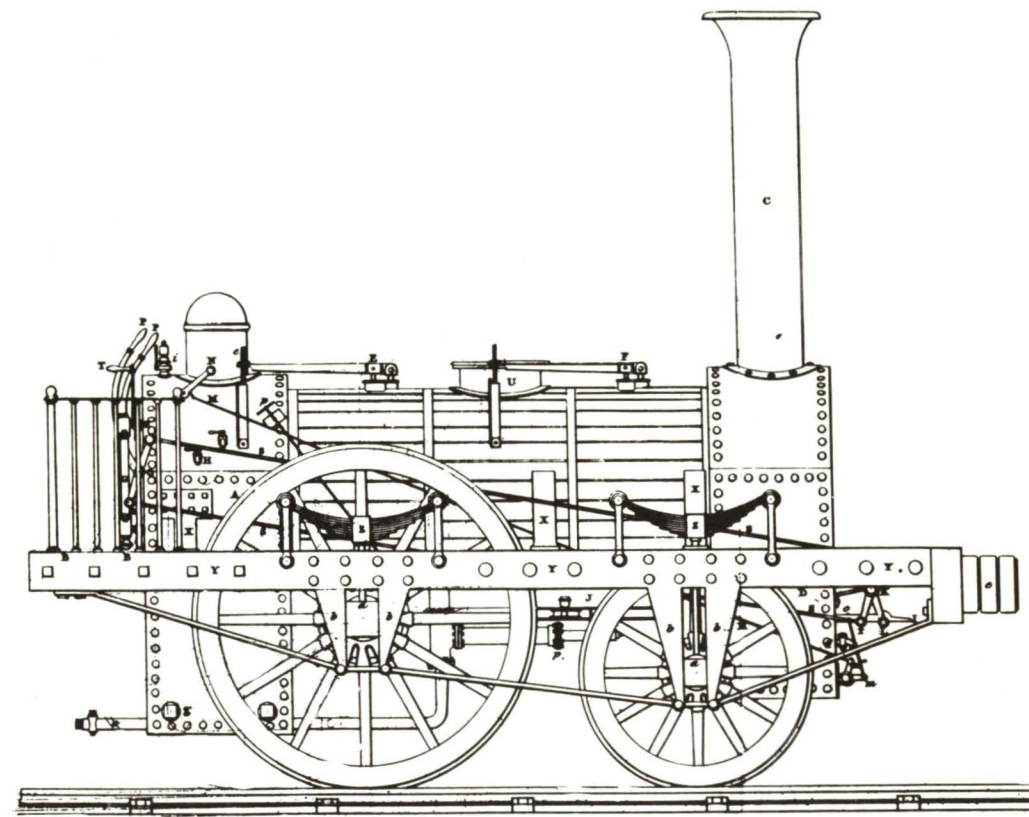




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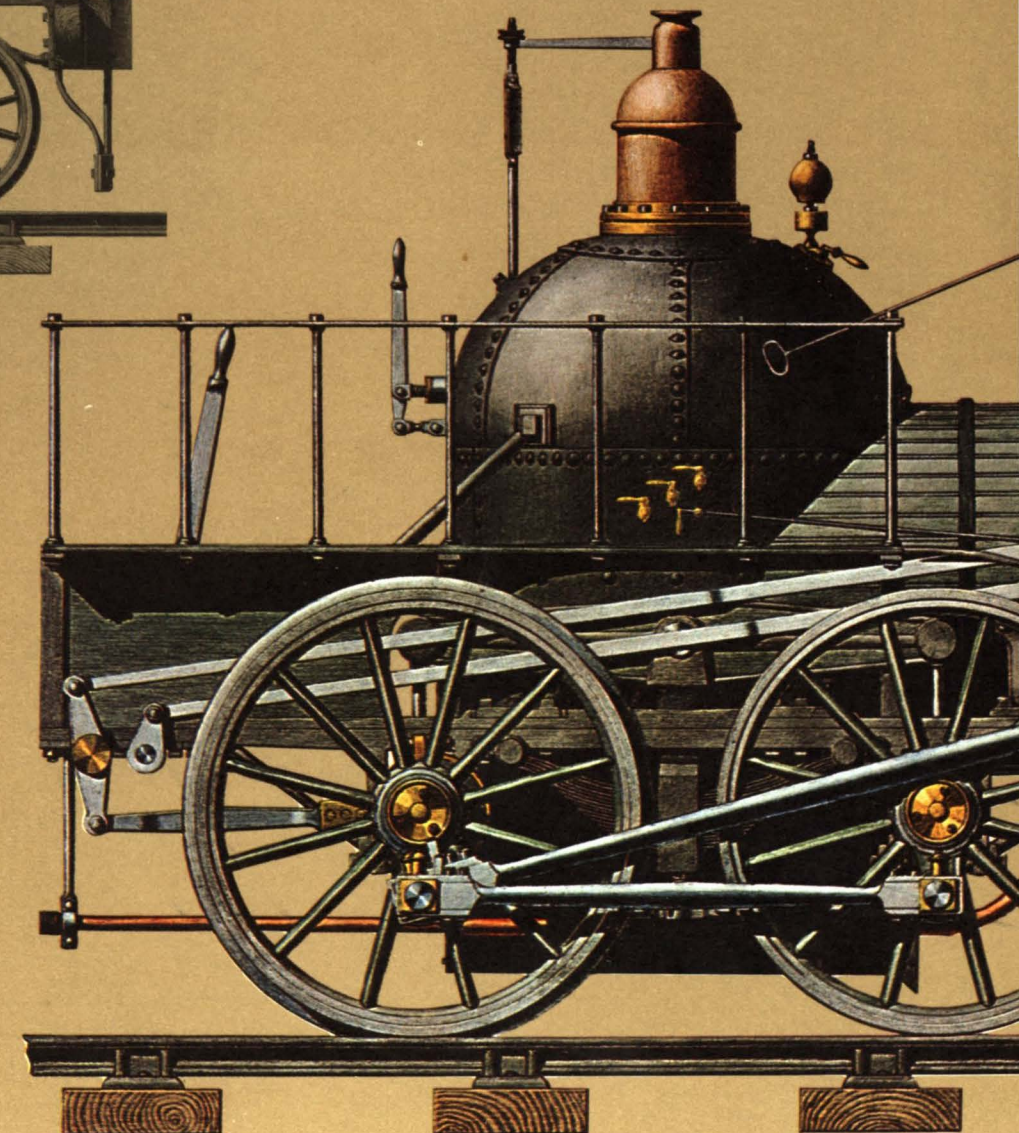
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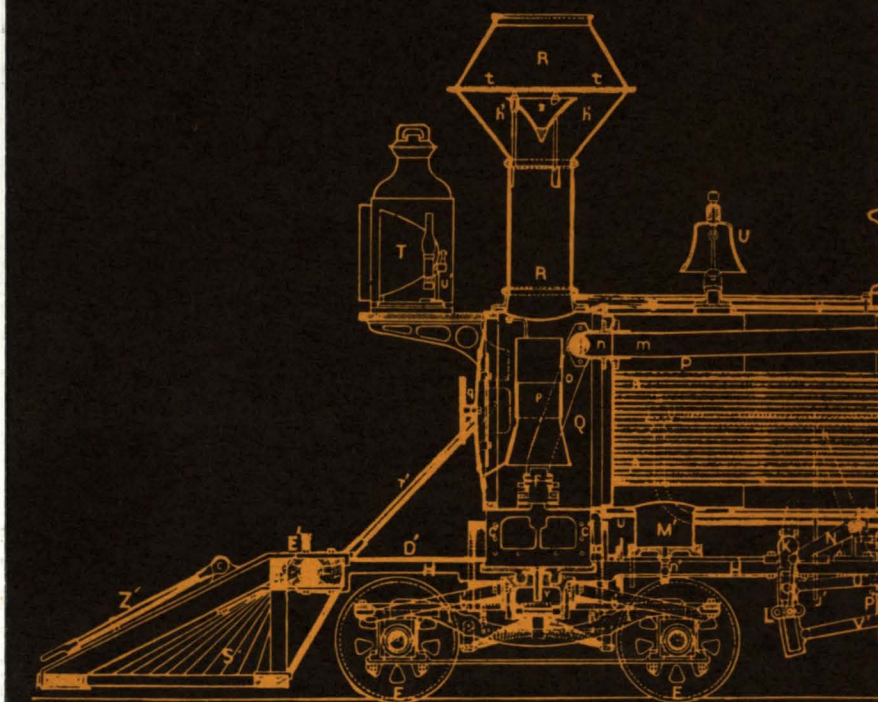
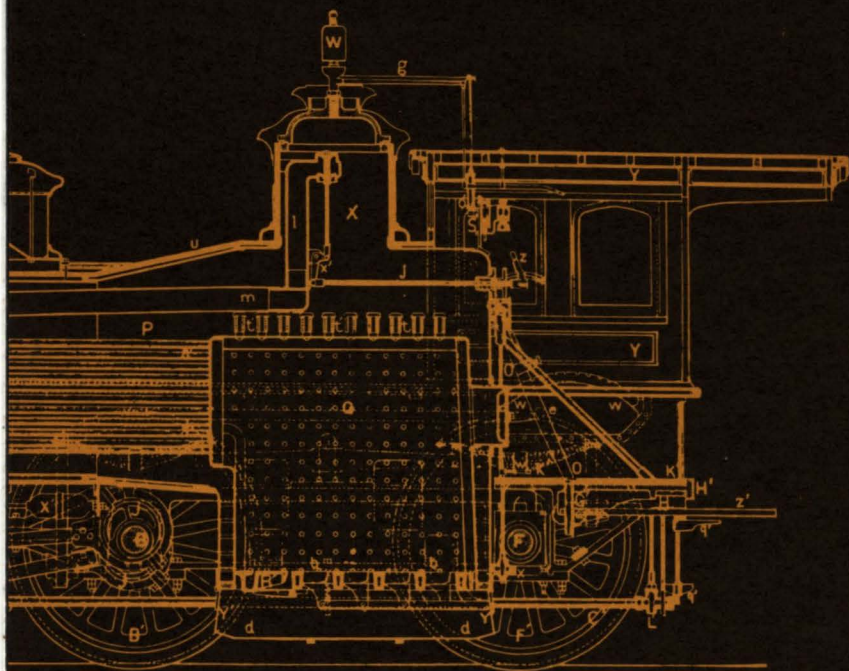
Vol 8.1

CROSSING THE CONTINENT



AMERICAN SCENE
MAGAZINE





Featured on cover is a colored lithograph by J. R. Hoessli, depicting the *Mercury*, Eastwick and Harrison's Patented Improved Locomotive, 1842. Published by P. S. Duval, Lithographers, Philadelphia.

Longitudinal section of an American locomotive manufactured by Grant Locomotive Works reproduced above; taken from Matthias N. Forney's *Catechism of the Locomotive*, New York, 1879.

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AMERICAN SCENE

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CROSSING THE CONTINENT

Relating briefly the history of the centuries-old search for a practical means to cross the continent of North America, this survey deals primarily with the development of the steam locomotive in the 19th century, and features as well an account of a journey from New York to California by rail only months after such a trip became possible.

Article written by Daniel M. McPike and prepared for publication in The American Scene Magazine by William M. Patterson.

Engraving featured here taken from the volume of plates accompanying *The Voyages of Captain Cook*, printed in London in 1778-79. Cook explored the Pacific Coast of North America to search for the rumored "Northwest Passage" across the continent in the 1770's.



When the explorers from the various nations of Europe began to chart the continents of North and South America in the 16th century, they were not only describing a new and potentially valuable world to be exploited, but also outlining a huge land barrier in the way of Columbus' anticipated short sea route to the Orient. Consequently, for the next 300 years or more, adventurers, sailors and navigators continued to seek a passage by water through or around North America from the West Indies to the frigid waters of the sub-arctic north.

It was predominantly the British who sought the rumored passage in the north, for the Spaniards and Portuguese already had established routes to India around Africa's Cape of Good Hope; and their interest in the Orient was ameliorated to some extent by their successful exploitation of the New World in the temperate and tropical areas. Even the initial attempts of Great Britain and France to find a way to penetrate the northern part of North America were soon distracted by thoughts of the great wealth to be realized from a profitable commerce in furs in that area.

L and Yeene Bearing & Dist. Depths & Soundings Currents & tides.

Prior Spanish claims to the whole of the New World bothered the British and the French very little, although Cortez' conquest of Mexico and Pizarro's occupation of Peru definitely established the predominance of Spain in those regions. The explorations of Coronado into central Kansas and DeSoto's presence in the Mississippi Valley area extended this Spanish influence and, of possibly even more importance, proved that the continent of North America in these latitudes was quite extensive.

As early as 1497 John Cabot had sought the northern limits of the continent; and soon after, Frenchmen began exploring the St. Lawrence River, establishing France's original claim to Canada. Following Cabot, Englishmen such as Henry Hudson, Martin Frobisher, Luke Fox, Thomas James and John Davys explored in the north, followed shortly by the founding of the first British colony in Virginia and the subsequent establishment of the Dutch at New Amsterdam.

The French explorers, hearing rumors of the existence of a body of salt water to the west, hoped that the St. Lawrence might rise near the western sea; but after the attempts of Joliet, Marquette, La Salle and deVerendrye, that nation came to understand that there was no easy way to the Pacific and that its future in America lay in the interior Great Lakes and Mississippi Valley regions.

In 1579, Sir Francis Drake had tried to find a way through the continent of North America from the west, sailing north after raiding the Spanish ports along the Pacific. Failing to gain an entrance along the northwest Pacific coast, however, by the time he had reached what is now Northern California or southern Oregon, he turned westward and went back to England via the tip of Africa. The

Pacific Northwest coast of America was not visited again until Vitus Bering visited the Aleutians in 1741, followed shortly by two Spanish expeditions in the 1770's, when Spain attempted to claim and protect what they considered by right to be theirs.

The British began again to think of looking into the possibility of finding a water route across the continent of North America; and in 1776 it was decided to dispatch a naval expedition under the command of Captain James Cook to explore the northwestern coasts of America. Cook's Pacific voyages along the northwestern coasts squelched the idea of finding a salt water passage across America once and for all; but he also found that the northwest abounded in fur-bearing animals, especially the sea otter; and once again the search for the fabled "Northwest Passage" resulted in the discovery of a new region to exploit.

The interests of the Hudson's Bay and Northwest fur companies soon shifted across the Rockies to the Pacific Slope; and as the passage seekers' names had been given to the bays, sounds, inlets and straits to the north, so the fur traders' names were soon given to the rivers to the south and west; rivers such as the Mackenzie, which unfortunately flows into the Arctic rather than the Pacific, and the Thompson and Fraser rivers, which are separated by the Great Divide from those rivers flowing east and north.

At the time these last attempts to discover a northwest passage were taking place, the industrial revolution and the scientific discoveries and inventions that attended it were taking place in England. Thus, only a few years separated the last attempts to find a way across the American continent by water and the invention of the first practical, if primitive, steam-powered locomotive in Europe.

Overprinted on this page is an excerpt from the original 1631 manuscript journal of Luke Fox, another early English explorer who searched for the Northwest Passage. Fox journals preserved in the Gilcrease Library, Sir Thomas Phillipps Collection of manuscripts.

Ever since the 6 Day, there was a current to the Southwards, specially the last 24. Hours.

No ground seen 160. fms.

About noon we were in the great overfall of a tide running out of the Bay.

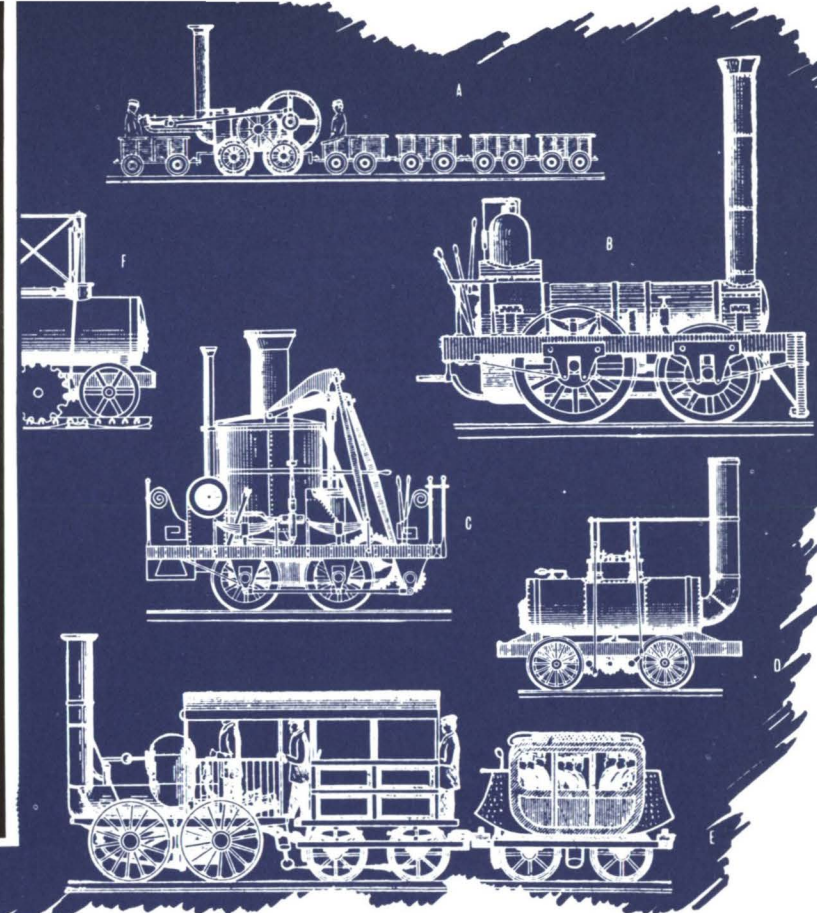
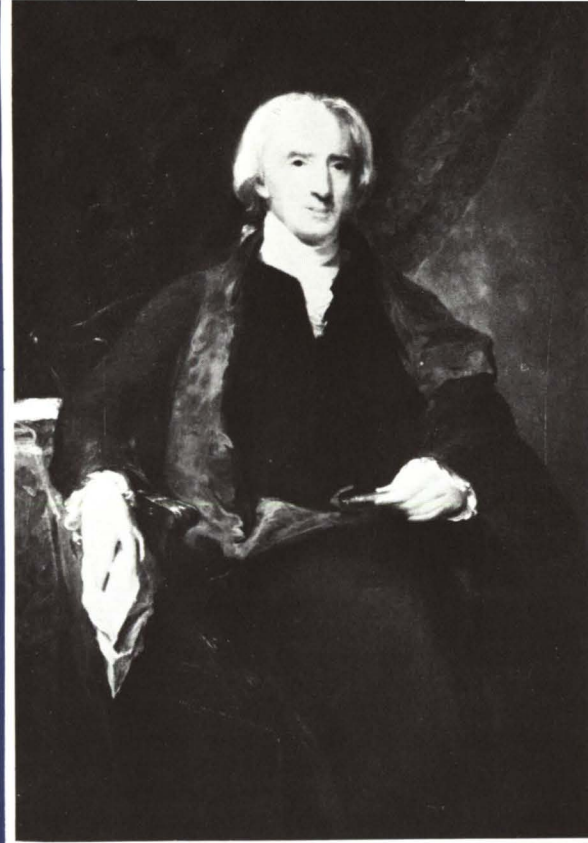
Sight of many big Islands before we came to Land. We stood in till within a long of shore, where we saw 2 small Islands not above half a league asunder. The Land lay E by N and W by S. The innermost land, was hardly seen for it.

in sight of shore within 4. leagues of the Island, we fell in with yesterday at noon in Lat. 62. 5. E. long. NW. 1/2 S.

At 12. at night the E. end of Resolution B. WNW. 1/2 W. 8 or 9 of the South is high land. At Noon we got under the Islands, where we observed the N. end of Resolution B. N by E. or 9. and Blunt's three of the Westernmost - SW. Islands (being small) of the middlemost - SW. 1/2 S. and round of the Easternmost - SW. 1/2 S. 12. 3/4 S. The straight frozen from side to side.

No ground seen 160. fms.

The flood set to the faster to the W. than the ebb to the E.



The first successful steam locomotive, designed and built by Richard Trevithick, pulled a line of cars over a tramway in England in 1804. There were other steam engines in England at this time, of course, but these were low-pressure, stationary machines used to operate mining hoists and mills, or to pull cars along a tramway by cable. Other men in England and America had previously experimented with steam-driven vehicles; but no one, at this point, had yet devised an engine that proved really practical, beyond the point of serious amusement.

Trevithick proved, however, that relatively high pressure steam was safe so long as the boiler was strong, and that smooth wheels provided enough traction to pull up a hill, as well as on level ground. He also demonstrated that by directing the exhaust up the chimney or smoke stack, and creating a much hotter fire the efficiency of the engine would be tremendously increased. The English were first to put the steam-powered railway into operation and a number of the first locomotives in America were of English manufacture. They were not successful here, however, as they proved to be too light of construction and capability.

By 1830, interest in America was sufficient for several people to make an attempt at locomotive construction. In 1827 Charles Carroll, one of the signers of the Declaration of Independence, broke ground for the first railway of any consequence in North America, the Baltimore and Ohio. The B&O had previously experimented with all manner and means of transportation from mules to sails, but something better was needed; and fortunately something better was rapidly being developed.

After Peter Cooper's success with the Tom Thumb on the B&O in 1830, the steam locomotive was rapidly accepted as the best means by far for transporting wagons on a railway. Within six years, the general shape—horizontal boiler, stack in front, steam dome in the rear, four

Oil portrait of Charles Carroll by American artist, Thomas Sully, reproduced above.

Carroll, who broke ground for the Baltimore and Ohio Railroad, is rumored to have felt that his participation in the organization of the B&O was more important than his having signed the Declaration of Independence. If so, the reason may be that he felt railroads would help hold together the confederation of states which he had helped create and which within his memory had been quite tenuously bonded. Line illustrations reproduced above taken from Marshall M. Kirkman's *The Science of Railways*, published by World Railway Publishing Company of New York and Chicago, 1902.

- (A) Trevithick's engine, 1804, driving wheels operated by cogwheels.
- (B) "Old Ironsides," 1832: first locomotive built by Matthias W. Baldwin, founder of the Baldwin Locomotive Works.
- (C) "The Traveler," 1832: first freight engine built by Phineas Davis.
- (D) Robert Stephenson's first locomotive, the "Blucher," 1814.
- (E) The "DeWitt Clinton," engine which hauled the first passenger train in America (Mohawk & Hudson RR, 1831).
- (F) Blenkinsop's Rock Rail Locomotive, 1811. Wheels and rails were notched.

drive wheels and a four-wheel leading truck—had been developed. This arrangement would be virtually standard for the next sixty years in North America. Road beds were improved over the original wooden rail on stone sleepers (ties) by adding a metal strap to wooden rail laid on wooden ties and finally by placing rolled solid rails on wooden ties. The road beds and tracks in this country were never as good as those in England, however, which is a possible reason why English locomotives were not successful here. Not only more powerful but more sturdy locomotives were required in America; and this fact is true to the present day.

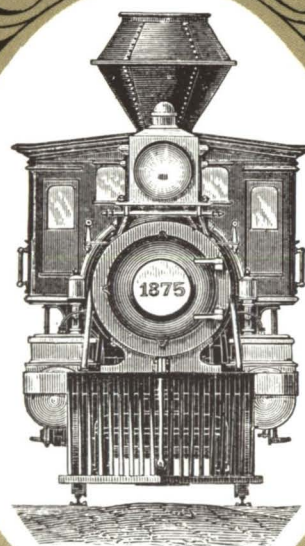


Eighteen thirty to eighteen fifty-five is the epic period of American railroad growth. During this time rails spread over most of the north-east quarter of the nation, penetrated into the south and by 1854 had even ventured west of the Mississippi River. Within this quarter century railroad technology had developed to the extent that it was sufficient to tackle the vast stretches of the West.

The exploration of John C. Fremont (a son-in-law of Senator Thomas Hart Benton of Missouri, ardent proponent of a Federally financed Pacific Railway) brought to the attention of Congress the feasibility of a railway from the Mississippi Valley to the Pacific Coast. Of the desirability of such a railway they had already heard on numerous occasions from Asa Whitney, who for many years was an advocate of a railway from the Great Lakes to the Pacific: a railroad constructed with funds from the sales of a strip of land sixty miles wide along the route for which he was willing to pay the government sixteen cents an acre. This early northern route was necessitated by the fact that prior to 1846 most of what is now the southwest quarter of the United States belonged to Mexico. This fact bothered Whitney only slightly, since one of his chief arguments for such a railroad was that it would shorten the route from New England or New York to the Orient, and that a northern route would do as well or better.

It was not until the discovery of gold in California in 1848 that Congress was prodded into something more than merely a mild interest in any sort of western railroad. In 1853 Senator Salmon P. Chase introduced a bill to appropriate funds for the exploration of possible routes across the continent. This bill resulted in explorations and perusals of the journals of past explorations published in eleven huge volumes entitled "The Pacific Railway Surveys." Surprisingly, the most direct route—that which was already in use by immigrants on the way to California or Oregon, and which had been established by the fur-seeking mountain men was not included. This was the route later followed by the Union and Central Pacific Railways.

After the intensification of interest in a Pacific Railway in 1848, regional politics also entered the scene. One manifestation of regional influence can be seen in that the Pacific Railway Survey was carried out under the direction of the Secretary of War, Jefferson Davis, and that the predominant recommendations emanating from this report were for a southern route. From the middle fifties until



the beginning of the Civil War these regional differences would effectively block any sort of government aid to a Pacific Railway along any route; for at least in the form of land sales or land grants, government aid was a necessity to such a venture.

In the meanwhile the future chief engineer of Union Pacific construction, Grenville M. Dodge, was undergoing his apprenticeship to western railroading by surveying a line for the Mississippi and Missouri Railroad from Rock Island, Illinois, across Iowa and later to Council Bluffs and up the Platte River. The Railroad was forced to abandon the project, but Dodge stayed on at Council Bluffs collecting information from immigrants and mountain men on the best route to the Pacific. In 1858 he reported the results of his labors to the directors of the Rock Island Railroad, which had fallen heir to the Mississippi and Missouri Railroad, but it met with little interest. Dodge was given permission, however, to begin grading east from Council Bluffs to Iowa City.

Up to this date all of the routes to the west coast, projected or dreamed of, were named in common usage. The route surveyed by Stephens and others in the North was referred to as the *Northern Route*, the 38th and 39th parallels route was called the *Buffalo Trail*, the 32nd and 35th parallels route, the *Southern Route*. In 1857 President James Buchanan designated the 42nd parallel route which Dodge had investigated as the *Union Pacific*, as planned, to hold the eastern and western portions of the Union together.

In 1861 the war between the North and South cancelled all Pacific Railway designs except for the 42nd parallel route, which was now viewed by President Lincoln and his Congress as a necessary device to help hold the West to the Union. Lincoln had talked to Dodge in Council Bluffs in 1859, interested in learning all he could of the best route through the central portion of the country to California. In the early part of 1863 General Dodge was ordered to report to Washington and found himself once again discussing the 42nd parallel route with Lincoln. In the spring of 1864 the Pacific Railway came into being, and Lincoln designated Omaha as the eastern terminal of the first transcontinental railroad.

Lincoln objected to Dodge's suggestion that the United States Government construct the railway, saying that it should be done by private interests, although with all the aid the government could furnish. Ground was broken on December 1, 1863, in Omaha. T. C. Durant had appointed Peter A. Dey, for whom Dodge had worked on the Mis-

issippi and Missouri Railroad survey, as chief surveyor. Dey resigned, however, when the company refused to obey government grading orders, and the Union Pacific requested that General Dodge be released by the army to assume the duties of chief engineer.

Many surveying parties were sent out during this period, usually accompanied by hunters to enable them to live off the land. At that time there were still plentiful herds of bison on the plains and several notable frontier personalities kept themselves going for awhile hunting for the Union Pacific.

At times it was handy to have a few of these frontiersmen around for other purposes than hunting. It was sometimes well to have anyone around who could handle a weapon. As Major-General Dodge commented in his published account, "*How We Built the Union Pacific Railway*:"

"Our Indian troubles commenced in 1864 and lasted until the tracks joined at Promontory. We lost most of our men and stock while building from Fort Kearney to Bitter Creek. At that time every mile of road had to be surveyed, graded, tied and bridged under military protection. The order to every surveying corps, grading, bridging and tie outfit was never to run when attacked. All were required to be armed, and I do not know that the order was disobeyed in a single instance, nor did I ever hear that the Indians had driven a party permanently from its work. I remember one occasion when they swooped down on a grading outfit in sight of the end of the track. The Government Commission to examine that section of the completed road had just arrived, and the Commissioners witnessed the fight. The graders had their arms stacked on the cut. The Indians leaped from the ravines and, springing upon the workmen before they could reach their arms, cut loose the stock and caused a panic. General Frank P. Blair, General Simpson and Dr. White were the Commissioners, and they showed their grit by running to my car for arms to aid in the fight. We did not fail to benefit from this experience, for, on returning to the East the Commission dwelt earnestly on the necessity of our being protected."†

However, the Indians could be a help as well as a hindrance; and although Dodge would undoubtedly have preferred to work out his surveys under less harrowing circumstances, many miles of favorable alignment were determined in the following manner:

"It was on one of these trips that I discovered the pass through the Black Hills and gave it the name of Sherman, in honor of my great chief. Its elevation is 8,236 feet, and for years it was the highest point reached by any railroad in the United States. The circumstances of this accidental discovery may not be uninteresting.

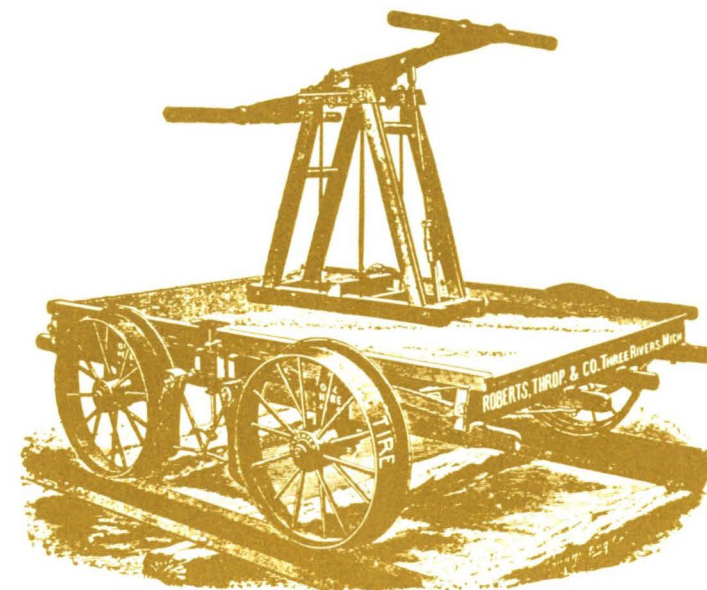
"While returning from the Powder River campaign, I was in the habit of leaving my troops and trains, and with a few men, examining all the approaches and passes from Fort Laramie south over the secondary range of mountains known as the Black Hills, the most difficult to

overcome with proper grades of all the ranges, on account of its short slopes and great height. When I reached the Lodge Pole Creek, up which went the overland trail, I took a few mounted men—I think six—and with one of my scouts as a guide, went up the creek to the summit of Cheyenne Pass, striking south along the crest of the mountains to obtain a good view of the country, the troops and trains at the same time passing along the east base of the mountains on what was known as the St. Vrain and the Laramie Trail.

"About noon, in the valley of a tributary of Crow Creek, we discovered Indians, who, at the same time, discovered us. They were between us and our trains. I saw our danger and took means immediately to reach the ridge and try to head them off, and follow it to where the cavalry could see our signals. We dismounted and started down the ridge, holding the Indians at bay, when they came to our relief; and in going to the train we followed this ridge out until I discovered it led down to the plains without a break. I then said to my guide that if we saved our scalps I believed we had found the crossing of the Black Hills—and over this ridge, between Lone Tree and Crow Creeks, the wonderful line over the mountains was built. For over two years all explorations had failed to find a satisfactory crossing of this range. The country east of it was unexplored, but we had no doubt we could reach it."†

The Black Hills referred to are not those of South Dakota but rather a mountain range in eastern Wyoming.

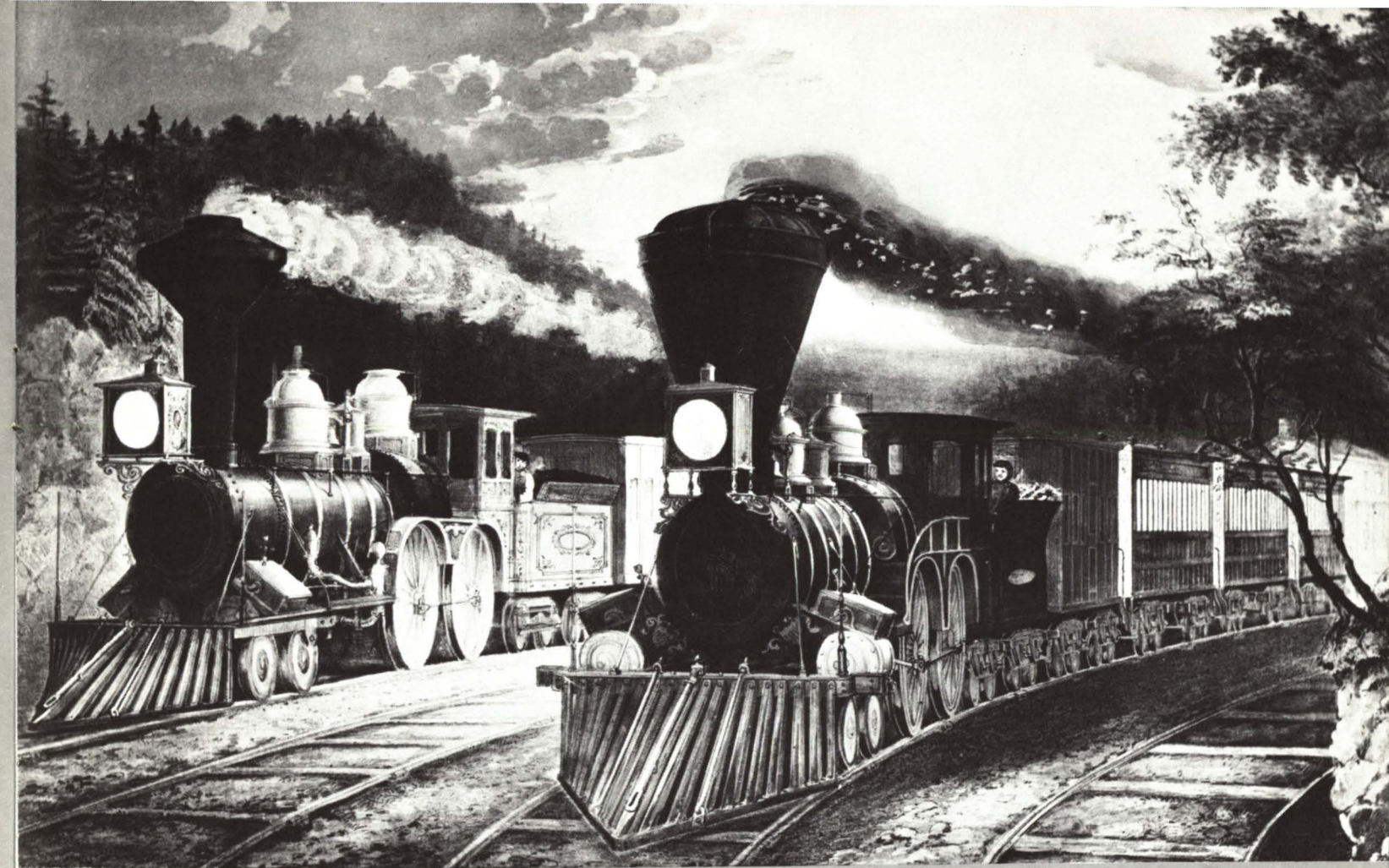
General Dodge spent the year 1866 on the eastern approaches outlining the best route for the crossing of the Rocky Mountains. The Union Pacific desired to include Denver in the route, but surveys indicated that the only way to cross the mountains with reasonable grades was by Lone Tree Pass. A 112-mile branch was planned south to Denver, even as was a branch that would have to be built later to Salt Lake City, which also was not on the most favorable gradient.



Engraving on opposite page taken from Forney's *Catechism of the Locomotive*, 1879. Pictured at right, a hand car used by section gang, featured in Kirkman's *The Science of Railways*, 1902.

The Central Pacific didn't have the Indian problems and they didn't have Buffalo Bill, Wild Bill Hickok and

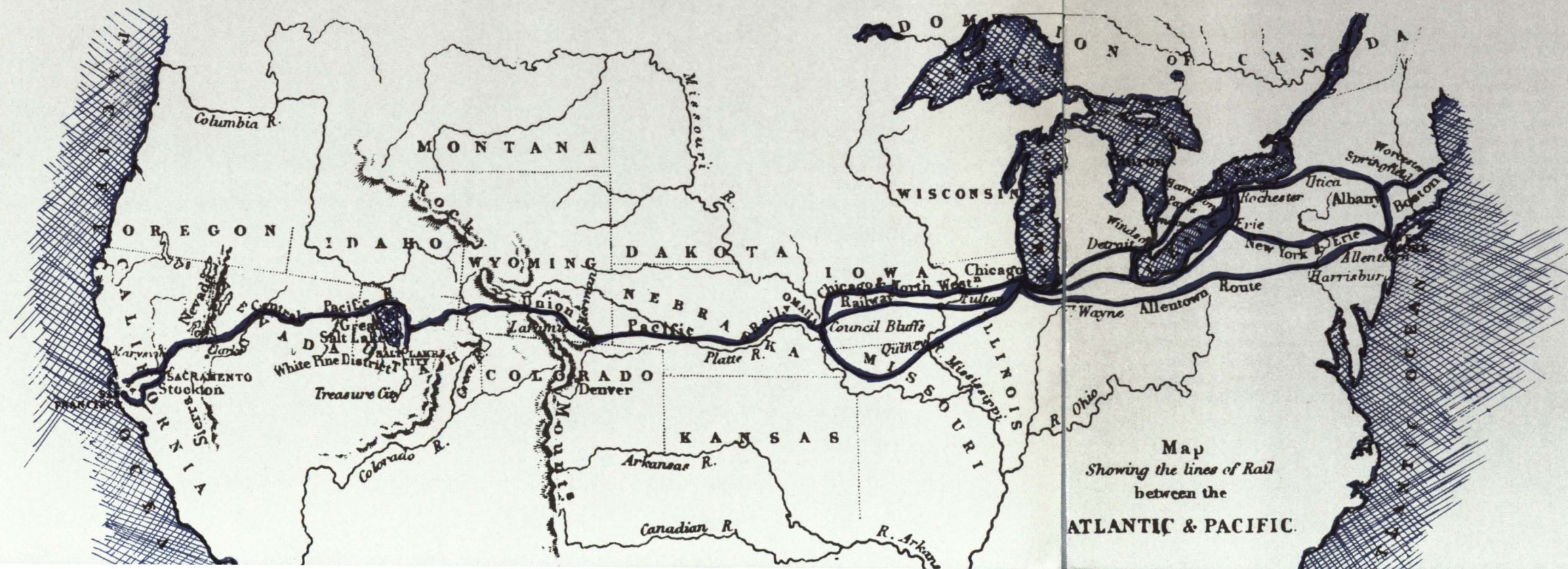
"The Central Pacific had made wonderful progress coming east and we abandoned the work from Promontory to Humboldt Wells," continues Dodge, "bending all our efforts to meet them at Promontory. Between Ogden and Promontory each company graded a line running side by side, and in some places one line was right above the other. The laborers upon the Central Pacific were Chinamen, while ours were Irishmen, and there was much ill-feeling between them. Our Irishmen were in the habit of firing their blasts in the cuts without giving warning."



The two lines were joined on May 10, 1869, and except for a small gap, rails now joined the Atlantic and Pacific Oceans.



At left is a map showing the railway lines between the Atlantic and the Pacific as they existed in 1870; taken from W. F. Rae's *Westward by Rail: The New Route to the East*, published by D. Appleton and Company, New York, 1871. Gilcrease Archives.



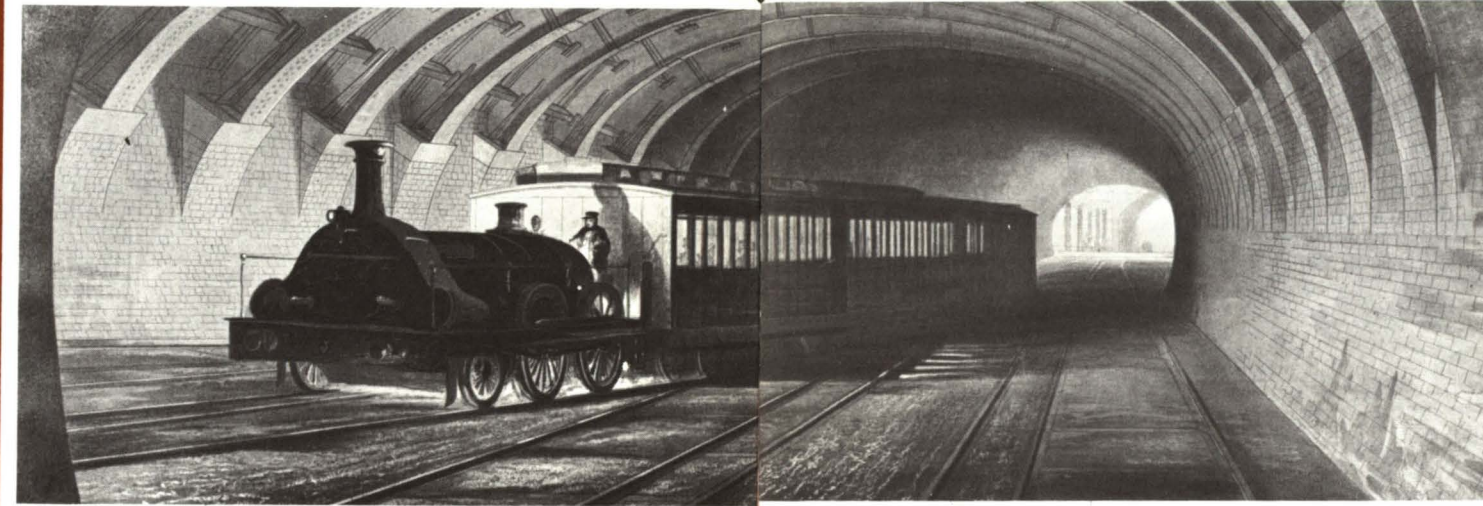
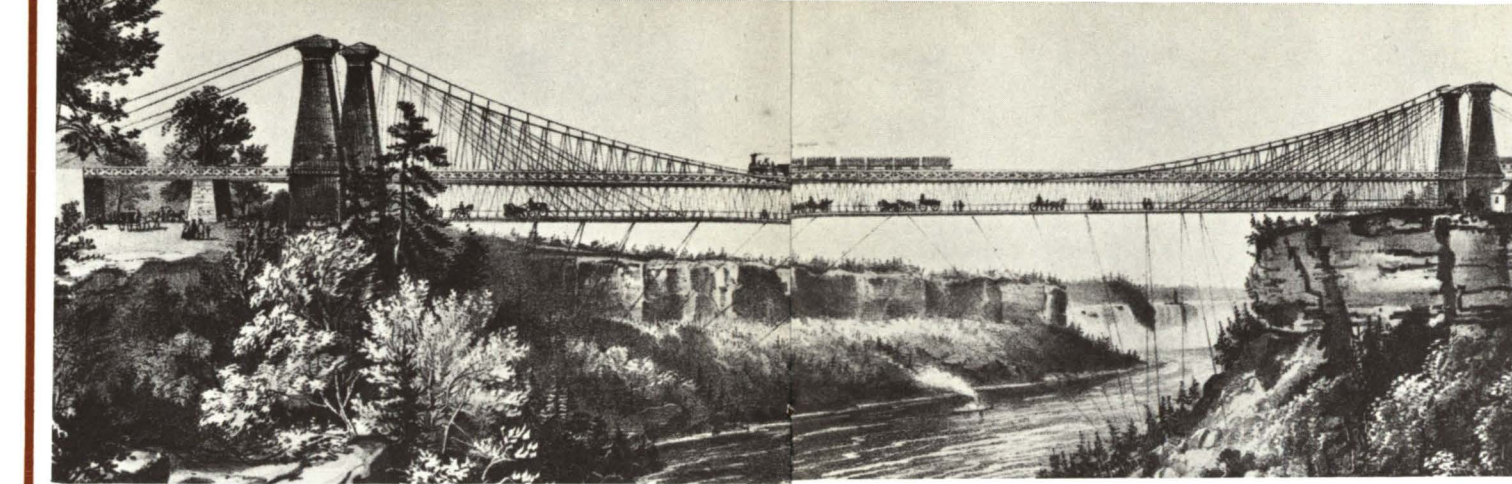
Reproduced below:
EXCERPT FROM W. F. RAE'S WESTWARD
BY RAIL,
featuring his account of a transcontinental
journey by rail from New York to California,
1871; published by D. Appleton & Company.
Original edition in Gilcrease Library.

Among the first travelers to tempt the fates on the still primitive "Pacific Railway" was an Englishman, W. F. Rae, who seems to have been a journalist and whose account of the journey was published in serial form in the *Daily News*. In 1871, D. Appleton and Company of New York published Rae's account in book form. A copy of this book can be found in the Gilcrease Library and it is well worth the reading, not only for its interesting descriptions of conditions of transcontinental travel, but for the narrative given by the critical, yet appreciative, Englishman of the cities, people and general condition of the United States at that time.

Near the end of August 1869, Rae boarded a Cunard steamship—named, appropriately for an element of our theme, "The China"—for the voyage to New York. Only the first and last days of this voyage can be described as enjoyable, and Mr. Rae could be thankful that his sojourn to California did not involve a passage by water around the Horn.

On arriving in New York, he found that there was constant reference to a "Pacific Railway," or a railway connecting New York with San Francisco, although there was no such thing as a "railway" between these two points. Tickets good on most of the railroads in the United States and Canada could be purchased in many shops or in almost any of the hotels in the East; and there were many different ways, by this date, to get from eastern cities to Chicago. From Chicago, once again, there was a choice of routes to Omaha where the Union Pacific and the "real" Pacific Railway started. Following are excerpts from Rae's book *Westward by Rail*, comments which have to do with the routing and travel conditions only. The quoted sections include only a small portion of the entire journal.‡

"Let me suppose that the 'Great Central' route has been chosen and that the traveler bound for the Far West starts from New York in the evening by the Pacific Express. On the morning of the following day he arrives at Rochester, where 'Pullman Palace Cars' are attached to the train; he gets a good view of Niagara Falls as the train slowly crosses the bridge over the boiling rapids, sees a large portion of the Western (sic) section of Canada, and then, after having passed two nights and one day in a railway carriage and traversed a distance of 900 miles, he arrives at Chicago.



"Railway Suspension Bridge," Currier & Ives, New York, 1856. This is the bridge with a view of Niagara Falls mentioned by Rae in his account of his travels across the continent.

"The lines of the Railway over which this train runs are the Hudson River, the New York Central, the Great Western of Canada, and the Michigan Central.

"At Hamilton (Ontario) station the passengers dine, with the exception of those who are so fortunate as to have secured seats in the Hotel Car attached to the train. The occupants of this car take their meals on board! I had heard much said in praise of 'Pullman Palace Cars,' but I was unprepared for the reality. The first trip on one of these cars forms an epoch in the traveler's life. To one accustomed to English railway carriages, they are specially welcome. The contrast between the wagon in which Roderick Random journeys to London and a modern carriage is not much greater than the contrast between the life on the rail in an English first class carriage and in a Pullman car. In order to form a fair notion of the character of the latter it is but necessary to recall the description of those luxurious saloon carriages which the directors of our railways have had constructed for the use of the Queen. No Royal personage can be more comfortably housed than the occupant of a Pullman car, provided the car be an

"Metropolitan Railway" forerunner of all underground railways. From a chromolithograph by Kell Brothers, Castle Street, Holborn. Gilcrease prints files.

hotel one. In the train on which I traveled, one out of the three sleeping cars was of the latter description. The Hotel Car is divided into sections, forming staterooms, wherein parties of four can be accommodated. Between these rooms are seats arranged in the usual way. At the rear is a kitchen which, though small, contains every appliance necessary for cooking purposes. There are water tanks, in which is stored a supply of water for washing and drinking sufficient to last the journey. A wine cellar contains liquors which are likely to be in demand, and an ice house preserves the ice for the gratification of those who prefer cold beverages. At stated intervals the conductor walks around, taking the passenger's orders, who make their selections from the bill of fare. To breakfast, dine, and sup while the train is speeding along at the rate of nearly thirty miles an hour, is a sensation of which the novelty is not greater than the comfort. An additional zest is given to the good things by the thought that the passengers in the other cars must rush out when the refreshment station is reached, and hastily swallow an ill-cooked meal. It is proposed to construct

dining cars which will be at the service of all who travel by the train, and when this is done, the limit of improvement will almost have been reached. Yet it would be a mistake to assign any bounds to the possibilities connected with railway travel in the United States, and in the western states in particular. No prejudices exist against novelties, nor are the directors of the several companies able to scorn the demands of the traveling public for increased comforts and conveniences.

"Meantime, the train has been speeding on its course towards Chicago. Paris has been left behind, a place of which the name alone recalls the capitol of France. More familiar to an English ear is London, with its river Thames and its Middlesex. At last Windsor is reached. This is the frontier town of this part of Canada. The river Detroit separates the United States from the Dominion, and across it the train is transported on a large flat-bottomed steamer. From Detroit the journey is made on American soil through the states of Indiana and Illinois. The country as seen from the window of the railway carriage is not prepossessing. The land may be very fertile, but it is certainly very swampy. When Lake Michigan comes in sight, the objects that arrest attention are the sandhills, which for a considerable distance, line its shore. Finally, the train runs in front of handsome dwellings, which not only represent Chicago, but which line one of its most fashionable avenues. A man appears who sells tickets to those who purpose going by omnibus to an hotel, the price being half a dollar. He also takes charge of the luggage checks. By taking a check from him in exchange for that procured at starting, the traveler finds his luggage safely deposited at any address he may give. In this way much subsequent confusion and inconvenience are saved.

"From Chicago, on Lake Michigan, to Omaha, on the Missouri River, the distance across the Prairie is about 500 miles. This journey has to be made in order to reach the eastern terminus of the Union Pacific Railway. Before leaving this city, (however), which is the headquarters of the Pullman's Palace Car Company, a few particulars (pertaining to the Pullman Company) may appropriately be furnished.

"About six years ago, Mr. Pullman first constructed one of these cars which have made his name famous throughout the Union. Before that time he had made experiments on a small scale, and of an imperfect character. Their success emboldened him to fresh efforts. Instead of confining himself, as at first, to providing sleeping accommodations for night trains, he devised an arrangement which combined comfortable sleeping berths at night with luxurious seats by day. He appealed to the eye as well as to the sense of comfort, furnishing his cars with artistic and costly materials. As much care was spent in decorating them as is expended in the decorating of the dwellings of the rich. Nor were any of the appliances omitted which could render a railway journey agreeable. The perfected car was a combined drawing-room, dining-room, and bedroom on wheels. That no expense was spared is proved by the fact that the cost of a single car exceeded 5,000 (pounds) sterling. But it was not enough to lessen the tedium and misery of a long railway journey by merely providing soft-cushioned seats by day, clean and most com-



fortable beds at night, and well cooked meals for those who chose to order them. The western railroads over which these cars were destined to run had sometimes been constructed far too hastily to be smooth. In England and in America also, the smoothness with which the train speeds along is in proportion to the care with which the rails have been laid and to the completeness of the permanent way. The problem for Mr. Pullman was how to diminish jolting on rough roads. He solved the problem by giving more attention to the wheels and springs of his cars than the engineers had given to the rails, the joints and the sleepers. The springs of a Pullman car are so well adjusted that the oscillation, which would be unbearable if the springs were imperfect or badly contrived, is reduced to a minimum. By employing double windows, constructed so as to render rattling impossible, noise is prevented, while dust and cold air are excluded. Arrangements of a very satisfactory kind have been made for heating and ventilation. These cars are run over the several railways on terms agreed to between the companies and the proprietors of the cars. The passengers pay an extra fare for a seat in one of them. The result has been profitable to both, while the risk of loss to the companies has been infinitesimal.

"Once a day the through train for the Pacific coast starts from Chicago. The advertisements announce the starting of two trains; but the traveler who rashly starts by the evening one finds that he must spend the night in Omaha. Let it be supposed that, having taken his ticket by the Chicago and North Western Railway, he arrives at the station in time to get his luggage 'checked' and to take his place in a Pullman's palace car at ten fifteen in the morning. When the struggle to get the luggage 'checked' is crowned with success, the traveler who has engaged and paid the extra charge for a seat in a palace car takes possession of it. This seat he retains throughout the journey. It is absolutely reserved for him. At night the seat is folded down on either side, the blankets, and clean sheets and pillows are arranged in due order, a curtain is drawn in front and a sleeping berth is thus formed. The berths in the cabins of many fine steamers are less comfortable than the berths in these cars.

"When the moment for departure arrives, the conductor calls out 'All aboard.' The engine gives a low and not unmelodious whistle, the ear piercing screech of our engines being unknown in America, and the train starts for the journey across the Prairie.

"Five hours after leaving Chicago, the train reaches the bridge which crosses the Mississippi. This bridge is nearly a mile in length, and is constructed partly of wood and partly of iron. The structure has a very unsubstantial appearance, and, as it creaks and sways while the train passes over it, the deep and rapid stream beneath flashes over the mind. Once across the bridge the Westward-bound traveler enters the young, yet flourishing state of Iowa, a state in which countless settlers may find homes on its rolling prairies. On either side, as far as the rolling horizon, a few farmhouses alone serve to break the monotony of the prospect. To these vast tracts the epithet which Homer affixed to the sea may not inaptly be applied. They are literally 'unharvested,' awaiting the touch of industry

Oil painting entitled "Locomotive in the Snow," by Wesley Webber. The possibility of heavy snow has always been a sword over the heads of railway operating men. It was even more terrible to contemplate in the 1800's when rescue operations were more difficult than they are today.

to yield up their teeming treasures. The long, rank grass which waves on their surface, rots for lack of mower to gather it in, or is converted into dust and ashes when the spark falling from the passing locomotive, or thrown by the heedless wanderer, kindles the flame which no human power can extinguish.

"One of the disenchantments for which the traveler by this line must be prepared, occurs when he has to be transported across the Missouri from Council Bluffs to Omaha. The accounts he may have read of palace cars running through from New York to San Francisco must have led him to underrate the discomforts to be faced and borne. One of these is changing from car to car and rail to rail. On arriving at Council Bluffs, we found omnibuses in waiting at the station. The morning was cold and raw. But a small proportion of the passengers could get inside seats, the remainder having the option of either sitting on the roof among the luggage, or else being left behind. In itself the seat on the roof was not objectionable, provided the time occupied were brief. As nearly an hour was thus spent, the feeling of satisfaction at having got a seat at all was supplanted by a feeling of annoyance at the treatment received. Through deep ruts in the mud the omnibus was slowly drawn by four horses to the river's bank, and thence onto the deck of a flat bottomed steamer. Seated there a good view was had of the Missouri. It has been called mighty, which it doubtless is, considered as a stream, yet the appellation of 'Big Muddy,' which is current here, is the one which more truthfully characterizes it. (The Union Pacific completed a bridge across the Missouri River in March 1872.)

"A general feeling of relief was manifested when the station of the Union Pacific Railway was reached. From this point the traveler really begins his trip over the great railway which Americans justly class among the grandest and most wonderful achievements of modern times. . . . Let it be supposed that the forenoon train is about to start on its long journey of more than 1,000 miles from the terminus at Omaha to the station at Promontory, which is the eastern terminus of the Central Pacific. Confusion reigns supreme here, as at most American railway stations. Excited passengers are rushing about in quest of the luggage which, despite the system of 'checking,' is often going astray or getting out of sight. Frantic efforts are made to attract the attention of the baggage clerk, and to induce him to attach the necessary check to the trunk or portmanteau, which has at length been discovered. Those who get this part of their business over proceed to the office in order to secure berths in Pullman's sleeping car. The number of these berths is limited and bitter is the disappointment of those who fail in obtaining one. The prospect of spending several nights in an ordinary car is enough to depress the mind and daunt the courage of the hardest traveler. Having had the good fortune to be among those who had secured berths by telegraph, I was able to hear the exclamations of the disappointed with pleasant equanimity.

"Four miles after leaving Omaha, the first stoppage is made. The journey is now fairly begun and every one is on the look out for new scenery and strange adventures.

"The first real sensation is obtained at Jackson, a small station an hundred miles west of Omaha. Here many

of the passengers see genuine Indians for the first time—that is men who live by hunting, and who glory in getting scalps. They are Pawnees. We are told that they are friendly at heart, but they are blood-thirsty in appearance. They probably consider themselves civilized, for each carries a revolver in a belt strapped round his waist. That they are staunch adherents to old traditions is proved by an inspection of their encampment. Outside the tents are poles stuck into the ground. From the tops of these poles, wisps of hair flutter in the breeze. The seeker after knowledge naturally asks the meaning of these things. His belief in the friendliness of the Pawnees is not strengthened when he is informed that the wisps of hair are trophies of victory which have been cut from the heads of vanquished foes. The Indians, whose advance in civilization is manifested by the addition of the revolver to the scalping-knife, are not persons for whom it is possible to entertain great admiration. Their acquaintance is more to be avoided than courted. Seen at a distance they are picturesque additions to the landscape; when met by the defenceless traveler they prove to be brutal monsters. The chief testimony given in favour of the Pawnees is that they are better than the Sioux, and that they are always ready to demonstrate their loyalty to the Union by murdering the Sioux without mercy.

"At Grand Island station the train stops, and the passengers are allowed half an hour for supper. On leaving this place the traveler is told that if of a religious turn of mind he may bid good-bye to schools and churches, and keep 'his eye peeled' for buffalo. The next two hundred miles run through the tract crossed by the buffalo herds on their migrations from South to North. However, the expectation of getting a sight of these denizens of the plains is one which is more frequently excited than gratified. Since the opening of the railway the buffaloes have shunned this district. The event of the succeeding morning was halting at Cheyenne city for breakfast. This is one of the towns which sprang up during the construction of the railway. In July, 1867, there was but one house here. At present there are 3,000 inhabitants in Cheyenne. The population has been as large as 6,000. It was what is here styled a 'rough place,' that is to say a miniature hell upon earth. Thieves and gamblers, murderers and prostitutes, were numbered among its 'prominent citizens.' But the day of its orgies is passed away; the scum of the population has moved off to other pastures, and the streets of Cheyenne are as quiet as the streets of other Western cities in which law has conquered license.

"The scenery from this point onwards is tame and uninteresting. In every direction the limitless plains extend to the horizon. Here and there a tuft of wild flowers relieves the monotony of the grass flats. A herd of antelopes bounding along is a sight most welcome to the fatigued eye, while the rare spectacle of two Rocky Mountain sheep, with wild aspect and long twisted horns, excites speculation as to how they had wandered so far from their native haunts. Dead oxen by the wayside bear witness to the passage of an emigrant train, and to losses sustained by its members. At Hazard, a station beyond Cheyenne, is a little mountain tarn. A few miles farther on, small patches of white in the crevices of the rocks cause the statement to be made that the country of alkali dust has been reached

at last. This, however, is contradicted. The patches in question prove to be traces of snow. It is true that the sun shines brightly overhead, and that the winter has not yet begun. Nevertheless, the intense coldness of the air excites general remark. The explanation is simple. We are nearing the highest point of the line. Since leaving Omaha the ascent has been gradual, but continuous. We have ascended nearly 8,000 feet above the sea level, and the height gained is amidst the peaks of the Rocky Mountains on which snow always rests, and where not a day throughout the year passes without the fall of a larger or smaller quantity of snow. The purity of the air is extreme. Objects many miles distant seem as if they were but as many feet removed from the spectator. With difficulty do the lungs become fully inflated, so great is the rarity of the air. As mile after mile is traversed the ground is more steep. Cuttings through the rocks have been made to reduce the incline. The strain on the engine becomes greater; the speed of the train is diminished, until the ascent is finally made, and the train halts at Sherman, a railway station of which the elevation exceeds that of any in the world, it being situated 8,235 feet above the level of the sea.

"Sherman station, the highest point of the Pacific Railway, is in the Territory of Wyoming, the youngest among the Territories of the United States.

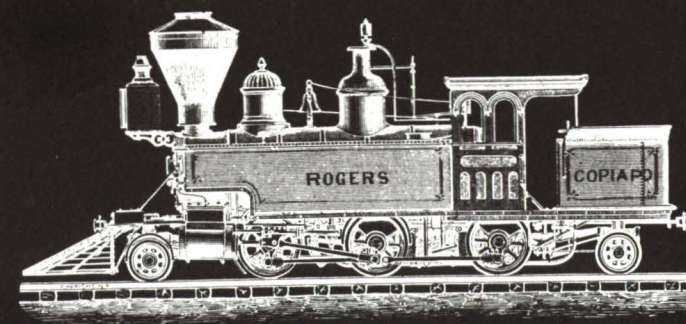
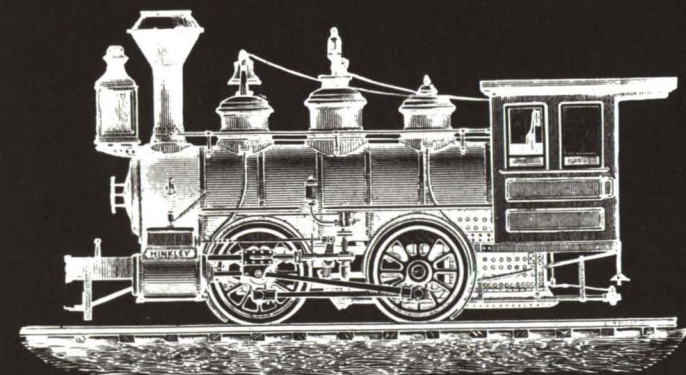
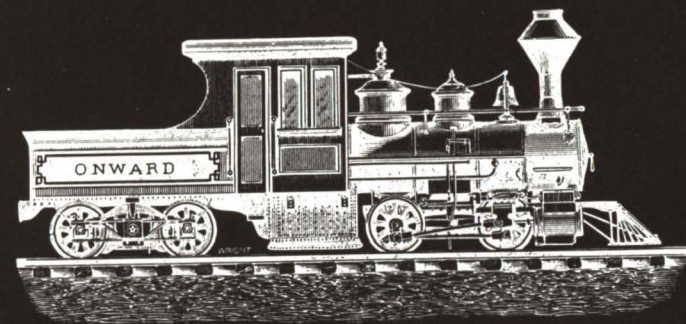
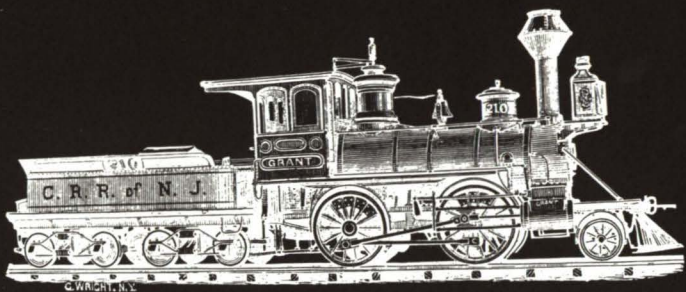
"Some writers strongly advise the traveler to make a halt at Sherman station. The inducements held out to him are mountain scenery, invigorating air, fishing, and hunting. A few weeks prior to my journey, one of the conductors of the train by which I traveled learned, by practical experience, that fishing amid the Rocky Mountains has palpable and painful drawbacks. Having taken a few days' holiday he went forth, fishing-rod in hand, to amuse himself. While whipping the stream in the innocence of his heart, he was startled to find himself made the target for arrows shot by wild Indians. He sought safety in flight, and recovered from his wounds to the surprise as much as to the gratification of his friends.

"The scenery around Sherman is bleak and wild. Several famous peaks are said to be perceptible in the far distance. I have read a statement to the effect that Long's Peak, one of the principal mountains of Colorado 75 miles to the Southwest, and Pike's Peak, 165 miles to the South are 'both plainly visible.' To the North, Elk Mountain is 'another noted landmark,' about 100 miles distant. It is possible that these mountain tops may have been discerned in a vision by the compilers of guide books. To the eye of the ordinary and unimaginative traveler they are invisible. What he does see to the left of the line looking westward is the snow-capped range of the Wahsatch mountains. On the right are rough and irregular elevations dotted over with dark pines. These are the Black Hills of Wyoming. A huge mass of red rock stands forth here and there on the solitary plains. Most welcome to eyes wearied with the savage grandeur of the scene, are the patches of purple and yellow wild flowers which flourish amidst the short brown grass. It is with a feeling of relief that Sherman station is left behind. The train descends by its own weight the rapid incline which leads to the Laramie Plains. Three miles westward of Sherman the line crosses Dale Creek on one of those wooden bridges



Showing the interior of an American Palace Car: pen and ink drawing reproduced in Kirkman's *Science of Railways*, 1902.

which appear so unsubstantial, yet are said to be so strong. It is 650 feet long and 126 feet high. The trestle work of which it consists resembles the scaffolding erected for the purpose of painting the outside of a London house. An enthusiastic writer terms this bridge 'the grandest feature of the road,' and commends it for its 'light, airy, and graceful appearance.' The contractors are said to boast of having erected it in the short space of thirty days. It is not stated how many days the bridge will bear the strain almost hourly put upon it. More than one passenger who would rather lose a fine sight than risk a broken neck breathes more freely, and gives audible expression to his satisfaction, once the cars have passed in safety over this remarkable wooden structure. Downwards speeds the train, at a pace which makes one shudder at the consequences of an accident. In twenty miles the descent of a thousand feet is accomplished. No steam power is employed. On the contrary, the brakes are tightly screwed down alike on the locomotive and the cars. As we proceed onwards the plains widen on either side, and the mountain ranges recede into the distance. We are again on the rolling prairie, but not such a prairie as is to be found in the states of Illinois and Iowa. The sage-brush plant begins to show itself. This constitutes the sole vegetation of the arid and desolate tract which is known by the name of the Great American Desert. On the right of the line is a small sheet of water, to which the name of Como Lake has been given. In nothing but the name does it recall the famous Italian Lake, yet the prospect is a pleasing relief to the monotony of the surrounding



waste. Carbon Station is one very important in reality, though apparently insignificant. Here the company's workmen made a discovery which has helped to fill the company's coffers. During the construction of the line a seam of coal was cut through. This was literally a godsend. It had been feared that all the fuel used along the line would have to be transported from the remote East. In this locality wood is very scarce, and the carriage of coal would have been costly. However, the discovery of a coalfield at Carbon settled the fuel question at once and forever. The quality of the coal is first-class, and the quantity is practically unlimited. Two hundred tons a day are extracted with ease. Not only is the coal burned in the locomotives, but it is also supplied to the stations along the line, being sent as far eastwards as Omaha. Nor is this the only coalfield which has been discovered and worked at a profit. In other parts of the Territory large fields of coal have been proved to exist, while iron ore of the richest kind abounds in the vicinity of the coal. Thus the Black Hills which have been regarded as yielding nothing but dark pine and have been more notable heretofore for their picturesqueness than their mineral treasures, may hereafter become the centre of an industry in coal and iron as important as any upon this Continent. From this point the line passes through elevated land on either side, till a wild gorge is entered a few miles to the east of Fort Steele. The mountains which stretch away from the mouth of the gorge seem designed to guard its entrance. They have the look of battlements carefully wrought and prepared to withstand a siege. The beholder naturally expects to see sentinels keeping watch on the top, and cannon protruding over the sides. It is difficult to believe that these escarpments have been cut by no mortal hand, but are due to the action of the warring elements on the friable red rock. At Fort Steele there is a garrison of four companies. All around is barrenness and desolation. Nothing but sagebrush covers the ground. The pools of water are bitter with alkali. Great enthusiasm or a high sense of duty can alone render life here other than a perpetual burden. At Rawlins Springs a stoppage is made for supper, and a few miles farther on the backbone of the Continent is reached and crossed. This point is 191 miles west of Sherman, and 1,034 miles distant from Sacramento. The height above the level of the sea is more than 1,000 feet less than at Sherman, yet the configuration of the country is such as to constitute this the watershed, whence the stream which runs East falls into the Atlantic, and the stream which runs West falls into the Pacific.

Column of line engravings, left, reproduced from Forney's *Catechism of the Locomotive*, 1879; featuring:
(A) Light passenger and freight locomotive
(B) Improved tank locomotive
(C) Double-truck, narrow-gauge tank locomotive
(D) Four-wheeled switching locomotive
(E) Double-end tank locomotive



"Snow Sheds — Sierra Nevada," oil painting by Joseph Becker. Snow was somewhat less of a problem in the Sierras than on the plains in the 19th century because it was a certainty instead of a probability. Occasional exceedingly heavy snows, however, can still block lines for days in the mountains.

"At an early hour the following morning the passengers are roused to take breakfast at Wahsatch. This place has a bad reputation. It was told that 'out of twenty-four graves here, but one held the remains of a person who had died a natural death, and that was a prostitute who had poisoned herself.' I give the statement in the words of my informant. It was evidently his opinion that suicide was perfectly natural under the circumstances; and possibly he was right. The line is now in Utah Territory; the land we now see is the land of the Mormons, and the people are Saints in name. Moreover, this part is the most striking and picturesque of any on the Union Pacific Railway, for the line runs along Echo and Weber Canyons, passing by the Devil's Slide, passing through the Devil's Gate.

"Where the pass narrows stands a solitary pine bearing the name of the 1,000 mile tree. It was so named because it was the first tree of any size which the constructors of the railway met with while they were carrying the line westward from Omaha. Swiftly does the train speed along the Canyon, until emerging from the narrow space between the sundered rocks which is called the Devil's Gate, the Great Salt Lake is discerned in the distance, and the view of a luxuriant valley is in pleasing contrast to the frowning rock and foaming river. The train stops at Uintah. Here Mormon lads sell peaches and Mormon women tempt the ladies in the train to purchase gloves which they have tastefully embroidered.

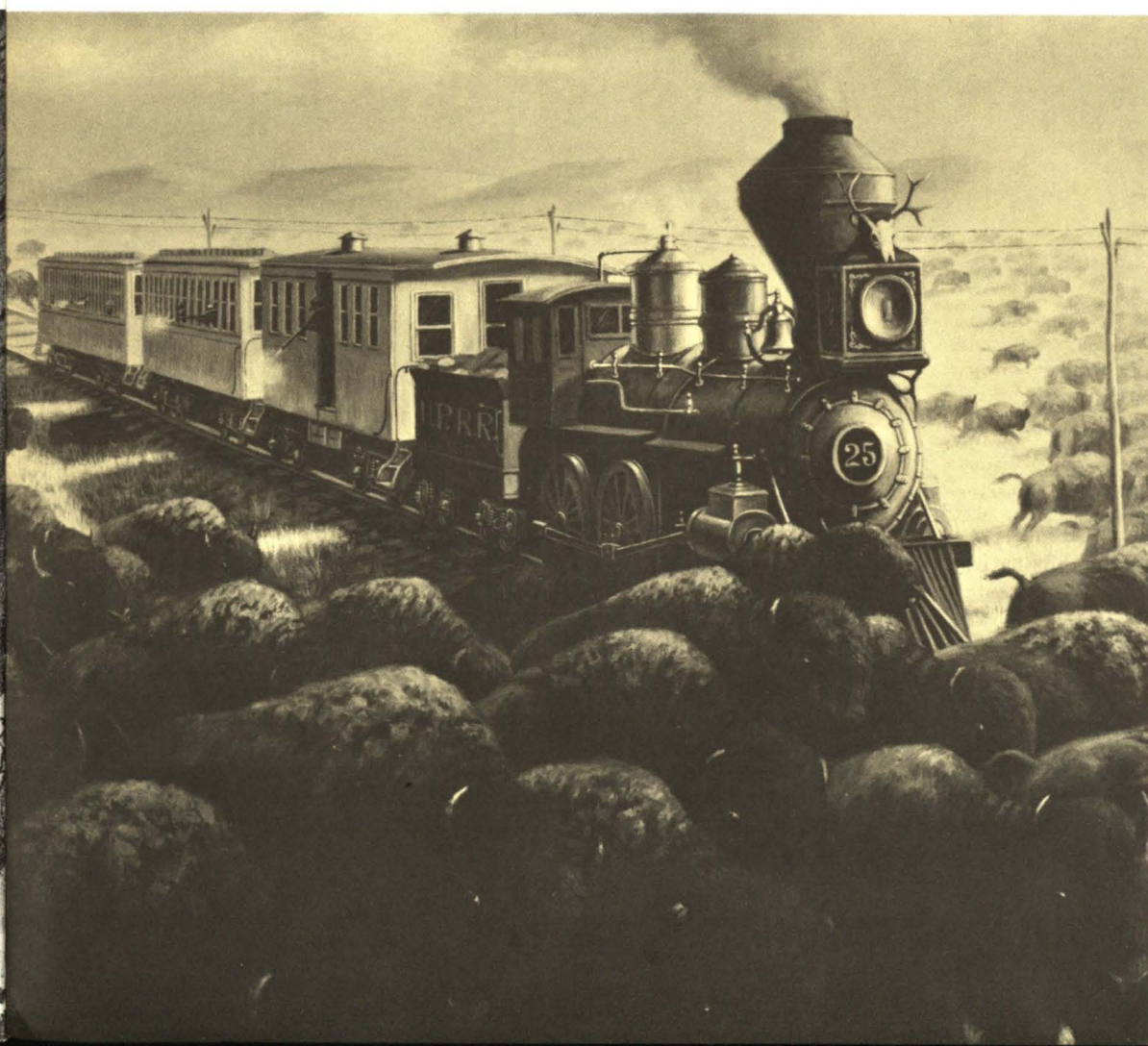
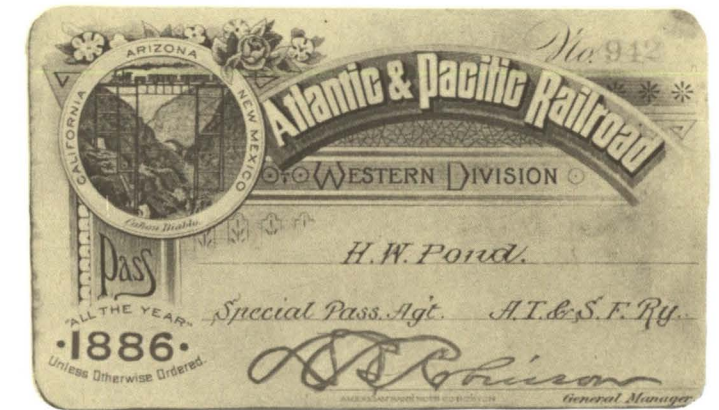
"Several miles westward of Promontory station, (now on the Central Pacific) the line traverses what, properly speaking, is the Great American Desert. This is supposed to be the bed of an inland sea. In barrenness it rivals the Desert of Sahara; in desolation and dreariness it cannot be surpassed. A coating of alkali dust gives to it the appearance of a snow-covered plain. But snow is far less intolerable than the alkali. Where it abounds nothing of service to man or beast can live. Shoe-leather is burned by it as by quicklime. The minute particles which float in the air irritate the throat and lungs as keenly as the steel dust which cuts short the lives of Sheffield needle-grinders. Long before Elko is reached, a station 200 miles distant from Promontory, the passengers in the train fervently pray to be delivered from this corrosive and ubiquitous alkali dust. Towards the next morning there was a commotion among the passengers. A sudden shock roused all from their slumbers. Many were greatly frightened, but no one was seriously hurt. A severe shaking was the only result of what proved to be a collision with a herd of cattle. The engine and tender had been thrown off the rails. Two oxen were crushed to death. Fortunately, the ground on either side was level; had the accident taken place farther on, where the embankment was very steep, the consequences might have been disastrous. As it was, a detention of eight hours between Wadsworth and Clarks' Station and the loss of breakfast were the only sufferings

to be borne. Before many minutes had elapsed energetic steps were taken to replace the engine on the rails. The necessary appliances were at hand, and were put to their respective uses. This was not the only proof of the completeness of the arrangements for such a contingency. A telegraph clerk was in the train, and he had an instrument for tapping the wires. In the course of a few minutes the requisite connections were made, and messages were telegraphed to the stations East and West. An hour did not pass away before two locomotives were on the spot. What was still more important, the passage of trains over the line was stopped. As the line is a single one, the timely warning thus given by telegraph doubtless helped to avert the danger of other collisions. Some passengers were indisposed to forego their breakfasts without an effort to provide a substitute. There was plenty of beef alongside the line, and the sage-brush could be used for fuel. What more natural, they argued, than to light a fire and cook a steak? The sage-brush was soon in a blaze, but the meat could not be procured with equal rapidity. Cutting through an ox hide and carving out a steak with a pen-knife was a task which baffled the passenger who made the attempt. While the ineffectual endeavor was being made, the fire threatened to produce serious consequences. The flames rushed along in the direction of the telegraph posts and the cars. A German gentleman of greater pluck than prudence had ignited the sage-brush, and he became ludicrously

alarmed at the results of his act. He rushed about in frantic consternation, making energetic attempts to stamp out the flames. His vigor in undoing the mischief he had caused, led to the scorching and permanent injury of his boots and trousers.

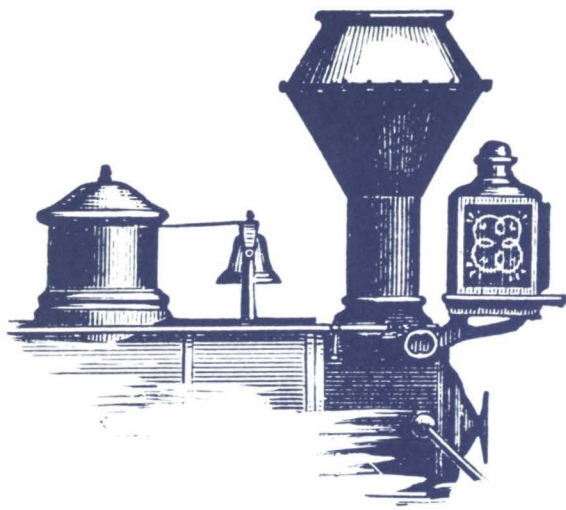
"Eight hours after the collision had occurred, the engine was replaced on the rails and the train was put in motion again. Not long afterwards the base of the Sierra Nevada range was reached, and the wearying sight of plains covered with alkali and sage-brush was exchanged for picturesque views of mountain slopes, adorned with branching pine trees, and diversified with foaming torrents. This was a gratifying relief, as well as a fascinating prospect.

1886 Railroad Pass
issued to H. W. Pond.



Pictured at far left is a Currier & Ives lithograph entitled "American Railroad Scene - Snow Bound." Published in 1871. Gilcrease prints files.

At the immediate left is an oil painting in the Gilcrease collection by Robert Lindneux entitled "A Hold Up."



"Reno is the last halting place of importance during the Westward journey through the State of Nevada. It is within a few miles of Virginia City, the headquarters of the miners who work the numerous silver and gold mines in this district. Here, as at other similar places, a large number of passengers left the train and a new set entered it. The amount of the local passenger traffic was far in excess of my expectations. Indeed, the proportion of through passengers is very small when compared with the number journeying from one intermediate station to another. Near Boca, which is 127 miles distant from Sacramento, the line crossed the boundary that separates the State of Nevada from the State of California. The Californians rejoiced when the train entered their state, and spoke with pleasure about soon basking in the sunshine which has made the Pacific slope a modern Garden of Eden. The ascent now becomes very steep, and two engines are employed to drag the train. At short intervals there are strong wooden sheds of about a thousand feet long, erected to guard the line against destruction from what we call avalanches, and what here are called 'snow slides.' Indeed, these sheds are very much like tunnels. They have been constructed at a vast expense, and in a solid manner. It has yet to be seen how far they will subserve their purpose. They have the drawback of interrupting the view of some of the most romantic scenery on the line. The glimpses one gets are just sufficient to tantalise and not prolonged enough to satisfy. The view of Donner Lake is the most charming of them all. This lake is picturesquely situated in a gorge of the Sierras.

"Summit Station, though the highest point on this line, is not so high as Sherman Station on the Union Pacific. It is 7,042 feet above the level of the sea. This represents not the altitude of the Sierra Nevada range, but only the elevation of this mountain pass. Above the station the peaks of the mountains tower cloudwards. The scene is one of unprecedented grandeur. Owing to the delay caused by the accident I have described, the speed of the train had been increased. The engine-driver had been running extra risks in order, as the Americans phrase it, to 'make time,' so as to arrive 'on time.' The descent from a height nearly half as great as that of Mont Blanc to fifty-six feet above the sea level has to be made. The velocity with which the train rushed down this incline, and the suddenness with which it wheeled round the curves, produced a sensation which cannot be reproduced in words. The line is carried along the edge of declivities stretching downwards for two or three thousand feet, and in some

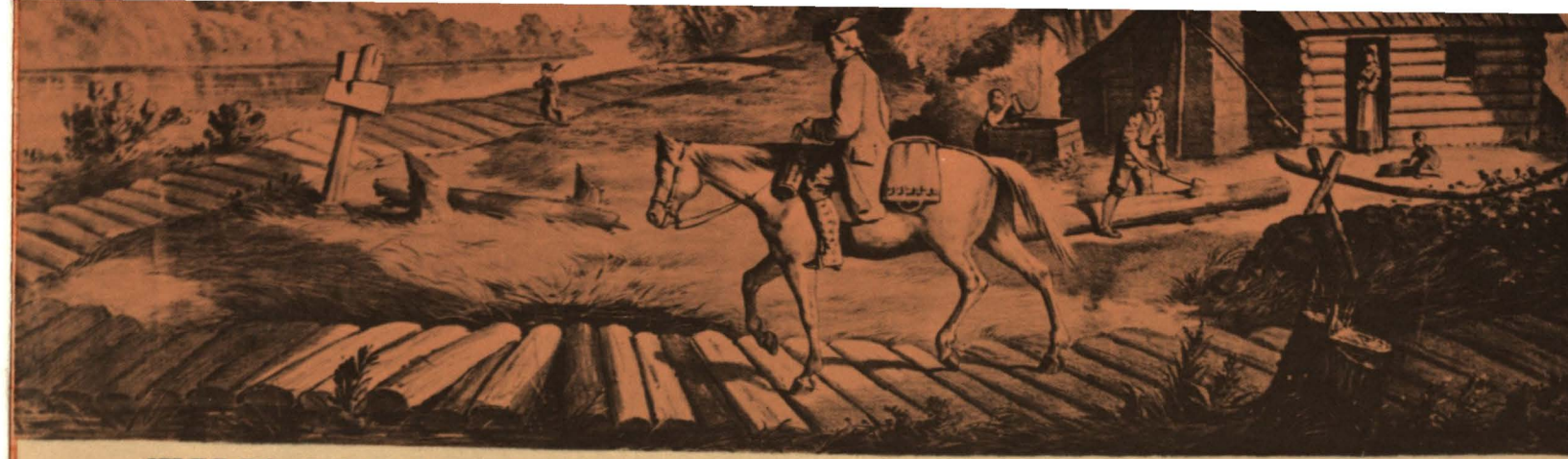
Colored lithograph entitled "The Fast Mail" by J. A. Burch. Published by Cosack and Company, New York, 1875.

parts on a narrow ledge which had been excavated from the mountain side by men swung from the upper parts in baskets. The speed under these circumstances seemed terrific. The axle-boxes smoked with the friction, and the odour of burning wood pervaded the cars. The wheels were nearly red hot. In the darkness of the night they resembled discs of flame. Glad though all were to reach Sacramento, not a few were specially thankful to have reached it with whole limbs and unbruised bodies.

"The charm of the last few hours is indescribable. But a few hours ago we were passing through a region in which desolation reigned supreme; a region of sage-brush and alkali dust, of bitter water and unkindly skies. Still more recently the icy winds of the snow-crowned Sierras had chilled us to the bone. The transition was sudden and the transformation magical. The sun descended in a flood of glory towards the Pacific Ocean, while the train was spinning down the ringing grooves of the mountains. The canopy of azure overhead, unflecked by a cloud and spanned with myriads of brilliant stars, surpassed in loveliness the brightest and most serene sky which ever enchanted the dweller on the luxuriant shores of the blue Mediterranean. The journey is not yet over. San Francisco is still upwards of a hundred miles to the west. But the Rocky Mountains, the American Desert, and the Sierra Nevadas are far behind us and a new country is before our eyes. That the Golden State is one of extraordinary richness is well known to every traveler. To some, however, as to me, it may have been a matter for rejoicing to discover that California is also a land teeming with unexpected natural beauties and rare natural delights.

"The western terminus of the Central Pacific Railway is at Sacramento. This city occupies the place at one end of the line which Chicago does at the other. Just as several routes lead from New York to Chicago, so are there more routes than one between Sacramento and San Francisco. (Again) the traveler is embarrassed by variety. He may select one out of two railways, or he may elect to take the steamer. His ticket gives him the option of land or water journey. The difference in time is trifling. As nothing worth speaking of was gained by continuing my journey by rail, I decided upon completing it by water. Besides, I could return by train, and thus see more of the country than if, on both occasions, I had traversed the same route.

"... The journey had been made too rapidly to make the aspect of a large and populous city a thing to be beheld again with special satisfaction. Among the marvels wrought by the Pacific Railway is the comparative annihilation of ideas as to distance in the minds of those who travel by it across the continent of America. Some time elapses, after arriving at San Francisco, before the fact is fully realized that New York is three thousand and Chicago two thousand miles distant. The traveler who has come thus far thinks it but a trifle to continue his journey in the track of the setting sun, even though aware that he would have to sail ten or twenty days before finding a halting-place at Honolulu, or Yokohama, or Hong Kong." ‡



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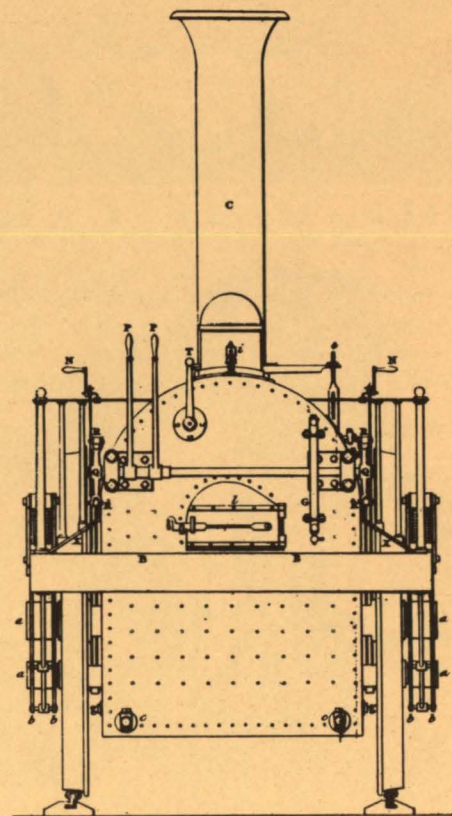
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The Popular Passenger Route between the EAST and WEST.
UNION DEPOTS, NO FERRY TRANSFERS, NO DELAYS.

The Union Pacific Central Pacific was only the first of several "transcontinental" Railways. The Northern Pacific, Great Northern, Santa Fe, Southern Pacific, and much later, the Milwaukee Railroad either built to the coast or combined with other roads to form a through line from the Mississippi Valley to the Pacific. In Canada the Canadian Pacific would be constructed with even more of a feeling of access to the Orient than was evident in the U. S. It may be noted, however, that the first Pacific Ocean point reached by the Atchison, Topeka and Santa Fe was Guaymas, Mexico. They made an issue of the fact that this point was several hundred miles closer to several Oriental ports than were San Francisco and Los Angeles. Until synthetics changed the fashion, there was marked competition between the transcontinentals in getting raw silk to eastern markets in the shortest time. With the end of the silk express, the association of the transcontinentals with the Orient trade disappeared from the American conscience.



Reproduced at right is a rear elevation (side elevation shown on back cover) of an early locomotive featured in *A Practical Treatise on Locomotive Engines* by Comte F. M. G. De Pambour, published in London by John Weale, 1840.

Engraving featured opposite depicts a Taunton switching locomotive featured as an illustration in *Forney's Catechism of the Locomotive*, 1879.



† Dodge, Major-General Grenville M. "How We Built the Union Pacific Railway and Other Railway Papers and Addresses." The Monarch Printing Co., Council Bluffs, Iowa (no date of publication).

‡ Rae, W. F. "Westward By Rail, The New Route to the East" Appleton and Co. 90, 92, and 94, Grand Street, New York, 1871.

