4-2-1867

Report of the Secretary of the Interior, communicating, in compliance with a resolution of the Senate of the 30th ultimo, reports of the government directors of the Union Pacific Railroad Company.

REPORT

OF

THE SECRETARY OF THE INTERIOR,

COMMUNICATING,

In compliance with a resolution of the Senate of the 30th ultimo, reports of the government directors of the Union Pacific Railroad Company.

APRIL 2, 1867.—Read; ordered to lie on the table and be printed.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., April 2, 1867.

SIR: In answer to a resolution adopted by the Senate on the 30th ultimo, requesting the Secretary of the Interior "to transmit to the Senate a copy of the report of the government directors of the Union Pacific Railroad Company, made during the last year, and that the same be printed when received," I have the honor to enclose reports from the government directors of the said railroad company, as follows, dated respectively, February 28, May 17, August 30, September 14, October 2, November 23, and December 1, 1866, January 7, 10, and 30, and March 2, 1867.

I am, sir, very respectfully, your obedient servant,

O. H. BROWNING, *Secretary.*

Hon. B. F. WADE,
President of the Senate of the United States.

FORT WAYNE, INDIANA, *February* 28, 1866.

SIR: The quarterly meeting of the directors of the Union Pacific Railroad Company, which in regular course should have taken place on the first Wednesday in January, was held in New York on the 7th of February. The government directors, having only a few days before had the honor of reporting to you in person, separated without making a further report upon the general business.

The undersigned, as a member of the committee on location and construction, devoted some time after the adjournment to a careful examination of the additional topographical and engineering facts bearing upon the location, as ascertained by the surveys of 1865, so far as at that time had been reported to the office. In this investigation I had the important aid of Mr. James S. Evans, one of the intelligent and enterprising engineers of the company, who during the past two seasons have conducted these very important surveys.

The report of the government directors, dated July 8, 1865, contained the following brief reference to the surveys proposed for the working season of that year:

"For the field-work of 1865, two full engineer parties have been sent out,

with a third party, numerous enough for separate explorations, in advance. The instructions given by the vice-president for the season's work cover the location from the 100th meridian to the eastern base of the Black Hill range, together with a survey of the South Pass route via the North Platte; and also the ascertainment of the fact whether or not a better route than the one surveyed last year from the Black Hills to Salt Lake can be found further south, passing through the basin of the Green and Uintah rivers."

The surveys and explorations between the Laramie river and Salt lake, under the charge of Mr. Samuel B. Reed, civil engineer, not having been reported to the office, owing probably to his engagement in construction during the winter, any special reference to that portion of the route must be deferred. I understand that Mr. Reed ran a line eastward from some point of connection with the Bridger Pass line of 1864, via South pass, and down the Sweetwater valley. He also made a reconnoissance of the Wahsatch mountain range, southeast from Utah lake, to test the practicability of a line from Salt lake to the Green river basin, via the Spanish Fork and the Uintah river, passing along the southern base of the Uintah mountains. The feasibility of getting into the Green river basin from the east, by crossing its eastern rim, through the head branches of the Platte on one side and of Bear river on the other, was examined by Mr. Evans. He reports that he followed up the most promising branch of the Laramie river, and found its direction and other features so unfavorable as to afford little ground to expect a practicable line across this part of the mountain range.

The party in charge of Mr. Evans was chiefly employed during the season in perfecting the route across Black Hills, and in connecting the surveys thence eastward along the Platte with the definite location from Omaha westward. A part of the field-work marked out for 1865 was necessarily deferred to the coming season, mainly in consequence of harassing disturbance and apprehension from Indian hostilities. And yet important progress has been made toward the solution of those weighty problems of location that must arise in the proper adjustment of two thousand miles of railroad line traversing a vast mountainous region, which, after all the liberal and wisely directed efforts of the government and its competent corps of topographical engineers, was found, at the commencement of these surveys, in great measure unexplored. A connected survey, with actual distances and levels, can now be reported from Omaha on the Missouri river to Salt Lake City, presenting a feasible line, both as to cost of construction and future working. The distance by the longer of two feasible routes over the Black Hills (the Cache la Poudre line) is 1,079 miles, subject to any variation which a definite location may cause. This surveyed distance is about thirty-five miles less than was assumed by Lieutenant Beckwith from his exploration in 1852, as given in the report of the Secretary of War.

In pursuance of the policy governing the board, looking not only to a practicable route but the discovery of the very best route over the difficult sections, a continued liberal expenditure of time and means in preliminary surveys is contemplated by them. The definite survey of the Lodge Pole line, from the mouth of that stream to the base of the mountains at Camp Walbach, hitherto only assumed in the comparison, the completion of the survey of the South Pass and North Platte route, with a reconnoissance, at least, of the Laramie river, in the section cutting through the Black Hills, where its cañons are reported as formidable, are among the important preliminary examinations marked out for the coming season. And as the question between the north and south forks of the Platte has a bearing, necessarily, upon the yet open question as to the point of junction of the Kansas and Iowa branches on the 100th meridian, which it is the province of the President of the United States to establish, and as the rapid progress of the grading westward will probably require the settlement of this question within this year, I have suggested to the board that the survey of the North Platte be completed at the earliest day practicable.

The nature of the mountain barrier stretching at right angles across the route of the Pacific railroad, known as the Black Hills, is well understood. Though but a spur of the main Rocky mountains, and not of itself the divide of the continent, yet the Black Hill range rises rather abruptly, at the lowest pass yet surveyed, some three thousand feet above the valley of the South Platte, near its base. Taken in connection with the Park mountains, sometimes called the Snowy Range, lying west of Denver, which rise generally two thousand to three thousand feet higher, and from which the Black Hill range is an offshoot, the whole chain from the South Park, near the headwaters of the Arkansas, to the point where the North Platte cuts through it, is in length transversely with our line over two hundred miles. When the surveys of this year are completed, a large proportion of three successive seasons will have been devoted by engineers of the company in instrumental examinations of this mountain barrier at its several points of greatest relative depression.

The board seem to have recognized, as a sound general policy, the idea of touching, in the location of this work, built for the development of our interior resources as well as for through commerce, those districts in which our enterprising people have formed settlements, growing speedily into States of the Union, and where they have already built up important material interests either in mining or agriculture, when this can be done without too great increase of distance. In 1864 Mr. F. M. Case, engineer, was instructed to examine by actual survey, and otherwise, the practicability of crossing the mountain range lying directly west of Denver. His report, in which was embodied the route of a previous examination made in 1862, refers to five distinct routes south of the Cache la Poudre line, which had been spoken of as possible or practicable for railroad purposes, and over two of which, in his judgment the most feasible, he had made an instrumental reconnoissance. At the Hoosier pass, the most southerly of the five, the grade line assumed was estimated to be 10,650 feet above the sea level, and requires a tunnel 2½ miles long. The route to the other pass, besides the objection of running for twenty miles through the cañons of the South Platte, seems to carry the road too far south of the proper direction to Salt lake. At the Berthoud pass, directly west from Denver, the grade line assumed as most judicious is reported, from actual tending west of that point, as 10,280 feet above the sea, requiring a tunnel 3½ miles long through granite rock. The summit of the mountain here rises 1,280 feet above the tunnel. No point of crossing this mountain range in the direction of Salt lake has yet been discovered by the engineers, or suggested by others, less formidable than Berthoud pass. The mere statement of the engineering facts places it out of the comparison. The enormous cost of the tunnel, the time required to excavate it, and the burden of passing the commerce of the country over an elevation two thousand feet higher than by routes further north, forbid the contemplation of this route, and suggest the impracticability of passing by Denver, unless further examination should discover a lower pass; for, even if the main line were brought to this point from the east, it must then turn north, at right angles with the general course, following near the base of the mountain for fifty or sixty miles to the gorge of the Cache la Poudre creek, before commencing the ascent westward.

The unfavorable result of these examinations will not surprise any one who has intelligently examined the territorial map. The mountain ridge, forming here the divide or water-shed of this part of the continent, is known to reach its greatest altitude as it skirts the North and Middle Park. The four great rivers, the Rio Grande, the Arkansas, the Platte, and the Colorado of the West, have their sources in this section of the Rocky mountains. Unless it may be a few more peaks in the Wind River mountains and in the Sierra Nevada, there is probably no section between the Mississippi and the Pacific ocean reaching so great altitude as is found in this snowy range.

Should the proposed survey of the North Platte, the aim of which is to flank the higher portion of the Black Hills, present a feasible route, we shall then have a choice among three lines, by either of which the Black Hill range may be crossed, covering, at their widest divergence, a distance north and south of 130 miles. In the present stage of the examinations two routes may be described and a comparative view presented as follows:

1st. Lodge Pole and Crow Creek route, 186 miles. This line, leaving the South Platte at mouth of Lodge Pole creek, follows up this direct east and west valley to base of mountain at Camp Walbach; thence (abandoning the Cheyenne pass, from which eastward the mountain descends too rapidly) the line bears to the southwest, via headwaters of Crow creek, and over Durant pass, to a common point (Station 2,606) at western base of the Black Hills. Grade line at summit is 8,398 feet above sea level; no tunnel required at summit, but an open cut, 50 feet deep, through granite. Ruling grade, ascending westward; first, 105 miles, 30 feet per mile; next, 50 miles to base of mountain, ruling grade ascending westward 45 feet per mile; next, 14 miles ascending slope, ruling grade 80 feet per mile; next, 6 miles to summit, a continuous ascending grade of 116 feet per mile; thence westward 5 miles, a continuous descending grade of 116 feet per mile; and next, 6 miles, a ruling grade, descending 80 feet per mile, to the common point at western base of Black Hills.

2d. Cache la Poudre route, 218 miles. Diverging at mouth of Lodge Pole creek, this line follows up South Platte and the Cache la poudre creek to base of mountain at Laporte; thence bearing northwest along and near Dale creek, and over Antelope pass, to the common point at western base of mountain, (Station 2,606.) Grade line on summit, 8,045 feet above sea level; no tunnel required; cut only 5 or 6 feet. For the purpose of comparison, in respect to the facility of operating the mountain division, we may commence at a point in the South Platte, equidistant with the mouth of Lodge Pole creek, from the common point at western base. Ruling grades, ascending from this point westward, are, for first 138 miles to base of mountain at Laporte, 20 feet per mile; next, 25 miles, ascending mountain slope, ruling grade 80 feet per mile; next, 12 miles to crest of mountain, a continuous ascending grade of 116 feet per mile; thence descending westward, 3 miles, continuous grade of 105 feet per mile; and next, 8 miles, descending westward, ruling grade 80 feet per mile, to the common point at western base of Black Hills.

This comparative statement must be regarded as approximate. In connection with the annexed rough profile sketch, marked A, of the two lines for 186 miles in length, it gives a good general idea of the character of the road over the Black Hills, and the nature of the engineering questions which will arise in the comparison of these two routes on the full completion of the surveys.

Omitting for the present any detailed calculation of relative cost of operating these two lines, which would be out of place in this general report, it will be observed that the Cache la Poudre line leads to a depression in the mountain (Antelope pass) 353 feet lower than the summit over which the Lodge Pole line passes, (Durant pass,) referring in each case to the grade line giving the advantage of less elevation by that amount for the traffic to pass over. On the other hand, this route must be charged with the obvious disadvantage of 32 miles additional length, alleviated somewhat by the fact that this extra distance lies in the level valley of the South Platte, and therefore cheaply constructed and operated. A commercial view of the question might find compensation in the nearer approach of the Cache la Poudre line to the existing mining operations of Colorado—so near, indeed, that a branch road to Denver would probably be constructed when that new State shall have acquired the needful strength.

Taking in at one view the topographical features of the entire route east of Bridger's pass, which is the point of division between the waters flowing into two oceans respectively, distant 736 miles from the Missouri river, there

seems to be nothing unfavorable to the working of the road with economy, certainty, and speed. The elevation of the Black Hills is the formidable obstruction. But the wide, smooth, and direct valley of the Platte, stretching out for 500 miles to the very base of the mountain, presents as an approach a uniform and gradually ascending plane, with grades ranging from 5 to 20 feet per mile, while the total ascent, from entrance into the Platte valley, 30 miles west of Omaha, to the summit of the mountain, is, by the Cache la Poudre route, 6,917 feet in a distance of 563 miles, overcome almost imperceptibly on the plains before reaching the foot of the mountain at Laporte, or by the Lodge Pole, which rises more rapidly. Over four-fifths of the total rise is made on the plains before reaching base of mountain at Camp Wabach. By either route the line divides itself, for operating distinctly into two sections, mountain and plane—each using a class of locomotive engines adapted to the power required, thus securing economy in the highest degree. It is, moreover, a favorable feature that in all this distance no undulating line intervenes. With care in the location, no elevation once attained need be lost. The grade from the Elkhorn to the mountain crest may be either ascending or level.

The well-known scarcity of timber on the plains for cross-ties and bridges is a characteristic, tending, on the other hand, to increase the expense of construction and operating. The limited growth, chiefly cotton-wood, on the islands and banks of the Platte, is in unfavorable contrast with the abundance of oak generally found in the States. Immediately after crossing the Black Hills, groves of pine and spruce are reported on the northern slopes of the Medicine Burr mountains, a portion of which is within carting distance from either of the two routes described, and also available for the line further west by floating down the Laramie river. This timber tract has not been carefully examined, but Mr. Evans says that, standing on a high point of the Black Hills, from which it was in distant view, he estimated its probable area equal to four hundred square miles. He considers it a valuable resource for the road.

The fuel question is likewise important. Coal must be chiefly used. All reports, as far back as the exploration of Captain Howard Stansbury in 1850, concur as to the existence of coal on Green river and its tributaries. But between this and the coal-fields of western Iowa or of Kansas eight hundred miles of road are to be operated. The discovery of coal of good quality in the Black Hills or on the Platte would materially cheapen the working of the road. It is found near Denver, and Mr. Evans heard from others that some coal had been mined on his route, near eastern base of mountain. As every additional burden upon transportation will be paid finally by the commerce and productions of the country in charges upon traffic, whatever may tend to lessen or cheapen the motive power is of public importance.

All of which is respectfully submitted.

J. L. WILLIAMS,
Government Director Union Pacific Railroad Company.

Hon. JAMES HARLAN,
Secretary of the Interior.

PITTSBURG, *May* 17, 1866.

SIR: In compliance with the duties imposed upon the government directors of the Union Pacific railroad, I have the honor to report:

At the request of the vice-president I accompanied him to Omaha, Nebraska, arriving there Saturday, April 28, and spent eleven days on the line of operations, in a personal examination of everything that would tend to give me an intelligent idea touching the condition, management and progress of the work. On our reaching the initial point at Omaha, I found the Burnettizing buildings,

temporary car-house, and saw-mill, considerable construction material, and the low river base of the company's operations, submerged by the overflowing waters of the Missouri, to an average depth of, say from one to three feet. The general business of the company was interrupted for about two weeks, say from the 23d of April to the 7th of May.

By the active management and exertions of Samuel B. Reed, esq., general superintendent, his assistants and employés, the company's movable property was to a great extent removed and secured, so that it was supposed that the absolute loss to the contracting company will not be very great; yet at considerable cost of time and money. I am pleased to be able to report that the company's permanent brick machine and workshops are situated on more elevated grounds, further from the river, and not in the least damaged. I think it would have taken from four to five feet more of a rise in the waters to have materially affected them. I was informed that the greatest floods known by any of the inhabitants were in April, 1857, and June, 1862. The flood of this year was, according to their data and recollections, within about seven inches as high as that of 1857, and within twelve to eighteen inches as high as the flood of 1862.

To provide against loss and interruption to the business of the road, by the recurrence of these overflows, should receive the early attention of the board of managers of the company.

The machine and workshops, engine-houses, and turn-tables of the company at Omaha, erected, as I was informed, in the unprecedented short time of sixty-five days, during last fall and winter, which contain one million one hundred thousand (1,100,000) well-burned bricks, good stone foundations and metallic roofs, are of the most permanent character, and conveniently arranged. The machinery in the same is sufficient for the present wants of the company, and of the latest and most approved construction.

On the 3d instant I accompanied the vice-president and consulting engineer of the company over the line of completed road to a point near Shell creek, a distance of seventy-five miles. We found the line in good condition, and it will compare favorably with any newly-constructed western road. At this point the track-layers, under the superintendency of General J. Casement, were energetically pushing the work at the rate of three-quarters of a mile to one mile per day. Additional boarding cars, sleeping coaches, and tents were being provided, so as to increase the track-laying force, which I since learn by telegraph has been done, and the work is now progressing at the rate of about 7,000 feet per day.

I confidently believe the first one hundred miles will be completed by the 1st day of June, whereby the act of incorporation, requiring one hundred miles of road to be built, will be fully complied with. The energetic contractors informed me that they contemplated providing artificial lights, to expedite the work by night as well as by day, and if possible complete one mile and a half to two miles every twenty-four hours.

From Shell creek I accompanied Colonel S. Seymour, consulting engineer, to the Loup Fork, and over a portion of the grading on the second one hundred miles.

I am pleased to be able to report that the temporary bridge over this river is completed and ready for the track-layers.

The energy displayed by Messrs. Dort and Butterfield, the contractors on this work, as well as by Mr. Reed, general superintendent, and Messrs. Case and Hurd, division engineers, deserves honorable mention. The first pile was driven March 22, and the last on May 2. The bridge is 1,500 feet long, with 57 bents, 3 piles each, and 37 bents, 4 piles each—in all 319 piles. The permanent bridge, which is intended to take the place of the temporary one, is being pushed forward with vigor—five-pier pile foundations and two-pile abut-

ments are driven. The masonry of this structure will most likely be limestone, transported from the quarries of the Poppillon.

I am informed no stone has yet been found between the Elkhorn and a point on the bluffs, about 110 miles beyond Fort Kearney, where it is supposed a good quality can be procured. The only bridging of any importance between Loup Fork river and Fort Kearney is one of 100 feet span, over Wood river, about 75 miles west of Loup Fork.

The grading on the second one hundred miles can (and I think will) be completed by the 15th of June. A corps of engineers have been sent out to definitely locate the third one hundred miles.

Returning to Omaha, I spent several days with the consulting engineer, examining the river banks and the effects of the overflow of the river bottoms for several miles up and down the Iowa and Nebraska sides of the Missouri. The proper site for a bridge-crossing of this river is a subject of momentous importance, not only to this company, but to the country and to the various railways pointing to connections with it, and it should be definitely settled at an early day, for the benefit of the various interests involved. Surveys and soundings have been made, the maps and profiles are being prepared, so that it is hoped intelligent conclusions may be arrived at.

Of equipment, I find there are five locomotives now on the line of road; four more in transit, which at this time, I presume, have reached the line of road; an additional seven contracted for, to be delivered by the 10th of June. Two first-class passenger coaches on the line of road, one more in transit, and two additional ones to be delivered in June. One hundred and nineteen box and platform cars on the line of road and in transit between Hannibal and St. Joseph.

CONSTRUCTION MATERIAL.

The vice-president informs me that the railroad iron, chairs, and spikes delivered, in transit, and provided for, will be sufficient to reach a little beyond the 100th meridian, say 250 miles from Omaha.

The general superintendent informed me that ties on hand and paid for from Omaha to Grand island numbered	116,900
Under contracts from points in the Missouri above and below Omaha	134,000
Under contract on the line of road of the first 100 miles	35,000
Under contract on the line of road of the second 100 miles	80,000
Under contract on the line of road of the third 100 miles, being red cedar, to be delivered by January 1, 1867	100,000
Estimated to be delivered under verbal contract	15,000
Estimated to be delivered from contractors' lands at three different points	170,000
Total	650,900

Being sufficient ties for the construction of over 250 miles of road.

The company is still put to serious inconvenience for the want of railway connections to and from the east. I am pleased to be able to report that these difficulties will be obviated next year certainly. Most of the railroads through Iowa, pointing to connections with the Union Pacific, are making more or less progress, while some are pushing ahead with commendable vigor. The Cedar Rapids and Missouri River Railroad Company, under the active management of John J. Blair, esq., of New Jersey, have put their entire work from Boonesboro (its present terminus) to the Missouri river under contract; a force of fully 1,500 men, with sufficient teams, is now employed upon the work. All of the grading on the first forty miles west of Boonesboro will be completed by the 10th of July. This embraces some of the heaviest work on the line.

The bridge over the Des Moines river, 840 feet, including its approaches, 1,000 feet in length, is completed, and the track is laid 5½ miles west of Boonesboro; 520,000 ties contracted for and being delivered, and 8,800 tons of iron, sufficient for 120 miles of road and sidings, on hand at the Des Moines river and in transit.

For this intelligence I am under obligations to W. W. Walker, esq., chief engineer. I confidently believe that this work, with its energetic management and its abundance of means, can reach the initial point of the Union Pacific within the next twelve (12) months.

The Mississippi and Missouri railroad is about passing into new hands, who have the ability, and whose interest will be manifestly, to reach the Missouri river at the earliest day possible.

The Burlington and Missouri River Railroad Company, I am informed, have a large force at work constructing westward. I am also informed that the Des Moines Valley railroad is making rapid progress and is confidently expected to reach the city of Des Moines within a few months.

The American Central railway, recently organized, or rather reorganized, is I am informed, under contract from Fort Wayne, Indiana, to the Missouri river, to be completed to New Boston, on the Mississippi river, in three years from the 1st of January, 1866, and from thence to the Missouri river within two years thereafter.

I am informed by Willis Phelps, esq., who, with his associates, is constructing the Council Bluffs and St. Joseph railroad, that they expect to be able to complete their road within this year, if some of the legal difficulties on the Missouri portion of the line can be overcome within a short time. The ties for the entire road are provided and one-fifth of the iron is in transit.

I could not learn of much progress being made westward on the Dubuque and Sioux City railroad. I herewith append a small map showing the probable connections at an early day of the several lines through the State of Iowa with the Union Pacific railroad. The lines will be feeders as well as receivers of trade and business of no ordinary magnitude.

I think the question of the future business of the road merits our earnest consideration. The entire nation has a substantial interest and investment in it, and every section completed opens up new fields for improvement, and from whence new sources of revenue may be derived.

It has been assumed that the tonnage westward will be largely in excess of the tonnage eastward. This theory, I am convinced, will not be practically sustained, after the great through line is fairly opened for business and in successful operation.

The cheap iron ores of Lake Superior, costing at the mines, say, three dollars fifty cents per gross ton, are transported by rail to the lake; thence by water say 600 miles, and by rail say 200 miles, (in all about 800 miles,) costing on an average ten dollars per ton, including everything, at points, for extracting and working the same; feeding a great number of blast furnaces; yielding 66⅔ per cent. of pure pig-iron, worth at this time say forty-two dollars ($42) per ton; supplying more than one-half the metal consumed by all the rolling-mills of northeastern Ohio and western Pennsylvania, and all of this trade has been created since 1858 or 1859.*

I am informed that the copper mines of New Mexico are now being succesfully worked. The ores are smelted, the cost of mining and smelting being about five cents per pound, the copper taken to Guaymas, Sonora, a distance of about 500 miles of land carriage, at a cost of seven cents per pound, thence to our eastern seaboard or Europe, at a cost of one cent per pound, thus making the

*For this information I am indebted to James J. Bennett, esq., who has been largely interested in the iron business of Pennsylvania and Lake Superior.

actual cost of the refined copper, at the consuming points, about thirteen cents per pound, when the net cost of the Lake Superior refined copper, delivered at Pittsburg or New York, will now average from twenty-two to twenty-four cents per pound.*

I am also informed that silver ore is being transported by wagons from Nevada to San Francisco, a distance of about 250 miles, and thence is shipped to England for smelting.

It is, therefore, no great stretch of the imagination to believe that the tonnage of this great national highway will, at no distant day, consist largely of the precious ores (including copper) from the mineral districts of our western States and Territories to the eastern States, where cheap fuel, cheap labor, and improved machinery will be used for their smelting and refining.

The completion of this gigantic interoceanic enterprise within the time designated by the act of incorporation begins to assume a decided probability. It is worthy the efforts of the nation. We can now contemplate the early connection of the distant parts of our Union, the development of our rich mineral and agricultural domain, and the great benefits that must inure to the nation, borne down by new responsibilities.

I am informed by the vice-president that a geological examination of the country for the first one hundred miles on the company's lands is now being made by Professor Eggleson and his assistants.

In closing this report I desire to express my obligations to the consulting engineer and the several officers of the company on the line of road for their uniform courtesy and the information they promptly furnished me with. I also desire to acknowledge the kind and gentlemanly treatment I received from Thomas C. Durant, esq, vice-president, whom I accompanied to Omaha, whose heart, mind, and money have been devoted to the enterprise from its first inception.

The public-spirited gentlemen who are contributing so largely of their means in the prosecution of this work, which is destined to conduct a traffic of extraordinary magnitude, merit substantial returns on their investments.

I am, sir, very respectfully, your obedient servant,

SPRINGER HARBAUGH,
Government Director Union Pacific Railroad Company.

Hon. JAMES HARLAN,
Secretary of the Interior, Washington, D. C.

UNION PACIFIC RAILROAD COMPANY,
President's Office, 20 Nassau street, New York, August 30, 1866.

SIR: The undersigned, government directors, called to this city to attend a special meeting of the board, beg leave to submit a brief report, as preliminary to a full statement, after their return from a visit contemplated within a few days to Nebraska and the line of the road.

Since our last joint report two reports have been made at our instance, one by Jesse L. Williams and the other by Springer Harbaugh, which are hereby referred to as containing important information in relation to the current progress of the work. The first, by Mr. Williams, of the date of February 28, 1866, refers to the location, and contains an elaborate summing up of the extended surveys and explorations of the several corps of engineers down to the date of the report. The second, embracing the results of Mr. Harbaugh's ob-

*For this information I am indebted to Dr. Curtiss G. Hussey and Colonel James M. Cooper, of Pittsburg, pioneers in the copper and mineral business of our country.

servations on the line of the road, contains valuable suggestions in regard to work at and near Omaha, its initial point.

These gentlemen were detailed by us for that duty, and their reports were approved and adopted by us as government directors.

It affords us pleasure to refer to the unexampled rapidity with which the work on the road has progressed down to this date.

On the 1st of April last only forty miles of track was laid. The following telegram, received yesterday, shows the present condition:

"OMAHA, *August* 27, 1866.

"T. C. DURANT, V. P., 20 Nassau street: Two hundred miles of track laid.

"S. B. REED, *Superintendent.*"

On no other road within our knowledge has so many miles of track been laid within the same period, with the single party working from necessity from only one end.

In respect to the work generally, we hope in a few weeks to have the means and data of presenting to you a further and more detailed report, based upon personal examination. Further preliminary surveys on the more difficult portions of the routes have been made during the present season, as seemed necessary to a full understanding of the responsible question of final location, but the results have not yet been reported to this office. The government directors have detailed of their number Jesse L. Williams to accompany the chief engineer of the company, Major General Dodge, and the consulting engineer, Colonel Seymour, on their proposed reconnoissance as far west as the Black Hills, where the heads of the several corps of engineers engaged in their explorations and surveys are expected soon to meet for comparison of results and for general conference. As soon as his report is received we will forward it to your office.

Respectfully yours, &c.,

SPRINGER HARBAUGH.
T. J. CARTER.
CHARLES T. SHERMAN.
J. L. WILLIAMS.
GEORGE ASHMUN.

HON. SECRETARY OF THE INTERIOR,
Washington, D. C.

OFFICE OF THE UNION PACIFIC RAILROAD,
Omaha, Nebraska, September 14, 1866.

SIR: The undersigned, government directors of the Union Pacific railroad, in accordance with our arrangements referred to in our report of September 1, proceeded to the line of road in Nebraska, and having made a personal examination of the work by passing over the road to the end of the track, submit the results in the following report:

The track is laid two hundred and twenty miles in running order from Omaha with the necessary side tracks at convenient points. The grading is completed ready for the superstructure twenty-seven miles further, to the one hundredth degree of longitude, and the work is in rapid progress to the North Platte river crossing, and commenced forty miles beyond it. At this point the bridge is commenced, and the materials delivered for the early completion of that important work, in time for laying the track when it reaches that point. The contractors have iron, ties, and other material on the line of road to complete it over three hundred miles, which is expected to be finished the present year. There are now delivered at Omaha ninety miles of rails and about two hundred thou-

sand ties, and four hundred thousand contracted for delivery there and along the track; also, contracts for two hundred and fifty thousand cedar ties from the tributaries of the Platte river, the delivery of which has commenced beyond the present track, and will save the transportation of them from the Missouri river.

At the terminus of the line at Omaha have been erected well arranged machine-shops and engine-houses of brick, sufficient for the wants of the road, with necessary tracks for the present business of the road, and can be extended as required upon the ample depot ground at the terminus of the line.

The rolling stock at present on the road consists of twenty locomotives, five first-class passenger cars, two baggage and mail cars, 142 platform cars, forty-six box cars, and thirty hand cars; also, six more locomotives are being built.

There are now being built, at the company's shops at Omaha, seven cars per week, and soon increased facilities will finish ten per week, while cars from other manufacturers are being delivered sufficient for the traffic and use of the construction as it progresses.

Substantial and commodious passenger and freight stations are erected at Elkhorn, Frémont, Columbus, and Kearney, and smaller houses at Shell creek and Lone Tree; also, passenger and freight stations are in course of construction at Silver creek, Grand island, and Wood river, and water stations have been built at convenient points along the line.

The permanent bridge of Loup Fork, fifteen hundred feet long, is in progress, with stone piers; one abutment and three piers now finished, and the whole will be completed at an early period this fall, thus dispensing with the temporary bridge now used to hasten the progress of the work.

The quality and present condition of the grading, masonry, bridging, and track completed we deem fully equal to a first-class road, and is constructed substantially according to the specifications and instructions agreed upon at the convention of government engineers, directors, and commissioners held in Washington in February last, and approved by the Secretary of the Interior; and will compare favorably with any western railroad for permanency and durability, while the alignment and gradients surpass any road of equal length in the United States, thus affording facilities for extensive means of transportation, as well as high rates of speed when required.

The character of the material composing the embankments is well suited to the purpose, requiring but little expense in repairs of track to keep it in perfect running order, and for practical purposes sufficiently ballasted. The cuts at some points will require other material for that purpose.

The surveys have been continued this season in the mountain region by efficient corps of engineers, the results of which are soon to be submitted to the chief and consulting engineers, who have gone to make a personal examination of the same on the line, and we deem it of much importance that a definite location should be soon made to commence work in that region, and with this view we have requested our colleague, J. L. Williams, esq., to accompany them; and he is now in the discharge of that duty, and upon his return will report the result of his investigations on that subject.

The rapid progress of the Union Pacific railroad renders it important that arrangements should be made at an early period to form suitable connections with the respective lines of railroad in progress in Iowa and Missouri, as it is confidently expected that early next season at least one line will be completed from Chicago by the Cedar Rapids line, and others are under construction; also, the line from St. Louis, by way of the Council Bluffs and Saint Joseph line; all of which will become important connections for traffic with this road.

This brings us to the consideration of the very important question of the most proper site and mode of forming these several connections across the Missouri river, in order to accommodate the various interests at minimum cost and satisfactory to all the parties, yet from our investigations have no doubt that it will

be accomplished in some manner within reasonable expense at an early period, as the concentration of railroads at this point will of necessity combine these several interests, and insure a permanent and reliable connection to expedite the transfer of the traffic between the different lines of railroad.

In closing this report, we think it a cause of congratulation upon the commencement and rapid progress of this great national work. While the present is emphatically an age of inquiry and improvement, in no department has it made more advancement than in the facilities of transportation of persons and property, and none tending more to the development of the resources of the country and improvements in civilization.

This enterprise is greatly indebted in its inception, organization, and progress to the sagacity of distinguished statesmen, combined with capitalists, energetic contractors, efficient officers and engineers, who have and are devoting their means and energies to press forward this work at a rate unexampled in the history of railroad construction.

The United States government has acquired a new claim to the gratitude of the people by delegating to a company the duty of constructing and managing this great work of national improvement, and in aiding it by the public credit and grant of lands. Thus the enterprise will enjoy the benefit of a permanent direction, and can be prosecuted with vigor on a systematic plan to ultimate completion, forming a continuation of the great system of railroads, commenced at the Atlantic and to be continued at an early day to the Pacific, affording not only facilities for commerce along the line, but a magnificent highway for interchange of products among the nations of the world.

Respectfully submitted:

T. J. CARTER,
CHARLES T. SHERMAN,
SPRINGER HARBAUGH,
Government Directors Union Pacific Railroad.

Hon. O. H. BROWNING,
Secretary of the Interior, Washington, D. C.

DENVER, COLORADO TERRITORY,
October 2, 1866.

SIR: In the communication which I had the honor to make from this place on the 21st ultimo, respecting the Berthoud pass, reference was made to a contemplated reconnoissance over the experimental lines surveyed for the Union Pacific railroad across the Black Hills. On the 25th ultimo I left Laporte, at the eastern base of the mountain, in company with Major General Dodge, chief engineer Colonel Seymour, consulting engineer, and Mr. James A. Evans, under whose immediate charge these preliminary surveys were made. Having with us the maps and profiles in addition to the personal knowledge possessed by these officers, facilities were afforded for obtaining the fullest acquaintance with the routes and their relative advantages possible in so short a time.

Cache la Poudre route over Antelope pass.

This line, as now revised, diverges from the Cache la Poudre creek some eight miles below the mountain, and following the valley of Pitchfork creek, enters the mountain eight or ten miles north of Laporte. Striking the line in this valley a few miles from the plain, we followed it closely over the summit at the head of this stream and into the valley of Stonewall creek, a branch of Dale creek; thence through Stonewall cañon and up the valley of Dale creek in a northwestern course to the dividing ridge between its waters and those of

Laramie river, crossing this divide at Antelope pass. The valley of Dale creek is the peculiar feature in this part of the mountain range; taking its rise in the higher part of the range near Cheyenne pass, and rather on the western slope, it pursues a southeastern course for over thirty miles, cutting through the range and joining the Cache la Poudre three miles above the eastern base of the mountain; thus opening a practicable route for a railroad, as it has heretofore afforded a favorable passage for the overland stage route. Having reached the western slope, we followed the line of survey to the base of the mountain in the Laramie plains, a distance of only six miles from the summit. Thence following near the line of survey over the Laramie plains some ten or twelve miles, we reached the United States fort John Buford, near the crossing of Big Laramie river, in Dakota Territory.

Here it is proper to notice the marked kindness shown to our party by the commandant of the fort, Colonel Mizner; during the day we remained for rest and outfit. In view of recent Indian depredations along the return route, General Dodge had been furnished by the commandant of this military department with an order for a sufficient escort from the forces here, which was promptly placed under the general's orders.

Lodge Pole and Crow Creek route over Evans's pass.

Returning to the common point of junction of the two lines at the western base of the range, our party ascended the western slope, following a second experimental line bearing more to the north, crossing the valley of Dale creek on the range and near its source; and thence over the crest of the mountain at Evans's pass. Descending the eastern slope, this line follows a ridge forming the divide between Lone Tree creek on the south and Crow creek on the north, and reaches the eastern base of the mountains about forty miles north of Laporte, from which it continues easterly to the valley on Crow creek on the plains. After examining with care these two lines, we returned to Laporte on the 1st instant, having travelled on horseback one hundred and fifty miles.

The chief engineer expects to close the surveys bearing upon the question of location across the mountains, and submit his report to the board within the next four or six weeks. Without entering into the engineering characteristics of the several routes, which, in advance of that report, would be premature, I may now say, for the information of the Secretary of the Interior, that General Dodge expresses a confident expectation of being able, without great expense, to reduce the maximum grade over the mountain range considerably below the limit allowed by the Union Pacific railroad act. The importance of such reduction is so manifest that I have not failed to urge it within reasonable limits of cost.

Very respectfully,

J. L. WILLIAMS,
Government Director.

Hon. O. H. BROWNING,
Secretary of the Interior.

UNION PACIFIC RAILROAD OFFICE,
New York, November 23, 1866.

SIR: The preliminary surveys across the first range of the Rocky mountains being nearly completed, the government directors deemed it important that one of their number should personally examine such of the lines as appeared most feasible. Accordingly, at the request of my colleagues and by invitation of Colonel S. Seymour, the consulting engineer of the company, I accompanied

him to the mountains in September last. At Omaha we were joined by General G. M. Dodge, chief engineer, and in passing over the several routes were further aided by explanations on the ground by the division engineer, under whose immediate direction the survey had in each case been made, with the advantage also of the maps and profiles. Under the requirements of the 13th section of the act of Congress, approved July 2, 1864, I respectfully submit for the information of the Secretary of the Interior, the following general results, premising that this report has been submitted to my colleagues and sanctioned by them:

This first mountain barrier, as it stretches north and south across the general course of the road, between the 105th and 106th meridian of longitude, may be described as extending from the cañon of the South Platte, near the latitude of Pike's Peak, to the point where it is cut through by the North Platte, a distance of near three hundred miles. Its more southerly and higher portion, called the Snowy range, or Rocky mountains proper, forms part of the great circle of the continent, separating the waters of the Platte from those flowing into the Colorado of the West. The northern section of this mountain barrier being a part of the subordinate range known as the Black Hills, and only dividing the drainage of the two forks of the Platte, is, nevertheless, as to direction, the continuation of the main Rocky mountain range northward, possessing the same mountain characteristics, though having less altitude and gentler slopes. The Cache la Poudre river, the largest tributary of the South Platte, taking its rise in its most southerly branch near the heights of Long's Peak, marks the point of division of the range into the two sections here described.

The water-shed of the continent diverges here to the northwest, forming first the southwestern boundary of the North Park, and thence, continuing northwest, sinks into the depression known as Bridger's pass, where it is 7,534 feet above the level of the sea, and 3,892 feet lower than at Berthoud pass in the Snowy range west of Denver.

Up to the eastern base of this north and south mountain range, the broad and generally smooth plain of the Platte valley opens favorable approaches, through its several tributaries, to any mountain crossing that may be selected. The point of crossing the mountain is therefore the problem first to be solved.

In the wide range of these surveys, continued now through three years, ten distinct points of crossing have been examined. They have been run with level and transit, in all cases affording reasonable hope of practicability; or, where less promising, they have been explored with care, availing in such cases of barometrical observations. The passes thus examined include, as it is understood, all that have been suggested by mountaineers or others familiar with the country as *possibly* feasible. Enumerating from south to north, they may be briefly described as follows:

Route No. 1, *over Hoosier pass at head of the South Platte.*

Mr. F. M. Case, civil engineer, reports to the vice-president, December 15, 1864, that he made a survey of the governing sections of this route, and submits profiles. First, of the mountain range at Hoosier pass; second, of a line eighteen miles northwestward down Blue river, a tributary of the Colorado; and third, of a line run 48 miles southeastward from the pass down the upper portion of the South Platte, through the South Park to the head of the Platte cañon. From the head of this cañon, as he reports, the line would follow the river northeastward some 40 miles, through the mountain to the plains with, as estimated, an average descent of 70 feet per mile. Of this distance the engineer estimates that 20 miles would be close cañon, both walls being washed by the stream, and the direction so circuitous as to require considerable tunnelling. His estimate of the height of this pass above the sea, from barometrical obser-

vations in the vicinity, is 11,500 feet. A tunnel of two and a half miles through granite is required. Grade line of tunnel upon the assumed level 10,660 feet above the level of the sea.

The general alignment of this route is so unfavorable, considering Salt lake as the point aimed at, as, in the judgment of the engineer, to render a more extended survey needless—145 miles of road being required between Denver and the mouth of Blue river, only 76 miles west of the meridian of the former place.

Route No. 2, over Tarry-all pass.

This route, it seems, did not so commend itself to the engineer as to require a survey. He estimates the pass to have about the same altitude as Hoosier pass —11,500 feet above the sea. The approach to it from the plains on the east would be, first, through the cañon of the South Platte for some 25 miles, and thence up Tarry-all creek, a branch of the Platte, to its source in the range a few miles northeast of Hoosier pass. From the west the approach would be from the valley of the Blue river above Breckinridge, through the Indiana gulch. While the engineer does not assume to speak of this route advisedly, he thinks the summit could not be reached from the east without exceeding the maximum grade of 116 feet per mile, and that the descent of the gulch on the west is 150 to 200 feet per mile. Having made no definite survey, he does not give the length of the tunnel.

Route No. 3, through the north fork of the South Platte.

As in the case last described, Mr. Case deemed a critical survey of this route unnecessary. He says in his report that it would enter the mountains at the mouth of the South Platte cañon, being thus coincident with the two last-named lines for ten miles, and thence up the north fork of the Platte 35 miles, crossing the range still further north than the route last described, and connecting on the west with one of the head branches of Snake river, an affluent of Blue river. This pass was represented to the engineer by a reliable explorer, as being a little below the line of arborescence or "timber line," and was assumed as about 11,500 feet above the sea. Upon this hypothesis, and with the aid of barometrical observations in the vicinity, the engineer estimates that on the eastern approach to the summit some 2,300 feet elevation must be overcome in 12 or 15 miles, and on the western approach 2,700 feet in 20 miles. How far this could be alleviated by a tunnel, and what would be the length of the tunnel, is not stated. The entire route from the plains on the east to the valley of the Blue river on the west is reported as running through a narrow mountain valley in many places tortuous.

It will be noticed that the two routes last described, entering the mountain, as they do, far to the south, through the cañon of the South Platte, are, like route No. 1, forced out of the proper directions

Route No. 4, over Berthoud pass.

From the beginning of these investigations this route has attracted much interest, as well from the general belief of mountaineers that it was the most favorable pass through the Snowy range as from its locality, being in the direct course from Denver to Salt Lake City, the two chief points on the route, both of which it is important to pass. In the summer of 1862, prior to the first meeting of the corporators of the Union Pacific railroad at Chicago for the purpose of organization, Mr. F. M. Case, at the instance, and I believe at the expense, of the friends of the work in Colorado, made what he called an instrumental reconnoissance of this route. His report, addressed to honorable John Evans, then governor of Colorado territory, was embodied in his subsequent official report of December 15, 1864. Subsequently, in 1866, by direction of this board, a sec-

ond and more careful survey of this route was made by Mr. P. T. Brown, one of their engineers. In the general topographical facts the two surveys agree. I passed over this line as far as the summit of the range, accompanied by Colonel Seymour and Mr. Brown.

The line from the South Platte at Denver to the summit of Berthoud pass is 60 miles in length. The survey was extended west into the Middle Park, 78 miles from Denver, in the direction of Salt lake. For general description it naturally divides as follows:

First. Denver to Golden City, 14½ miles. This is over a rolling and rapidly rising plain, falling into Clear Creek valley, six miles east of the mountain, and meeting the foot of the range 12 miles from Denver. Ruling grade 116 feet per mile, of which there is about three miles. Construction not very expensive.

Second. Golden City to the upper end of Clear Creek cañon 15¾ miles. Golden City is at the transition point from the sedimentary to the granite formation. Here the line enters Clear Creek cañon, which extends 15¾ miles, rising in this distance 1,544 feet. Through a portion of the cañon the valley rises faster than the maximum grade; but with careful location and heavy cost Mr. Brown thinks the grade need not exceed 116 feet per mile at any point. Two-thirds the distance will be curved; much of it sharp. The greater part of the distance may be called close cañon, and a part narrow, open cañon, with abrupt slopes.

Third. From the head of cañon to east end of Berthoud tunnel, 28½ miles, the line follows the narrow mountain valley of Clear creek, through the midst of the gold-mining developments, passing many quartz mills. Ruling grade 116 feet per mile, of which there will be about 13 miles. For seven or eight miles of the upper portion the fall of the valley greatly exceeds the maximum grade, reaching in places over 300 feet per mile. Using the maximum grade of 116 feet per mile from the tunnel eastward, the line is necessarily thrown on the steep, rocky, and in places precipitous mountain sides, at an elevation of 100 to 400 feet above the creek, involving, of course, very heavy cost. In the whole distance, from the base of the mountain to the tunnel, Clear creek, as Mr. Brown supposes, would be bridged perhaps twenty times, with probably two to three miles of tunnelling through sharp points. To give greater length of line, for the purpose of reducing the grade to the maximum prescribed by law, the surveyed route, in ascending, turns up South Clear creek for 2½ miles, thence by a short tunnel through a ridge into Bard's Creek valley, which it follows down, reaching the main valley at Empire City.

Fourth. Berthoud tunnel would be 3 1/10 miles long, and pierces the mountain 1,364 feet below the summit of the pass. The material to be excavated, the common granite of the mountain. Grade line in the tunnel at the highest point is 10,100 feet, and summit of pass 11,426 feet above the sea.

Fifth. West end of the tunnel to end of survey, 16½ miles. Descending westward, the slope of the mountain is followed for some distance until the valley of Moses creek is reached, which is the tributary of the Colorado, and thence with this valley to the Middle Park. Grade 116 feet per mile for first 11½ miles. I did not pass over this portion of the route.

Route No. 5, over Boulder pass.

While standing on the mountain peaks near Berthoud pass, on the 18th of September, in the clear mountain atmosphere, I had a full view of the Boulder pass, twelve miles further north. From its apparent height above the growth of timber, and from barometrical observations before reported, I was fully convinced of its impracticability; yet, in deference to the views of gentlemen having mining interests on the Boulder, I fully intended visiting that pass, but a fall of eight inches of snow on the 19th on the eastern slope, which I learned was two feet deep at the western base of the range, defeated this purpose. A few weeks

later Mr. Brown made a survey of the Boulder route. The chief engineer reports the results as follows:

First. That the pass is 11,700 feet above the sea.

Second. A tunnel of six miles required.

Third. The approach is through either South Boulder or Middle Boulder creeks, on either of which the ascent is too rapid for the maximum grade; and

Fourth. That on either of these streams expensive cañons are encountered.

Route No. 6, up the Cache la Poudre and Dale creeks, over Antelope pass.

During the last week in September I made a reconnoissance on horseback over this route from the eastern base of the mountain at Laporte to the western base of the Laramie plains, at the common point of junction with Lodge Pole and Crow Creek route, in company with the chief engineer, the consulting engineer, and Mr. James A. Evans, division engineer, whose three years' service in directing these experimental surveys has made him familiar with the topography of this range.

Antelope pass is a depression in the ridge separating the waters flowing into the Laramie river on the west and those of Dale creek, a tributary of the South Platte. Dale creek, taking its rise near Cheyenne pass, runs in its upper section on the western slope of the range, cutting the main range of the Black Hills in its southeasterly course, and joins the Cache la Poudre river some three miles above the eastern base of the mountain. Through the Dale Creek valley a favorable route is found from the Cache la Poudre, near Laporte, to Laramie plains, in a northeastern direction, finding its summit, not in the main Black Hill range, but in the subordinate divide between Dale creek and Laramie river. This ridge or divide is crossed at Antelope pass, which has 195 feet less elevation than the main range at Evans's pass, in the direction of Crow creek and the Lodge Pole.

The opening thus cut through the mountain range by Dale creek, and which has heretofore been used as the overland stage route, the railroad survey now occupies. The main features of this line are these: Total length of mountain section from eastern to western base, 39½ miles, of which 33 miles is in the ascent of the eastern slope, and 6½ miles on the western slope. The western slope, and also the first 7½ miles of the eastern ascent from the plains, following up Pitchfork creek, is chiefly in the secondary formation, and presents a comparatively favorable profile. On these two sections the line may be located with a maximum grade of from 85 to 90 feet, without expensive work. The intermediate section of 25 miles, all in the valley of Dale creek, and in the granite formation, presents some expensive grading, expecially near the crossing of Dale creek, and also near the cañon of Stonewall creek, where the line of transition between the stratified and granite formations is crossed. Three bridges of some magnitude are required on this division, the chief of which is over Dale creek, near four hundred feet long. The deepest part of the narrow chasm here to be bridged is 168 feet below grade line. As the line now runs the maximum grade occurs frequently, with occasional undulations, by which ascent is lost. With the time and care needful on a final location, the ruling grade may be reduced below the limit allowed by law, and probably to 105 feet or 110 feet per mile, and the undulations chiefly if not altogether avoided. The grade line at Antelope pass, without a tunnel, and with a cut of moderate depth, is 8,045 feet above the sea.

The approach to this passage of the Black Hills is up the valley of the South Platte to the mouth of the Cache la Poudre river, and thence up that valley to Pitchfork creek, some eight miles below Laporte, which latter tributary is followed to the entrance of the Black Hills. The whole route east of the mountain is of the most favorable character, permitting a grade uniformly ascending with the rise of the valley.

Route No. 7, following the divide between Crow creek and Lone Tree creek to Evans's pass.

Returning eastward from Fort John Buford, on the Laramie river, to which point our party had extended their reconnoissance, in part to obtain a military escort which General Dodge deemed a prudent precaution against Indian depredations on the Lodge Pole, we crossed the Black Hills by the Lone Tree and Crow Creek Divide route, which we followed to a point near the travelled road from Denver to Fort Laramie, and thence to Laporte along or near the eastern base of the range.

As the route last described finds an easy ascent of the mountain through the valley of Dale creek, so this route, by following the smooth and gently ascending ridge, dividing the drainage into Crow creek on the north and Lone Tree creek on the south, which ridge extends far out into the plains, occupies a favorable locality for crossing the Black Hills more exempt from obstructions by snow-drift than ordinary lines. This ridge can be approached from the valley of Crow creek through a small east and west tributary, rising at the rate of from thirty to sixty feet per mile. Reaching the divide, seven miles east of what appears to be the general course of the base of the range, the line pursues it for twenty miles, to the summit of the Black Hills, at Evans's pass. For the first seven miles this divide presents a smooth profile. Entering a little west of this the granite formation the next five miles presents a rough profile, on which the work will be heavy, and the material in great part rock. The next eight miles, to the pass, is on the summit, or on the adjoining slopes of the divide, with a favorable profile and alignment, and comparatively light work. Where excavation is required to any considerable depth it will be rock. The experimental line up this eastern slope of the mountain is laid with a ruling gradient of 106 feet per mile. But the chief engineer is confident that this can be reduced on a final location to the maximum of ninety feet per mile, which is less than the grade of the Pennsylvania Central railroad in the ascent from Altoona to the tunnel, with curvature very much easier than is there introduced. The summit of the mountain presents here a broad and gently rounded surface, admitting of no reduction by any judicious tunnelling. With an open cut of moderate depth through rock the grade line is 8,242 feet above the sea.

Descending westward the profile is less favorable. Dale creek, heading a few miles north, near Cheyenne pass, has worn a valley in the western slope which can be crossed only by an embankment and bridge of considerable height; and after reaching the secondary summit, between this creek and the Laramie plains, the descent thence to the common point of junction with the line over Antelope pass, at western base of mountain, is here more abrupt than on that route. A careful resurvey of this western slope, 10¼ miles distance, is proposed by the chief engineer, under the belief that he can, within reasonable limits of cost, establish a ruling grade not exceeding ninety feet per mile, as on the eastern slope, and at the same time avoid any depression of grade in the intermediate valley, below the summit, west of Dale creek. So important is it that on these mountain ascents elevation once obtained be not lost by injudicious undulations, that I have not failed, as a member of the committee on location, to urge this view.

To reach this crossing of the Black Hills the line would leave the South Platte at Julesburg, following up the valley of Lodge Pole creek 106 miles, and thence bearing a little southward through a southwestern tributary, cross the divide to Crow Creek valley.

Route No. 8, via Lodge Pole, Camp Walbach, and Crow creek.

This route, like the Cheyenne Pass line, finds its approach to the Black Hills through the Lodge Pole valley to Camp Walbach at the base of the range, and

its route thence up the mountain slope is coincident with the Cheyenne Pass line to the crossing at Lodge Pole creek; thence diverging to the south, it pursues generally the divide between the drainage to Lodge Pole on the north and Crow creek on the south. It crosses the summit of the range at Evans's pass, there intersecting route No. 7, and having, of course, the same gradient, to wit, 8,242 feet above the sea. But before reaching this pass, in traversing the uneven surface on the mountain tributaries of Crow creek, this line encounters a higher country, over which the gradient reaches the height of 8,400 feet above the sea. The descent of the western slope is coincident with route No. 7.

Previous to the examinations made in 1866 this was considered the shortest practicable route over the Black Hills, and it is the route compared with the Cache la Poudre line in the report which I had the honor to make to the department, dated February 28, 1866. But the investigations of the last season, under the direction of General Dodge, chief engineer, whose knowledge of this region, acquired during his command of this military department, has been of great service to the company, have resulted in the discovery of route No. 7, which, by leaving the Lodge Pole far out in the plains, finds a more direct alignment, and in all respects a better line.

Route No. 9, *via Lodge Pole creek and Cheyenne pass.*

The Cheyenne pass over the Black Hills, in connection with the Lodge Pole valley as its eastern approach, has long been a thoroughfare for travel, and was thus from the beginning brought prominently to the notice of those seeking a route for the Pacific railroad. In the fall of 1863 a line of levels was run over this pass by Mr. B. B. Brayton, engineer. Again, in the summer of 1864, a more careful survey was made by Mr. Evans. The general results of Mr. Evans's survey are:

First. That the summit of the pass is 8,656 feet above the sea.

Second. That a tunnel, 1,500 feet long, through granite, on a grade line 8,540 feet above the sea, would be required.

Third. That this tunnel could be reached from the east by way of Camp Walbach, with a maximum grade, probably, not exceeding 116 feet per mile; and

Fourth. That on the western slope of the mountain, the ruling grade could not be reduced below 132 feet per mile, unless by the objectionable expedient of increasing the length of the line by switching.

Route No. 10, *through Laramie cañon.*

Knowing that this stream had cut its channel deep through the Black Hill range, thus presenting, by its immediate valleys, a more uniform ascent, and a total rise and fall between the Platte valley and the Laramie plains, materially less than by other routes crossing *over* the range, and, further, that this route would occupy a good general direction, the character of its great cañon has been an object of interest from the first. In 1864 Mr. Evans commenced the examination, but accomplished it only on the lower portion.

In 1865 Mr. Case explored, without instruments, the upper portion. But until Mr. Evans, in his second attempt, in 1866, succeeded in running a line entirely through this cañon, it is not probable that any human being, savage or civilized, ever passed through the whole length of this deep and rugged gorge. Its direct length is 14 miles; its length by the survey, 25 miles; its course in many places very tortuous; and its vertical walls of rock from 500 to 1,500 feet in height. The fall of the stream in places is from 150 to 200 feet per mile, and its current, of course, extremely rapid. It is wholly impracticable for railroad purposes.

The route up the North Platte, and through the South pass, has been followed by the travel from the earliest beginning of emigration across the continent. The North Platte, like the Laramie, but with a still larger flood, has worn its channel through the range, presenting, unquestionably, if it could be followed, an easier and more uniform grade from the plains to the divide of the continent at the South pass, than any other route. Its greater length, however, caused by its northern circuit, its wider divergence from the important mining resources of Colorado, in which the nation has an interest, with the apprehension of deeper snows in the region drained by the Sweet Water, precipitated there through the directing influence of the Wind River Mountain range, seem to have outweighed, in the judgment of the company and their engineers, any supposed advantage in grades. The survey of this route, though commenced in 1865, near Fort Bridger, and extended eastward through the South pass and a short distance down the Sweet Water, by Mr. S. B. Reed, one of the company's engineers, was not continued through the Black Hills. The engineers, from their reconnoissance and information from others, report narrow defiles and cañons where the North fork cuts the mountain range, so formidable as probably to force the line out of the valley, and over mountain spurs; but the length of this difficult construction, as also the exact camparative length of the North Platte route, is unknown. The water-shed at the South pass is 7,470 feet above the sea. It is 64 feet lower than the same dividing ridge of the continent at Bridger's pass, 100 miles to the southeast, and 3,956 feet lower than Berthoud pass, west of Denver.

Comparison of routes.

Grouping the ten routes thus briefly described into two classes, five of them cross the Snowy range, and five the Black Hill range.

Of those in the Snowy range, examinations indicate the Berthoud pass, designated No. 4, as having most of the elements of a feasible line.

Contrasting the Berthoud Pass line with the two available lines over the Black Hill, either Lodge Pole and Crow Creek line, over Evans's pass, designated as route No. 7, or the Cache la Poudre line No. 6, the comparison is greatly against the Berthoud, as follows:

First. At Berthoud pass the grade line is 10,100 feet above the sea; at Evans's pass, 8,242 feet. Difference in the elevation, to be overcome with the commerce of the country, 1,858 feet.

Second. Tunnel at Berthoud pass, three and one-tenth miles long. As the summit of the pass rises near 1,300 feet above the level of the tunnel, the material excavated would be chiefly passed out at the ends. Under these circumstances, not less than three or four years, certainly, would be required for its construction, within which time, it is confidently believed, the track-layers from Omaha, by a more favorable route, may meet those from Sacramento, on the plains of the Humboldt river. No estimate has been made of its cost. Unquestionably, the outlay of capital would be greater than is warranted at a single point, be it from national or individual means, when the same capital and labor would stretch out the road so far toward the Pacific, over the cheaper routes that offer. At either of the two Black Hill passes no tunnelling is required.

Third. Besides Berthoud tunnel, there would be 15 miles in the Clear Creek cañon, and 10 miles in the upper section of Clear creek, which would cost perhaps beyond all precedent in this country. Contrasting the aggregate of the tunnel and this 25-miles with same length of mountain work on the Lone Tree and Crow Creek Divide route over the Black Hills, and the difference would grade more than 100, perhaps 150, miles of average line between the Black Hills and Salt Lake.

This comparison, thus stated in very general terms, is confined to the first

mountain range, as if beyond that the extension of the two routes to Salt Lake were alike feasible. Such, however, seems not to be the case.

In June, 1865, Mr. Reed, under instructions from F. C. Durant, esq., vice-president, and with a view to a line across the intermediate Green River basin, made an extended reconnoissance of the country east of the Utah lake, to find, if possible, a practicable route over the Wahsatch mountains to Green river, *via* Spanish Fork and the Uintah river. His report, dated April, 1866, represents that there is no route practicable for a railway from Utah lake eastward to Green river, through the Uintah valley. We have seen that the eastern rim of the Green River basin cannot be crossed without an expense and delay quite too great, and if the Snowy range could be crossed the chief engineer expresses the belief that two subordinate north and south ranges would interpose further west. The basin of the Green river, and especially its main valley, the White river, running from east to west, near the fortieth parallel, has been represented as much more favorable to agriculture, with better supply of timber, than the country along the Bridger Pass route, having less altitude by some two thousand feet, and lying two degrees further south; this claim is no doubt just, and it is to be regretted that access for the railroad seems forbidden by the great height of the mountains forming its eastern and western boundaries.

But were this route practicable, yet in the aspect of gradients, it would be much less favorable than the Bridger Pass route, the mountain ranges being higher and the intermediate valley lower. Green river, where this line would cross it, must be some two thousand feet lower than on the Bridger Pass route, while the Snowy range, over the Berthoud pass, is near two thousand feet higher than the Black Hills, making a total difference of some four thousand feet in the ascent to be overcome between Green river and the summit of this most easterly mountain range.

In whatever aspect this important question may be viewed, whether in the detail of actual surveys and levelling or in a general grasp of the leading features of this part of the continent, there can be no question but that the Union Pacific Railroad Company, in deciding to locate over the Black Hills and through Bridger's pass, have but conformed to the controlling topographical shaping of the region to be traversed by the road.

Having thus presented the engineering characteristics of the Berthoud Pass route across the Snowy range, in contrast with the two available routes across the Black Hill range, showing conclusively that the former does not enter into the comparison, it remains to compare the two available Black Hill routes with each other.

Taking the entire division between the mouth of the Lodge Pole, opposite Julesburg, on the east, where the lines diverge, and their point of intersection at the western base of the range in the Laramie plains, the facts bearing upon the comparison are as follows:

1. Length of line by Cache la Poudre and Antelope pass, 216 miles. Length by Lodge Pole and Crow creek over Evans's pass, 179 miles; difference 37 miles in favor of the Lodge Pole route.

2. The greatest altitude reached by the grade line on the Cache la Poudre route is 8,045 feet above the sea. On the Lodge Pole line, 8,242 feet. Difference against the Lodge Pole route, 195 feet.

The ruling mountain gradient, which limits the road over the two routes respectively, will be fifteen to twenty feet per mile less on the Lodge Pole than could be obtained on the Cache la Poudre line, giving to the former a very important advantage.

3. Length of expensive mountain line across the range, by the two routes respectively, is by the Cache la Poudre 39¼ miles; by the Lodge Pole 23¼ miles.

This difference is on the eastern slope, and results from the greater elevation

of the plain at the eastern base of the mountain, in the vicinity of the Lodge Pole, Crow, and Lone Tree creeks, by near two thousand feet than where the deeper valley of the Cache la Poudre meets the mountain slope. Besides the cost of constructing the extra length of line by the Cache la Poudre, it may be safely assumed that the Lodge Pole line will cost far less per mile than the other.

4. The commercial bearing of the question should not be overlooked. Though the topography of this mountain region forbids the passage of this national thoroughfare directly through the mining region of Colorado, yet the transverse valleys favor a connection by branch. The interests of the company of Colorado and of the nation seem alike to demand such connection. Adopting the Cache la Poudre route, the proposed branch, as already surveyed along the South Platte to Denver, would be 53 miles long, or by the Lodge Pole the branch would be lengthened to 112 miles, but the main line shortened 37 miles. The paramount claims of through commerce seemed to the board to give preponderance in the aspect of commercial considerations to the short main line.

5. The fuel question also enters into the comparison. Coal is found at many points along near the base of the mountain, between the Cache la Poudre and the branches of the Arkansas. North of the Cache la Poudre, though it may exist, the swell of the plains before described has covered it beyond our reach. Coal is also found east and northeast of Denver, on Coal creek, Kioway creek, and other tributaries on the southern slope. The chief engineer reports that he has discovered coal northwest of the Platte on Crow creek and Lone Tree creek, but far out from the base of the mountain. From this outline of the coal field, it will be seen that the Cache la Poudre line passes through or near it, while the Lodge Pole line runs some thirty miles north of it. The proposed branch to Denver would make it available for either route. If this South Platte coal field be passed by, we are not assured of any coal on the line of the road between the western slope of Iowa and Rock creek, beyond the Laramie plains, a distance of about 650 miles, though possibly it may yet be found intermediate by further search or by shafting.

In the distribution of duties among the government directors, the supervision of the location has fallen to the undersigned, and to that I have chiefly given my attention. Very thorough and extended surveys of the country, of which heretofore so little was known, have been urged, and in this the company has expended much time and means. The advantage is apparent, for the very favorable route across the Black Hills—certainly with easier gradients and of much cheaper construction than was expected—was only discovered, with its connections, by the third year's survey. The road is now permanently located as far west as Laramie river, 576 miles from the Missouri. The next section requiring very critical examination is the Medicine Bow range, the spurs of which cross our route. Within the next year the location may be established to Salt Lake City, now ascertained by the shortening of the line over the Black Hills to be about 1,032 miles from Omaha.

This report was prepared soon after my return from the mountains, from personal observation and facts politely furnished by the engineers, but delayed so that the levels and distances might be corrected from the official report of the chief engineer, only yesterday presented to the board. All which is respectfully submitted.

J. L. WILLIAMS,
Government Director Union Pacific Railroad.

Hon. O. H. BROWNING,
Secretary of the Interior.

Altitude of various points west of the Missouri river.

	Feet above the sea.
Missouri river at Omaha	968
Columbus station, Union Pacific railroad	1,458
Kearney station, Union Pacific railroad	2,128
One hundreth meridian	2,514
North Platte crossing, near its mouth	2,790
Julesburg (mouth of Lodge Pole creek)	3,513
Latham (mouth of Cache la Poudre creek)	4,600
Mouth of Crow creek	4,534
Laporte	5,050
Denver	5,302
Golden City, Colorado	5,854
Head of Clear Creek cañon	7,398
Lodge Pole Creek junction	5,262
Crow Creek crossing	6,019
Evans's pass	8,242
Cheyenne pass	8,656
Antelope pass	8,050
Berthoud pass	11,426
Boulder pass	11,700
Bridger's pass	7,534
South pass	7,870
Sibyl's pass and Black Hills	7,020
Camp Walbach	7,040
Fort Laramie	4,250
Laramie river at mouth of Laramie cañon	4,800
Laramie plains at junction of railroad surveys on Laramie river	7,175
The end of the line in Great Salt Lake City	4,285
The mouth of Weber cañon	4,654
The Devil's Gate in Weber cañon	4,894
The Weber valley at the mouth of Echo cañon	5,535
The Weber valley at the mouth of Chalk creek	5,645
The summit at the head of Chalk creek	7,834
The summit at the head of Echo cañon	6,879
The surface of water in Bear river on Chalk Creek line	7,503
The surface of water in Bear river on Echo Cañon line	7,045
The summit between Bear river and Muddy, the rim of Great Salt Lake basin	7,567
In the valley of Muddy, near the overland stage station	7,067
The surface of water in Black's Fork, two miles below the mouth of Muddy	6,375
The surface of water in Black's Fork, twenty miles below the above	6,257
The summit between Black's Fork and Green river	6,460
The surface of water in Green river	6,245
The summit between Green river and north branch of Bitter creek	7,175
The Bitter Creek valley at the junction of Mr. Evans's line	6,315
The end of the line in Quilla valley	4,243
At the point of the West mountain	4,267
The surface of water in the Jordan river at the Narrows	4,522
In the Timpanogos valley at the mouth of the cañon	4,892
In the Timpanogos valley at Kamas prairie	6,391
On Kamas prairie	6,667
The surface of water in Weber river at the north end of Kamas prairie	6,340
The mouth of Chalk creek in Weber valley	5,645

North pass of Cedar mountains	4,604
Great American desert	4,480
Reed's pass of Humboldt mountains	6,125
Humboldt river	5,228

FORT WAYNE, *Ind.*, *December* 1, 1866.

SIR: On the 23d November I had the honor to forward to you from New York a report of my late reconnoissance over the preliminary lines run for the Union Pacific railroad across the first mountain range.

At that date the important subject of definite location was before the committee on location and construction, by reference to them of the chief engineer's report, the question having been virtually narrowed down to the two available routes over the Black Hill range.

I now report that the committee, after mature deliberation, recommend the line designated in my descriptive report of the 23d ultimo, as "*Route No.* 7, *following the divide between Crow creek and Lone Tree creek over Evans's pass*," and that this route was unanimously adopted by the board of directors. Its leading advantages over the Cache la Poudre route are, the saving of distance, 37 miles, lower maximum grade by 15 or 20 feet per mile, lighter grading, facilitating the rapid extension of the track, and less obstruction from snow drifts, following as it does, on the eastern slope, a ridge instead of a valley.

The line adopted, in its approach to this mountain, leaves the South Platte at Julesburg, following up the valley of Lodge Pole creek 106 miles, and thence, bearing a little southward, crosses the Black Hills some ten or fifteen miles south of Cheyenne pass.

Respectfully submitted:

J. L. WILLIAMS,
Government Director Union Pacific Railroad.

Hon. O. H. BROWNING,
Secretary of the Interior.

OFFICE UNION PACIFIC RAILROAD COMPANY,
New York, January 7, 1867.

SIR: The regular quarterly meeting of the board of directors of the Union Pacific Railroad Company was held last week, and the undersigned, government directors, submit for your information, on the condition and progress of the road, the following report:

Referring to the report of the government directors of September last, it was stated that our colleague, J. L. Williams, esq., was then making an examination, with the chief and consulting engineers of this company, of the lines surveyed in the Rocky Mountain region, and his report on that subject has since been made and filed in your department.

The board of directors have adopted the location of the route via Lodge Pole creek, over the Rocky mountains at Evans's pass, to Laramie river, 580 miles from Omaha.

The company are inviting proposals for the construction of the extension of the road 275 miles beyond the present terminus, to the above-mentioned point, with a view of commencing work on the mountain division early in the spring, in advance, so as to have the grading done by the time the track shall have reached the base of the mountains.

The track is laid 305 miles from Omaha, and the necessary engines, cars, and stations furnished for immediate use, though not fully equipped, and has

been accepted from the contractors, and steps taken for a settlement, at $50,000 per mile, including $5,000 per mile for equipment, under the provisions of the Hoxie contract, referred to in our report of July 8, 1865. Said contract was extended to the 100th meridian of longitude by the executive committee without the knowledge of any of the government directors, the extension of said contract not having been reported to the board of directors until October last; such action had, however, been taken by the company, as to render the contract legally binding.

The road thus opened has been turned over to the company to be immediately placed in charge of the operative department of the company, for general traffic of freight, passengers, and mails, and trains are now regularly running over the road.

The grading is nearly completed on 35 additional miles, and contracts made for grading on about 40 miles more, extending to the mouth of Lodge Pole creek. There are 145,000 ties on hand, sufficient for about sixty miles of track, 200,000 hardwood ties contracted to be delivered at Omaha, and 70,000 red cedar ties for delivery near the present terminus.

There is contracted for—and a part of which is delivered—232,000 tons of rails, sufficient for 250 miles of track.

It is due to the parties controlling the road to say that great zeal and energy has been manifested in the prosecution of the work, though some delay occurred at the commencement from the remoteness from the rail-mills and centres of capital and labor, and the high prices of work at the close of the war; yet the progress during the past year has been very satisfactory; in eight months 245 miles of track was laid, a rate of progress unequalled on any continuous line of railroad at any time, even under the most favorable circumstances.

The great cost of the division of road now opened is accounted for, in part, by the circumstances above named, the high rates of transportation, and the difficult navigation on the Missouri river.

It is expected that the Cedar Rapids and Missouri River railroad will be completed the present month through western Iowa, which will save much expense, with more certainty in future in transportation of materials.

We, therefore, congratulate the country that we will soon have an unbroken line of railroads (except the crossing of the Missouri river) from the Atlantic to a point approximating the base of the Rocky mountains, which will greatly facilitate commerce between our States and Territories.

Respectfully submitted:

T. J. CARTER,
SPRINGER HARBAUGH,
CHARLES T. SHERMAN,
J. L. WILLIAMS,
GEO. ASHMUN,
Government Directors of the Union Pacific Railroad.

Hon. O. H. BROWNING,
Secretary of the Interior, Washington, D. C.

WASHINGTON, D. C., *January* 10, 1867.

SIR: In compliance with your request, we herewith submit to you, in writing, the views and opinions we expressed to you verbally this morning.

We visited you at the request and by order of the board of directors of the Union Pacific Railroad Company, as you will see by reference to their resolution, a copy of which we presented you at our interview, for the purpose of calling your attention to the necessity of fixing, at an early day, the point of

the eastern base of the Rocky mountains by the President, as contemplated by the 11th section of the act of Congress approved July 1, 1862.

We believe the progress of the work would be facilitated by an early decision, for the following reasons:

First. The plans of the company, as we understand them, embrace the most rapid progress of the work that is practicable, reaching Salt Lake City, or the same meridian, in about two and a half or three years. To accomplish this, two hundred and fifty to three hundred miles must be built in the year 1867, which will include the first or main range of the Rocky mountains, known as the Black Hills. Judging from the progress of the past season, during which two hundred and forty-five miles of track was laid in eight months, it is considered practicable, with the experience gained, and the improved facilities for transporting materials, to lay two hundred and fifty to three hundred miles of track, provided the grading can be prepared.

Second. It is evident that the grading of the line over the mountain range, which consists of heavy rock excavation and masonry, should be chiefly finished by the time the track shall have reached the eastern base of the mountains. Although this involves the extra expense of hauling machinery, tools, and supplies forward from the end of the track by teams, an average distance of probably one hundred and twenty-five miles; yet, with the liberal aid granted by the government, it is manifestly the duty of the company to incur this extra expense. To postpone the heavy work on the mountains, awaiting cheaper transportation by rail, would delay the track-laying for another season.

Third. In pursuance of this general plan of progress, the board has invited proposals for constructing two hundred and seventy-five miles, extending from the present terminus, three hundred and five miles west of Omaha, to the west bank of the Laramie river. But in order to intelligent and safe action in entering into such contract, it is desirable that the means of payment should be understood. This cannot be ascertained until the eastern base of the Rocky mountains shall have been fixed according to the terms of the act of Congress.

Fourth. The provisions of the 8th section of the act of Congress relative to the Pacific railroad, approved July 2, 1864, granting government aid to enable the company to commence the grading among the mountains between the eastern base of the Rocky mountains and the western base of the Sierra Nevada mountains, contemplates and authorizes the commencement of the work of grading before the track reaches the eastern base.

For these reasons, and believing that the President has not, at the present time, sufficient data and information to enable him to fix the precise base of the Rocky mountains, we would respectfully suggest that he at this time fix the point within certain limits, leaving the precise points to be settled after the President shall have obtained further information from a personal examination of an officer of his own selection.

Such a course would enable the company to proceed at once with their contracts, and to carry out their policy, the importance of which we trust will justify, in your view, the freedom we take in making this suggestion.

Very respectfully,

CHARLES T. SHERMAN,
J. L. WILLIAMS,
GEO. ASHMUN,
T. J. CARTER,
Government Directors of the Union Pacific Railroad Company.

Hon. O. H. BROWNING,
Secretary of the Interior.

SPRINGFIELD, ILLINOIS, *January* 30, 1867.

SIR: In compliance with your request when in Washington last month, I have the honor to report for your information the comparative distances, heights, and other suggestions upon the Pacific railroads, authentic data for which was but recently obtained.

In order to fully understand the various titles of Pacific railroads, it is necessary to present a brief description of the different lines, to avoid confusion and make a proper discrimination of the routes, progress, also the financial and commercial interests of this great national enterprise.

The Union Pacific Railroad Company was organized October 30, 1863, under the act of Congress of the United States of America, "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, with amendments approved July 2, 1864, commencing "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 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 survey; thence running westerly on 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."

IOWA BRANCH.

The "Union Pacific Railroad Company is hereby authorized and required to construct a single line of railroad and telegraph from a point on the western boundary of the State of Iowa, to be fixed by the President of the United States, upon the most direct and practicable route, to be subject to his approval, so as to form a connection with the lines of said company at some point on the one hundredth meridian of longitude, aforesaid, from the point of commencement on the western boundary of the State of Iowa, upon the same terms and conditions, in all respects, as are contained in the act for the construction of the said railroad and telegraph first mentioned."

The initial point on the western boundary of the State of Iowa was informally fixed by the President of the United States, November 17, 1863, and March 7, 1864, designated and established upon section 10, township 15 north, range 13 east, sixth principal meridian in the Territory of Nebraska.

Therefore the Union Pacific railroad commences at Omaha, Nebraska; thence to 100th meridian of longitude in the Platte River valley; is thence the main-trunk road to the western boundary of Nevada Territory or California line.

CENTRAL PACIFIC RAILROAD OF CALIFORNIA.

This company was formed and incorporated under the general railroad laws of the State of California, June 21, 1861. The places from and to which the proposed road is to be constructed are the city of Sacramento and the eastern boundary of the State of California.

By the act of Congress approved July 1, 1862, the Central Pacific Railroad Company of California, after completing its road across said State, is authorized to continue the construction of said railroad and telegraph through the Territories of the United States, on the same terms and conditions, in all respects, provided in this act in relation to said Union Pacific Railroad Company, until said roads shall meet and connect.

WESTERN PACIFIC RAILROAD OF CALIFORNIA.

This company is organized under the laws of the State of California, extending from Sacramento to San Francisco, by way of San José.

The above-described companies form the continuous through line from the Missouri river at Omaha to the Pacific ocean at San Francisco.

NORTH BRANCH TO SIOUX CITY.

Under the act of Congress July 1, 1862, this company is formed as provided: "And whenever there shall be a railroad completed through Minnesota or Iowa to Sioux City, then the said Pacific Railroad Compamy is hereby authorized and required to construct a railroad and telegraph from said Sioux City, upon the most direct and practicable route, to a point so as to connect with the branch railroad and telegraph in this section hereinafter mentioned, or with the Union Pacific railroad; said point of junction to be fixed by the President of the United States not further west than the one hundredth meridian of longitude aforesaid, and on the same terms and conditions as provided in this act for the construction of the Union Pacific railroad aforesaid, and complete the same at the rate of one hundred miles per year."

By the act amended July 2, 1864, this branch is transferred to such company, now or hereafter organized, as the President of the United States may designate or approve for that purpose, and is now in progress accordingly.

SOUTH BRANCH UNION PACIFIC RAILWAY, EASTERN DIVISION.

This company exists in the State of Kansas, under "An act to incorporate the Leavenworth, Pawnee, and Western Railroad Company," enacted in 1855, and subsequently changing its corporate title.

By the act of Congress July 1, 1862, this company is authorized to construct a railroad and telegraph line from the Missouri river, at the mouth of the Kansas river, on the south side thereof, so as to connect with the Pacific railroad of Missouri, to the aforesaid point on the one hundredth meridian of longitude west from Greenwich, as herein provided, upon the same terms and conditions in all respects as are provided in this act for the construction of the railroad line first mentioned, and the Leavenworth, Pawnee and Western Railroad Company may construct their road from Leavenworth to unite with the road through Kansas.

The route was changed by act of Congress in 1866: "*Provided*, said company shall be entitled to only the same amount of bonds of the United States, to aid in the construction of their line of railroad and telegraph, as they would have been entitled to if they had connected their said line with the Union Pacific railroad on the one hundredth degree of longitude, as now required by law; and provided further, that said company shall connect their line of railroad and telegraph with the Union Pacific railroad, but not at a point more than fifty miles westwardly from the meridian of Denver, in Colorado."

CENTRAL BRANCH, UNION PACIFIC RAILROAD.

This company was organized in the State of Kansas as the Atchison and Pike's Peak Railroad Company, and, recently changing its title, derives its rights, franchises, and grants, assigned it by the Hannibal and St. Joseph Railroad Company.

By act of Congress, July 1, 1866, the Hannibal and St. Joseph Railroad Company of Missouri may extend its road from St. Joseph, via Atchison, to connect with the road through Kansas, upon filing its assent to the provisions of this act, upon the same terms and conditions in all respects for one hundred miles in length, next to the Missouri river, as are provided in this act for the construction

of the railroad and telegraph line first mentioned, and may for this purpose use any railroad charter which has or may be granted by the legislature of Kansas.

This road commences at Atchison, Kansas, extending westerly; is intended to connect with Union Pacific railway, eastern division; thence to connect with the Union Pacific railroad at one hundredth meridian west of Greenwich; but the change of route of the Union Pacific railway, eastern division, by act of Congress in 1866 conflicts with such connections.

The aforementioned companies include all those to which government bonds are now authorized to be paid, though several of the following lines have valuable land grants in aid:

Pacific railroad of Missouri.—In operation from St. Louis to Kansas City.

Southwest branch, Missouri.—In operation from Franklin, on the last-named line, to Rolla, but recently organized as the Atlantic and Pacific railroad, extending by the proposed route, near 35th parallel, to Pacific coast.

Central Pacific of Arkansas.—From Memphis, via Little Rock, to Fort Smith.

Memphis and El Paso.—Through Arkansas and Texas.

South Pacific.—From Shreveport, Louisiana, through Texas.

Gulf and Pacific.—From Matagorda bay, Texas, through Arizona, to San Diego; also connecting with proposed line in Mexico to Guaymas.

South Pacific, of California.—From San Francisco to San Diego.

San Francisco and Central Pacific.—From Sacramento to Benicia.

Northern Pacific—From Lake Superior to Puget sound.

Many of the above-mentioned companies have applied for United States bonds in aid of construction, and bills are now pending before Congress of the United States for that purpose; therefore a comparison of the proposed routes, connections, and distances is important to decide the question as to their merits and necessity.

The lines of railroad in operation and progress from the principal points in the present railroad system to connect with the Union Pacific railroad are shown as follows:

	Miles.
South branch, from Wyandotte, via Lawrence, Fort Riley, Denver, to Junction, base of Rocky mountains	713
From Wyandotte, via Leavenworth, St. Joseph, and Council Bluffs branch road Union Pacific railroad, to Rocky mountains	699
From proposed connection at or near Omaha—	
Via Cedar Rapids, Clinton, to Chicago	502
Via Rock Island, to Chicago	492
Via Burlington, (Iowa,) to Chicago	505
Via St. Joseph and Kansas City, to St. Louis	468
Via St. Joseph, Macon, to St. Louis	421
Via St. Joseph and North Missouri extension	452
Via Chicago, Sarnia, Montreal, to Portland	1,643
Via Chicago, Detroit, Suspension bridge, Albany, to Boston	1,522
Via Chicago, Toledo, Cleveland, Dunkirk, to New York	1,450
Via St. Joseph, Quincy, Springfield, (Illinois,) Fort Wayne, Pittsburg, Allentown, to New York	1,454
Via Burlington, (Iowa,) Logansport, Fort Wayne, Pittsburg, Allentown, to New York	1,386
Via St. Joseph, St. Louis, Indianapolis, (Indiana,) Columbus, (Ohio,) Pittsburg, to Philadelphia	1,419
Via St. Louis, Cincinnati, Parkersburg, to Baltimore	1,349
Via St. Louis, Cincinnati, Parkersburg, to Washington	1,320
Via St. Louis, Cairo, Corinth, Atlanta, Augusta, to Charleston, (S. C.)	1,466
Via St. Louis, Cairo, Columbus, (Kentucky,) to Mobile	1,099
Via St. Louis, Cairo, Memphis, Jackson, to New Orleans	1,210

Via San Francisco, Omaha, to St. Louis	2,311
Via San Francisco, Omaha, to Chicago	2,392
Via New York, St. Louis, to San Francisco	3,385
Via New York, Chicago, to San Francisco	3,291
Via Washington, Cincinnati, St. Louis, to San Francisco	3,210
Via Washington, Harrisburg, Chicago, to San Francisco	3,233

By comparison of the above distances, it is evident that the principal Atlantic and Gulf ports and prominent railroad centres, as well as of trade and commerce, have equal facilities to a common point on the Pacific coast by the Union and Central Pacific railroads, and quite as favorable routes as the other proposed lines.

The undulations, or rise and fall, will be seen by the following table:

Distances and heights between Omaha and San Francisco.

	Miles.	Feet above sea.
Initial point, Missouri river, Omaha	----------	965
One hundredth meridian	247	2,504
Base Rocky mountains	517	6,019
Summit Evans's pass	548	8,248
Laramie river	578	7,175
Summit Rattlesnake pass	613	7,560
North Platte	667	6,695
Bridger pass	690	7,534
Green river	820	6,092
Reed's summit	910	7,556
Salt Lake City	1,035	4,286
Cedar mountains	----------	4,604
American desert	1,161	4,480
Humboldt mountains	----------	6,125
Humboldt valley	1,243	5,220
Truckee river	1,526	----------
Nevada and California State line	1,560	----------
Summit Sierras	1,620	7,042
Western base Nevada mountains	1,709	----------
Sacramento city	1,716	Tide.
San José	1,836	----------
San Francisco	1,890	----------
Omaha to base of mountains and branch to Denver	630	5,302

GOVERNMENT SUBSIDIES.

The act of Congress provides that each of the companies referred to in the act of 1862 and amendments thereto may receive United States bonds, payable in thirty years, with six per cent. interest, at the rate of $16,000 per mile on portions of the line; $48,000 per mile for most mountainous and difficult of construction, viz., 150 miles westwardly from the eastern base of the Rocky mountains, and 150 miles eastwardly from the western base of the Sierra Nevada mountains; $32,000 per mile between the sections last named; also, 12,800 acres per mile of every alternate section of public land, designated by odd numbers, on each side of said railroad on the line thereof, upon the certificate of United States commissioners that twenty consecutive miles are completed.

The companies are authorized "to issue their first-mortgage bonds on their respective railroad and telegraph lines to an amount not exceeding the amount of the bonds of the United States, and of even tenor and date, time of maturity, rate and character of interest, with the bonds authorized to be issued to said

railroad companies, respectively; and the lien of the United States bonds shall be subordinate to that of the bonds of any or either of said companies hereby authorized to be issued on their respective roads.

"The grants aforesaid are made on condition that said company shall pay said bonds at maturity, and shall keep said railroad and telegraph lines in repair and use; and shall at all times transmit despatches over said telegraph line, and transport mails, troops, and munitions of war, supplies and public stores upon said railroad for the government, whenever required to do so by any department thereof; and that the government shall at all times have preference in the use of the same for all the purposes aforesaid, at fair and reasonable rates of compensation, not to exceed the amounts paid by private parties for the same kind of services, and one-half of the compensation for services rendered by the government, by said companies, shall be required to be applied to the payment of the bonds issued by the government in aid of the construction of said roads."

The financial success of the work depends much on the judicious application of the funds derived from these bonds, lands as well as the subscription of stock, and negotiations of bonds authorized, yet the credits here offered are deemed ample under economical, sagacious and experienced managers to complete the work at an early period, and prosecute it as rapidly as the wants of the country demand, and it is now confidently expected that the whole line may be in operation in 1870.

Having thus presented this description of the lines, with the characteristics of the route, there is another subject of vital importance to its security and ultimate completion, that is soon likely to be fully discussed and considered—that of

LEGISLATION.

Referring to the original act of Congress granting aid to Pacific railroads, the principles recognized and objects to be obtained are fully expressed in the title "To secure for government the use of the same for postal, military, and other purposes, and upon the most direct, central, and practicable route through the Territories of the United States, at the same time providing for the several branch lines to afford connections with the principal lines of railroads in the western States between 35° and 45° of latitude, and thus concentrating all the lines in the eastern States from Maine to Georgia, terminating at the most important cities and seaports on the Atlantic coast."

The subject of legislation is increasing in importance, affecting the interests of nearly every department of business, and is less of a political and more of a national character in regard to railroads. As the system is extended, the collision of interest is so formidable that it requires more than ordinary vigilance and firmness for the protection of the public interests, and it is almost impossible to hope that, from the separate and connected proceedings of bodies whose existence commences and terminates with occasion of each particular project, there should issue any distinct system uniform in its foundation and principle.

It cannot be too constantly kept in view that the great difficulties are now only beginning to be experienced, that questions for decision are comparatively simple, so long as each new scheme is applicable to a new and separate district of country, but when its interests extend through adjoining States or across a continent it becomes of paramount importance.

It may be said with propriety, the present time exhibits an era in the history of the country; that this is a day in which the public mind is stimulated by a great spirit of enterprise, and there is no doubt enterprise desires encouragement; yet all must admit that enterprise itself is not commendable when it degenerates into a mere spirit of speculation.

One of the forms in which this spirit now exhibits itself is that of railroads; it is ever deserving, in proper limits and bounds, of our encouragement, but in this very matter is liable to tend to generate speculation and distrust.

This state of things calls for great discretion and consideration; one part of the principle that is to govern us is, that we avoid the hasty granting of corporate powers; the other warns against the infringement of already granted powers. A general motive and rule of conduct to be observed with great caution is, that they be established where a clear necessity for them exists; this is required as well for the public as for individuals.

If there is not an essential exigency, a high demand, for the proposed work, all the expense incurred is so much improperly expended—lost to the community, and not of sufficient public utility and use to require its promotion for the time being.

On the other hand, a persistive course of legislative interference with the various pursuits of commercial and industrial enterprise, and with the complex relations of supply and demand, for the purpose of protecting the public interest, has abundantly proved the fallacy upon which it is based. Enlightened public sentiment now justly condemns any restrictions by legal enactments upon the free operations of traffic and commerce.

Railroads, as compared with any other mode of transportation on land, it needs no argument to prove, can have no successful competition; they are to a certain extent exclusive just in proportion to their superiority, and the safe operation of a road requires unity of action, a combination of details which cannot be obtained without confining the management of the traffic within the limits of its control.

No benefits have been obtained by competition for a long period, except in populous districts where the traffic is sufficient to afford adequate income to rival lines, but in such cases it may well be questioned whether the public interest is enhanced by competition.

Taking it for granted that a large proportion of the cost of transportation consists of the amount and use of capital invested, from which an income is expected, it is evident that an equal amount of business could be done much cheaper with the same profit on one line than if the same traffic is divided between two or more lines; consequently the general welfare is more effectually promoted by a single road properly conducted and restricted than by competition by rival lines, and often results, as it may in the lines referred to, in consolidation of the roads instead of competition injurious to the capital, thus requiring an income on increased investments from the regions contributing to the traffic.

Every improvement whenever made among nations holding intercourse with each other—and it is emphatically true of different parts of the same nation—every such improvement results in the common benefit of the whole. Every product enters into and forms a part of the elements of other products.

Transportation is an item in the cost of production, which is enhanced in value in proportion to the cost of conveying it from the original place of creation to the place of consumption or ultimate use; therefore whatever facilitates transportation and diminishes expense, enriches the communities producing and consuming.

We now learn, and a large part of the world understand, that for commerce to rest on the most solid basis, it must deal on the largest scale in commodities which command the largest consumption. It only remains to consider this subject now

FINANCIALLY AND COMMERCIALLY.

With these views, and the experience of other lines constructed, the railroad system has been extended in the eastern States between the most important cities, connecting the manufacturing and mechanical with the mineral and agricultural districts—the commercial and seaport towns with the rural villages and country, yielding an average remunerative income on the investment.

The capital required has been derived from stock subscriptions, and from

States and cities, yet a large proportion is loaned on bonds and mortgages, having priority of lien to other securities.

In the western States this modern system has been promoted even beyond the Mississippi river, by individual enterprise, combined with loans and securities of States, counties, and proceeds of land grants, which has developed the rich regions through which the roads pass, and increased the value of property along their lines more than the whole cost of the roads, as is demonstrated in their official reports.

When railroads were first introduced some men wondered; others looked upon their success as impossible; most doubted it being a profitable investment, and few deemed it necessary to act with forethought then respecting them; therefore, from lack of skill in their construction, inexperience in management, and want of sagacity in financial affairs, many of the early projects proved unsuccessful pecuniarily, to those who invested with hope of dividends and income; yet they have increased the value of property, developed the resources of the country, and now we more fully realize their success.

We ought, therefore, to fully understand what advantages we derive, what evils to guard against, and consider the best modes to obtain one and avert the other, and duly exercise our judgment and apply correct principles, as in other affairs of business.

Although many volumes have been written exhibiting the physical, political, and moral aspects of the country, apart from the equally interesting topics of its commercial, financial, and social interests, with which they are now so closely allied, yet an accurate knowledge of the effect of this combination is by no means generally possessed, even by those whose pecuniary resources are to a large extent influenced, prompted, and intimately identified in their results as safe investments.

Railroad securities, stocks, and bonds of our main lines are now sought as the most favorite investments, and rank favorably with other financial loans in the market, and may continue so if prudent measures are taken to secure and protect them.

The amount issued to receive dividends should represent the least possible cost to secure those holding them. If, however, large amounts of such bonds and stocks are to be negotiated by rival lines and adverse interests, it will soon tend to depreciation, or suspension, of all such projects, as the uncertainty of regular dividends affects the value of such securities more than the ultimate payment of the principal, as that is secured and fixed in future.

If we turn our attention to finances, we find no subject so agitates the minds of the people as the currency and the broader questions of the proposed national financial policy in funding and preparing for maturing debts at the lowest possible rate of interest, affecting prices and values, which is a matter of hope and fear to every citizen, until something definite is settled; and, as a practical matter of reform, we must return to specie payments, though not accomplished suddenly, yet by steady and constant contractions. This question as to value of currency is not one of national honor, credit, confidence, or of ultimate security, but of the relation of supply and demand, which fixes prices of currency as other commodities.

The amount of aid now authorized by the government is estimated at over sixty millions of dollars for the main line and branches. It therefore becomes a serious consideration whether hundreds of millions more should now be granted, though it would develop the region of the proposed routes advocated, and tend to concentrate traffic upon other lines of railroads in the immediate vicinity. Yet it may equally subserve the public interest to limit the subsidy to such amounts as is absolutely necessary for that purpose, and to go on to complete one main line to the Pacific, by concentrating all the capital, energy, and traffic, and

making that remunerative, rather than to divide our resources among several rival lines with uncertain success.

It is probable the trade and travel will astonish those who have not investigated the subject, when the road is fully in operation to the mineral regions of the mountains; though the local traffic in an unsettled country is small at the early completion of such improvements, yet it will afford increased facilities to the government for "postal, military, and other purposes," as it was designed. All objects of human use naturally tend towards the points where they are demanded for consumption, and the removal of natural obstacles, by artificial transportation has enabled the productions of our great western interior to comply with this principle of trade, and those interior productions tend to their markets at the seaports, at several points.

This country is especially adapted to become a great commercial one; its forests of timber, its mines of iron and coal, its rivers and harbors, its connections with so many foreign countries by steamers and sailing vessels, and the new links now soon to be made between the east and the west, forming a thoroughfare between Europe, California, and China, we shall naturally become, to a large extent, the carrier of the world's products, and take the place Venice and Holland once held, and England now holds, if judicious measures are taken to promote such results.

To the enterprise and science of our capitalists and engineers belong the merit of announcing and influencing this law of trade, a triumph of art over nature as truly magnificent as astounding.

This system of railroad lines is drawing the whole trade area to the Atlantic cities, and the exchangeable values created in every other part of the Union. Truly this trade conquest has produced a revolution in the internal commerce, making the whole nation tributary to a few commercial cities.

It is claimed as an axiom, that the commerce of a country increases in distinct proportion to the improvements of its railroad system, and that railroad development is one of the most powerful and evident causes of the increase of commerce.

The exports and imports bear a variable but appreciable proportion to the inland traffic of a country.

The one source of wealth, national and individual, next to the energy and industry of our people, is the large quantity of lands held and granted for public improvement, which will soon become settled and add to the traffic and productions of the country. Though not all at present susceptible of profitable cultivation, from the dry climate in the mountain region, yet they will be used for grazing, and, like India, Egypt, and Mexico, ultimately will be irrigated by artificial methods, and become fertile.

The public lands along the lines are of great value, an inheritance unsurpassed by any nation in the past, which, when fully developed by its agriculturals, minerals, precious metals, lead, iron, and other resources will be increased many fold in value by the improvements projected.

We are aware it is the legitimate province of the government to administer justice and protect its citizens; the establishment of agricultural and commercial pursuits, and legislation of an analogus character, can hardly be said to be confined to its purposes.

There are reasons why public sentiment should approve and be the condition precedent to legislation. Railroad extension is not promoted in the long run by ruinous projects or wasteful financiering, but should tend to restore credit, and hasten the payment of the public debt by increasing the taxable property and wealth of the nation.

The pursuits of commerce are absolutely essential to other departments of industry, to render them remunerative. The facilities of a market are even vital

to some pursuits and all enterprise; acting on this principle, nations have granted large subsidies to develop public improvements.

The facts are recognized and the expenditures made, though private enterprise could not afford to enlist in so great an undertaking, and without government aid capitalists would not enter on hazardous experiments and advance large sums to carry on such work rapidly; only by such aid can it be accomplished, and it is warranted by the broad consideration of its importance, applying a portion of the rates of transportation of mails, military supplies, and troops to liquidate the bonds in a few years. It is not always practicable to carry on improvements by the government. Exigencies arise which complicate these matters; true statesmen understand this and provide accordingly.

Therefore the government has acquired a new claim on the gratitude of the people by delegating to a company of experienced and responsible capitalists the duty and privilege of completing this work, under the supervision of government directors, to the acceptance of United States commissioners, and in aiding it by public credit and grants of lands, by which it will progress upon a uniform system, exempt from the delays and uncertainty of annual appropriations, and upon a continuous plan matured by those who have the skill and practical knowledge of its affairs to secure the most favorable results to all concerned.

This subject has been extended more than first intended, to elucidate by a comprehensive view of all interests and supply the want of definite information in regard to these lines of railroads.

If I have been successful in a duty in the position occupied, it is all that is claimed, in promoting this work of national importance.

In conclusion I will state that nearly 600 miles of the main and branch lines are in operation, and probably 400 miles more will be completed the present year.

The Union Pacific Railroad Company have recently contracted 212 miles to the base of the Rocky mountains; also arranged for bridging the Missouri river at or near Omaha, to be completed in 1867, which will give a continuous line of railroad an average distance of over 2,000 miles from the Atlantic coast.

But who shall estimate the consequences that will follow the prodigious increase of commerce, the activity of national intercourse, the spread of civilization and advance of human intelligence, by such extension of this modern system in the world?

Respectfully submitted by your obedient servant,

T. J. CARTER,
Government Director Union Pacific Railroad.

Hon. O. H. BROWNING,
Secretary of the Interior, Washington, D. C.

UNION PACIFIC RAILROAD OFFICE,
20 *Nassau street, New York, March* 2, 1867.

SIR: The government directors of the Union Pacific Railroad Company have the honor to submit the following brief report for your information, in regard to its affairs and proceedings since our last report:

At a regular meeting of the board of directors, just closed, a contract was concluded for the construction of 212 miles of the line, extending from the present terminus to the base of the Rocky mountains, at $42,000 and $45,000 per mile, which includes provision for ample equipment and stations.

The work will be immediately commenced on that portion, of which about 40 miles of the grading is in progress already.

The ties for a large proportion of the distance are delivered on the line, ready for use.

Iron rails are now being forwarded to the road, and manufactured as required for use.

Thirty locomotives are ordered for delivery at an early date as the traffic demands.

The portion of the road completed has been accepted and turned over to the company for traffic, with favorable prospects for a large amount of transportation over the road completed, the ensuing season, to the mining regions, thus affording greatly increased facilities. The reports of the engineers, and results of surveys and examinations for bridging the Missouri river, at the eastern terminus of the road, have been submitted to the directors, with proposals, plans, and estimates, which were referred to a committee on that subject, and are under consideration. Though no definite decision has been made, yet it is confidently expected that the work will be commenced as soon as the season will permit.

Without further details, we are gratified to state, generally, that the work of the company is progressing with as much energy as the means within its power can justify. We shall take pleasure in furnishing you any information requested that may be desired.

In view of its importance, we desire to make a suggestion, supplementary to our letter to you of the 7th day of January, on the subject of fixing the points designated in the act of Congress as the eastern base of the Rocky mountains. Everything tends to show more clearly the importance of an early decision of this question, and we respectfully invite your early attention to it.

Respectfully submitted:

T. J. CARTER,
SPRINGER HARBAUGH,
J. L. WILLIAMS,
CHARLES T. SHERMAN,
GEORGE ASHMUN,
Government Directors Union Pacific Railroad.

Hon. O. H. BROWNING,
Secretary of the Interior, Washington, D. C.