

PACIFIC WAGON ROADS.

LETTER

FROM THE

SECRETARY OF THE INTERIOR,

TRANSMITTING

A report upon the several wagon roads constructed under the direction of the Interior Department.

MARCH 1, 1859.—Laid on the table and ordered to be printed.

DEPARTMENT OF THE INTERIOR,
February 23, 1859.

Sir: I have the honor to transmit herewith reports, with maps, of the several wagon roads constructed under the direction of the Department, under the provisions of the acts of Congress approved July 22, 1856, February 17 and March 3, 1857, respectively.

I am, sir, respectfully, your obedient servant,

J. THOMPSON, *Secretary.*

Hon. JAMES L. ORR,

Speaker of the House of Representatives.

REPORT
UPON
THE PACIFIC WAGON ROADS,

CONSTRUCTED

Under the direction of the Hon. Jacob Thompson, Secretary of the Interior, in 1857-'58-'59.

BY ALBERT H. CAMPBELL, General Superintendent, &c.

DEPARTMENT OF THE INTERIOR,
Pacific Wagon Road Office, February 19, 1859.

SIR: I have the honor to submit the following brief report upon the operations of the several wagon road expeditions organized under the provisions of the acts of Congress approved July 22, 1856, February 17, 1857, and March 3, 1857, respectively, the general management of which you have entrusted to me.

FORT RIDGELEY AND SOUTH PASS ROAD.

On the 25th of April, 1857, new instructions were issued to Mr. William H. Nobles, who was continued as superintendent of the Fort Ridgeley and South Pass road. These instructions were substantially the same as those given him by the Commissioner of Indian Affairs, September 18, 1856, in reference to the character of the road to be constructed.

On receipt of these instructions Mr. Nobles proceeded to St. Paul to perfect his organization, from which place he reported on the 15th of May that he had purchased a portion of his outfit, and could start about the 26th, but that he should be delayed in his departure from that place one or two weeks, in consequence of the unusually severe and backward season, preventing the growth of grass. On the 19th of June Mr. Nobles left St. Paul, his party starting the two days previous for Fort Ridgley, to prosecute the work assigned him, the provisions having been sent forward nearly a month previous by steamboat up the Minnesota river to the point of rendezvous. A despatch dated July 14, Big Sioux river, announcing his arrival and the progress of the work to that place, and expressing his apprehension in regard to Indians retarding his further progress, was received on the

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detailed account, dated St. Paul, Minnesota Territory, July 30, announcing his arrival in St. Paul two days previous for ammunition, and giving an account of the opposition of the Ihankton Indians to his progress through their country. This opposition to passing through their country Mr. Nobles says arose from "no particular enmity to his progress through their country, provided they were compensated for the right of way."

On the 25th of September Mr. Nobles writes from St. Paul, Minnesota Territory, announcing his return to that place, having left his party on the 18th of that month on the Big Sioux, engaged in completing a portion of the road in that vicinity. In this letter Mr. Nobles expressed his great pleasure in informing the department of the entire success of his expedition, and reports a road "from the Big Sioux river to the Missouri, over which any team can pass, and through a country inviting to the emigrant."

This road was completed only as far as the Missouri river, 254 miles some time in the fall of 1857, in consequence of the insufficiency of the appropriation and of alleged Indian hostilities. The general location of this road is as follows: beginning at the ferry on the Minnesota river, which is 150 feet wide at this place, opposite Fort Ridgeley, the general course of the road is southwesterly, passing through a marshy region a few miles south of Limping Devil's Lake to the north fork of the Cottonwood, a distance of about 17 miles, thence to the Cottonwood river, over a rolling country, with lakes and marshes, about 14 mile below the mouth of Plum creek, distance about 19 miles. From this point the road continues across Plum creek and three good watering places to the crossing of Cottonwood at Big Wood, about 18 miles. Thence the road continues to Hole-in-the-Mountain, near Lake Benton, a distance of about 32 miles, passing through a region abounding in lakes and an abundance of wood, water, and grass. From Lake Benton the road passes for the most part over a high prairie to the Big Sioux river, about 23½ miles. From the Big Sioux to James river, about 62½ miles, "is a vast sandy prairie, with no timber whatever." This timberless prairie extends to the Coteau du Missouri, 23 miles from James river. From Coteau du Missouri to the Missouri river, distance about 60 miles, the country is represented as being gently undulating until the tributaries of the Missouri are reached, it then becomes more broken. The longest distance on the entire road between water is 19 miles, and this occurs between the edge of the Coteau and Crow creek.

This road, as far as built, is remarkably direct, and is believed from the description of the country through which it passes, to be the best location which could have been made, securing a plentiful supply of water, grass, and timber.

The report of the superintendent, and the very able and interesting report and map of Samuel A. Medary, engineer, herewith transmitted, will give a detailed account of the operations on this road, as well as a description of the country passed over.

Eastern division.

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This road being about 1,400 miles in length, for the sake of economy and convenience of construction was divided into three divisions, viz: the first extending from Fort Kearney to Independence Rock; the second from Independence Rock to City Rocks; and the third from the City Rocks to the eastern boundary of California, near Honey Lake valley. The plan of operations adopted to secure the rapid construction of this road, was as follows: The superintendent of the Fort Ridgeley and South Pass road was instructed to return after completing his operations on that road from Independence Rock to Fort Kearney, improving so much of this road as required it; the particular points to which the attention of the department had been called as needing material improvement were Scott's Bluffs, Ash Hollow and Plum Creek. This portion of his instructions, however, were not complied with for reasons previously assigned.

The superintendent of the eastern and middle divisions, Mr. Wm. M. F. Magraw, to whom instructions were handed on May 1, 1857, was directed to repair as rapidly as possible over the first division, improving so much of the road only as would facilitate the movements of his own train, and commence at Independence Rock and improve the present road from that point to near the summit of the South Pass, and thence to City Rocks, to open a new road to avoid the detour via Salt Lake City and by Bear river, &c. It had been suggested that a good route for a wagon road exists from the summit of the South Pass running near the base of the Wind River mountains; thence in a direct line to Beer or Soda Springs on Bear river, crossing Green river near the New Forks; thence from Beer Springs via Thousand Spring valley, north of the Humboldt, to the Mud lakes.* To test the practicability of a portion of this route, which promised so much in point of distance, and affording better grass and a greater and more permanent supply of water than the present travelled roads, besides avoiding the Green River deserts and at the same time offering superior advantages to the Oregon emigrant, as a glance at the map will show, the superintendent was empowered to send a party in advance in charge of F. W. Lander, his chief engineer, who had been selected by the department for his eminent qualifications for that service, having crossed the continent a few years ago via the South Pass, exploring for a practicable route for a railroad from the Mississippi river to the Pacific coast. Mr. Lander was instructed to thoroughly examine the Bear River mountains "between the trail via Ham's Fork and the head waters of Port Neuf or some other tributary of Snake river, and from such a point as he might discover in these mountains to City Rocks."

The advance party, under the chief engineer, left the frontier on the 15th of June, 1857, and reached the South Pass on the 15th of July.

* In a letter of W. H. Nobles to the Secretary of the Interior, March 26, 1857.

His party was divided into three divisions, for the thorough exploration of the Wasatch mountains and the upper basin of Green river. These explorations were accomplished with remarkable energy, and having accomplished them to his satisfaction, proceeded to the South Pass to meet the superintendent, which he did on the 22d of September, having travelled with his several small parties several thousand miles. A report and map of these explorations were furnished the superintendent, and the latter subsequently passed into the hands of the commander of the army of Utah, and is said to have been of material service to that officer.

The superintendent and his party left Independence about the 1st July, 1857, and reached the head waters of the Sweetwater in the latter part of September of the same year, too late to proceed with safety through the South Pass and into the Wasatch range, in consequence of the severity of the winter in that region and the hostile attitude of the inhabitants of Utah toward the authorities of the United States at this time. The superintendent was compelled therefore to seek suitable winter quarters, which he did on Popo Agie, a tributary of Wind river. Here the party was disorganized, a portion of the employes returned to the frontier, a portion accompanied the chief engineer to this city to report upon the operations of his advance corps, a small force was left on Popo Agie in charge of the public property, and a large number volunteered into the service of the army of Utah, selecting their superintendent as their captain; their services were accepted by the proper officer in command, and a large portion of the mules, and wagons, and other property of the expedition was turned over to him for the use of the army.

The accompanying report of the chief engineer of the results of his explorations west of the South Pass is herewith submitted.

The superintendent having vacated his commission, by volunteering into the service of the army of Utah, the chief engineer, Mr. F. W. Lander, was appointed to the superintendency of this road, and received instructions to carry out in the main the instructions originally given to his predecessor. His party left the frontier about the 1st of May last, and, being equipped for rapid movement, reached the South Pass, the point of beginning their operations, 950 miles from the starting point, on the 14th of June following. Immediately on the arrival of this party at the South Pass, preparations were made by Mr. Lander for the location and construction of the road. Having secured the services of sufficient number of laborers, many of them Mormons from Salt Lake City, a vigorous prosecution of the work was commenced. Mr. Lander was instructed to open a road from the South Pass of the Rocky mountains to the City Rocks, or north fork of the Humboldt river, *via* Thompson's or McDougal's Passes; that is to say, along what is designated in his report of November 30, 1857, and on the map* accompanying it, as the "Northern Route." From the very extensive explorations of Mr. Lander in the summer of 1857, developing several practicable routes for roads through a region of

* This map has been replaced by a map accompanying Mr. Lander's report of January 20, 1859.

country abounding in nutritious grasses, permanent supplies of water, and timber for fuel and for building purposes, it was deemed important to open this route, in view of the large emigration which annually passes overland to the Pacific shores, and in view also of the unsettled condition of affairs in the vicinity of Salt Lake City at the time. The road, as now located, will, it is believed, be of incalculable advantage to the Oregon and California emigration, particularly to that portion of it which contemplates making the entire march from the Mississippi valley to California, or to the settlements of Oregon, in one season. The overland emigration reaches the vicinity of the South Pass toward the end of July, and by adopting the route now open to them, they will avoid the artemisia barrens of the Green River basin, with its deleterious waters, and the rugged defiles of the Wasatch mountains, leading to Salt Lake City, and the circuitous route by the valley of Bear river. "The passage of the line, as located nearer to the base of the snow-capped mountains in a more elevated region, richly grassed, and along the great summer trails of the Indians, is favorable to their health, the preservation of their stock, and gives them abundance of pasturage, with water at short intervals from mountain streams."

The direct road from the South Pass to Beer or Soda Springs, on Bear river, which had been suggested, as above referred to, as feasible and of easy construction, it will be seen by Mr. Lander's report and map, is in part impracticable. The Wasatch and Bear River mountains, between Thompson's Pass and the mouth of Tulick's fork of Bear river, are represented as being very rugged and covered with dense pine forests, requiring expensive grading and extensive cutting through pine timber.

The location of this road, as constructed by Mr. Lander, is as follows: Beginning at Gilbert's trading station, in the South Pass, it passes along the base of the Wind River mountains, heading Little and Big Sandy creeks; thence west, across the Green River basin, crossing the New Fork, Green River, and White Clay and Bitter-root creeks to the valley of Piney creek; thence up this valley through Thompson's Pass to the headwaters of Labarge creek; thence, *via* the head of Smith's fork of Bear river to the valley of Salt river. The road continues down this fertile valley about twenty-one miles to Smoking creek; thence up the valley of this creek to the head of Blackfoot creek, and the valley of John Gray's lake to Blackfoot creek, lower down; thence over to Ross creek. Passing several miles down this creek the road crosses over to Snake river or Lewis' fork of the Columbia, near the mouth of Pannock river; thence down the valley of Snake river to the valley of Raft river; thence up this valley direct to City Rocks; a total distance of 345.54 miles from Gilbert station at the South Pass, and 950.54 miles from Fort Kearney. From City Rocks to Honey Lake valley, by the survey of Superintendent Kirk, is 436.93 miles. The total length, therefore, of this entire road is 1,387.47 miles.

From a tabular statement in Mr. Lander's report it will be seen that over sixty-two thousand cubic yards of earth and rock have been removed, eleven miles of willow, and twenty-three miles of heavy pine timber cleared from the roadway.

Mr. Lander represents the agricultural and pastoral resources of the country traversed by this road as highly favorable. The western base of the Wind River mountains and the upper basin of Green river afford fine pasturage, and many valleys are adapted for settlements. On the headwaters of Snake and Blackfoot rivers, large crops of wheat and barley have been raised. All the great tributaries of Upper Green river have their sources in the Wind River and Wasatch mountains, and are well timbered with yellow pine. The tributaries of the upper Snake river are also heavily timbered. The Mormons have extended their settlement a considerable distance into the region of country through which this road passes, and should it come to be a thoroughfare it will doubtless be thickly populated.

In connexion with his report, Mr. Lander presents an interesting account of his intercourse with the Indian tribes, through whose range this road passes. He speaks of the Shoshonees particularly, as being friendly disposed toward the whites, and makes several suggestions with regard to maintaining this friendly feeling toward this and other tribes, to which I would respectfully call your attention. The Snakes have received very little attention hitherto from the authorities of the United States, and frequent wars with their powerful neighbors, the Blackfeet and Crows, have compelled them in a manner to withdraw from the buffalo range and keep within the mountain fastnesses, where they derive a scanty subsistence from roots and the smaller game. The effect of opening an emigrant road through this country will be disastrous to their means of subsistence, by destroying their root grounds and driving away their game, and expose them also to the wanton annoyance of a class of emigrants, who never avoid an opportunity of attacking small bands of Indians whenever they are met with. This inevitable result, Mr. Lander very justly argues, will provoke their hostility and involve the government in an expensive war. By the judicious distribution of a few thousand dollars worth of suitable goods and implements among them, with encouragement to preserve peaceful relations with the whites, and devote their energies to developing the resources of the country, by the production of grain and vegetables, and other articles suited to the wants of emigrants, this interesting people may be gradually brought to the knowledge and practice of the arts of civilization. Without some such provision being made, Mr. Lander states that a much larger force will be necessary to continue operations in that country than would otherwise be required.

Western Division.

The western division of this road extends from City Rocks to the California line at Honey Lake valley.

The superintendent of this division, Mr. John Kirk, was instructed to organize his force at Placerville, California, and select a road from Honey Lake valley to City Rocks, avoiding as much as possible the Humboldt, St. Mary's, or Ogden's river, leaving it to the south. The alleged deleterious character of the waters of this river, and its destructive effects upon cattle and horses, renders it advisable to avoid it as

much as possible. Instructions were handed Mr. Kirk on May 1, 1857. On the fifth he embarked for California, where he arrived on the thirtieth. He organized a party, and started, *via* Carson's valley, for Honey Lake valley, the point of beginning, on the 27th of June; reached City Rocks, the eastern terminus of his division, about the 1st of September, 1857, and returned thence to Placerville, where his party was disbanded. His report and map will be found accompanying, and will give the details and results of his operations.

Mr. Kirk and his engineer, Mr. Bishop, both agree that the only route for a wagon road between City Rocks and the Great Bend of the Humboldt river is in the valley of this river. The distance from Honey Lake valley to City Rocks, by the route surveyed by Mr. Bishop, is 436.93 miles.

EL PASO AND FORT YUMA ROAD.

Instructions were issued to James B. Leach, the superintendent of this road, on May 9, 1857. He was directed to proceed to Memphis, Tennessee, to organize a partial force and travel by as direct a line as possible from that place to opposite El Paso, on the Rio Grande, the initial point of his operations. From Memphis to the Rio Grande he was instructed to collect such information and make such surveys as the progress of his march would admit of, with reference to the character of the country and its capabilities for maintaining a good wagon road.

With the supplies, instruments, and tools for the expedition, this party left the west bank of the Mississippi river, opposite the city of Memphis, Tennessee, on July 1, 1857, and arrived at Des Arc, on White river, in Arkansas, on the 8th, (97.1 miles from Memphis.) Here the wagons were reloaded, a portion of the freight being left to be conveyed by the ox train, which was expected to follow the mule or advance train very soon. The mule train left Des Arc on the 17th of July, crossed the Arkansas river at Little Rock, (148.6 miles from Memphis,) on the 19th, reached Doaksville, in the Choctaw country, (380 miles,) on the 13th of August. The recent and long continued rains rendered the roads generally heavy, and in many places almost impassable, consequently much time was lost and labor required in getting the train over this portion of the route. Leaving Doaksville on the 17th of August the train crossed Red river at Preston, (472 miles,) on the 22d reached Fort Belknap and the Brazos river, (635.4 miles,) on the 1st September, passed old Fort Phantom Hill, (709 miles,) on the 8th, Fort Chadbourne, (767 miles,) on the 12th, the Mustang Ponds, (915 miles,) on the 27th, and reached the Pecos river, at the "Horsehead" crossing, (961 miles,) on the 29th. Left the west bank of the Pecos October 1st, passed Comanche Springs, on road from San Antonio to El Paso, (1,027 miles,) on the 5th, Fort Davis, (1,100 miles,) on the 8th, Rio Grande, (1,225 miles,) on the 16th, and arrived at Franklin, opposite El Paso, (1,309½ miles from Memphis,) on the 22d of October.

Franklin being the eastern terminus and initial point of the road to be constructed, three parties were immediately organized and the

intermission or suspension, except the necessary delay in the movement of the working parties along the route, from October 25, 1857, to August 1, 1858, at which time the advanced state of the work authorized a reduction of the laborers employed, and rendered unnecessary a large portion of the outfit, embracing mules, oxen, wagons, tools, &c., which were sold at public auction, in La Mesilla, on the 1st of August. With the reduced force, the superintendent and chief engineer again passed over the road from La Mesilla to Fort Yuma, to make additional improvements, as well as to secure and render more certain an abundant supply of permanent water, reached Fort Yuma about October 1, proceeded to San Diego, sold the property and disbanded the party on October 16, 1858, and leaving California on the 20th November reached Washington on December 10, 1858.

Location of the road.—Beginning at Franklin (opposite El Paso) the road proceeds up the valley on the east side of the Rio Grande, touching the river at convenient points for water, crosses it near La Mesilla and continues up the valley, on the west side, to the Picacho, (51.5 miles from Franklin;) thence, turning westwardly, ascends the Mesa and passes over a gently undulating prairie to Cook's Spring, (101.4 miles;) thence through the favorable pass in the Mimbres mountains, crossing the Rio Mimbres directly to Ojo de la Vacca, (134.5 miles,) passing the southern edge of the Burro range of mountains to Ojo Excavado, (147.6 miles,) through the Peloncillo pass, (187.7 miles,) crossing the Rio de Sauz (201.7 miles) directly to Parke's railroad pass, (between the Chericahui and Pineleña mountains, 231 miles,) to Croton Springs, (248.7 miles;) thence through Nugent's pass, in the San Calistro range, to the Rio San Pedro, (271.5 miles,) down the valley, on the east side of the river, to the junction of the Rio Aravaypa, (328.1 miles, and 15 miles from the Rio Gila;) then crossing the Rio San Pedro the road continues, by a very favorable pass in the Santa Catarina range, directly to and striking the Gila (375.2) 21 miles east of the Pimos villages; thence by the Maricopa Wells down the valley, on the south side of the Rio Gila, to Fort Yuma, the western terminal point of the road, (573.1 miles from Franklin,) making the new road about 40 miles less in length than the old travelled road *via* the Puerto del Dado or Apache Pass, Tucson, &c.

Construction of the road, character of work, &c.—The excavation, owing to the generally smooth or gently undulating surface of the prairies and valleys, and very favorable mountain passes of the country traversed by the road, was not very heavy or expensive, but confined chiefly to "side cutting," in making the road around the rocky hills and bluffs in the vicinity of Franklin, at the Picacho, (opposite Doña Ana,) in ascending the Mesa, from the valley of the Rio Grande and along the valleys of the San Pedro and Gila rivers, turning the points of mesas and rocky bluffs, or keeping the roadway above the wet and marshy bottoms; also, wherever it was required, to make easier the crossings of the arroyos and streams, or more gentle and gradual the ascents and descents of the mountain passes.

The road-bed was cleared of boulders and loose or detached rock, as

labor, especially in the valleys of the San Pedro and Gila rivers. All the springs and permanent watering places were improved and made easy of access, and the supply of water rendered ample to meet the demands of the stage and emigrant trains at all seasons. Where permanent water was not found at suitable points, reservoirs were constructed, either by damming the arroyos or sinking large tanks to collect and retain a supply of rain water.

The tabular statement of the localities of the most convenient watering points, with the required facilities for camp purposes, shows how abundantly the country along the road supplies the great desiderata of travellers across the plains, wood, water, and grass. The soil, generally a mixture of coarse sand, clay, and gravel, is very favorable to the formation of a good and durable road-bed, which a little use will render hard, compact, and smooth.

The gradients and curvature of the road are comparatively light and offer no obstruction to the rapid transit of vehicles of any description. The crossing of the Rio Grande is effected with much trouble and difficulty by fording at low stages of water, owing to the quicksand in the channel, and at high water the rapidity of the current makes the ferrying tedious and dangerous. The Mimbres and San Pedro are small streams and are readily forded at all seasons; the Colorado is crossed by ferry.

In reviewing the improvements effected by this line of location, and the labor executed upon it, it will be found that there is a saving of distance between the termini of 47^{1/2} miles; an increase of over seventy (70) miles along running water; a reduction of the greatest distance between camps to 27 miles by the construction and improvement of six new watering places; and the reduction of all gradients to a slope easily passed over by loaded wagons drawing a maximum load, which, for six mules, is 4,000 pounds, and for ten mules, 6,000 pounds; and the opening to settlers and emigrants of the valleys of the San Pedro and Gila rivers.

The effect of these improvements amounts to a saving in time, with loaded wagons, of about five (5) travelling days between El Paso and Fort Yuma.

The able and interesting report of Mr. N. H. Hutton, who was selected as the engineer of this road on account of his familiarity with the country through which it passes, will give a more detailed account of the results of the operations upon this work, from which it will be seen that over fifty-seven thousand cubic yards of earth and rock have been removed, and an increase in watering facilities of over three hundred thousand gallons afforded.

NEBRASKA ROAD.

Instructions were sent to George L. Sites, the superintendent of this road, at Fort Wayne, Indiana, May 19, 1857, with directions to proceed at once to the Platte river, and, with his engineer, make a rapid reconnaissance of the whole route, with a view to a judicious and economical expenditure of the sum appropriated throughout the entire distance. Two reports, which are herewith submitted, dated respect-

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Sites; the first comprising the results of his examinations between the Platte river and Dakota City, and the second his operations between the latter place and the l'Eau qui Court, (Running Water river.) Mr. Sites, in these reports, and in a subsequent report dated March 4, 1858, expresses the opinion that a good road could and would be built by him, including several important bridges, with the appropriation.

This road was commenced in June, 1857, and was located up the valley of the Pappillion, *via* Belleview, thence to Omaha City, and from this place to Saratoga, and thence through Florence over the "second bottom lands" of the Missouri, crossing Spring and Mill creeks, to the bluffs of the Missouri, five miles from the bridge erected on the military road from Omaha City to Fort Kearney; crossing here a high ridge, the road passes down the valley of Poncas creek for one mile, and thence over to the valley of Deer creek; thence over to the second bottom lands of the Missouri, crossing Turkey creek, to the town of Fort Calhoun. From Fort Calhoun the road continues along the bottom lands of the Missouri, crossing Moore, Mill, and Glover creeks to Desota. From this point the road passes over the highlands and across the bottom lands to Cumming City, and thence to Tekama, crossing North, Stewart's, New York, Pike Spring, and Dry creeks. From Tekama the road bears to the west of north crossing Silver and Elm creeks, and reaches Decatur City. From Decatur City the road passes through the Blackland hills to the town of Omadi, and thence to Dakota City—105 miles from the Platte river. From Dakota to Niobrara, at the mouth of the Running Water river, (l'Eau qui Court,) the distance is 100 miles; and from the Platte to Niobrara, the terminus of the road, 205 miles. The entire country passed over by this road is represented to be rich, and well adapted to agricultural and pastoral pursuits. The accompanying reports and map of the superintendent will afford a more detailed statement of this road, which was completed so far as Dakota City before the close of the year 1857. The superintendent was instructed early last spring to resume his operations, with a view to the completion of the road from Dakota to Niobrara.

The final report of Mr. Sites, dated January 20, 1859, herewith submitted, gives a general resumé of his operations to the close of the work; by reference to which it will be seen that he has constructed fifty-one bridges, of various sizes, ranging from seven to seventy-eight feet in length, besides excavation and other work necessary to render the road passable and of a permanent character.

This road having been judiciously located by Mr. Sites, appears to have given great satisfaction to the people of Nebraska; and it is believed that it will assist greatly in developing the resources of that region by affording a ready means of communication between the various settlements along its course.

I am, sir, very respectfully,
ALBERT H. CAMPBELL,
General Superintendent Pacific Wagon Roads.

Hon. JACOB THOMPSON,
Secretary of the Interior.

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Report of Superintendent William H. Nobles upon the Fort Ridgeley and South Pass Wagon Road, constructed under the direction of the Department of the Interior, 1856-'57-'58.

WASHINGTON, D. C., January 18, 1858.

SIR: I have the honor herewith to transmit my report, with accompanying map of the route; also a journal of daily operations and engineer's report, being a full statement of the operations of the expedition under my charge for the purpose of building a wagon road from Fort Ridgeley to the South Pass of the Rocky mountains, as provided for by acts of Congress.

The late date of the starting of the expedition from St. Paul, owing to the absence of funds to pay for the necessary outfit, prevented my completing my portion of the road this season further than the Missouri river.

I have to report that I have located and built a good wagon road from Fort Ridgeley to the Missouri river, in lat. 43° 47', between Bijou hill and Fort "Lookout."

The road has been selected and made with a view to accommodate the emigrant, by having it pass through a good country and in the vicinity of wood and water; and also, with these valuable considerations always in sight, I have been able to complete the road in almost a direct line from Fort Ridgeley to the terminus on the Missouri river.

The topography of the country is principally of a level prairie character, and presents but few serious obstacles to the traveller, and a train with heavily loaded wagons can now pass to the Missouri, without once unloading or doubling of teams.

The rivers on the road to be crossed are—

North branch of the Cottonwood river.

Cottonwood river, (twice.)

Redwood river.

Medary creek.

Big Sioux river.

Perrine creek.

Rivière du Jacques or James river.

Beside a number of small creeks.

On the Cottonwood river I have constructed a rough bridge adapted to the present travel, but it is important that this river should be well bridged at both of the crossings. The rapid flow of emigration to this section of country also demands that these bridges be immediately constructed.

I have caused a good fording to be made across the Big Sioux river. The banks of this stream are firm and substantial and well timbered. The bed of the river I paved with boulders and gravelled the same. So that there will be no difficulty in the way of teams passing across at any stage of water during the year.

I have also pursued the same course with the Rivière du Jacques or James river; but the bottom lands of this stream are low and wide

stream is ever too deep to present serious impediments to trains. I expended a great deal of labor on this ford, having to haul stone a great distance.

I beg to refer you for full particulars in reference to the streams along the route to the "Itinerary," and able report of the engineer.

The country situated between the Minnesota river and the Big Sioux, comprising the Cottonwood valley, is rich prairie land with numerous small lakes scattered along.

The Cottonwood river is timbered, and the numerous lakes also have timber on their margins.

These lakes are filled with good clear water, and exist along the entire route to the Missouri river, and are at convenient distances for watering places.

The land between the Big Sioux and Rivière du Jacques, or James, is a vast sandy prairie with no timber whatever; this prairie crosses the Rivière du Jacques and extends to the Coteau du Missouri, where the country assumes new features, becoming hilly with small creeks emptying into the Missouri.

The land situated on these creeks is rich and generally covered with timber.

There are but two or three hills along the road that present obstacles, and those I have graded, so that the ascent and descent will be easily accomplished.

The most serious hills, are the bluffs along the Missouri river and the Coteau hills along the James river valley.

In making the approach to the Missouri river I found the bluffs high and precipitous, except at the mouth of Crow creek, and experienced a good deal of difficulty in selecting a place through which I could construct a road to the river; this was accomplished at last, and as near to the Bijou hill as the country permitted, in accordance with the wish of the department as expressed in my instructions.

At the outset of the expedition I was met by a large number of "Ihankton" Indians in the vicinity of Lake Benton, who warned me from entering their country, intimating if I crossed the Sioux river I must expect resistance from the "Ihankton" tribes.

At this time most alarming accounts had been received from the Yellow Medicine, and messengers were going through the country preparing the frontiers in anticipation of a general Indian war.

It placed me in a precarious situation to enter the country of hostile Indians who openly threatened me, and also to have in my rear all of the Sioux tribes at war with the whites.

In view of these difficulties I returned to my former camp on the Cottonwood river, and employed my men bridging that stream, and repairing wagons, harness, &c., while I could obtain information from "Yellow Medicine."

I hastened to the scene of difficulties, and, after consulting with Mr. Superintendent Cullen and Major Sherman, then in command at that place, I decided upon obtaining more and better ammunition and push on through their country. Having supplied myself with such

ammunition, I recrossed the Sioux, conciliating the Indians with suitable presents, and met with no further opposition from them.

I have no reason to believe that the Indians in that country will ever interfere with travellers over "that road."

I have caused to be erected along the route about 1,500 mounds; these mounds are from three to five feet in height, and are distant from each other about one-fourth of a mile.

The Missouri river is well timbered at the terminus of the road; the bottom lands are very rich, and present a fine field for the settler.

I have erected on the Cottonwood river a substantial log-house, with a store-room, &c., and have placed the stock and property in charge of a small number of men. I have also erected good stables for the protection of the animals; cut and secured hay sufficient, I think, to keep them through an ordinary winter.

The stock are generally in good condition, excepting the horses, which do not thrive without grain. I have lost a number of horses from no other reason than the absence of such provender.

I believe that mules and oxen are the more profitable stock for an expedition of this character.

The climate is temperate and very regular. The thermometrical observations for the trip average as follows:

	Sunrise.	Noon.	Sundown.
July	62°	82°	72°
August	56	78	72
September.....	49	70	61

During these months the winds were fresh and usually from the south.

The distance from Fort Ridgely and the Missouri, as measured by the odometer, is 254 miles; the road is a few miles longer than it was possible to make it in order to have it practicable at all seasons of the year.

The distance from Fort Ridgely to the South Pass, by this road, I believe to be at least 250 miles shorter than from Fort Leavenworth, on the Missouri, to the South Pass. This is a most valuable consideration for the emigrant, as well as claiming the attention of our countrymen in reference to the best route of the Pacific railroad.

In concluding my report, I beg to avail myself of this opportunity of recalling the circumstances which prevented the completion of my section of the road.

A delay of from six to eight weeks was experienced at St. Paul and vicinity, owing to the absence of funds to provide for the outfit, as explained in my correspondence of May and June to your department. This unanticipated delay caused my arrival on the Missouri river to be at a season when to have crossed it would have exposed the entire train to loss from lack of forage for the cattle.

In September, when I was encamped on the Missouri river, the grass was dried up and burning, and to have pushed further on would have been not merely of no avail but ruinous.

But for the unforeseen delay at the outset I could have completed

It was contemplated, in making up my outfit of provisions, to provide for the sustenance of the full number of men necessary for the trip to Independence Rock and then to Fort Kearney; and I was advised by your department that the sum of \$20,000 was placed to the credit of my portion of the road, in addition to the appropriation for the Fort Ridgeley and South Pass wagon road, and my instructions were to get up the outfit accordingly.

In thus providing the outfit and the wages of the men the Fort Ridgeley and South Pass wagon road appropriation has been exhausted, and I have drawn upon the \$20,000 allowed me out of the \$30,000 appropriated by Congress last year for the completion of that road only to the extent of not exceeding (\$10,000) ten thousand dollars.

Could I have started as soon as my outfit was complete, I should have completed the road to Independence Rock and thence to Fort Kearney, and not have exhausted the \$20,000 allowed me.

I regret that I cannot hand in the report of the surgeon, J. D. Goodrich. On my arrival at St. Paul he received news of the dangerous illness of his wife, and was compelled to hasten to her, and up to date has been unable to leave her.

The important observations and thermometrical record, together with a collection of flora of the country gathered by him, I herewith transmit; and as soon as I receive his report in full shall have the honor to transmit the same to you.

I take great pleasure in making favorable mention of my assistants, from all of whom I have received cheerful support.

I have the honor to be, very respectfully, your most obedient servant,

WM. H. NOBLES,

Sup't of the Fort Ridgeley and South Pass Wagon Road.

Honorable JACOB THOMPSON,
Secretary of the Interior.

Report of Samuel A. Medary, Engineer, to W. H. Nobles, Superintendent.

ST. PAUL, MINNESOTA, December, 1857.

SIR: In accordance with my instructions, I have the honor herewith to submit my report, accompanied with a map of the located line of the "Fort Ridgeley and South Pass Wagon Road," to the crossing of the Missouri river, with field notes of the same.

Very respectfully, your most obedient servant,
SAMUEL A. MEDARY,
Engineer.

WILLIAM H. NOBLES,
Superintendent, &c., &c.

Engineer's Report.

The initial point of the road is at the landing of the Fort Ridgeley ferry, on the west bank of the Minnesota river, agreeable to instructions from the Department of the Interior.

The first ($\frac{1}{10}$) seven-tenth mile of the road passes through a heavily timbered bottom, subject to inundation.

The road way is cut out (30) thirty feet in width; four hundred and thirty feet of the distance is through a grassy marsh, usually covered with from five to ten inches of water; this marsh has been a serious obstruction to military trains going west from Fort Ridgeley, as a greater portion of the year they have been compelled to cross the Minnesota river at the Lower Sioux Agency, (13 miles above,) to avoid it.

This obstacle is now overcome by a timber road bed, twelve feet in width, covered with earth and ditched.

Leaving the bottom land the road ascends to the high prairie by the most favorable of the boulees or ravines; yet such is the ascent that, with the improvement of excavation and embankment, the average grade for one thousand feet is about seven hundred feet to the mile.

From the top of the bluff, 140 feet above high water mark, to the northern branch of the Cottonwood river, the road for sixteen miles passes over undulating prairies, interspersed with grassy lakes, near which is good grazing, but no wood.

A crossing of the north branch was made as soon as the stream, which heads in "Limping Devil's" lake, and the surrounding marshes, became well defined.

This stream has a sluggish current, and partakes, except after heavy rains, more of the nature of a slough. Its banks are low and soft, and present no reliable place for fording.

A bridge of 12 feet span and eight feet rise, (its cost not to exceed \$200,) would obviate the uncertainty of a ford, timber for which could

Preliminary report of F. W. Lander, chief engineer, upon his explorations west of the South Pass, for a suitable location for the Fort Kearney, South Pass, and Honey Lake wagon road. Wm. M. F. Magraw, superintendent. Constructed under the direction of the Department of the Interior, 1857.

WASHINGTON, November 30, 1857.

Sir: The instructions of the department to the superintendent, and through him to the chief engineer, directed the construction of a wagon road from Fort Kearny to City Rocks on the shortest practicable route.

The word "practicable" was here susceptible of many definitions. The road to be built was for the benefit of the overland emigration.

In interpreting and following what I considered to be the letter of the instructions, I was guided by the following conclusions, viz:

A large sum of money had been appropriated to build a practicable wagon road over a route where a practicable wagon road had existed for the last ten years. [Want of grass, danger of loss of stock by deleterious and poisonous waters, extreme tolls levied at the traders' bridges, and the circuitous route pursued] were difficulties to be overcome or obviated

But the law of Congress and the instructions of the department might also be interpreted as directing that a new road was to be built rather than that an old road was to be improved.

A route has therefore been sought over the more difficult portions of the division, which would—

- First. Avoid the alkaline plains of the desert of the Big Sandy.
- Second. Pass across Green river at a point above the depth of water requiring ferriage.

Third. Throughout the length avoid bridge-crossings and be abundantly furnished with excellent grass and fuel. It was also important to find minor routes and cut-off lines, which, by the expenditure of small sums of money, could be made of practicable passage for wagon trains, that the emigration might be divided and suffer less from want of pasturage.

For these purposes [the whole country between the South Pass and City Rocks was explored, surveyed and mapped, and the result is that the route of emigration may actually be shortened seven days' travel in a distance of five hundred miles] the map lettered for explanation is herewith transmitted.

[A preliminary reconnaissance, made during the month of June by the chief engineer, has established the fact that several days' travel can be saved upon the rear division between Fort Kearney and the South Pass.] The emigration can also be divided on this division. much sandy road avoided, and many of the traders' bridges rendered free by the expenditure of the sum of \$40,000.

[H. K. Nichols, first assistant engineer, was instructed to furnish the reconnaissances of the rear division, and as he failed to do so, they are now under progress of completion in charge of Assistant Engineer Jno. F. Mullowny.]

[q.v.]

From the non-arrival of the building train at the South Pass, the completion of any portion of the work laid out must be deferred to another season.]

The line A upon the accompanying sketch is a northern route from the South Pass to City Rocks by way of Fort Hall. It is better adapted for the passage of the ox-team emigration to the Pacific than any other line west of the South Pass, as there are no poisonous waters upon it, nor any ferries or expensive bridges required. It is well wooded and timbered throughout its length, and the great grassed valley of the Pines, which it bisects, is a halting ground, the advantages of which to this class of emigration, after a passage of the eastern sand plains, cannot be over-estimated. A preferable line to the main northern route may be found through McDougal's Gap, (see sketch;) but this line cannot be graded within the limits of the present appropriation, much of which has been expended.

Choice could be made by the department between the northern route (A, as designated upon the sketch) and the extreme southern line, B. The latter, which passes through the upper Mormon settlements, is of important character, and the shortest yet discovered by the season's explorations. Had difficulties not occurred with the Mormon population, this road could have been very cheaply and rapidly graded by the aid of the labor of Utah Territory. It is neither well wooded nor abundantly grassed, but it is a direct route of easy slopes from the South Pass to City Rocks.

The intermediate routes or connexion lines designated upon the sketch should be laid open for travel.

The principal of these is the Wind River mountains line, (marked X,) which should receive the especial attention of the department. The facilities afforded by this route when graded will repay the country the whole amount appropriated by Congress for the wagon road.

Mr. John Hockaday, an experienced mountaineer, discovered in 1854 a cut-off route across the Bear River mountains, over which he attempted to turn the emigration, and he erected a bridge for the purpose of aiding the adoption of the line.

For light trains this route is decidedly preferable to the old travelled road, and may be so improved as to serve the important purpose of dividing the travel and preventing the present great loss of stock from want of grass.

The wagon road expedition, consisting of a full equipment of tools, wagons, &c., now encamped on Wind river, can grade the Wind River mountain line, which avoids the Big Sandy desert and the ferries of Green river, and open the Hockaday's cut-off to travel, and the bridge can be purchased within the limits of that portion of the appropriation which I have been informed is set apart for the building of the eastern division. No wagon has ever been taken through the Bear River mountains north of Hockaday's cut-off.

An eighty pound measuring vehicle, taken apart and packed on mules, was carried over the most practicable northern pass by the advance party of engineers of the wagon road expedition.

The statement in reference to the improvement of Hockaday's cut-off is made in apprehension of the loss of the mules of the main expedition.

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ern route, B, at the option of the department, can be built, many of the connexion lines opened, and the rear division of the South Pass to Fort Kearney materially improved within the limits of the appropriation.

In the last instance, it is proposed that the work is to be done during the summer of 1859, and after the division from the South Pass to City Rocks is completed the bridges of the rear division to be rendered free by the proceeds of the sale of the stock of the expedition when the work is over. This proposal to postpone the purchase of the traders' bridges until 1859 must be qualified by the presumption of the fact that the present tolls will be an exorbitant tax on government transportation during 1858, if large military operations are carried on in Utah Territory.

The arrival of Assistant Engineer Mulloony will bring intelligence of a new route, by which it is proposed to avoid the bridge over the north fork of the Platte. The price of fifteen thousand dollars (\$15,000) is asked for this bridge by the owner, and the passage of it yearly costs the emigration from four to ten thousand dollars. The bridge is offered for sale in apprehension of the building of a free bridge by the wagon road expedition. The owner, Mr. John Richard, is a reliable mountain trader. He proposes either to give bonds to keep the bridge in good repair for six years, and to renew it if destroyed within that time, or to receive only a sixth part of the purchase money yearly. The same arrangement could undoubtedly be made in relation to the bridge at Laramie. In view of the large military operations now going on in the country, the War Department might properly join their funds with those of the wagon road in the purchase of the Richard bridge.

OTHER RESULTS OF EXPLORATION.

Fabulous accounts existing of a desert which extends between the Big Sandy and Green rivers, it was determined to examine it. The first passage across it was made by the chief engineer. It was afterwards thoroughly explored by B. F. Ficklin.

This desert is nearly destitute of herbage, the wild sage or artemisia lining a few depressions of the surface, and grass being found only in the great cañons which extend from the centre of the desert to Green river. These cañons are water drains during the early spring months.

There are several springs upon the desert, which become dry towards the close of the emigration. These may be made of service at low cost, and by artificial means other copious supplies of water may be procured. Were such a result required, the headwaters of the Big Sandy could even be delivered through the centre of the desert plain, and the whole surface might be irrigated from the mountain tributaries of the New Forks of the Big Sandy and Green rivers.

As excellent lines are found which avoid the desert, such extensive operations are not required for the construction of new and direct wagon roads.

The great upper valley of Green river and of the New Forks, its

tributary, has been surveyed and mapped. This well timbered and abundantly grassed region is undoubtedly suited to agricultural purposes, and is one of the immense herding grounds of the Shoshonee tribe of Indians.

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The first Wahsatch, or Bear River, mountain range divides John Gray's river, a main tributary of Lewis' Fork of the Columbia, from Green River valley.

Through several low passes in the more northern chain passage may be made to the headwaters of the Snake or to Wind river, the principal tributary of the Yellowstone. Passing in a westerly direction, the second Wahsatch range and main divide, separating the waters of the John Gray from the Salt river, is encountered. Both of these rivers are large tributaries of Lewis' Fork. Further westward a third range is encountered, dividing the waters of Salt river from the head of the Blackfoot Fork, and a fourth lower and more broken range of mountains is crossed near the open valley of Bear river.

Tracing the tributaries of the Snake to their sources, it may be seen upon the sketch that they all rise in a higher divide than any crossed by a direct western line from the South Pass, and that a mountain chain, from which run out the spurs of the northern system, breaks down towards the south into lines of country which divide the waters of Green river from its tributaries, the Labarge and Fontenelle, and present the junction of Smith's, Thomas', and Solos forks of Bear river.

All the last named streams take rise near the corresponding sources of the waters of Lewis' Fork. The main chain to which I have referred, extending east and west, is at too great an elevation to permit practicable wagon routes over it, and the engineering study of the country developed the necessity of a passage of the great side ranges by the location already described and designated upon the map.

Passing south, the country soon becomes a broken region, covered with sage or with a scanty pasturage on the water courses. In the north, on the contrary, the whole space is well wooded, fertile, and abundantly grassed. A detour north serves location regarding grade, and near the head of Green river by inconsiderable deflection a very level route may be found, which, from the South Pass to the valley of the Great Snake and Bear rivers and to the plains of the Great Basin, presents no obstruction to the favorable passage of railroads. It has been thought expedient to lay out the wagon road further south than this extreme northern line, which would head the great valley of the Upper Colorado.

All the railroad routes designated upon the sketch have been examined and statistics gained of their character. They are very favorable passages of the grand Wahsatch mountain chain, and principal divide of the American continent near latitude 42°.

They are well timbered, and abundantly supplied with pure water and excellent building stone. Beds of coal, iron, and salt, and a spring of peculiar mineral oil, which, by chemical process, may be made suitable for lubricating machinery, are found in their vicinity. In the opinion of the undersigned, the most objectionable of these routes is preferable to any hitherto explored near the 42d parallel.

JOHN B. HARRIS, the following results may be offered, as gained by side reconnaissance:

[A wagon route can be opened from the Devil's Gate (so called,) north of the entire Wind River mountain chain, and passing to Fort Hall by the upper waters of Snake river.] It would extend through the excellent watering grounds of Wind river, and when graded, which could undoubtedly be done during one season, would afford the base of a system of military operations from the eastern frontier to Oregon and California, with an open and easily protected line towards the supply grounds of the Beaver Head and St. Mary's valleys.

It cannot be approached from the south save by a few passes, and these may be easily defended by a small body of men; whereas the present line of the old road must be protected by large forces of mounted rangers, the animals of which will eat off the grass of the route and embarrass the emigration.

The whole great influx of the northern population to the Pacific must for the present cease, unless some decided steps are taken during early winter for its protection. [It may seem expedient, in view of the unforeseen contingency of Mormon hostilities, to amend the law of Congress directing the construction of the wagon road through the South Pass, or, by further appropriation, provide for the exploration and construction of the more northern line.]

The geological resources of the whole region are of extraordinary character.

The following synopsis is a deduction from the results of exploration:

WORK ON THE WIND RIVER MOUNTAIN ROUTE.—1,000 days' labor in Sweetwater and Big Sandy cañons; bridge or submerged platform and dressed fords at Green river and New Forks, if deemed expedient for mail service during spring freshets; whole cost of work to turn off Hockaday's Cut-off and old road, twenty-five thousand dollars.....	\$25,000
Purchase and repairs of the Hockaday and Dempsey bridge, with sum for rendering free the bridges at Smith's and Thomas' Forks.....	6,000
Change of line over mountain by zigzags, or detour approach.....	15,000
	46,000

MAIN NORTHERN ROUTE.

Wind River mountain line, as above.....	15,000
Cañon approach at head of Piney and descent to valley of Labarge.....	10,000
Work at Thompson's Pass.....	20,000
Descent along Smith's Fork.....	5,000
Work at summit and descent along branch of Salt river.....	8,000
All other work.....	12,000
	70,000

Work in cañon of Muddy.....	\$8,000
Bridges at Bear river, upper crossing.....	8,000
Bridges at head of lake.....	1,000
Work on gulley at Martin's Pass.....	4,000
Work in 17 mile cañon, near Cache valley.....	30,000
Bridges at Bear and Malade rivers.....	20,000
	71,000

In the event of the suspension of Mormon hostilities, the work on the southern route could be done cheaper by contracts with the Utah population and sale to them of the materials of the expedition on hand than in any other way.

They are the ablest and most efficient managers and working men to be found in the central mountains.

Under the circumstances of the present war the exposure of the bridges and costly works of the long cañon to their molestations would be a serious contingency to encounter.

The cost of protecting these works by a military force cannot properly appear in this estimate. The probable refusal of the emigration to use the road when built has already been alluded to.

All these estimates are guided by apprehension of a decided, energetic, and united course of action on the part of the superintendent and command, and of such discretionary power being conferred on the chief of the expedition as will enable him to practice due economy in expenditure.

The sums named include subsistence for six months, with the transportation of it to Fort Thompson and the use of the government property now at that point.

The usual notes, journals, and scientific data obtained by exploration are in hand, and this preliminary statement, made in view of the directions of the superintendent, and in reply to your letter of November 21, properly precedes a full exposition of the results of the year's labor, and the office-work required for its arrangement.

As your letter of instructions to the superintendent gave me no authority over subsistence and transportation beyond the expression of my desire to obtain it, my departure from the frontier was delayed until the 15th day of June.

The whole work of the advanced corps of engineers was completed in sixty days, for it required thirty days to reach the field of labor.

I cannot close this report, therefore, without expressing my sense of the obligations I am under to the members of the party for their efficient and manly persistence in duties performed during a stress of physical and mental labor not ordinarily required.

I am, sir, with great respect, your obedient servant,

F. W. LANDER,
Chief Engineer, &c., &c.

SAN FRANCISCO, January 4, 1858.

SIR: Upon my arrival in California I immediately set about organizing a party for the purpose of carrying out the designs embraced in your instructions dated May 1, 1857.

More time was required in procuring the necessary outfit than was anticipated, and, with utmost diligence, the expedition was not ready for starting until the 27th of June.

I determined to start with a full complement of men, well knowing that, in crossing the mountains, many would abandon the party and many prove worthless; at the same time more work was supposed to be required on the road than our experience has since proved.

I set out with seventy-eight men, including the officers, five large ox wagons drawn by oxen, two smaller wagons drawn by mules, and a spring wagon for the instruments, also drawn by mules. The number of animals was as follows, viz: 58 oxen, 14 mules, and 8 horses.

The itinerary of the route gives the movements of each day. I proceeded by the most direct route from Placerville, my headquarters, to Honey lake, and from that place to the west bend of the Humboldt river. So far as the road between the latter places, in relation to grade or solidity of road-bed, is concerned, it has no superior during the dry season; but, in the winter, the Mud lakes, without proper embankments, must be impassable for wagons.

It will be seen by the itinerary that the grass and water is not uniformly distributed along the route.

The survey of the Humboldt river has amply proved that it is the most direct and best location for a road from Thousand Spring valley to its western bend, a distance of about 250 miles.

The peculiar topography of the country prevents the location of any other route, without great expense, from the Great Bend to Thousand Spring valley. Even then the saving of distance would be small.

The successive mountain ranges that extend from the rim of the Great Basin towards its centre are perforated by this river, thus making a natural and easy road. Nearly the whole length of the stream is a fine, grassy bottom, whose rip's alluvian invites the agriculturist and stock-grower, after a proper survey and assurance of protection from the Indians. It is well understood that the principal requirements of our emigrant road to California are water and grass; therefore, for large cattle trains, the occasional springs and patches of bunch grass in the mountains cannot be depended upon.

It is believed that the experience of this season will correct the current opinion in relation to the pernicious qualities of the water of the river and the grass upon its banks.

Except at the lake and its vicinity we found the water good and the grass superior, both in quantity and quality. A little care exercised on the part of the emigrant in keeping his stock from the water

standing in occasional sloughs will save him much loss. From the examinations already made it is evident that the greatest difficulty in the road is between the west bend of the Humboldt and California.

Either of the present roads from the river literally cross a desert. It is proposed, then, to avoid this at the expense of distance. The object of the act of Congress seems to require that the approach to California should be over the best passable road, without deviating materially from the general route; hence, the terminus is placed "at or near Honey lake." By leaving the river at Big Meadows, 39 1/4 miles below Lassen's Meadows, and crossing the broken range to the west over to the south end of Pyramid lake, it is believed that a good road can be got through the mountains.

Mr. Bishop, in his examinations about the end of Pyramid lake, reports that several passes were seen through which a road could be constructed; also, plenty of grass at the south end of the lake and along the Truckee river. From this place the road can connect with the long valley by passing up through the cañon which I examined the 31st day of July.

The distance from the river to Pyramid lake is about 55 miles; from the lake to the State line 35 miles; making 90 miles from the State line to the river. Adding, then, the distance of 39 1/4 miles up to Lassen's Meadows, makes 129 1/4 miles against 107 by the way of the Mud lakes, which makes a distance of 22 1/4 miles in favor of the upper route in distance. The construction of a road over the proposed route would probably be one-third less than the other.

I beg leave to call the attention of the department to the outrages committed by the Indians during the past season on the line of my division. It will be seen that a number of persons have been murdered, much stock driven off, and other property destroyed. It is stated, and to some extent believed, that the whites were the aggressors. Such may be the fact, but, as is almost always the case, innocent persons have been the sufferers.

It is strongly suspected that these excesses were instigated by white persons, but I have no evidence that such is the case.

Military posts should be established, then, for protection of both parties; and unless some measures are taken for the protection of the emigrant, his family, and property, the overland travel by this route will be seriously affected. I would suggest the Stony Point Meadows, on the Humboldt, and the City Rocks or vicinity, as proper locations for posts. Both places are favorable resorts for the Indians; of the advantages of the latter place, other than this, I am not qualified to report. But at the Stony Point Meadow every facility is at hand for their establishment which a country of this kind is likely to afford.

The estimates for the construction of the road will be found in the able report of the engineer.

This, with the itinerary, will furnish, it is believed, the necessary information for which the organization was designed. The economy of my operations will, I trust, compare favorably with others of similar nature.

There has been no attempt at display, nor any extravagance permitted. Upon our arrival at Placerville all the men were discharged,

except the engineer corps, and the stock was placed upon a ranche in the Sacramento valley.

I remain, sir, most respectfully, your obedient servant,
JOHN KIRK.

Hon. JACOB THOMPSON,
Secretary of the Interior, Washington, D. C.

FORT KEARNEY, SOUTH PASS, AND HONEY LAKE WAGON ROAD—WESTERN DIVISION.

Report of Francis A. Bishop, engineer, to John Kirk, superintendent.

SAN FRANCISCO, January 4, 1858.

SIR: In obedience to your instructions, I have the honor to submit the following report and maps of the survey made under my direction between Honey lake and the City Rocks.

I deem it unnecessary to enter into an elaborate statement of the topographical features, geology, and natural history of the country through which our line runs. The explorations of Colonel Frémont and Lieutenant Beckwith extended over the greater part of the country traversed by our survey, and all the necessary information of that character is furnished by the admirable reports of those gentlemen. After a general description of the country, I shall confine myself to such details as have a direct bearing upon the location of the road.

Beginning near Honey lake, the line of road follows the northern margin of the Great Basin and crosses near its eastern terminus, the dividing ridge separating the waters of the Great Basin from the tributaries of the Columbia river.

The topographical features of the adjacent country, for the whole distance, are nearly the same.

Three great ranges, the West Humboldt, the Humboldt, and the Goose Creek mountains, which converge towards the centre of the Great Basin and in the vicinity of the line—the two former immediately to the south, and the latter crossing it.

Between these principal ranges are numerous smaller ones, many of them isolated, but bear in the same general direction. At their bases are small dry valleys covered with artemisia, or forming white mud bottoms destitute of vegetation.

The Humboldt river, rising in latitude 41° 15' 30" north, longitude 114° 51' 31" west, flows westerly for a distance of two hundred and forty-seven miles, and, excepting occasional small springs, is the only water in the northern line of the Great Basin.

It is only along this stream that a road can be constructed combining the advantages of distance, grade, natural road, and a plentiful supply of grass and water.

In making the estimates the line has been divided in four divisions: The first extending from the 120th meridian, at Rush valley, to the Lassen's Meadows, on the west bend of the Humboldt river; distance of 107.09 miles. The second extends from Lassen's Meadows to

Gravelly Ford; distance of 132.54 miles. The third extends from Gravelly Ford to the Humboldt Wells, 104.50 miles. The fourth division, from the Humboldt Wells to the City Rocks; distance 92.80 miles. A fifth division has been added, extending from the Lassen's Meadows southwesterly to the west end of Truckee cañon; distance 141.32 miles.

The topographical positions of various camps, in latitude, have been very accurately determined.

The observations were taken by the sextant; but they have been sufficiently multiplied to give satisfactory results, and agree very nearly with the traverse.

In our observations for longitude we have not been so fortunate; Lassen's Meadows is the only place satisfactorily located. The traverse, however, was connected with places in Carson valley, the positions of which had been well determined.

I regret my inability to furnish a profile of the line; my barometers were either broken or worthless previous to my arrival at the initial point, and we are thus deprived of the invaluable information derived from a well conducted set of meteorological observations.

The method of construction called for by the estimates is simple and unpretending. The aim of your engineer is the construction of a good road, carried out on the principles of true economy, but at no time forgetting its purposes or importance. A natural road is to be found nearly the whole distance, and no engineering difficulties are encountered. The courses and distances have been very accurately taken; the location of the road in some places will be subject to the modification of constructing engineer. Mounds have been erected at intervals along the line, but nature has with more permanence marked the route. The system of bridges and culverts is unexpensive, and the quantity of rock excavation small.

At the crossings of the various dry, gravelly ravines which only drain the surface water during the rainy season, the banks will be sloped to a proper grade and no culverts will be required.

The width of the embankment is estimated at 24 feet on the top, with slopes of 1½ horizontal to 1 in altitude. The bridges will be of wood, and the timber will be obtained from the Sierra Nevada and Goose Creek mountains. The culverts will be of stone, and five-miles is the average distance of suitable materials from the line. The estimates of each division, after a description of the localities requiring labor, are arranged in a tabular form. The calculations are on the basis that the labor and supplies for the whole work will be drawn from California.

First division.—Commencing at the boundary line between Utah Territory and California as determined by me.

The road passes over a steep, stony hill from Rush Creek valley into Smoke Creek bottom; a bridge 15 feet in length will be required to cross Rush creek. Side grading will be necessary on the hill.

The crossing of Smoke creek, in the valley, requires another bridge 40 feet long. Those in Smoke Creek cañon will not require bridging; the bottom of the stream wide and solid. The cañon itself requires but little work.

Table of geographical positions—latitudes.

Place.	Latitudes.	Remarks.
	° ' "	
Camp north end of Honey lake.....	40 21 16	By sun and Polaris.
Rush valley.....	40 33 07	By traverse.
Lassen's Meadows.....	40 41 44	By sun and Polaris.
Big Bend of the Humboldt.....	41 0 34	By Polaris.
Gravelly Ford.....	40 34 06	By Polaris.
Mouth of Humboldt cañon.....	41 12 51	By Polaris.
Humboldt Wells.....	41 15 30	By traverse.
City Rocks.....	42 3 15	By meridian alt. sun.
Do.....	42 2 16	By traverse.
Sink of Humboldt.....	39 56 15	By Polaris.
Truckee Meadows, west end of Buttes.....	39 28 34	By Polaris.
Genoa, Carson valley.....	39 1 10	By Polaris.
Do.....	39 0 2	California boundary survey.

Table of geographical positions—longitudes.

Place.	Longitudes.	Remarks.
	° ' "	
Camp north end of Honey lake.....	120 17 51	By traverse.
Rush valley.....	119 59 19	Do.
Lassen's Meadows.....	118 16 51	By observation.
Do.....	118 17 30	By traverse.
Big Bend of Humboldt.....	117 33 02	Do.
Gravelly Ford.....	116 23 53	Do.
Mouth of Humboldt cañon.....	115 1 56	Do.
Humboldt Wells.....	114 51 31	Do.
City Rocks.....	113 44 33	Do.
Sink of Humboldt.....	118 42 26	Do.
Truckee Meadows, west end of Buttes.....	119 44 47	Do.
Genoa, Carson valley.....	119 49 42	California State boundary survey.

Report of Superintendent F. W. Lander upon the central division of the Fort Kearney, South Pass, and Honey Lake wagon road, constructed under the direction of the Department of the Interior, 1857-'58-'59.

WASHINGTON, D. C., January 20, 1859.

SIR: In pursuance of the directions of your letter of December 7, 1858, I have the honor to transmit a report and map of the central division of the Fort Kearney, South Pass, and Honey Lake wagon road.

Very respectfully, your obedient servant,

F. W. LANDER,
Superintendent, &c., &c.

Hon. JACOB THOMPSON,
Secretary of the Interior.

NARRATIVE OF PROGRESS OF EXPEDITION.

Your instructions to organize an expedition at some suitable point on the Missouri river, and to continue the construction of the Fort Kearney, South Pass, and Honey Lake wagon road, were carried out by the selection of Independence, Missouri, as a starting point, where was stored some of the property of last year's expedition.

The expedition left Independence on the 29th day of April. The actual progress of the march commenced at Fort Leavenworth on the 4th day of May. The expedition was equipped for fast service, and, in addition to the tools and appliances of construction, carried only one hundred days' provisions for the outfit. A contract was made at Fort Leavenworth with S. E. Ward, the sutler of Fort Laramie, for a train of provisions to be delivered at the latter point early in July. Prior to reaching Fort Laramie large numbers of destitute men were met upon the road. They were discharged teamsters and individuals who had left Camp Scott on the opening of spring. As the expedition, with the exception of Colonel Hoffman's, which had started a month earlier, was in advance of all other trains, I was compelled to feed and shelter these destitute and starving men. On reaching Fort Laramie a Mexican train was encountered loaded with flour, kiln-dried meal, and *frijoles*, or Mexican brown beans. The opportunity thus offered of turning to advantage the number of laborers who were destitute and seeking employment along the road, and of carrying the work you intrusted to my charge to more immediate completion, was embraced, by the purchase of the freight of this Mexican train. It was bought at prices much lower than the usual rates of the country, and cheaper than I could myself have brought supplies from the States. Fresh oxen and wagons having been purchased for the purpose of moving these provisions to the mountains, the new train was placed in charge of Mr. B. F. Purche, who was directed to forward it with as much celerity as might seem practicable. These arrangements were all perfected during the one day's halt which the expedition made at Fort Laramie. It arrived at the South

Pass, a distance of 950 miles from the starting point, and the commencement of the work, on the 14th day of June. A block-house was immediately constructed, and the tools and provisions of the advanced train placed in it. The best mules and wagons were then despatched back to Fort Laramie in charge of Alexander Mitchell, who was directed to bring up the remaining portion of the Mexican supplies and the Indian goods transported by Mr. Ward. A smaller party, under the direction of Charles Evans, was sent to Fort Thompson, on Wind River, to collect and bring to the line of the work such tools and appliances of the last year's expedition as might still remain serviceable. John Justus, the wagon-master of the last year's expedition, whom I had been fortunate enough to engage at Fort Laramie, was despatched to Salt Lake City for men to work upon the road. The engineers, with a detached party, commenced their work upon the base line of the route, and upon such reconnaissances and side surveys as the limited amount of transportation which I was enabled to furnish permitted their attempting. On the fourth day after reaching the South Pass, and after concluding these arrangements, I started in advance upon the line of the new road with the small train that remained. The party with me consisted of the lumbermen and bridge builders, hired in the State of Maine, for cutting out the heavy timber upon the line and for erecting such bridges as might be required. I was also accompanied by the employés who had joined the train during its march. The rate of 15 miles per day was kept up from the broad plain of the South Pass to Piney cañon, of the Wahsatch mountains. At Piney cañon the first hard work of the division was encountered. Through this difficult section a narrow road-way only was built, and the first range of the Wahsatch mountains crossed by cutting out the timber which lined the summit of the section to Labarge creek. The party continued its progress up the open valley of Labarge creek and crossed the main or great range of the Wahsatch mountains to Smith's Fork, cutting out the timber, but making only a narrow road-way, arriving at Smith's Fork on the 10th day of August. From Smith's Fork, which is the great tributary of Bear river, it crossed the third mountain range and arrived on Salt river, the principal tributary of the Great Snake River of the North, on the 21st day of August.

During this period the train of Mr. Burche and those of Alexander Mitchell and Charles Evans had arrived. John Justus had also brought to the work 47 employés from Salt Lake City, the latter chiefly Mormons. The engineering party, under the direction of Mr. John Lambert, had fixed with accuracy the position of some of the principal points on the road and completed some important side reconnaissances. Messrs. William H. Wagner, first assistant engineer, and J. C. Campbell, general assistant, had in the last named duty done themselves great credit by the discovery of a route towards the south partially explored by my party of last year, and had also tested the work by an excursion towards the valley of the Snake. A reorganization also took place in the engineering corps, which led to marked efficiency and progress, the conduct of which places me under peculiar obligations to William H. Wagner, R. L. Poor, and Melchior

M. Long. The small road-way broken by the advanced party was widened by placing regular forces of laborers along the line, weekly supplied with provisions from the fort which had been erected in Piney Cañon by Mr. B. F. Burche after his arrival there. From the limited amount of my transportation I was compelled to make a reconnaissance for the location of the road with one companion, a mountaineer named Peter Gabriel, to whom I am much indebted for his self-reliance, determined energy, and courage.

As it was at this time necessary for me to visit Salt Lake City, not only to carry out your instructions regarding the last year's expedition, but also to procure money to pay off employés, as the work approached completion, I left the main working parties of the line in charge of J. C. Campbell, B. F. Burche, and William West, and gave to Mr. Wagner the important duty of reconnaissance in advance from the western Wahsatch mountain range, towards the head of Ross' Fork of Snake river. All these gentlemen performed their duties to my entire satisfaction. I was accompanied to Salt Lake City by Mr. John H. Ingle, disbursing clerk, who has been of great service to me during the entire progress of this and last year's expeditions. We returned on the 7th day of September, after a rapid trip, with a pack party of two men, through the unfrequented trails of the Bear river and Malade mountains. During my absence, and while in Salt Lake City, I learned that the western Snake Indians had attacked the mail and stopped emigrant parties in Malade valley, and near Goose creek mountains. As it was necessary to carry the survey of the road to the last named point, and also to pass a portion of the wagon road employés, who at the end of the season had been promised a passage to California or a return to the States, and preferred the former, I now organized a party of five picked men, and accompanied by the engineers, Wagner, Poor, and Long, and Mr. Campbell, went forward to the end of the division, and visited these Indians, and completed the survey and location of the road. On my return, the work of the division being completed, with the exception of such minor details as could be profitably left in charge of Mr. Campbell, and as circumstances dictated this course as the most expedient one to pursue, suitable caches were made of tools and appliances, the parties called in, and the expedition prepared for its return to the States. The circumstances which led to the return of the expedition to the States, rather than to the wintering of it in the mountains, are as follows:

The Crow and Shoshonee Indians having broken out into open war in the north, did not permit of my risking or exposing the large stock of mules of the expedition at the camp selected as the wintering ground of last year's expedition, on Wind river. Every point near Salt Lake City suitable for wintering stock had been occupied by Mormons, the army, or by the large trains of transportation contractors. Forage was at such rates and prices at Salt Lake City as to preclude its being purchased for this expedition. All articles of supply not possessed by my own train were held at exorbitant prices. The oxen of the expedition were fat, and could be sold at their original cost. The mules were in such excellent condition as to be able to make a trip to the States without serious loss. The articles of supply needful for the

ensuing year could be brought up by the mule train in the spring at mere nominal cost, as compared with the prices demanded by the spring transportation contractors for furnishing them. In addition to these facts, as the road was completed, with the exception of that dressing up necessary after the spring freshets, and before it was trodden by the emigration, there was no reason for remaining in the country. But beyond all this, some of the most excellent employes of the train had been hired at high rates of pay for peculiar services, and engaged under the idea that it would take eighteen months to construct this work, and that they would be furnished transportation home or to California on its completion. I had, therefore, either to keep up their pay and subsistence during the winter, and give them transportation in the spring or to return them to the settlements. My winter provisions were well stored at Fort Laramie, and being within 300 miles of the work would answer for the ensuing summer. In addition to all these reasons, which render the matter conclusive in my own mind, it was absolutely necessary that I should consult you on the subject of Indian difficulties liable to arise from the location and construction of this new road across the herding and camas grounds of the Shoshonee and Pannack tribes. The direction of a portion of the appropriation remaining unexpended for the purpose of obtaining the good will and kindness of these Indians, or the propriety of a new appropriation for the same end, is referred to in that part of my report embraced under the head of "The Indians." Should my views in this respect be adopted by you, and carried out, a portion of the return wagons will absolutely be required for the transportation of presents for these Indians. Under the weight of all these circumstances, and as the amount of work ordered by your instructions had been accomplished, and I had received no further directions from the department, I brought the expedition to the States, and discharged the employes at St. Joseph's, Missouri, on the 17th day of November last. Mr. J. C. Campbell, who remained in charge of the Mormon employes, took with him to Salt Lake City a small amount of transportation, which he has been instructed to dispose of or to winter there, as may seem to him most expedient, and to await your instructions for spring service or such as you may order me to carry out. In closing this narrative I desire to express my obligations to John Justus, James Snyder, Edward Yates, C. C. Wrenshall, and the employes who remained with them, exposed on the grassed islands of Platte river, in charge of weak stock, during the terrible storm of thirteen days, encountered by the expedition on its passage through eastern Nebraska, when coming to the States. Careless travellers having burned the grass along the route, it became necessary to move the expedition faster than was deemed expedient to drive some of the tired stock. The party which remained with the mules and horses left behind covered them during the night with their own blankets, and kept them alive until a return train was sent out with a supply of forage. Mr. James A. Snyder is also entitled to be mentioned for having remained in charge of the supply stations of the mountain work, often without a companion, in exposed situations at the edge of the Crow and Pannack country. I have given the names of the mem-

bers of the expedition to whom I am particularly indebted a prominence in this public statement, because success has only been achieved by their hearty co-operation, energy, and obedience. Many of them were hired at much lower rates of pay than they could have obtained on the border by not going upon the work. I also take this opportunity of stating my appreciation of the excellent employes, all of whom have sustained me in carrying out your instructions.

Construction.—Amount of work done.

Miles of grading.	Cubic yards of excavation.	Total cubic yards of excavation.	Miles of rock excavated.	CLEARING.		Remarks and locality.
				Miles heavy pine.	Miles of willow.	
2½	4,560	4,562	—	—	1	Between South Pass and Piney Cañon.
4½	8,797	13,359	½	½	3	In Piney Cañon.
—	651	14,010	—	—	—	Fort Piney.
—	243	14,253	—	1	—	Between Fort Piney and foot of mountain.
3	5,865	20,118	—	3	—	Foot of mountain to Labarge creek.
1½	243	20,361	—	1	2	On Labarge creek.
3½	6,516	26,877	—	1½	1½	From Labarge to road's leaving first branch of Smith's Fork.
½	243	27,120	—	½	—	First branch of Smith's Fork to summit of mountain.
4½	9,280	36,406	100 yds.	4½	—	Between summit of mountain and Main Smith's Fork.
1	1,955	38,361	—	½	—	Along Main Smith's Fork.
4	7,820	46,181	½	4	3½	Between Smith's Fork and Salt river.
2½	489	46,670	—	—	½	Salt river.
—	3,910	50,580	½	10	—	Between mouth of cañon and West's camp.
6	11,730	62,310	—	—	½	West's camp to main emigrant road.

62,310, total number of cubic yards of excavation, of which 25 per cent. is loose rock and ledge.
 1 mile of rock removed.
 23 miles of heavy pine clearing. The pine timber extends over about two hundred miles of the route.
 11 miles of willows cleared.

52 Estimate of cost of expedition from April 1, 1858, to December 1, 1858.

Amount expended.....	\$67,873 12
Value of property on hand and available for use, viz:	
Transportation.....	\$16,797 84
Camp equipage, &c.....	2,498 57
Provisions	4,051 59
Debts of old expedition and not chargeable to the present one.....	4,264 35
	<hr/> 27,612 35
	<hr/> 40,260 77

WASHINGTON, D. C., January 7, 1858.

SIR: Above please find the estimate of the cost of the expedition for the eight months ending November 30, 1858.

Very respectfully, your obedient servant,

JNO. H. INGLE,
Disbursing Clerk.

F. W. LANDER, Esq.,
Superintendent, &c.

Property of expedition and employés; where situated.

The following extracts from the report of Mr. J. C. Campbell explains the situation of the stock and government property in his charge at Salt Lake City.

Extract.—"I have sold six yoke of oxen, two yoke at \$100 and four yoke at \$90. I have now on hand fourteen (14) mules, three (3) horses, and seven (7) head of cattle. The stock is in excellent order, but everything is enormously high here. November 26, 1858."

Wagons, harness, provisions, arms, tools, &c., as per schedule A, on file.

Property cached by J. C. Campbell, as per schedule E, on file.

Mr. Campbell retains Edward Williamson, Isaac Frappe, and Frank Truchet, all excellent mountaineers, subject to dismissal or retention, as he may think proper.

Cached in fort at Piney Cañon, tools, for which see schedule C, on file.

In charge of C. H. Miller at Fort Gilbert, South Pass, Rocky mountains: tent, provisions, tools, &c., as per schedule I, on file.

Mr. Miller is directed to take barometrical observations during the winter, and to collect such information as will undoubtedly be valuable to the country. His reports for October and November have been received.

At Fort Laramie, receipt being taken from S. E. Ward, sutler: provisions, wagons, stock, &c., as per schedule E, on file.

At Troy, Kansas Territory, in charge of William H. West, arms, saddles, &c., as per schedule F, on file.

With Mr. West are A. Mitchell, C. C. Wrenshall, E. L. Yates, Jerome Boles, Anthony Cosgrove, and the four Mexican employés.

At St. Joseph's, Missouri, in charge of Cogwill & Co., receipt having been obtained: wagons, harnesses, arms, blankets, &c., as per schedule C, on file.

At Washington city, John H. Ingle, disbursing clerk; James Ingle, commissary; William H. Wagner, R. L. Poor, and Melchior M. Long, engineers.

The Engineering.

The engineering corps of the present season was a very small one. The amount of money expended has been almost exclusively devoted to the carrying out that clause of your instructions which directs "the most vigorous prosecution of work on the wagon road."

The following extracts from a report of Mr. John Lambert, engineer, and the report of Mr. Wm. H. Wagner, first assistant engineer, refer to the engineering:

Extract from Mr. Lambert's report.

"The unusual agreement of the following results for latitude at this camp will be sufficient excuse for asking attention to them; as they compare fairly with the results obtained with larger instruments, and published as specimen work or illustrations in astronomical books:

By "Antares" twice, July 21 and 22...	42° 31' 50".95 (both the same.)
By Ophiuchi.....	42° 31' 54".4
By Ophiuchi.....24th and 25th...	42° 31' 50".66 (both the same.)
By Altair.....25th...	42° 31' 51".5
Mean.....	<hr/> 42° 31' 51".52

Had it not been for the prevailing cloudy nights and an accident to the watch used before I could get a complete set of "Luna Distances," I have no doubt that I should have obtained results as reliable for longitude before this time. I made an attempt to observe an eclipse of the first satellite of Jupiter, which is now above our horizon in the morning, but the glasses in the party are too feeble for distinct vision in presence of the moon. In the hurry of immediate computation at night, I mostly omitted some small corrections, such as for mean declination, height of barometer, &c., but which leave no error perceptible in the general maps, these also I propose to correct in Washington."

WASHINGTON, January 19, 1859.

54 SIR: I have the honor to submit the map and meteorological notes collected during the progress of the expedition.

The map contains the results of surveys and reconnaissances of the first and second expeditions through this section of country. The astronomical observations for latitude were made by Mr. J. Lambert and Mr. R. L. Poor, with great accuracy, along the new worked road. The want of proper instruments and the short sojourn in any one place prevented observations being taken for longitude, but the utmost care has been taken to supply their place by exact measurements.

In connexion with the survey, several important reconnaissances have been made by Messrs. Poor and Long and myself. This side work, resting upon the base line of the surveyed route, completes in some measure that of last year.

Twenty-three (23) meteorological observations were made at Aspen Hut, and ninety (90) at Piney Fort, by Mr. Snyder. Twenty-seven (27) readings were made at the mouth of Piney Cañon, and one hundred and forty along the line of the new road. These last were taken at each important break of the surface. It is impossible to note on the map all the heights thus obtained for fear of confusing it. In computing these heights, and to get reliable results, due care was taken to observe the directions given in the work of Lieutenant Abbot, topographical engineer, in reference to the corrections to be made in barometrical readings. The formulæ used in computation were those of Guyot, as published by the Smithsonian Institution.

Since the departure of Mr. Lambert from the charge of the engineering work of this road, I have been most ably assisted by Messrs. Campbell, Poor, and Long, and am indebted to them for their cheerful and energetic aid in carrying out the work entrusted to my charge.

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

W. H. WAGNER,

First Assistant Engineer in charge.

F. W. LANDER, Esq.,
Superintendent, &c.

The barometrical data and the journals, note books, itineraries, &c., of the expedition, from which the results offered are made up, are on file in the office, but not now transmitted, as they would increase the size of this report to unreasonable limits.

Description of the old roads westward from the South Pass, and the amount of emigration over them in the year 1857.

The following extracts from Assistant Engineer John F. Mulloney's report of last season, who was placed in charge of surveying and examining the old roads while I was making the reconnaissances of the

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The unexplored country, afford valuable information. My own examinations of the old emigrant roads were made in 1854, and led me to suggest the propriety of further explorations prior to building the overland wagon road.

Extracts from Mr. Mulloney's report.

"The line cannot well be changed for the better from the South Pass to the forks of the road, near Little Sandy creek. It is an even and broad gravel surface. From the forks of the road it passes over a gravel surface mixed with sand, affording little grass, save in the early part of the season, and which soon withers during the summer months. From the forks toward Crow creek, (a small stream so called near the base of the Bear mountains,) it is mainly an elevated table land, a smooth surface of alluvial deposit, mixed with fine sand and gravel, of arid and sterile appearance, and yielding nothing but stunted sage. In crossing this desert, both man and beast suffer from the long, tedious marches, without water or grass. The wheels of the wagons sink deep into the dusty soil, and the hauling is slow and hard. The strong winds which prevail here during the summer months sweep over the level plains, whirling the loose deposits into thick clouds, obscuring the sight, and filling both eyes and nostrils with dust. The hot, dry air parches the lips and throat, and even makes respiration difficult.

"This waste, therefore, has long been known as one of the most dreaded parts of the road travelled in crossing the Rocky mountains. Of the several routes across it I consider none worthy of improvement, unless with the view of dividing the emigration. To do this, experiments might be made by sinking ordinary wells at suitable points to obtain a supply of water. If this attempt should not be made, I dismiss the subject of the whole of these routes from any further consideration, as possessing nothing in their favor to recommend them compared with the Wind River mountain route, by way of the New Forks of Green river, reconnoitred and examined by yourself."

EMIGRATION OVER THE SOUTH PASS ROUTE BY THE OLD ROADS.

I furnish the following interesting schedule from the report of Mr. B. F. Ficklin, of my advance exploring party of 1857. It gives information of the number of wagons crossing the Green river ferries, and a description of the roads over the ungrassed regions west of the South Pass, and the desert towards Slate creek.

Extract from B. F. Ficklin's report, August 15, 1857.

The Mormon road.—This road crosses at the Mormon ferry of Green river.—(See map.) It is one hundred and fifteen miles from the South Pass, on this route, to Crow creek, the connecting point of all the roads. Eighty wagons crossed this ferry to date, only twenty of which belonged to California emigrants.

The Kinney road.—It is one hundred and thirteen miles from the

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South Pass to Crow creek. With the exception of the last six miles it is a hard, gravelly, gently rolling, and unexceptionally good road. Very little grass; sage for fuel.

Over two hundred and twenty wagons have crossed the Kinney ferry for California up to date. The numerous loose animals not counted by the ferrymen, as they are generally crossed by swimming.

The Sublett road.—This, the northernmost of the old emigrant roads, crosses the desert by a distance of fifty-two miles, and has a side line to the Desert spring; water of the Desert spring slightly impregnated with sulphur and alkali; the spring is thirty-two miles west from the Big Sandy. To Crow creek, by the main Sublett road, one hundred and seven miles; by the spring route, one hundred and twelve miles.

One hundred and fifty wagons had crossed at Sublett's ferry. No account kept of loose stock.

Davis' road.—It is one hundred and eleven miles from the South Pass to Crow creek by this route, which is preferred by emigrants.

Five hundred and sixty wagons have crossed at Davis' ferry up to this date; number of loose animals not noted. The Mormons' estimate for loose cattle driven to California the present season is seventy thousand.

The different ferries at Green river are what are called rope ferries. The boats are badly and roughly constructed. They are built of pine timber, and are not over thirty feet long, making it necessary to pull wagons into and out of the boats by hand. This is a tedious job. The cattle are forded, or in high water swam over, attended with risk both to cattle and drivers. The price charged for ferrying varies from three to six dollars per wagon, depending on the stage of water. The Kinney and Mormon ferries are owned by Mormons, and are in Utah Territory.

The above was a very small emigration, less than one-third what it was in 1854, when I passed along this route from Oregon. Apprehension of a Mormon war reduced the number of emigrants.

The tolls of bridges and ferries are as follows on the South Pass road:

Laramie river.....	\$2 00
North Platte.....	5 00
Five other small bridges.....	10 00
Bear river ferry (Owens' road).....	4 00
Green river.....	4 50
Total.....	25 50

Twenty-five cents per head is paid by cattle drivers for loose stock, in the highest stages of water.

In a large emigration, fifty thousand dollars is a small estimate for tolls paid by overland emigrants. We cannot estimate loss of stock by the old road at less than twenty per cent. of the whole number driven.

Mr. Miller's report of the travel of October and November, 1858, is given below, the latter going to Salt Lake, and consisting of freight trains:

SOUTH PASS, ROCKY MOUNTAINS,
Gilbert's Station, November 30, 1858.

All snow falling previous to November 20 did not remain long on the ground. The snow in the pass is now six inches deep. It is three inches at Green river.

The travel past this station in October was—

Outfits (various kinds).....	59
Men.....	838
Women and children.....	9
Horses.....	91
Mules.....	369
Oxen.....	4,851
Wagons.....	490

In November—

Outfits.....	36
Men.....	528
Women and children.....	—
Horses.....	100
Mules.....	207
Wagons.....	107
Oxen.....	932

As my party was off the line of the old roads from May until October, I cannot give the amount of travel, which was large.

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EMIGRANT GUIDE.

The following schedule, made up in the simple forms in use by overland travellers, will be of service to emigrants :

TO EMIGRANTS.

Gilbert's station, at the South Pass, (last crossing of the Sweet-water river,) is the point at which you had better leave the old road, for fear of getting lost among the different camp trails. Gilbert will direct you.

You must remember that this new road has been recently graded, and is not yet trodden down; and, with the exception of grass, water, wood, shortened distance, no tolls, fewer hard pulls and descents, and avoiding the desert, will not be the first season as easy for heavily loaded trains as the old road, and not until a large emigration has passed over it.

All stock drivers should take it at once. All parties whose stock is in bad order should take it, and I believe the emigration should take it, and will be much better satisfied with it, even the first season, than with the old road.

	Intermediate distances.	Total number of miles.
From Gilbert's station to Aspen Hut ----- Good grass and water. If the grass has been eaten off by the Salt Lake trains, go--	3. 50	
To Long's creek ----- Here you have a good camp, the grass on the hills being excellent. Willows on creek, aspen or mountain cottonwood to left, pine timber to left, crossing good gravel bottom.	2. 20	5. 70
From Long's creek to Clover creek ----- Good grass and water.	2. 23	7. 93
From Clover creek to Garnet creek ----- Good water and fine grass; aspen timber. From this creek to the Sweetwater it is a rolling country, with fine bunch grass. Fine timber as you approach the river.	3. 14	11. 07
From Garnet creek to Sweetwater River crossing ----- You will find this a good camp. Fine grass and heavy pine timber a short distance up the creek to right.	4. 95	16. 02
From the Sweetwater to crossing of Poor's creek ----- Excellent grass and fine timber to left of road. Good camping places all the way for nine miles, the road following up the stream for that distance.	1. 59	17. 61
From Poor's creek to Little Sandy creek ----- Good grass; abundance of pine timber. Four miles from crossing the road descends into a large grass plain, called Antelope meadow. A great many antelope here. Camp near the rocks, where you can have cedar for fuel.	11. 66	29. 27
From Little Sandy to Big Hole of Big Sandy ----- A good laying up place. A large valley; abundance of grass and pine timber.	5. 33	34. 60

	Intermediate distances.	Total number of miles.
To crossing of Big Sandy ----- Hard pitchy road. A steep pitch to go down to the river, -----	6. 00	39. 60
From Big Sandy to Grass Spring ----- No wood, but fine grass and water; abundance of sage for fuel.	8. 15	47. 75
From Grass Spring to New Forks of Green river ----- This distance can be shortened by striking toward a clump of timber to the right and finding good camping grounds; then by following down this stream to the left a short distance you strike the road at the crossing, which is good. There is a large island in the centre, and the stream on each side is from twenty to thirty yards wide. In the spring it is from three to four feet deep. You had better raise the beds of your wagons. Timber on island and western bank.	18. 56	66. 31
From New Fork to Green river ----- From this point you can strike south, and in four miles come to Piney creek, with good grass, and plenty of timber for camps. This, however, can only be done late in the season, for in the spring it is marshy, and you had better keep the beaten trail, on which you will find water and grass enough even for laying up.	5. 51	71. 82
From Green river to White Clay creek ----- Alkali along its banks, but clear running water in the bed of the creek.	8. 00	79. 82
From White Clay creek to Bitter-root creek ----- Good grass; large willows on its banks for fuel.	5. 18	85. 00
From Bitter-root creek to north fork of Piney ----- Willows on banks; one mile to left pine and cottonwood timber.	10. 32	95. 32
To middle fork of Piney creek ----- Good grass; large willows for fuel.	3. 00	98. 32
From Middle Fork to mouth of Piney cañon ----- Cañon from a quarter to one and a half mile wide.	1. 54	99. 86
From mouth of cañon to Piney Fort ----- The road through the cañon crosses the creek eight different times; all the crossings, however, are good. You will find several camping spots in the cañon, between its mouth and Piney Fort; you had better lay over at Piney Fort, as you have excellent grass, and a block-house, with corral attached. The country for thirty miles beyond is thickly timbered, which will render it necessary for you to keep careful watch of your stock. You should move as rapidly as possible over to Salt river. After leaving Piney Fort the road passes over a ridge and crosses a small creek within half a mile; thence crosses mountain--	7. 70	107. 56
To Labarge creek ----- Road follows up creek for half a mile, crosses and passes along low ridge for a short distance, when it strikes the--	5. 19	112. 75
Crossing of small creek in valley -----	2. 55	115. 30
To crossing of another small creek ----- Good grass.	. 43	115. 73
To crossing of Spring branch in valley ----- Enclosed by high ridges. After crossing another small creek road enters--	1. 39	117. 12
Labarge valley ----- Good grass on hill to right.	. 89	118. 01
To junction of Labarge and Spring creek ----- Road from this point lies over a mountainous country.	1. 84	119. 85
From Spring creek to first branch of Smith's fork of Bear river ----- You travel along this stream for one and three-fourths of a mile. Good grass in timber.	2. 57	122. 42

SCHEDULE—Continued.

	Intermediate distances.	Total number of miles.
To Smith's fork of Bear river.....	7.44	129.86
Valley narrow; thick growth of willows half a mile up this stream to right from where the road strikes it and further. You will find good grass on the hills and in the valley. Road follows down Smith's fork and crosses—		
Little Beaver creek.....	2.04	131.90
From Little Beaver creek to spring near the top of the mountain. Before reaching this point you pass through a small body of aspen timber. Be careful here to keep good watch of your stock, as this timber is very thick with Indian trails running north and south, upon which your stock is apt to stray, and you will not be able to recover them. You are now leaving the friendly Indians and reaching the Pinnack country. Treat them kindly or you may have some trouble. Road ascends hill for one-fourth of a mile, then descends gradually. From here to old road grass is very abundant in all valleys.	1.88	133.78
To Salt River valley.....	3.91	137.69
Good grass		
To crossing of creek.....	1.04	138.73
Gravel bottom; road follows up valley—		
To crossing of Small Spring creek.....	2.50	141.23
Valley widens, and is covered with excellent grass.		
To Salt River crossing.....	5.95	147.18
Half a mile northeast of crossing Janvier's fork of Salt river, coming in from the right, unites with the main stream.		
To west branch of Salt river.....	4.83	152.01
Good grass Valley at this point about four miles wide; road runs along valley.		
To Smoky creek, (mouth of cañon).....	6.47	158.48
Road crosses creek and enters cañon, which is one and a fourth mile long.		
To Red Willow creek.....	2.00	160.48
You will find good grass in the bottom.		
To Salt Bottom.....	3.00	163.48
Surface of ground in many places white with pure and excellent salt. A good laying up place to salt your stock. Water clear and fresh; grass very fine. Here the road leaves valley and ascends bench, crossing several spring branches, keeping, however, the general direction of the valley.		
To Kinni-Kinnike reek cañon.....	4.00	167.48
Cañon one mile long, cross creek twice. After crossing seven spring branches and two small creeks you come—		
To Noon creek.....	3.08	170.56
You then cross two spring branches and come—		
To Flat Valley creek.....	2.43	172.99
Large valley of fine grass.		
Crossing of another creek.....	1.75	174.74
Good grass all the way—		
To Large Grass valley.....	2.23	176.97
In which is a lake several miles long. You travel up valley, on edge of lake, crossing two sloughs. At end of valley you come—		
To a creek.....	10.27	187.24
Which is a branch of Otter Spring creek. Fine grass.		
To Otter Spring creek.....	1.38	188.62
Good grass.		
To spring in valley.....	7.85	196.47
Water brackish; good grass.		

SCHEDULE—Continued.

	Intermediate distances.	Total number of miles.
To branch of Blackfoot.....	.87	197.34
Good grass.		
To Blackfoot river.....	1.85	199.19
Crossing good; fine grass. You leave river here to right.		
To Granite creek.....	3.53	202.72
Good grass; willows on creek.		
To crossing of creek.....	1.30	204.02
To point where road leaves Blackfoot river.....	4.79	208.81
To Thistle creek.....	1.82	210.63
One mile to right a small grove of aspen timber; grass good. Road crosses two small creeks.		
To head of Portneuf river.....	4.89	215.52
Aspen grove and good grass at crossing.		
To road from Soda Springs.....	1.24	216.76
To entrance of cañon.....	1.12	217.88
Spring branch runs through this cañon, which is three-fourths of a mile long; grass good.		
To small stream coming in from the left.....	.89	218.77
To two small streams emptying into Ross' fork.....	9.76	228.52
Fine grass.		
To Emigrant road.....	.94	229.46
Thence follow old Emigrant road, and in one-eighth of a mile cross a small branch. Road level.		
To Ross' Fork.....	1.47	230.93
Cross creek and enter cañon, which is about one and a half mile long		
To Snake River valley and fork of roads.....	11.18	242.11
You take right hand road to Fort Hall, and the left to bridge on Ross' Fork. The latter is the main or short road.		
To bridge on Ross' Fork.....	2.38	244.49
Good grass. Road good.		
To bridge on Portneuf river.....	8.00	252.49
Fort Hall is in sight from this point, Portneuf mountains to left. Fine grass, but little timber in valley.		
To stream in Portneuf valley.....	.23	252.72
To slough in Portneuf valley.....	.42	253.14
To road from Fort Hall.....	.60	253.74
To Fort Hall and Salt Lake road.....	5.16	258.90
Road from bridge on Ross' Fork lies over a very level country, sometimes in valleys, but principally on bench land. Willows and grass on creek.		
To Pannack river.....	6.50	263.39
Good grass.		
To Irvin's old fort.....	4.36	267.75
To Big Spring.....	6.99	274.74
At all the above points you touch Snake river. This spring is about thirty feet in breadth, and is formed of innumerable small ones.		
To American falls of Snake river.....	1.93	276.67
You keep along river, and one mile on cross a steep ravine. Timber.		
To crossing of creek.....	3.33	280.00
To crossing of creek.....	1.66	281.66
To ravine.....	.83	282.49
Rocky island opposite mouth of ravine. Fine grass; some pine timber. Within the next three miles you cross three ravines with timber and grass.		

	Intermediate distances.	Total number of miles.
To crossing of creek	5.79	288.28
Timber and grass. You cross a ravine in half a mile.	2.91	291.19
To Fall creek	2.03	293.22
Steep bank on west side. Timber and grass.	6.16	299.38
Leaving Snake River bottom to right.		
To Raft Creek crossing	3.60	302.98
Good grass; willows for fuel.		
To second crossing of Raft creek	11.11	314.09
Good grass.		
To third crossing of Raft creek	8.81	322.90
Good grass.		
To forks of road	3.50	326.40
Junction of this road and Hedspeith's cut-off.		
To crossing of small stream	2.84	329.24
Road crosses two small streams within the next half mile.		
To fork of Raft creek	10.74	339.98
Good grass; willows for fuel.		
To crossing of creek	2.00	341.98
Good grass; no timber.	2.33	344.31
To crossing of small creek		
To entrance of Rocky cañon	1.23	345.54
Cañon three-fourths of a mile long.		
To City rocks		
Good grass and camp ground on small Spring branch. Thence the usual route to California.		

Table of distances from Fort Leavenworth to Gilbert's station at the South Pass, (last crossing of the Sweetwater river.)

	Intermediate distances.
From Fort Leavenworth to Fort Kearney	294
From Fort Kearney to Fort Laramie	335
From Fort Laramie to Gilbert's station, (South Pass)	270
Total number of miles	899

The following extracts from my report of last year, when chief engineer, made to W. M. F. Magraw, superintendent, on his arrival at the South Pass, presented the subject of location, as I was then able to weigh it:

"Sixteen mountain passes have been explored, the topography of the Northern Wahsatch mountain chain thoroughly defined, and several practicable wagon routes discovered, with very important cut-offs and connexions. * * * Of these wagon routes the two principal ones are a southern and a northern line, at the extreme verge of the limits of explorations named by the department. * * * Of the two main routes either can be built within the limits of the amount appropriated by the department for the work of this division. To either of them, therefore, may be applied the word practicable;" both of them cannot be built for the amount of the appropriation. The act of Congress, as interpreted by the department, is "to construct a wagon road from the South Pass to City Rocks, on the shortest practicable route." The shortest practicable route is the southernmost of these two main lines, and is seven days nearer travel to the City Rocks than any of the old emigrant trails. That it is the shortest practicable route is the engineering deduction; but that it is the best route for an emigrant road is denied by many of the most experienced traders and employes of overland trains, to whom I have described its facilities and disadvantages. The northern route, on the contrary, is but a few days travel shorter than the present emigrant roads, but is so abundantly furnished with grass, timber, and pure water, with mountain streams abounding with fish, plains thronged with game, and so avoids the deleterious alkaline deposits of the south that it may be described as furnishing all that has been so long sought for through this section of the country—an excellent and healthy emigrant road, over which individuals of small means may move their families and herds of stock to the Pacific coast in a single season, without loss.

"This northern route also passes in the vicinity of what, in my own belief, will prove to be the very best northern railroad line across the continent, when all routes are properly located and surveyed by practical building engineers of such experience in all varieties of construction, of deterioration and wear of way, as to comprehend the contingencies and requirements of the interesting problem of a railroad through 2,000 miles of uninhabited country.

"In the choice between these routes, beyond the engineering presentation of surfaces, acclivities and distances, the word practicable is susceptible of many definitions; for in some measure repeating conclusions, a straight or the shortest route may be practicable for the passage of emigrant wagon trains, but sparsely grassed, and one which would not be selected by emigrants, if built by the department. It may mean a short line as a mail route of easy grades, and if supplied with forage stations suited to the rapid transit of mule and horse teams—a route, too, to be easily supplied with these forage stations from its passing in the vicinity of the Salt Lake settlements—this would mean

64 the southern route. Here stands, too, the definite interpretation of the act of Congress by the department: 'The shortest practicable route from the South Pass to City Rocks.' No one can deny that the southern route is the shortest; it is highly practicable; it is the cheapest: for, by access to the Utah populations, it can be more quickly and advantageously built than the northern, or in fact than any other, and in proportion to its length is as well supplied with grass and water as either of the old emigrant roads. Even if the projectors of the wagon road bill advocated it as an aid to the overland emigration, and if for this purpose we should more properly select an excellent roadway of détour, abundantly furnished with wood, water, and grass, and presenting no natural obstructions which cannot be removed within the limits of the appropriation, and one particularly adapted to the great claims of the ox-team emigration, that class of population yearly flooding the great plains, and adding so much to the strength and prosperity of our Pacific possessions, yet we are not called upon to go so far behind our instructions, or to assume responsibilities not necessary to be borne."

The result of this communication was that I was instructed to go to Washington and confer with you on these subjects. You directed me to build the northern route, and it has been constructed the present season.

A review of the statements of my last year's report now becomes necessary. During my absence important changes appear to have taken place in the views which have led to the passage of appropriations for constructing emigrant wagon roads. If it is to be held that the new road is to be used as a winter mail route across the continent, then it is not properly placed. It is especially and emphatically an emigrant road, so located as to avoid the tolls of bridges, alkali plains, and deleterious and poisonous waters, and to furnish fuel, water, and grass to the ox-team emigration. And it is neither the very shortest nor the very best which would be selected for a winter route in the vicinity of the same parallel of latitude. The overland emigrants reach the mountain sections in the latter part of July, and pass over the adjacent sand plains during July and August. The chief difficulties and obstacles which they encounter arise from the extreme dryness and heat of the artemisian deserts. The passage of the line as located nearer to the base of the snow-capped mountains, in a more elevated region, richly grassed, and along the great summer trails of the Indians, is favorable to their health, the preservation of their stock, and gives them abundance of pasturage, with water at short intervals from mountain streams. These very streams, stocked with mountain trout, soon disappear, or become stagnant pools, after reaching the sand plains. A railroad from the South Pass toward the Pacific could make the passage of these sand plains over a more level country, or by détour would pass toward the north of the valley of Snake river by much lower passes than those which have been adopted for the wagon road, and it would encounter only one, and that one the very lowest of the Wahsatch mountain ranges, at a point where it breaks down into low foot hills, offering no obstacle to the favorable passage of a railroad line which could be built without a tunnel. The wagon road, on the

contrary, although not at a long distance from this line, has been carried along the base of the higher ranges, and over a country of easy slopes, but at greater elevation above the sea. As to mail facilities, a very excellent mail route—probably the best in that region of country, permitting a short connecting line with Oregon and Washington, through Salmon River valley, avoiding the Snow mountains—can be obtained north of the Wind River ranges to the great valley of the Snake, by a pass which is travelled in the winter by the Indians and mountaineers. A very good one also exists by the old emigrant wagon road. A third is that described in my last season's report, as above quoted, extending to Cache valley. This southern or Cache valley route would connect with the new line from Bridger's Pass, constructed by Captain Simpson, of the War Department, and is also much more direct towards California than any other route from the South Pass, north of the Great Salt Lake. The line explored the present year by Mr. Wagner, in completing my engineering work of last season, would connect with this southern route into Cache valley, and I have already received your instructions to build it with the tools and appliances remaining of this year's expedition. But if the Bridger's Pass road is found to be practicable, that is, supplied with water and grass, during July and August, for the passage of a large emigration, then the construction of this main southern route by Slate creek would enable the emigration to avoid the passage of the farms of the Mormon population, except at Cache valley, and relieve them from the great want of grass experienced by their trains in the vicinity of Salt Lake City. But from the Old South Pass road it would not prevent the emigration from travelling that terrible range of country extending from the South Pass to Slate creek; nor would it save them from the ferries of Green river and two crossings of Bear river, either by bridges or ferries. I can only say, therefore, that, although in reality a better road for an overland mail than the one which I have just completed, it is not so good for an overland emigration, unless that emigration takes the route by Bridger's Pass.

The question as to whether the emigration will prefer the Bridger's Pass route must be solved by knowledge of the grass and water on it late in the season. There is always water enough in the early spring, or before the emigration arrives, at the mountains in the small lakes and pools made by the melted snow.

RESOURCES OF THE COUNTRY.

All of the large valleys in the vicinity of the South Pass are suitable for grazing purposes, and many of them adapted for settlements. The elevation of this range of country has not prevented its occupation by the Mormons. Crops of wheat have been raised on the emigrant road at various points, even at so great an elevation above the sea as Independence Rock. On the headwaters of the Snake and Blackfoot rivers enormous crops of wheat and barley have been raised. The country in the more elevated ranges is very fertile, and the condition of the oxen, mules, and American horses of the wagon road expedition after their severe service of the season, the sale of these oxen at cost in Salt Lake City, and the successful return of the mules to the States,

are sufficient guarantees of the value of these mountains as grazing regions. The country has been improved by the Mormon population so far north as the valley of the Salmon river. Farms extend through Malade valley, and are considered very productive. The eastern Shoshonee or Wash-i-kee band of the Snake Indians and the Pannack of Snake River valley are adverse to communication with the Mormons, and will not permit them to settle upon their lands, at least at the present time. The Pannack tribe have repeatedly killed Mormon farmers and driven off their stock. The encouragement for the settlement of the country west of the South Pass, in the vicinity of the new road, either by the Mormons or by a Gentile population, would be of great service to the overland emigration. The new road touches only the northern extremity of the Mormon settlements at Blackfoot river, a tributary of the Snake, where, as previously stated, large crops of wheat are raised, but where a mill has not yet been erected. The new cut-off road which you have directed me to build into Cache valley, designated upon the plan by line II, will, however, pass near the Mormon farms, where flour can undoubtedly be purchased at low rates, and where the country is not yet so much taken up as to interfere with grazing facilities for the emigration. Nearly all this region is very heavily wooded, and the excellent pine and fir timber are so situated as to be easily transported by water. All the great tributaries of upper Green river have their sources in the foot-hills of the Wind River and Wahsatch mountains, and are heavily timbered with yellow pine. All the tributaries of the upper Snake river are likewise heavily timbered adjacent to the road. Should a railroad ever pass towards Salt Lake City, either by the Bridger's or by the South Pass of the Rocky mountains, this timber could be delivered on the line with great facility and at low cost. It can be furnished with equal facility in the passage of a railroad from the South Pass to the waters of the Snake river, and thence to the head of the Humboldt towards California, and by a branch road by the way of Salmon river, or the valley of the Great Snake, towards Oregon and Puget's Sound. In fact, if a forked road was built from any point near the South Pass, north of it or south of it, having termini at Puget's Sound and the Bay of San Francisco, no apprehension need exist regarding supplies of timber and fuel for the line for any number of years, either east or west, from these dense forests. Large quantities of excellent bituminous coal were discovered at distances of eighty and one hundred miles west of the South Pass. Supplies of coal were also discovered on Wind river. The quantity of mineral tar which exists in the vicinity of Wind river, known by mountaineers as the Oil springs, a variety of asphaltum or petroleum, would also greatly facilitate the working of a railroad. This substance is readily converted, by a simple chemical process, into lubricating oil, and the mere article of oil is a costly item of the running expenses of railroads. Excellent iron ore exists thirty miles north of the South Pass, and has been found in the mountains of the Great Basin, further south.

THE MORMONS.

In a previous report I informed you that on reaching St. Louis I was led to increase the size of the expedition from intelligence of the intentions of the Mormon population. This was prior to the departure of the Utah commissioners. I felt justified in this course from my own knowledge of this singular people and their peculiarities. The passage up the Platte and into the mountains was made without any difficulty whatever, so far as the Utah population was concerned. John Justus, my messenger to Salt Lake City to procure men, was enabled to proceed in the business of hiring them without interruption immediately on the arrival of Colonel Johnston's command. The greater part of the Mormons, however, who worked upon the wagon road came up after their return from the south, whither they had followed their leader, Brigham Young. I gave Mr. Justus particular instructions to ask no assistance from the influence of the leaders of the church in obtaining men, but to go openly among the people and state to them my intention to give them employment, without reference to their religion, citizenship, or nationality. Some of the Mormon bishops told members of the church that they would be turned out of it if they went to work for the United States government; at least I was so informed by these very men who, notwithstanding this caution, came up and aided in building the wagon road. I was assured by Ex-Governor Young, whom I visited while in Salt Lake City, that this was not the case, and that he would be very glad to have his people employed by me, not only because the work was one of public utility, but because it aided the people in getting a little money for the purchase of groceries and what they term "settlement supplies." The Mormons who worked upon the wagon road were very much pleased with their engagement, and returned to the city comfortably clad from the stock of clothing which had been taken to the mountains by the expedition. The existence of this Mormon population, and the supplies they are enabled to furnish, is a most important matter in making estimates for any public work to be carried on in that section of the country. They are very excellent laborers, many of them Cornish miners, who understand all sorts of ledge work, masonry, &c. The majority of the lower classes are trained in the use of implements of excavation, from the amount of picking and digging which is required in the building of the great irrigating ditches, and in the erection of the earth and rock fences by which the farms of the country are separated. They will prove of remarkable service should the proposed line of the Pacific railroad pass anywhere in the vicinity of their settlements. I paid them a dollar a day for work, but the next season I shall probably have to pay them at higher rates. Ex Governor Young told me that he would engage to find laborers and mechanics to build that portion of a Pacific railroad which should extend across the Territory of Utah. The Mormons are very anxious that a part of the appropriation for the building of a wagon road through the South Pass may be devoted to bringing the road in the vicinity of their city; and they assured me that if the road could be

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emigration would visit them for such supplies as could be purchased there. Governor Cumming also spoke to me in reference to the same matter, and I replied to him in writing, (the letter, I think, has since reached your department.) I have referred to this subject of carrying the road near the city in my remarks upon location. It would more properly be done as connected with the new road through Bridger's Pass. The measure suggested would undoubtedly prove of great service to the Mormon population, for much of the emigration, as is stated, does certainly pass through Salt Lake City, some of it wintering there.

THE INDIANS.

No difficulty occurred with Indians on the way up the Platte; a small party of horse thieves, supposed to be Pawnees, entered the camp during the night, about 25 miles east from Fort Kearney; they were fired upon by the guard, took to the water and crossed the Platte river. The Sioux also visited the camps, and were treated with hospitality and kindness.

After leaving the South Pass, on my passage west, with an advanced party, I met the whole of the great tribe of the eastern Shoshonees, under the direction of the celebrated Wash-i-kee. They were on their annual hunt near the headwaters of the Green river, surrounding antelope. The Indian presents which I had proposed taking to this tribe were then behind me in the train of S. E. Ward. Having with me a very fine herding horse, I presented him to the chief, and talked with him upon the subject which brought me to the country. Wash-i-kee's reply to what I said to him was very characteristic. He remarked, "that it was never the intention of the Shoshonee tribe, at least his portion of it, to fight the whites; that he had himself been fired upon by emigrants, but had always taught his young men that a war with the 'Great Father' would be disastrous to them. He said, before the emigrants passed through his country, buffalo, elk, and antelope could be seen upon all the hills; now, when he looked for game, he saw only wagons with white tops and men riding upon their horses; that his people were very poor, and had fallen back into the valleys of the mountains to dig roots and get meat for their little ones. They did not complain, however, for they knew they could not conquer the whites or drive them out of the country. He said he did not even propose to fight, notwithstanding the building of this new road would destroy many of their root grounds and drive off their game. Other Indians had told him that if he killed some whites the 'Great Father' would then send him a great many presents to keep him from killing any more. He wished me, however, to say to the 'Great Father' that his people were waiting to hear from him; that they did not stand with open hands that he might give them presents, but they hoped he would be just and treat the Snakes as if they were really his children, as the white men had so often told him he would do."

I told this heroic and manly chief, known among the mountaineers

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much from the American government as if he endeavored to compel gifts by force of arms; that his course in the Mormon difficulty was worthy of admiration; his refusing to take part with or against the Mormons was sufficient proof that he did not desire war to the prejudice of any of the white people, and only wished properly to represent his tribe. I promised him nothing, because, if I failed to fulfil that promise, I should excite every feeling of a cruel and vindictive nature to its extreme of enmity. Although the Snakes or Shoshonees have probably suffered more than any other tribe from the passage of emigration along the narrow valleys of their rivers, driving out their game, it is a peculiar and very remarkable fact that they have hitherto received nothing in the way of presents from the American government, while the Sioux and Cheyennes, whose broad plains are stocked with buffalo, have been paid annuities for many years. A sum of from \$2,000 to \$5,000 might properly be used in this connexion with great advantage to the overland emigration, and perhaps to the prevention of one of those desolating Indian wars which have cost the government so much trouble and expense. A war once commenced may be considered as never closed; for the relatives of warriors killed will invariably, whatever may be the disposition of the chiefs of the tribe, cut off lone parties of emigrants and single men. It is part of the nature and religion of an Indian to take blood for blood; and although naturally cowardly, greater risks have been encountered by them for the purpose of making this sort of retaliation than is often attempted in the wars of more civilized nations. Although Wash-i-kee declares his intentions to be friendly, the Snakes will be much injured by the passage of the new road by emigrants. The following extracts from Mr. Miller's report are worthy of note:

SOUTH PASS, November 8, 1858.

The Snakes are wintering on Wind river, and the last accounts from them say they are in a starving condition; they are at war with the Crows, and are afraid to go out to hunt for game. On the 27th of October they had a battle with a party of Crows, and killed ten. Wash-i-kee is very much dissatisfied with the Crow agent, and says if Uncle Sam does not do better by him he will let his band steal from the whites all they wish. He says they are cheated every year. The Pannacks have burned Fort Thompson to the ground; they are wintering with Wash-i-kee.

The new road in many instances follows the summer and fall trail of the Shoshonee tribe. The animals of the emigrants will destroy the grass in the valleys where the Indians have kept the pine timber and willows burnt out for years as halting places in going and coming from their great annual buffalo hunts, and I believe, even beyond the mere question of policy, that it would be a very unjust and cruel course of action for the government to pursue should we take the use of their lands without reimbursement to the tribe.

After passing the Shoshonee or eastern Snake tribe I entered the country of the Pannacks, a very dangerous, cruel, and vindictive race, intermarried with the Shoshonees, speaking a language closely simi-

lar, but with no regularly constituted chief, and only respecting the great Wash-i-kee, and sometimes joining his tribe in their excursions to the buffalo country east of the Rocky mountain range, or in wars against the Crows. The Pannacks hold the whole country from Blackfoot creek towards Fort Boisé, and extend north to the northern Snakes, or "Sheep-Eaters." After my working parties were placed in the main Wahsatch mountain range, being with Peter Gabriel, the mountaineer, some days' travel in advance of the pioneer train, laying out the road, I fell in with one of the outlying parties of the Pannack tribe. Both myself and my comrade could use the language of signs remarkably well, but neither could speak the Shoshonee or Pannack language well. The Pannacks had recently killed many Mormons and stolen their stock. It was a position of extremity with us, for a council of war was held, in which we were not permitted to join. The medicine pipe was smoked, and a discussion took place as to whether we should be killed or not, the Indians believing us to be Mormons. While the chief and the leading men were holding council I approached them, and, taking the pipe from the hand of the last smoker, smoked it myself, and told them, by the language of signs, that I had come a long way to see them, but that I could only hold a talk at my own camp, which was three days' ride back. At this time the women and the young men came forward, crying with loud voices, in the Shoshonee or Pannack language, "Shoot, shoot! they are Mormons." The nominal chief of this party, however, who is a temperate and quiet man, said that we had visited them in their camp, and that he and six of his best warriors would go with us and hear more; that we might possibly be Americans, and that, although his heart was very bad against the Mormons, he loved the children of his "Great Father," and should not permit any harm to come to them within the borders of his camp. He set out some roots and boiled antelope flesh, of which we partook. The same afternoon the chief, with six of his warriors, joined us and rode for three days to the main camp of my party, on the head of Beaver creek. Before reaching the camp I despatched Peter Gabriel in advance, who brought back "Shoshonee Aleck," a half-breed now in the service of Mr. Campbell at Salt Lake, an interpreter and reliable man. After his arrival the Indians were satisfied as to my character and my business in the country.

Staying one day at our camp, I returned to the tribe, made them a few trifling presents, and obtained their good wishes for the success of our enterprise by stating that the "Great Father" would not probably destroy their hunting and root grounds by the passage of an emigration without paying something to reimburse to them the extreme loss which they must thereby sustain. These Indians are very much under the influence of a celebrated prophet of the western Snake tribe, who reside in the vicinity of the old Hudson Bay trading post of Fort Boisé. Should I receive your instruction to do so, during the next season I desire very much to visit this noted prophet and confer with him through a good interpreter. He is a man of great influence among these dangerous tribes west of the Wahsatch mountain range, and perhaps this influence may be gained in behalf of the whites. I

consider him one of the most dangerous and desperate men now living west of the Rocky mountains, for the Indians have a superstitious reverence for him. He is extremely hostile to the Mormons. This noted partisan was the chief cause of the expedition against the Mormon settlement of Salmon river, which was attacked by the Pannacks and the Snakes on their learning that the American government had commenced war upon the Mormons of Salt Lake. Under the direction of this man the Pannack and a portion of the western Snake or Shoshonee tribe attacked the Mormon fort, killed many of the settlers on Salmon river, drove off all their stock, and broke up this settlement entirely. The most direct route from the South Pass to Oregon and Puget's Sound being through the Salmon river settlements, the advantage to emigrants from the fact that flour can be purchased there at low rates is one which cannot very well be surrendered, and any treaty or arrangement which could be made with this wild tribe, permitting the Mormons once more to occupy their fort and farms on Salmon river, would redound to the interests of the country. It is believed by the most reliable men in the mountains that, in the present unsettled state of the Pannack tribe, the first small emigrant trains which pass from Fort Hall towards Oregon will inevitably be attacked by both the Pannacks and the western Snakes. Even during my visit to this tribe information was brought to me that some young warriors had stolen several mules from a Mormon train which had come up to Fort Hall with provisions for the mountaineers there. I employed Ten-toi, a celebrated young Indian who was of service to my party last year, and was mentioned in my report to you, to endeavor to find these robbers, and, if he were successful in securing the mules, again to give them up to Mr. Campbell, whom I left behind, that he might take them to Salt Lake and return them to their Mormon owners. Ten-toi is a man of great influence in the country as a successful warrior, having distinguished himself in wars against the Blackfeet. He is not, however, a chieftain. An Indian known by the name of Le-Grand-Coquin, (The Great Rogue,) a term applied to him by the French half-breeds from his former horse-stealing proclivities, is the leading man among the Pannacks in the vicinity of Fort Hall or adjacent to our own line of road. I consider the Pannack and western Snake or Shoshonee tribes the most dangerous of all the Indians whom I have ever visited. I do not think the term "treacherous," as usually applied to Indian tribes, is always just. We can hardly say that a tribe is treacherous which definitely asserts, through its chief, that it will not permit the passage of white men through their country. It has been in the most manly and direct manner that these Indians have said that if emigrants, as has usually been the case, shoot members of their tribes, they will kill them when they can. They undoubtedly use all the means and appliances of Indian warfare, and, as barbarians, torture their prisoners; but if met with the true spirit of American energy, with kindness and justice, there is no difficulty whatever in approaching and subduing the worst elements of the Indian character; that is my opinion, after an experience of several years among them.

The western Shoshonees, termed by mountaineers the Sho-sho-kos,

They are a very dangerous and warlike tribe. It is a well known fact that the western Shoshonees, of Humboldt River and Goose Creek mountains, have sometimes ventured to attack an equal number of overland emigrants. They fight with the utmost determination, and, with the advantages which Indians inevitably procure in assailing whites, have often been successful in the destruction of small parties of our overland emigrants. They generally assail them from the willows of Humboldt River valley. When I heard that these Indians had broken out into hostilities, had stopped the United States mail, and killed some of the emigrants who were, in small parties, endeavoring to reach California from Salt Lake City, I thought it proper to visit them, taking with me "Shoshonee Aleck," the interpreter, my engineers, Messrs. Wagner, Long, and Poor, Mr. Campbell, and the mountaineers Justus, Gabriel, and Williamson. On my way I procured the services of a leading warrior of the Pannack tribe, and by his kindness and discretion I was enabled first to obtain an interview with ten warriors, an outlying party of the band of Po-co-ta-ro or the "White Plume." The leader of these ten warriors told me that he would visit Po-co-ta-ro's camp in the mountains, but that the chief's heart was bad, and that he would listen to soft words from the whites. I sent by this messenger a few small presents to Po-co-ta-ro, inviting him to come to me and have a talk. He came with fifty-five mounted warriors, and treated me and my small party with the utmost respect and consideration. I have to place on record before your department the simple fact that this young chief, known to be hostile to the whites, received me with an attention which I have seldom known manifested by the wild tribes of the interior whom I have repeatedly met, from the very fact that I had thrown myself on his hospitality and kindness, without an escort or a large amount of presents, with full faith in the better attributes of the Indian nature. He said to me his tribe had received what he termed in the Indian language, so far as I reach the interpretation, "assaults of ignominy" from the white emigrants on their way to California; that one of his principal men had had his squaw and his children killed by the emigrants quite recently; that the hearts of his people were very bad against the whites; that there were some things that he could not manage, and among them were the bad thoughts of his young men towards the whites on account of the deeds of the whites towards his tribe. Many of the relatives of his young men had been killed, and nothing but the death of white men could atone for this; nevertheless, I had come to him like a man, and he would meet me like a man; that his father, "Big-um," (referring to Brigham Young, of the Mormon population,) had sent to him many presents, but he knew, for all that, that there was a greater man than Big-um, the Great Father of the whites, before whom Big-um was as a little finger to the whole hand; and much frightened, Big-um, with all his warriors, had run away towards the south when the blue caps, or soldiers, the bands of the White Father, came in sight; therefore, he knew and respected the power of the White Father, and that whenever he should feel certain that the White Father would treat him as well as Big-um did, then he would be the kindest friend to the

Americans that they had ever known. I told this chief that if after the conclusion of the present year I heard good accounts of him and his people, I would endeavor to bring to him full proof of the estimation of the Great Father of the whites, when I came to see him the succeeding season. The whole conclusion of this statement in reference to the western Shoshokos or Snakes is, that either out of a portion of the wagon road appropriation, or by the action of Congress, or from the contingent fund, as in your own view most expedient, a sum of money should be devoted to the purchase of presents to be donated to these Indians on my going into their country, that I may once more visit them and bring home to their uncultivated but stern and true natural minds, the fact that the disposition of this government is not to oppress or harass them, but to gain their confidence and win their friendship towards that nomadic population which must inevitably pass through their tribes on its way to California and Oregon.

The sum of \$10,000, covering presents and cost of transportation, would undoubtedly keep these tribes quiet. If no means are furnished, I think the expedition should move as an armed body; and, west of Fort Hall, detached parties never consist of less than twenty men; our side reconnaissances would be very limited, and cost much more than has hitherto been expended on them; and the whole work of next summer be carried on under the embarrassments which must inevitably occur. As to the emigration, the Indians often approach small trains and ask for food or presents, sometimes endeavoring to frighten the emigrants into giving them these articles. The emigrants resist, and often fire upon the Indians. Blood once shed, the next party of emigrants is almost sure to be attacked. During the season of emigration the whole trail is like a travelled highway—thousands of passengers being always on the road. Small parties of one or two men are passing and repassing in search of lost cattle and in visiting trains. They are necessarily very much exposed, and, in event of difficulty, are sure to be cut off, even when the tribes are not at open war with the whites. Should such an arrangement as I have proposed be made with these western Indians, (I refer particularly to both the Oregon and California roads,) as has been made with the Sioux and Cheyennes, it would prevent the recurrence of these difficulties in some measure, because the older men of the tribes would impress upon the young warriors the fact that the "Great Father" had paid for the passage of the emigration through their country. The tribes to which I refer are in eastern and northern Utah and southern Oregon.*

* I learn with great solicitude from the letter of a correspondent in Salt Lake City that difficulty is apprehended with the Loose Creek or western band of Shoshonees. These Indians, as I have stated in my report, are not under the direction of Wash-i-kee. The leading chiefs amongst them have a jealousy of him. They are more properly termed the Sho-sho-kod or Digger Indians. They are the Indians visited by me with a small party. They were visited after their attack upon trains and after robbing the mails. Their good faith and kindness were manifested by the first tribe or band sending runners the whole length of Humboldt valley, a distance of 400 miles, in order that thirteen of my men, unprotected and imperfectly armed, might, on their arrival, be passed through the various bands of this tribe in safety to Honey Lake valley, the country of the western Utes. Now that the Mormon war is over, and this new road is constructed, saving to emigration the tolls of the

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Geo. L. Sites

Supr. New Wagon Road

Reports of Superintendent George L. Sites upon the Platte river, Dakota, and l'Eau qui Court wagon road, constructed under the direction of the Department of the Interior. 1857, 1858.

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DACOTA CITY, NEBRASKA TERRITORY,
July 10, 1857.

DEAR SIR: Enclosed herewith please find my report of a reconnaissance from the Platte river to Dakota City, for the wagon road from the Platte via Omaha Reserve and Dakota City to Running Water river, accompanied by a map of the survey.

The report has been hastily prepared, entering only into such details as immediately appertain to the road, so as to enable the department to give me definite instructions for my future government.

Upon the completion of the location of the road a full and complete report will be submitted.

With the permission of the department I shall bend every energy towards a completion of the construction of the bridges by the time cold weather sets in.

When the construction of the bridges shall have commenced it would add much to the convenience of the disbursing officer to have a place of deposit established at Omaha City. This would enable the employes to obtain the constitutional currency for the checks of the superintendent. At present these checks can be disposed of to local banks, for which they can obtain only a paper currency, most of which is foreign to the territory and of very doubtful value. I would suggest that the receiver of the land office at Omaha City would be a proper person with whom to deposit the funds. I had the honor of addressing a letter to the department under date of 26th ultimo, asking for a modification of my instructions, to which I would ask, respectfully, the attention of the department.

I have the honor to be, very respectfully, your obedient servant,
GEO. L. SITES,

Superintendent wagon road from Platte to Running Water.

Hon. JACOB THOMPSON,
Secretary of the Interior.

DACOTA CITY, NEBRASKA TERRITORY,
July 10, 1857.

SIR: In obedience to a clause in my instructions of the 15th of May, 1857, requiring the superintendent to "report to the department from Dakota City, upon the portion examined that far" of the route for the wagon road from the Platte river via Omaha Reserve and Dakota City to the Running Water river, I have the honor to submit the following report:

My instructions ordered me to "proceed at once to the Platte river, and with your (my) engineer make preparation for a rapid reconnaissance and survey of the proposed road, with a view to ascertain the