensive repairs on the cars⁵⁰⁰ and steam locomotives of the era. At right, *Benton, Wyoming* in 1868.



Top: caption: "Construction train at Bear River, near Evanston"
Bottom: caption: "Irish Track Layers, John (Jack) Casement in foreground"

501

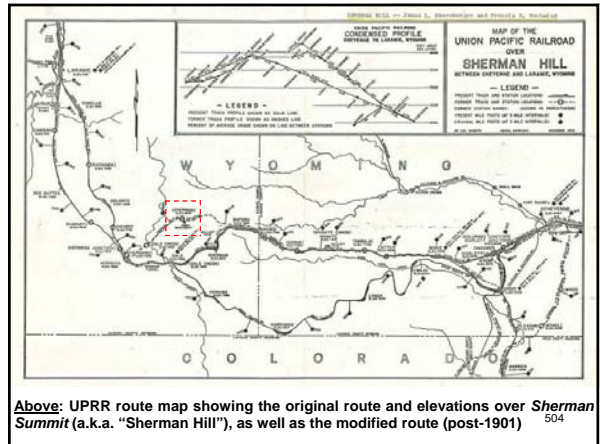


Sherman Summit

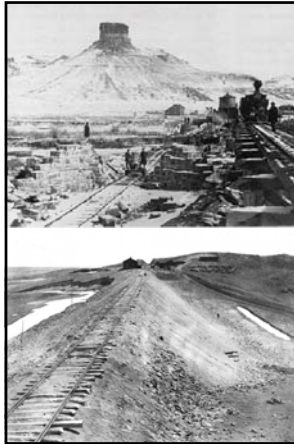
502

To make the shortest route to the top of the highest point on the line, UPRR engineers established a 90-foot grade that climbed thirty-two miles from the base of the *Black Hills*. The peak was named "Sherman Summit," in honor of *William Tecumseh Sherman*. Though Chief Engineer Dodge discovered the pass (a.k.a. *Lone Tree Pass*) by accident, credit is more often given to English-born engineer *James Evans* (who surveyed the area in 1864), thus the name "Evans Pass" was given to the route to the summit.

503

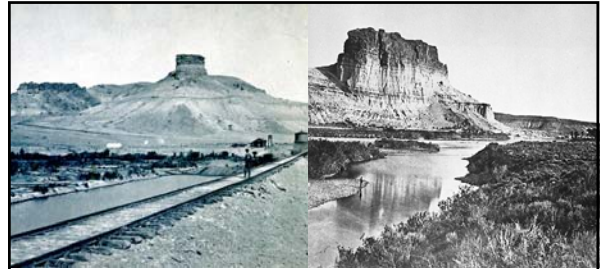


Above: UPRR route map showing the original route and elevations over *Sherman Summit* (a.k.a. "Sherman Hill"), as well as the modified route (post-1901)⁵⁰⁴



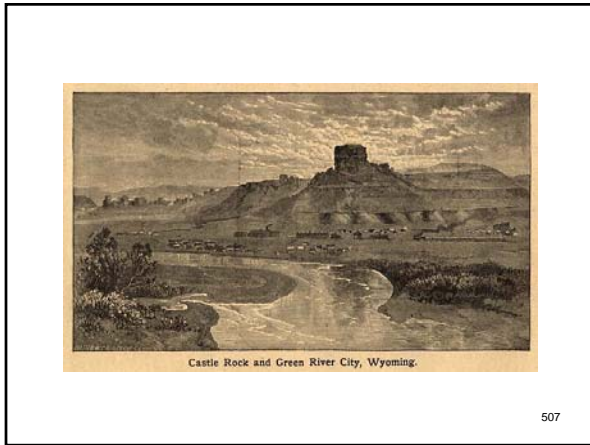
Top: caption: "Citadel Rock, 1868." UPRR construction crews reached *Sherman Summit* in April 1868 and quickly advanced to *Green River, Wyoming*, by the fall of 1868. In the photograph, crews work on the permanent bridge over the *Green River* with *Castle Rock* in the background.
Bottom: just prior to reaching *Sherman's Summit* (in April 1868), construction crews passed through *Granite Canyon*. It later became one of the UPRR's sources of rock ballast.

505



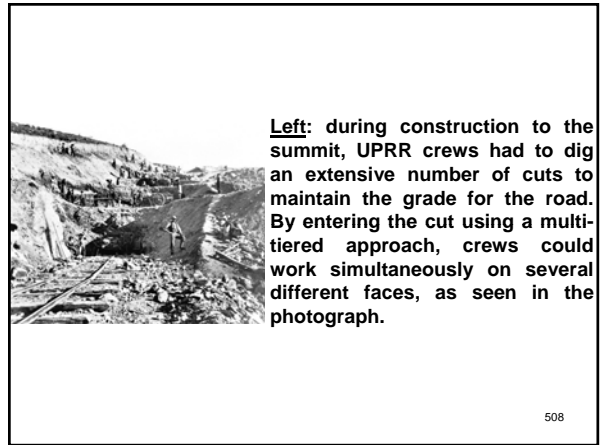
Left: caption: "Green River and Castle Rock"
Right: caption: "Castle Rock - Green River Valley, Wyoming"

506



Castle Rock and Green River City, Wyoming.

507



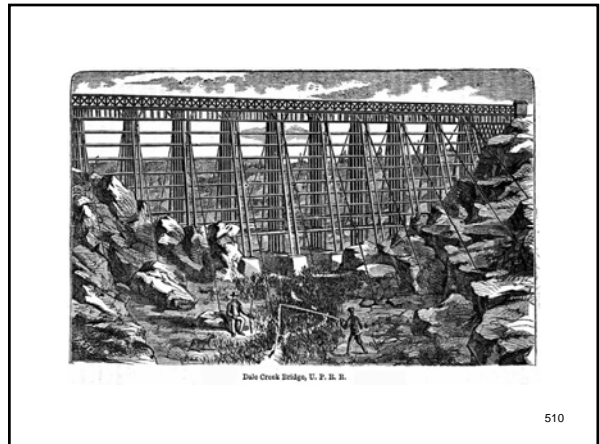
Left: during construction to the summit, UPRR crews had to dig an extensive number of cuts to maintain the grade for the road. By entering the cut using a multi-tiered approach, crews could work simultaneously on several different faces, as seen in the photograph.

508



About four miles beyond *Evans Pass*, the UPRR had to build an extensive bridge over *Dale Creek Canyon*. The crossing proved to be one of the UPRR's most difficult challenges. *Dale Creek Bridge* was 650-foot long and 125-feet above *Dale Creek*. The trestle bridge's components were pre-built of timber in *Chicago* and shipped on rail cars to the bridge site for assembly. The eastern and western approaches to the bridge required cutting through granite for nearly a mile on each side. The original *Dale Creek Bridge* had a four mph limit for all trains crossing the bridge. Beyond *Dale Creek*, construction paused at what became the town of *Laramie, Wyoming* (to build a bridge across the *Laramie River*).
Left: *Dale Creek Bridge*. The trestle bridge was the first of a series of three that spanned the gorge. Under *E.H. Harriman's* leadership (after 1900), the route was relocated south of the gorge, making the bridge unnecessary. It brought the UPRR line down into *Laramie* after it came over the summit from *Cheyenne*.
Right: the *Dale Creek Bridge* approach. The sign (highlighted) cautions oncoming trains to slow to a safe four mph.

509



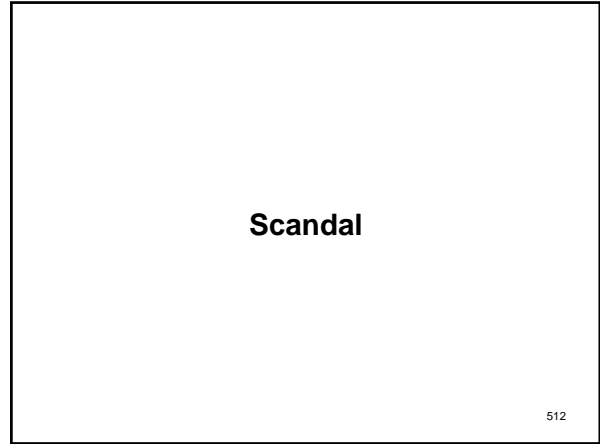
Dale Creek Bridge, U. P. R. R.

510



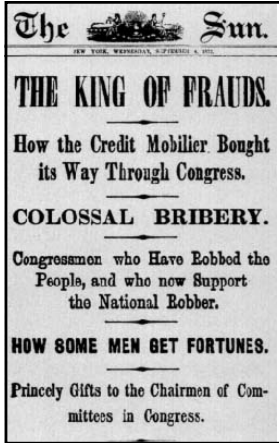
Left T&B: this later, steel version of the Dale Creek Bridge was abandoned after the UPRR line was moved a few miles south in 1899

511



Scandal

512



Credit Mobilier of America was positioned as a supposedly independent, impartial company that the UPRR could hire for construction and contract management of the road. Instead, UPRR directors funneled projects through Credit Mobilier (of which they were also investors) paying the transparent holding company inflated prices and pocketing the difference. The fraud came to a head when the *New York Sun* (left) revealed that several members of Congress had accepted cash bribes or shares of Credit Mobilier stock. The scandal resulted in a Congressional investigation that censured two participants (one of which was Oakes Ames) and caused a financial collapse that left the UPRR on the verge of bankruptcy. Oakes Ames died in 1873. His brother Oliver Ames died in 1877.

513



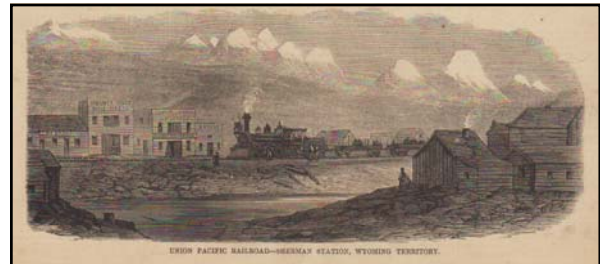
Top: caption: "The 'Lincoln Car.' Acquired by the Union Pacific in 1866 and used as a Directors' car during construction days."
Left: Thomas C. Durant, second from right (highlighted), while having severed official ties with Credit Mobilier in 1867 and the UPRR in 1869, was still called before a congressional committee in 1873 to testify. Impressed with the work of the Credit Mobilier de France, an international banking firm, he changed the name of the company from "Pennsylvania Fiscal Agency" to "Credit Mobilier of America."

514



"Resolved that in memory of Oakes Ames and in recognition of his services in the construction of the Union Pacific Railroad to which he devoted his means and his best energies with a courage, fidelity, and integrity unsurpassed in the history of railroad construction, the directors (of this Company) are requested to take measure in cooperation with such friends as may desire to contribute, for the erection at some point in the line of the road, of a suitable and permanent monument."
RE: resolution passed at the meeting of the UPRR's stockholders held in Boston on March 10th 1875. At Sherman Station, the highest point on the UPRR line, a pyramidal monument (top) was erected bearing the simple legend: "In Memory of Oakes Ames and Oliver Ames"

515

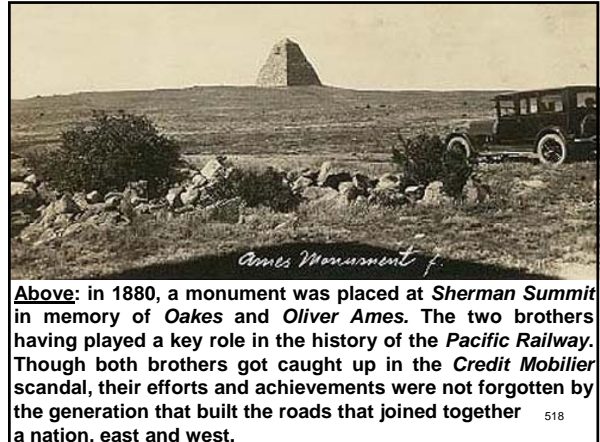


Above: caption: "Union Pacific Railroad - Sherman Station, Wyoming Territory"
Left: caption: "The Union Pacific station and roundhouse at Sherman, on the summit between Cheyenne and Laramie"

516



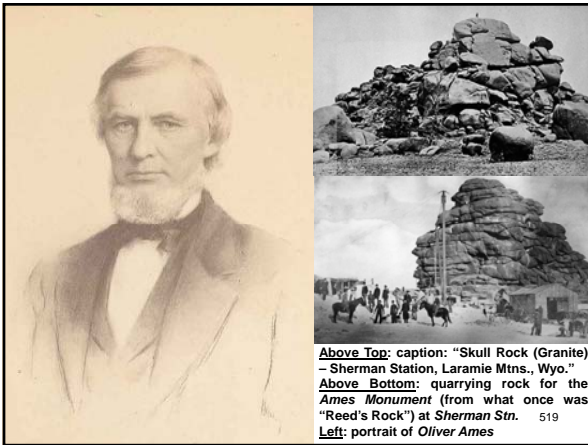
517



Ames Monument

Above: in 1880, a monument was placed at *Sherman Summit* in memory of *Oakes* and *Oliver Ames*. The two brothers having played a key role in the history of the *Pacific Railway*. Though both brothers got caught up in the *Credit Mobilier* scandal, their efforts and achievements were not forgotten by the generation that built the roads that joined together a nation, east and west.

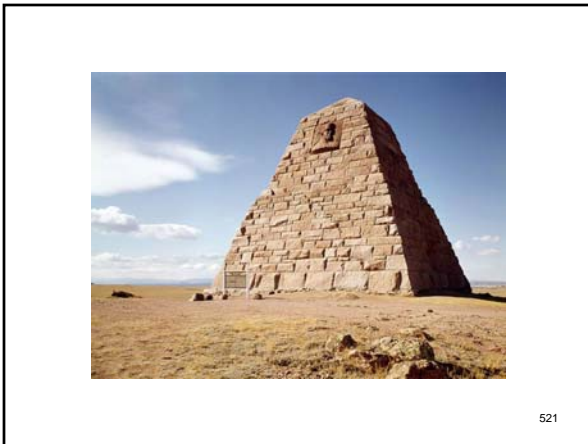
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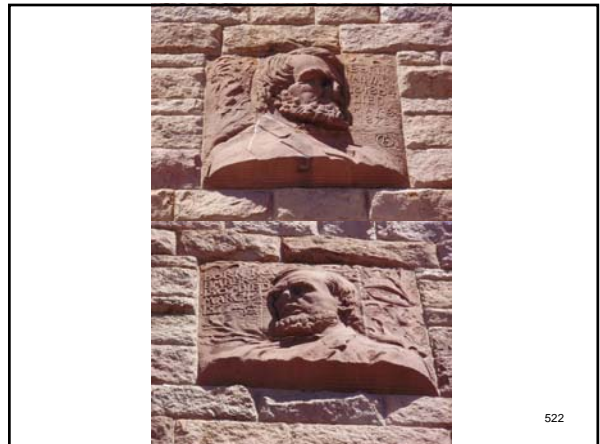
Above Top: caption: "Skull Rock (Granite) - Sherman Station, Laramie Mtns., Wyo."
Above Bottom: quarrying rock for the Ames Monument (from what once was "Reed's Rock") at Sherman Strn. 519
Left: portrait of Oliver Ames



520



521



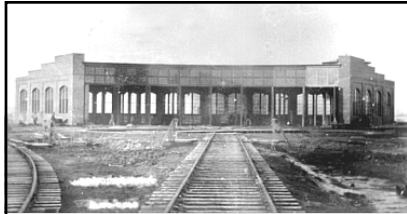
522

Planning Ahead

523

As the UPRR line progressed, round houses were put up at *Omaha, North Platte, Cheyenne, Laramie* and *Ogden* (each having twenty stalls) and at *Grand Island, Sidney, Rawlins, Bitter Creek, Medicine Bow* and *Bryan* (with ten stalls each). These were substantial fire-proof buildings of brick or stone with sheet-iron roofs. In addition to the large shops at Omaha (where much of the building of equipment was done), repair shops were built at Cheyenne and Laramie. Stations were established at an average of fourteen miles apart. The station buildings were built of wood and of two classes; 75% were twenty-five by forty-feet with the remaining 25% thirty-six by sixty-feet. At each station water tanks were erected, surmounted by wind mills. Sidings three-thousand-feet-long were located at each station and, in some cases, at intermediate points (fifteen-hundred feet long). In all, there was about 6% of the main line distance in side tracks. To accommodate not only the public, but also their own employees, the UPRR put up substantial hotels at North Platte, Cheyenne, Laramie and Rawlins. Eating houses were established at Grand Island, North Platte, Sidney, Cheyenne, Laramie, Rawlins, Bryan, *Wasatch* (relocated to *Evanston*) and Ogden. During construction, the charge for a meal was \$1.25, but with the opening of the road this was reduced to \$1.00.

524



Top: front view of a UPRR roundhouse



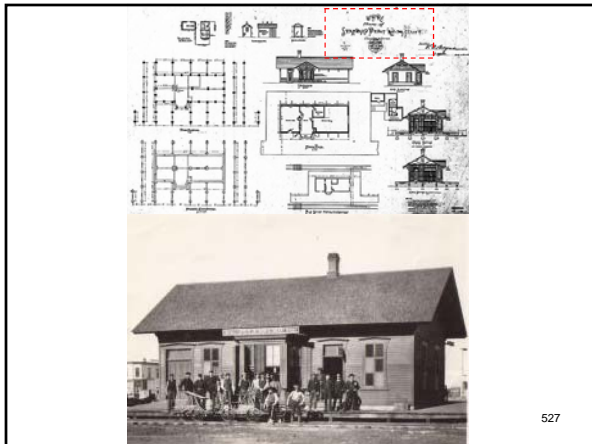
Bottom: view of the UPRR roundhouse in *Rawlins Wyoming* (showing locomotives, trains, turntable & shops)

525



Above: inside Laramie's UPRR machine shops
Left T&B: a windmill at *Laramie* drew water for steam locomotives. Roundhouse and machine shops at back right.

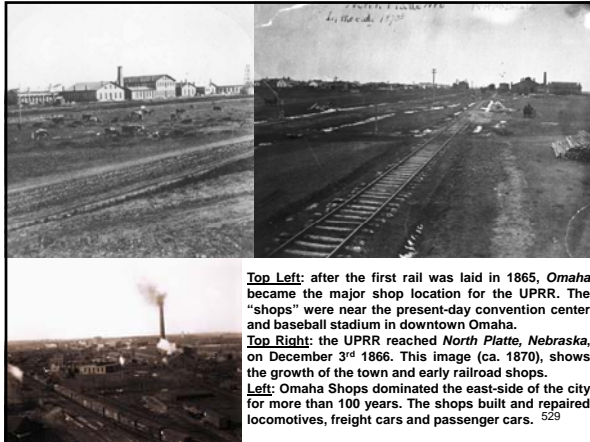
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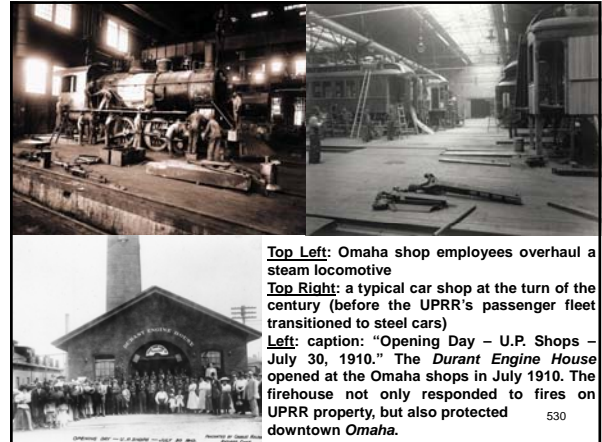
527

Nine saw-mills and several steamboats were owned by the UPRR. For sixty miles below *Omaha* and one-hundred miles above the banks of the *Missouri River*, forests were being stripped of timber. Tie camps to employ thousands of "choppers" (woodcutters) were being planned for the mountains. A machine shop costing \$20K had been opened at *North Platte*, in addition to the \$250K shops at *Omaha*. The UPRR was preparing to turn out twenty cars per week and take care of all maintenance for its fleet of locomotives.

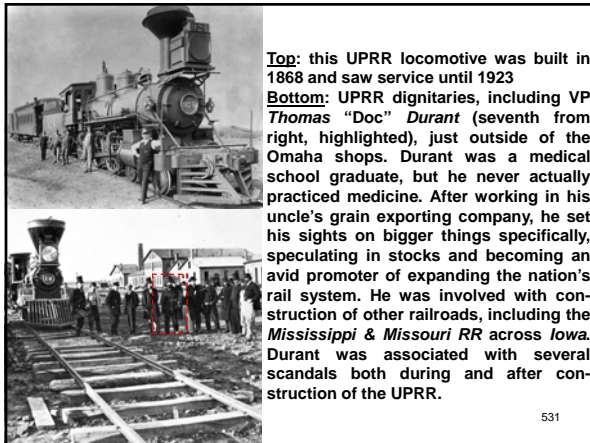
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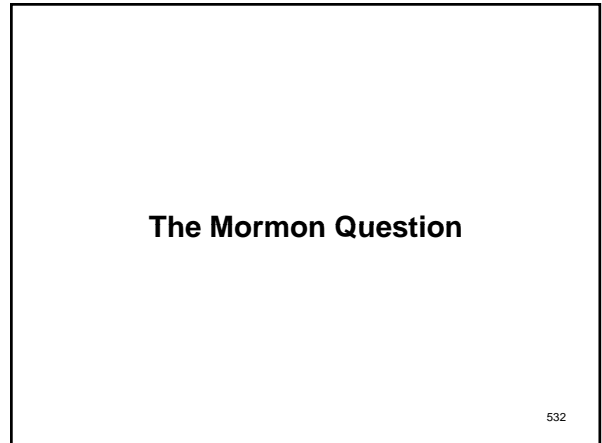
Top Left: after the first rail was laid in 1865, Omaha became the major shop location for the UPRR. The "shops" were near the present-day convention center and baseball stadium in downtown Omaha.
Top Right: the UPRR reached North Platte, Nebraska, on December 3rd 1866. This image (ca. 1870), shows the growth of the town and early railroad shops.
Left: Omaha Shops dominated the east-side of the city for more than 100 years. The shops built and repaired locomotives, freight cars and passenger cars. 529



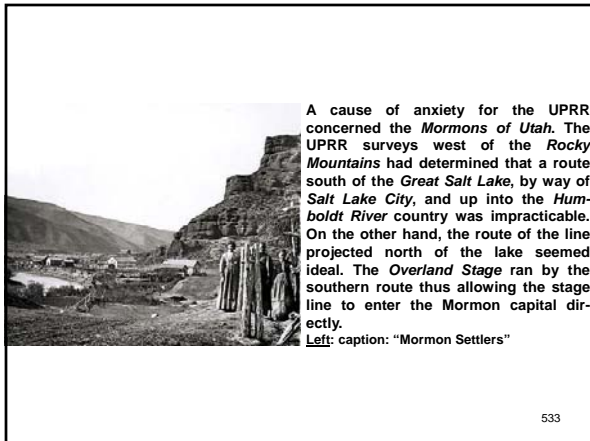
Top Left: Omaha shop employees overhaul a steam locomotive
Top Right: a typical car shop at the turn of the century (before the UPRR's passenger fleet transitioned to steel cars)
Left: caption: "Opening Day - U.P. Shops - July 30, 1910." The *Durant Engine House* opened at the Omaha shops in July 1910. The firehouse not only responded to fires on UPRR property, but also protected downtown Omaha. 530



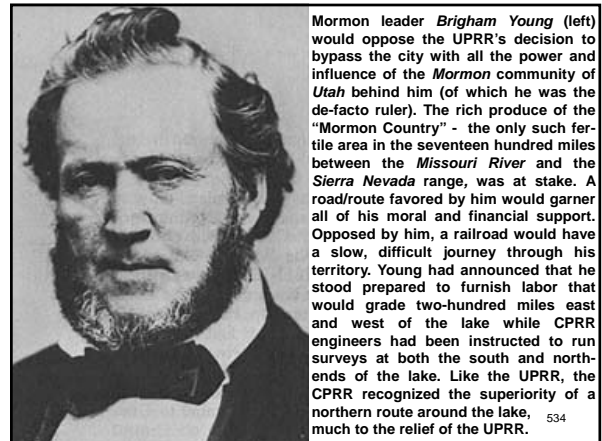
Top: this UPRR locomotive was built in 1868 and saw service until 1923
Bottom: UPRR dignitaries, including VP Thomas "Doc" Durant (seventh from right, highlighted), just outside of the Omaha shops. Durant was a medical school graduate, but he never actually practiced medicine. After working in his uncle's grain exporting company, he set his sights on bigger things specifically, speculating in stocks and becoming an avid promoter of expanding the nation's rail system. He was involved with construction of other railroads, including the *Mississippi & Missouri RR* across Iowa. Durant was associated with several scandals both during and after construction of the UPRR. 531



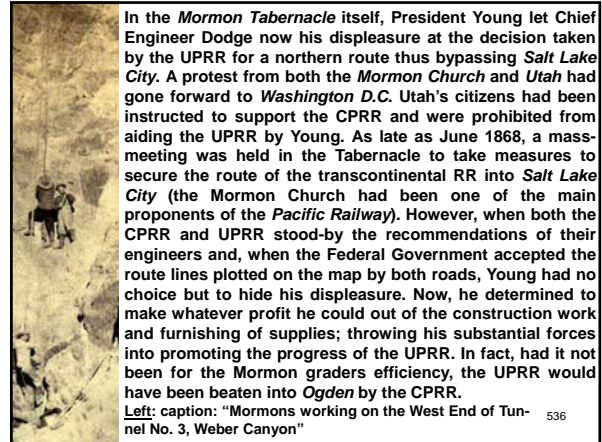
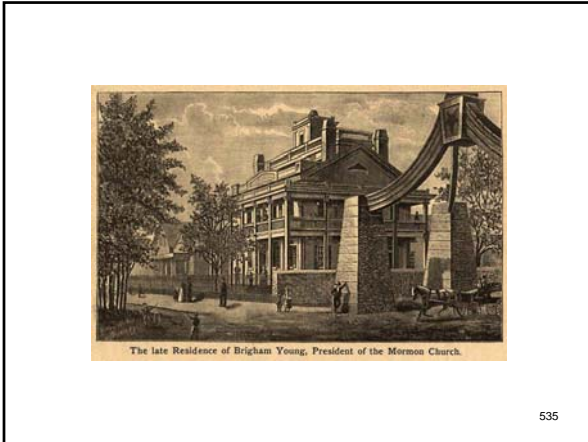
The Mormon Question



A cause of anxiety for the UPRR concerned the *Mormons of Utah*. The UPRR surveys west of the *Rocky Mountains* had determined that a route south of the *Great Salt Lake*, by way of *Salt Lake City*, and up into the *Humboldt River* country was impracticable. On the other hand, the route of the line projected north of the lake seemed ideal. The *Overland Stage* ran by the southern route thus allowing the stage line to enter the Mormon capital directly.
Left: caption: "Mormon Settlers" 533



Mormon leader *Brigham Young* (left) would oppose the UPRR's decision to bypass the city with all the power and influence of the *Mormon* community of *Utah* behind him (of which he was the de-facto ruler). The rich produce of the "Mormon Country" - the only such fertile area in the seventeen hundred miles between the *Missouri River* and the *Sierra Nevada* range, was at stake. A roadroute favored by him would garner all of his moral and financial support. Opposed by him, a railroad would have a slow, difficult journey through his territory. Young had announced that he stood prepared to furnish labor that would grade two-hundred miles east and west of the lake while CPRR engineers had been instructed to run surveys at both the south and north-ends of the lake. Like the UPRR, the CPRR recognized the superiority of a northern route around the lake, much to the relief of the UPRR. 534



*At the head of great Echo the railway's begun,
The Mormons are cutting and grading like fun;
They say they'll stick to it until it's complete –
When friends and relations they're hoping to meet.
Hurrah, hurrah, the railroad's begun.
Three cheers for the contractor; his name's Brigham Young.
Hurrah, hurrah, we're honest and true,
And if we stick to it, it's bound to go through.
Now there's Mr. Reed, he's a gentleman too –
He knows very well what the Mormons can do.
He knows they will earn every cent of their pay,
And are just the right boys to construct a railway.*

RE: with their popular superintendent *Sam Reed* and encouraged by the mandate of *Brigham Young*, the sturdy Mormon men had flocked with pick, spade, wheelbarrow and cart to open the grade from the *Wasatch Range*. President Young had taken the major contract, at \$2 million, to grade from the head of *Echo Canyon* to *Promontory Summit* - one-hundred and twenty miles distant. At the completion of the road, the company owed him \$1 million. Ultimately, he obtained a settlement (as partial payment) of \$600K in left-over equipment for his *Utah Central Railroad*.

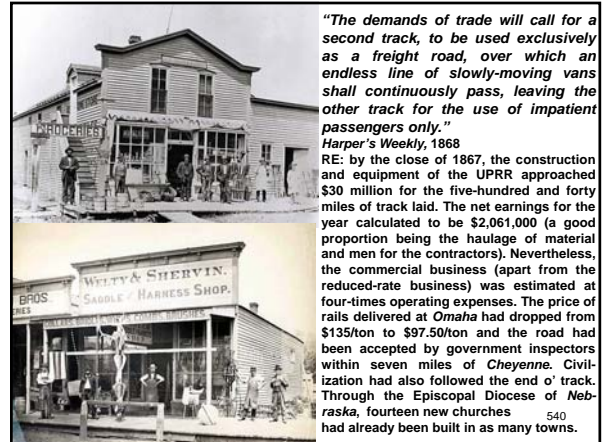
537

Ogden or Bust

538

In the winter of 1867-68, Chief Engineer Dodge was called to NYC for a conference of the heads of departments and UPRR officers. He received directions to start out at the earliest practicable moment and push the rails forward with all speed, regardless of expense; time, not money, was the prime issue. *Ogden* must be won at all costs and there still was the opportunity of striking so far toward the *California* border that when the two roads met, the UPRR would control the traffic, thus shutting the CPRR out of the *Salt Lake Valley* and its lucrative trade. During the winter, immense quantities of material and stores were accumulated at *Cheyenne*, the terminus at the time. Tons of iron flowed in, the ties stacked high bulging the *Casement Brothers'* warehouses. In the *Black Hills*, one-thousand men worked cutting timber, to be floated to the grade down the spring streams. A call for labor was sent out resulting in an army of ten-thousand Irish graders and track-layers gathered in *Cheyenne*. The surveyors were told to be prepared to move-out before the spring. Four hundred and eighty miles of track (from *Sherman Summit* to *Ogden*) were to be laid without a halt and location lines were to be run from *Ogden* to *California* - six-hundred miles distant, in readiness for the grade.

539





541

Part 4

Railroaders & Indians

542

The Great American Desert

543

"In regard to this extensive section of country, I do not hesitate in giving the opinion, that it is almost wholly unfit for cultivation, and of course uninhabitable by people depending on agriculture for their subsistence. This region, however, viewed as a frontier, may prove of infinite importance to the United States inasmuch as it is calculated to serve as a barrier to prevent too great an extension of our population westward, and secure us against machinations or incursions of an enemy that might otherwise be disposed to annoy us in that part of our frontier."

Colonel Stephen H. Long, U.S. Army Corps of Engineers, 1820

RE: the great vastness of the American west was daunting and, until the middle of the nineteenth century was considered by many to be unconquerable. In the summer of 1820, Stephen H. Long - a prominent Army Topographical Engineer, led the first formal government topographical survey and scientific expedition out of the Platte River Valley from Council Bluffs, proceeding as far west as Long's Peak (in what is now Colorado) before turning south and east again. A half-century later, the Platte River Valley would become the UPRR's route for the easternmost portion of the transcontinental RR. In a report of his survey entitled: "General Description of the Country Traversed by the Exploring Expedition," Long propounded what became known as the "Great American Desert" myth which, for the next three decades, did much to discourage any serious consideration of western settlement on the Great Plains.

544

In the first half of the nineteenth century the area west of the *Mississippi River* was known as "The Great American Desert" (top). This area was inhabited by tribes of Native American Indians. In general, white Americans considered the area to be unfit for settlement, though the opportunity to obtain free land drew many westward. As settlers moved onto the *Great Plains* and beyond, the area referred to as the Great American Desert shrank until only the *Great Basin* and parts of *Utah*, *Nevada*, *Arizona*, and *California* bear the name (bottom).

545

The Great Plains

546



"...the lands not occupied by the Indians and which are producing nothing are the best farming lands on this portion of the State, and which would at once be settled by whites and cultivated, if an opportunity offered...The rapid construction of the Pacific railroad, running as it will directly through these reservations, will necessarily consume the greater portion of the timber, as well as scatter the Indians from their present location. I cannot too strongly urge upon the department the necessity of an early removal of these Indians..."

Superintendent - Department of Indian Affairs (for Nevada, in Carson City), January 1866

Above: caption: "Northern Great Plains"

547



548

The Condition of Things

549



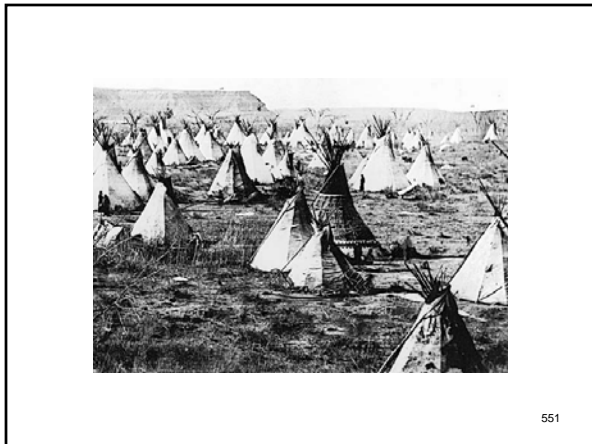
"The steady growth of emigration to the grounds heretofore devoted to the chase and the rapid progress of railroads pointing towards the Pacific and traversing the country over which the Indians from time immemorial have roamed, imperiously demand that the policy of concentrating them upon reservations should, whenever practicable, be adopted. Until recently there was territory enough to supply the demands of the white race, without unduly encroaching upon the districts where the Indians subsisted by hunting. This condition of things no longer exists."

(Acting) Commissioner of Indian Affairs
RE: excerpt from a report for the year 1867 to the Secretary of the Interior

Left: caption: "Shoshone Indians gathered around tipis"

Right: caption: "Navajo Family"

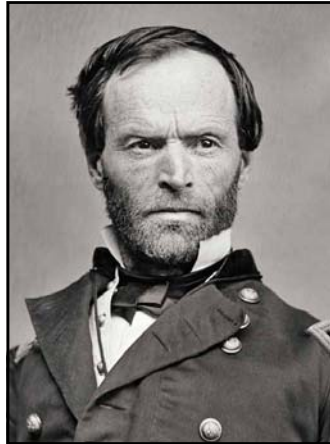
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551

The Iron Horse Cometh

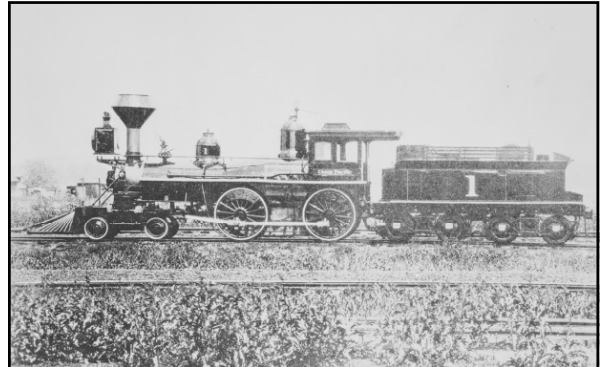
552



"No particular danger need be apprehended from the Indians...So large a number of workmen distributed along the line will introduce enough whiskey to kill off all the Indians within three-hundred miles of the road"

William Tecumseh Sherman
RE: excerpt from a letter to his brother – a U.S. Congressman. Inevitably, whiskey alone would not be enough to quell Indian tribes hostile to the transcontinental RR and Sherman himself (left) would be called upon to defend the westward rails of the UPRR.

553

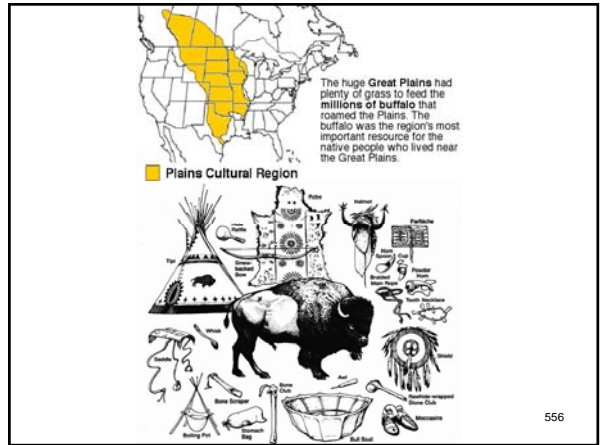


Above: caption: "The 'General Sherman,' Union Pacific's engine No. 1., delivered to Omaha in the mid-1860s" 554



The transcontinental RR was built straight through hostile country; by nature and by man. For the eastern and western march alike, there were mountains and deserts to conquer, but whereas the CPRR encountered Nevada's amenable *Paiute* and *Shoshone* tribes, the UPRR crossed the heart of the Buffalo Range; long the preserve of the *Sioux* and *Cheyenne*. The iron trail crossed the pony trail, lodge trail and war trail of these proud tribes. Telescopic transits of the UPRR's surveyors were soon followed by the hammer blows of the rail-setters and, inevitably, the shriek of the "iron horse" became a banshee wail, dooming the wild Buffalo which provided sustenance and a way of life for the Plains Indians.

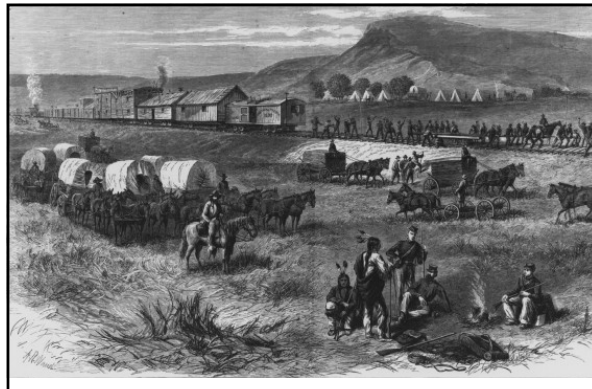
555



The huge Great Plains had plenty of grass to feed the millions of buffalo that roamed the Plains. The buffalo was the region's most important resource for the native people who lived near the Great Plains.

Plains Cultural Region

556



Above: caption: "Railroad Building on the Great Plains" 557

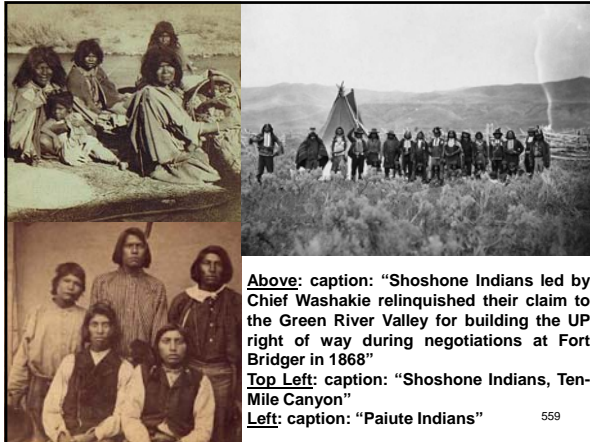


"We gave the old chief a pass, good on passenger cars, and we told our men to let the common Indians ride on the freight cars whenever they saw fit"

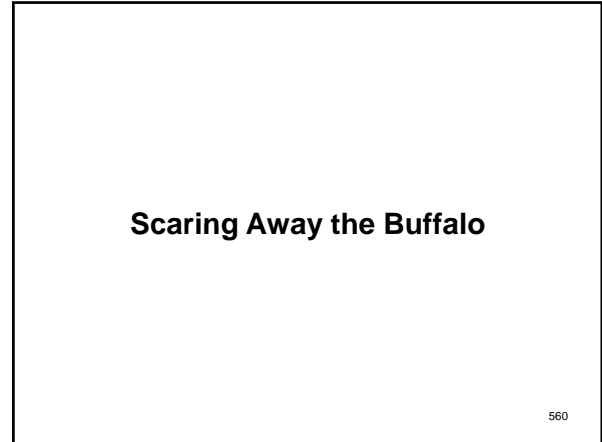
C.P. Huntington, CPRR VP

RE: the march east of the CPRR was not an armed march, the company having minimized "Indian Trouble" early-on. A treaty was negotiated first with the *Paiutes*, then with the *Shoshones* providing free transportation. The CPRR promised that if the Indians would take care of the road, they would be cared for in return. This well pleased the *Paiutes* and *Shoshones* and they kept faith with the treaty. Succeeding *California* railroad projects would copy this successful model.

Left: caption: "Wash-A-Kie, Peace Chief of the Shoshone Indians" 558



Above: caption: "Shoshone Indians led by Chief Washakie relinquished their claim to the Green River Valley for building the UPRR right of way during negotiations at Fort Bridger in 1868"
Top Left: caption: "Shoshone Indians, Ten-Mile Canyon"
Left: caption: "Paiute Indians" 559

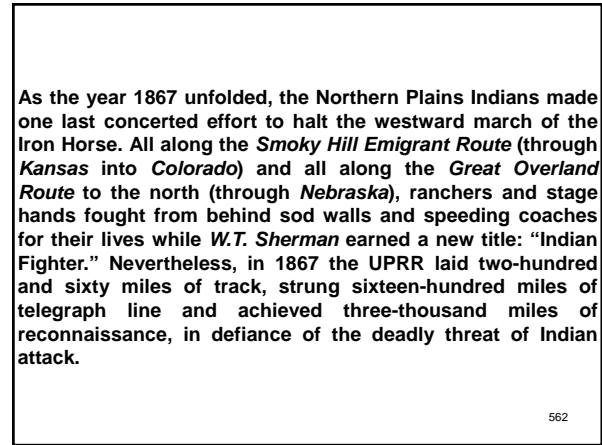


Scaring Away the Buffalo

560



"We do not want you here. You are scaring away the buffalo"
 Chief Red Cloud, 1866
 RE: in 1866, survey parties were driven in from the plains of central Nebraska. Chief Red Cloud of the Sioux nation personally warned the UPRR engineers present in Wyoming that they must leave and turn for the back trail. Through Nebraska and Wyoming the road was reconnoitered, surveyed, located and built inside a picket line provided by the War Department. General Crook stated: "It is hard to surround three Indians with one soldier." Indeed, there was a period when it seemed as though the UPRR could proceed no further.
 Above: caption: "Indian attack on a U.P.R.R. handcar" 561

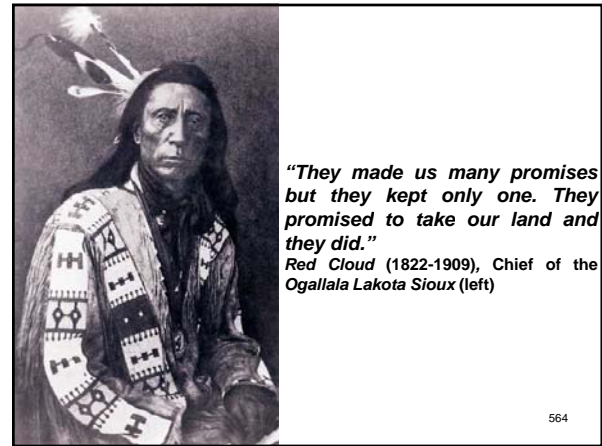


As the year 1867 unfolded, the Northern Plains Indians made one last concerted effort to halt the westward march of the Iron Horse. All along the *Smoky Hill Emigrant Route* (through Kansas into Colorado) and all along the *Great Overland Route* to the north (through Nebraska), ranchers and stage hands fought from behind sod walls and speeding coaches for their lives while *W.T. Sherman* earned a new title: "Indian Fighter." Nevertheless, in 1867 the UPRR laid two-hundred and sixty miles of track, strung sixteen-hundred miles of telegraph line and achieved three-thousand miles of reconnaissance, in defiance of the deadly threat of Indian attack.

562



"Every mile had to be run within range of the musket. In making the surveys numbers of our men, some of them the ablest and most promising, were killed; and during the construction our stock was run off by the hundred, I might say by the thousand; our cars and stations and ranches burned. Graders and track-layers, tie-men and station-builders, had to sleep under guard, and have gone to their work with their picks and shovels and their mechanical tools in one hand and the rifle in the other, and they often had to drop one and use the other."
 Grenville Dodge, UPRR Chief Engineer
 Above: caption: "Defending the Rails, 1867" 563



"They made us many promises but they kept only one. They promised to take our land and they did."
 Red Cloud (1822-1909), Chief of the Ogallala Lakota Sioux (left)

564

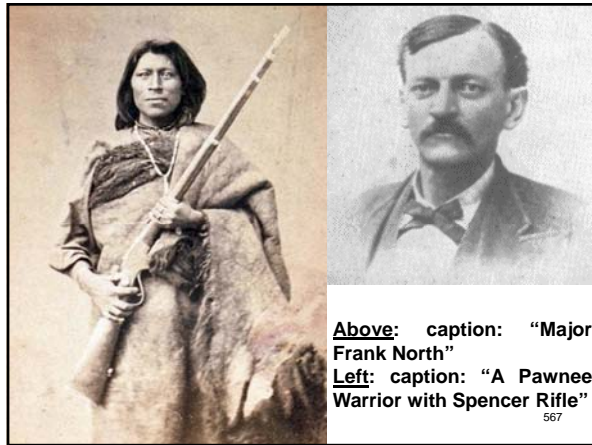
The White Chief

565



Above: caption: "Calvary charge on the Southern Plains." The bulk of the defense by the military fell upon the *Second Cavalry* and the *Twenty-first, Thirtieth and Thirty-sixth Infantry* stationed at *Fort/s Kearney, McPherson, Sedgwick and Morgan* (along the *Platte River*), *Fort Russell* (at *Cheyenne*), *Fort Sanders* (beyond the *Black Hills*) and *Fort Douglas* (*Salt Lake City*). Major *Frank J. North* ("The White Chief") led a band of free-roving *Pawnees* on the *Great Plains*. Having lived among them and able to speak their language, they trusted him and he organized them into a potent force of four companies enlisted into the U.S. Army as scouts. They were outfitted with regulation arms and clothing and in battle they were fierce, preferring to ride breech-less against their ancient enemies: the *Sioux* and *Cheyenne*.

566



Above: caption: "Major Frank North"

Left: caption: "A Pawnee Warrior with Spencer Rifle"

567

The Axeman

568

UPRR surveyor *L.L. Hills*, Assistant Chief of Survey for *James A. Evans* (who was in-charge of the location work from *Cheyenne* westward over the *Laramie Plains*) was the first casualty. The *Sioux* attacked his party in May 1867 six miles east of present-day *Cheyenne*, killing him. Had it not been for the able leadership of axeman *J.M. Eddy* – a *Civil War* veteran, the *Sioux* might have wiped out the whole survey crew. Eddy organized the defense and made a fighting retreat until the *Sioux* gave up. Chief Engineer *Dodge* learned of the affair by dispatch from the commanding officer at *Fort Collins* in northern *Colorado*. The dispatch stated that Eddy had brought a UPRR survey crew in from the *Lodge Pole Creek* (fifty miles to the northeast) and that the chief of the survey party had been killed. As it turned out, Eddy had served in the *Sixteenth Army Corps* which was under the command of General *Grenville Dodge* during the *Civil War*. When only sixteen years of age, Eddy had enlisted in the *Thirteenth Illinois Volunteer Infantry*, seeing action through to the close of the war. *Dodge* requested a meeting with Eddy near the scene of the attack and a well-deserved promotion in survey duty ensued (other promotions followed during the course of the UPRR's construction). Eddy later served under *Dodge* during the construction of the *Texas-Pacific RR*, serving as General Manager of the TPRR until his death. The UPRR station of *Hillsdale* (in southeastern *Wyoming*) pays tribute to *L.L. Hills* who died there.

569

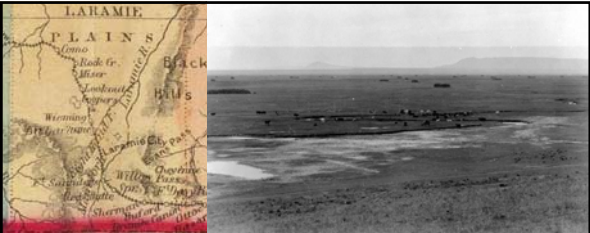


Union Pacific Depot Hillsdale, Wyoming

570

A Man Without a Blemish

571




“To develop the country from Fort Sanders to Green River”

RE: orders given to *Percy T. Browne*, UPRR Assistant Engineer. For a distance of two-hundred and seventy-five miles, no assignment could have been more dangerous. The region comprised the *Laramie Plains* - the prized hunting range of the *Sioux* - and the far, unprotected, practically unknown *Red Desert* and *Bitter Creek* basins beyond.

Left: caption: “Portion of a Wyoming map (ca. 1872) showing Fort Sanders and the Laramie Plains”

Right: caption: “Laramie Plains looking southwest from ridge two miles north of Mandel, Little Laramie River in the foreground, Sheep Mountain to the left of center, Albany County, Wyoming”


572



Top: caption: “Dial Rock – Red Buttes, Laramie Plains, Wyoming”

Bottom: caption: “Bitter Creek Valley – near Green River, Wyoming”

573



Above: historical drawing of *Fort Sanders, Wyoming*. With his survey party, Browne was only six days (fifty-five miles) out of *Fort Sanders* and was reconnoitering from his camp near *Rock Creek* (north of the Overland Stage route through the *Laramie Plains*) when, on the evening of May 12th 1867, it was attacked by the *Sioux*. A wood-gathering squad was cut-off; Sergeant Clair (of the *Second Cavalry* escort) was killed and several mules were stampeded. The cavalry and survey men barely managed to reach shelter, losing several guns in the process. The attack was resumed in the morning. This time, a well-liked member of the party from *Albany, NY* named Clark fell dead. The *Sioux* were beaten-off in action which caused the deaths of several soldiers. Browne took the bodies back to *Fort Sanders* for burial.

574

On June 1st 1867, Browne led a survey party out of *Fort Sanders* once again. They crossed through the *Laramie Plains*, forded the *North Platte River* and the *Red Desert* spread out before them. The survey party, by necessity, was strung-out, with the level-men and the front and rear flagmen separated from Browne and from each other by a quarter mile. With eight troopers as escort, Browne decided to reconnoiter further into the desert, leaving the survey party behind on July 5th 1867. Browne and his escort had penetrated one-hundred miles into the Red Desert when, on July 23rd 1867, three-hundred *Sioux*, riding to attack the stage line, discovered and pounced on them. They dismounted and, upon a knoll, put up a spirited defense, but it was nine against three-hundred. At dusk, Browne was shot through the stomach. Having stampeded all the horses, the *Sioux* abandoned the attack. The soldiers, despite his protests to leave him where he lay and save themselves, made a litter and carried him fifteen miles through the brush to *LaCiede Station* of the Overland Stage. There Browne died. A small UPRR station on the Laramie Plains was named “Percy” in remembrance of *Percy T. Browne*.


575

Percy—The station was named for Percy T. Brown, an engineer who was killed by the Indians, while employed surveying the line.

During the construction of the road, this was an important station. Ties, telegraph poles, wood and bridge timber, were landed at this point in immense quantities.

They were obtained at Elk Mountain, seven miles to the south. The old stage road winds around the base of the mountain, between that and the railroad. Near the foot of the mountain, old Fort Halleck and one of the most important stations of the Overland Stage Company, were located; both are now abandoned.

Croft's new overland tourist, and Pacific coast guide ... , 1884



576

“Unable to go on for want of water, with their horses gone, their escorts used up, and apparently with no alternative but to back out of the country that Browne was killed in while endeavoring to get a line through. They were, however, in good spirits, and I had no doubt could soon be put on their feet again.”

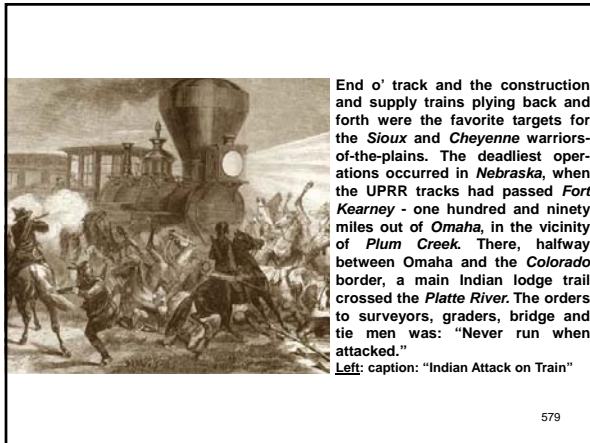
Grenville Dodge, UPRR Chief Engineer

RE: Dodge met the main Browne survey party (now under the interim command of UPRR Assistant Engineer *Francis E. Appleton*) west of the *North Platte River*. Dodge commissioned Appleton as the new chief of the survey party and they pressed ahead. Appleton said of Browne: *“Those who knew him best can best appreciate how great is his loss...he was a man without a blemish.”*

577

Never Run

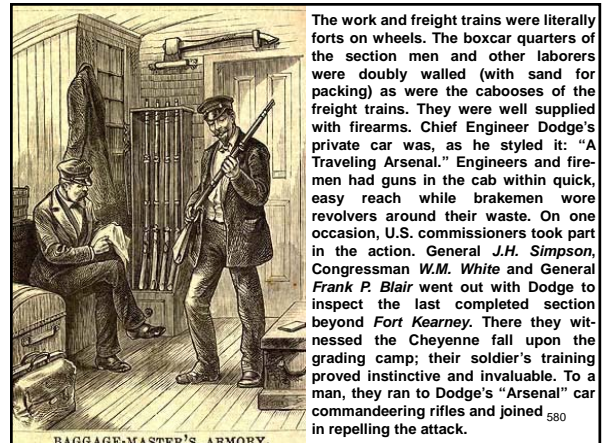
578



End o' track and the construction and supply trains plying back and forth were the favorite targets for the *Sioux* and *Cheyenne* warriors-of-the-plains. The deadliest operations occurred in *Nebraska*, when the UPRR tracks had passed *Fort Kearney* - one hundred and ninety miles out of *Omaha*, in the vicinity of *Plum Creek*. There, halfway between *Omaha* and the *Colorado* border, a main Indian lodge trail crossed the *Platte River*. The orders to surveyors, graders, bridge and tie men was: "Never run when attacked."

Left: caption: "Indian Attack on Train"

579



The work and freight trains were literally forts on wheels. The boxcar quarters of the section men and other laborers were doubly walled (with sand for packing) as were the cabooses of the freight trains. They were well supplied with firearms. Chief Engineer Dodge's private car was, as he styled it: "A Traveling Arsenal." Engineers and firemen had guns in the cab within quick, easy reach while brakemen wore revolvers around their waste. On one occasion, U.S. commissioners took part in the action. General *J.H. Simpson*, Congressman *W.M. White* and General *Frank P. Blair* went out with Dodge to inspect the last completed section beyond *Fort Kearney*. There they witnessed the *Cheyenne* fall upon the grading camp; their soldier's training proved instinctive and invaluable. To a man, they ran to Dodge's "Arsenal" car commandeering rifles and joined in repelling the attack.

BAGGAGE-MASTER'S ARMOY.

580

Fall In

581



“They went forward as steadily and in as good order as we had seen the old soldiers climb the face of Kennesaw under fire”

Grenville Dodge, UPRR Chief Engineer

RE: at *Plum Creek*, while returning from the UPRR end o' track in his private car attached to a train bearing a number of discharged UPRR workmen, it was stopped by a telegraphed message that further down the track a freight train had run into trouble. Having set it afire, it was stalled and surrounded by the shrieking war cries of hostile Indians. Acting decisively, Dodge delivered rapid orders, rallying the train crew and the discharged laborers. To a man, they obeyed his order to "fall in." They proceeded cautiously to the scene, deploying his make-shift force as skirmishers, and retook the train (what was left of it).

Above: caption: "Cheyenne Indians Attacking a Working Party of the Union Pacific Railroad, August 4, 1867"

582

The Plum Creek Incident

583

"In these big wagons that go on this metal road there must be things that are valuable - perhaps clothing. If we could throw these wagons off the iron they run on and break them open, we should find out what was in them and could take whatever might be useful to us. We got a big stick, and just before sundown one day tied it to the rails and sat down to watch and see what would happen."

Porcupine (Cheyenne warrior)

RE: from a distance, the Indians had watched the white man's curious wagons passing back and forth on the iron rails. Heretofore, both the Sioux and Cheyenne had confined themselves to racing the engine and peppering the cab, boiler and/or caboose with gunfire. More daring was the practice of stretching a hide rope; from pony-to-pony, across the track, in anticipation of stopping the iron horse short. This practice never ended well for the rope holders.

584

"It felt as if the whole top of my head was taken right off"

William J. Thompson

RE: at dusk on Tuesday, August 6th 1867, a party of Chief Turkey Leg's Cheyenne accomplished the first railroad wreck ever achieved by Indians. This was in a dry ravine four miles west of Plum Creek. The Indians had fastened a wooden tie to the rails with telegraph wire and at nine o' clock head lineman William Thompson and five of his repair crew were sent out of Plum Creek on a hand-car to investigate the break. The Cheyenne warriors had built a fire and were complacently waiting to: "see what would happen." They heard a rumbling in the darkness and glimpsed: "a small thing coming with something on it that moved up and down." By the time the handcar men saw the fire and the Indians on either side it was too late to stop. At full speed the handcar struck the tie, somersaulted end-over-end and landed halfway down the ravine. The six men had dived off, spreading out in all directions. Gaining their composure, they tried to escape. A mounted Cheyenne chased Thompson and called for him to halt, then shot him through the right arm and, still in pursuit, knocked him down with the butt of his rifle. The Cheyenne warrior dismounted, stabbed him through the neck and began to scalp him. Conscious throughout the ordeal, the Indian galloped away but the scalp slipped from his belt. Thompson retrieved it in the hope that it might be made to grow back in place again. All around, he heard nothing but groans from his fallen comrades.

585

JOSIAH M. CLARK,

[Successor to
WYKOFF, CLARK
& IMMEN,]
HOWELL, MICH.,
Manufacturer of



STANDARD & NARROW-GAUGE
HAND-CARS,
Railroad, Steamboat and Warehouse Trucks,
Baggage Barrows, Grain Wagons, and Willis'
Patent Car Pusher.

586

The success of their experiment emboldened the Cheyenne to try again immediately. They had discovered that the iron trail was not invulnerable. They busied themselves by the still glowing firelight. With poles, they pried the end of a pair of rails loose, bent them upward and, piling more ties atop, waited. Two westbound freights were coming. The first train, running at twenty-five mph, was derailed in an instant. The engine leaped from the tracks, dragging with it the tender and five cars, including two flat-cars loaded with brick. The two flat-cars were catapulted clear over the locomotive, scattering their bricks forty-feet forward of the engine. The boxcars piled-up on top of the locomotive and the tangled mass caught fire. The fireman had been in the act of stuffing the firebox with wood when the engine struck the ties. He was thrown against the furnace and was roasted alive. The engineer was hurled through the cab window. The throttle handle had cut his abdomen open thus, he sat amidst the debris holding his entrails with his fingers. The victorious Indians reconnoitered around the glowing wreck, yelling, laughing and now and then shooting into the caboose which was still on the rails. To all this the scalped lineman (Thompson) bore witness by the light of the mounting flames.

587




Above: caption: "The Union Pacific's engine No. 53 which was wrecked by Indians at Plum Creek (now Lexington, Nebraska) on August 6, 1867, killing the engineer and fireman. It was a Norris engine, a rare type on Union Pacific" 588

In the caboose, conductor *William Kinney* and two brakemen spotted the second westbound freight train. Kinney ordered brakeman *Fred Lewis* to go out and flag down the oncoming train lest it crash into the caboose – Lewis refused. Kinney took on the task, running down the tracks himself. Soon, Lewis followed while the other brakeman - *Charles Ratcliffe*, hid under the caboose until he spotted an Indian investigating and escaped into the brush while pursued by two Indians. The figures of the three trainmen were outlined against the glare of the train's headlight and the engineer leaned out of his cab. The oncoming train's headlight scared-off the pursuing *Cheyenne* and Ratcliffe was hoisted into the engine's cab while the train reversed course back to *Plum Creek*. The operator at Plum Creek telegraphed the news to UPRR headquarters in *Omaha*. Omaha replied: "Get out of the way as soon as possible." Except for the telegraph operator, all of Plum Creek's population boarded the freight train for the safety of *Elm Creek Station*, eighteen miles due east. ⁵⁸⁹

At the scene of the wreck, lineman *William Thompson* was witnessing a horrific scene. The engineer had been shot, scalped and his body thrown into the fire. The bursting boxcars were being plundered. Bales of calico, cotton, boxes of tobacco, sacks of flour, sugar, coffee, boots, shoes, bonnets, hats, saddles, ribbons, velvets were free for the taking. Ribbons fluttered from scalp locks and from the manes and tails of ponies. Calico and strips of velvet were worn toga-like. Whole bolts of cloth unrolled from the tails of galloping horses while impromptu races were staged in which warriors tried to run each other down and tear the bolts loose. A barrel of whiskey had been broached and, having gorged themselves with the contents, the Indians bore torches alighting each car in turn from end-to-end. Quickly, the whole train was a mass of roaring flames, with the drunken Indians encircling it in a furious war dance. ⁵⁹⁰

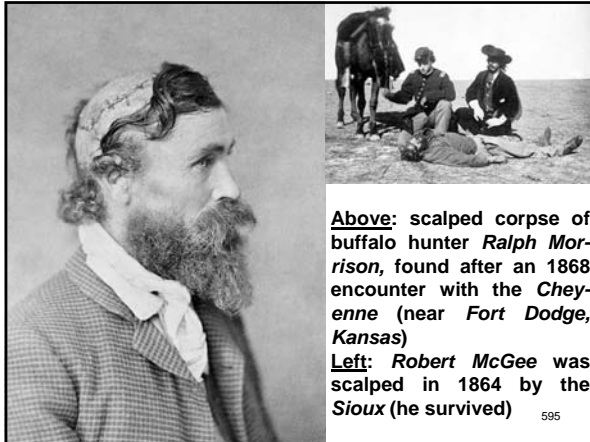
Toward daylight, the wretched Thompson had crawled and staggered away making it to *Willow Island*, fifteen miles due west, arriving with his rag of a scalp in hand. The *Plum Creek* refugees returned in the morning. With a spyglass, they could see the *Cheyenne*'s drunken celebration around the smoldering wreck while from the bluff above, another war party watched intently. Traffic was paralyzed. The wires were down to the west. *Fort Kearney* was being dismantled (it had a garrison of only twelve infantrymen). The cavalry and most of the infantry were distributed west on scout duty. By overland telegraph, word was sent from *Omaha* for Major North's *Pawnee* scouts to traverse the two-hundred and fifty mile gap from their present position to end o' track post-haste. ⁵⁹¹



Toward evening, the *Cheyenne* were clearing out, bearing their plunder with them. The residents of *Plum Creek* ventured cautiously to the scene. The Pawnees arrived eager for a fight and, finding none, set out upon the trail in pursuit. The remains of the engineer and fireman were recovered and brought back to *Omaha*. *William J. Thompson's* scalp (left) was placed temporarily in a pail of water to keep it moist. Doctors tried to restore it to Thompson's head, but failed in the attempt. Placed in a jar of alcohol, in later years it was donated to the *Omaha Public Library Museum*. ⁵⁹²

Dog Soldiers

In April 1868, the Sioux's "Dog Soldiers" surprised *Elm Creek* (east of *Plum Creek*), killing five section men and running off the station stock. On the same day, another band of *Sioux* attacked *Sidney*, four hundred and fourteen miles from *Omaha*, but short of end o' track by one-hundred and fifty miles. Two freight conductors; *Tom Cahoon* and *William Edmundson*, were fishing in *Lodge Pole Creek*, a mile-and-a-half outside of town. They heard the shooting and climbed up the creek bank to see what was happening. Several *Sioux* spotted them and raced to cut them off from the station. Cahoon was shot down and scalped and left-for-dead. Edmundson made a running fight, holding the pursuing *Sioux* off with a small derringer. He arrived in *Sidney* with four arrows in him as testimony of his close call with death. Both men recovered from their wounds. Cahoon was promoted to passenger conductor, retiring to *Ogden* where a street is named for him. He said he always wore his hat well to the rear of his head, where there was a peculiar "bare spot." ⁵⁹⁴



Above: scalped corpse of buffalo hunter *Ralph Morrison*, found after an 1868 encounter with the *Cheyenne* (near *Fort Dodge, Kansas*)

Left: *Robert McGee* was scalped in 1864 by the *Sioux* (he survived)

595

In September 1868, the *Sioux* imitated the *Cheyenne* technique of bending up a pair of rails, thus wrecking a train between *Alkali* and *Ogalalla, Nebraska*, about three-hundred and thirty miles from *Omaha*. The ends of the upturned rails pierced the engine's boiler, spurting out steam which cooked the fireman alive. The other trainmen and the few passengers seized arms and fought off the *Dog Soldiers* of the *Sioux* until a wrecking train arrived. In October 1868, *Potter Station* - eighteen miles west of *Sidney*, was attacked by the *Sioux*. The station's personnel ran for cover while twenty horses and mules were stampeded. Besides "death by Indian," The construction itself levied its tax of death; sunstroke, freezing/frostbite, snake bite, poisoning, drowning, falling, being struck by falling/flying debris and/or trains etc. As well, illnesses such as pneumonia took their toll on the ranks of both roads' workmen. If accident, disease or Indian attack didn't kill them, there was always the possibility of being knifed or shot to death in town.

596

Part 5

The Roaring Towns

597

The Wild West

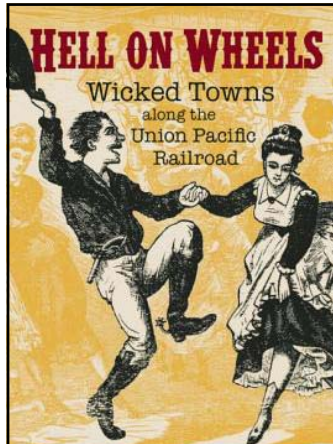
598

The "roaring town" - terminal points serving as a temporary supply base from which end o' track was fed, sprung up in the footsteps of the transcontinental RR. Upon the CPRR's mountain and desert iron trail; five-hundred and seventy-five miles from the *California* boundary to central *Utah*, terminal bases flourished at *Cisco, Truckee, Lakes Crossing* (renamed "*Reno*"), *Wadsworth, Humboldt, Lovelocks, Winnemucca of French Ford, Argenta, Carlin, Elko, Wells* and *Toano*. Upon the UPRR's iron trail, where for four-hundred miles at a stretch the supplies required (for man, beast and road) had to be readily available, the roaring towns of *North Platte, Julesburg, Sidney, Cheyenne, Laramie, Benton, Bryan, Green River, Wasatch, Corinne* and *Promontory Point* emerged to compete with the likes of *Virginia City, Dodge City* and *Deadwood* in the annals of the "Wild West."

599

Hell on Wheels

600



The title accorded them: "Hell on Wheels" was, supposedly, first coined by journalist Samuel Bowles in 1868. They were a phenomenon. When, in the spring of 1866 the CPRR headed east out of *Fremont, California*, the only town on the horizon was *Columbus* - forty-five miles distant. By early summer, it had become the first "terminal base" of the transcontinental RR. For the UPRR heading west out of *Omaha, Old Fort Kearney* (two-hundred miles to the Overland Stage crossroads settlement of *Julesburg*) served as the second of the transcontinental RR's terminal bases.

601

The one-hundred mile point west of *Fort Kearney* was achieved on November 1st 1866. By November 22nd 1866, the town of *North Platte* was reached by the UPRR; two-hundred and ninety miles out on the plains but only five days by mail from NYC. *North Platte* rang to the noise of hammer and saw and the hustle and bustle of one-thousand people. With twenty buildings including a brick roundhouse (for forty engines), water tank, depot, the *Railroad House Hotel* (costing \$18K), the Casement brothers' portable quarters (comprising warehouse, eating-house and general store), "wet" and "dry" mercantile establishments and dwellings of various types. *North Platte City* swelled apace the fall and winter of 1866 as railroad supplies poured in preparatory for the spring (1867) drive. In the meantime, the idle laborers idled and the real estate speculators speculated while the "blackleg" merchants of *Chicago, Omaha* and *St. Louis* hastened to the bountiful harvest.

602



603

Everything and everyone bound westward stopped at *North Platte City* en-route: *Mormon* immigrants; *Idaho* settlers; *Montana* gold-seekers and Overland Stage travelers (waiting for a seat on the stage to *Denver* and/or *Salt Lake City*). Freight outfits by the dozen settled there while their roughneck "bullwhackers" roamed the streets. Gamblers reveled in the "flush times" and every building seemed to house a saloon. By May 1867, there were fifteen-thousand tons of freight piled up, twelve-hundred wagons and eight-hundred teamsters encamped on the outskirts of the city and the population had swelled to five-thousand. By mid-June 1867, *North Platte* had shrunk from five-thousand souls to less than five-hundred. It now reverted to respectability while *Julesburg* - three-hundred and seventy-seven miles out of *Omaha*, would serve as the transcontinental RR's third terminal point.

604

Wickedest City in America

605

In June 1867, *Julesburg* had a population of forty men and one woman. By the end of July 1867, it had four-thousand transient residents. Town lots (staked off by the land agent of the railroad) were selling for \$1K. The streets; ankle deep in sand, were lined by warehouses, saloons, gambling houses and stores piled with goods fresh from NYC and *Chicago*. The people trudged, laughed, whooped, bargained, joked, cursed and killed one another in those heady days. Soldiers, teamsters, graders, merchants, clerks, gamblers, prostitutes, tourists, Mexicans and Indians all mixed together in this melting pot of the northern plains. Twelve bits bought a fine meal at the *Julesburg House* while in the evening, the "King of the Hills" dance hall was ablaze with the brightest of lights; the strains of music and the shuffle of dancing feet and the clamor of voices. Beyond the kerosene-illuminated streets, along the shallow *Platte River*, a myriad of campfires twinkled by night. Come morning, the casualties of the previous evening were buried. The town's gamblers and gunmen considered human life worth little more (or less) than a bottle of whiskey. When on the survey west of *Salt Lake City* Chief Engineer Dodge heard of the defiance of law and order in *Julesburg* (the UPRR had laid-out the town), he wired *Jack Casement* to go back with his track force and help restore the rule of law.

606

They Died With Their Boots On


607

Dodge: "What did you do, General?"
Casement: "I will show you," Casement then led Dodge straight to the graveyard and, indicating by a wave of his hand, stated: "There they are General. They died with their boots on, but they brought peace."
 RE: in the fall of 1867, Chief Engineer Dodge and Jack Casement (both former Union Generals who addressed each other as "General") visited Julesburg together with Casement acting as guide. After Casement's makeshift army had tamed the "Wickedest City in America," there remained only the graveyard, station agent, heaps of tin cans and prairie dogs when its five months' existence as the UPRR's terminal point came to an ignominious end.

608

Winter Terminus

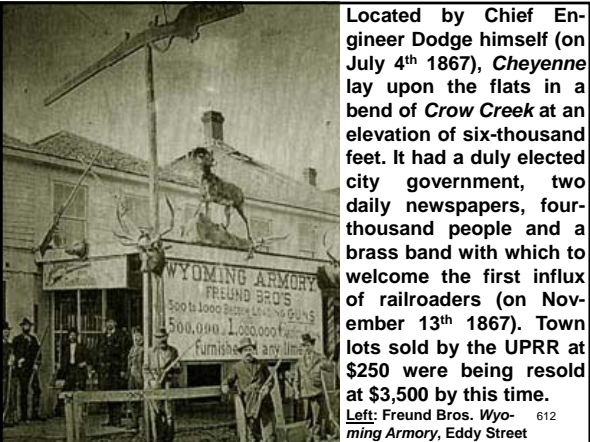
609



One-hundred and forty miles to the west, Cheyenne - the "Magic City of the Plains," was booming by the fall of 1867. The Casement brothers' portable warehouse, store and dining room; all the knock-down contraptions of canvas, rough lumber and sheet-iron; the imitation stucco-front buildings (collapsible into numbered sections); the gamblers' card tables, saloon bars, merchants' counters and desks, the various commodities of trade and housekeeping - all these, accompanied by their respective owners and employees, had been loaded on flat-cars. "Hell on Wheels" had once again hit the trail. Up the trail - by horse, buggy, wagon and foot - men, women and children strode, following the caravan from Julesburg to Cheyenne. Midway was Sidney whose pretensions as a terminus were ignored for the greater promise of Cheyenne.

Left: Elkhorn Livery Barn, corner of 18th and Reed, Cheyenne, Wyo., 1868
Right: J.R. Sumner's Commission and Auction House, Eddy Street, Cheyenne, Wyo., 1868

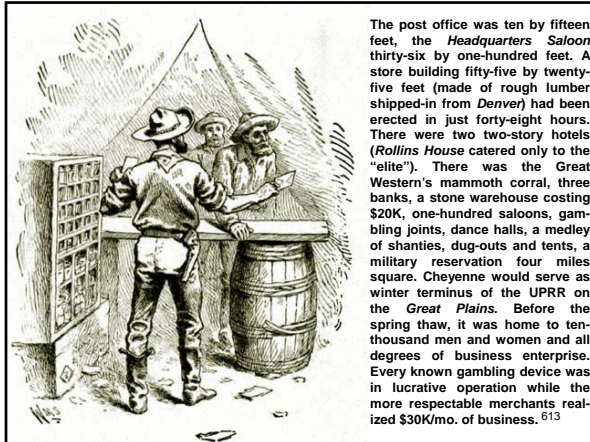
610

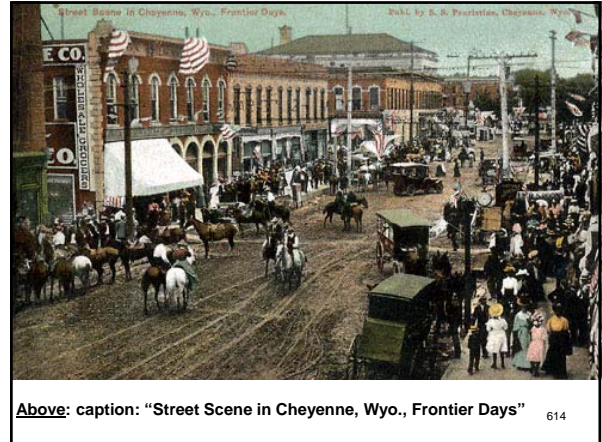
Located by Chief Engineer Dodge himself (on July 4th 1867), Cheyenne lay upon the flats in a bend of Crow Creek at an elevation of six-thousand feet. It had a duly elected city government, two daily newspapers, four-thousand people and a brass band with which to welcome the first influx of railroaders (on November 13th 1867). Town lots sold by the UPRR at \$250 were being resold at \$3,500 by this time.

Left: Freund Bros. Wyoming Armory, Eddy Street

612



The post office was ten by fifteen feet, the *Headquarters Saloon* thirty-six by one-hundred feet. A store building fifty-five by twenty-five feet (made of rough lumber shipped-in from *Denver*) had been erected in just forty-eight hours. There were two two-story hotels (*Rollins House* catered only to the "elite"). There was the Great Western's mammoth corral, three banks, a stone warehouse costing \$20K, one-hundred saloons, gambling joints, dance halls, a medley of shanties, dug-outs and tents, a military reservation four miles square. Cheyenne would serve as winter terminus of the UPRR on the *Great Plains*. Before the spring thaw, it was home to ten-thousand men and women and all degrees of business enterprise. Every known gambling device was in lucrative operation while the more respectable merchants realized \$30K/mo. of business.⁶¹³

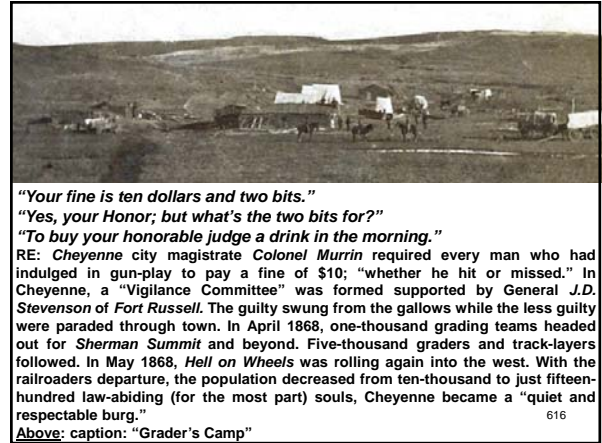


Above: caption: "Street Scene in Cheyenne, Wyo., Frontier Days" 614



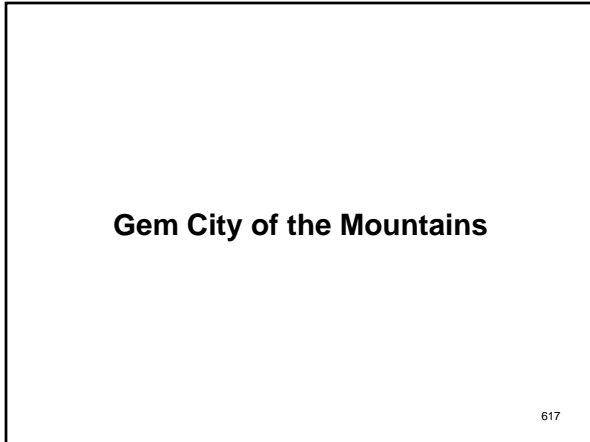
Hit or Miss

615



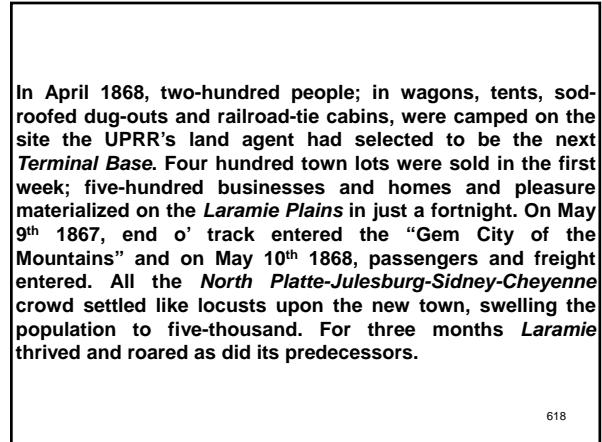
"Your fine is ten dollars and two bits."
 "Yes, your Honor; but what's the two bits for?"
 "To buy your honorable judge a drink in the morning."
 RE: Cheyenne city magistrate Colonel Murrin required every man who had indulged in gun-play to pay a fine of \$10; "whether he hit or missed." In Cheyenne, a "Vigilance Committee" was formed supported by General J.D. Stevenson of Fort Russell. The guilty swung from the gallows while the less guilty were paraded through town. In April 1868, one-thousand grading teams headed out for Sherman Summit and beyond. Five-thousand graders and track-layers followed. In May 1868, Hell on Wheels was rolling again into the west. With the railroaders departure, the population decreased from ten-thousand to just fifteen-hundred law-abiding (for the most part) souls, Cheyenne became a "quiet and respectable burg."⁶¹⁶

Above: caption: "Grader's Camp"



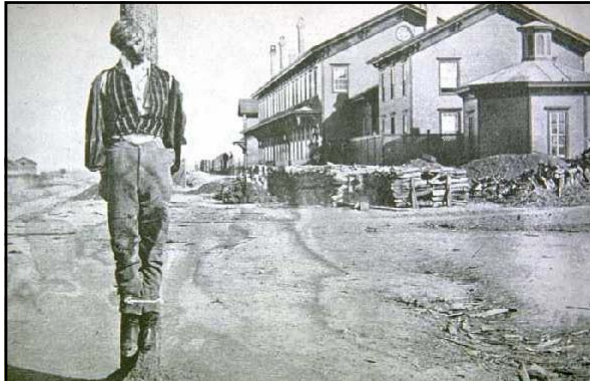
Gem City of the Mountains

617



In April 1868, two-hundred people; in wagons, tents, sod-roofed dug-outs and railroad-tie cabins, were camped on the site the UPRR's land agent had selected to be the next Terminal Base. Four hundred town lots were sold in the first week; five-hundred businesses and homes and pleasure materialized on the Laramie Plains in just a fortnight. On May 9th 1867, end o' track entered the "Gem City of the Mountains" and on May 10th 1868, passengers and freight entered. All the North Platte-Julesburg-Sidney-Cheyenne crowd settled like locusts upon the new town, swelling the population to five-thousand. For three months Laramie thrived and roared as did its predecessors.

618



Above: caption: "The Hanging of 'long Steve' Young, Laramie City, October 28, 1868" 619

The Middle of Nowhere 620

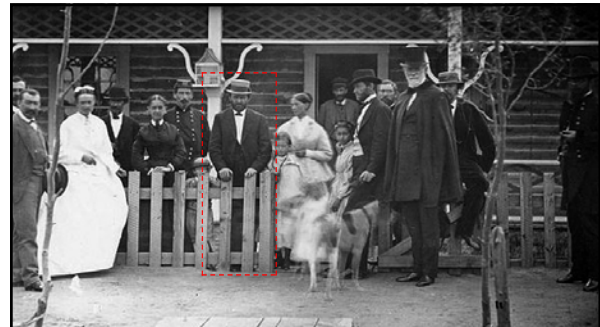


"Far as they could see around the town not a green tree, shrub, or spear of grass was to be seen; the red hills, scorched and bare as if blasted by the lightning of an angry God, bounded the white basin on the north and east, while to the south and west spread the gray desert till it was interrupted by another range of the red and yellow hills. All seemed sacred to the genius of drought and desolation." RE: Benton, Wyoming

Above: caption: "Street Scene in Benton, Wyoming Territory" 621

Within six months, Laramie's time as terminus had passed and, by July 1867, *Hell on Wheels* had relocated to *Benton, Wyoming*. Two weeks of influx bloated the new Terminal Base to three-thousand souls on the edge of the *Red Desert* – seven-hundred miles from *Omaha*, three-hundred from *Salt Lake City*. It was, quite literally, the middle of nowhere. It was stage terminus, freighting terminus, railroad terminus and the terminus of many a life. Water was hauled three miles from the *North Platte River* selling for one-dollar a barrel, ten-cents a bucket. The streets were eight inches deep with white dust, making a person dressed in black clothing look like a cockroach struggling through a flour barrel. Despite the depravities of the location, twenty-three saloons, five dance halls and for night-time entertainment, the "Big Tent" (100-feet long by forty-feet wide) summoned the populace for a night's entertainment. The wholesale liquor dealers in a canvas tent booked \$30K/month, realizing an 80% profit. The red-brick and brownstone-front buildings of painted pine (shipped from *Chicago* at \$300 F.O.B.) could be erected by twelve men in a day, constituting an entire business block. Life - and nothing else, was cheap at Benton. 622

"Probably no more noted military gathering has occurred since the Civil War"
Grenville Dodge, UPRR Chief Engineer
RE: in July 1868, *Ulysees S. Grant* led an inspection party. With him he brought a host of army generals (many of whom served under Grant during the *Civil War*) to observe the transcontinental RR's progress to-date (Grant was, by this time, a candidate for the presidency). Dodge met the party at *Fort Sanders*, three miles south of *Laramie*. T.C. Durant's *Pullman* car conveyed the inspection party to end o' track; then one-hundred miles distant, at the western-end of the *Laramie Plains* (six-hundred and seventy miles from *Omaha*). The construction gangs hailed "Old Bill" (*W.T. Sherman*) great "Little Phil" (*Phillip H. Sheridan*) and "Unconditional Surrender" (*U.S. Grant*) with hearty cheers from the many Union Army veterans along the line (an occasional "Rebel Yell" was also heard). 623



Above: caption: "The General Grant Inspecting Party at Fort Sanders, Wyoming, July 1868. From left to right – Gen. August Kautz, Gen. Phillip H. Sheridan, Mrs. Gibbon, Gen. Frederick Dent, Mrs. Gibbon, Gen. John Gibbon, Master John Gibbon, Mrs. Kilburn, Allie Potter, Chief Engineer G.M. Dodge, Lieut. Gen. William T. Sherman, Gen. William S. Harney, Dr. T.C. Durant, Gen. Adam Slemmer, Gen. Joseph H. Potter, Gen. Louis C. Hunt." 624

Onward and Upward

625



By summer's end, all that remained of *Benton* were deserted barrel-hoops, perforated tin cans, crooked mud chimneys and about one-hundred nameless graves. *Rawlins*, next terminus, had absorbed the best of Benton; the worst had been dealt with by the military and/or the vigilantes or had trekked to *Green River City* - one-hundred and forty miles further distant, at the western edge of the desert country. The former mayor of *Cheyenne* had founded it by crossing the forbidden stretches of *Twenty-Mile*, *Red Sand*, *White* and *Bitter Creek Desert's*. In September 1868, end o' track arrived there. Two thousand people, permanent adobe buildings, a new railroad bridge and law and order greeted them. It was now the fall of 1868 and the UPRR was due at *Ogden* on January 1st 1869. The westbound rails found the bridge, passed over it leaving a much diminished *Green River City* behind.

Left: caption: "Green River, Wyo. Terr., 1871)

626

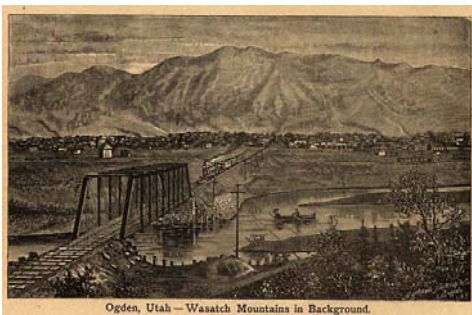
Right: caption: "Construction of a railroad bridge over the Green River in 1868"



627

Bryan (thirteen miles beyond the *Green River Bridge*) served as the next terminal base of the UPRR's westward march. With only one saloon, one store, a telegraph station and a handful of shacks it was but a shadow of the former illicit glories of *Hell on Wheels*. *Wasatch*, at seven-thousand feet above sea-level and nine-hundred and sixty-six miles from *Omaha*, served as winter terminus. Four-thousand graders, track-layers, trainmen and clerks required hospitality over the winter months. For two weeks in January 1869, fifteen-hundred men toiled in the sub-zero temperatures to make *Wasatch* a real place. For most of the three winter months of 1869, *Wasatch* was a community snowed in to the eaves of the shacks and deprived of amusements. Of the forty-three occupants of its new graveyard, only five had "died natural." The UPRR tore loose from winter's grip and entered *Ogden* March 3rd 1869. On March 25th 1869, at the north-end of the *Great Salt Lake* and thirty-one miles from *Ogden*, *Corinne* was open for business as the UPRR's new terminus.

628



Ogden, Utah -- Wasatch Mountains in Background.

629

Queen City

630



The residents of *Corinne, Utah* (above) determined their destiny to be the "Queen City of the Great Basin," rivaling *Salt Lake City* and proclaimed its advantages. It had the navigable portion of the *Bear River* as a waterfront, the *Great Salt Lake* as a waterway, *Montana* and *Idaho* as tributary trade centers and the transcontinental RR ran right through it, connecting it with both east and west. It also had facilities for "R&R" for the tourist and railroad man alike; nineteen saloons and two dance-halls featuring eighty "syrens" (dancing girls). Though lots rose as high as \$3K and the population was expected to rise to ten-thousand in two years, in just three months time the population had been reduced to four-hundred sobered-up residents. Alas, it was no to be a "Queen City" or the "Chicago of the Rocky Mountains," as first predicted.

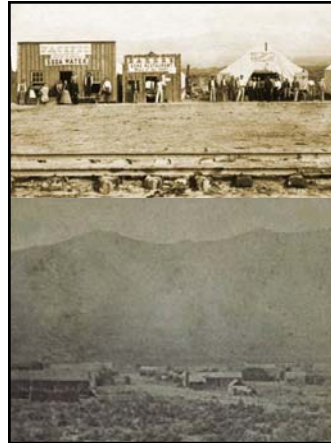
631

Last Hurrah

632

Meanwhile, the UPRR had founded the *Blue Creek* work camp - only eighteen miles west of *Corinne*. Twenty-eight killings occurred there in thirty days. *Promontory* town roared last but not least. As the junction of two great railroads its future seemed golden. It had the *Pacific Hotel*, a clubhouse, thirty tent houses and one street. Drinking water was hauled four miles and an eating house (sixty-feet long) was able to serve seventy-five at a sitting. The remnants of *Hell on Wheels* (which had persisted through the three years' journey from *Omaha*) was amply rewarded and found at Promontory its "last hurrah." The roaring towns served each successive stage of the march of the UPRR westward across plains, deserts and mountains. Some settled-down to prosperous, law-abiding communities while others, like the shifting sands they were built upon, withered away. The march of the CPRR eastward was in stark contrast to the UPRR's westward march. Crocker's celestials did not drink alcohol and gambled only amongst themselves. The CPRR traveled a trail of law, order and determination; whiskeyless, cardless, viceless (for the most part). That's not to say the CPRR's roaring towns: *Cisco*, *Truckee*, *Reno*, *Wadsworth*, *Winnemucca*, *Argenta*, *Carlin* and *Elko* did not enjoy the fiscal benefits of their "terminus boom."

633



Top: caption: "The short-lived 'Hell on Wheels' town of Promontory in 1869"

Bottom: caption: "Winnemucca Town and Peak"

634



635

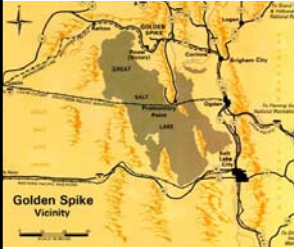
Part 6

Race to the Finish

636

At Which the Rails Shall Meet

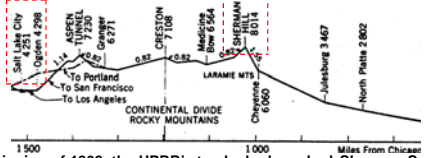
637



In April 1869, Congress passed a joint resolution naming *Promontory Summit* the place: "...at which rails shall meet and form one continuous line." By early May 1869, UPRR crews had laid the final track from *Corinne, Utah*, to the summit. Railroad officials, workers and citizens alike were ready for a celebration, but it would have to wait a little longer. Wet weather, a washed-out bridge and a revolt by disgruntled UPRR workers postponed the ceremony a few extra days.

Left: map of the "Golden Spike Vicinity"

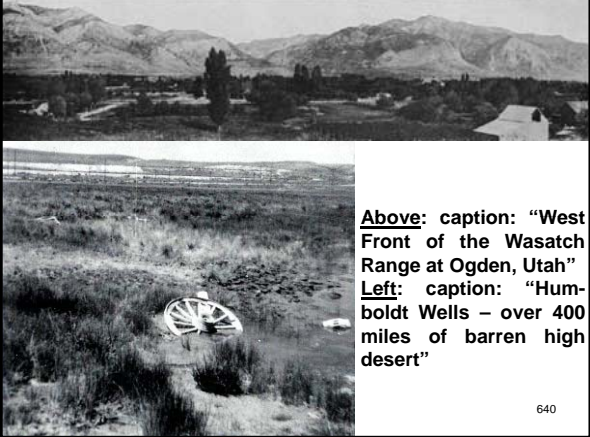
638



At the beginning of 1868, the UPRR's tracks had reached *Sherman Summit* – five-hundred and forty miles out of *Omaha*. The grade was a broken line of reddish earthworks which extended thirty-five miles farther down the line to the next base; *Laramie City*, just three miles north of *Fort Sanders*. The survey of the UPRR's engineers led on into the *Laramie Plains*. On the high plateau and in the *Red Basin* and *Bitter Creek* country, the Indians had cut wide gaps in the surveyor's path. From there, the route lay across the snowy *Wasatch Range* to *Ogden* and into the vast *Great Basin* of an ancient sea in the *Utah* and *Nevada* desert/s. For this region, the surveys were only tentative. The UPRR directors instructed Chief Engineer Dodge to locate the line to *Green River*, three-hundred miles distant, by June 1st 1867; to the *Great Salt Lake* by fall and, before winter, to have extended it west of the lake. Dodge decided that this extension west of the lake should comprise an actual location; *Humboldt Wells*, two-hundred and twenty miles beyond *Ogden*. In all, the work on the line mapped out to over seven-hundred miles of track in eight months.

Above: profile map of the UPRR route between *Sherman Hill* and *Ogden* (ca. 1938)

639



Above: caption: "West Front of the Wasatch Range at Ogden, Utah"
 Left: caption: "Humboldt Wells – over 400 miles of barren high desert"

640

Once again, the UPRR would part company with the *Overland Stage*, which had followed it up the *Platte River* and had jumped across country to meet it at *Cheyenne*. From the *Laramie Plains*, the *Overland Stage* swung southward to the foothills that bordered the southern rim of the *Red Basin* and the *Bitter Creek Desert*. No horse in harness could be expected to survive the desolate, bone-dry, poisoned water expanse of this godforsaken region. Nevertheless, the iron rails of the UPRR would traverse this flat, hellish landscape and, by a shortcut, avoid the grades of the hills. In order to get the survey work so far advanced by the spring (as to be far out of reach of the construction corps), Chief Engineer Dodge issued early marching orders to the survey crews. By February 1st 1868, *Jacob Blickensderfer, Jr.* - chief of the UPRR's *Utah Division*, received instructions to proceed into the field as early as practicable and, if possible, to begin survey work by March 1st 1868. With his survey party, he left *Omaha* on February 26th 1868, crossed the *Wasatch Range* by sleds (in snow above the tops of the telegraph poles) and arrived on March 5th 1868. *James A. Evans* was appointed chief of the *Laramie Division*. His task was to complete the location surveys from *Laramie* to the *Green River* and connect with *Blickensderfer's* men who were working east from the *Great Salt Lake Valley*.

641

"To cover the road with men from *Green River* to *Salt Lake* within one month, and to *Humboldt Wells* in three!"
Thomas C. Durant, UPRR VP (January 1868)
 RE: the spring was late to arrive and the surveying parties had to fight snow and storm. Durant's directive called for the seven-hundred miles to *Humboldt Wells* be completed by August 1868 - just eight months away.

642



The advancing construction trains of the CPRR, then in western Nevada, greatly concerned the UPRR's Directors. At their NYC office (at 20 Nassau Street), bonds; government and company, in the sum of \$64K per mile and land; to the sum of 12,800 acres per mile, was the prize offered by the competition. Chief Engineer Dodge offered his opinion that the rush of construction work to Ogden could cost an extra \$10 million. Nevertheless, he was directed to proceed post-haste, understanding the cost implications fully.

Above: caption: "Map of the Land Grants & Connections of the Union Pacific Railroad - 1,037 Miles of Road - 12,000,000 Acres of land - 1871"

"We do not take our hand off the throttle night or day until we know the front is supplied"

UPRR Operating Dept.

RE: on the long road to Ogden there was to be no rest, summer or winter. Dodge rearranged his work parties as best he could, communicated with them by telegraph and messenger wherever he could, throwing all available UPRR forces into the stretch of four-hundred miles between Green River, Wyoming and Humboldt Wells, Nevada. The Evans survey from Laramie to the Green River was almost complete and the construction crews were free to press forward into the formidable Red Desert. The best trail over the Wasatch Range was accepted by the government, being endorsed by the lines already run eastward by the CPRR (the UPRR had adopted the CPRR's surveys through the Wasatch Range as their own). The route to Ogden, by way of Echo Canyon and Weber Canyon, proved to be the most feasible route. In any event, there was little time for second guessing and time would prove the decision to be a prudent one.

644



"I do not hesitate to say that over half the number of miles of line was never located before in the same time by the same force - especially when it is remembered that the line between Green River and Salt Lake (the mountain portion) was difficult, requiring long and careful study. In eastern states, with the same force, it would have been considered a quick location if made inside of a year."

Grenville Dodge, UPRR Chief Engineer

Top: caption: "The 1,000-mile Tree in Weber Canyon. One-thousand miles from Omaha, 1869."

Bottom: caption: "Thousand-Mile Tree, Weber Canyon, Utah"

645



THOUSAND-MILE TREE.

646

Work, Work, Work

647

The actual work of the surveyors far outstripped the preparations of the Mormon graders. When Chief Engineer Dodge passed over the line in July and August 1868, he found the grading camps idle, wanting for tools and essential supplies. By this time, the UPRR's forces were running their lines from Ogden westward and from Humboldt Wells eastward. The Green River-Ogden Division had been virtually completed. The project of crossing the northern portion of the Great Salt Lake (via the "Lucin Cutoff") had by now been abandoned. Instead, the road would detour from Ogden to the north of the lake and scale the abrupt Promontory Ridge. Beyond was the mud-lake basin; worthless as land but still yielding the government mileage subsidy of \$64K/mile and guaranteeing the mastery of the transcontinental route for the UPRR.

648

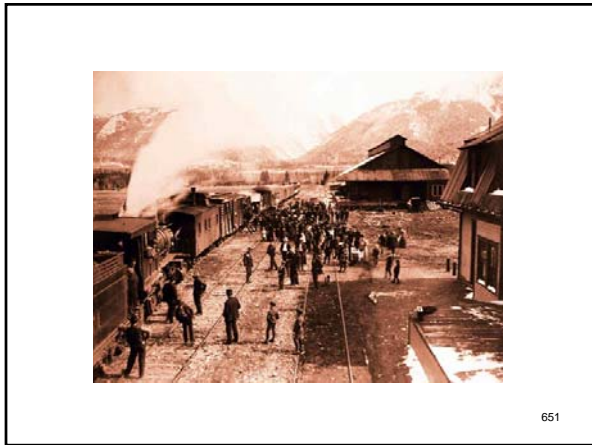


Left: UPRR crews construct a trestle over the Weber River, Utah during the winter of 1869. Devil's Gate in Weber Canyon was one of the final obstacles crews overcame before reaching Promontory Summit. Right: the UPRR's last geographic obstacle before reaching Promontory Summit came in the form of a series of tunnels through hard rock in Weber Canyon. This image shows a construction train crossing a trestle bridge after exiting the eastern portal of Tunnel No. 3.

649

Between the foothills of the Sierra Nevada and the Black Hills, a twelve-thousand strong army of UPRR workmen was being directed by their general – T.C. Durant, from his luxurious NYC office. On April 1st 1868 - while the ground was still frozen too hard for the picks of the graders, the UPRR's army had set-forth from their winter quarters in Cheyenne. At the front, Jack Casement traveled by rail, horse and foot up and down the line, denouncing everything but work, work, work. At the supply base, Dan Casement's warehouses sent a steady stream of material – like ordinance to an army in the field, taxing the capacity of eighty-foot-long freight-cars and six-horse teams. Owing to the late spring, end o' track was a month in reaching the "Gem City of the Plains" – Laramie, Wyoming (at the five-hundred and seventy-three mile-post, twenty-three miles from Sherman Summit). Even so, a mile-a-day of track had been laid in reaching Laramie. The rails now pressed forward for another leg northwest through the Indian hunting grounds of the Laramie Plains. At \$500K/month interest, Credit Mobilier urged haste for the meeting of the tracks.

650



651

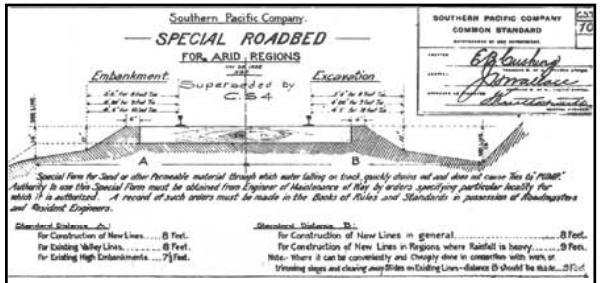
In two months time end o' track had moved one-hundred and twenty miles farther, and the town of Benton was founded. Here on the eastern edge of the Red Desert a sprawling dust-coated town of three-thousand sprang-up. Before the first snow, it was a ghost town. Two miles of track laid per day had been the rate from Laramie. Now the graders were working for two-hundred and fifty miles in advance, distributed along the more difficult stretches clear into the mountains. There were ten-thousand of them, with five-hundred horse teams. From five to twenty miles ahead of the track, the bridge and culvert gangs labored. At end o' track, Jack Casement was using the energies of one-thousand track-layers and one-hundred teams. The supply teams, plodded back and forth along the grade. The desert dust, red with pulverized granite, white with soda and alkali hung in a hue one-hundred miles long. Eastward stretched the rails. The construction trains, relaying the supplies transported from the distant Missouri River, puffed in and out. Forty carloads of material to the mile was demanded; by single track from terminus and by single track from Omaha itself.

652



Left: caption: "Advance of Civilization, Scene on the Humboldt Desert" Right: caption: "Alkali Flat, Construction Train in the distance"

653



Above: Engineering Design for Special Roadbed in Arid Regions (Southern Pacific RR)

654

*Drill, my paddies, drill!
Drill, you tarriers, drill!
Oh, it's work all day,
No sugar in your tay
Workin' on th' U. Pay Ra-railway*

UPRR work song

RE: to the south, the dust stirred up by the *Overland Stage* - at the base of the *Medicine Bow Range*, might be glimpsed by the army of workmen. Laborers were drawing \$3/day. They were Irish, nearly to a man (except for three-hundred negroes), drawn from the east and by the lure of good wages and steady work from the mining camps. In the mountains (to the south and west), the timber crews hacked and sawed and hewed, turning out ties and bridge timber. Their product poured in a torrent down the mountain streams or by trails on creaking wagon wheels to meet the grade. The Casement Brothers' track-laying contract allowed for \$800 per mile for anything less than two miles per day; \$1,200 per mile for over two miles per day. For delays caused by an unfinished grade, the penalty was \$3K per day. No doubt, ample motivation was provided by the terms of the contract. The boast of the UPRR men was: "*one Irishman is worth three Chinamen.*" Daily facing thirst, heat, cold, fatigue and the scalping knife, the Irish demanded only their due pay and a boss who dealt no favors.

655



656

By August 1868, the UPRR rails had swept across the *Red Desert*, climbed the broad, bare plateau of the *Continental Divide* (at 7,164-feet) and charged on into the alkali dust of the *Bitter Creek Basin*. For one-hundred miles through the basin, the water was fouled by salt and alkali. It foamed in engine boilers and turned the stomachs of the men. Water barrels hauled by wagon from two to ten miles was brackish when it arrived. Tank trains plied between end o' track and the last passable water supply. There was no halt to the work to bore wells. On September 20th 1868, the track was at the 820-mile post. Thankfully, the desolation of the Bitter Creek Basin was now to the rear. Despite the deprivations, one hundred and twenty miles had been achieved in two months time once again (although the two-miles-a-day gait had not been constant). Three miles in a day, four miles in a day and even five miles in a day was now being realized.

657

March to the Sea

658

"It was worth the dust, the heat, the cinders, the hurrying ride day and night, the fatigue and the exposure, to see with one's own eyes this second grand 'March to the Sea.' Sherman with his victorious legions sweeping from Atlanta to Savannah was a spectacle less glorious than this army of men marching on foot from Omaha to Sacramento, subduing unknown wildernesses, scaling unknown mountains, surmounting untried obstacles, and binding across the broad breast of America the iron emblem of modern progress and civilization."

The Chicago Tribune

RE: the press and people of the east were, by now, awakening to the miracle being made a reality in the west. The front pages of the metropolitan papers followed the progress carefully and during the summer and fall of 1868, intrepid travelers came to see for themselves the progress of the great work.

659



660



The UPRR Directors' orders to their engineers was to run their line according to best engineering judgment, regardless of cost and/or solicitation. Despite the solicitations of Colonel "Dick" Carter, the route of the *Overland Stage* through old *Bridger's Fort* (via *Bridger's Pass*) was bypassed. Instead, the UPRR's rails swept it by (eleven miles to the north). At *Piedmont, Utah* the rails were atop the *Uintah* chain of the northern *Wasatch Range*. Here, at *Piedmont*, the great stacks of ties were stored. At *Aspen, Utah*, the 937 mile-post, nine and one-half miles beyond *Piedmont*, the rails were at an elevation of 7,540-feet (second only to *Sherman Summit* in the *Black Hills*).

Above: caption: "The Overland and Related Trails From Fort Kearney to Fort Bridger, 1847-69" 661



Above: caption: "Moore's Lake - Head of Bear River, Uintah Mountains, Utah" 662

By late November 1868, winter was setting-in upon the heights. In close proximity to the *Overland Stage* once again, the UPRR rails plunged downward for thirty miles to the *Wasatch Range* passes; struck the *Bear River* (which was crossed on a trestle six-hundred-feet long) and advanced through the *Wasatch Pass* - one-thousand-feet lower than *Aspen*. It then passed through the *Evanston Coal Depot* (named for *James Evans*, late UPRR Division Engineer). By the end of the year 1868, the winter terminus was established at *Wasatch, Utah* - 966 miles from *Omaha* and a mile-and-a-quarter above the sea. The record for the eight months was as follows:

- Track-laying - 425 miles (plus 100 miles of sidings);
 - Track accepted - 940 miles out of the 966;
 - Operating expenses - a jump from \$1.4 million to \$4.16 million, and;
 - Earnings - \$5,062,000;
- The prize - *Ogden* was sixty-five miles distant.

663



Left & Right: caption: "Railroad Trestle Work crossing Bear River, Cal." 664

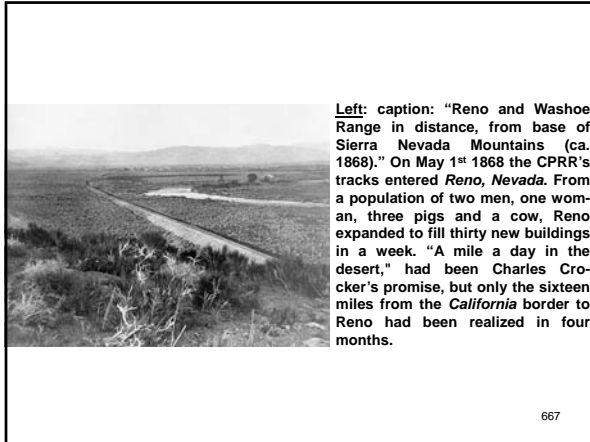
664

Promise Kept

665

When at the close of 1867 the CPRR's track had crossed the *California-Nevada* line, Charles Crocker's construction firm was financially, if not physically, exhausted. The outlay and difficulties had been extraordinary. Fortunately for the CPRR, the "Contract and Finance Company" had come to the rescue. Emulating the example of the UPRR's *Credit Mobilier*, it had been organized by the Big Four and incorporated to carry on the construction work. The new company engaged to build and equip the road from the *California* boundary through to the *Great Salt Lake* for \$43K per mile cash and an equal payment in CPRR stock. At the completion of the line, the four principals held some \$52 million in company stock and had personally assumed between \$3 and \$4 million of company debt. From the state border (at Camp 24) to *Ogden* was six hundred miles. On May 1st 1868 the CPRR's tracks entered *Reno, Nevada*. From a population of two men, one woman, three pigs and a cow, *Reno* expanded to fill thirty new buildings in a week. "A mile a day in the desert," had been Charles Crocker's promise, but only the sixteen miles from the *California* border to *Reno* had been realized in four months.

666



Left: caption: "Reno and Washoe Range in distance, from base of Sierra Nevada Mountains (ca. 1868)." On May 1st 1868 the CPRR's tracks entered Reno, Nevada. From a population of two men, one woman, three pigs and a cow, Reno expanded to fill thirty new buildings in a week. "A mile a day in the desert," had been Charles Crocker's promise, but only the sixteen miles from the California border to Reno had been realized in four months.

667



668



Charles Crocker now made good on his promise of "a mile a day." The CPRR's end o' track was now two-hundred and forty-five miles west of Ogden, only twenty-five miles short of the UPRR goal of Humboldt Wells, making good progress through the snow-less desert. Its graders had surpassed the UPRR's graders, advancing two-hundred and twenty miles beyond Ogden to claim the right-of-way. They were forging ahead towards Promontory Summit and Ogden, threatening the passes of the Wasatch Range, where the CPRR had set their survey stakes.

Above: caption: "Water Tank at Peko"

669

The CPRR had about the same work force as when they were in the Sierra Nevada; ten-thousand Chinese and two-thousand Irish. In early July 1868, the tracks commenced from the lush Truckee Meadows (resting-spot of the desert-worn stage lines) by way of the lower Truckee Canyon. On July 9th 1868, the CPRR tracks crossed the Truckee River. One mile beyond, the CPRR founded the town of Wadsworth, Nevada thirty-five miles from Reno. From Wadsworth eastward stretched the alkali Nevada desert, and then the Utah desert; an accursed, bitter region with only the emigrant stations and the tenuous water supply of the Humboldt River in all the five-hundred miles of the route between the Truckee River and the Great Salt Lake. Crocker called for material and set himself to the task at hand. From the survey, word came of difficult country ahead. In the Humboldt Desert, three canyons awaited the CPRR. Crocker loaded three-thousand graders into wagons and sent them forward two-hundred and fifty miles (along with four-hundred animals) to dig and blast through the formidable canyons of the Humboldt. Fifteen-Mile Canyon was graded in six weeks. Five-Mile Canyon was graded in three weeks. Twelve-Mile Canyon (eight-hundred feet deep) was open and ready when the rails arrived.

670



The Humboldt River runs through northern Nevada. At approximately 330 miles long, it is the third longest river in the Great Basin (after the Bear and Sevier River/s). It has no outlet to the ocean, but instead empties into the Humboldt Sink. It furnishes the only natural transportation artery across the Great Basin and has provided a route for historic westward migrations and subsequent railroads and highways. The river is named for the German naturalist Alexander von Humboldt.

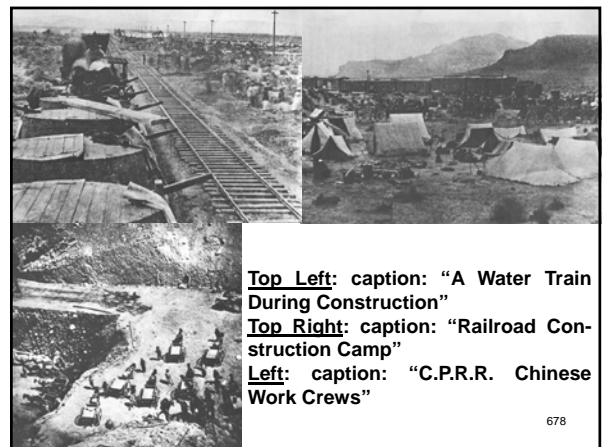
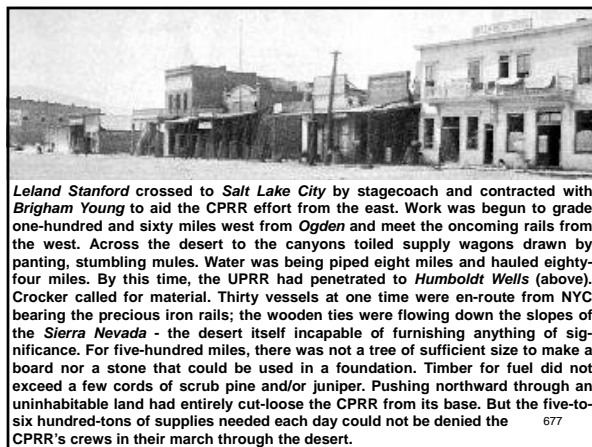
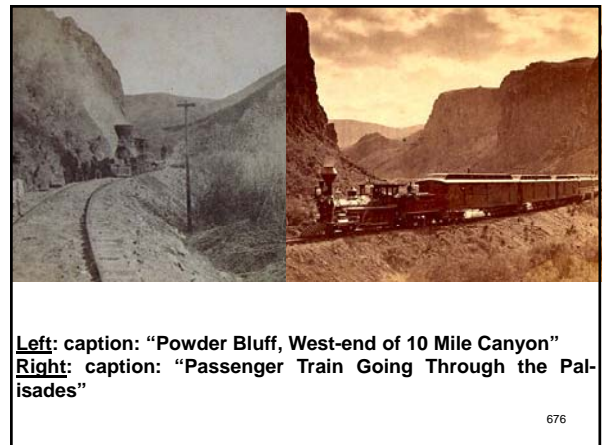
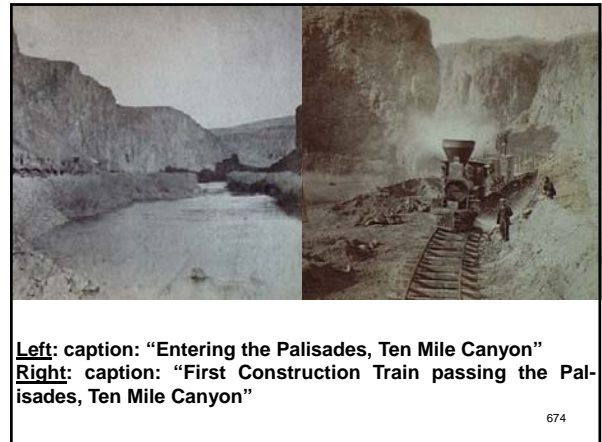
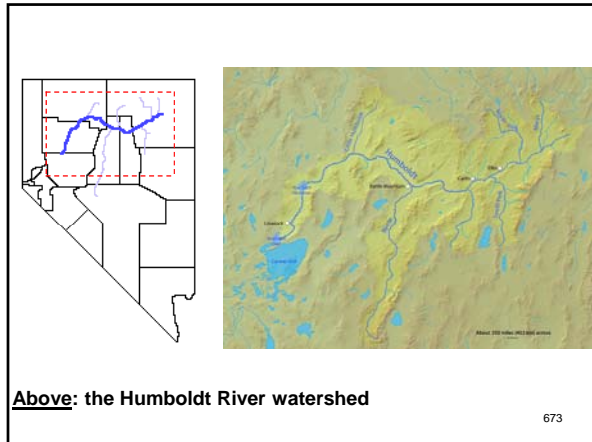
Left T&B: Palisades Canyon and the Humboldt River in 1868 (top, during construction of the transcontinental RR) and present-day (bottom).

671



Left: Lake Lahontan was a large Endorheic (a closed drainage basin that retains water and allows no outflow to other external bodies of water) Pleistocene (geological epoch which lasted from about 2,588,000 to 11,700 years ago) lake in modern northwestern Nevada that extended into northeastern California and southern Oregon. The area of the former lake covers a large portion of the Great Basin that borders the Sacramento River watershed to the west. At its peak (approximately 12,700 years ago), the lake had a surface area of over 8,500 square-miles with its largest component centered at the location of the present-day Carson Sink. The depth of the lake was about 900-feet (at present day Pyramid Lake) and 500-feet at the Black Rock Desert. During the most recent glacial period, Lake Lahontan would have been one of the largest lakes in North America.

672



The Camp Train

679

From his end o' track mobile headquarters, each morning at dawn CPRR Superintendent Strobbridge issued his orders for the day. The mess cooks prepared the breakfasts while the assistant superintendents and crew bosses organized the men. The mobile blacksmith shop and its accompanying harness shop opened for the day to perform their never-ending tasks of hammering, rasping, cutting and stitching. Behind stretched the long double line of rails and the equally long single line of poles strung with the wire. From the last pole, the line dropped sharply into the telegraph office of the camp train. The work of the day began promptly at sunrise. The iron and ties were first loaded onto wagons which hauled them around the camp train, to be reloaded upon the "Trucks" drawn by horses. The Chinese "Coolies" grabbed the ties, dropping them seven to the rail-length. Then, the rail gangs dropped the rails; the spike men, bolt men and fastener men sprang to life with sledges and wrenches. When empty, the Truck was thrown on its side allowing a fresh truck to pass. On the right, the telegraph poles kept pace with the rails. From the wire wagon, the wire was unreeled. In the telegraph office of the camp train, the sounder clicked away. Their system differed little from that of the UPRR, except for the quiet murmur of the Chinese which was in stark contrast to the jolly banter of the Irish.

680



681

Only every other tie was placed for the rails; a follow-up gang installed the left-out ties. The camp train brought dinner at noon and, in the evening, moved to its station at end o' track to connect to the telegraph. For the first thirty-five miles of arid desert, the CPRR paralleled the *California* emigrant trail, but on the opposite (south) side of the *Humboldt River*. When tracks crossed the river; the gateway through the lava walls of the canyons were ready and opened. Three canyons deep into the *Humboldt Desert*, *Carlin* was founded as division headquarters. By December 20th 1868; the march of the CPRR from the *California* border was upwards of 300 miles; from *Sacramento*, the base of supplies, 444 miles (of which 330 miles had been accepted by the government inspectors); distance from *Ogden*, 300 miles. The iron trail again thrust forward and by year's end was within striking distance of the *Humboldt Wells* emigrant station. The year 1868's records were:

- Track laid – 363 miles;
 - Construction expense - \$22,350,000;
 - Net earnings - increased from \$1,055,000 to \$1,271,700, and;
 - Operating expenses - increased from \$378,600 to \$680,900
- Iron rails were down to \$75 per ton (F.O.B. *Sacramento*). Locomotives cost the CPRR \$11K/each, passenger cars \$3,500/each and flat-cars \$600/each (in 1868).

682



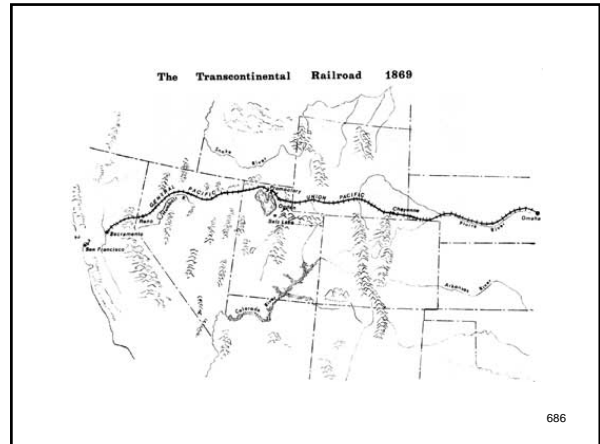
683

1869

684

At the beginning of 1869, there was three-hundred miles of mountainous desert between the CPRR and UPRR's end o' track, unoccupied save for the rival graders competing; westbound (UPRR) and eastbound (CPRR). Once around the *East Humboldt Range*, there was clear sailing for the CPRR to the *Promontory Range* (north of the *Great Salt Lake*). For the UPRR, there was still two-hundred and seventy-five miles between end o' track and *Humboldt Wells*. They would never make it. The CPRR would cover the distance to Humboldt Wells in a fortnight, racing from there into the *Salt Lake Valley*, meeting not only the UPRR but its own oncoming (westbound) grade from *Ogden*. Crocker and Stobridge saw their opportunity and made the most of it. The CPRR had the advantage of position in holding the comparatively snow-less lowlands while the UPRR was battling the timbered heights; blasting the granite-like frozen earth while winter winds blew fiercely. Despite the difficulties, the track advanced to the coveted Humboldt Wells. From there onward, to *Ogden*, was contested ground.

685



686



Twenty-three miles (thirteen of them continuous) out of a final thirty-seven across the summit of the *Sierra Nevada* were being protected by snow-sheds and galleries; 2,500 men and six construction trains were fighting the winter snow to keep the road open to the desert. Thus, during the winter of 1869, the CPRR's line was blocked by snow for only two weeks.

Left: the CPRR grade at *Donner Summit* as it appeared in 1869 (top) and present-day (bottom)

687

The "Z"

688

"No one can obtain at this time an intelligent idea of the difficulties met with and overcome; to appreciate them one had to be present and witness the work. Men who went out in the morning with overcoats on, and would have to work with overcoats on all day, were not able to do very large days' work."

Grenville Dodge, UPRR Chief Engineer

RE: surrounded by the *Wasatch Mountains*, the UPRR was now experiencing winter's wrath, with snow burying all. Two-hundred miles of track were put out of commission when blizzards swept the *Laramie Plains*. For weeks at a time, neither supplies nor material moved forward. The work was to continue all winter; those were the orders. Thaws succeeded freezes, but the snow had gathered up twenty-feet high and the grade - shoveled partially bare, became a white-walled gallery. To descend from the divide into *Echo Canyon*, a tunnel of 770-feet (approached by two lofty trestles of 230 and 450-feet length) was necessary lest the grade exceed the 116-foot vertical rise per mile limit. The hard, frozen red clay and sandstone required nitroglycerin, but the UPRR could not wait for the tunnel. By a zigzag ten mile long temporary route (named: "The Z"), the track circumvented the tunnel. The rails could not wait for the clearing of the grade either; they were laid on the ice and snow, causing a whole train - from engine to caboose - to slide sideways down into the canyon below, carrying with it its load of iron and ties.

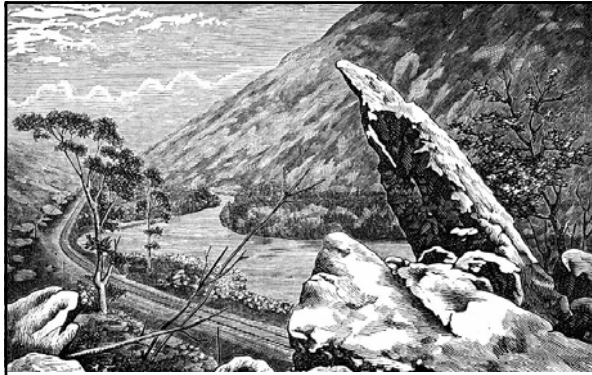
689



Left: caption: "Union Pacific Railroad Brigham Young Construction Camp, Echo Canyon, Utah"

Right: caption: "Finger Rock, Upper Weber Canyon, near Tunnel No. 3. Union Pacific Railroad"

690



Above: caption: "Finger or Needle Rock, Weber Canyon, U.P.R.R." 691

"I met some teams with ties in the Wasatch Mountains and I asked what the price was. They said \$1.75 each. They had seven ties on the wagon. I asked where they were hauled from, and they said from a certain canyon. They said it took three days to get a load up to the top of the Wasatch, Mountains and get back to their work. I asked them what they had a day for their teams, and they said \$10. This would make the cost of each tie more than \$6. I passed back that way in the night in January, and I saw a large fire burning near the Wasatch summit, and I stopped to look at it. They had, I think, from twenty to twenty-five ties burning. They said it was so fearfully cold they could not stand it without having a fire to warm themselves."

C.P. Huntington, CPRR VP

RE: given the conditions, the UPRR's track-men demanded \$3.50 a day, as did the graders; they got it. The Mormon's demanded \$5/day for man and team, except for Sundays which required a doubling of their wage to \$10/day (for laboring on the Sabbath). It too was agreed to. 692

From Ogden, Mormon superintendent Sam Reed - in charge of the work west for the CPRR, launched a grading party targeting Humboldt Wells - two-hundred and twenty miles distant. At the same time, he was dispatching material for eighty miles of track to be built eastward from Humboldt Wells. Thus, the Mormon grading gangs were attacking the grade to Promontory Point from both the east and west lest the UPRR drive the spikes in its own gap before them. From NYC, UPRR VP Huntington sent word back not to be concerned over the presence of the CPRR in the Humboldt Valley. Rather, he encouraged the CPRR: "to come right on as fast as possible and leave a good road behind." Forthwith, up Weber and Echo Canyon/s, the CPRR's Mormons expedited the grading operations upon the CPRR's survey. In Washington D.C., the CPRR's survey map was filed, claiming the right-of-way to the head of Echo Canyon (and the advance bonds for these sixty miles). 693



694

Hail to the Highway of Nations!

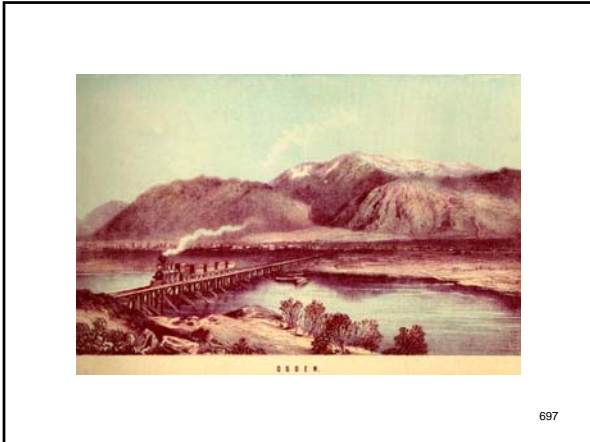
695



"About 2:30 P.M. they (the track-layers) steamed into Ogden. Flags waved, the military brass band blared, the Captain Wadsworth artillery boomed, and a parade bore the banner: 'Hail to the highway of nations! Utah bids you welcome.'" Newspaper report

RE: the CPRR's track was still one-hundred miles west of Ogden and the UPRR, with only twenty-five miles to go, had virtually won the race into the Salt Lake Valley. On the last day of POTUS Andrew Johnson's administration bonds, in the amount of \$1,333,000, were issued. On the same day (March 3rd 1868), the UPRR rails entered Ogden. At about 11:00 A.M., the townspeople observed smoke rising. 696

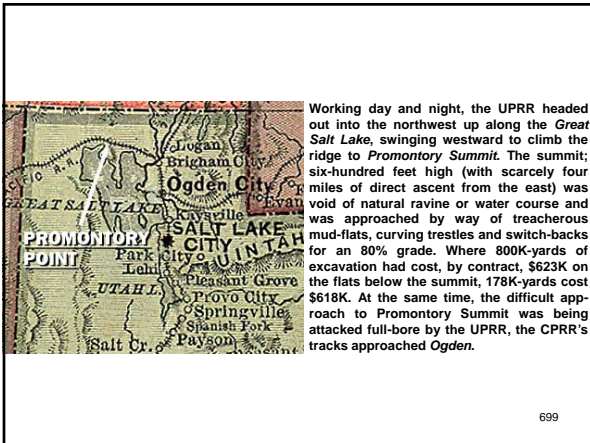
Above: caption: "The U.P.R.R. at Ogden, 1869"



697

"The point of junction has been assumed to be 78.295 miles east of Salt Lake City, or at a point that will entitle the two companies to an equal amount of bonds."
 U.S. Secretary of the Interior, February 1869
 RE: for many months, the press had been speculating on the final outcome of the rivalry between the two roads. In a gesture of compromise, the Federal Government suggested that, by establishing a specific point east of Salt Lake City where the two roads would meet, an equal sharing of the remaining bonds would ensue. This was wishful thinking. The UPRR already had passed the 78.295-mile mark and Ogden had been fairly won. It was a forgone conclusion that the route to California and the stretch to Humboldt Wells had been lost to the CPRR. Now, the UPRR's goal was to reach out as far as possible from Ogden. As such, the UPRR recalled all its graders from the Nevada desert and concentrated its efforts on laying as much track as possible west from Ogden.

698

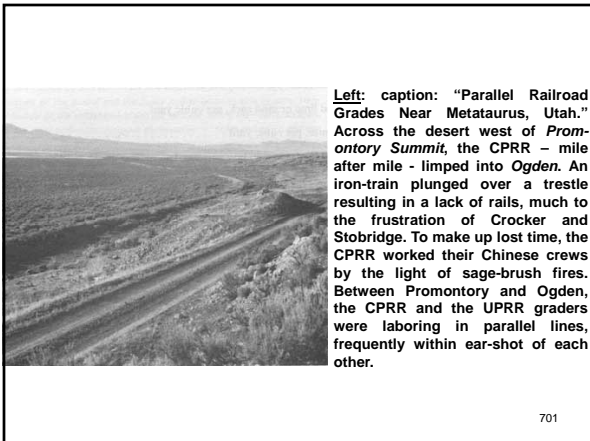


Working day and night, the UPRR headed out into the northwest up along the Great Salt Lake, swinging westward to climb the ridge to Promontory Summit. The summit, six-hundred feet high (with scarcely four miles of direct ascent from the east) was void of natural ravine or water course and was approached by way of treacherous mud-flats, curving trestles and switch-backs for an 80% grade. Where 800K-yards of excavation had cost, by contract, \$623K on the flats below the summit, 178K-yards cost \$618K. At the same time, the difficult approach to Promontory Summit was being attacked full-bore by the UPRR, the CPRR's tracks approached Ogden.

699

A Deadly Tit-for-Tat

700



Left: caption: "Parallel Railroad Grades Near Metataurus, Utah." Across the desert west of Promontory Summit, the CPRR - mile after mile - limped into Ogden. An iron-train plunged over a trestle resulting in a lack of rails, much to the frustration of Crocker and Stobridge. To make up lost time, the CPRR worked their Chinese crews by the light of sage-brush fires. Between Promontory and Ogden, the CPRR and the UPRR graders were laboring in parallel lines, frequently within ear-shot of each other.

701

On two occasions, the UPRR's Irish graders - not to be outdone by "Mongolians," intentionally set-off "Graves" - blasts that killed and/or injured several CPRR Chinese workmen. Protests from the CPRR to the UPRR's bosses as well as reprimands and direct orders from Chief Engineer Dodge to cease and desist had no effect. As retribution (and in their own self-defense), the Chinese set off a blast directly above the UPRR grade, killing several Irishmen and injuring many others. This deadly tit-for-tat finally ended the hostilities on both sides.

702

In the Shadow of Promontory Ridge

703

With the ascent from the west relatively easy in comparison, the UPRR had the more difficult leg to the summit from the east. On March 28th 1869, the UPRR's terminal base at *Corinne* was established - twenty-eight miles from *Ogden*. Despite the obstacles, the UPRR rate of advance had averaged one mile per day, but the CPRR; fifty miles out in the desert, was doing equally well. At the CPRR graders' camp at *Blue Creek*, in the shadow of *Promontory Ridge*, the CPRR end o' track had been declared.

704



Left: one of the cuts blasted through solid rock on the UPRR grade in May 1869. The marks left by the blaster's drills and chisels in the limestone rock are in evidence still. The width of the grade here is about fifteen-feet, slightly larger than a standard lane on a modern Interstate highway.

705



For two-hundred and twenty miles from *Ogden* to *Humboldt Wells* in the *Nevada* desert - with the exception of the partially closed 10-mile gap from *Blue Creek* (above, ca. 1920) to the top of the summit, the UPRR grade skirted the CPRR grade for nearly 80 miles into *Humboldt Wells*. Though the UPRR's rails had been hastily laid, the UPRR survey extended to the *California* state line. Now, there were rumors that *California* interests (hostile to the CPRR) had invited the rival road to enter *California* via *Beckwith Pass* in the *Sierra Nevada* (to the north). East from *Ogden*, *Echo Canyon* (55 miles distant) had been endorsed by government payment and the CPRR survey had been run across the *Wasatch Range*.

706

At or Near Ogden

707

"That the common terminus of the Union Pacific and the Central Pacific Railroads shall be at or near Ogden; and the Union Pacific Railroad Company shall build, and the Central Pacific Railroad Company shall pay for and own, the railroad from the terminus aforesaid to Promontory Point, at which point the rails shall meet and connect and form one continuous line."

Congressional Decree, April 19th 1869

RE: by now, both companies were weary of the race. By entering *Ogden* first, the UPRR had won the *Salt Lake Valley* trade, but with an empty treasury was agreeable to overtures from the CPRR. A compromise between *Huntington* and *Durant* was reached upon advice from the two road's engineering chiefs. Upon the careful wording: "...at or near *Ogden*..." both companies based their hopes and plans. Now, the race was a matter of history thus, there was no incentive for the UPRR to head across the plateau.

708

In settlement of the *Omaha-to-Ogden* main line contracts, the UPRR paid *Credit Mobilier* as follows:

Contract	Miles	
Hoxie Contract		
Omaha to 100th Meridian	247	\$12,974,416.24
Ames Contract		
100th Meridian West	667	\$57,140,102.94
Davis Contract		
To point five miles west of Ogden	125	\$23,431,768.10
Totals	1,039	\$93,546,287.28

These figures represent stocks and bonds at par (face value). Considering depreciation, the actual cost of the UPRR main line (from *Omaha, Nebraska to Ogden, Utah*) was about \$73 million. The cost of material used in the construction of the road was considerable. Rails for the first four-hundred and forty-miles cost \$135 per ton (after a connection was made with *Council Bluffs, Iowa* and the east, the price came down to \$97.50 per ton). The pay of laborers ran from \$2.25 to \$3.50 per day.

709

Payment to *Credit Mobilier* for the construction, equipment, station buildings and the expense of the UPRR during the construction period was issued as follows:

* Government Bonds	\$27,236,512.00
* First Mortgage Bonds	\$27,213,000.00
* Income Bonds	\$9,355,000.00
* Land Grant Bonds	\$9,224,000.00
* Union Pacific Stock	\$36,000,000.00
Total	\$109,028,512.00

Under its charter, land grants of 11,309,844 acres were granted to the UPRR. Up to December 31st 1866, sales of this land had brought in \$19,090,672.42 and unsold land was then valued at \$2,395,507.00.

710

The UPRR constructed a trestle 300-feet long by 30-feet high and another 500-feet long by 87-feet high along with numerous heavy cuts, fills and sweeping curves in their journey to the summit. On April 28th 1869, having crossed three mountain ranges, passed for sixty miles through the gorges of the *Wasatch Range* and, in so doing, having dropped from over 7,500-feet to less than 4,300-feet, now found itself on the broad tableland fifty miles from *Ogden*. With a westward glance, the UPRR track-gangs might glimpse the twinkle of the CPRR's bonfires on the desert incline twenty miles to their west. The grades connected six miles before, where the expectant railroad camp of *Promontory* had settled-in to wait for the end.

Left T&B: caption: "Trestle constructed by the U.P.R.R. between Promontory and Blue Creek"

Above: present-day panorama looking southwest from the east end of "Big Fill" (highlighted). The *Promontory Mtns.* are on the horizon. To the left is the *Blue Creek Valley* floor.

711

At top, the UPRR's "Big Trestle" (with Engine No. 119 pushing men and supplies towards *Promontory Summit*). The trestle was constructed in thirty-six days and was completed on May 5th 1869; just five days before the scheduled completion ceremony. Note the light gray area (in the upper areas of the photograph) defining the shoreline of the *Great Salt Lake*. Compare that with the shoreline in the photograph below taken in June 2012 (showing the *Big Fill* in place of the *Big Trestle*).

712

"Tomorrow we'll lay those ten miles. We'll do it now, when they can't get back at us."
Charles Crocker

RE: Crocker sent word by telegraph to Durant in NYC that ten miles of laid track would close the gap to a last ten, of which the UPRR's share was six miles

Left: the final graded section of the CPRR (about two miles west of *Promontory Summit*). The tracks were removed in 1942 to provide steel for the war effort. The grade remains much as it was in May 1869.

713

Part 7

The Rivalry

714

To Be Determined

715

Upon the passage of the *Supplementary Act of 1864*, the restriction confining the CPRR to the *State of California* was withdrawn and they were authorized to build for one hundred and fifty miles east of the *California* state line. This latter restriction was withdrawn by Congress via the *Act of 1866*, leaving the meeting point to-be-determined by the rapidity of the construction of the respective lines or, as the 1866 Congressional Act put it, the CPRR could: "...locate, construct and continue their line until it should meet the UPRR continuous line."

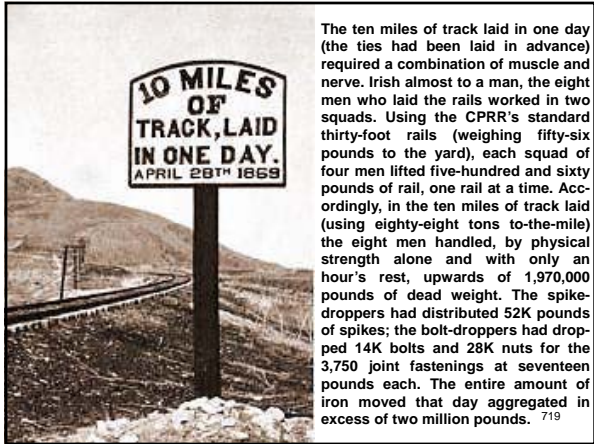
716

Charles Crocker: *"The Central promises ten miles in one working day"*
T.C. Durant: *"Ten thousand dollars that you can't do it before witnesses"*
 RE: in late October 1868, witnessed by his camp guests, Jack Casement's crews laid down seven-and-a-half miles of track. After the crew bosses shouted "lay-off," Casement vowed that the next effort would produce eight miles in one day. The CPRR's *Charles Crocker* would not be outdone.

717

"No damned Chinamen can beat me laying rails"
Jack Casement, UPRR
 RE: with three years experience behind them and the land grants, government bonds and prospective earnings (as well as pride and competitive spirit), the two railroads entered into a race the likes of which had never been seen before. The rivalry extended from the presidents of the two roads down to the water boys. Both forces, justly proud of their achievements, considered themselves "better" than the other. One form of the rivalry was played out as to which line could get the greatest amount of track down in a single day. The UPRR's forces led off with six miles. Soon after, the CPRR surpassed them by a mile, then seven-and-a-half miles were put down by the UPRR. Not to be outdone, the CPRR announced they could get down ten miles inside of one working day. Durant offered to wager \$10K that it could not be done; the CPRR took the bet. Waiting until there were just fourteen miles to lay, from 7:00 A.M. to 7:00 P.M. (using four-thousand men in the operation), on April 20th 1869 the CPRR laid down ten miles plus two-hundred feet (for good measure). The UPRR cried foul, claiming if they had massed their forces, made special preparation, etc., they could do even better than their competitor, but they could not prove it for there was no more track left to lay.

718



The next day (April 21st 1869) both companies leisurely laid track to the meeting-place. By May 1st 1869, the two roads had stopped short by a pair of rails each, with a mere fifty-eight feet separating the two ends o' track. To the west stretched the CPRR's iron trail of 690 miles to *Sacramento*. To the east stretched the UPRR's iron trail of 1,086 miles to *Omaha*. During just thirteen months, the UPRR had laid 555 miles of main track and 180 miles of sidings and temporary track; 735 miles all told. From *Laramie* to *Humboldt Wells*, they had graded 676 miles. In the same time period, the CPRR had laid 549 miles of main track and graded 615 miles (they had laid 501 miles in just nine months). Now, the two forces rested pending the last act; that of uniting the tracks. The end had come with such swiftness that it left them all dazed. The UPRR had been discharging men rapidly in order to lessen their payroll (only enough had been retained for repairing the last division of the road that had been so hastily laid during the winter, thus bringing it up to government approval). The UPRR construction camp was removed from the waterless *Promontory Summit* to the border of the lake below (south from *Blue Creek* station, where there were springs). *Promontory Camp* (up on the plateau) and *Blue Creek* (at the eastern base) teemed with idle graders and track-layers. Likewise, the CPRR sought water but maintained a large camp some distance beyond their end o' track - well removed from the unruly *Promontory Summit*. Crocker sent many of their Chinese workmen back along the line to complete work that had been left unfinished.

721



722

The Final Act

723

By agreement, Chief Engineer/s Dodge and Montague (on behalf of their respective companies) set the joining ceremony for Saturday, May 8th 1869. Although the UPRR would have considerably more representatives on hand at the uniting ceremony than the CPRR, it wanted only to get the matter of connection done with and find out how much of the road west from *Ogden* it controlled. The UPRR management was consumed with its own affairs to organize excursions into a little known country. On the other hand, *California* was alive to the occasion, feeling a strong sense of ownership in the CPRR. So it was that the California delegation was first upon the *Promontory* plateau. A regular CPRR passenger train, leaving *Sacramento* at six o' clock on the morning of May 6th 1869, bore a number of excursionists to the ceremony. It was closely followed by the "Stanford Special," consisting of engine, tender and superintendent's car. This Pullman car comprised a kitchen, dining conveniences and sleeping accommodations for ten. Dignitaries aboard included CPRR president *Leland Stanford*, Governor *A.P.K. Safford of Arizona*, three government commissioners, *W.T. Sherman* and a few other dignitaries. The previous evening, the contributions of California had been on display in the *Sacramento* office of the *Pacific Union Express*. This included the "Last Tie" (a gift from the CPRR's tie contractor) made of highly polished native laurel; eight-feet long by eight-inches wide by six-inches thick, bound with silver and set with an inscribed silver plate as well as the "Last Spike" (cast from twenty-dollar gold pieces) of regulation size (about seven inches long) and extended, at the time of casting, by a gold nugget (the nugget was designed to be broken off at the ceremony and melted into souvenirs).⁷²⁴



The Silver Tie and Golden Spike.

The *San Francisco Bulletin*, of May 4, has the following description of the silver tie and golden spike manufactured for use in joining the ends to the Pacific Railway:

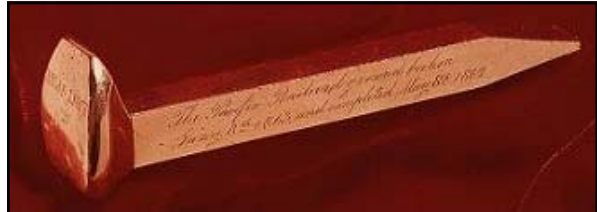
"The railroad tie to be put down as the last tie of the Pacific Railroad is cut from a beautifully grained stick of California laurel. A silver plate, six by eight inches, is prepared by Schulz, Fischer & Mohrig, manufacturing silversmiths, No. 10 Stevenson street, to be attached to the tie. On this plate is engraved the following inscription:

"The last tie laid on the completion of the Pacific Railroad, May --, 1869.

Directors - Leland Stanford, Charles Crocker, Mark Hopkins, B. H. Miller, Jr., C. P. Huntington, E. B. Crocker, A. P. Stanford, Charles Marsh.

Officers - Hon. Leland Stanford, President; C. P.

725



On the head of the spike was inscribed: "The Last Spike." On each of the four sides of the spike itself was inscribed:

- "The Pacific Railroad; Ground Broken January 8, 1863; Completed May 1869"
- "May God continue the unity of our country as this railroad unites the two great oceans of the world"
- "Presented by David Hewes, San Francisco"

On the fourth side were the name/s of CPRR company officers. The value of spike and nugget was set at \$413 by the *Sacramento* reporters. The *Pacific Union Express Company* presented a silver-headed maul for the driving of the golden spike into the laurel tie.

Above: caption: "The Last Spike." The golden spike was not made of pure gold (gold is too soft to hit with a hammer). Rather, it was/is a mixture of alloys (73% gold) and weighs 14.03 troy ounces.

726

Bad Omen

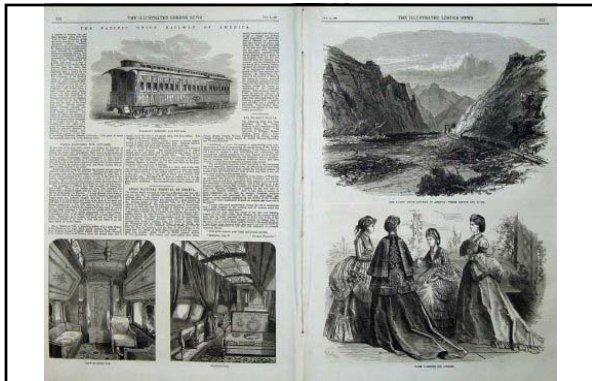
727

A CPRR work crew cutting timber on the mountain above the entrance to Tunnel No. 14 (near the *California* state line, east of *Truckee*) observed the regular train from *Sacramento* pass that day (May 6th 1869). Not aware of the following special, they carelessly skidded a log down onto the track below. The log; fifty-feet long by three and one-half feet thick, landed in a cut with one end against the bank and its other end upon a rail. The special's engineer, rounding the curve to the tunnel's entrance, had no time to slow down and struck the exposed log. The engine was badly damaged and a guest riding on the cowcatcher was seriously injured. The thick log scraped along one side of the Pullman car taking the steps with it. A wire was sent ahead from the next station in time to hold the regular passenger train at *Wadsworth* until the "Stanford Special" could be attached to it. The reconfigured regular train arrived at *Promontory* on Friday, May 7th 1869, finding no preparations for the next days' ceremonies. 728

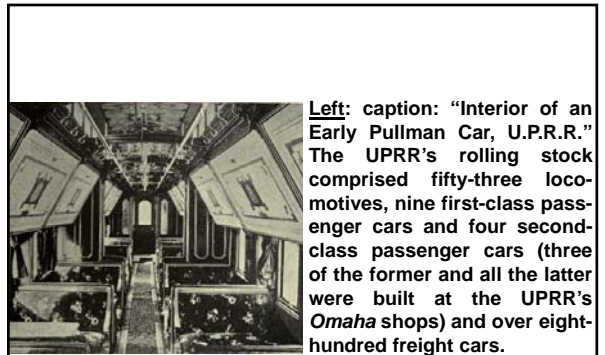


Above: caption: "The special train of California Governor Leland Stanford; the 'Jupiter,' meets a wagon train en-route to the meeting of the train from the Union Pacific to their historic meeting at Promontory Point, completing the Transcontinental Railroad in 1869" 729

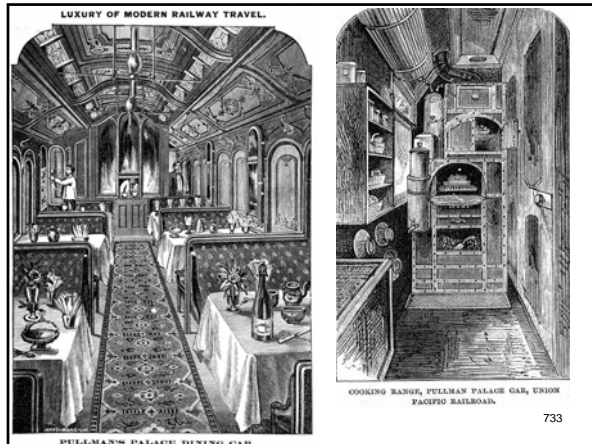
The telegraph operators for each road's end o' track were housed in tents within sight of one another. A query was wired to the UPRR's *Ogden* office inquiring as to the lack of preparations for the joining ceremony. Casement replied that it was impossible for the UPRR delegation to arrive before Monday, May 10th 1869 due to heavy rains which had interrupted traffic east of *Ogden*. Stanford telegraphed back to *Sacramento* and *San Francisco*, informing them of the change in program. Both cities answered that it was too late now for them to alter their own schedule of festivities; they were going to celebrate despite the glitch. And so they did, for three straight days. However, the official *California* delegation and the other passengers found themselves stranded atop *Promontory Summit* in a heavy rain, with a two days' wait ahead of them. Casement ordered a special train from *Ogden* to bring the regular passengers back to *Ogden*. The night was spent by Stanford and personal guests in his private Pullman car. The next morning, the UPRR superintendent's car arrived to take the dignitaries on a tour into *Weber Canyon*. 730



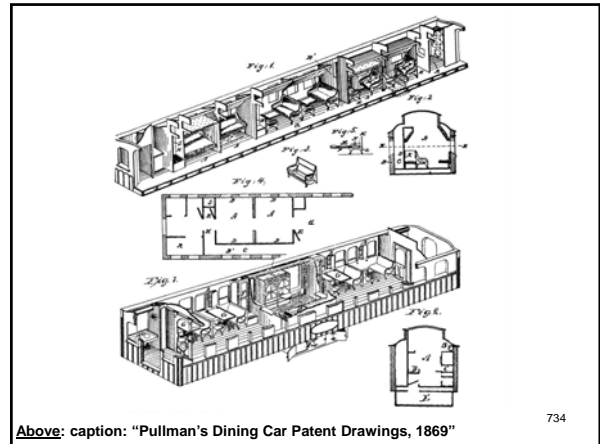
Above: two-page article appearing in the *Illustrated London News* (in 1869) concerning George Pullman's private car and the excursion to *Weber Canyon* 731



Left: caption: "Interior of an Early Pullman Car, U.P.R.R." The UPRR's rolling stock comprised fifty-three locomotives, nine first-class passenger cars and four second-class passenger cars (three of the former and all the latter were built at the UPRR's *Omaha* shops) and over eight-hundred freight cars. 732

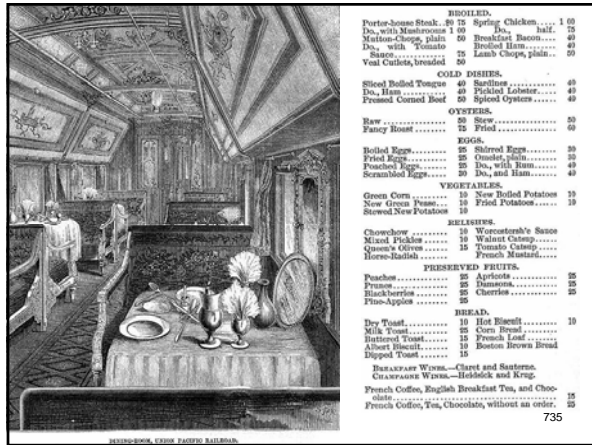


733



Above: caption: "Pullman's Dining Car Patent Drawings, 1869"

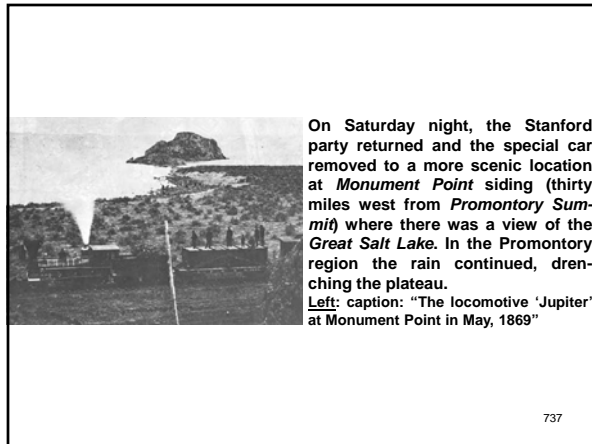
734



735

It was now obvious to the CPRR excursionists that the UPRR had encountered severe weather-related difficulties. The unusually heavy spring rains were playing havoc with the roadbed down through the canyons of the *Wasatch Range*. The approaching train from the east, bearing the first excursionists and through passengers, was creeping in at a snail's pace. With tourists gathered from *New York, Boston, Chicago* and intermediate points, it had left *Omaha* May 5th 1869. On the evening of May 8th 1869, it was stalled in the downpour near the exit from *Weber Canyon*, ten miles outside of *Ogden*. The UPRR's section men were working hard to fortify the track and bridges (the *Devil's Gate Bridge* had to be closely watched all day Sunday and Monday). The UPRR operating department could not guaranty anything pertaining to the arrival of trains.

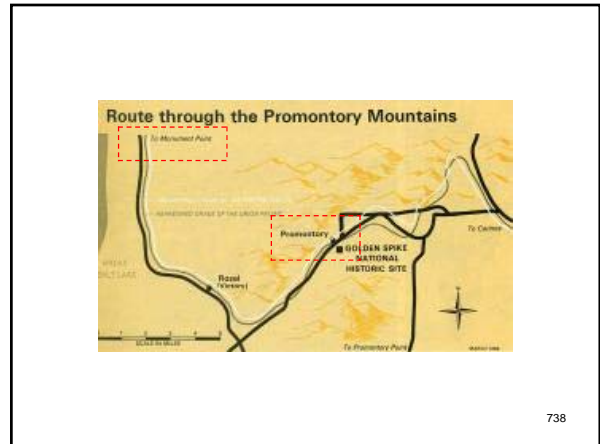
736



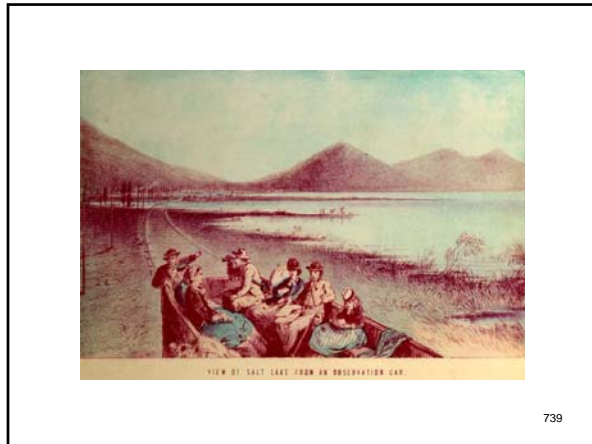
On Saturday night, the Stanford party returned and the special car removed to a more scenic location at *Monument Point* siding (thirty miles west from *Promontory Summit*) where there was a view of the *Great Salt Lake*. In the Promontory region the rain continued, drenching the plateau.

Left: caption: "The locomotive 'Jupiter' at Monument Point in May, 1869"

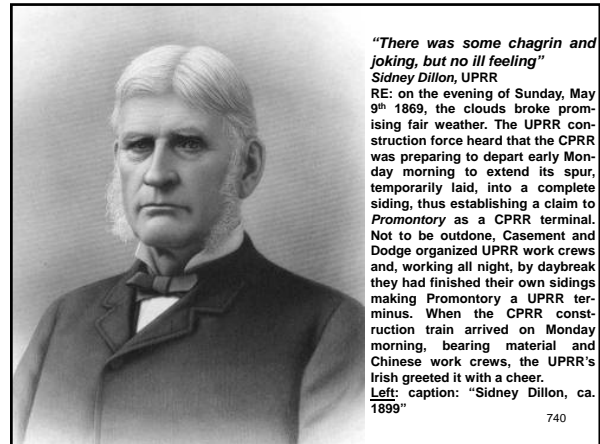
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738



739

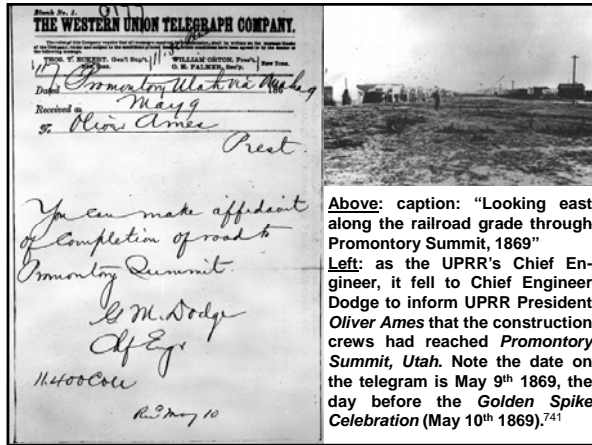


"There was some chagrin and joking, but no ill feeling"
Sidney Dillon, UPRR

RE: on the evening of Sunday, May 9th 1869, the clouds broke promising fair weather. The UPRR construction force heard that the CPRR was preparing to depart early Monday morning to extend its spur, temporarily laid, into a complete siding, thus establishing a claim to Promontory as a CPRR terminal. Not to be outdone, Casement and Dodge organized UPRR work crews and, working all night, by daybreak they had finished their own sidings making Promontory a UPRR terminus. When the CPRR construction train arrived on Monday morning, bearing material and Chinese work crews, the UPRR's Irish greeted it with a cheer.

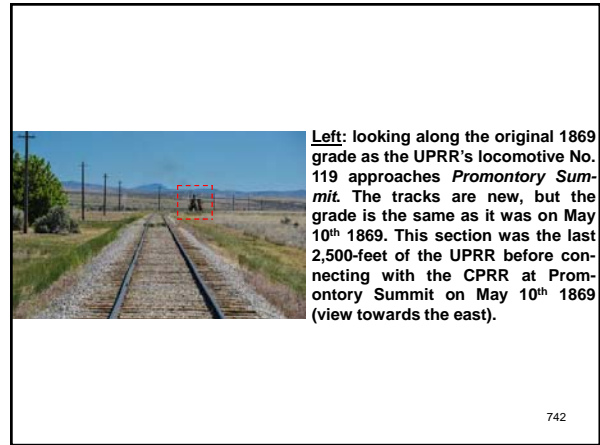
Left: caption: "Sidney Dillon, ca. 1899"

740



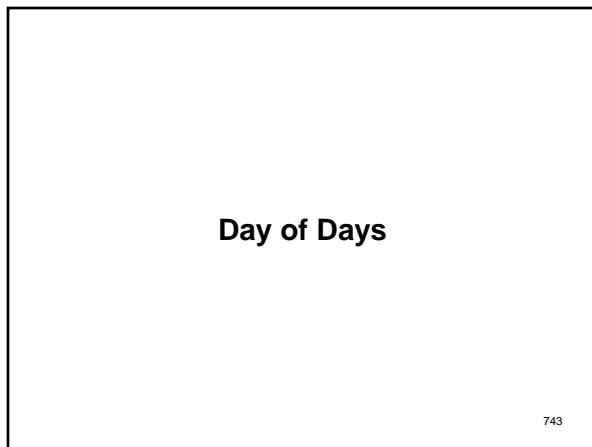
Above: caption: "Looking east along the railroad grade through Promontory Summit, 1869"

Left: as the UPRR's Chief Engineer, it fell to Chief Engineer Dodge to inform UPRR President Oliver Ames that the construction crews had reached Promontory Summit, Utah. Note the date on the telegram is May 9th 1869, the day before the Golden Spike Celebration (May 10th 1869).⁷⁴¹



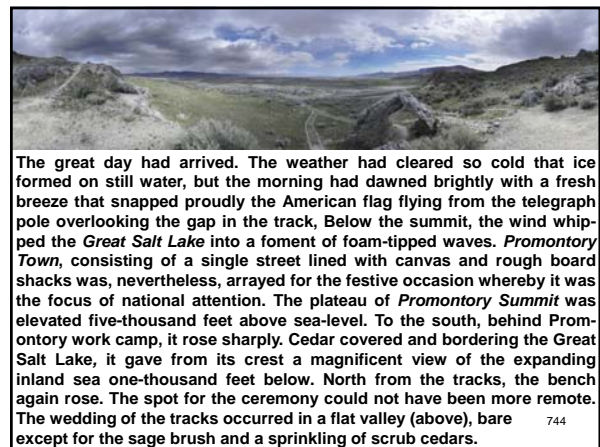
Left: looking along the original 1869 grade as the UPRR's locomotive No. 119 approaches Promontory Summit. The tracks are new, but the grade is the same as it was on May 10th 1869. This section was the last 2,500-feet of the UPRR before connecting with the CPRR at Promontory Summit on May 10th 1869 (view towards the east).

742



Day of Days

743



The great day had arrived. The weather had cleared so cold that ice formed on still water, but the morning had dawned brightly with a fresh breeze that snapped proudly the American flag flying from the telegraph pole overlooking the gap in the track. Below the summit, the wind whipped the Great Salt Lake into a foment of foam-tipped waves. Promontory Town, consisting of a single street lined with canvas and rough board shacks was, nevertheless, arrayed for the festive occasion whereby it was the focus of national attention. The plateau of Promontory Summit was elevated five-thousand feet above sea-level. To the south, behind Promontory work camp, it rose sharply. Cedar covered and bordering the Great Salt Lake, it gave from its crest a magnificent view of the expanding inland sea one-thousand feet below. North from the tracks, the bench again rose. The spot for the ceremony could not have been more remote. The wedding of the tracks occurred in a flat valley (above), bare except for the sage brush and a sprinkling of scrub cedars.

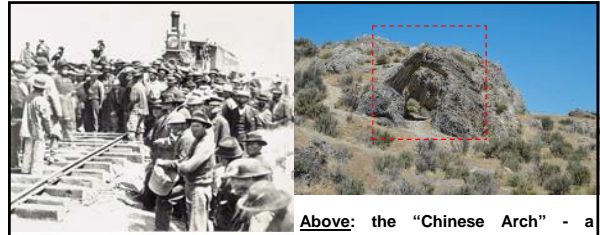
744



It was planned for the CPRR and UPRR specials to arrive, from west and east, simultaneously. But the construction trains were first on hand, loaded inside and out from end-to-end with cheering track and grading gangs. They side-tracked and their multitudes poured out upon the scene. A CPRR excursion train pulled in, received with applause from the crowd. The train, drawn by "Jupiter-60," fluttered banners and bunting in red, white and blue. A handful of CPRR Chinese were engaged in putting last touches on the gap in the tracks, thus preparing it for the last tie and the joining of the iron. The gap had been spanned by one line of rail, leaving only the south end/s of the ties vacant. Between ten and eleven o'clock, the UPRR special excursion train arrived, bringing the eastern officials and also four companies of the *Twenty-first Infantry*, with the headquarters band from *Camp Douglas* (en-route for the *Presidio at San Francisco*).

Above: the CPRR excursion train on its way to the joining ceremony

745



Above: the "Chinese Arch" - a natural formation that has become a memorial to the thousands of Chinese labors who helped build the *Pacific Railway*

Top Left: caption: "Chinese at Laying of Last Rail"

Left: caption: "At the ceremony for the driving of the 'Last Spike' at Promontory Summit, Utah, May 10, 1869"

746



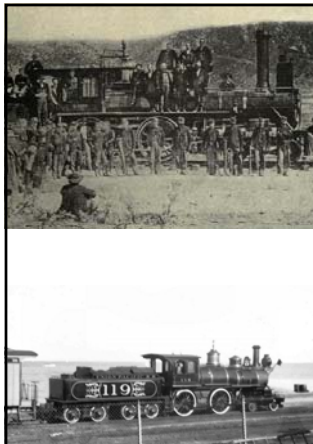
The difference between the two locomotives; "Jupiter-60" (left) of the CPRR and "Rogers-119" (right) of the UPRR was glaringly obvious. The CPRR engine featured a flaring funnel stack, whereas the UPRR's No. 119 featured a straight stack (crowned with a spark-arrester cap - a necessary fire-prevention feature for traversing the *Great Plains*). Both engines were ornately decorated for the occasion.

747



Above & Left: the CPRR's Jupiter-60

748



Top: caption: "Union Pacific Locomotive No. 119, at Promontory Summit, May 10, 1869. Dignitaries of the day posed on the boiler."

Bottom: Union Pacific 4-4-0 No. 119 was one of two locomotives that participated in the *Golden Spike Ceremony*, marking the completion of the transcontinental RR. The other was the Central Pacific's *Jupiter-60*. Both of these historic locomotives were later scrapped (the *Jupiter* was salvaged and rebuilt by the *Southern Pacific RR*). Thus, reenactments of the ceremony use other, similar, locomotives disguised as the original participants.

749



750

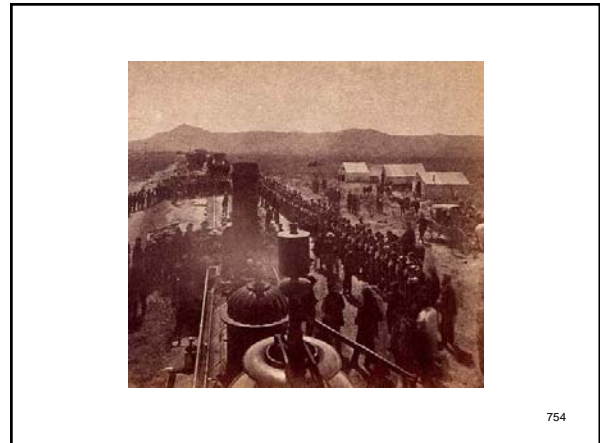
The officials proceeded to the gap in the track, kept clear by the infantry. A second train from the west arrived while, simultaneously, a second train from the east arrived bringing with it the *Tenth Ward Band of Salt Lake City* and a host of sightseers from *Utah*. Neither *Brigham Young* nor the governor of *Utah* was present (the *Mormon* leader was attending to church and personal business in southern *Utah* that day). The following Monday; May 17th 1869, he was to officiate at the ground breaking for his own *Utah Central RR*, which would connect *Salt Lake City* with *Ogden*. The space to the south of the gap was kept open; the officials and guests of the grouping themselves on either side. Construction superintendent/s *Strobridge* of the *CPRR* and *Reed* of the *UPRR* brought from the *Stanford* car the silver-plated laurel tie. The rails followed. The *CPRR*'s rails were proudly carried by a squad of *Chinese* while the *UPRR*'s rails were carried by an *Irish* squad. After the rails were laid and secured, cheers burst forth while the engines' shrieked and whistles blew.⁷⁵¹



752

"Now's the time, Charlie! Take a shot"
 RE: when the two sets of rails arrived, a voice called out to a photographer. The word "shoot" was all too familiar to the *CPRR*'s *Chinese* as a warning of a blast about to occur. They looked up to see the opening of the camera pointing their way and, dropping the rail, stampeded for cover. Amidst the laughter of the crowd, it took considerable effort to convince them all was well and safe and get them back for the laying of their portion of the rail.

753



754

Wedded

755



"Ribbed in iron, clad in silver, and crowned with gold, Arizona presents her offering to the enterprise that has banded the continent and wedded the oceans."

Arizona Governor A.P.K. Safford
 Above: caption: "Arizona's Spike." Arizona's spike was made of an alloy consisting of gold, silver and iron. *Idaho* and *Montana* furnished spikes of silver.

756

"To the iron of the East and the gold of the West, Nevada adds her link of silver to span the continent and wed the oceans."

Commissioner F.A. Tritle

RE: presentation of a spike made of silver taken from the Comstock Lode. In forging this spike, one-hundred miners each struck one blow.

"From her mines she has forged this spike and from her woods she has hewn this tie, and by the hands of her citizens she offers them to become a part of the great highway which is to unite her with her sister States on the Atlantic. From her bosom was taken the first soil, so let hers be the last tie and the last spike."

RE: Dr. Harkness of Sacramento presented California's two golden spikes; one for each end of the meeting of the rails

757



Above: caption: "A hand wrought 1868 original construction CPRR 'Flat head' iron rail spike." Actually, there were a total of six spikes used in the original ceremony (five ceremonial and one common spike). A regular iron spike (a.k.a. "Lemon Spike") was the only spike driven into the tie (left). The gold and/or silver spikes were never "driven" into a tie. Instead, they were temporarily placed in holes in a ceremonial tie made for the occasion. The last rail laid was also pulled up after the original ceremony and sliced into several sections. At least one of those sections still exists. Four of the five gold/silver spikes are known to still exist.

758

Done!

759

"To everybody. Keep quiet. When the last spike is driven at Promontory Point, we will say 'Done'...Don't break the circuit, but watch for the signals of the blows of the hammer...Almost ready. Hats off; prayer is being offered. We have got done praying, the spike is about to be presented...All ready now; the spike will soon be driven. The signal will be three dots for the commencement of the blows...Dot! Dot! Dot! Done!"

RE: by orders of James Gamble, head of the Western Union, all telegraph wires were cleared for Promontory news, which had the right-of-way. Consequently, the bulletins flashed from high in the Utah desert were read almost at the same moment by the crowds gathered in front of the telegraph offices in the majority of the large cities the length and breadth of the North American continent. Leland Stanford was give the honor of driving the last golden spike. Nervous, he missed the spike with the first blow striking the rail instead. Despite the near miss, the telegraphs flashed the message "Done," to the thrill of the expectant crowds across the nation.

760

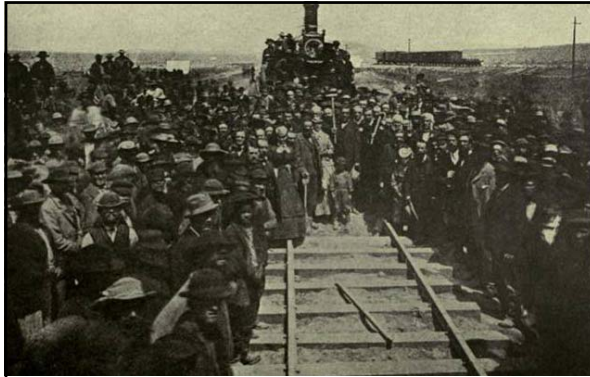


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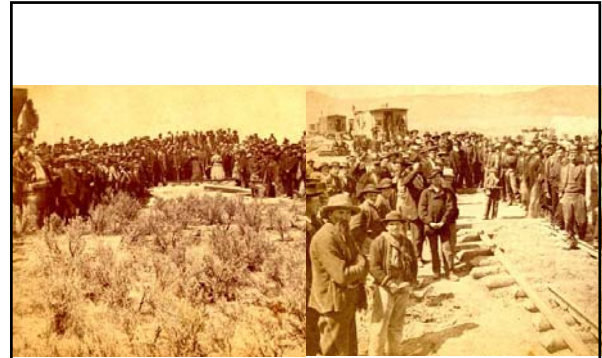
BY STATE TELEGRAPH.

Railroad Connection of California and Nevada.
STRONG'S CANYON, VIA CONYER'S, June 17th—9 P. M.—The last rail connecting California with Nevada was laid at 8:20 o'clock this afternoon. The honor of driving the last spike was awarded to Mr. H. H. Minkler, and it is to the untiring energy of Messrs. Strowbridge & Minkler that the Company is indebted for the early completion of this, the greatest railroad triumph of the age. The "army of occupation" will at once move eastward and be placed upon the unfinished line between the Big Bend and Salt Lake. The great drawback to this gigantic national work having been overcome, now, with a fair field and no favor, California enterprise will win itself a name for rapid railroad construction, second only to its great Eastern rival.

762



Above: caption: "'The Final Act.' Probably the best photograph extant of the gatherings at Promontory Summit, May 10, 1869, where the golden spike was driven." 763



764

At 2:47 P.M. (eastern time), when the three dots and "Done!" message was received, a magnetic ball atop the dome of the capitol building in Washington D.C. fell and the crowd gathered in front of the telegraph office became ecstatic. In San Francisco, the message began the pealing of the heavy fire-bell in the city hall tower and the discharge of two-hundred and twenty guns at Fort Point. In Sacramento, the din of cannon, whistles and bells drowned the uproar of thousands of excursionists brought in from the surrounding countryside by free trains. In Omaha, one hundred guns burst forth from Capitol Hill amid a procession of cheering military and civilian parades. In NYC, one-hundred guns were fired in salute while in Philadelphia the Liberty Bell was rung in celebration. In Chicago, a procession four miles long wound through the streets. In Salt Lake City, the great Tabernacle was filled to overflowing. In Ogden, where the news had been received at 12:32 P.M., guns fired for fifteen minutes and all business places were closed in celebration of the event. On Promontory Point, CPRR president Stanford politely stood aside for UPRR VP Durant who, in seeming sympathy, missed the spike - hitting the rail instead.

765

COMPLETION OF THE PACIFIC RAILROAD.— Some twenty years ago it was proposed to build a railroad to the Pacific coast. The idea at that time was looked upon by most men as visionary in the extreme, and by some pronounced impossible, yet this so-called visionary project has been accomplished and the iron horse will now speed its way over three thousand miles of continuous rail, from the Atlantic to the Pacific Ocean.

766

Promontory Summit, Utah, May 10, 1869.

The last rail is laid, the last spike driven. The Pacific Railroad is completed. The point of junction is 1,086 miles west of the Missouri River, and 690 miles east of Sacramento City.

Leland Stanford - Central Pacific Railroad.

T.C. Durant, Sidney Dillon, John Duff - Union Pacific Railroad

RE: formal announcement flashed by telegraph to POTUS U.S. Grant. All the dignitaries present were invited to tap the last spike soon rendering it in a rather battered condition (beside the scarred adjoining iron rail from the many missed blows). The final setting of the spike was awarded to the two Chief Engineers. Mr. Montague struck first, Dodge second, then they shook hands. After, there was a chorus of hammering; securing permanently with ordinary spikes the last set of rails for both roads. Once complete, the two engines (which had been separated by the gap) were unhooked from their trains. Bearing enthusiastic celebrants, they advanced proudly down a cheering lane. While the stokers took the throttle, the two drivers (engineers) swung out of their respective cab, each with a bottle of champagne. As the locomotives touched noses, the bottles were broken foaming down onto the last tie, rails and spike. The engineers shook hands and cameras clicked.

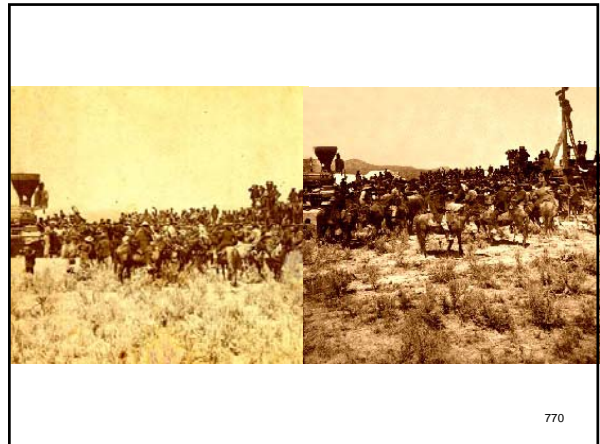
767



768

Both trains then backed up and hooked on. The CPRR train retired a short space; the UPRR train entered, crossed the juncture of the tracks, halted an instant and majestically withdrew. The CPRR train pursued. The trans-continental RR was a reality. Scarcely had the gap been cleared when joint crews of CPRR and UPRR trackmen charged in with spades, crow-bars and pinchbars. They removed the precious metal spikes from the memorial tie, unbedded the tie itself, substituted a common tie, drove iron spikes home and bolted the fishplate fastening. Hardly had the workers straightened their backs when a rush was upon them; knives were digging at the tie, reducing it to splinters and hacking at the rails. Six ties and two rails were demolished before the juncture was left in peace. The last tie was discovered dust-covered and neglected in a storeroom of the Southern Pacific RR shops at Sacramento ca. 1903. It was restored and moved to the Directors' room in San Francisco. Unfortunately, the devastating earthquake of April 1906 and ensuing fire destroyed it. By evening, there was only a small force of construction and operating experts remaining, readying the junction for through traffic.

769



770



Above: Thomas Hill's famous painting: "The Last Spike" (1881) was reproduced as an engraving (in 1888) entitled: "Driving the Last Spike." The original painting was, for many years, in the rotunda of the California State Capitol, but is presently on display at the California State Railroad Museum (also in Sacramento). Thomas Hill (1829-1908) completed painting this ambitious collection of portraits - the most ever attempted on a single canvas, but was never paid for his work.

771

"Kneeling at the feet of Governor Stanford is F.L. Vandenburg, the chief electrician of the occasion, who is adjusting the wire which leads off through the crowd to the telegraph pole on the right. At his left is J.H. Strowbridge, general superintendent of the work of construction. The chief men of the Central Pacific railroad, C.P. Huntington, Mark Hopkins, E.B. Crocker, Charles Crocker, T.D. Judah, are all represented in characteristic attitudes, and with features accurately portrayed. Near Governor Stanford are the President and Directors of the Union Pacific, Oakes Ames, Sidney Dillon, Dr. Durant, and John Duff; Hon. A.A. Sargent, who played so important and honorable a part in the legislation that made the building of the road possible, is shown by an admirable portrait at the right. Behind him is Hon. T.G. Phelps, his colleague in Congress while the Pacific Railroad legislation was taking shape, and its friend throughout. In the same part of the canvas are S.S. Montague, Chief Engineer of the Central Pacific; Colonel George E. Gray, Consulting Engineer; the two assistant engineers, L.M. Clement and Charles Cadwalader; Judge S.W. Sanderson, at present chief legal adviser of the road; B.B. Redding of the Land Department; A.K.P. Safford, then Governor of Arizona; and Hon. Milton S. Latham, United States Senator from California when the road was begun, and at all times its warm friend. Elsewhere can be found William Sherman, James W. Haynes and F.A. Tritle, United States Pacific Railroad Commissioners; John Corning, Division Superintendent, afterwards Assistant General Superintendent, and E. H. Miller, Jr., Secretary of the Central Pacific Railroad Company; Robert Robinson, Counsel for the Company; Arthur Brown, Superintendent of Bridges and Buildings; E. Black Ryan, Private Secretary of Governor Stanford; Charles Marsh, one of the original incorporators; Edgar Mills, Master of Ceremonies; Dr. H.W. Harkness, of Sacramento; Dr. J.D.B. Stillman, of San Francisco; A.P. Stanford, brother of Governor Stanford; J.R. Watson, Conductor of the first passenger train on the Central Pacific; Benjamin Welch, Master Builder of the Sacramento Car Works; Stephen T. Gage, of the Chief Executive Department of the Central Pacific; John Casement, Contractor of the Central Pacific, and David Hewes. The ladies are Mrs. Strowbridge, Mrs. Ryan, and the wives of officers commanding troops in the vicinity..."

RE: excerpt from Thomas Hill's self-published pamphlet entitled: "The Last Spike, A Painting by Thomas Hill: Illustrating the Last Scene in the Building of the Overland Railroad. With a History of the Enterprise" (1881)

772



773



Top: UPRR locomotive No. 119 (belching smoke from its wood fueled boilers) while the CPRR's Jupiter-60 looks on. They are in the same positions as they were on May 10th 1869.

Bottom: the actual joint of the Union Pacific and Central Pacific lines on May 10th 1869 where the golden spike was driven (Latitude: 41°37'5" Longitude: N 112°33'6" W)

774



775

What the Engines Said

776

*What was it the engines said,
 Pilots touching - head to head.
 Facing on the single track,
 Half a world behind each back?...
 Yet today we shall not quarrel,
 Just to show these folks this moral.
 How two engines - in their vision -
 Once have met without collision
 That is what the engines said,
 Unreported and unread;
 Spoken slightly through the nose,
 With a whistle at the close*

Francis Bret Harte

RE: excerpt from his poem entitled: "What the Engines Said" (composed and read for the opening of the transcontinental RR)

777



778

Part 8

The Way to India

779

Prophecy to Fact

780

1869. MAY 10TH. 1869.

Great Event!
ATLANTIC TO THE PACIFIC
GRAND OPENING

UNION PACIFIC RAILROAD

Via Omaha and Platte Valley.

OMAHA

BY THE ARRIVAL OF TRAINS FROM THE EAST
THROUGH TO SAN FRANCISCO IN LESS THAN FOUR DAYS

TRAVELERS FOR PLEASURE, HEALTH OR BUSINESS WILL FIND A TRIP OVER THE ROCKY MOUNTAINS HEALTHY & PLEASANT

LUXURIOUS CARS AND EATING HOUSES ON THE UNION PACIFIC R. R.

GOLD, SILVER & OTHER MINERS


CALIFORNIA

EXCITE YOURSELF. VISIT THE GREAT CITY OF SAN FRANCISCO
AL OGDEN & OGDEN, BY HELIX, VA. VIRGINIA CITY, S. LARIE CITY and ANGLETON.

TRAVELER TICKETS for sale at all principal Railroad Offices. Be sure that they read THE PLATTE VALLEY or OMAHA

JOHN P. HART, J. REID, W. SNYDER, A. H. COOK, JOHN P. HART, J. REID, W. SNYDER

THE BURLINGTON ROUTE



"Gentlemen, the great Benton proposed that some day a giant statue of Columbus be erected on the highest peak of the Rocky Mountains, pointing westward, denoting this as the great route across the continent. You have made that prophecy today a fact. This is the way to India."

Grenville Dodge, UPRR Chief Engineer (May 10th 1869)

Above caption: "San Francisco to Chicago via the CPRR, UPRR, & Burlington Route, A.A. Hart, Traveler's Own Map, 1870"

Left: official poster announcing grand opening of the "Railroad from the Atlantic to the Pacific" 781



"...inaugurating the overland trade with China and Japan"

RE: on the morning of May 11th 1869, the first transcontinental passengers by rail from the east passed across the now immortal last tie. On May 12th 1869, a San Francisco dispatch in the NYC newspapers announced that, at the moment of the driving of the last spike, a consignment of tea had been started eastward. Thus, the Orient was now open to direct trade with the eastern U.S.

Top caption: "Eastern Bound Tea Train at Blue Canyon, C.P.R.R."



Bottom: Promontory Summit was short lived as the junction between the UPRR and the CPRR. Ogden, Utah, became the interchange point when a cut-off was created across the Great Salt Lake. 782



The Great Train Robbery

784

While his CPRR peers were speeding westward (after the joining ceremony concluded), the UPRR's *T.C. Durant* sped eastward. At *Piedmont, Utah* (on the east slope of the Wasatch Range's summit) his train was halted by a pile of ties, an open switch and gunshots. Three-hundred discharged and yet-to-be-paid graders and tie-cutters held the train carrying Durant at bay. They had installed a sympathetic telegraph operator in the station who kept tabs on the approach of the train carrying Durant. The train was shifted to the siding, the UPRR cars (at the tail of the train) including Durant's car were uncoupled and the engineer told to "move along." The UPRR cars carrying dignitaries and guests were placed under guard until the demands of the unpaid workmen were satisfied. It was a veritable hold-up - the first of many on the transcontinental RR.

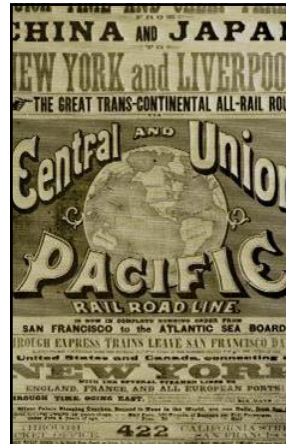
785

The amount of back-pay owed the UPRR workmen aggregated in the neighborhood of \$200K. Durant had no immediate means of supplying the funds and he argued that, in any event, he was not to blame for the situation. Nevertheless, they were indifferent to his protests. Durant telegraphed to the east and west seeking a ransom. He was kept in custody from May 11-13th 1869 before *Henry Rogers*, who controlled banks in *Cheyenne, Laramie* and *Salt Lake City*, gained his release by transmitting the cash. Durant, who had been made the scapegoat in lieu of negligent and irresponsible contractors, proceeded east with the remark that he had "had enough of the west." Durant was never to return to the west and absented himself from the railroad business in the aftermath of the incident.

786

An All-Rail Route

787



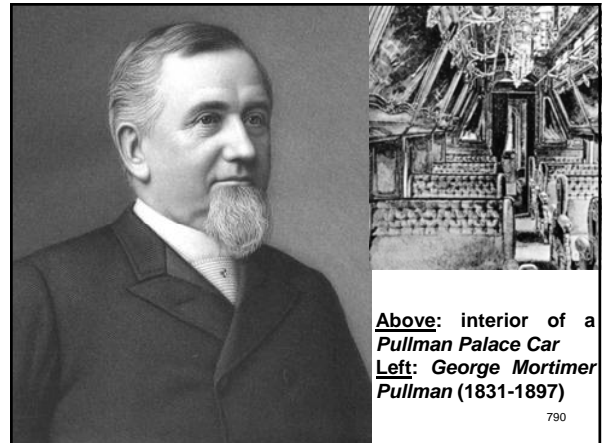
The first passengers from California arrived in Omaha on May 16th 1869. Two trains per day (each way) were soon needed. The regular schedule between Sacramento and Omaha was five days; between Sacramento and the Atlantic coast, six-and-a-half days. For example (as of the May 1869 schedule), an east-bound passenger departed Sacramento early in the morning on Monday; arrived at Ogden about 12:30 P.M. Tuesday; arrived at Omaha at 10 A.M. Friday; arrived at Chicago at 10 A.M. Saturday; finally arriving in NYC shortly after noon on Sunday. Departure from San Francisco added twelve hours to the trip. Rates between Omaha and San Francisco were: \$100 first-class, \$75 second-class, \$40 "emigrant" (these cars were attached to the freight trains with uncertain schedules). The rates across the continent were: \$139 first-class, \$109 second-class, emigrant \$65. Children under five years of age traveled free-of-charge.

788

"The Pullman Palace Car Company is ready to furnish excursion parties with sleeping, drawing-room, and hotel cars for a trip to San Francisco or elsewhere on these terms: For a regular sleeping car, containing twelve open sections of two double berths each, and two staterooms of two double berths each (in all twenty-eight berths), with conductor and porter, seventy-five dollars per day. For a drawing-room car, containing two drawing-rooms, having each a sofa and two large easy-chairs by day, and making up at night into two double and two single berths, three state-rooms having each two double berths, and six open sections of two double berths each (in all twenty-six berths), with conductor and porter, seventy-five dollars per day. For a hotel car, containing two drawing-rooms, as above described, one state-room having two double berths, and six open sections of two double berths each (in all twenty-two berths), and having also, in one end, a kitchen fully equipped with everything necessary for cooking and serving-meals, with conductor, cook, and two waiters, eighty-five dollars per day. The conductor, if desired, will make all arrangements for the excursionists with the railroads for procuring transportation of the car; and in the case of their taking a hotel car, will also act as steward, purchasing for them the requisite provisions for the table. The car is chartered, with its attendants, at a certain rate per day from the time it is taken until we receive it back again. We have no facilities for securing special rates of railroad fare, and would suggest that, in case an excursion is organized, application be made to any ticket agent who is empowered to sell through-tickets, and the best rates of railroad fare obtained from him to and from the terminal point of the proposed trip. We can forward a car from our head-quarters in Chicago to any point which the excursionists may designate as their starting place."

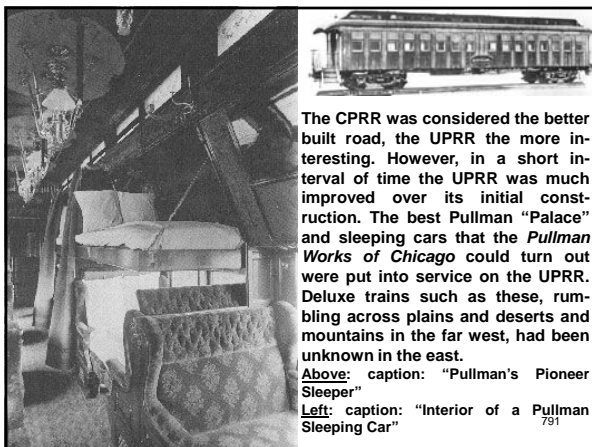
George Pullman, ca. 1870

789



Above: interior of a Pullman Palace Car
Left: George Mortimer Pullman (1831-1897)

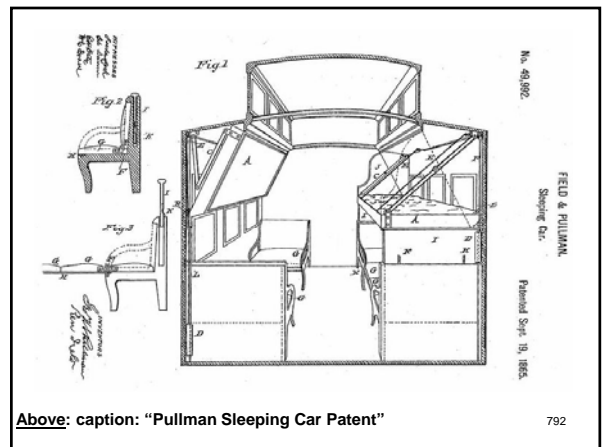
790



The CPRR was considered the better built road, the UPRR the more interesting. However, in a short interval of time the UPRR was much improved over its initial construction. The best Pullman "Palace" and sleeping cars that the Pullman Works of Chicago could turn out were put into service on the UPRR. Deluxe trains such as these, rumbling across plains and deserts and mountains in the far west, had been unknown in the east.

Above: caption: "Pullman's Pioneer Sleeper"
Left: caption: "Interior of a Pullman Sleeping Car"

791

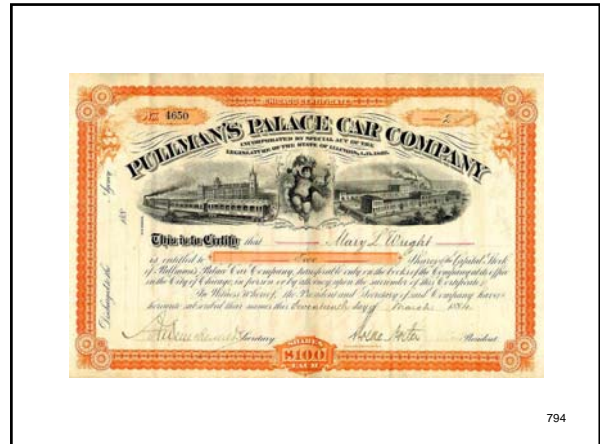


Above: caption: "Pullman Sleeping Car Patent"

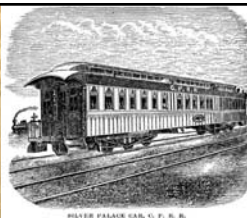
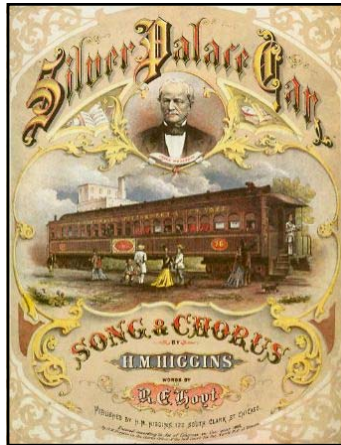
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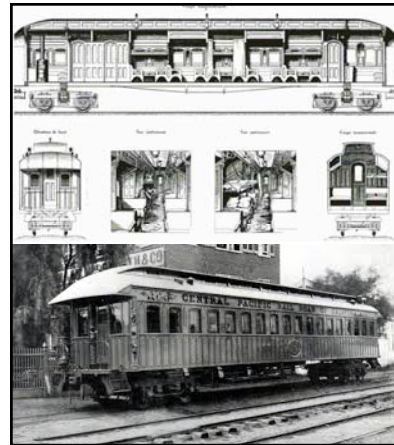


794



From Ogden to San Francisco six of the CPRR's "Silver Palace" sleeper cars were provided. These cars were inferior to the UPRR's Pullman cars (in the general opinion of the traveling public) and the CPRR soon adopted the superior Pullman cars.

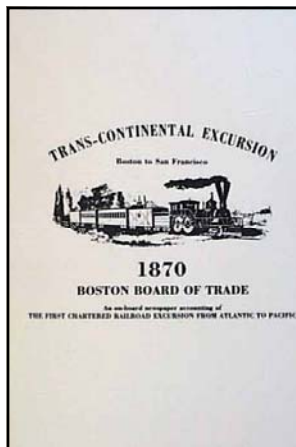
795



Top: caption: "A Silver Palace car built in 1869 for the Central Pacific by Harlan and Hellingworth"

Bottom: caption: "Silver Palace Sleeping Car, built by the Harlan and Hollingworth Company of Wilmington Delaware, for the Central Pacific Railroad of California"

796

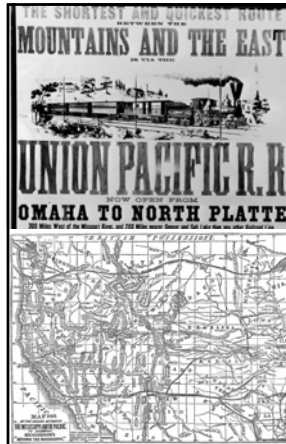


In May 1870, after the trans-continental route had been in operation for only one year, the famous "Hotel Train" from Omaha direct to San Francisco (no transfer of trains) was implemented. It left Omaha once a week equipped with three sleeper cars, a dining (a.k.a. "lounging" car). Eventually the service was discontinued and the terminus resumed at Ogden (when the CPRR declined to participate further in the scheme). That same month, the Boston Board of Trade chartered a through train from the Atlantic to the Pacific coast. In September 1870, a large delegation of eastern and southern railroad agents were taken from Chicago to Ogden in a special UPRR train.

797

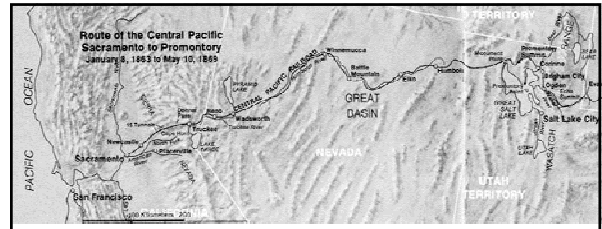


798



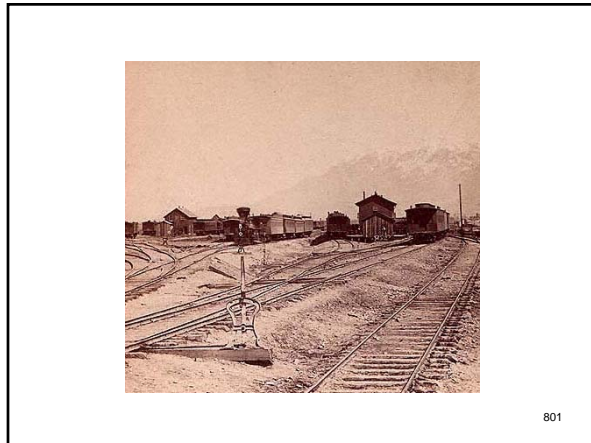
Not long after the joining celebration on *Promontory Summit* concluded, the two roads began to bargain over the common terminus directed by Congress to be "at or near Ogden." The exact distance of UPRR track from *Ogden* was determined to be 53.56 miles. The UPRR offered forty-five miles of this for \$4,000,224.96. Congress scaled the price down to \$3 million. For forty-seven and one-half miles (to within about five miles of *Ogden*), the CPRR paid the \$3 million, mainly in bonds, which reduced the cash outlay to \$2,698,620.00. The remaining five miles were later leased. Thus, the CPRR had finally arrived at *Ogden*, courtesy of the UPRR. In June 1870, the CPRR absorbed the *Western Pacific RR*, rounding out the all-rail route from NYC to *San Francisco*.

Top: period UPRR advertisement
Bottom: caption: "Map of the Region Between the Mississippi and the Pacific, 1869" 799

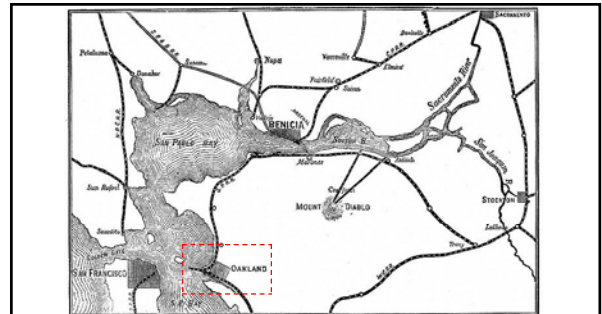


The CPRR route passed through *Newcastle* and *Truckee* (both in *California*) and, in *Nevada*, *Reno*, *Wadsworth*, *Winnemucca*, *Battle Mountain*, *Elko* and *Wells* (with many more fuel and water stations along the line) before connecting with the UPRR at *Promontory Summit* in the *Utah Territory*. When the eastern-end of the CPRR was extended to *Ogden* (by purchasing the existing UPRR line from *Promontory* in 1870) it ended the short boom period for *Promontory*, extended the CPRR's tracks about sixty miles and made *Ogden* a major point on the transcontinental RR (passengers and/or freight switched from CPRR to UPRR trains and vice-versa there).

Above: caption: "The route of the Central Pacific from Sacramento to Promontory Summit" 800



801



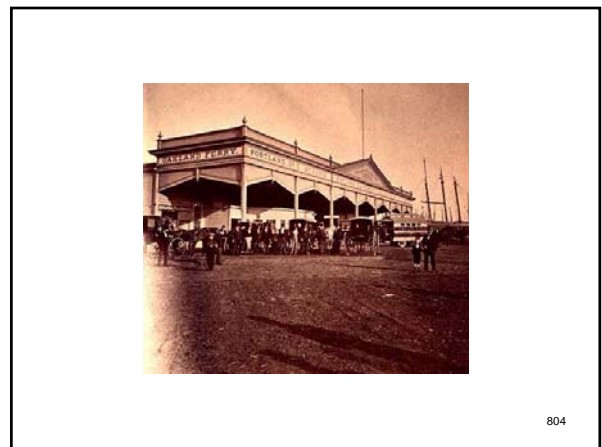
In the following years, the western part of the CPRR route was extended from *Sacramento* to the *Alameda Terminal* in *Alameda, CA*. Shortly thereafter, it was further extended to the *Oakland Long Wharf* (at *Oakland Point* in *Oakland, CA*) and on to *San Jose, CA* (train ferries transferred some railroad cars to and from the *Oakland* wharves and tracks to wharves and tracks in *San Francisco*).

802

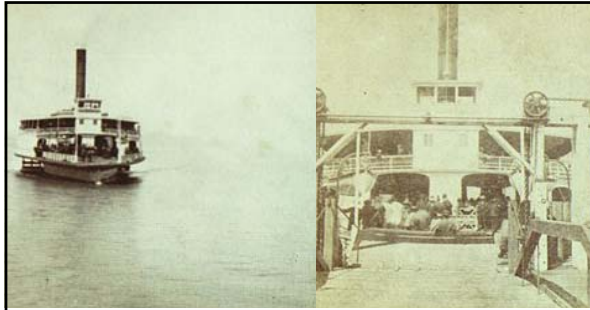


Left: caption: "Oakland Ferry Building, S.F."
Right: caption: "C.P. ferry boat *Solano* in slip at Pt. Costa waiting for train"

803

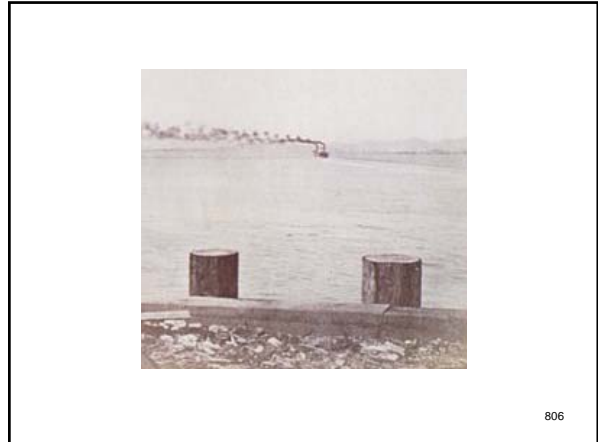


804



Left: caption: "Railroad Ferry Boat El Capitan"
 Right: caption: "Western Pacific Railroad Ferry Steamer, in the slip"

805



806

Settling Accounts

807

The UPRR placed the contract cost of the road from *Omaha to Ogden* at \$93,546,287.28. However, the *United States Pacific Railway Commission* asserted that the actual cost was \$50,720,958.94, further asserting that the real outlay had been only \$38 million. An accounting expert who was put to work on the UPRR's company books (eighteen years after the *Promontory Summit* celebration) concluded that the cost of the road was \$98,309,880.77 (he complained of the company's poor bookkeeping). The CPRR figured the contract cost of the road; from *Sacramento to Promontory*, to be \$71,116,828.15. Guidebooks of the day stated that the *Pacific Railway* cost over \$181 million. In August/September 1869, five "eminent citizens" were appointed by Congress to inspect the roads and render a verdict on their acceptability. They found the UPRR to be a road that: "compared favorably with a majority of the first-class roads in the United States," recommending the application for \$1,586,100 in further improvements. They found the CPRR: "capable of doing its business with safety and dispatch," recommending \$576,650 in improvements.

808

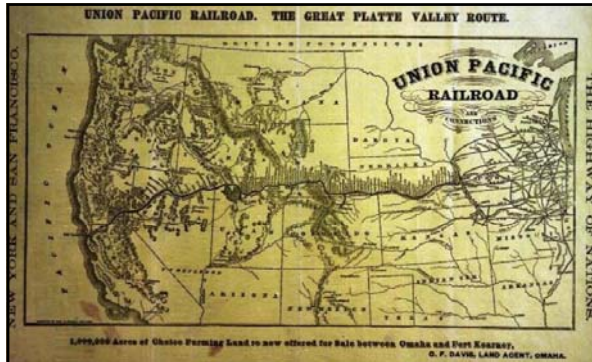


Upon completion of the work, the UPRR spent thousands of dollars on promotions and sale of the company's stock. Display advertisements (left) were inserted in all prominent newspapers and paid agents located in all important cities. The result was not only large quantities of its stock sold, but the prices obtained were greatly increased. However, in 1867 a government inspector (appointed for the purpose of examining and accepting completed sections of the road) refused to do so until he received "his fee" (\$25K). By his refusal to act until his fee was in hand, he tied up the issue of the government bonds, seriously affecting the credit of the company at a critical time. *Credit Mobilier* was paying as much as \$500K per month interest. In fact, several of the company's directors claimed that the paramount reason for the haste in building the road was not so much the competition with the CPRR as it was to get rid of the enormous interest charges they were paying which would terminate upon the road being accepted by the government and the consequent receipt of government bonds.

809

As for land grants, there was due the UPRR 11,309,844 acres valued at \$1.25/acre (a considerable portion worth less than fifty-cents per acre at the outset). To the CPRR, eight million acres (of similar valuation). As sold, these lands averaged \$4.50/acre. Before releasing payments of bonds and/or land, the careful Secretary of the Interior determined to know for certain whether or not and/or when the *Pacific Railway* contract with the Federal Government had been completed. The Secretary of the Treasury alleged that the CPRR had been completed July 16th 1869; the UPRR on November 6th 1869. The government directors of 1873 proposed that the two roads had been completed, according to specifications, on June 30th 1870. In 1874, a special commission set the date of completion as October 1st 1870. Ultimately, the U.S. Supreme Court determined the completion date to be on or about November 6th 1869.

810



Above: caption: "1,000,000 acres of Choice Farming Land is now offered for sale between Omaha and Fort Kearney, O.F. Davis, Land Agent, Omaha" 811

"This enterprise was viewed as a national undertaking for national purposes and the public mind was directed to the end rather than the particular means to be employed for the purpose. Although the road was a military necessity, there were other reasons active at the time in producing an opinion as to its necessity besides the protection of our exposed frontiers. There was a vast un-peopled territory between the Missouri River and Sacramento which was practically worthless without the facilities afforded by a railroad for the transportation of persons and property. With its construction the agricultural and mineral resources could be developed, settlements made, and the wealth and power of the United States essentially increased. And then there was also the pressing want in times of peace even of an improved and cheaper method for the transportation of the mails and supplies for the army and the Indians."

David Davis, Associate Justice of the U.S. Supreme Court
 RE: in 1870, the question of repayment of the government loans (made in the form of bonds) arose, in particular that of the interest accruing on them (the thirty-year bonds would not fall due until 1895-1899). The question was whether the lines were to pay this interest in cash or through services rendered in transporting men, material and mail for the Federal Government. Congress had assumed that the services to be rendered by the road to the government would equal the interest to be paid, understanding fully that the government had bound itself to pay interest every six months and the principal at the time the bonds matured, with the entire property of the UPRR as security for the ultimate payment of the principal and interest. The matter soon got into the courts and a decision in favor of the UPRR providing services as payment (in lieu of cash) was rendered by Justice Davis of the Supreme Court of the United States. 812

"And after said road is completed, until said bonds and interest are paid, at least five per centum of the net earnings shall be annually applied to the payment thereof"

RE: excerpt from the Curtis Bill of 1862. With the question of interest payments settled, the next issue to arise was the question as to the payment of 5% of the net earnings towards the termination of the Federal Government's indebtedness. By Act of Congress, on June 22nd 1874, the Secretary of the Treasury was directed to require this payment failing which, to bring suit. In an 1878 decision, the U.S. Supreme Court ruled that the UPRR must pay the 5%, defining "net earnings" as what was left out of the gross earnings after deducting all the expense of organization, operation or for betterments paid out of earnings. This became known as the "Thurman Act," which became law in 1878. A sinking fund (whose purpose was the extinguishing of the government's debt) was established and it included the collection of the 5% payment.

813

Achievement of the Age

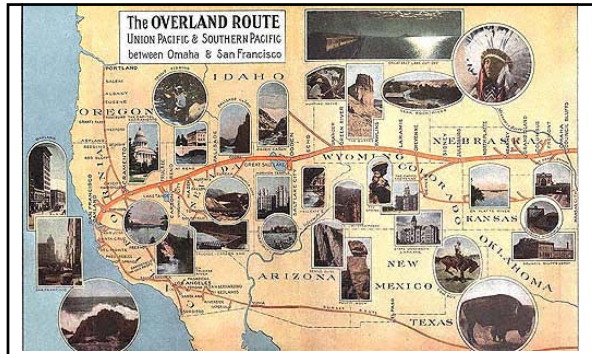
814

In 1869 the CPRR handled nearly thirty-thousand through passengers. In 1870, the UPRR passengers numbered 142,623. In 1869 the population of the five states and territories traversed by the Pacific Railway was eight-hundred and twenty thousand; within a year it was over a million. The "uninhabitable waste" - assumed to extend from two-hundred miles west of Omaha to the California border (with only the Great Salt Lake Valley as break), had been made habitable in part, if not whole. The Overland Stage had carried one-thousand pounds of mail daily on a contract of \$1.8 million per year (schedule for delivery from the Missouri River to California, during eight months, sixteen days of the year). In 1870, six-thousand pounds daily were being delivered in four and-a-half days between Omaha and San Francisco, at an annual expense of \$513K. Quick delivery and low freight charges spelled ruin for seven-thousand western teamsters who were thrown out of work with the opening of the transcontinental RR. On the bright side, the annual transportation expense of \$8 million was reduced to \$1.3 million. Furthermore, troops and their equipment could now be forwarded at the speed of five-hundred miles in twenty-four hours; a distance that previously would have required a full month on the march. General Sherman saw it as the beginning of the end of the Indian wars. In less than two years, the Northern Pacific RR, Atlantic & Pacific RR and the Texas Pacific RR had been launched under government auspices. In 1876, poet Robert Louis Stevenson, summed it all up: "...this railway was the one great achievement of the age in which we live."

815



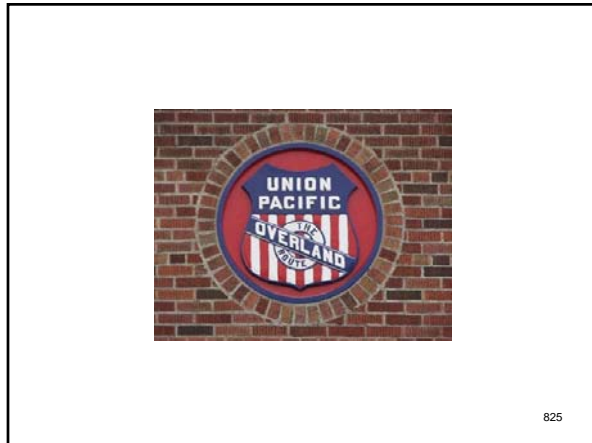
816



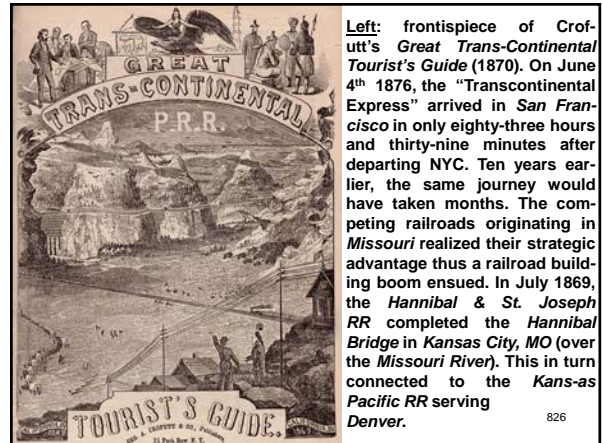
Above: caption: "Map from 'The OVERLAND ROUTE to the Road of a Thousand Wonders: The Route of the Union Pacific & Southern Pacific from Omaha to San Francisco — A Journey of Eighteen Hundred Miles Where Once the Bison & the Indian Reigned' Union and Southern Pacific Railroad Passenger Departments, 1908." 823



824



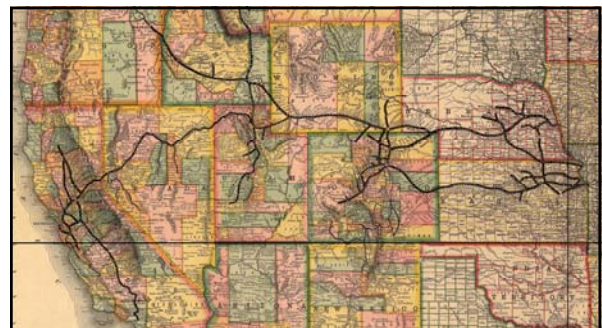
825



Left: frontispiece of Croft's Great Trans-Continental Tourist's Guide (1870). On June 4th 1876, the "Transcontinental Express" arrived in San Francisco in only eighty-three hours and thirty-nine minutes after departing NYC. Ten years earlier, the same journey would have taken months. The competing railroads originating in Missouri realized their strategic advantage thus a railroad building boom ensued. In July 1869, the Hannibal & St. Joseph RR completed the Hannibal Bridge in Kansas City, MO (over the Missouri River). This in turn connected to the Kansas Pacific RR serving Denver. 826



Above: caption: "CPRR - UPRR Timetable Map, 1881, Rand McNally, verso. (Showing RR Land Grants)." 827



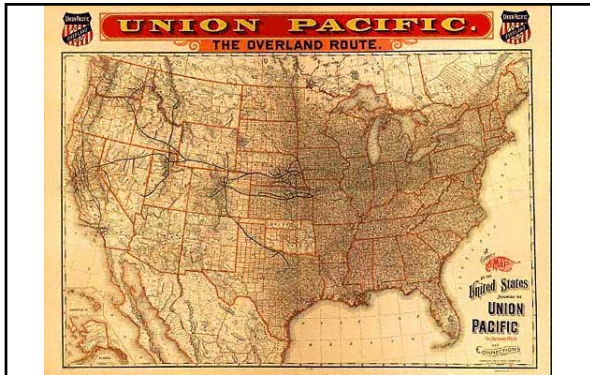
Above: caption: "New Map of the Union Pacific Railway, the Short, Quick and Safe Line to All Points West, Rand McNally and Company, 1883" 828



Above: caption: "New Map of the Union Pacific Railway, the Short, Quick and Safe Line to All Points West, Rand McNally and Company, 1883" 829



Above: caption: "Map Showing the Pacific Railways and their Branches. Prepared for the United States Pacific Railway Commission. Prepared by G.W. & C.R. Colton & Co., 1887." 830

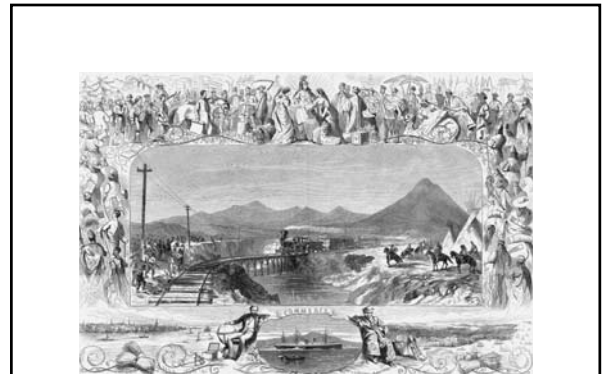


Above: caption: "A correct map of the United States showing the Union Pacific, the overland route and connections. Knight, Leonard & Company, 1892." 831

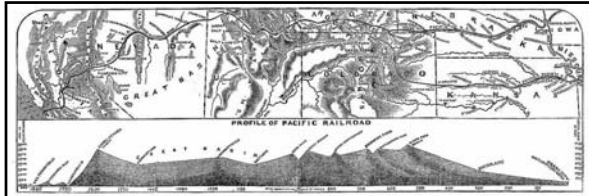
A Change in the Climate



"The opinion seems to be gaining strength that the Pacific Railroad is working a great change in the climate of the Plains. Instead of continuous droughts, all along the railroad rain now falls in refreshing abundance. This result has been remarked upon in other sections of the West. In Central Ohio, it is said, the climate has been completely revolutionized since iron rails have formed a network all over that region. Instead of the destructive droughts formerly suffered there, for some four or five years these has been rain in abundance - even more than enough to satisfy the wants of farmers. The change is thought to be a result of an equilibrium produced in the electrical currents, which has brought about a more uniform dispensation of the rain. It is a fact within the observation of all who remember ante-railroad times, that we have few or no such thunderstorms as we formerly had in New England. The iron rails which touch and cross each other in every direction, serve as conductors and equalizers of the electrical currents, and so prevent the terrible ex-plosions which used to terrify us in former years. The telegraphic wires which accompany the iron rails everywhere, also act an important part in diffusing electricity equally through the atmosphere, thus preventing the occurrence of severe thunder storms." Boston Traveler, November 30th 1869 833
Above: caption: "Lightning Scene on the Prairie"



834



Many sections of the original grade of the combined CPRR-UPRR route (as originally laid down between 1863 and 1869) have been realigned and/or relocated since the opening of the transcontinental RR on May 10th 1869. However, the location of the CPRR's route through and across the *Sierra Nevada* range remains virtually unchanged, serving today as one of the busiest and most important arteries of the nation's rail commerce. Now owned and operated by the UPRR, the route of the first railroad from *Omaha* to *Sacramento* is, primarily, a today freight road. However, passengers on Amtrak's *California Zephyr*, which runs daily (in both directions) from *Chicago* to *Oakland* can enjoy the view from the train's window thanks to those hearty souls who laid the tracks across perilous deserts and mountains to give additional meaning to the "United States."
 Above: caption: "Central Pacific Railroad - Map and Profile Map of the Line from Omaha to San Francisco" (appeared in *Harper's Weekly*, December 7th 1867) 835



836

To Set the Greenbacks Flowing

837

*Ring out, oh bells.
 Let cannons roar in loudest tones of thunder.
 The iron bars from shore to shore are laid and Nations wonder.*

*Through deserts vast and forests deep, through mountains grand and hoary
 A path is opened for all time and we behold the glory.*

*We, who but yesterday appeared but settlers on the border, where only savages were reared mid chaos and disorder.
 We wake to find ourselves midway in continental station,
 And send our greetings either way across the mighty nation.*

*We reach out towards the golden gate and eastward to the ocean.
 The tea will come at lightning rate and likewise Yankee notions.
 From spicy islands off the West the breezes now are blowing,
 And all creation does its best to set the greenbacks flowing.*

*The eastern tourist will turn out and visit all the stations
 For Pullman runs upon the route with most attractive rations.
 RE: poem read at the May 10th 1869 Chicago celebration of the opening of the Transcontinental Railroad 838*

*"We leave this estimate on record as a moderate (not an exaggerated) view of the business and profits which may be fairly expected from the Grand Pacific Railroad; Three hundred thousand passengers annually carried from coast to coast at \$150 each: \$45,000,000. Three hundred thousand tons of freight at \$1 a cubic foot or \$34 a ton: \$10,200,000. Gross receipts, to the through line, \$55,200,000."
 E.D. Mansfield, Ohio Commissioner of Statistics (1869)*

839




840

Part 9

Expand & Improve


841



Up to 1879, the policy of the UPRR was to transfer all through freight at its eastern terminus in *Omaha* (none of its equipment was allowed to leave its own rails). Soon after the absorption of the *Kansas Pacific RR* (and through it the *Denver Pacific RR*), the UPRR entered upon a policy of extension by the absorption of other roads and building of branch lines. By 1893, the total mileage reached 8,167 miles, made up of 1,823 miles of UPRR track and 6,344 miles, owned, leased and controlled. Despite this expansion, on October 13th 1893 the UPRR went into receivership due to unfavorable economic conditions (frequent train robberies also had a detrimental effect).

Left: Denver Pacific route map (ca. 1868)

842



The "Kansas Pacific" was previously called the "Union Pacific Eastern Division." However, because of allegations of corruption and fraud at the UPRR, the *Eastern Division* changed its name to *Kansas Pacific* in 1868. From 1870 until completion of the UPRR's *Missouri River Bridge* at *Omaha*, the *Kansas Pacific* and *Denver Pacific* were part of the only through-rail route across the continental *United States*. Railroad baron Jay Gould's plan for the UPRR was to build a system of interconnected railroads in the Midwest in order to expand the company to key areas in *Colorado* and *Wyoming*. When the UPRR was consolidated with the *Kansas Pacific* and *Denver Pacific*, Gould controlled all three railroads and renamed the company "Union Pacific Railway Co."

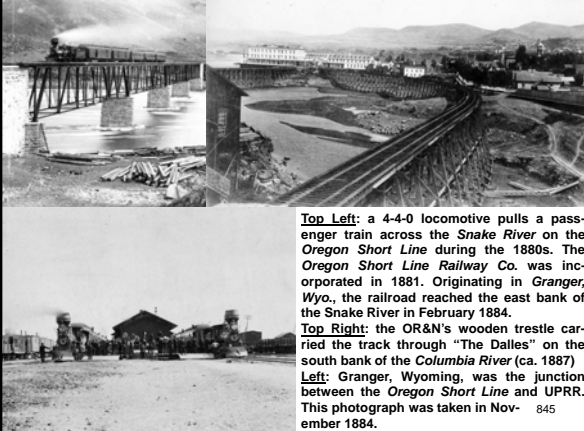
843



"WIDE WEST" AND "S. G. REED."

By the early 1880s, the *North American* rail system was operating in-sync. Railroads in the U.S. and *Canada* instituted standard time zones on November 18th 1883, ending the confusion caused by different towns along the line using their own preference. The *Oregon Steam Navigation Co.* owned the first portage railroads to carry freight and passengers around rapids and falls on the *Columbia River*. After purchase by the *Oregon Rail & Navigation Co.* in 1879, it became part of OR&N's rail network in *Oregon*, *Washington* and *Idaho*. The *Oregon Short Line* and the OR&N met at *Huntington, Oregon* on November 25th 1884, completing the shortest rail route from *Wyoming* to *Portland, Oregon*.

844



Top Left: a 4-4-0 locomotive pulls a passenger train across the *Snake River* on the *Oregon Short Line* during the 1880s. The *Oregon Short Line Railway Co.* was incorporated in 1881. Originating in *Granger, Wyo.*, the railroad reached the east bank of the *Snake River* in February 1884.


Top Right: the OR&N's wooden trestle carried the track through "The Dalles" on the south bank of the *Columbia River* (ca. 1887)

Left: *Granger, Wyoming*, was the junction between the *Oregon Short Line* and UPRR. This photograph was taken in November 1884.

845

The ICC

846




When the UPRR was founded, the railroad industry was privately owned and unregulated. Competition thrived among the growing number of rail companies who were moving into each others territory. The "Interstate Commerce Act of 1887" aimed to prevent monopoly and enhance competition through the "Interstate Commerce Commission." The ICC later expanded to oversee the trucking industry as well as interstate bus lines and telephone companies. In 1995, the ICC was terminated and some of its functions were transferred to a new regulatory agency.

847

Bust to Boom


848



In 1893, UPRR (and every other railroad in the country) paid the price for over-expanding and over-speculating. A national financial panic and a resulting depression sealed their fate. As businesses in the east collapsed, western railroads failed. Continued heavy construction expenditures, a sharp drop in revenue and growing debt proved too much for many. Construction came to a halt and many lines, including the UPRR, went into receivership. Adding to the economic troubles were the frequent train robberies, most notably by "The Hole in the Wall Gang" (1899-1900), led by *Butch Cassidy* and *the Sundance Kid*. In one instance, they blew apart an express car to get at the safe inside.

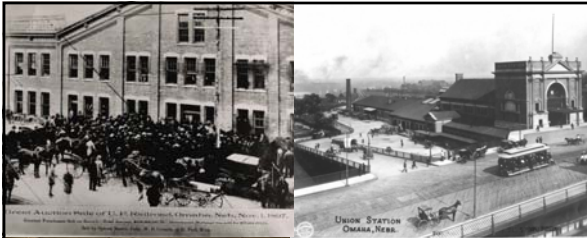
Above L&R: the real *Hole in the Wall Gang* (left) and the *Hollywood* version (right) starring *Paul Newman* (Butch Cassidy) and *Robert Redford* (Sundance Kid)

849



By the turn of the century, *E.H. Harriman* (left), who began his business career on *Wall Street* at the age of fourteen, had built an empire of railroads. His properties included the UPRR and *Southern Pacific RR*. SPRR leased the CPRR in 1885, which became a "non-operating subsidiary" of the SPRR by 1888. Harriman had served on the board and was president of the *Illinois Central RR*. Serving as president of the UPRR from 1904 to 1909, he reorganized the company and reacquired other major portions of the railroad (such as the *OSL* and the *OR&N*). Harriman spent more than \$240 million improving the line from *Omaha* to *Ogden*. His initiatives included investing in modern locomotives, freight and passenger cars, eliminating curves and reducing grades, replacing wooden bridges with steel or masonry, constructing cut-offs, reducing mileage, improving water supply, enlarging operations yards, installing heavier rail and double tracking by the hundreds of miles. Ultimately, Harriman's rehabilitation of the company returned the UPRR to prosperity.

850




Top Left: after falling into bankruptcy in 1893, parts of the UPRR were sold on the steps of a freight house

Top Right: Omaha's *Union Station* was completed December 2nd 1899. The project had been postponed many times and finally was finished under E.H. Harriman's leadership.

Left: under E.H. Harriman, the UPRR standardized plans and parts for everything from depots to locomotives for both the UPRR and SPRR. The photograph is of the Omaha Stores Department (ca. 1912).

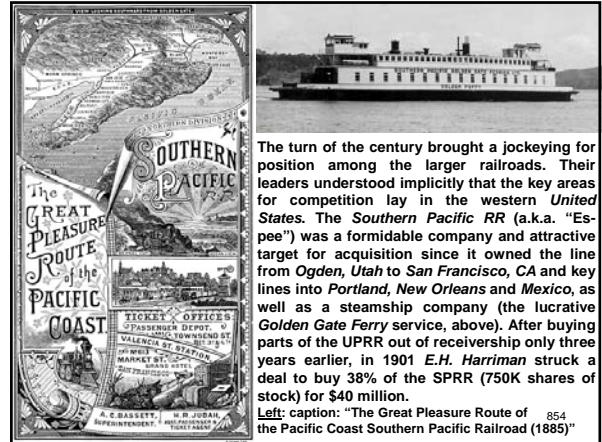
851



852

The Espee

853



The turn of the century brought a jockeying for position among the larger railroads. Their leaders understood implicitly that the key areas for competition lay in the western United States. The *Southern Pacific RR* (a.k.a. "Espee") was a formidable company and attractive target for acquisition since it owned the line from *Ogden, Utah* to *San Francisco, CA* and key lines into *Portland, New Orleans* and *Mexico*, as well as a steamship company (the lucrative *Golden Gate Ferry* service, above). After buying parts of the UPRR out of receivership only three years earlier, in 1901 *E.H. Harriman* struck a deal to buy 38% of the SPRR (750K shares of stock) for \$40 million.

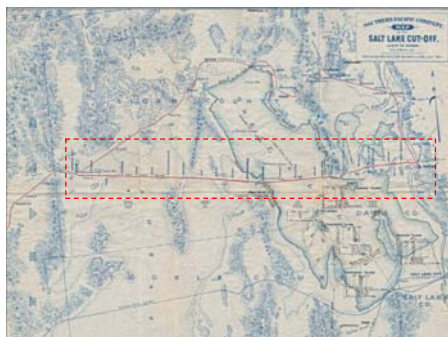
Left: caption: "The Great Pleasure Route of the Pacific Coast Southern Pacific Railroad (1885)"

The Cutoff

855

Costing \$8,358,833 and considered one of the most ambitious and successful engineering feats of the era, on March 8th 1904 the SPRR's 102-mile long "Lucin Cutoff" (a.k.a. "Salt Lake Cut-Off") bypassed and replaced the original *Promontory Summit* line. Under the direction of Chief Engineer *William Hood*, an estimated 3K workers labored seven days-a-week to create the bypass across the *Great Salt Lake*. The new line reduced the distance on the SPRR's main line (between *Ogden* and *Lucin, Utah*) by nearly forty-four miles and was considerably less curved and less steep than the old "Promontory Summit Route" - allowing for heavier freight movement and faster passenger travel. In 1942, the original line was removed between *Lucin* and *Corinne, Utah*. The original Promontory spikes were pulled up and the scrap metal donated to the war effort. By 1908, five passenger trains and seven freight trains in each direction used the *Lucin Cutoff* each day. Including twelve miles of trestle across the *Great Salt Lake*, the project was heralded not only as a great engineering achievement, but also as a highly profitable investment by the UPRR.

856



857



Above: satellite photo of the *Great Salt Lake* shows the difference in colors between the northern (right) and southern (left) portions of the lake, the result of creating the *Lucin Cutoff* (highlighted)

858



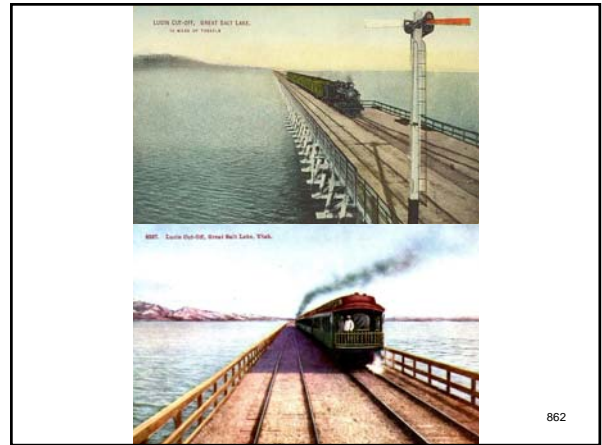
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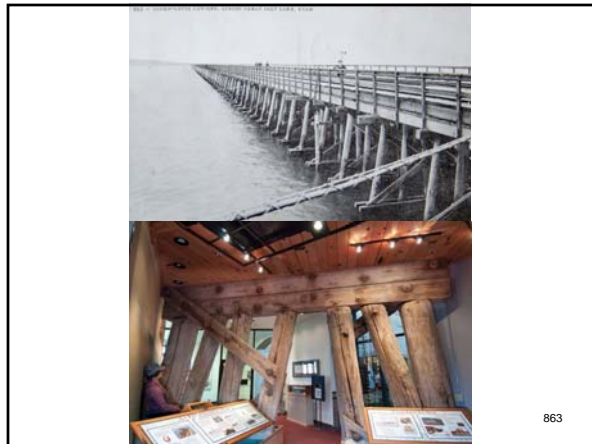
Top Left: E.H. Harriman's special train crosses the *Lucin Cutoff* (photograph taken from a boat on *Salt Lake*). The cutoff was a mixture of trestle bridge and fill.
Top Right: excursion stop at the *Midlake Station* (shortly after the completion of the *Lucin Cutoff* in early March 1904)
Left: photographs were taken at the center of the new line during a special excursion. Accompanying *E.H. Harriman* were railroad officials from *Omaha*, *San Francisco* and *Chicago*, personal friends, newspaper contacts and several prominent individuals from *Salt Lake City* and *Ogden*.
 860



861



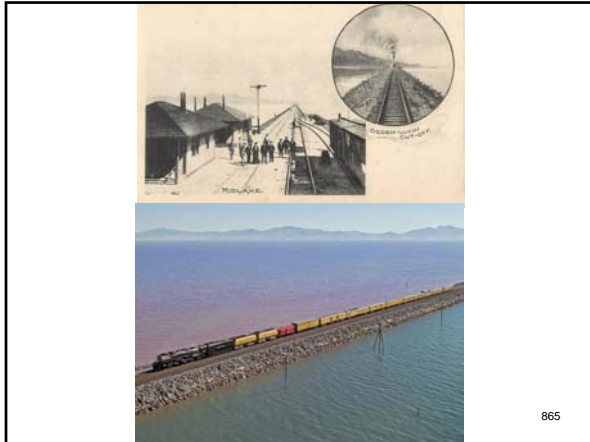
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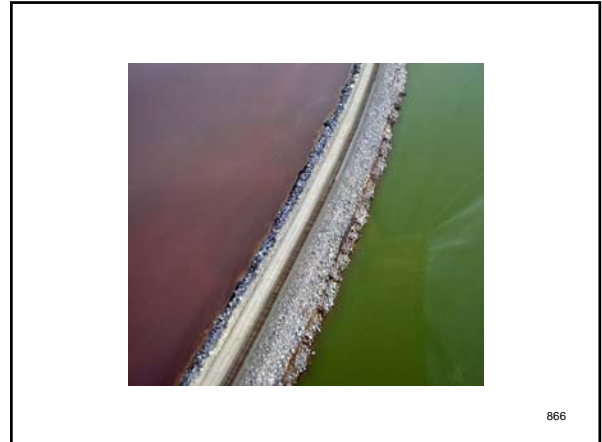
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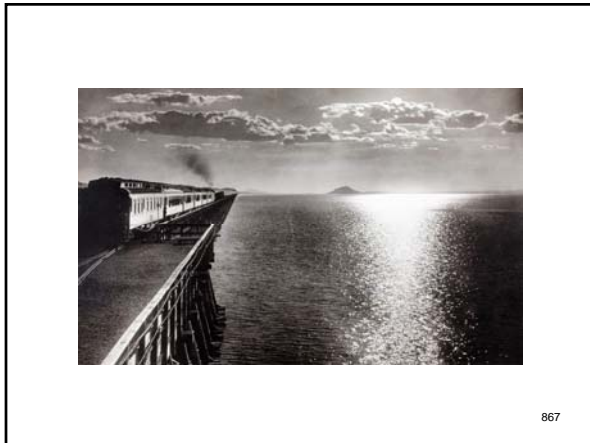
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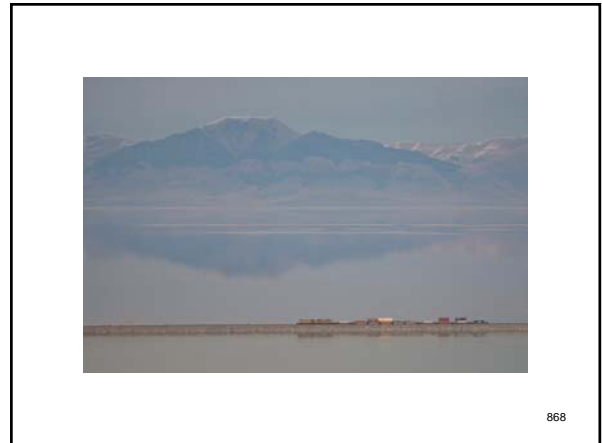
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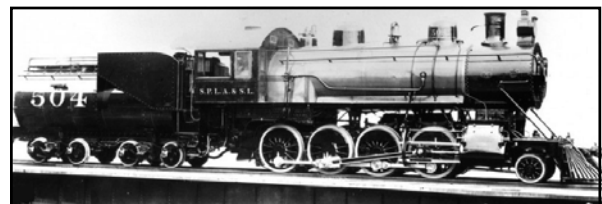
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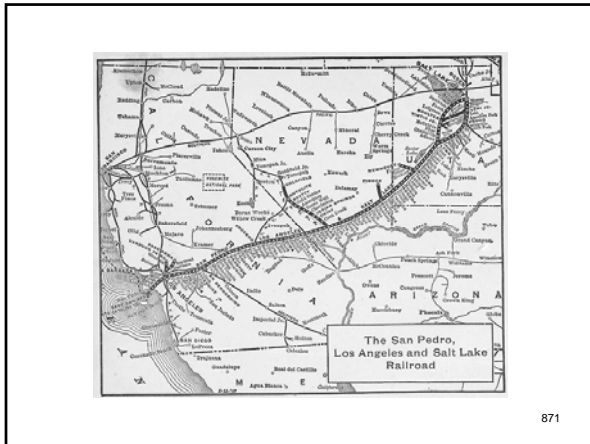
Hollywood or Bust

869

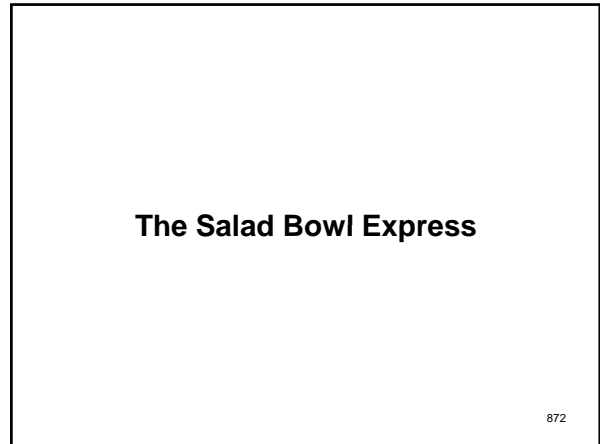


A rail link from Salt Lake City to Los Angeles was highly prized in the late nineteenth century. UPRR owner E.H. Harriman and U.S. Senator William A. Clark of Montana, owner of the San Pedro, Los Angeles and Salt Lake Railroad (SPLA&SLRR) engaged in a head-to-head battle for rights to build in the Las Vegas Valley. Both railroads built lines west from Utah. Eventually, they came to terms. Harriman and Clark actually reached a compromise for the railroad purchase two years earlier, in 1902. They managed to keep the agreement secret until October 1904, when news of the transaction was published in the UPRR annual report. Under the terms of the deal, Clark could operate the SPLA&SLRR on the UPRR's lines and, in return, the UPRR received a 50% share in the SPLA&SLRR. Construction crews completed construction of the rest of the route and the Salt Lake-Los Angeles line opened on May 1st 1905.

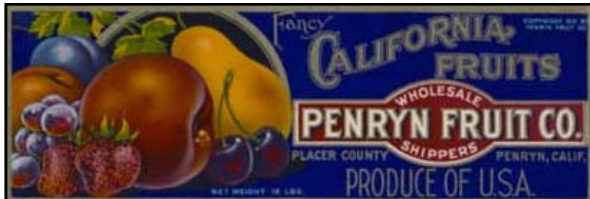
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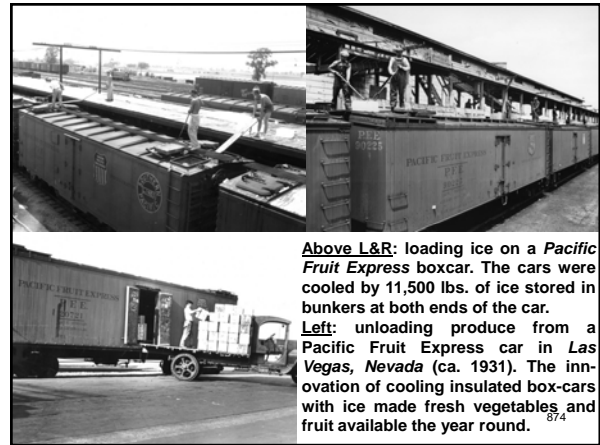
871



872



In 1906, the SPRR and the UPRR created "Pacific Fruit Express" to answer a demand for rail cars that could ship perishable fruits from California's *Salinas* and *Central Valley*'s. *E.H. Harriman* made an initial order of six-thousand insulated refrigerator boxcars, cooled by ice stored at each end. Though considered a risky purchase by some at the time, it soon paid dividends. Fresh fruits and vegetables were in high demand, enough so that growers developed ways to produce crops all year round. By 1921, *Pacific Fruit Express* had grown to 19,200 rail cars carrying 170K carloads. At present, the UPRR maintains a fleet of nearly five-thousand refrigerated rail cars (above). The cars transport a variety of fresh and frozen products including produce, seafood, meat, poultry and potatoes.⁸⁷³



Above L&R: loading ice on a *Pacific Fruit Express* boxcar. The cars were cooled by 11,500 lbs. of ice stored in bunkers at both ends of the car.
Left: unloading produce from a *Pacific Fruit Express* car in *Las Vegas, Nevada* (ca. 1931). The innovation of cooling insulated box-cars with ice made fresh vegetables and fruit available the year round.⁸⁷⁴



In his first major screen role, actor *James Dean* played *Cal Trask* in the 1955 film adaptation of *John Steinbeck's* 1952 novel "East of Eden" (original poster at left). It's 1917 and the *United States* seems to be on the brink of war with *Germany*. *Cal's* father gambles on shipping a trainload of lettuce cross-country from *Salinas, CA*, using a new refrigeration technique that he's created, only to see the shipment stalled, the ice melted and the lettuce ruined.⁸⁷⁵

875



876

"In 1863 he (Dey) began work with the Union Pacific Railroad Company having charge of the surveys between Omaha and the Salt Lake Valley and also of the construction of the first one hundred miles west of Omaha. In November, 1863, he went with the officers of the road and government directors to see the President of the United States presenting a map on the showing of which Mr. Lincoln designated the Congressional Section in which Omaha was located, as the initial point of the Union Pacific Railroad. While employed on this work Mr. Dey raised the question on the Credit Moblier Contract, suggesting that this was a violation of a trust and a diversion of the advances made by the general government without due consideration. The history of this may be found in the Credit Moblier Report of the Wilson Committee to Congress published in 1873. In connection with his work on the Union Pacific Railroad, Mr. Dey located and recommended a line from Omaha almost due west to Elkhorn but through the influence of some of the officers of the company the line was changed to add nine miles to a distance of thirteen..."

RE: excerpt from the "Thirty-Fourth Annual Report of the Board of Railroad Commissioners - State of Iowa" (1911). From 1863 to 1865, Peter Dey directed surveys of the road to Promontory Summit, helped secure land for the right-of-way, ordered equipment, arranged tie contracts, raised funds for construction and served as the UPRR's Chief Engineer. 877


"The claim was made that this would eliminate heavy work and heavy grades, but many saw other reasons for the change and it was violently opposed by both Omaha and Council Bluffs for the fear that the design was to make Bellevue the real terminal. As a matter of fact nothing was gained from an engineering point of view by the proposed change. The case was carried to the Government which was to issue bonds at several thousand dollars per mile of road completed and after a long contest and many reports it was ordered that the change should not be made unless the Omaha and Elkhorn grades were eliminated. General Dodge is authority for the statement that 'by the change and addition of nine miles they made no reductions in the original grades or in tonnage hauled in a train on the new line, over the old line if it had been built.' The company paid no attention to the Government order or to the recommendations of its engineer, and went ahead on the changed line. The Government commissioners accepted the line thus built and bonds were issued on it. The decision to make the change and the letting of the contracts for a much larger sum than that necessary to actually construct the road, to an inside ring of the stockholders of the company (the Credit Moblier) caused Mr. Dey to tender his resignation. In the improvement work done on the Union Pacific Railway since 1900, a part was the cutoff west of Omaha, practically a relocation on the original line recommended by Mr. Dey in 1864."

Engineering News, August 31st 1911
RE: the plan for the "Lane Cutoff" was conceived by Dey who laid-out a straight route between Omaha and the Elkhorn River. It was vetoed by consulting engineer Silas Seymour, who proposed an "Ox-Bow" line with less grade but with nine extra miles of track. 878



"...When his estimate was made to the Directors, it was returned to him with orders to retouch it with higher colors, to put in embankments on paper where none existed on earth, to make the old embankments heavier, to increase the expense generally, and he was requested to send in his estimate that it would cost \$50,000 per mile. When Mr Dey was informed that this part of the road was let at \$50,000 per mile which he knew could be done for \$30,000, this difference amounting to \$5,000,000 on the two hundred and forty six miles, he resigned his position as Chief Engineer in a noble letter to the President of the road."

Scribner's Monthly, March 1874
Above: caption: "Map of the routes of the Union Pacific Rail Roads with their eastern connections by W.J. Keeler, CIVIL Engineer, November, 1867" 879



"My views of the Pacific Railroad are perhaps peculiar. I look upon its managers as trustees of the bounty of Congress. You are doubtless uninformed how disproportionate the amount to be paid is to the work contracted for. I need not expatiate on the sincerity of my course when you reflect upon the fact that I have resigned the best position in my profession this country has offered to any man."

Peter Dey, UPRR Chief Engineer
RE: excerpt from his resignation letter to the president of the UPRR. Dey (left) resigned his office as Chief Engineer of the UPRR effective December 30th 1864. 880

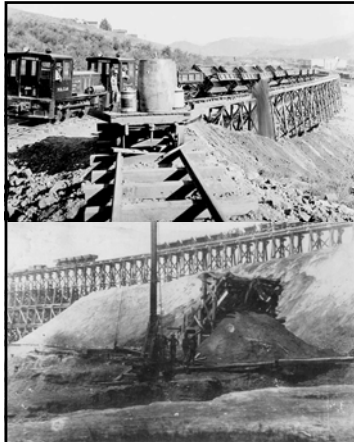


Peter Dey was ultimately vindicated when E.H. Harriman straightened the main line (opened in May 1908). His "Lane Cutoff" directly followed the first route laid out by Dey forty-five years earlier. Today, Interstate 80 (I-80) closely parallels the Lane Cutoff.

Left: caption: "Interstate Highway 80 and the Union Pacific Railroad" 881

Bridge & Fill

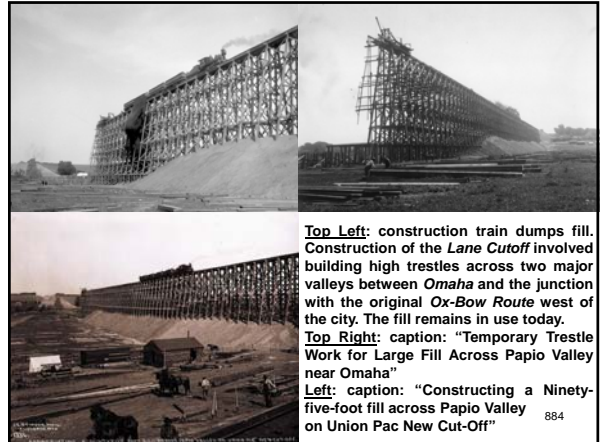
882



Initially, many valleys were bridged with temporary trestles that could be rapidly built, later to be replaced by much lower maintenance and permanent solid fill. The existing railroad made transporting and placing fill material in the valleys much easier; load it on railway dump cars, haul it where needed and dump it over the side of the trestle.

Top: trestle being back filled
Bottom: dumping fill

883

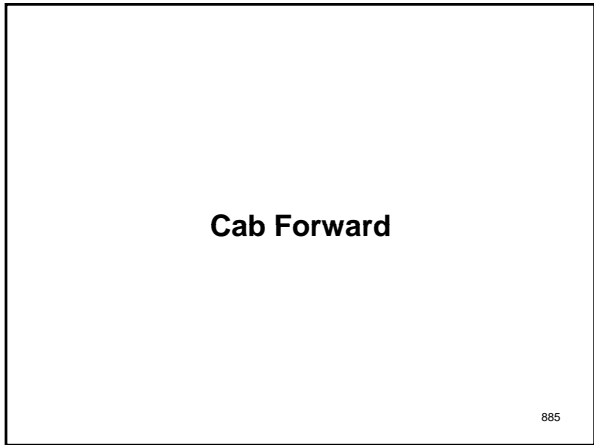


Top Left: construction train dumps fill. Construction of the *Lane Cutoff* involved building high trestles across two major valleys between *Omaha* and the junction with the original *Ox-Bow Route* west of the city. The fill remains in use today.

Top Right: caption: "Temporary Trestle Work for Large Fill Across Papio Valley near Omaha"

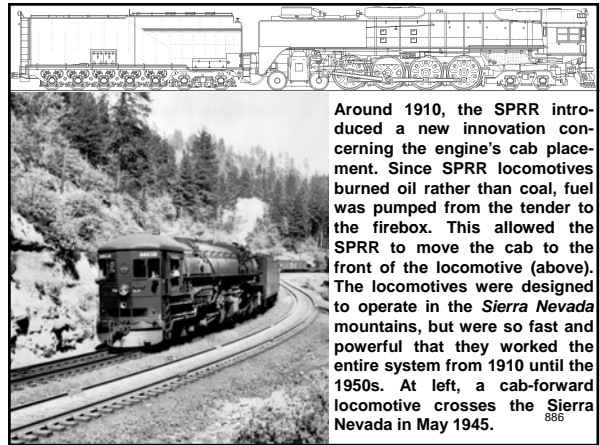
Left: caption: "Constructing a Ninety-five-foot fill across Papio Valley on Union Pac New Cut-Off"

884



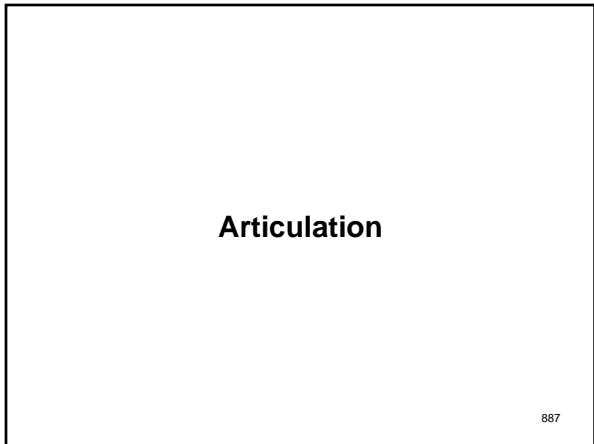
Cab Forward

885



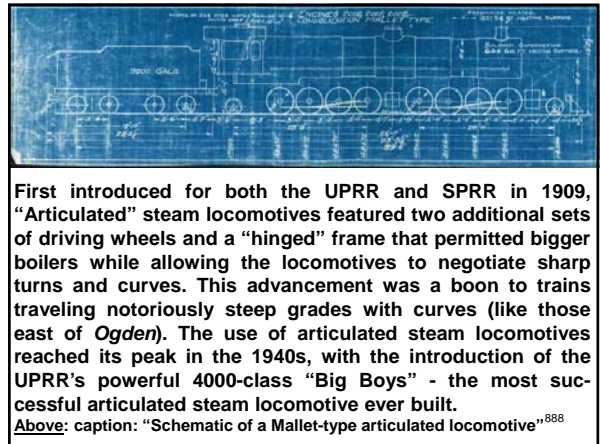
Around 1910, the SPRR introduced a new innovation concerning the engine's cab placement. Since SPRR locomotives burned oil rather than coal, fuel was pumped from the tender to the firebox. This allowed the SPRR to move the cab to the front of the locomotive (above). The locomotives were designed to operate in the *Sierra Nevada* mountains, but were so fast and powerful that they worked the entire system from 1910 until the 1950s. At left, a cab-forward locomotive crosses the *Sierra Nevada* in May 1945.

886



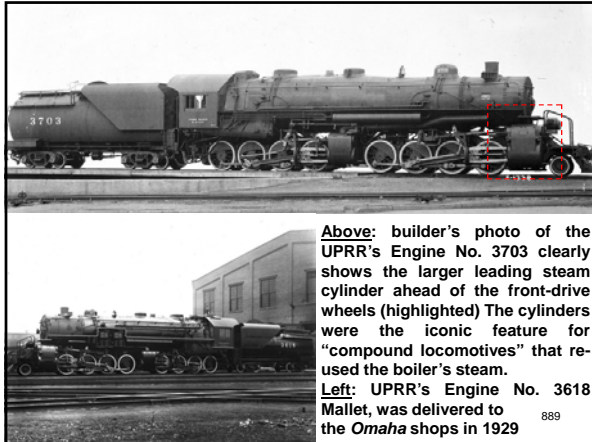
Articulation

887



First introduced for both the UPRR and SPRR in 1909, "Articulated" steam locomotives featured two additional sets of driving wheels and a "hinged" frame that permitted bigger boilers while allowing the locomotives to negotiate sharp turns and curves. This advancement was a boon to trains traveling notoriously steep grades with curves (like those east of *Ogden*). The use of articulated steam locomotives reached its peak in the 1940s, with the introduction of the UPRR's powerful 4000-class "Big Boys" - the most successful articulated steam locomotive ever built.

Above: caption: "Schematic of a Mallet-type articulated locomotive"⁸⁸⁸



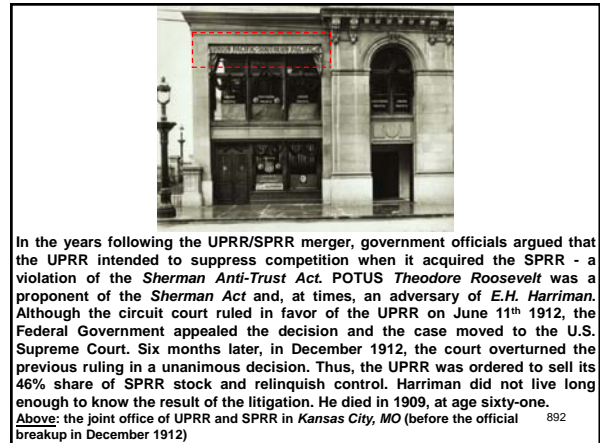
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890

The Sherman Act

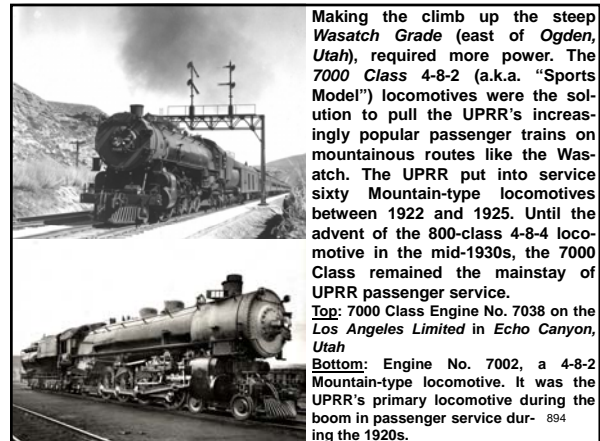
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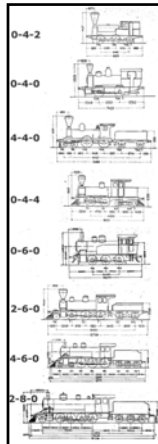
892

Making the Grade

893



894



Devised by *Frederick Methvan Whyte* in the early twentieth century, the "Whyte System" is a notation for the number of wheels on a steam locomotive. For example, for the 7000 Class 4-8-2, the first digit represents the first group of wheels (4); the middle number or numbers represent the big driving wheels (8) (responsible for pulling power) and the last is the number in the trailing truck under the cab (2). Thus, a locomotive with two leading axles (four wheels) in front, three driving axles (six wheels) followed by one trailing axle (two wheels) is classified as a 4-6-2.

Above: a 4-10-4 locomotive
Left: selection of early twentieth century locomotive types (according to their Whyte System notation) and their comparative size

895

WHYTE CLASSIFICATION SYSTEM

Whyte ID	Name	Primary Use	Notes
0-6-0	Switcher	Switching	
4-4-0	American	Freight/Passenger	
4-6-2	Atlantic	Freight/Passenger	
2-6-2	Pacific	Passenger	
4-6-0	Pacific	Passenger	
4-6-4	Hudson	Freight/Passenger	
2-8-0	Consolidation	Freight	
2-8-2	Montana	Freight	
2-8-4	Montana	Freight/Passenger	
4-8-2	Montana	Freight/Passenger	
4-8-4	Northwest	Freight/Passenger	
2-10-2	Santa Fe	Freight	
2-10-4	Texas	Freight	
2-10-6	Albigator	Freight	Articulated
4-6-4	Challenge	Freight/Passenger	Articulated
2-8-8-4	Yellowstone	Freight	Articulated
4-8-8-4	Big Boy	Freight	Articulated
2-10-10-2		Freight	Articulated
4-8-4-4		Passenger	PRR T-1



Locomotives—Types of—

Single Drive..... 4-2-2
 Atlantic..... 4-4-0
 Pacific..... 4-6-2
 Ten Wheel..... 4-6-0
 Pacific or St. Paul..... 4-6-2
 Twelve Wheel..... 4-8-0
 Mastodon..... 4-10-0
 Columbia..... 2-8-2
 Niagara..... 2-8-0
 Hudson..... 4-6-4
 Consolidation..... 2-8-0
 Mikado or Calumet..... 2-8-2
 Decapod..... 2-10-0
 Santa Fe..... 2-10-2
 Oregonian..... 2-10-4
 Four Wheel..... 0-4-0
 Four Coupled..... 0-4-0
 Six..... 0-6-0
 Eight..... 0-8-0
 Ten..... 0-10-0
 Articulated—Four six coupled.
 Whyte original..... 0-4-4
 "..... 0-coupled 0-6-4
 "..... Single..... 4-2-2
 "..... Multiple..... 2-4-4
 "..... Subtype..... 2-4-4

Locomotive Classification. L-9

Above: Whyte System classifications for several popular steam locomotives
Left: Whyte System notation - from a handbook for railroad industry workers published in 1906

896

In March 1926, the UPRR developed the 9000 Class steam locomotive to improve speed and pulling power. The locomotive had a running speed of 50mph (40mph was the standard of the day). It hauled freight primarily between *Council Bluffs, Iowa*, and *Green River, Wyoming* (over *Sherman Hill*). The unusual 3-cylinder 4-12-2 arrangement had the longest rigid wheelbase of any U.S. manufactured steam locomotive. It was used only by the UPRR (mainly because the wheel arrangement could not negotiate tight curves on other railroads). The 9000 Class was retired in 1955.

Top: this was the first 9000, delivered in April 1926 by *American Locomotive Company* in *Dunkirk, N.Y.* The distinctive 4-12-2 wheel configuration is visible here.



Bottom: the 9000 series were three-cylinder engines and featured the longest rigid frame of any steam locomotive ever built. They were made only for the UPRR and often were called the "Union Pacific Type" with a 4-12-2 wheel arrangement. The internal cylinder made them difficult to maintain.

897



Streamline Moderne

899

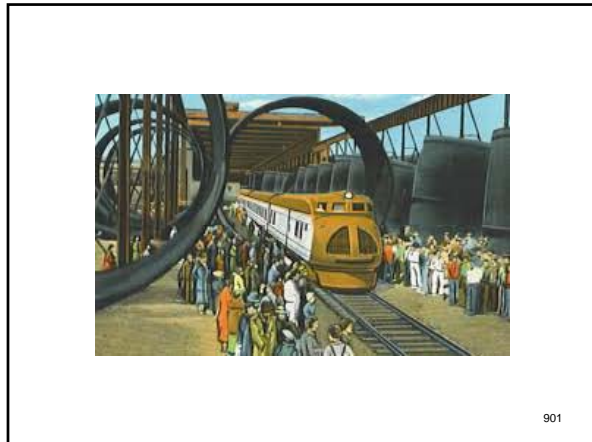



The M-10000 was the first of eleven streamlined "M" units delivered to the UPRR in the 1930s and '40s. The "M" stood for "Motor" designating locomotives that were powered by internal combustion. This first streamliner (made of aluminum alloy) was a three-car "day train" (sleeping cars were added in subsequent models). Fully loaded with 116 passengers, crew and baggage, an M-10000 weighed far less than a conventional steam train requiring less horsepower. It was nicknamed "Lil' Zip" and was recognizable by its modern shape and vibrant "Armour Yellow" paint scheme.

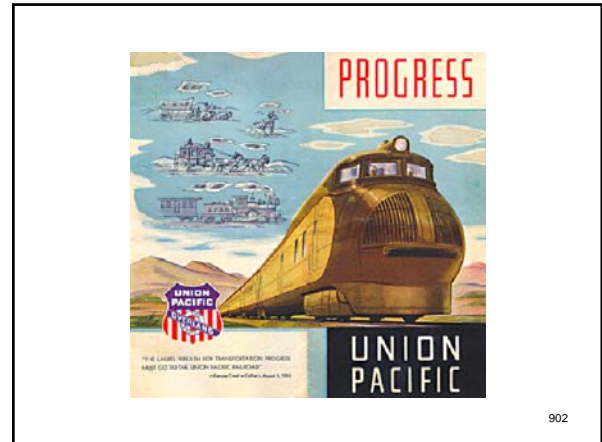
Top: the nation's first streamlined passenger train was built by the Pullman Company for the UPRR. It was delivered to *Chicago* on February 25th 1934, to begin a year-long tour of the *United States*.

Bottom: this shot of the M-10000; in a 30-foot diameter pipe section at the then under-construction *Hoover Dam*, was taken during the train's national tour in 1934

900



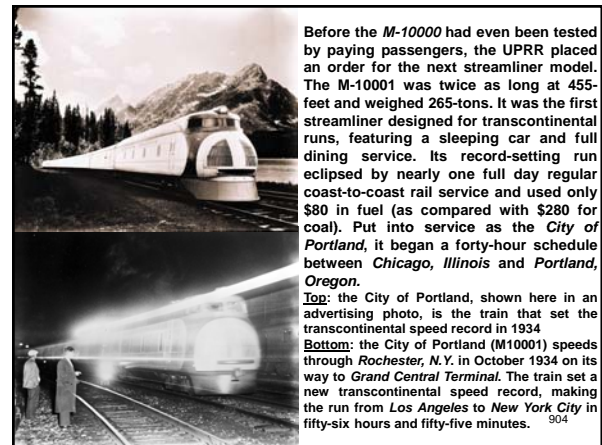
901



902



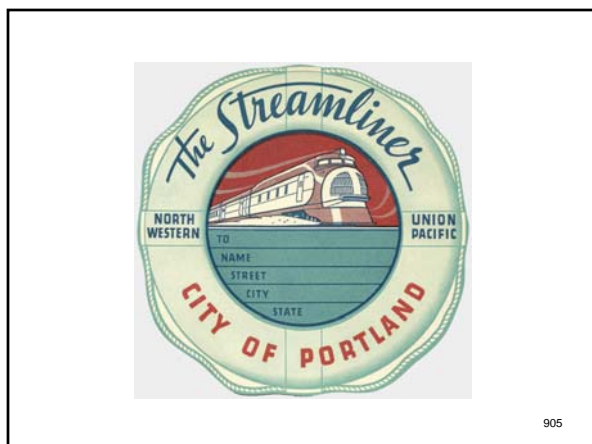
903



Before the *M-10000* had even been tested by paying passengers, the UPRR placed an order for the next streamliner model. The *M-10001* was twice as long at 455-feet and weighed 265-tons. It was the first streamliner designed for transcontinental runs, featuring a sleeping car and full dining service. Its record-setting run eclipsed by nearly one full day regular coast-to-coast rail service and used only \$80 in fuel (as compared with \$280 for coal). Put into service as the *City of Portland*, it began a forty-hour schedule between *Chicago, Illinois* and *Portland, Oregon*.

Top: the *City of Portland*, shown here in an advertising photo, is the train that set the transcontinental speed record in 1934

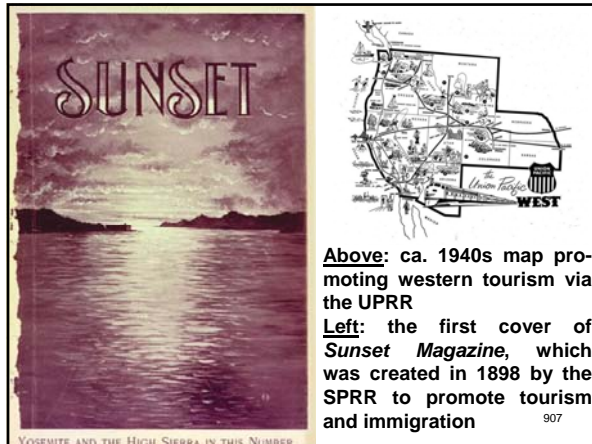
Bottom: the *City of Portland* (M10001) speeds through *Rochester, N.Y.* in October 1934 on its way to *Grand Central Terminal*. The train set a new transcontinental speed record, making the run from *Los Angeles* to *New York City* in fifty-six hours and fifty-five minutes. ⁹⁰⁴



905

The Union Pacific West

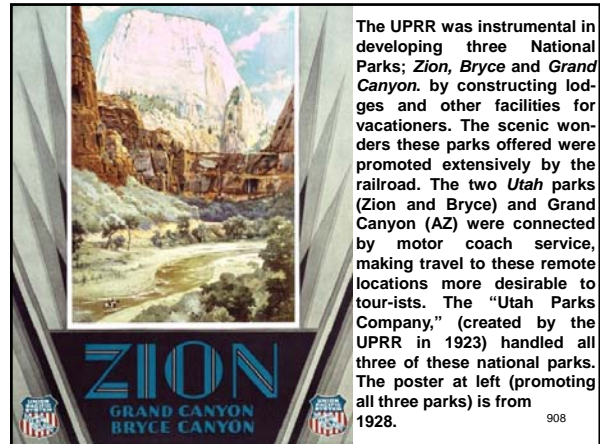
906



Above: ca. 1940s map promoting western tourism via the UPRR

Left: the first cover of *Sunset Magazine*, which was created in 1898 by the SPRR to promote tourism and immigration

907



The UPRR was instrumental in developing three National Parks; Zion, Bryce and Grand Canyon. by constructing lodges and other facilities for vacationers. The scenic wonders these parks offered were promoted extensively by the railroad. The two Utah parks (Zion and Bryce) and Grand Canyon (AZ) were connected by motor coach service, making travel to these remote locations more desirable to tourists. The "Utah Parks Company," (created by the UPRR in 1923) handled all three of these national parks. The poster at left (promoting all three parks) is from 1928.

908

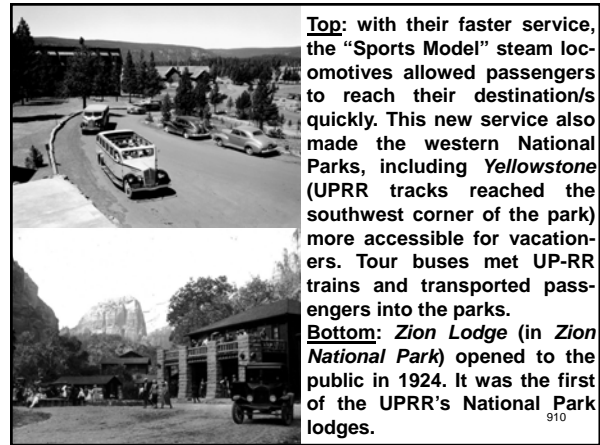


The New Way To See GRAND CANYON NATIONAL PARK

Union Pacific's Children's Book Yellowstone Bears

UNION PACIFIC

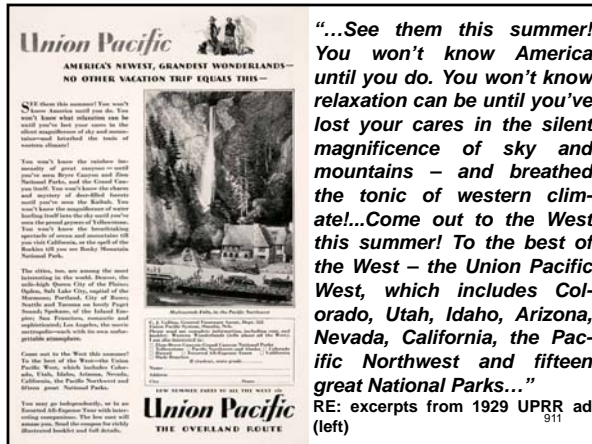
909



Top: with their faster service, the "Sports Model" steam locomotives allowed passengers to reach their destination/s quickly. This new service also made the western National Parks, including Yellowstone (UPRR tracks reached the southwest corner of the park) more accessible for vacationers. Tour buses met UP-RR trains and transported passengers into the parks.

Bottom: Zion Lodge (in Zion National Park) opened to the public in 1924. It was the first of the UPRR's National Park lodges.

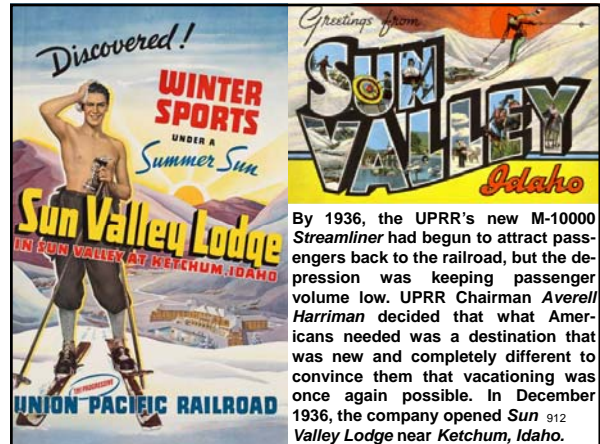
910



"...See them this summer! You won't know America until you do. You won't know relaxation can be until you've lost your cares in the silent magnificence of sky and mountains - and breathed the tonic of western climate!...Come out to the West this summer! To the best of the West - the Union Pacific West, which includes Colorado, Utah, Idaho, Arizona, Nevada, California, the Pacific Northwest and fifteen great National Parks..."

RE: excerpts from 1929 UPRR ad (left)

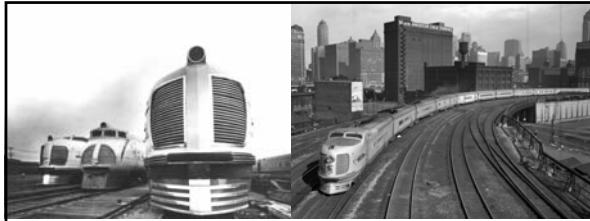
911



Greetings from SUN VALLEY Idaho

By 1936, the UPRR's new M-10000 Streamliner had begun to attract passengers back to the railroad, but the depression was keeping passenger volume low. UPRR Chairman Averell Harriman decided that what Americans needed was a destination that was new and completely different to convince them that vacationing was once again possible. In December 1936, the company opened Sun Valley Lodge near Ketchum, Idaho.

912



The UPRR transformed passenger rail service with its *Streamliner* series. The M-series trains were sophisticated hotels and restaurants on wheels. To offer daily service between three western points (*Denver, San Francisco and Los Angeles*) and *Chicago* involved a tremendous outlay of equipment and personnel. Each train required an engineer, two brakemen, conductor, fireman, baggage man, car attendants, cooks, waiters, lounge car attendants and sleeping car attendants. Travelers on the M-series Streamliners enjoyed a fine dining experience at every meal as well. By the 1950s, the "City" trains featured dome dining cars, a unique experience offered only by the UPRR.

Left: the success of the M-10000 and the *City of Portland* quickly led to the inauguration of more streamliners in 1936, including the *City of San Francisco* and *City of Denver*. **Right:** the *City of Denver*, the fastest scheduled daily streamliner on the UPRR, is seen leaving Chicago (ca. 1936)

913



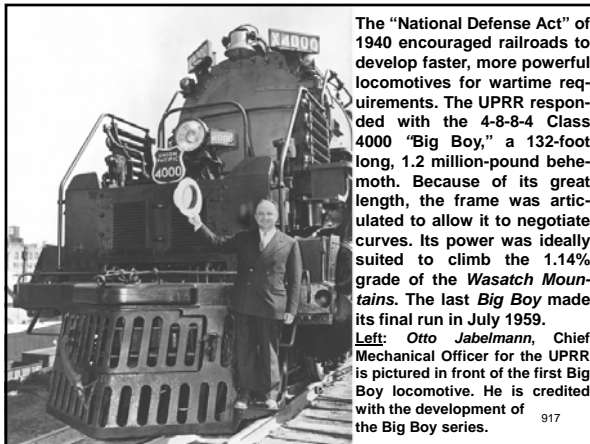
914



915

The "Big Boy" Era

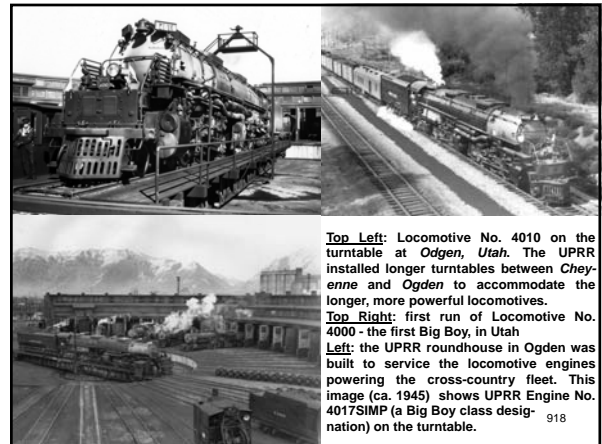
916



The "National Defense Act" of 1940 encouraged railroads to develop faster, more powerful locomotives for wartime requirements. The UPRR responded with the 4-8-8-4 Class 4000 "Big Boy," a 132-foot long, 1.2 million-pound behemoth. Because of its great length, the frame was articulated to allow it to negotiate curves. Its power was ideally suited to climb the 1.14% grade of the *Wasatch Mountains*. The last *Big Boy* made its final run in July 1959.

Left: *Otto Jabelmann*, Chief Mechanical Officer for the UPRR is pictured in front of the first *Big Boy* locomotive. He is credited with the development of the *Big Boy* series.

917

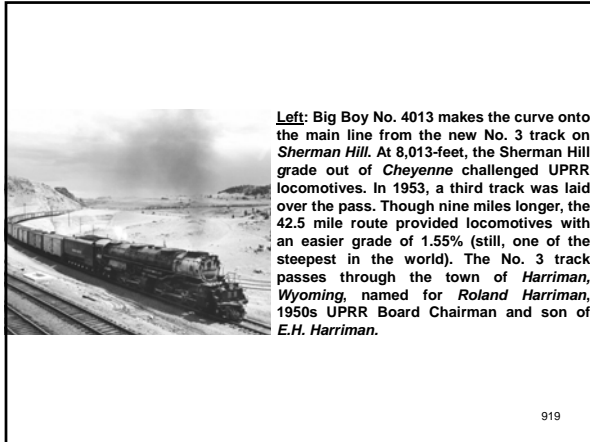


Top Left: Locomotive No. 4010 on the turntable at *Odgen, Utah*. The UPRR installed longer turntables between *Cheyenne* and *Ogden* to accommodate the longer, more powerful locomotives.

Top Right: first run of Locomotive No. 4000 - the first *Big Boy*, in Utah

Left: the UPRR roundhouse in *Ogden* was built to service the locomotive engines powering the cross-country fleet. This image (ca. 1945) shows UPRR Engine No. 4017SIMP (a *Big Boy* class designation) on the turntable.

918



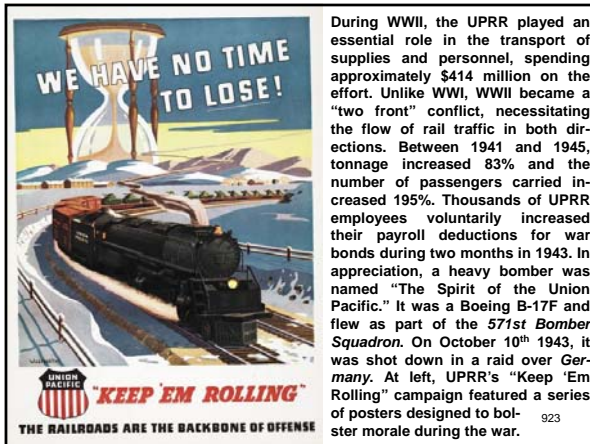
Part 10

The Spirit of the Union Pacific

921

A Two Front War

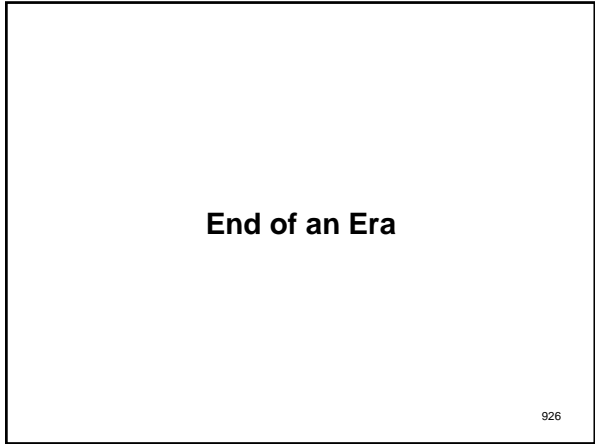
922





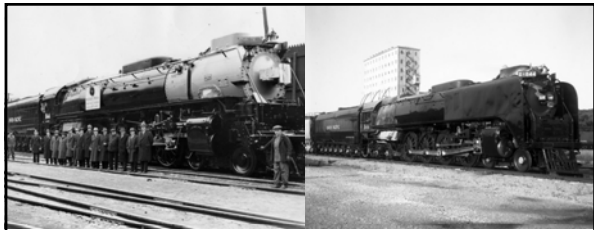
One of the most visible contributions to the war effort associated with the UPRR was its maintenance of servicemen's Canteens and USOs at stops like the *North Platte Depot*. Staffed entirely by volunteers, the canteen operated every day for fifty-one consecutive months, serving as many as ten-thousand servicemen and women each day. Soldiers passing through were greeted with free sandwiches, coffee, cookies, cigarettes and friendly smiles.
Top: coffee, sandwiches and cigarettes were provided every day to soldiers, sailors and marines. The canteen was supported entirely by small *Nebraska* communities who pooled their rationed foodstuffs and farm goods.
Bottom: troops had as few as ten minutes during their stop at the famous *North Platte Canteen*

925



End of an Era

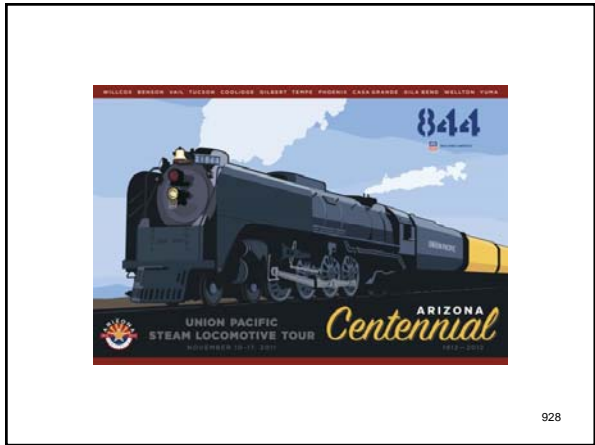
926



Steam locomotive No. 844 was the last steam locomotive built for the UPRR. A high-speed passenger engine, it pulled such widely known trains as the *Overland* and *Los Angeles Limited*, *Portland Rose* and *Challenger*. When diesels took over all of the passenger train duties, No. 844 was placed in freight service in *Nebraska* between 1957 and 1959. It was saved from being scrapped in 1960 and held for special service. Hailed as a "Living Legend," the engine is known for its excursion runs, especially over *Sherman Hill* (between *Cheyenne* and *Laramie, Wyoming*).

Left: No. 844 being delivered to UPRR from the *American Locomotive Company* (December 1944)
Right: No. 844, shown in *Council Bluffs, Iowa*

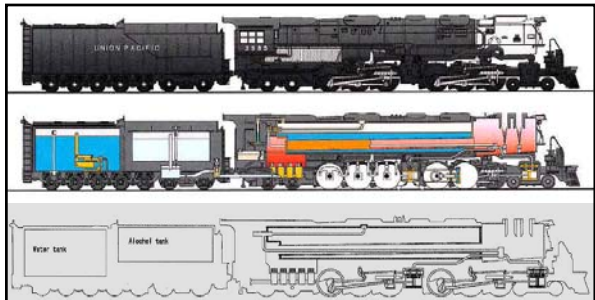
927



928



929



Above: the UPRR at one time owned one-hundred and five "Challenger" locomotives. Built between 1936 and 1943, the Challengers were nearly 122-feet long and weighed more than one-million pounds. Articulated like their big brother, the *Big Boy*, the Challengers had a 4-6-6-4 wheel arrangement. They operated over most of the UPRR system, primarily in freight service, but a few were assigned to passenger trains operating through mountainous territory to *California* and *Oregon*.

930

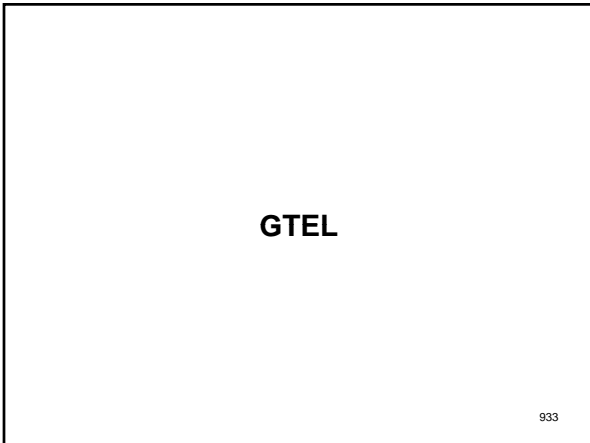


931



Above: as the efficiency of diesels overtook steam, The UPRR relegated its Challengers to the Wyoming lines beginning in the mid-1950s. On July 23rd 1959, a Challenger steam locomotive, made the last steam-powered run from North Platte to Cheyenne. The event was covered by NBC's *Wide Wide World* television Show.

932

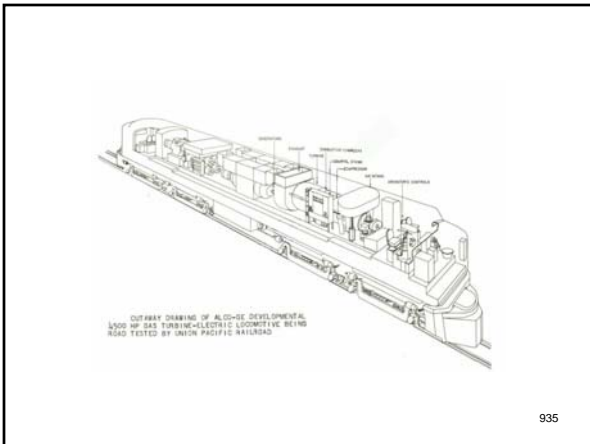


GTEL

933

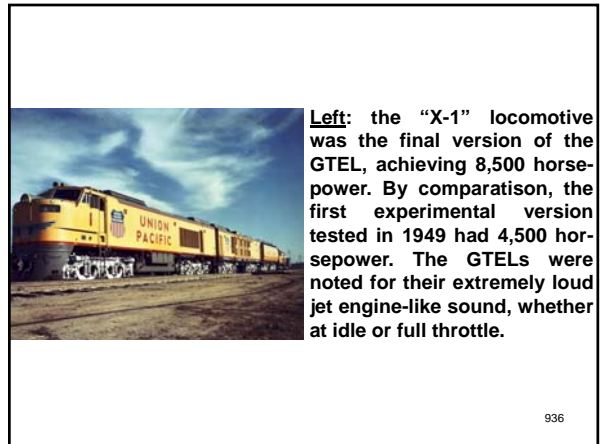
As the need for more powerful and energy-efficient locomotives grew, the UPRR looked to alternative forms of energy. It found a way to use waste oil to power gas turbines that generated electricity, which in turn powered traction motors. Gas turbines are essentially jet engines that create electricity when the blades turn. In locomotives, steam and super-heated gas are used to power turbines. The electricity generated by the turbine is used to power traction motors on locomotive trucks, much like diesel-electric locomotives. UPRR worked with *General Electric* and the *American Locomotive Company* to test a prototype ("UP 50"). It had more than twice the power of the diesel-electric locomotives of the time. The railroad operated dozens more *Gas Turbine Electric Locomotives (GTEL)* before retiring the last of the fleet in 1970.

934



CUTAWAY DRAWING OF ALCO-DE DEVELOPMENTAL 4500 HP GAS TURBINE-ELECTRIC LOCOMOTIVE BEING ROAD TESTED BY UNION PACIFIC RAILROAD

935



Left: the "X-1" locomotive was the final version of the GTEL, achieving 8,500 horsepower. By comparison, the first experimental version tested in 1949 had 4,500 horsepower. The GTELS were noted for their extremely loud jet engine-like sound, whether at idle or full throttle.

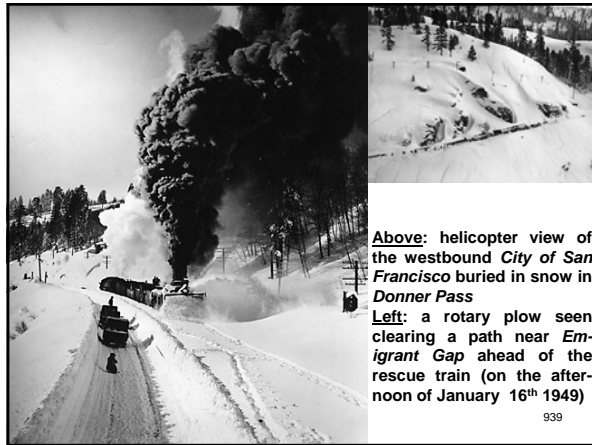
936

The Blizzard of '49

937

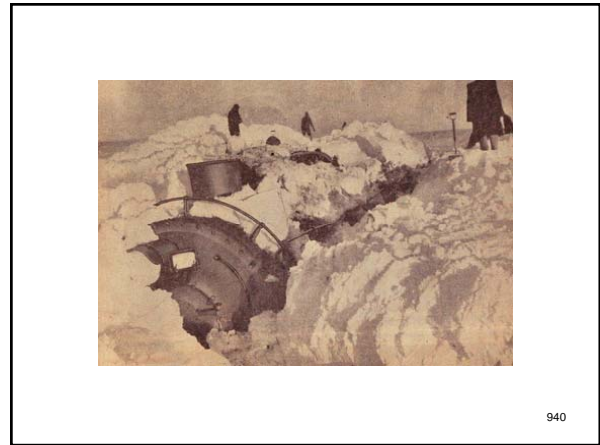
Thought to be the worst storm to hit the UPRR since the early 1870s, the New Year's Blizzard on January 1st 1949 brought traffic across the *Great Plains* to a standstill. One of the trains affected was the westbound *City of San Francisco*. It met ten-foot drifts in *Kimball, Nebraska*. Amid sub-zero temperatures and howling winds, passengers and crew took refuge at a local hotel. There were similar stories all along the line. The UPRR dispatched fourteen-thousand men, tons of equipment and sticks of dynamite to break through the drifts. A rotary snowplow was used to clear the line. Just three years later, in 1952, the worst series of blizzards in fifty years stalled the *City of San Francisco* near *Donner Pass*, trapping two-hundred and twenty-two passengers for days. Amphibious Army vehicles delivered emergency food supplies. The train was finally freed after five days of being snowbound. In the winter of 1993, the rotary snowplow was called into service again during the record snows in the *Sierra Nevada* mountain range.

938

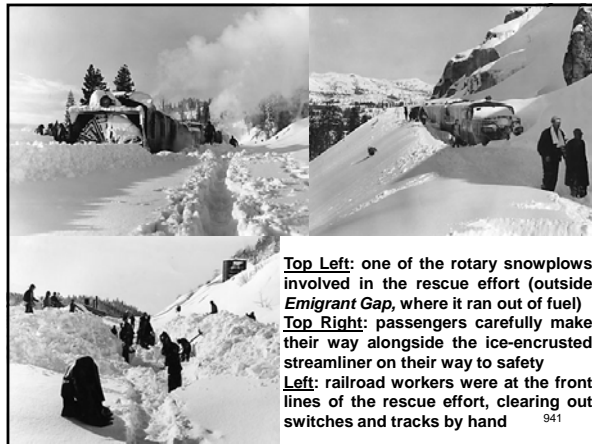


Above: helicopter view of the westbound *City of San Francisco* buried in snow in *Donner Pass*
Left: a rotary plow seen clearing a path near *Emigrant Gap* ahead of the rescue train (on the afternoon of January 16th 1949)

939



940



Top Left: one of the rotary snowplows involved in the rescue effort (outside *Emigrant Gap*, where it ran out of fuel)
Top Right: passengers carefully make their way alongside the ice-encrusted streamliner on their way to safety
Left: railroad workers were at the front lines of the rescue effort, clearing out switches and tracks by hand

941



942



Above: caption: "A Snow Drift on the Pacific Railroad. Hand colored wood block engraving from Harper's Weekly, March 19, 1870." 943



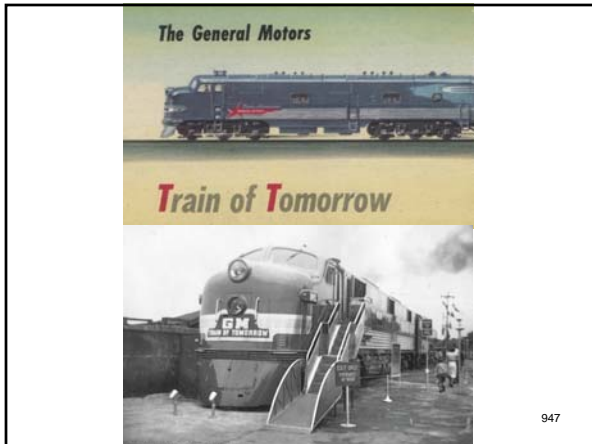
944

The Train of Tomorrow

945



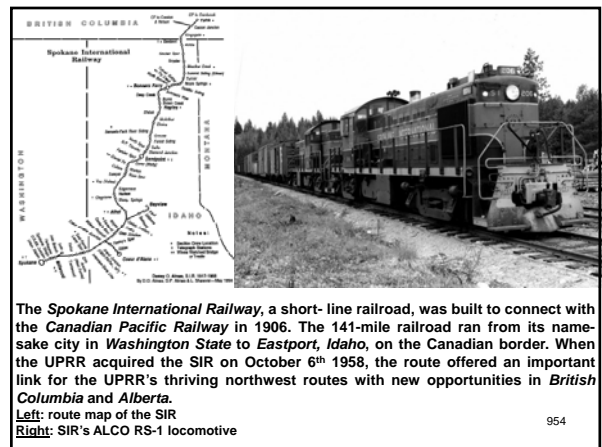
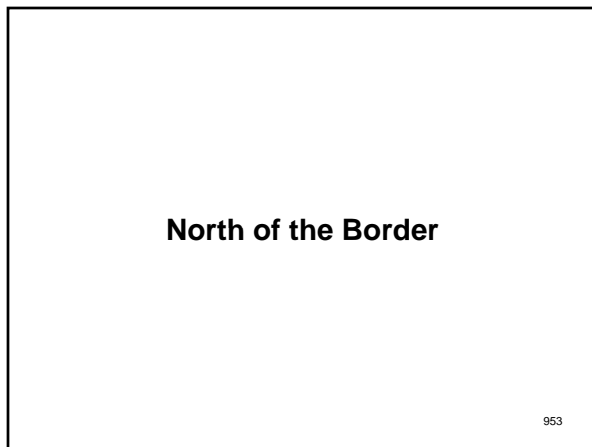
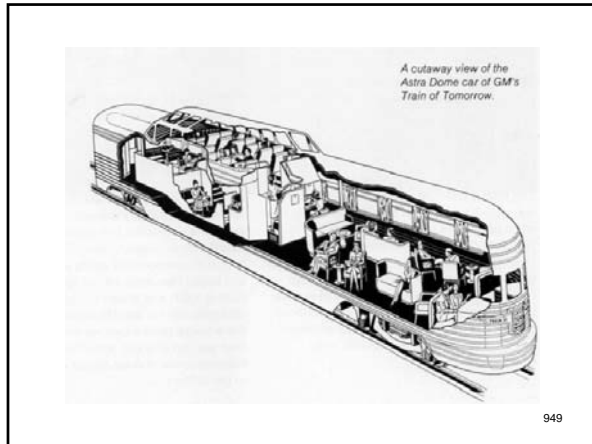
General Motors toured its domed concept train, the "Train of Tomorrow," across the country beginning in 1947. After the tour ended, the UPRR purchased the four cars and assigned the Astra-Dome train (powered by an Electro-Motive 2K-horsepower diesel locomotive) to pool service on the Seattle-Portland route. Service began on April 1st 1950. Passengers found a new way to enjoy the scenery when they rode in the Sky View diner, Star Dust chair car, Dream Cloud sleeper and Moon Glow lounge-observation car. The cars operated until the early 1960s. Left: the UPRR encouraged family travel in the 1950s by offering family rates. Travelers are seen here embarking on the "Domeliner" City of Los Angeles. 946 Right: enjoying the scenery via the observation car (ca. 1957)



947



948



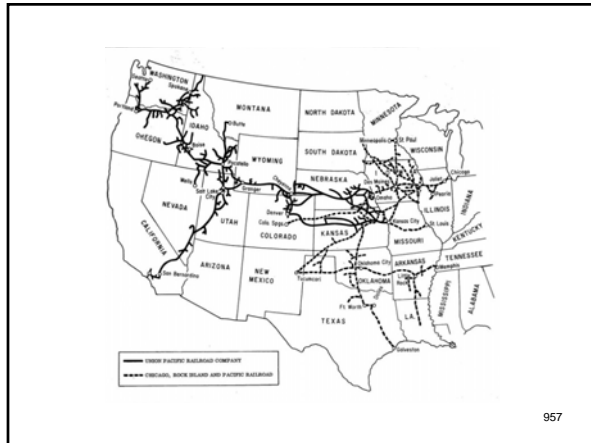
Super Railroad

955



By the 1950s, the *Rock Island RR* found itself with either redundant or non-existent routes to key Midwest cities, seeking to merge with a more prosperous railroad. The timing was right for the UPRR, which was looking to create a "Super Railroad" that would serve a route from *Chicago* to the west coast. After years of contentious arguments from other rail carriers, in 1974 the ICC made its ruling in favor of the merger. The ICC eventually approved a plan that would designate four "Super Systems" to cover rail service throughout the western U.S. and give the UPRR the *Chicago-Omaha* main line. In March 1975, only a few months after the ICC approved the merger, the RIRR filed for bankruptcy. A few days later, the UPRR terminated its merger agreement, citing the decline of the RIRR, and asked the ICC to deny the application. In 1980, the RIRR ceased operations.

Above: the depot at *Topeka, Kansas*, was one of the points jointly served by the UPRR and the RIRR 956



957



Above: caption: "Map of the U.P.R.R. illustrates how the railroad historically appeared in 1950, prior to its major mergers and acquisitions" 958

TCS

959



The *Missouri Pacific RR* first developed the widely used integrated management information and control system for railroad transportation known as TCS (*Transportation Control System*). When the UPRR merged with the MPRR in 1969, it implemented TCS in its own operations, providing for traffic scheduling and real-time tracking, maintenance scheduling, yard assignments, inventory control and billing. TCS revolutionized operations, allowing the railroad to monitor four-hundred trains and seventy-thousand cars over the UPRR's twelve-state, 12K-mile system.

960

Centennial

961




Named for the centennial of the *Golden Spike Ceremony* (May 10th 1869), the newest UPRR locomotives were put into high-speed freight service. The *Centennial*, which weighed in at 270-tons and measured 98-feet long, achieved 6,600 horsepower provided by two diesel engines mounted on a single frame. The UPRR purchased forty-seven units in all (known as the 6900 Series) between 1969 and 1971. Each ran more than two million miles before the locomotives were retired in 1986. UPRR No. 6936 was assigned to special service in 1985 and now travels, on occasion, as part of the UPRR *Heritage Fleet*.

Top: this artist's rendering of the 6900 "Centennial Locomotive" was widely used to celebrate the Golden Spike's Centennial in 1969

Bottom: 6900 Series UPRR locomotive⁹⁶²

The Amtrak Era

963



By the late 1950s, cars and planes had edged out passenger rail service as the preferred mode/s of travel. Only 547 intercity passenger trains remained in the country. To save the ailing industry, President Nixon signed the "Railroad Passenger Service Act," which created the carrier commonly known as *Amtrak*. The federally subsidized railroad company serves nearly thirty million passengers each year. Today, the UPRR operates commuter rail service in the *Chicago* area. Commuter trains also operate on UPRR tracks in *California* and Amtrak operates several routes on UPRR tracks.

Left: May 1st 1971. The UPRR's *City of Los Angeles* leaves⁹⁶⁴ *Union Station* for the last time



965

The Era of Deregulation

966



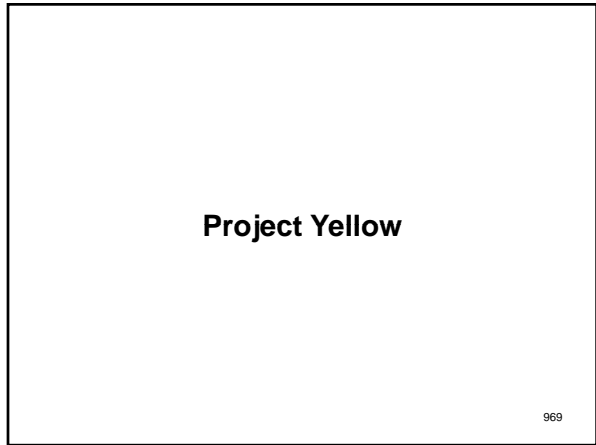
John Kenefick (left) served as UPRR president from 1971-83. He led an aggressive upgrading of the UPRR in the 1970s and guided the company into the era of deregulation after the passage of the "Staggers Rail Act" in 1980. This legislation (named for Congressman *Harley Staggers* of *West Virginia*) revolutionized the business of railroads. Signed into law by President Carter, the act phased out industry wide rate-making and encouraged railroads to compete with each other as well as other modes of transportation. Railroads also were given more freedom to abandon unprofitable lines, set their own prices and tailor services that would meet specific shipper needs, receiving broad authority to establish competitive contracts with shippers.

967



The UPRR saw attractive partnership opportunities in the *Missouri Pacific RR*, which served the *South Central* states, *Gulf Coast* and the *Western Pacific RR*, which connected *Salt Lake City* with *Northern California*. The MP-RR's north-south routes complemented UPRR's east-west routes and the MP-RR's nearly 12K miles of track actually made it larger than the UPRR system. The merger was challenged by many of the railroads that served the western U.S., but eventually was approved by the ICC two years after application on December 22nd, 1982. The resulting rail network made the UPRR the third largest system in the nation.

Left: route map of the UP, SP and WP railroad/s 968



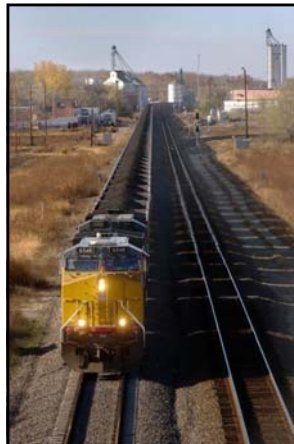
Project Yellow

969



Burlington Northern RR and the *Chicago & North Western RR* became interested in de-veloping Wyoming's coal fields in the early 1970s (following the first Arab oil embargo). Through an initiative code-named "Project Yellow," the UPRR helped underwrite C&NWRR's Connector Line into the *Powder River Basin* with more than \$325 million. Construction began in 1983 and C&NW's first coal train into the basin embarked on August 16th 1984, from the *North Antelope Coal Mine* to *Newark, Arkansas*. During the line's first full year of operation in 1985, nineteen-million tons were hauled out of the Powder River Basin - almost five trains per day. By 1995, 23 trains per day left the basin and average train size had grown to almost 12K-tons.

Left: the first C&NWRR train from the Powder River Basin breaks through a banner opening the connector line between the UPRR and the Wyoming coal fields in August 1984
Right: coal trains originating in Wyoming pass en route to power plants in the Midwest and South 970



Today, the UPRR averages about thirty trains per day and average train size is nearly 15,700-tons. Coal produces 50% of the electricity generated in the *United States* and two-thirds of that coal is shipped by rail. Nearly one of every four freight cars on U.S. railroads carries coal. Acquisition of the C&NWRR was finalized on June 23rd 1995.

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Above: to celebrate the completion of the UPRR-C&NWRR merger in 1995, this locomotive was given a distinctive paint scheme and designated as one of the UPRR's heritage locomotives. On December 28th 1995, the fifty-thousandth coal train departed Wyoming's *Powder River Basin*.

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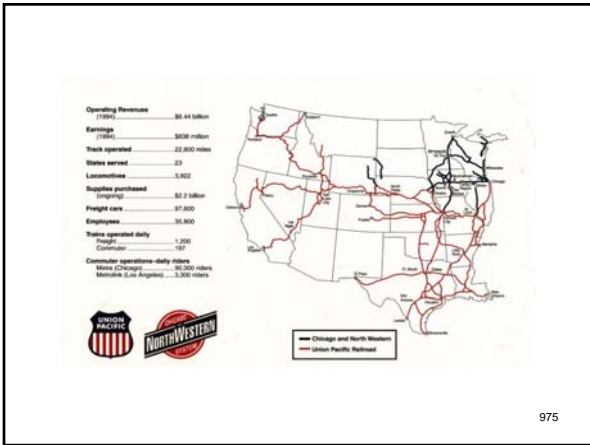
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Representing an investment of more than \$50 million by the UPRR, on October 1st 2009 the new *Kate Shelley Bridge* opened, improving operating efficiency and increased freight capacity for the UPRR's busy corridor linking *Chicago* to the west coast. The new bridge, located west of *Boone, Iowa*, is more than 2,800-feet long and 190-feet high, making it one of the tallest double-track railroad bridges on the continent. It was designed to handle modern trains traveling at speeds up to 70 mph. The new bridge replaced a steel structure built in 1901 by the C&NWRR. The original bridge was named for fifteen-year-old *Kate Shelley* who, in 1881, risked her life to warn of a washed-out bridge near her home. Her heroic efforts saved the lives of dozens of passengers on an eastbound passenger train. For her heroism, she had the honor of being the first woman to have a bridge named after her.

Above: the original bridge (top) and new bridge (bottom)

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An average of one-hundred trains a day travel the *Kearney Subdivision* between *North Platte* and *Gibbon, Nebraska*, making this run the busiest freight main line in *North America* handling as many as one-hundred and fifty trains per day. Increased coal traffic spurred the need to build a third 108-mile main line track. Keeping track in peak operating condition is critical to safety and efficiency. Completed in 1999, the four-year project eased the congestion and now carries UPRR-distributed coal trains as well as other traffic. It serves the *Bailey Yard* in *North Platte*, the world's largest classification yard.

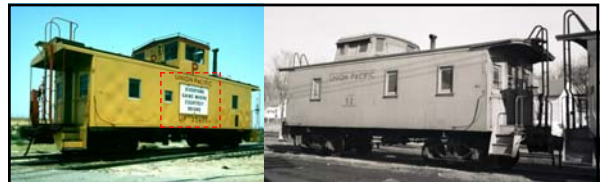
Left: triple track between *North Platte* and *Gibbon, Nebraska*

Right: *Bailey Yard*

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Caboose-Less

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As railroad technology evolved, the role of the conductor, flagman and brakeman changed. Advances in communication equipment took the crew out of the Caboose and put them in the locomotive. EOT (End of Train) devices have a nighttime safety light and automatically radio information about brakes and car movement to the engine's cab, allowing the engineer to monitor brake pressure at the rear of the train and set the air brakes from both halves of the train. On October 7th 1984, Union Pacific's first official "Caboose-less" train left westbound out of *Salt Lake City*. The origins of both the Caboose and the word are surrounded by both legend and fact. One popular version dates the word back to a derivation of the Dutch word "Kombuis," which referred to a ship's galley. Use of Caboose began in the 1830s, when railroads housed trainmen in shanties built onto boxcars or flatcars.

Above L&R: a typical UPRR Caboose, which trailed UPRR freight trains from the 1940s to 1984. Safety slogans, such as the one shown on the Caboose at left, were popular during the 1970s.

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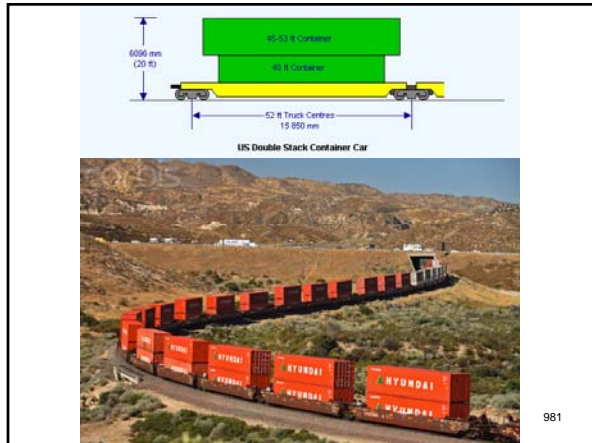
Double-Stacked

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As the UPRR's intermodal business grew, so did the need for trains that could carry more loads in less space. Following a pioneering development on the SPRR, the UPRR collaborated with shippers and a rail car manufacturer to introduce a new type of transport: a lightweight car strong enough to handle double-stack loads and improved ride quality. In March 1984, the UPRR started its new double-stack service from Los Angeles to Chicago. The twenty-car, high-speed train could carry two-hundred shipping containers - twice the number of a conventional container train. By 1986, the UPRR was running twenty-two double-stack trains daily, most of them carrying two-hundred and eighty containers on twenty-eight cars. Left: an example of a double-stack train

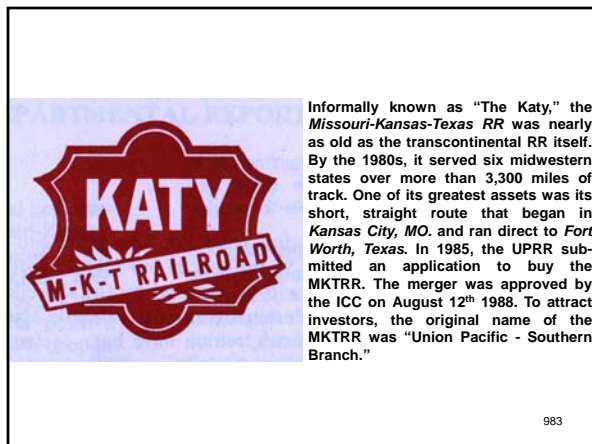
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The Katy

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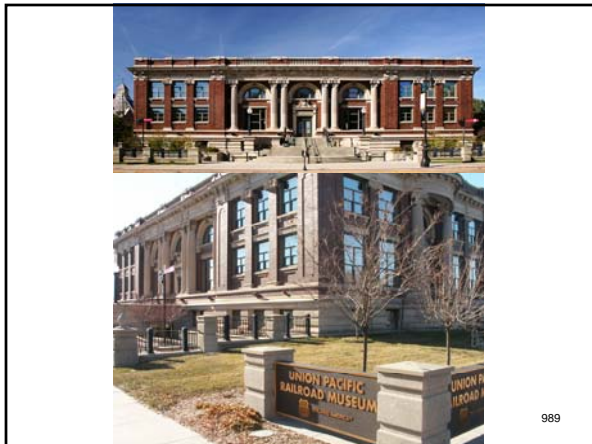
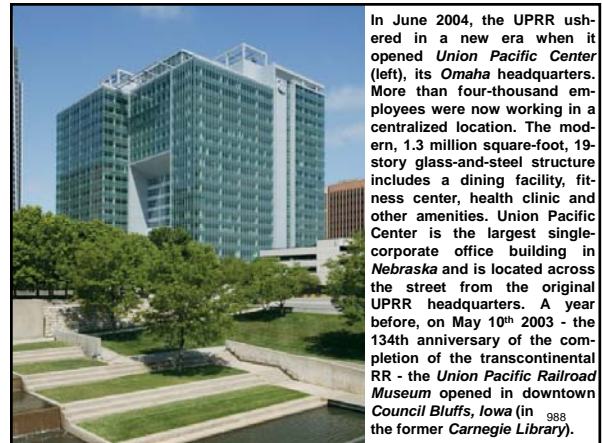
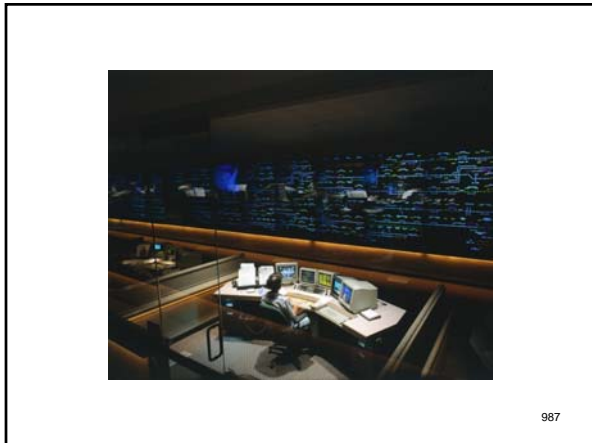
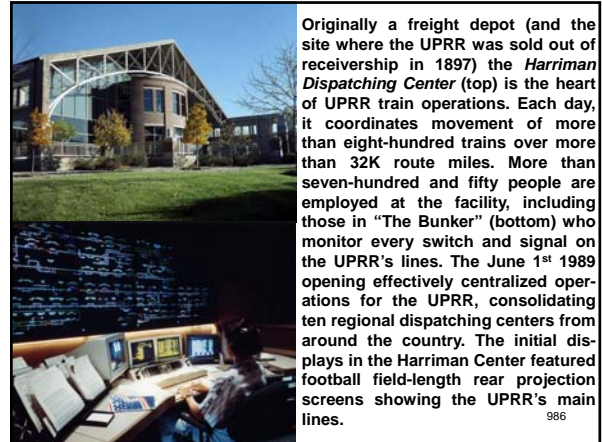


Informally known as "The Katy," the *Missouri-Kansas-Texas RR* was nearly as old as the transcontinental RR itself. By the 1980s, it served six midwestern states over more than 3,300 miles of track. One of its greatest assets was its short, straight route that began in *Kansas City, MO.* and ran direct to *Fort Worth, Texas.* In 1985, the UPRR submitted an application to buy the MKTRR. The merger was approved by the ICC on August 12th 1988. To attract investors, the original name of the MKTRR was "Union Pacific - Southern Branch."

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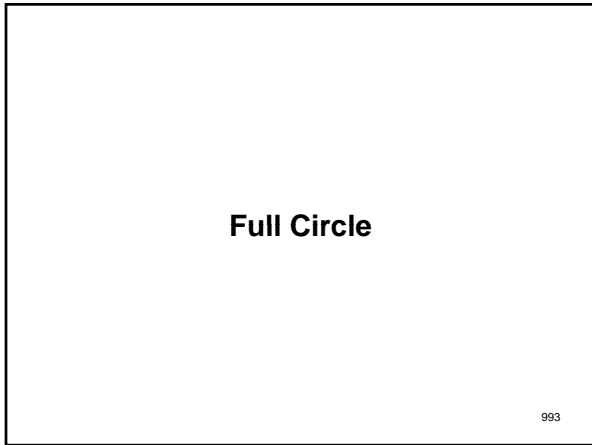
Unrelenting rain pelted UPRR's entire *Central Region* in the summer of 1993, flooding lines in *Nebraska, Kansas, Missouri* and *Illinois*. Flood waters, lightning and winds severely affected key UPRR rail segments, resulting in washouts, knocked-out signals and traffic congestion for 1,700 miles of the line (above L&R). Some rail segments were closed for just one day; others for weeks. Maintenance-of-way teams, tie and surfacing gangs and dispatchers worked to keep UPRR lines in service by clearing debris, resurfacing track and re-routing traffic.

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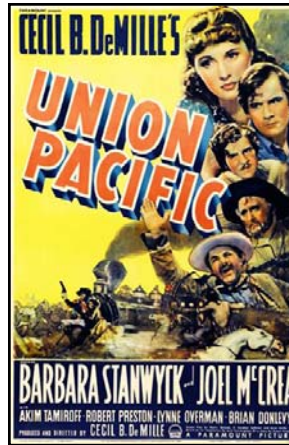
Above L&R: the January 19th 2008 *Cascade Mudslide* (on the *Cascade Subdivision* at *Frazier, Oregon*) was one of the largest natural disasters ever to affect the UPRR. Cleanup of this line (on the I-5 Corridor) required a maximum effort. Over three months, one-hundred and seventy-five UPRR employees worked twelve hour shifts to clear the line and build the new railroad grade. Crews removed 350K cubic-yards of mud and rock (the very fine silt was unsuitable to rebuild with) and brought in another 700K-tons of rock to re-stabilize the mountain. On April 5th 2009, after a seventy-seven day service outage, the first UPRR train crossed the slide area.

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Full Circle

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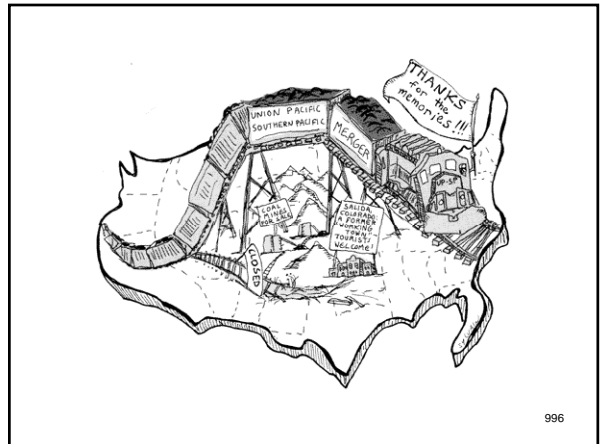
The transcontinental RR was one of the inspirations for author Jules Verne's classic *Around the World in Eighty Days* (published in 1873). Hollywood movies, including 1939's *Union Pacific* (original poster at left) and Director John Ford's 1924 classic silent film: *The Iron Horse*, dramatized the building of the first trans-continental RR. Perhaps most memorable is the Buffalo stampeding scene over the UPRR rails in 1962's *How the West Was Won*, starring Gregory Peck. Other films such as *Once Upon a Time in the West* (1968), *Wild Wild West* (1999), *The Claim* (2000) and a host of TV shows/series and documentaries feature the building of the *Pacific Railway*. Several notable books including: *The Great Railroad Race*, *A Man of Destiny* and *Ten Mile Day* also feature prominently the building of the transcontinental RR.

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Over the decades, the *Southern Pacific RR* had expanded to more than thirteen-thousand miles of rail covering most of the southwestern *United States*, including the CPRR's original *Sacramento-to-Ogden* line. On July 3rd 1996, the newly formed "Surface Transportation Board" approved the UPRR-SPRR merger (the STB was created in 1996 after the ICC had been abolished). Part of the U.S Department of Transportation, the STB is an economic regulatory agency that oversees railroad industry mergers, rate disputes, abandonments and construction. The new system covered thirty-one thousand miles through twenty-four states and ran two-thousand trains a day. With the merger, the UPRR became the largest rail company in the U.S. and saw its history come full circle as it became the owner of both halves of the first transcontinental RR. In 2012, the UPRR marked its Sesquicentennial - the 150th anniversary of its founding in 1862. Since then, the UPRR's history followed closely the history of the nation it serves.

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