

PACIFIC RAILROAD SURVEYS.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

Reports of surveys, &c., of railroad routes to the Pacific ocean.

FEBRUARY 6, 1854.—Referred to the Select Committee on the subject of the Pacific railroad, and ordered to be printed.

WAR DEPARTMENT,

Washington, February 6, 1854.

SIR: The law, approved March 3, 1853, requires that the several reports of the engineers and other persons, employed to make explorations and surveys to ascertain the most practicable and economical route for a railroad from the Mississippi river to the Pacific ocean, shall be laid before Congress by the Secretary of War on, or before, the first Monday in February, 1854.

In pursuance of this requirement, I herewith transmit copies of all reports that have reached this department from the chiefs of the several parties charged with surveys under the act. From some, no information has been received in regard to the explorations intrusted to them, and the reports from the others are so partial and incomplete as not to afford the means of judging of the relative merits of the different routes, and they are only transmitted because the terms of the act render it imperative to do so.

The operations confided to each of the parties are stated in the last annual report from this department, and, as far as heard from, they have been, with one exception, successfully conducted. That exception is the party in charge of the late Captain Gunnison. This meritorious officer, while in the performance of the duty assigned him of surveying what is called in the annual report the line of the 38th parallel, and after having crossed the great water shed of the continent and conducted his survey successfully up to that point, was massacred on the 26th of October, 1853, together with thirteen of his party, including some of his principal assistants.

No official information has yet been received of the preservation of his notes and maps, and nothing is known at this department of the results of his observations, except what is contained in the meagre report received from him, which is herewith sent.

The destruction of this officer and his party has made a gap in the surveys, and will deprive this department of the materials necessary to present to Congress a full view of the subject. If Congress desire this gap to be filled up, a new appropriation will be necessary, and, to be most effective, it should be made speedily.

None of the reports received are accompanied by a full exhibition of the data upon which the opinions expressed are founded, and, therefore, they cannot be received as final or conclusive. In one of these reports, opinions are incorporated upon the practicability of certain passes, which are in conflict with the results obtained from actual observation. Such discrepancies will, no doubt, disappear in the final reports, when the chiefs of parties shall have been able to collate the various surveys of their subordinates; and it is but just to those who have been entrusted with these examinations to say, that it was not to be expected that full or exact information could be given before the parties had closed their labors in the field, and had time to assemble the work and enter into a thorough examination of the data obtained.

To facilitate a review of his work, a summary of the results and opinions reported by Governor Stevens is given in paper marked A.

The report of Lieutenant Whipple, engaged on the line of the 35th parallel, is short, and does not require a summary.

No report of operations has yet been received from Captain Pope, who is engaged in the further examination and extension of the line heretofore designated as that of the 32d parallel.

Lieutenant Parke, who, at a later date, was assigned to another part of the same line, was, at the date of his last report, making preparations to commence the explorations.

A map is projected to embrace all the reliable surveys and observations that have been made west of the Mississippi, and is now in a condition to receive the trace of each survey as it comes in; so that all the surveys that have been made, or that are making, can be presented in one connected view. It will be transmitted to Congress with the final reports, when they shall have reached this office.

The amount of the appropriation for explorations and surveys, to ascertain the best route for a railroad from the Mississippi river to the Pacific ocean, was \$150,000.

This sum was apportioned as follows:

1. For the survey of the northernmost route, as described in my annual report of December 1, 1853, in charge of Governor Stevens, \$40,000.
2. For the survey of the route designated as near the 38th parallel of latitude, in charge of the late Captain Gunnison, \$40,000.
3. For the survey of the line designated as that near the 35th parallel of latitude, in charge of Lieutenant Whipple, \$40,000.
4. For the survey of the several partial routes on the Pacific side, to connect with the two last named surveys and with the United States boundary survey, in charge of Lieutenant Williamson, \$30,000

5. The completion of the survey near the 32d parallel, already accomplished in detached parts, was directed to be undertaken with outfits to be turned over by parties who had completed their field work, and unexpended balances of appropriations applicable to military surveys, and put in charge of Lieutenant Parke and Captain Pope.

Governor Stevens had expended, on the 15th of October, 1853, the whole of the sum apportioned to the survey entrusted to him, and has asked for an additional appropriation of \$70,000, and an extension of the time for his explorations to the 30th of June, 1855.

Captain Gunnison has drawn from the treasury the sum of \$17,000; but from the report, herewith transmitted, of Lieutenant Beckwith, the assistant, who succeeded to the charge of the work, the balance of the sum placed to the credit of this survey will be mainly absorbed in sustaining the remnant of the party until it can be reinforced or brought in from the field.

Lieutenant Whipple has drawn from the treasury \$25,690 27, and the balance of the sum allotted to the survey of which he has charge will be required to complete his work.

The sum assigned to Lieutenant Williamson has been drawn from the treasury, and, his field work being completed, his outfit has been turned over to Lieutenant Parke, for the survey of which the latter officer has charge.

From the foregoing statement, it will be seen that Governor Stevens has exceeded in his expenditures the sums allotted to the survey under his charge, and made arrangements to continue his operations beyond the period contemplated by law, and though, as soon as the information reached this department, instructions (a copy of which are herewith transmitted) were dispatched requiring him to close his operations as originally directed; it will be necessary to provide for this deficit, with any other which may be found in the final settlement, and to this end I recommend that an appropriation of \$25,000 be made to cover deficiencies for the survey of the route for a railroad from the Mississippi river to the Pacific ocean.

Should it be designed to make further explorations similar to those under consideration, it would be advantageous that early action should be taken for that purpose, so that the animals and equipments now on hand should be retained, and parties that are now organized be held together, by which the expense of re-organizing would be avoided and the operations expedited.

Very respectfully, your obedient servant,

JEFFERSON DAVIS,
Secretary of War.

Hon. LINN BOYD,
Speaker of the House of Representatives.

LIST OF ACCOMPANYING PAPERS.

Survey of the northernmost route, in charge of Governor I. I. Stevens.

	Page.
Summary of results reported to the Secretary of War, marked A.	5
Report of May 27, 1853.....	7
Report of June 3, 1853.....	23
Report of June 10, 1853.....	28
Report of July 4, 1853, with sketch.....	30
Report of August 8, 1853, do.....	31
Report of September 8, 1853.....	33
Report of September 8, 1853.....	35
Report of September 8, 1853.....	36
Report of September 18, 1853, from Captain McClellan.....	37
Report of September 18, 1853.....	39
Report of December 5, 1853.....	72
Report of December 19, 1853.....	95
Letter from the Secretary of War to Governor Stevens, December 1, 1853.....	98

Survey of the route near the 38th parallel of latitude, in charge of the late Captain Gunnison.

Report of June 20, 1853.....	99
Report of August 22, 1853.....	99
Report of August 22, 1853.....	100
Report of September 20, 1853, with sketch.....	101
Report of September 23, 1853.....	103
Report of October 29, 1853, from Lieutenant E. G. Beckwith.....	103

Survey of the route near the 35th parallel of latitude, in charge of Lieutenant Whipple.

Report of July 23, 1853.....	106
Report of October 1, 1853.....	109
Report of October 29, 1853.....	109
Report of November 25, 1853.....	110

Survey of the several partial routes on the Pacific side, in charge of Lieutenant Williamson.

Report of July 9, 1853.....	113
Report of August 30, 1853.....	113
Report of November 7, 1853.....	116

Survey near the 32d parallel of latitude, in charge of Lieutenant Parke.

Report of December 20, 1853.....	117
Letter of the Secretary of War to Lieutenant Parke, December 9, 1853.....	117

I.

SURVEY OF THE NORTHERNMOST ROUTE IN CHARGE OF GOVERNOR I. I. STEVENS.

A.

Summary of results of North Pacific railroad survey, reported by Governor Stevens to the Secretary of War.

WASHINGTON CITY, January 31, 1854.

Accompanying these reports is a map sketch on a scale of $\frac{1}{600000}$ of the operations and proposed road from St. Paul to the Shayenne river, and Governor Stevens is "confident no grade will be found of more than twenty feet per mile," and "cost without equipment will not exceed \$20,000 per mile."

Another map sketch is given on a scale of $\frac{1}{1200000}$ from St. Paul to Fort Union. He says "the enclosed sketch of a railroad route certainly practicable at a cost not probably exceeding \$40,000 per mile. * * * The great key points of the country are the valley of the Moose river and the region of the Bois de Sioux." No grade is mentioned, nor profiles given, of any portion of the route.

West of Fort Union no sketches of the country have been received. The rivers along the route are reported as being very much out of place on the maps, and indeed it is impossible to trace the route definitely upon the maps in this office. No astronomical positions are given.

The nature and substance of the results obtained west of Fort Union, so far as reported, are as follows:

At Fort Benton.—Governor Stevens says "up to this point we have found the country entirely practicable. Whichever pass in the mountains is decided upon, the Milk river valley will furnish a good approach."

At St. Mary's village.—He reports that two approaches to Cadot's pass were examined, both requiring a tunnel "not exceeding a mile in length," and a grade that will not "probably exceed forty or forty-five feet per mile."

To the west, "the descent down the Hellgate river was mostly through an open valley, till the Hellgate passage is reached, where the river winds in a narrow defile, requiring for a railroad expensive sustaining walls and embankments, and probably some small tunnels to avoid short curves." "It can be turned by tunnelling a marble mountain to the south of it, or by crossing over from a tributary of the Hellgate in the open valley of the pass to the valley of the river Jocko, one of the principal southern tributaries of Clarke's fork." This was explored and a barometer profile taken; "in the absence of it, can only state it will probably furnish a practicable mode of avoiding the Hellgate defile."

Cadot's pass is reported as being "nearly 3,000 feet below the south pass," and "a much better one, both in summer and winter" A small party examined a pass in the Rocky mountains south of Cadot's

pass, and one was fitted out to examine the Maria's pass to the north of it.

The Bitter Root range, west of St. Mary's valley, are said to be impracticable.

At Olympia, December 5.—Governor Stevens reports that a route was surveyed over the Cœur d'Eleine mountains from St. Mary's to Fort Colville, but no barometer profile taken for want of an instrument. "It is probable" these mountains might be passed with a tunnel not exceeding "six or perhaps four miles without involving impracticable grades." Difficulties from snow "should be carefully investigated."

Lieutenant Donelson surveyed the general line of Clarke's fork. Governor Stevens says he "reports the route from the debouche of the Hellgate pass to the banks of the Spokane" * * as "practicable, involving no other difficulties than are usually met with in the Atlantic States, and that it will connect well with a route through the Marias pass, should a practicable one be ascertained. The grass is generally good, there having been a scarcity only two nights."

The Columbia was explored from Fort Colville to the forty-ninth parallel. Captain McClellan explored the Cascade range as far north as the forty-ninth parallel, and his examinations were connected with the others under Governor Stevens.

Governor Stevens refers to Captain McClellan's examinations, and "I apprehend no difficulty whatever in the Snoqual-me pass to the passage of a railroad; and from information I have received from old residents, particularly from Major Goldsborough, a civil engineer who has carefully examined the country, it will be an easy matter to carry it to a good harbor on the sound."

According to Captain McClellan's report of September 18, the Snoqual-me pass "is at the head of the main Yakima," some thirty-five miles north of mount Reginer. The lowest point of the divide is 3,543 feet above Vancouver. The descent to the east to Lake Katchelas, a distance in a direct line of about three and one-fourth miles, is 1,129 feet; beyond this, "there is no difficulty in the construction of a road of any kind." He did not "proceed more than a few miles beyond the divide" to the west, but as far as he went, "the valley was narrow and the descent steep." He reports the Nah-ches pass as 4,966 feet above Vancouver, and not so favorable as the other. In both passes the snow accumulates in the narrow valleys, probably 20 feet, and in the mountains, five or six feet.

Owing to the lateness of the season, the survey was to be continued to Puget sound by the line of the Columbia and Coultitz.

Governor Stevens does not mention any grade as the probable maximum from the summit of Cadot's pass to Puget sound. The extent of country adapted to cultivation, and the facilities for wood and water, are not particularly alluded to. At the date of Governor Stevens' last communication, (December 5,) the finished drawings and estimates had not been made for any portion of the work. The explorations west of the Cascade range are not terminated. The reports of those sent to gauge the snows had not been received, nor could they, and that of the party left to finish the survey of the Missouri river, and the one to run a line from St. Mary's to Fort Hall, be expected in before the first of March.

UPPER MISSISSIPPI,
Steamer Nominee, May 27, 1853.

DEAR SIR: I have the honor respectfully to inform the department, that I left Washington city on the 9th instant, stopped in New York one day to transact business, and taking the route of Lake Erie and Chicago, reached St. Louis on the 15th. I remained in St. Louis until the departure of the fur company's boat on the 21st, which carried up ten thousand rations to Fort Union, and a small party, consisting of Lieutenant Donelson, Lieutenant Mullin, Mr Graham, and six sappers and miners. Lieutenant Donelson is instructed to make the best possible survey of the Missouri, and of the country in the vicinity of Fort Union, from the White Earth to the Porcupine rivers. Whilst at St. Louis, I secured the services of Alexander Culbertson, esq., as a special agent among the Blackfeet Indians. He has lived in the country twenty years, knows by name every adult male in each tribe. He estimates the number to be from fifteen hundred to eighteen hundred lodges. I found him to be a reliable, steadfast, calm man. He joins the main party at Fort Union, and accompanies us to Fort Benton. The fur company make the trip, 400 miles, in twenty days, four mules drawing 1,600 pounds. The grasses in the Blackfeet region are exceedingly good, the country is well watered, and wagons can be taken to the very base of the mountains.

The Blackfeet tribes know all the passes in the mountains, and Mr. Culbertson assures me that we shall have no difficulty in securing the confidence and controlling the Blackfeet. With vigilance and firmness, I entertain no apprehensions whatever.

Dr. John Evans, who is entrusted with the geological reconnaissance of Oregon, under the supervision of the General Land Office, for which Congress has made a special appropriation, has accepted the position of geologist of my expedition. He will, on his way to Oregon, go through the "Mauvais Terres," exploring the routes in that interesting region, connecting it with the Missouri by two lines, leading respectively to Fort Pierre and Fort Union, and making for my exploration collections of the highest value to geological science. The topographical information which he will collect will be a great assistance in enabling me to determine the best route for my return party. Dr. Evans will place at the disposal of the expedition all his topographical notes and barometrical observations crossing the mountains, and thus, at very small expense, the expedition will derive from his labors great aid in both its direct and incidental objects.

I shall reach St. Paul's this evening, where I expect to find all the arrangements well advanced to commence the exploration, and from which place I hope to start at the furthest by the first of June. I will communicate again with the department as I leave the settlements, and will at the same time enclose a statement of expenditures up to that point.

I enclose herewith, printed copies of the instructions given in each branch of the survey. As the party was quite numerous, and each member receives copies of them, in addition to specific instructions, I had them all printed, except the paper called "General Organization of

the Expedition," as it was more economical than to be subjected to clerk hire for so great a labor.

I have the honor to be, very truly, your obedient servant,
ISAAC I. STEVENS.

HON. JEFFERSON DAVIS,
Secretary of War.

Northern Pacific Railroad Expedition.

The special object of the exploration is the determination of a railroad route from the head waters of the Mississippi river to Puget sound. In consequence of the meagreness of the information in reference to the country to be gone over, particularly in the Rocky and Cascade mountains, a general topographical survey must be had of these mountains between the 46th and 49th parallels, and of most of the intervening country, in order to determine the general course of the railroad and furnish the data to guide the civil engineers in determining the route. The operations involved are therefore as follows :

1st. *A general reconnaissance of the country.*—This reconnaissance will embrace the general features of the country, as mountain ranges and passes, windings of rivers and streams, their dividing ridges, prairies, and every thing which shall be necessary in the construction of a general map of the country passed over. The result of this examination, done by reconnoitering corps assigned to the special duty, will be to determine the most advantageous route to be pursued for the railroad, and to direct the movements of the party entrusted with locating it. It will be an important object in the general reconnaissance to determine, with all possible accuracy, the important features of the country, especially those which have a bearing upon the location and construction of the proposed railroad. Of this class are the important points of the Missouri and Columbia rivers, as the heads of steamboat and boat navigation ; the debouches of the mountain passes, both of the Cascade and Rocky mountain ranges ; and of such important points, the latitude and longitude should be determined either by the sextant and transit, or by the sextant and chronometer, as may be practicable. The observations of important objects by compass ranges should be referred either to those points whose geographical positions have been determined, or to the base line of the route.

Parties entrusted with reconnoissances and surveys will make topographical sketches of the country on the several routes pursued by them, and will, as far as practicable, be supplied with the necessary instruments for working with facility. In the lack of an odometer for measurement, such means must be made use of as are generally resorted to in similar cases, as measurement by the pace of a horse or a man, &c.

2d. *The survey and location of the railroad.* This will be along the route, resulting from the labors of the reconnoitering corps, and will embrace all the facts bearing upon the construction of the road ; particular regard being had by the reconnoitering corps, and the corps entrusted

with the location of the road, to the natural facilities for the transportation of iron, supplies, &c., which will be required for the road. Objects observed will be referred to the known points of the base line of the route, referred to hereafter. The route will be run by compass courses day by day, and measured by an odometer, and the results thus obtained, checked by the daily determination of latitude and longitude, will form the base line, to which will be referred all objects observed in the survey.

A general profile of the route will be determined by means of barometrical measurements. The altitudes of the halting places at night and noon, the tops of ridges and bottoms of valleys, and, so far as possible, the altitudes for the construction of a continuous profile, in connexion with the measurements by the odometer, will be obtained. In the crossing of rivers, the height of the banks must be noted, the depth of the water, the apparent highest water, the nature of the bottom on which the foundation for the abutments and piers must rest, the width between the banks, and all information determining the means and cost for carrying a road over the stream, should be obtained as fully as practicable. So, in smaller crossings of gullies and small streams, similar facts in reference to culverts should be obtained. In general, every thing in the character of the country passed over affecting the construction of a railroad will be noted, the estimated or determined grades, the nature of the excavation, facilities for obtaining stone, timber, and all building materials, &c., &c.

The positions of all objects noted on the route will be determined either directly by the odometer and compass, referred to the line of the route by compass bearing and estimated distance from one point, or simply sketched in, according to the importance of the object.

3d. The decisive points which must determine the location of the road are the mountain passes of the Cascade and Rocky mountain ranges; and it may occur that the location of the road between the two ranges, and for a long distance east of the Rocky mountains, must be suspended until these passes be examined and selected; and much of the general reconnoissance must be made after the selection of these mountain passes, which are the controlling points of the survey.

It is proposed to construct the following maps, embodying the geographical results of the exploration; and the efforts of reconnoitering and surveying parties will be especially directed to obtaining the best data for the construction of these maps:

A general map, scale $\frac{1}{2400000}$, from the head waters of the Mississippi river to the Pacific ocean, and from the 42d to the 56th parallel. A map in two sheets, scale $\frac{1}{1200000}$ of Washington Territory, and thence eastward to the head waters of the Mississippi:

A map, scale $\frac{1}{400000}$, Cascade range, Rocky mountains, and other critical points of the route.

Mountain passes, scale $\frac{1}{800000}$.

Working sketches, scale $\frac{1}{400000}$.

The field books are constructed so as to be convenient for reduction to the scale of the several maps above. As ruled, in small squares of about $\frac{3}{8}$ inch side, each side represents $\frac{1}{4}$ of a statute mile, scale $\frac{1}{400000}$, and it is designed that this scale should be generally used in sketch-

ing. Where necessary, however, to depart from it, the sketches should be of a scale $\frac{1}{80000}$, $\frac{1}{100000}$, $\frac{1}{800000}$, &c., the sides of the squares respectively representing $\frac{1}{32}$, $\frac{1}{16}$, $\frac{1}{2}$, statute mile, as shall be found necessary, the scale by which the sketch is made being marked on the page containing it. The direction of the magnetic meridian of the sketch (running longitudinally down the page, or taking the direction of the other sides of the square, as shall be most convenient at different times) will also be noted on each page, and the magnetic variation recorded in the field book with each day's work.

The work of the day will be made up in camp at night with ink, and will be transferred by the draughtsman to the general map, scale $\frac{1}{1200000}$.

General Organization of the Expedition.

1. The expedition is in charge of Isaac I. Stevens, governor of the Territory of Washington.

2. There will be two main parties in prosecuting the work. One party, under the immediate direction of Governor Stevens, will proceed from the Mississippi river, and surveying rapidly the intermediate country will reach as early as practicable the Rocky mountains, and examine all the passes to ascertain the most practicable one. The second party, under the command of Brevet Captain George B. McClellan, will organize at Puget's sound, or on the Columbia, and operate for a similar purpose in the Cascade range of mountains. The parties will operate in the mountains until they are thoroughly explored, or till driven away by the snow, when they will be applied, with probably a somewhat reduced organization, to the survey of the intermediate region.

To insure unity in the entire operation, Governor Stevens, as soon as the eastern party has been put to work on the Rocky mountains, will advance rapidly with a small reconnoitering force to meet Captain McClellan and arrange the entire operations.

For more full information as to the organization of the expedition and character of the survey, see the printed instructions of the Secretary of War.

3. All officers detailed on the survey are on topographical duty, and will in the field receive one dollar per day.

Lieutenant Rufus Saxton, junior, is the acting assistant quartermaster, and commissary of the expedition. His most important duty as such is, as early as practicable to cross the isthmus, and establish a depot of provisions at the Flathead village of St. Mary's, just west of the Rocky mountains, and then crossing the mountains by the Black-foot trail, meet the eastern party at Fort Benton, at the sources of the Missouri River.

5. Till he joins the main party, *Lieutenant Cuvier Grover*, will act as commissary and quartermaster for the eastern party.

6. Under the instructions of the Secretary of War, the administrative branches of the service will bear all the expenses of the army portion

of the expedition. The appropriation for the survey will be chargeable with the pay, subsistence and transportation of the civilians employed as a scientific corps and their assistants, with instruments and collections.

7. Each officer and scientific man of the expedition will keep a daily journal, noting everything worthy of observation of a general character. These journals will be deemed a part of the results of the expedition; will be turned over as a part of its archives, and will be made use of in preparing the report. This is not intended to preclude copies being taken and published by the writer, after the publication of the report and proceedings of the expedition.

8. Whilst every effort will be made to render the expedition in all its parts effective, the most rigid economy is enjoined. Transportation is not only expensive but cumbersome. Personal baggage must be reduced to the smallest practicable amount. Attendants and animals to be kept at a minimum. Great care must be taken in matters of account, particularly in the division of the expenses between the survey and administrative branches of the services.

9. The clerk and disbursing agent is *Isaac F. Osgood*. He will keep an account of books and instruments, taking receipts therefor, whenever practicable. They will be turned over to him when not wanted for further use.

10. Professor *Spencer F. Baird* is the naturalist of the expedition. The naturalists and collectors, for full information in reference to the duties, are referred to his printed notes prepared expressly for this expedition, and his printed directions prepared for the Smithsonian Institution. The collections will all be sent to him in Washington for the preparation of that portion of the report.

11. *Dr. John Evans* is the geologist of the expedition, and the geologists and collectors are referred to his printed paper for valuable suggestions in reference to that interesting and almost unexplored region in which the expedition will operate.

12. For instructions in reference to meteorological matters, see printed instructions.

13. For full information and instructions in reference to the topographical and railway survey, reference will be had to the printed instructions.

14. For magnetic and astronomical instructions, reference will be had to the written paper of the instructions.

15. Mr. Stanley is appointed the artist of the expedition. For valuable suggestions in connexion with this and other branches of the work, see a written paper prepared by him, which will serve as a basis of instructions.

16. Whilst great care will be taken to assign each man to his special and appropriate duty, all are desired to inform themselves in reference to the general objects and results of the expedition, and do all they can to forward the several special operations.

This is the more important, as parties will be frequently subdivided, and several duties thus be, of necessity, thrown upon the same individual.

ST. LOUIS, *May 21, 1853.*

MY DEAR SIR: If it would be a possible thing for you to prepare a brief popular notice of the "Mauvaises Terres," to go into my preliminary report, I shall be glad. That report I mean to send from Puget sound, about the 15th of December, and your notes I should want a month earlier.

I hope the artist will prove equal to his duties, and that with his assistance you will be able not only to make sketches of the bad lands, but a tolerable survey, which can be incorporated into our general map. You will easily connect it with the Missouri river by your two lines to Fort Pierre and Fort Union.

At Fort Union, should I leave before your arrival, I will leave word as to the two routes I shall take, with the probable time of being at Fort Benton.

I hope I shall not fail to meet you before you cross the mountains.

Truly yours,

ISAAC J. STEVENS.

Cannot you, in the form of a journal, have a notice which will answer as a preliminary notice; and I would suggest that if, at Fort Benton, you could let me have your journal, with all your sketches and topography, the artist and draughtsman of the expedition could at once prepare them, with other matter, for publication.

Mr. JOHN EVANS,
Geologist, St. Louis.

METEOROLOGICAL OBSERVATIONS.

PROGRAMME.

1. Permanent posts for one year, to be kept up for a longer period if additional appropriations are made.

2. Parties in the field to be continued six months; the permanent posts a result of their labor.

3. At permanent posts will be barometrical and hygrometrical observations; also, quantities of rain and snow will be carefully observed; also, observations as to wind and storms.

4. Parties in the field will all observe for temperature, wind, and storms. Some four, main parties, will use the barometer, and, if practicable, make observations as to rain and moisture. Aneroids to be used for detailed work.

NOTE.—The Aurora Borealis, temperature of hot springs, &c., will be carefully observed, both at posts and by field parties.

5. *Permanent posts.* 4. Main posts. 1. Puget sound. 2. Columbia barracks. 3. The Flathead village of St. Mary's. 4. Fort Benton, and three posts of second order. 5. Fort Colville or Okonogan. 6. Fort Wallah-wallah, and 7, the British trading post at the debouche of the Marias pass, and 5, winter posts. 8. In the Blackfoot trail. 9. In the Marias pass. 10. In the intermediate pass, and 11, 12, two passes in the Cascade range.

NOTE.—The above programme of posts is designed to indicate what it is desirable to accomplish. Circumstances may require changes in it and a reduction of the scale.

Instructions for meteorological observations.

NOTE.—These instructions have been drawn up by Louis Blodgett, esq., of the Smithsonian Institution, and revised and improved by Professor Henry.

En route observations.

Observe all the instruments at every halt of the party.

Observe the barometer and thermometer at every point of considerable elevation or depression, and at every point of abrupt change of climate in passing a mountain range.

Observe at some certain hour, whenever possible, and not at points, between hours. Take the temperature of large springs and streams *en route*, and of the earth, when practicable, at one foot below the surface. Measure every fall of rain during a halt, whether partial or complete, as in starting or halting during rain.

Enter all observations precisely as taken, with proper note of locality, circumstances, &c.

Special parties from a camp to determine heights must arrange hours for simultaneous barometric observations, and compute heights by the compared observations.

Measure the amounts of rain, at different heights, when it may be done in surveys.

Camp observations.

Observe all instruments in camp *hourly*, when the force is sufficient; *bi-hourly*, at the even hours, with less force; three times at 7 a. m., 2 p. m., and 9 p. m., with the least camp force.

Observe the barometer simultaneously with any party leaving camp, or known to be taking elevations near.

Camp and field observations to be made in the blank book forms. Refer to the directions on the monthly blanks.

Post observations.

Observe all the instruments at 7 a. m., 2 p. m., and 9 p. m. If a few more can be taken, observe at sunrise, 9 a. m., and 6 p. m. If sufficient force can be applied, give night observations at 12 p. m., 2 a. m., and 4 a. m. and hourly observations during the day.

Use the blank books for hourly observations, and the sheet forms for the less numbers and the monthly results.

Observe extremes of temperature and of barometer whenever they occur differing materially from the regular observations.

Instruments.

Barometers.—Use the open cistern or Alexander's barometer for a standard; the syphon and Wurdeman's, for common field work, and

the aneroid for difficult surveys only, and where great accuracy is not required. Compare all the others used with the standard, before leaving a post and on the return to the same.

Adjust the float or tangent point of the open cistern barometer carefully before each observation.

Fill the tube perfectly on taking the instrument down, by screwing up the bottom of the sack, or by inclining the tube in the Alexander's barometer. The instrument remains perfect when a small vacuum gives a clear concussion in throwing the mercury to the end of the tube.

Wurdeman's steel barometer should not be completely filled after an observation; leave a globule of mercury, as large as a rifle ball, in the short tube, to permit the expansion of the forcing it through the joints of the tube in the changes of temperature. A slight shock of the column should be felt on shaking the tube.

Adjust the aneroid barometer to the mercurial before each separate use of the aneroid, (by the screw at the back.) This form of barometer cannot be used for variations greater than one inch, or for a time beyond one day, without re-adjustment.

Suspend all barometers vertically, for observation, and read the verniers from the top or apex of the convex surface of the column of mercury.

All barometers, except the aneroid, must be carried by a man, and cannot be packed safely.

Thermometer.—Take the air temperature in the shade, and where the air circulates freely. Suspend the thermometer, and leave it a sufficient time for the purpose.

Wet bulb thermometer or hygrometer.—Coat the bulb with *very thin* cotton or linen. If it is kept constantly wet, the observation may be instantly made; if not, wait five or ten minutes after wetting it. If the air is very still, fan it, or swing it until it falls as low as it will. Eight degrees of difference shows a dry atmosphere; twelve degrees, very dry; no difference is complete saturation.

Rain guage.—Place the guage in an open space, and sink it in the earth nearly to the level of the surface when practicable, at the beginning of every rain, and measure the amount when it ceases.

One inch on the surface will measure *four* in the small part of the guage. A foot rule will give the amount, one inch deep being one-fourth or .25 on the surface; one-tenth of an inch being (.025) twenty-five thousandths. The small part of the guage full gives *three inches*; the whole guage *four and $\frac{1}{10}$ th inches*. (The guage is 6 inches across the top, three inches in the tube; the tube is 12 inches high; the whole 15 inches high; the two inner capacities as one to four.)

Measure snow as snow, and melted as water; soft snow will measure in the guage; dry snow should be caught in a box; melting as many superficial inches as the guage contains.

The general purpose of these observations should be kept in view by each observer as a guide beyond specific directions. That purpose is to make the best possible determination of heights and of the profile of the country; secondly, to get the utmost possible amount of definite knowledge relative to its climate.

The mean and extreme temperature of each particular district for each month of the year. The amount of rain and snow, and sum of rain and melted snow, for each month and each district. The contrast afforded in different districts and by the different mountain ranges. The comparison of the Pacific climates with those of the mountain valleys and the plains, and the comparison of both with those of the eastern United States.

The determination of every fact which may bear upon its topography; upon engineering in every district; upon adaptation to settlement and cultivation; and upon its general salubrity.

Memoranda in relation to Sketches in Natural History, Geology, Botany, and to views of Scenery and Natural Objects.—By J. M. STANLEY, artist of the expedition.

1st. As a general rule, all that is necessary in regard to the delineation of animals, birds, and reptiles, while on a journey, will be to make sketches of their attitudes and outlines, without going into any minute detail. This is less necessary for birds than for other mentioned reptiles, as frogs, toads, and salamanders, which ought always to be sketched while alive. Details can always best be supplied in the office. Neither is it necessary to make colored sketches, excepting of such species as are likely to fade after preservation. Birds, quadrupeds, insects, and shells will usually retain their color sufficiently. Reptiles, fishes, crustacea, and soft animals generally, and in nearly all alcoholic specimens, fade more or less, and should have sketches of color made while alive, or immediately after death. These can be made on the outlines of the natural attitude, but no care need be bestowed in details of drawings, as these will be made anew. Sometimes it will be sufficient to write on the sketch of outline the names of colors corresponding to different areas of the body.

Similar sketches of colors may be made for flowers of evanescent tints. Sketches of entire trees of the different species will be highly interesting, as communicating information otherwise indescribable.

Fossils, of course, need not be drawn, except when of such size as to prevent their being brought along. Sketches of geological formations, rock exposures, &c., may frequently be made to great advantage.

When possible, the subject of the sketch should always be brought along, and a corresponding number made to indicate the relation of the two.

2d. Sketches of Indians should be made and colored from life, with care to fidelity in complexion as well as feature.

In their games and ceremonies, it is only necessary to give their characteristic attitudes, with drawings of the implements and weapons used, and notes in detail of each ceremony represented. It is desirable that drawings of their lodges, with their historical devices, carving, &c., be made with care.

Instructions for Magnetic Observations, prepared by J. E. HILGARD, assistant U. S. Coast Survey.

A.—Observations with azimuth compass.

These observations will be made by reading the magnetic azimuth of the sun, near rising or setting, and noting the time. An observation should be taken on each limb of the sun, and the mean used. The error of the chronometer must be known by a suitable observation for time. The sun's true azimuth and resulting magnetic declination will be computed according to the printed form.

B.—Observations with the magnetometer and dip circle.

1. Observations of dip, declination, and relative horizontal intensity will be made daily, if practicable.

2. One set of observations of dip, without reversal of poles, will be made with each needle whenever time permits, and will be recorded in the printed form. At convenient stations, at intervals of four or five weeks, the connection depending on the reversal of poles will be determined by four sets of observations with reversal, with each needle. The dip circle may be placed in the magnetic meridian by means of the magnetic bearing of some object, determined by the azimuth compass.

3. Observations of declinations will be made and computed according to the form prepared for that purpose. The zero of the collimator magnet will be determined once a week by inversals. The observation of true azimuth may be made on the sun, or any star near rising or setting.

4. The observations of relative horizontal intensity will be made by vibrating one or both of the larger magnets in the vibration apparatus, and observing the time of 200 vibrations.

The largest arc of vibration should not exceed 2° ; observations of deflection, for attaining the magnetic moment of the vibrating magnets, will be made once a month, in connexion with the observations of vibration by deflecting one of the shorter magnets with the magnets used in vibrating; the observations being made and recorded strictly according to the printed form. These sets of deflections should be observed with each magnet, at distances no less than 1.5 feet from the deflected magnet.

5. The observations of horizontal intensity cannot be reduced to absolute measure, until the moments of inertia of the vibrating magnets, (with their stirrups and suspension,) designated by K in the formula, are determined. This is done by vibrating them loaded with a ring, the moment of inertia of which K is known by its dimension and weight. Both inertia rings should be used for this purpose, and at least five series of vibrations, with and without rings, should be observed with each magnet.

These observations, as well as those for the temperature, co-efficient g , may be made during the ensuing winter. They may be made in a room, and are not influenced by local attraction.

6. Great care will be observed to place the magnets in their proper positions in the cases, and not to touch them with iron or steel. The observations must be made at a distance of at least 300 paces from the wagons, to avoid the influence of the iron tires. Observers will carefully divest their clothing of all substances having magnetic attraction.

Memoranda in reference to the Natural History operations.—By S. F. BAIRD.

The general principles to be observed in making collections of natural history in a new country, or one previously unexplored, is to collect everything which may present itself, from time to time, subject to the convenience or practicability of transportation. The number of specimens to be secured will, of course, depend upon the dimensions, and the variety of form or condition caused by the different features of age, sex, or season.

Where a small part only of the specimens collected can be taken along, such species should be selected as are least likely to be procured in other localities or at other opportunities. Among these may be mentioned the reptiles, fishes, soft insects, &c.; in fact, all such as require alcohol for their preservation. Dried specimens, as skins, can be procured with less difficulty, and are likely to be brought in by persons not specially interested in scientific pursuits.

The description of various processes, to be employed in the collection and preservation of specimens of different kinds, will be found detailed at sufficient length in the "directions" published by the Smithsonian Institution, and in the Admiralty Manual of Scientific Enquiry.

In collecting specimens of any kind, it will be important to fix, with the utmost precision, the localities where found. This is especially desirable in reference to the fishes, which occupy a very intimate relation to the waters in which they live.

The smaller quadrupeds, of the size of a mouse, may be preserved entire in alcohol. Larger kinds should be skinned, and the skins thrown in alcohol, or coated inside with arsenic and dried.

The latter course may be indicated for species larger than a prairie dog or hare. The skulls of the small kinds may be left in the skins; those of the larger should be removed, taking care to attach some common mark by which they may be again brought together. Large animals of the size of a wolf and above may, for greater convenience, be skinned after the method pursued by butchers, by skinning the legs down to the toes, and cutting off at that point. The skins need not be sewed up, as is directed for the smaller kinds, but rolled up into bales, after applying an abundance of arsenic and drying.

It will be very important to procure the skeletons, and, at all events, the skulls, of all the species of animals, in sufficient numbers to include all the variations of age and sex. These may be roughly prepared by cutting off the flesh and drying in the sun.

As the expedition will pass through the breeding ground of many

species of birds whose nidification and eggs are not known, attention should be paid to securing abundant specimens of the nests and eggs. As far as possible the skin of the bird to which each set of eggs may belong should be secured, and have a mark attached common to it and the egg.

The larger snakes should be skinned, as indicated in the "directions," and as thereby they will occupy much less space than otherwise. The smaller specimens preserve entire, together with the lizards, salamanders, and small frogs. All of these that can be caught should be secured and preserved.

The head, legs, with feet, the tail, in fact the entire skin of turtles, may be preserved in alcohol; the soft parts then extracted from the shell, which is then to be washed and dried,

Every stream, and, indeed, many localities in each stream, when passable, should be explored for fishes, which are to be preserved as directed in the pamphlet. For these, as well as the other alcoholic collections, the lino bags will be indispensable.

All the alcohol used should be supplied with tartar emetic. This besides adding to its preservative powers, will remove any temptation to drinking it on the part of unscrupulous persons.

Insects can, with the exception of lepidoptera, be readily preserved in alcohol; crabs and small shells may likewise be treated in the same manner.

The specimens from each locality should be kept entirely separate. This can readily be done by means of the lino bags. The locality of the specimens may be marked with a red or black pencil on the outside, or written with ink on a piece of parchment and dropped inside. The ink should be perfectly dry before being wetted. Larger specimens may have the parchment label tied to some part without enclosure in the bags.

As the instructions contained in the "directions" are not sufficiently minute in regard to plants, it will be necessary to go here into some detail. The portfolios provided are intended to receive the plants as collected. About forty or fifty sheets of the paper should be put into the portfolio on starting out on an excursion. Put the specimens of each species in a separate sheet as fast as gathered from the plant, taking a fresh sheet for each additional species. On returning to camp, place these sheets (without changing or distributing the plants) between the brown drying papers in the press, and draw the straps tight enough to produce the requisite pressure. The next day the driers may be changed, and those previously used laid in the sun to dry. This to be continued until the plants are perfectly dry.

If paper and transportation be limited, several specimens from the same locality may be combined in the same sheet after they are dry.

Throw into each sheet a slip of paper having a number or locality written on it corresponding with a list kept in a memorandum book. Record the day of the month, locality, size, and character of the plant, color of flower, fruit, &c.

If the stem is too long, double it or cut it into lengths. Collect, if possible, half a dozen specimens of each kind. In the small specimens, collect the entire plant so as to show the root.

It will not be possible to collect minerals, fossils, and geological specimens in very great quantity of large dimensions. The fossils selected should be as perfect as possible, and especial care should be paid to procuring the bones and teeth of vertebrate animals. Of the minerals and rocks specimens as large as a hickory nut will, in most cases, be sufficient for identification.

All facts relating to the habits and peculiarities of the various species of animals should be carefully recorded in the note book, especially those having relation to the peculiarities of the season of reproduction, &c. The accounts of hunters and others should also be collected, as much valuable information may thus be secured.

The colors of the reptiles and fishes when alive should always be given.

Memorandum of apparatus for making collections in Natural History, supplied to the several parties of MAJOR I. I. STEVENS.

1. *Two leather panniers*, supplied with back strap for throwing across a mule. One of these is intended to contain the copper kettles, and their included alcohol, together with the nets and other apparatus; the other to hold the botanical apparatus, skins of animals, minerals, &c.

2. *Two copper kettles* in one of the panniers, to contain the alcohol for such specimens as require this mode of preservation, viz: reptiles, fishes, small quadrupeds, most insects, and all soft invertebrates. The alcohol, if over eighty per cent. should have one-fourth of water added.

3. *An iron wrench*, to loosen the screw caps of the copper kettles, when too tight to be managed by hand.

4. *Two India rubber bags*, one for each kettle. These are intended to be inflated inside of the kettles, and by displacing the alcohol cause it to rise to the edge of the brass cup, and thus fill the kettle. Unless this be done, and any unoccupied space thus filled up, the specimens will be washed against the sides of the vessel and much injured.

5. *Small bags made of lino*, of different sizes, and open at one end. These are intended, in the first place, to separate the specimens of different localities from each other; and, in the second place, to secure them from mutual friction, or other injury. The number or name corresponding to the locality is to be marked on the outside with red chalk, or written with ink on a slip of parchment and dropped inside. The specimens are then to be placed in the bag, a string tied around the open end, and the bag thrown into alcohol. The ink of the parchment must be dry before the slip is moistened in any way.

N. B.—Fishes and reptiles over five or six inches in length, should have a small incision made in the abdomen, to facilitate the introduction of the alcohol. Larger snakes and small quadrupeds may be skinned, and the skins placed in alcohol.

6. *Red chalk pencils*, for marking the bags.

7. *Parchment*, to serve as labels for the bags. This may also be cut into labels and fastened by strings to such specimens as are not suited for the bags.

8. *Small seines*, for catching fishes in small streams. The two ends should be fastened to brails or sticks, (hoe handles answer well,) which are taken in the hands of two persons, and the net drawn both up and down stream. Fishes may often be caught by stirring up the gravel, or small stones in a stream, and drawing the net rapidly down the current. Bushes or holes along the banks may be enclosed by the nets, and stirred so as to drive out the fishes, which usually lurk in such localities.

9. *Casting net*. This is sent only to the permanent station.

10. *Alcohol*. About five gallons to each travelling party. This should be about eighty per cent. in strength, and medicated by the addition of one ounce of tartar emetic to one gallon of alcohol, to prevent its being surreptitiously drunk.

11. *Arsenic* in two pound tea canisters. This may be applied to the moist skins of birds and quadrupeds, either dry or mixed with alcohol.

12. *Tartar Emetic*, for medicating the alcohol as above.

13. *Cotton*, for stuffing out the heads of birds and mammals. To diminish the bulk; but little should be put into the bodies of animals. The skulls of the quadrupeds had better be removed from the skins, but carefully preserved.

14. *Paper*, for wrapping up the skins of birds and small quadrupeds each separately. The paper supplied for botanical purposes will answer for this.

15. *Butcher knife, scissors, needles and thread*, for skinning and sewing up animals.

16. *Blank labels* of paper for marking localities, sex, &c., and tying to the legs of the dried skins.

17. *Portfolio* for collecting plants.

18. *Press* for drying plants between the blotting paper. Pressure is applied by straps.

19. *Very absorbent paper* for drying plants.

20. *Stiffer paper* for collecting plants in the field. The same paper to be used for wrapping skins of birds and quadrupeds, as well as minerals and fossils.

21. *Small bottles* for collecting and preserving insects.

22. *Geological hammer*,

23. *Fine shot* for birds. About No. 9, is most convenient for the purpose.

WASHINGTON, April 20, 1853.

SIR: In compliance with your request, I have the honor to submit, briefly and simply, a few suggestions for the guidance of your several corps, such as in my judgment will best serve to develop the mineral and agricultural resources of the interesting but comparatively unexplored region of country assigned to you for examination.

The best mode of effecting these objects would be, in the first place, to collect sufficient data for the construction of a geological section and map, showing the order and succession of rocks from the upper Mississippi river to the Pacific ocean. To accomplish this object, careful examination should be made of every exposure of rock in place on the

route. The dip, or inclination from the horizontal; thickness of each stratum of rock exhibited; relative position; and, so far as practicable, the lithological character noted. Where outbursts of granite or other igneous rocks occur, through the stratified rock, observe the general range of the volcanic action; also notice the direction of veins of quartz or other minerals. Specimens for analysis should be collected at all important points. Two inches by one of surface, and half an inch in thickness, will answer this purpose. Careful barometrical observation should be made, not only of the elevations, but at regular intervals, say six times a day, along the whole extent of country. The small streams and rivers afford the best opportunity for geological investigations.

In all cases where the rocks are fossiliferous, collect two or three well preserved specimens; these would better determine the age and true position of the rocks than weeks of investigation without them; one or two perfect specimens being far more valuable than a dozen that have been rubbed or fractured.

From the Sioux river to the falls of the Missouri, on both sides of the Missouri, you pass through the cretaceous and tertiary formations, perhaps as rich in fossil remains as any other region in the country, or it may be in the world.

Microscopic organic deposits, recent and fossil, are occasionally met with. These infusorial remains are sometimes found in layers of considerable thickness, and are well worthy of careful investigation. These rocks are siliceous and calcareous, usually of a yellowish tinge and somewhat friable, and have been found in the banks of the Missouri, and in the beds of several of its small tributaries. Small specimens should be collected.

All discoveries of valuable ores, or useful minerals, clays, marls, saline and chalybeate springs, &c., should be located, when practicable, by the distance and direction from some prominent geographical feature of the country, as mountain, river, &c., and specimens be collected for analysis. In connexion with this subject it is highly important that a series of observations be made on the dip and intensity of the needle, as intimately connected with the geological and mineralogical character of that region of country, and as likely to lead to results interesting to the cause of general science. Note carefully at all times whether there are such indications of valuable minerals as would render expedient a further examination.

All specimens of rocks, minerals, and fossils, should be wrapped in strong paper, with a label of the locality inside written in ink, and packed sufficiently tight, either in bags or boxes, to prevent rubbing. Crumbling fossils may be preserved by soaking them in a thin solution of glue or gum arabic.

Specimens of soil for analysis should be collected, and the subsoil noted, in prairie and bottom land, throughout the entire route; at least on every change of surface rocks, as you pass over the various geological formations, from the magnesian limestone and lower sandstone of the St. Peter's river, through the vast drift region extending to the Sioux river of the Missouri, through the various chalk marls, sandstones, plastic clays and slaty clays of the cretaceous formations, the

limestone coarse conglomerates and siliceous clays of the tertiary period, on to the comparatively fertile strip of land caused by the decomposition of the older limestones of the Rocky Mountains and the vegetable matter washed down from their various slopes, to the basaltic soils of Middle Oregon, occupying three hundred miles in extent, and, crossing the Cascade range of mountains, to the tertiary soils of Western Oregon. Each of these soils, so different in their constituents, produce different grasses, wild flowers, and trees, and are more or less adapted to various agricultural purposes. Hence the vast importance of a careful analysis of these soils in advance of the settlement of the country. Bags, made of ticking, holding from a pint to a pint and a half, are best suited to a preservation of these specimens. They should be numbered, and a corresponding number entered in the note book, with a particular description of the localities.

It will not be necessary to make geological collections, except of soils, until you reach Traverse des Sioux, as the exploring parties of Dr. Owen have already determined with sufficient accuracy the geology of that district. But after crossing the extensive drift region before alluded to (where it is only important to notice the underlying rocks) you come into the rich fossiliferous regions of the cretaceous and tertiary formations. Here it is of great importance to make careful geological sections of the rocks exposed, and to collect all the fossil remains met with, in order to determine with greater accuracy the boundary of these formations, and as far as practicable of their various members. As before stated, they extend to near the falls of the Missouri, and is the only portion of the route where it is particularly desirable that *extensive* geological collections should be made. All specimens collected in this region you are requested to deposit at Forts Union and Benton, carefully packed in boxes for shipment down the Missouri river and directed to

An interesting feature in the geology of the upper Missouri river country is the great lignite bed, commencing about latitude 47°, and showing itself at various points on the Missouri river for seven hundred miles. In this vast prairie country, almost wholly destitute of timber, it is important that the quality and extent of this coal bed be determined. Specimens, therefore, should be collected, both of the coal and the rocks associated with it.

Special attention is directed to the geological formations along the base of the Rocky Mountains, both east and west of the main range. The age of these rocks has been a matter of some doubt; and it is highly important, if any of them are fossiliferous, that collections be made.

The Bitter Root range of mountains is perhaps the most interesting portion of your route for mineralogical research. I collected here rich specimens of iron, copper, and other valuable and useful ores; and in some portions of the range the rocks bear considerable analogy to the talcose and other allied rocks of the gold-bearing regions of California.

As you proceed northward a considerable change occurs in the geological features of the country; galena, of good quality, has been found near Fort Colville, north of the British line. If these seams extend

into our own territory, it would prove a discovery of great value, and is therefore worthy of investigation.

West of the Cascade range of mountains, on the way to and from Puget sound, your parties will pass and repass through the great coal or lignite region of Washington territory. The beds are of greater thickness and better quality than have been found in the same geological formation in any other country, and may prove of great value. It is my intention to spend several months in the exploration of that section, but the incidental information obtained by your numerous corps might be of great advantage in developing the extent and value of these deposits.

Very respectfully,

JOHN EVANS,
Geologist of the Expedition.

GOV. ISAAC I. STEVENS.

CAMP PIERCE, *June 3, 1853.*

SIR: I reached St. Paul's on Friday evening last, (May 27th,) and the next morning went to the camp which had been established by Captain Gardiner, some three miles from Fort Snelling, west of the Mississippi river; and which, in honor of the President, I have named Camp Pierce.

The camp was established by Captain Gardiner on the 24th of May, the day after the arrival of the full list of mules, one hundred and seventy-two in number; and on the twenty-fifth ultimo, the whole expedition was brought together, with the exception of Mr. Stanly, the artist, Mr. Osgood, the disbursing agent, Mr. Evans, and Mr. Kendall, two aids of the expedition and myself. About one-half of the mules had never been broken, either in wagons, to pack or saddle, and the remaining half were quite wild, and required much work to prepare them for service.

In consequence of these difficulties, and there not having been engaged a sufficient number of teamsters, some delay has necessarily occurred in setting out.

Captain Gardiner and Lieutenant Grover have been indefatigable in their exertions, and considering the difficulties that have been encountered, great progress has been made.

On Tuesday, May 31st, the two civil engineers, Mr. Lander and Mr. Tiukham, were sent out with small parties to commence the survey of the railroad route. Their riding mules, as well as all the riding mules of the gentlemen of the party have been broken by themselves, with very little additional assistance, several of the younger members of the party having only succeeded in mastering their animals after having been thrown several times: Mr. Lander, the morning he set out, was thrown, and had his shoulder put out of joint. It was brought back by the main strength of three men, and he immediately set out at the head of his party.

I refer to these facts, to shew the spirit of my command, and the promise thus given that all difficulties must disappear before the har-

dihood and the resolution thus exhibited. All this has been done in the midst of drenching rains. It has rained since Tuesday till to-day.

Mr. Lander had previously made a reconnaissance of the several crossings of the Mississippi, for the details of which I will refer you to the enclosed copy of his report. I also enclose the instructions given to Mr. Lander and Mr. Tinkham, in relation to their respective duties.

To-day I sent off a small train of three wagons and twenty-four pack mules to a depot and station which I propose to establish west of the Mississippi river, near the Sauk Rapids.

The mules were the wildest of the whole number, and were packed for the first time, yet they reached their camping ground, setting out at eleven o'clock, a distance of six miles, in season to picket the animals before sundown.

To-morrow I shall send off a small train, and on Monday the whole camp will be in motion.

Proceeding with myself, and the astronomical and magnetic party, I shall take the steamer at St. Anthony and reach the depot west of the Sauk Rapids on Tuesday evening, and there establish a station, which, with the observations at this station, will connect with Nicolle's survey, and give a good base on the Mississippi river.

I shall reach the depot in season to make arrangements for the crossing the river of the whole command, and at the same time be in easy communication with Mr. Tinkham and Mr. Lander. The whole command, will, I trust, be on the west side of the Mississippi on Saturday next, June 11th, and on Monday I hope to be able to push rapidly into the interior.

Lieutenant's Du Barry and Grover, have been indefatigable in preparing themselves for their duties, practicing at all the observations and computations. They will be able, on leaving the Mississippi, to take command of sub-parties, and do in person all the observations.

Before leaving this depot, I will again communicate with the department, and state more specifically how I shall organize the several parties, particularly those under Lieutenants Du Barry and Grover.

I am very truly and respectfully, your obedient servant,

ISAAC I. STEVENS,

*Governor of Washington Territory,
in command of expedition.*

HON. JEFFERSON DAVIS,
Secretary of War, Washington, D. C.

ST. PAUL'S, *May 22, 1853.*

SIR: In receiving your instructions in regard to a reconnaissance of the Upper Mississippi for a railroad crossing, I was directed to view this subject with reference to a feasible connexion with Lake Superior; to choose a point which should not interfere with steamboat navigation, and one that would occupy a favorable position for joining the main line east.

With these quite definite instructions to guide my examinations, I

have made actual reconnaissance of the river, from St. Paul's to Fort Ripley, and beg leave to submit the following report:

At the ferry near falls of St. Anthony, at the rapids near mouth of Sauk river, at several points for two miles above these rapids, at the ferry near Swan river, and at Little Falls, I have found locations for crossing the river with a railroad bridge. The first of these, near the falls of St. Anthony, is about eight hundred (800) feet. It does not occupy so favorable a position, in regard to a connexion with Lake Superior, as either of the other points. The crossing is much greater in length, and the quantity of masonry, larger than at those further north. The cost of this masonry is excessive, from the necessity of bringing the material for construction from Sauk rapids. The distance to "Dead Colt Hillock"—a point near course of survey—is not less by this crossing than by passing over the fine gravel country east of the Mississippi to Sauk rapids. The water is deep, and the current much more swift than at any of the other points. Passing west, the country is thickly wooded, springy, entirely impassable for wagons, and inducing additional cost in grubbing and culvert masonry. I deem this crossing the least favorable of those I have examined. Eighty miles north of the falls of St. Anthony, at the head of steamboat navigation, and near the mouth of Sauk river, occur several favorable crossings, nearly similar in character. These, with the routes connected, should at some future period be subjected to a careful survey. The limited time allowed for the present examination, necessarily confining my attention to reconnaissance.

The first of these, near the mouth of Sauk river, is about five hundred (500) feet. By encountering the rapid current near the falls, excellent foundation for bridge masonry can be obtained upon the granite ledge of the section. Within two (2) miles are five other points, none exceeding six hundred (600) feet in length. The adjoining ledge furnishes granite of suitable quality for heavy masonry.

I have estimated the cost of a bridge at Sauk rapids, for a road-bed of twenty (20) feet as follows:

500 feet of Howe's truss at twenty-five (\$25) dollars.....	\$12,500
1,353 cubic yards of bridge masonry at twelve (\$12) dollars.	16,236
Repairing foundations, say.....	1,000
	<hr/>
	29,736
	<hr/>

Five miles further north, near the mouth of river Watab, occurs a crossing four hundred (400) feet in length, with excellent foundations of granite ledge. This crossing is so situated as to induce cutting of about twenty (20) feet in hard material, upon the east shore of the river; say twenty thousand yards at forty (40) cents, or \$8,000. The adjacent ledge not being of suitable quality for building, the material for masonry must be brought from Sauk rapids. The location is neither so feasible of approach, or in facility of getting west, as that at Sauk rapids, although the passage of the river is shorter, and the current not so swift.

Twenty-four miles north of Watab, near the mouth of Swan river, is

a crossing four hundred and fifty (450) feet in length. It has no advantages over those at Sauk rapids. The abutment foundations must be obtained by piling, pier foundations adjusted by coffer dam, or winter crib-work. The current is not swift, the water about eight feet in depth. Four miles north of this point, at the island near Little Falls, is a very fine crossing of three hundred and twenty-five (325) feet.

Four wing abutments and a slight increase of truss will be required from the destructible nature of the ledge foundation, which is slate rock, strongly impregnated with iron, and affected by the atmosphere. Two short bridges would be necessary—one, of one hundred and twenty-five (125) feet, crossing east branch of the river to island; thence embankment of one hundred and fifty (150) feet; thence bridge span of two hundred (200) feet, over main channel of the river. The actual width of the main channel here is one hundred and seventy-five (175) feet, and the whole crossing the best upon the Mississippi from St. Paul's to Fort Ripley. The boulders of the hillsides in this vicinity afford good granite for light masonry. The magazine at Fort Ripley is built of these boulders, but they are not abundant, neither do they furnish blocks of sufficient size for exposed bridge abutments. The material for this purpose must be brought from Sauk rapids, thirty-two miles below. The country on east side of Mississippi, from St. Paul's to Little Falls, presents facilities for railway construction I have never seen exceeded; one hundred and twenty miles of level, or slightly rolling gravel plain, supersedes all necessity for ballasting, and affords peculiar advantages for forming an embankment road-bed—the very best mode of construction for guarding against the snows and frosts of a northern climate.

Passing west from Little Falls, I find no serious difficulty to encounter over a route which had been represented to me as very severe. The country, to be sure, is broken, the ground springy, and the cost of moving material will evidently exceed that of the line east of the Mississippi. There is a greater quantity of earth to be excavated, and quite an increase in the amount of culvert masonry; still the surface presents a favorable aspect for good alignment. No cut will exceed twenty feet. There is no appearance of ledge, and by exercising some degree of care in the location an excellent route can be obtained.

I have no knowledge of this line extending beyond Long Prairie. It is represented to me as broken into sharp ridges, very swampy, and quite thickly wooded.

Summing up this matter, it seems evident that the proper course of the survey would be from St. Paul's up the eastern shore of the Mississippi to Sauk rapids, thence near the Red river trail towards headwaters of the Sauk. Sufficiently reliable information is afforded to prove to us that a very excellent route can thus be secured.

The passage of the Mississippi is made at a point that does not interfere with steamboat navigation. It affords all necessary advantages to a communication with Lake Superior, is in a favorable position as it regards an eastern connection, and will thus ensure the proper direction of capital in the location of private lines. The crossing at Little Falls is nearer a direct route from the Pacific to Lake Superior, and there-

fore worthy serious notice ; yet it is evident that the interests of private companies should not be neglected, and that those operations should be fostered which, in efforts to develop the resources of this rich inland country, will add their share to the importance of our great enterprise, and aid in bringing it to a successful termination. Passing through a country already forward in vegetation, and presenting every facility for expediting progress of survey, the route at Sauk rapids is superior to all others in the features required by your letter of instructions.

Submitting this result of my examinations, I remain, with respect, your obedient servant,

F. W. LANDER.

Gov. ISAAC I. STEVENS,
Chief N. P. R. R. Ex. Ex.

CAMP PIERCE, *May 31, 1853.*

DEAR SIR: You will immediately proceed to St. Paul's, and at once commence the survey of a railroad route, and proceed northward on the east side of the Mississippi river, crossing said river at the Sauk rapids, making a reconnaissance of the country over which you pass, and directing particularly your attention to the examination of the river crossings.

At Sauk rapids you will direct your attention to the investigation of the best method of and securing the means for the crossing of the main party, which will follow in a few days. You are authorised to employ men, secure boats, and to procure the best means to accomplish this object ; and the arrangements which you make you will communicate to me at the earliest practicable moment.

From Sauk rapids you will continue your reconnaissances of the country westward, examining the various routes. You are not confined to any specific route, but, keeping in mind the line over which the main train will pass, much is left to your own judgment.

In the map of Nicollet, accompanying this, several probable routes are laid down. One crossing the Cheyenne river but once, and passing just south of the Mina Wakan lake ; a second crossing the river twice, and passing some twenty or thirty miles south of the lake ; a third keeping at the head waters of the southern tributaries of the same river, in the general direction of Dead Colt Hillock, and north of the Coteau des Prairies. All these routes, there is reason to believe, can be pursued, and they are referred to simply to call your attention to the magnitude and extent of the work of the expedition through that region. You will endeavor to keep me advised of your movements, and may expect me to join you before you have advanced far into the interior.

You will give special attention to the several river crossings on the Red river trail, so far as it will be pursued by the main party, and will make such arrangements for the crossings as you may deem advisable.

Endeavor to replace the two teamsters sent with your wagon to-day, and send them back to camp ; send in all the good men you come

across. Engage none but hardy fellows to assist you, and such men as will be useful in the whole expedition, should their services be needed. Purchase the four-mule team at Fort Ripley, and have it at Sauk rapids for the main party, with two good teamsters.

I am, very truly, &c.,

ISAAC I. STEVENS.

F. W. LANDER, Esq.

CAMP PIERCE, *May 31, 1853.*

DEAR SIR: You have already received verbal instructions to take the field to-day and enter upon your duties as one of the associate civil engineers on the northern Pacific railroad exploration.

The general course reconnoitered by your associate, Mr. Lander, east of the Mississippi river, from St. Paul's to the crossing of the Mississippi above the Sauk rapids, will be pursued by you; and, whilst you will collect as much data in reference to the details of the construction as practicable, you will arrange the scale of it so that with your present force, with a few days' experience, to be able to make fifteen or twenty miles per day.

You will connect the camp, and the magnetic, and astronomical observations with your route; and at each camping-ground leave some mark, as a blazed tree, whereby future observations can be connected with your work. You will also note in your journal good points for camping, with brief notes as to grass, water, and wood for camp fires. Keep up the sketches with care. The variation of the needle will be furnished in season.

You will probably reach the Sauk rapids a day or two in advance of the main train, and will be able to make a rapid instrumental survey of the same. I have instructed Mr. Lander to make arrangements for the crossing at that point; and should the main body not reach you, you cross the river without delay and work westward.

Should you, on special occasions or for permanent services, find it necessary to engage more men, you are authorized to do so—recollecting that it will be necessary, so far as practicable, to reduce the scale of the work, abridging the quantity of the data, rather than to increase the force.

A written report will be required, to include the crossing of the Mississippi; and I will suggest that, so far as practicable, it be simply your journal. It seems to me, that with a brief introductory memoir, it will be just the thing that is to be desired.

Send to camp all the good men you find; we are very deficient in force.

Yours, truly,

ISAAC I. STEVENS.

A. W. TINKHAM, Esq.

CAMP DAVIS, NEAR SAUK RAPIDS,
June 10, 1853.

SIR: Having on Saturday and Sunday, June 4th and 5th, sent forward two small parties of wagons, and a party with the mountain

howitzer and 5 dragoons, I broke up my camp on Lake Amelia (Camp Pierce) on Monday, June 6th, and sent the command forward in three parties: one under Lieutenant Grover, consisting of the astronomical, magnetic, and meteorological party, were sent on the steamer that plies between St. Anthony and Sauk rapids, with directions to land on the west side of the Mississippi river, below the mouth of the Sauk river, one of its western tributaries, and crossing the ford, to establish an astronomical, magnetic, and meteorological station on the Red river trail; the second, under Lieutenant DuBarry, consisting of Mr. Stanly, the artist of the expedition, Dr. Suckley, the surgeon and naturalist, Mr. Le Frambois, the guide, a sergeant and fourteen dragoons; the third consisted of the train in charge of Mr. Everett, the quartermaster and commissary clerk. I remained in St. Anthony until about noon of Tuesday, to secure the services of several voyageurs; and particularly of Pierre Boutineau, the great guide, and Menoc, the great hunter, in which I was successful. Taking a rapid conveyance, I pushed forward forty miles the same day, passing all the parties on the road, and reached Sauk rapids, a distance of seventy miles, on Wednesday, 11 o'clock, a. m. Lieutenant Grover landed, as directed, on Tuesday evening, and being somewhat incommoded by rains, did not establish his camp till yesterday.

Yesterday afternoon I pushed forward with Boutineau, the guide, and reached the civil engineers, eighteen miles ahead, at Cold Spring; in company with whom, towards night-fall, I rode to the crossing of Sauk river and back—eight miles. One bad place near the camp has been placed in good condition. There are two other bad places in the road, which I am confident can be made practicable for wagons in a few hours; and I think the civil engineers will be beyond the river Sauk to-day.

I returned from the civil engineer camp to camp Davis this morning, and shall in an hour go to the east side of the Mississippi river, at Sauk rapids, to make provision for the crossing of a portion of the train, and Lieutenant DuBarry is hourly expected. The remainder of the train will hardly cross the river till Monday.

We made very good observations of all kinds at camp Pierce, and the promise is good here. The railroad examinations, pushed fifteen or twenty miles a day, are satisfactory. The artists have been much occupied, and in the natural history department we have made quite a collection.

No delay shall occur here in going ahead. The animals will not be pushed, but kept in motion. They are, generally, well broken—thanks to the spirit and determination of the command. I have not yet entirely arranged my plans; all I can do, is to see what a day will bring forth, bringing to the duties of each day all that previous experience has suggested.

I will write again as I leave the Red river trail, and will send in a more elaborate report.

I am, very respectfully, your obedient servant,
ISAAC I. STEVENS,

Governor of Washington Territory, in command of expedition.

Hon. JEFFERSON DAVIS, *Secretary of War.*

CAMP McCLELLAND, WEST SIDE OF CHEYENNE RIVER,

July 4, 1853.

SIR: The train from Pembina and the Red river, on their way to St. Paul's, passed the surveying party on the 2d instant, and I embrace the opportunity again to communicate with the department.

My last letter, in regard to the progress of the expedition, was written on the eve of leaving camp Davis, since which time we have made rapid progress into the interior. The command has now become thoroughly organized, with broken animals, and hardy willing men. I feel the utmost confidence in accomplishing the great objects of the expedition.

Besides the difficult task of breaking-in wild animals, many too young for the service, and the still more difficult task of getting into working condition those run down in the operation, we have had to encounter bad roads, muddy sloughs, river crossings, consuming each an entire day, and drenching rains.

But for a few days the weather has been good. To-day we shall reach the Maple river and enter upon the high rolling prairie. The worst portions of the road are gone over. The grazing is remarkably fine. Every man is now mounted, and we shall now make our regular marches of fifteen to twenty miles per day.

But to return to camp Davis. On the 12th of June I dispatched Lieutenant Grover, with a picked party of some fifteen men, with instructions to reconnoitre carefully the country north and in the vicinity of White Bear lake, with the view of ascertaining the point where the expedition should leave the Red river tract, and indicating that it was desirable to run from that point north of Lake Traverse to the Dead Colt Hillock, and thence to the Yellow Stone. The remainder of the party followed on the 13th, 15th, and 16th; and on the 23d the whole party was in camp at Pike lake, a few miles north of White Bear lake.

Here we remained till Saturday, and made our final arrangements for the march to the Yellow Stone. Some inefficient men were sent home; and a detached party of nineteen picked men, two wagons, twenty-six mules, and four horses, under Lieutenant Grover, was organized to explore the line he was sent forward from camp Davis to examine. He moved on the morning of the 23d, in fine spirits, determined to distinguish himself. I was then confident, and am still, that he will pass over a fine route. It is an almost irresistible inference, from the general course of the streams as laid down on Nicollet's map. His instructions are to push forward to the Yellow Stone, touching, if possible, the Missouri, to connect with Lieutenant Donelson's survey.

I moved also on the 23d with the main train, and crossed the Cheyenne early on Saturday morning, (July 2.) We have moved rapidly; one day making, to reach wood, a march of twenty-seven miles. We bridged the Wild Rice river and found a good bridge on the Cheyenne, the work of our Red river friends.

The train is now in motion and I am behind to make up a mail, the last till I reach the Yellow Stone. We shall cross the Cheyenne a second time, a few miles north of Bald Hillock creek, and shall pass within fifteen or twenty miles of Mini Wakan lake. Thence our course

will be nearly straight. With my reconnoitering force I hope to cover a broad belt of country, connecting with Lieutenant Grover's route. The accompanying sketch will show the character of our work. It is all the result of careful observation. The work north of our route, on the Bois de Sioux, Wild Rice, and Red rivers, was done in a single day, by Mr. Adams, a young gentleman attached to the civil engineers' party. That west of our present camp on the Cheyenne, by Mr. Lander, one of my civil engineers, assisted by Mr. Adams and one man. Mr. Lander left this on Saturday afternoon, at four o'clock, and returned last evening a little after eight—riding eighty miles in twenty-eight hours, and carefully observing for all that distance.

By a comparison with Nicollet's map, it will be seen the course of the Cheyenne, at its southern bend, is much out of the way, and I have determined to have its southern shore carefully examined by Mr. Lander. He will accordingly start to-day, with Mr. Adams and four picked men, on his duty; and will be instructed carefully to explore the region along, and south and west of, the Cheyenne river, connecting, if possible, with Lieutenant Grover's route. He has choice animals and spare horses for reconnoitering. I entertain no apprehensions as to hostile Indians. He will join me south of the Mini Wakan lake.

The sketch indicates the course of Lieutenant Grover, of my proposed course to the second crossing of the Cheyenne river, and the relative position of the two routes to the direct course from the Sauk crossing to the mouth of the Yellow Stone.

The country thus far is exceedingly favorable for a railroad. I am confident no grade to this point will be found of more than twenty feet. The Cheyenne is a great obstacle, and the indications are very decided that the line must go south. I have indicated a practicable railroad route. Its cost, without equipment, will not exceed twenty thousand dollars per mile. No important deflection is made. The crossing of the Cheyenne at this point would cost, say one hundred thousand dollars. Twenty miles west, at the point A, not fifty thousand dollars. The line by Dead Colt Hillock will, I think, be better. But when I reach the Yellow Stone and have Lieutenant Grover's work before me, I shall be able to report more definitely on this portion of the route.

I must make my acknowledgment for the promptitude and efficiency shown by the civil engineers, Mr. Tinkham and Mr. Lander, in the work on the railroad explorations.

Very truly yours,

ISAAC I. STEVENS,

Governor, &c., in charge of expedition.

HON. JEFFERSON DAVIS,

Secretary of War.

CAMP CUSHING, NEAR FORT UNION.

August 8, 1853.

SIR: I have the honor to report to the department, that since the date of my last communication at camp M'Clelland upon the Cheyenne river, the party has advanced with rapid marches up to this point,

where we arrived at noon on August 1st. The detached party under Lieut. Grover, which was referred to in my communication as having been dispatched by a southern route by the Dead Colt Hillock, arrived six days in advance of us, with information concerning the route of the most satisfactory character. The animals are all in fine condition. Our marches the last nine days having exceeded an average of twenty miles, and but two are at this time unserviceable. The very short time to make up my mail at this time—as the steamer, which only arrived last evening, returns at noon to day—will permit only the brief statement of our general success, reserving a full report until my arrival at Fort Benton.

A broad belt of country has been thoroughly examined, the courses of Cheyenne river, and of the valley of the Mouse river, have been brought in by side reconnaissance, and excellent practicable routes for a railroad ascertained. From this point I shall move to-day for Fort Benton, which will be reached in twenty-five days. The command will be divided into two parties, one under my own supervision, with Lieut. Grover in charge of the scientific details, taking the usually travelled road by Milk river, and the second under Lieut. Donelson, pursuing a route some fifty miles to the northward, on which the most prominent landmark is the Cypress mountain, in which rise streams flowing into both the Saskatchewan and the Missouri rivers. I have secured excellent guides, by one of whom I am assured that he will lead us to a pass in the mountains through which the whole wagon train can be taken—a pass through which, from Fort Benton to the St. Mary's village, an express train can move in four days, a pack train in seven, and a wagon train in fifteen days. Everything looks extremely favorably, and I doubt not in the least, that by the last of September we shall have crossed the mountains. As regards the Indians, I take pleasure in reporting, that we have met two large encampments of Assiniboins, by whom we have been received with unbounded hospitalities. In reference to the Blackfeet, whose country we are now about entering, I am assured by Mr. Culbertson, my special agent for that tribe, that they will receive us with open arms, and that no trouble need be apprehended. The necessary cautions will, of course, be taken to secure against attacks and loss of animals, but I can see no reason to apprehend the slightest trouble with any of the tribes to be met upon the route.

The enclosed memorandum will give you a more full account of the details of the operations, and the enclosed sketch of a railroad route certainly practicable, at a cost not probably exceeding \$40,000 per mile. It is certain the two great key points of country, are the valley of Mouse river and the region of the Bois des Sioux. The Mouse river is erroneously given on all the maps. It no where approaches the Missouri nearer than thirty or forty miles, and the pass over the Coteau is so gradual, and the whole valley is so open, that the ascent is scarcely observed.

I must not fail particularly to advert to Lieut. Donelson's excellent survey of the Missouri river, as high as the boat has been navigated the present season, some one hundred and twenty miles above this point, and the numerous collections made by him on the route; nor to a very

extended reconnaissance of the White Earth river, and the Coteau de Missouri, in which, in nine days, he passed over a distance of two hundred and thirty-five miles.

A more detailed account will be given hereafter. I shall from Fort Benton make a report on the navigability of the Missouri, with suggestions for, and an estimate as to its improvement.

T. S. Everett, esq., the quartermaster and commissary clerk of the expedition, returns from this point to Washington, and will call on you personally, to give you information which I cannot embody in a report at this time. I am sir, very respectfully, your most obedient,

ISAAC I. STEVENS,

Governor of Washington Territory.

HON. JEFFERSON DAVIS,
Secretary of War.

N. B.—The memorandum I regret I cannot prepare in time, and shall have to refer you to Mr. Everett for additional particulars than can be found in this brief letter.

NORTHERN PACIFIC R. R. EXPLORATION AND SURVEY.

Fort Benton, Upper Missouri, September 8, 1853.

SIR: We left Fort Union on the 9th of August, and pursued the Milk river line, abandoning the two lines contemplated in my letter of the 8th of August, on coming together at the Big Muddy river, in consequence of an inability to furnish proper transportation, and the requisite force to the two parties. The train moved forward under my charge until the 24th of August, when with a small party, including Alexander Culbertson, esq., the special agent among the Blackfeet Indians, and accompanied by two select detached parties under the respective directions of Lieut. Grover and Mr. Lander, started in advance, and arrived here on the 1st instant.

We found the Missouri much out on all the maps, and the Milk river still more so—flowing nearly due west. Up to this point, we have found the country entirely practicable for a railroad. Whichever pass in the mountains may be decided upon, the Milk river valley will furnish a good approach.

Dr. Evans, geologist of the expedition, arrived here on the 5th instant, having made a complete and satisfactory examination of "Mauvaises Terres," the country south of the Yellow Stone from the Blackhills to the Missouri river, and north of the Missouri, between the Milk and Missouri rivers.

The main train reached here on the 6th instant, the animals in excellent condition, and the men all anxious to press forward to the mountains—the command is a unit, and none are desirous to turn back.

Already are my parties ahead, examining the country between here and the mountains. Lieut. Grover with a select party of seven men, started on the 5th, to reconnoitre Cadot's pass, and ascertain its practicability for wagons, and push ahead to the St. Mary's village, and thence open the communication with Capt. McClelland.

Mr. Lander, the estimating engineer, with a small picked party has gone northward, to make a through examination of the Marias pass, and

a reconnaissance of the country to the Kootonais post. This pass is said, in consequence of fallen timber, to be almost impracticable, and is here pronounced to be the most difficult of the three passes to be examined.

Lieut. Mullan with a small party, has gone to the Flathead camp, on the Muscle Shell river, about a hundred miles south of this point, where procuring good Flathead guides, he will go through a third pass, and join the expedition at St. Mary's village.

Lieut. Donelson will leave to-day with an advance party of twenty-five men, two wagons, &c., making a thorough survey and reconnaissance of the approaches to Cadot's pass, and make the road practicable for the wagon train which will follow on the 11th instant, and overtake him at the foot of the first dividing ridge.

Myself, with a small party, will start to-day for the Pegan camp at the Cypress mountain, some hundred and twenty miles northward, passing along the base of the mountains, and will in person make an examination of the approaches, and overtake the train before it reaches the St. Mary's village.

No apprehensions are felt as to snow—there will be none during the coming month, and the first fortnight of the following, except on the mountain peaks. I am determined, if practicable, to push my whole wagon train through. On reaching the St. Mary's village, I shall establish a winter post, in charge of Lieut. Mullan, to operate in the passes of the mountains, till driven out by snow, and then to explore the lateral valleys and passes, examining the country southward to Fort Hall, to connect the survey with Fremont's, and northward to the Kootonais post, under the 49th parallel.

In addition to the reconnaissance of Cadot's pass, and opening the communication with Capt. McClelland, Lieut. Grover is instructed to return to Fort Benton, make a survey of the Missouri river from the Falls to the Milk river, connecting with the survey of that river by Lieut. Donelson, and returning to Fort Benton, get up a dog train and cross the mountains in the month of January. The winter post under the charge of Lieut. Mullan, besides furnishing the means of obtaining valuable meteorological information, is essential to the success of the dog train of Lieut. Grover.

The labors of the survey up to this point, have been of the most satisfactory character, and attended with entire success, besides examining a large field of country, and establishing the entire practicability of a rail-road. The Missouri river is believed to be navigable at all seasons of the year, except when obstructed by ice, to the Falls of the Missouri, for steamboats not drawing over eighteen inches of water. Slight obstructions may occur which can be removed at a comparatively small expense. The survey of the Missouri river will next month be taken up, by Lieut. Grover, at the Falls, and continued to a small distance below Milk river, where Lieut. Donelson's labors terminated—and on their joint labors and collections a reliable report will be based.

I have the honor to be, very respectfully, your obed't servant.

ISAAC I. STEVENS,

Governor of Washington Territory, in charge of Exploration.

HON. JEFFERSON DAVIS,

Secretary of War.

NORTHERN PACIFIC RAILROAD EXPEDITION AND SURVEY,
Fort Benton, Upper Missouri, September 8, 1853.

SIR: Dr. Evans, the geologist of the expedition, will precede me through the mountains, and going with a light pack train, will reach the mails a fortnight before me. I have made every exertion to prepare my accounts in season for estimates for Congress, at the commencement of its session, but having not yet even met or communicated with the parties, west of the mountains, I can only make a conjectural estimate. With great exertion on my part to reduce expense and to push through my operations, I am obliged to report that the allotment made of \$40,000 from the appropriation for the survey, will be entirely exhausted by the close and perhaps by the middle of next month. I do not feel justified to suspend operations. We are on the eve of complete success. My parties are now exploring the passes of the mountains. My intercourse with the Indians has been of the most satisfactory character. The Blackfeet Indians have sent their chiefs and braves to invite me to their camps—not a horse has been stolen, not a man touched, no private article has been missed. They have brought our disabled animals into camp and acted as guides and guards. These Indians sent their war parties to the California trail, and horses believed to be stolen from our emigrants by the Crows are actually taken to the camps of the formidable Blackfeet, under the 49th parallel. To-day I set out with a small party, with Mr. Culbertson, the special agent, to visit a large Pegan camp at their most favorite resort, the Cypress mountains, one hundred and twenty miles north of this point. My object is twofold. To secure guides for the examination of the Marias pass, and to bring about a general pacification of all of the tribes north of the Missouri, and those immediately west of the mountains, on the basis of the treaty of Laramie. I shall in a letter of this date to the Commissioner of the Indian Bureau, recommend a council to be held next year at some suitable point, say Fort Benton, and shall urge the passage of an appropriation of money to defray the expenses. I do not doubt that complete success will attend it, and that hereafter a single man will go unmolested through these vast plains.

In view of the great results which I am of opinion this expedition is on the eve of accomplishing, I do not feel that I would fulfil the reasonable expectations of the department by suspending operations. It seems to me my highest obligation is to continue vigorously the work placed in my charge, and to get results which will justify the expenditure of means. Believing that the department and Congress will sanction this course, I shall vigorously pursue the work, reducing the force on the approach of winter to the smallest amount compatible with an efficient winter organization, and one which in the spring can at a moment be increased for a full resumption of the work. This I will earnestly recommend. An instrumental survey should be made of the best mountain passes, both of the Rocky mountain and Cascade range. The intermediate lines should be reviewed. The astronomical, magnetic, and meteorological observations should be continued. A large expenditure has been made; trained men are in the field, and all the appliances are at hand. I shall not suspend the work till I receive the instructions of the department to this effect.

Estimate for continuing the work to the close of the present fiscal year is, monthly, as follows:

October 15 to 30th, 1853.....	\$2,500
November, 1853.....	5,000
December, 1853.....	3,000
January, 1854.....	3,000
February, 1854.....	3,000
March, 1854.....	3,000
April, 1854.....	3,000
May, 1854.....	3,500
June, 1854.....	4,000
	30,000

Estimate for fiscal year ending June 30, 1855, \$40,000

In addition to the above, I am satisfied that the Missouri can be navigated by steamers to the falls above this place, and I would recommend an appropriation of \$10,000 to test the question next year. The Indian Bureau needs a steamer exclusively for its own use.

Recapitulation.

For continuing the exploration and survey of a route for a railroad from the head waters of the Mississippi to Puget sound, including the thorough examination of the passes of the mountains during the winter, and including a steamer to determine the practicability of navigating the Missouri river to the falls, for the fiscal year ending June 30, 1854, \$40,000.

For continuing the survey of a route of a railroad from the headwaters of the Mississippi to Puget sound, including an instrumental survey of the best mountain passes, for the fiscal year ending June 30, 1855, \$40,000.

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

ISAAC I. STEVENS,

Governor of Washington Territory,

in charge of exploration and survey.

Hon. J. DAVIS,

Secretary of War.

NORTHERN PACIFIC RAILROAD EX. AND SURVEY.

Fort Benton, Upper Missouri, September 8, 1853.

SIR: I have to request that \$10,000 still remaining in the treasury, of the sum allotted to me from the appropriation for the survey of the several routes for a railroad from the Mississippi river to the Pacific, be drawn out and placed on deposit, subject to my order, with the Treasurer of the United States.

In a report of this date, I have made estimates for continuing the

survey the present year, and have recommended that an appropriation of \$40,000 be asked of Congress. I will earnestly request that, from existing appropriations legitimately applicable to such a purpose, a portion of this sum be drawn out and placed on deposit with the Treasurer of the United States, subject to my order, and that I be advised of the action of the department at the earliest practicable period. Communications should be sent to me, at Olympia, Washington Territory.

I regret I cannot go into more details at this time. But at this moment, I feel I must throw my energies into the almost herculean task before me, and send in careful estimates on reaching Puget sound.

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

ISAAC I. STEVENS,

*Governor of Washington Territory,
in charge of exploration.*

HON. JEFFERSON DAVIS,

Secretary of War.

CAMP AT KETETAS, ON YAKAMA RIVER,
September 18, 1853.

SIR: I have the honor to report that, in consequence of the great detentions caused by the miserable quality of the animals and pack saddles with which I was provided, and the difficult nature of the country through which we have passed, I was unable to reach the valley of the Wenass (a branch of the Yakama) until August 20. Hearing, from what seemed good authority, that there were numbers of government mules at Steilacoom, and that the trip could be made in five days, I at once sent in my pack horses to be exchanged, and to bring out provisions to enable me to start from here with three months' supplies; intending to occupy myself, in the meanwhile, in examining the passes near Regnier. On my return from the Nah-chess pass, I received an express from Lieutenant Hodges, informing me that most of his horses had given out, and that there were no spare mules at Steilacoom. I, therefore, at once determined to reduce the size of the party, and on the next day sent in the escort and packers enough to reduce the number from sixty-eight to about thirty, for which number I can carry the requisite supplies on mules. The Nah-chess pass is at the head of the river of the same name, (the south fork of the Yakama,) about fifteen miles north of Regnier. The lowest point of the divide is 4,966 feet above Vancouver; the divide quite narrow, the ascent in the upper eight miles of the valley 1,612 feet. The valley is frequently reduced to a mere cañon, wholly occupied by the bed of the stream. Judging from the snow marks on the trees, and information received from the Indians, the snow accumulates to great depths in the narrow valleys. I should suppose at least twenty feet, and upon the mountains some five to six feet.

Lieutenant Hodges reports the valley on the west side as sloping with great rapidity for about twenty miles from the summit, and as presenting no great difficulties thence to the sound. The pass at the head of the main Yakama, (the Sno-qual-me pass,) some twenty miles

north of the Nah-chess pass, is but 3,544 feet above Vancouver. On the lowest point of the summit is a shallow lake, about two hundred yards long, from which the water runs both ways. From this lake to the west, the descent is exceedingly rapid. Towards the east the descent in the distance of about three quarters of a mile is five hundred and thirty feet to another lake about half a mile long; from this to the large lake in which this river heads—a distance of about two miles in a direct line—the descent is five hundred and ninety-nine feet. From this last lake (Ketchela's) there is no difficulty in the way of the construction of a road of any kind; the valley of the river being generally wide and level, but covered in the upper part by a dense growth of timber. The snow must accumulate to about the same extent as in the other pass; but the valley on the east slope being more open, the obstruction would be much less on this route. Being exceedingly pressed for time, I was unable to proceed more than a few miles beyond the divide in the Sno-qual-me pass; as far as I went the valley was narrow and the descent steep. The Indians say that, at the distance of about twenty-five miles from the divide, the stream enters a lake, at the foot of which is a cascade some sixty feet in height. Lieutenant Hodges informs me that the officers of the Hudson Bay Company at Nisqually are confident that the western portion of this pass is better than the corresponding portion of the Nah-chess pass. But the result of my short experience in this country has been, that not the slightest faith or confidence is to be placed in information derived from the employées of the company, or from the inhabitants of the Territory—in every instance when I have acted upon information thus obtained, I have been altogether deceived and misled. It will, therefore, be impossible to make any accurate comparison of the relative advantages of the west slopes of these passes, until we have examined the whole of the Sno-qual-me pass ourselves. Near St. Helens, the mountains are by no means so large and rugged as near Mount Regnier, yet there does not appear to be so well marked and defined a pass. The lowest point over which our trail passed in that vicinity was 3,100 feet above Vancouver; yet, judging from the appearance of the country near St. Helens, I think there would be great difficulty in passing by the mountain. In the portion of the range near Regnier, the mountains are so thickly timbered that it is very difficult to obtain any extensive view, and they are so rough as to make it exceedingly difficult to explore them even on foot. I have examined the divides on foot, and from the short time at my disposal, have been unable to extend the examination as far as would be desirable.

Following the west slope of the mountains from Vancouver to the Cath-le-pootle river, the country is very densely timbered, and required constant cutting on the trail; with the exception of a few small tracts, the soil is poor. In the valley of the Cath-le-pootle, which we followed for four days, the country is quite rough and thickly timbered—the soil miserable, and no grass. On the east slopes near Mount Adams, the country is generally covered by an open pine woods, with a coarse grass, the soil not good enough to induce settlements. The last forty-five miles of the trail has been over barren sage plains, mostly without grass, always without timber, and very stony—in some of the valleys

pretty good bunch grass is found. The soil of the valleys of the Yakama and its branches, though very limited in extent, is good enough to make tolerable farms, if irrigated. The Indians raise excellent potatoes, but the cold nights (the thermometer frequently standing below 32° at sunrise) and the shortness of the season, would be great obstacles in the way of cultivation. We have found gold in this valley—but no deposit sufficiently rich to justify working. The Indians are thus far perfectly friendly. I have informed the chiefs of the probable passage of immigrants through their country, and of Governor Stevens' approach. They have promised to be friendly to the immigrants, and extend every assistance to them; to prevent depredations on the part of their own people, and to refer any complaints they may have against the immigrants to the governor on his arrival—but on no account to retaliate, as I have told them that would not for a moment be allowed.

I shall leave this place to-morrow for the north, and will endeavor to reach Fort Colville from Mount Baker.

While in the mountains myself, I sent one small party to the mouth of the Yakama and another to the Dalles. The Yakama valley below this is wide, often destitute of grass, no timber of any consequence, and a limited extent of soil that by irrigation could be made moderately productive. On the trail to the Dalles, the country is everywhere stoney, barren, and worthless. The valley of the Columbia, near the mouth of the Yakama, is a vast sage desert. I shall strike it again somewhat further north. On the road to Steilacoom, after having passed the mountains, there are a few limited tracts of good land; that, on the sound and for some miles back, is a mere mass of gravel—perfectly worthless.

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

GEORGE B. McCLELLAN,
*Lieut. Eng. and Brevet Captain U. S. A.,
commanding expedition.*

HON. JEFFERSON DAVIS,
Secretary of War.

N. P. R. R. EX. AND SURVEY,
Fort Benton, September 18, 1853.

SIR: Since my letters of the 8th instant, transmitted by Dr. Evans, the geologist of the expedition, very important changes have been made in the plan of continuing the survey westward, in consequence of the information brought by the arrival of Lieutenant Saxton.

I was on my way to the Pegan camps to secure guides for the survey of the Marias pass, and to provide for permanent relations of peace with the Blackfeet, when Lieutenant Grover's express overtook me, sixty-five miles from this point, with information that he met Lieutenant Saxton just near the dividing ridge; that the road passed over by Lieutenant Saxton was in many places, in consequence of timber, impracticable for wagons, and that he would be at Fort Benton one day after the express, with much valuable information as to the routes west of the mountains. I immediately determined to return, continuing on

Mr. Stanley, the artist of the expedition, with Hammel, the interpreter, and three voyageurs, to see the Indians and invite them to Fort Benton.

On my return, which was accomplished in less than twenty-five hours, I placed Mr. Landers' party in camp on the Marias river, where it would be in position either to move on to the exploration of the Marias, or join, by running a side line, the main party as it entered Cadot's pass.

Lieutenant Donelson having informed me by the express bringing Lieutenant Grover's letter, that he should, the next day, move on with the whole party in pursuance of my instructions, I dispatched early in the morning our Indian guide, to direct him to move forward the advance party, that delay might not occur in the survey of the country, but to keep the supply train in camp till my arrival, and on my arrival to meet me with Lieutenant Saxton for consultation.

Reserving to a subsequent portion of this report some account of Lieutenant Saxton's admirable reconnaissance, one made under many difficulties, it will be sufficient for me to state that our mutual congratulations were of the most cordial character. He left Washington in April with instructions to organize a supply train, on the Columbia, to establish a depot of animals and provisions at the St. Mary's village, and passing over the Blackfeet trail to meet me at Fort Benton.

It was in Washington determined to direct our first exploration on this pass. As we approached it from this side of the mountains, we called it Cadot's pass, from Cadot, one of our guides, who passed over it two years since. My first thought, on reaching Fort Benton, was to send forward Lieutenant Grover to ascertain whether he had reached St. Mary's, or was on his way to this point. I point to the circumstance of their actual meeting within three miles of the dividing ridge, as some evidence of the goodness of the pass, and how well it was understood in the first instructions.

Cadot's pass is, by the barometer measurements of Lieutenant Saxton, nearly 3,000 feet below the south pass, and is a much better route both in summer and in winter. It presents not the slightest difficulty to the passage of a railroad.

A copy of my order No. 18, published on Lieutenant Saxton's arrival, shows the appreciation which we have of his labors.

I learned from Lieutenant Saxton that the passes in the Bitter Root and Cascade ranges were more difficult than those in the Rocky mountains; that they could not be crossed later than October, and that the greatest dispatch must be used to reach the Pacific before the setting in of winter. I also learned that Captain McClellan was probably still struggling in the passes of the Cascade range, north of the Columbia, to ascertain the most practicable one, and that he could not be expected to push his line east of the Columbia the present season.

My previous arrangements had been based on the winter not setting in till the middle or last of November, and on having before me at least a working season of eight weeks. I found it to be reduced, at the very outside, to six, and as regards the Bitter Root range, where snows fall on the 20th, and sometimes as early as the 10th of October, to five weeks. The plateau, between the Milk and the Missouri rivers, rises gently, and is, in almost every direction, practicable for a railroad.

The St. Mary's valley connects with other valleys running both north and south at the base of the mountains, an aggregate distance of one hundred and fifty miles. Thus Cadot's pass connects all the railroad lines north of the Missouri with all the lines from the Columbia to Puget sound.

Accordingly I determined to leave my wagons at this point, to resort entirely to packs to send my whole force through Cadot's pass with the greatest dispatch, and direct them on several routes westward through the Bitter Root and Cascade ranges to ascertain the best pass, and to connect with Captain McClellan's work, and thus endeavor to collect the present season the data to establish the practicability of a railroad from the head waters of the Mississippi to Puget sound.

The survey of the Marias pass was deferred, and Mr. Landers, under orders for this service, was directed to report to Lieutenant Donelson, who was, by my orders of the 14th instant, a copy of which I herewith enclose, continued in charge of the main party operating in Cadot's pass.

It was with great reluctance I abandoned the survey of the Marias pass. I am sanguine that it will prove the best pass, and it more naturally connects with the line of Clarke's fork of the Columbia river. The great obstacle to the survey of all these passes, and especially the Marias pass, is in the immense forests which in all directions obstruct the way. The superabundance of nature has to be done away with in a measure, before the full measure of her gifts can be known. The Indians pursue the best trails they can find, but they have not axes to hew their way, nor finding one pass practicable, have they the patience to search for better ones.

To reach the valley of Clarke's fork, a road from Cadot's pass must make a considerable deflection to the north, and it is believed that, in no other direction, can a road be run to the Pacific, in consequence of the impracticable character of that portion of the Bitter Root ranges of mountain, lying immediately west of the St. Mary's valley. Should, however, a good pass be found leading to the little Salmon fork of Snake river, and should this route to the Pacific prove more feasible than more northern routes, then Cadot's pass will more naturally lead to it and to the preferable one. Dr. Evans's survey shows that a railroad line can be run on nearly a straight course from the mouth of Milk river, between the Milk and Missouri, to the falls, and which, in connection with a good pass in the Bitter Root range west of St. Mary's, would make the route by Cadot's pass, the Little Salmon, or Kooskooskia river, not only a remarkably direct route, but one that, by branches to Puget sound, to the Willamette valley of Oregon, and even to California, would afford great facilities to emigrants to both Territories, and be in connection with the great port of the Pacific. I shall give as much attention as practicable to the passes in this direction, though they are represented to me as entirely impracticable.

I have established at this place a meteorological and supply post, under the charge of Mr. Doty, with Corporal Kouster, of the dragoon detachment, to assist in charge of property; private Lynt, of the sappers and miners, to assist in observations; and Hugh Robie, laborer and cook.

Mr. Doty has rendered service on the route in the astronomical and magnetic observations, having been placed in charge of the latter observations a few days since. He is exceedingly well qualified for his duties, well educated, of decided character, of experience as a woodman, a hunter, and in intercourse with Indians. He will devote himself to the magnetic and meteorological observations, to getting in the topography to the base and into the passes of the mountains, and to maintaining the present friendly feelings of the Blackfeet Indians. A copy of his instructions is herewith enclosed.

From the post established at St. Mary's, as announced in my letter of the 8th instant, I expect the most valuable results, not only as illustrating the meteorology of the region west of the mountains, but in knowledge of the several passes, by actual survey, made before operations are resumed in the spring.

Lieutenant Saxton left New York on the 5th of May, and, taking the Isthmus route, arrived in San Francisco on the 1st of June. During the time he remained, delayed by procuring an outfit for his journey to the Flathead village, intelligent gentlemen pronounced his undertaking difficult, and indeed impracticable, from the hostility of the Indians and the character of the country. He had intended to accomplish his labors with a small party of from four to six men. Not able to discourage him, they advised him to enlarge his force, and be attended with an escort.

On the 27th of June, he reached the Columbia barracks, and proceeded to organize his party and prepare his train. The most experienced and intelligent men there, including Governor P. S. Ogden, chief factor of the Hudson Bay Company, discouraged his efforts, and predicted his entire failure of getting through this season, in consequence of the bad country towards the mountains. Upon the urgent persuasion of these gentlemen, Lieutenant Saxon resolved, in carrying out his instructions, to take a larger party than originally contemplated.

On the 1st of July, Lieutenant Saxon sent forward Lieutenant Arnold, 3d artillery, with the greater portion of the men and provisions to the Dalles, remaining at Columbia barracks, to complete his arrangements. On the 18th of July, the organization of this party was perfected, and he started for the mountains, his force consisting of Lieutenant Saxton, 4th artillery, in command, Lieutenant Richard Arnold, 3d artillery, astronomer, Mr. Lyman Arnold, his assistant, Lieutenant MacFeely, and 18 soldiers, of the 4th infantry, as an escort, Mr. D. S. Hoyt, assistant quartermaster's department, 1 packmaster, 1 assistant packmaster, 23 packers and 2 herders.

Lieutenant Saxton encountered many obstacles on his march, which were calculated to deter a man of less energy and force of character. The whole of one day he was crossing a sandy desert, the sand at a temperature of 150° Fahrenheit. On reaching the Pend d'Oreille lake, the supplies were all carried across in canoes, and when over, they discovered the prairie had been burnt for a great distance. The crossing of the burnt prairie and timber occupied four days, during which Lieutenant Saxton lost several of his horses, and every man advised his return. False reports as to the intention of the expedition had been circulated among the Indian tribes, through whose country

Lieutenant Saxton had to pass. They manifested much suspicion, but meeting Lieutenant Saxton, who had a talk with them, their doubts gradually vanished, and they became steadfast friends. He told them that we were their friends, that our objects were peaceable, and that among the highest of our duties was bearing the friendly messages of the Great Father at Washington to his children, and attesting his kindly feelings by a few presents, he soon established friendly relations.

From this time to reaching the Saint Mary's village, he found them ever willing to assist him. Each stream crossed, they were present with their canoes, and one instance occurred, where, after assisting Lieutenant Saxton's party over, they sent on to him, requesting him to fix the rate they should hereafter receive for ferrying over other white men.

They reached the Saint Mary's village on the 28th of August, after encountering such obstacles as are common to mountainous countries, obliged to cut their way through dense forests of mountain timber.

At this point, Lieutenant Saxton placed his provisions in depot, leaving them in charge of Lieutenant Arnold and four men, sent Lieutenant MacFeely with all the soldiers and quartermaster's employees whose services could be dispensed with, back to Vancouver by another route, and with Mr. Hoyt, his assistant, 8 soldiers, 8 packers, and an Indian guide, came across the Rocky mountains by the Blackfeet pass, and joined me at Fort Benton. It is proper here to add, that much dread appeared to exist in regard to the Blackfeet Indians, and Lieutenant Saxton's guide, Antoine, an excellent man, would not come further than the Saint Mary's village, without the party numbered twenty men. It was his intention to bring but four men across the mountain to Fort Benton, but he was thus compelled to bring an escort.

Lieutenant Saxton followed up the Columbia as far as Wallah-Wallah, crossed Lewis fork of the Columbia forty miles from its junction with the latter stream, thence crossed the Spokane to Clarke's fork, crossing Clarke's fork, near the outlet of Kalispel lake, continued along the northern shore of Lake Kalispel, and up the valley of Saint Mary's fork of the Bitter Root to the Flathead village.

Lieutenant Saxton reports the route he followed from the Dalles to this place as practicable for a railroad, the Rocky mountains offering no obstacle to its construction, and furnishing almost inexhaustible supply of timber, and other building materials. At the place where he crossed, the elevation is nearly three thousand feet less than the south pass.

He found the country east of Kalispel lake deserted by the Indians, from fear of the Blackfeet. The universal opinions in regard to the viciousness and disposition to plunder of these Indians, keeps the whole country in terror during the summer season. The two Messrs. Owen, who for several years have been engaged in raising stock at the Saint Mary's village, were met on their way to the Pacific coast, deeming it no longer safe to remain.

As good a map and barometric profile of the route, as their rapid march and their limited means would allow, was made by Lieutenant Saxton's party.

I might add that the establishment of a depot at the Saint Mary's

village, with plenty of fat oxen, and the depot for which Lieutenant Saxton made especial provision at the head of Pend d'Oreille lake, where Governor P. S. Ogden has had collected abundance of cattle for our supply, are facts, the knowledge of which enable us to work much later, and secures us much from providing a great amount of transportation.

He has, in addition to the supply of provisions left at Saint Mary's, sixty-three animals, which, on our arrival, will be in fine condition. My train moved forward with strong animals, fit for the service, after leaving at this post some nineteen feeble animals, which could not probably have stood the journey across the mountains, but should the survey be continued another year, will then be in good condition.

On the junction of Lieutenant Donelson and Mullan's parties with the party at Saint Mary's, leaving at that post for the winter the animals unable to proceed, I shall have sufficient transportation to mount well every member of the survey, and with good packs be able to push forward, making forced marches of 35 and 40 miles per day, if the season compels us to move so rapidly.

The unexpected arrival of Lieutenant Saxton with the information he has brought, changes, in several respects, as announced in letters written at this point on the 8th of September, and sent forward by Dr. Evans, who left on the 10th with packs for Oregon, and will connect with the mails to the Atlantic States some fortnight earlier than myself. I cannot do better at this time than enclose those copies, and make them part of this letter. I apprehend, however, that this will reach you before they possibly can.

In those letters I have briefly referred to our progress up to this point, and have frankly given a statement of the balance of the allotment of the appropriation for the survey entrusted to my charge. By the middle of October that will have been exhausted, and I have sent my estimates of what I regard actually necessary to continue the survey. I must refer you to Lieutenant Saxton in person for much valuable information in connection with our work, its progress, its certainty of success. I must earnestly recommend the appropriation at an early date in the session of one hundred and fifty thousand dollars to continue all the surveys for the fiscal year, ending June 30th, 1854, and should they make such appropriation forty thousand as the allotment for this survey. The information brought by Lieutenant Saxton is of so important a character, that I have thought it advisable to send him to Washington city to prepare his report, and communicate in person with the departments. He will be accompanied by Mr. D. S. Hoyt, his assistant in the quartermaster's department, and Sergeant Collins, of the detachment of sappers and miners, who will assist him in his office work.

I have concluded to send back from this point four non-commissioned officers and thirteen dragoons, whose services are no longer required, and they have been placed in charge of Lieutenant Saxton. Four discharged quartermaster's employees who crossed the mountains with him, and three of my party, who desired to be relieved from duty at this place, also go down the river to Saint Louis. Sergeant Collins, who has been connected with the main party, has been unable to cross the mountains, in consequence of a severe attack of dysentery. Too

much cannot be said in commendation of his merits since his connection with the party. Lieutenant Donelson, in his report of the survey of the Missouri, notices his efficient service, and since his connection with the main party as assistant topographer, he has performed his duties admirably.

Of Mr. D. S. Hoyt, connected with Lieutenant Saxton as his assistant, I would merely say, that Lieutenant Saxton speaks of his labors as being in the highest degree satisfactory. He and Sergeant Collins are detailed for office duty with Lieutenant Saxton in assisting in the preparation of his report, and in resuming the survey next year. The following is a statement of the results already accomplished, those which will be gained during the remainder of the season and in the winter, and those which may be expected from the continuance of the survey, from the resumption of operations in the spring to the close of the next fiscal year.

Results already accomplished.

1. A line drawn from the Dalles of the Columbia to the head of navigation of the Mississippi.

2. The ascertainment that Cadot's pass in the Rocky mountains is nearly 3,000 feet below the south pass, and is a much better route, both in summer and in winter.

3. That this pass connects by the plateau between the Milk and Missouri rivers, rising gently to the mountains west from Fort Benton, and by the valley of the St. Mary's and other valleys, extending for 150 miles along the western base of the Rocky mountains, with the several known practicable lines from the Mississippi river north of the Missouri, and with at least one practicable route to the Columbia.

4. That the routes north of the Missouri will connect with the Missouri at the mouth of the Yellow Stone and at the falls by easily constructed and short spur roads.

5. That the Missouri is navigable at all seasons, when not obstructed by ice, for some distance above Fort Union, and is believed to be navigable to the falls for steamers drawing 18 inches of water.

6. That east of the Yellow Stone all the roads must pass over the broad plateau of the Bois de Sioux and the valley of the Mouse river.

7. That roads may be run over the Bois de Sioux from several points on the Mississippi.

8. That at least two good routes can connect the Bois de Sioux with the Mouse river valley—one in the direction of Dead Colt Hillock, on the general route pursued by Lieut. Grover, and one on the general route pursued by the main party crossing the Cheyenne river. These routes meet on the entrance into the Mouse river valley.

9. That the Milk river route affords extraordinary facilities for a railroad connecting with all the passes, and that a route can be pursued between the Milk and Missouri rivers, running near Fort Benton and the falls, and naturally connecting with Cadot's pass.

10. That a natural valley, called the Grand Coule, connecting the routes between the mouth of the Yellow Stone and the mountains with the Mouse river valley, and that the passage of the Coteau du Missouri is of easy grade.

11. That by a deflection from Cadot's pass along the valley of the St. Mary's river, a road can be made to Clarke's fork of the Columbia, and by a somewhat circuitous route, and with expensive side cutting, can be extended to the head of navigation of the Columbia.

Work to be done during the fall and winter.

1. The route pursued by Lieut. Saxton to be carefully examined by the estimating engineers, to collect the data for estimating the cost of the road. The profile to be tested by additional barometrical observations, and additional observations to be made for latitude and longitude. The line to be straightened and improved by side reconnaissance.

2. The survey of the Missouri to be continued to the falls, to determine its navigability for steamers and the cost of removing the obstructions, to secure a greater depth of six to twelve inches.

3. A pass to be searched for in the Bitter Root range and a route to be explored from Cadot's pass along the Little Salmon river to Wallah-Wallah, to connect with the survey already made by Capt. McClellan in laying out the military road from Wallah-Wallah to Nisqually.

4. A route to be examined from Cadot's pass by the Mission of St. Joseph, and passing over a somewhat difficult portion of the Bitter Root range, but much used by the Indians and half-breeds in passing from the mountains to Wallah-Wallah.

5. A detached party under Lieut. Arnold to leave the main party operating on Lieut. Saxon's line and move to and beyond Fort Colville to the Cascade mountains, and thence along the eastern base to the line of the military road, to open a communication with Capt. McClellan and connect the surveys to the Columbia with the passes explored by him in that range.

6. Winter posts at Fort Benton and St. Mary's, under the charge of Mr. Doty and Lieut. Mullan, to make meteorological and magnetic observations, surveys of the country along the base of the mountains and into the entrance of the several passes, to collect information as to these passes from guides and Indians, in readiness for operations in the spring. In addition to which, attention to be given to collections and to the Indian tribes.

7. The survey of the mountain passes in winter by Lieut. Grover, going with a dog train over all the ranges from Fort Benton to Puget sound.

8. Such observations as to the navigability of the Columbia as may be practicable at this late season.

9. Moving the main party to Puget sound over the pass found by Capt. McClellan to be the best.

10. Meteorological posts at Wallah-Wallah, at Olympia, and possibly at Fort Colville.

11. Office work at Olympia, preparing the report.

Work proposed from the resumption of operations in the spring to the close of the next fiscal year.

1. Careful explorations of the Marias pass of the Rocky mountains, and such other passes as from information acquired on the resumption of the survey shall come into competition with that at Cadot's pass.

2. The completion of the exploration of the Bitter Root and Cascade ranges, it being scarcely practicable to accomplish it the present season.

3. Instrumental surveys of the passes in all three ranges found by exploration to be the best.

4. These passes to be connected by reconnaissance in the best practicable manner.

5. The best pass in the Rocky mountains to be connected with the best crossing of the Mississippi, by a review of the whole line by a small party under the charge of a competent estimating civil engineer, regard being had to questions of supply and modes of construction; spur roads to the Missouri and a connection with Lake Superior and the roads leading eastward from the Mississippi.

6. The careful survey of the Columbia river, to determine to what extent it can be made useful in transporting supplies, &c., for the construction of the road.

7. Examinations in relation to connecting the most practicable route with Oregon and California.

8. Re-continuance of the meteorological posts.

9. Information to be collected as to emigrant routes, wagon roads, and country adapted to settlement.

I append to this report copies of all the orders since leaving Camp Pierce, and copies of all the important instructions since leaving Fort Union. These papers will, in connexion with this communication, give as full a report of the present state of the exploration as my limited time will allow.

1. Copies of my three letters to the department, of the 8th September, forwarded by Dr. Evans, and which will not probably reach Washington till after this communication is received. They give a bird's-eye view of operations, state that the survey fund will probably be exhausted in October; state my determination to continue the survey and organize a small but efficient winter force, in readiness to resume operations in the spring, and urge the recommending Congress to pass in the deficiency bill an appropriation of \$40,000 to continue the work the remainder of the present fiscal year. They ask that, to the \$10,000 now in the treasury of the sum allotted from the appropriation to the survey of this route, and such other sums as may be applied to it from other appropriations, may be drawn from the treasury and be placed on deposit with the treasurer, subject to my order. The only modification I now make of these views is, that I would recommend the urging Congress to pass an appropriation of \$150,000 to *continue all these great railroad explorations* during the remainder of the present fiscal year, and the same amount in the general appropriation bills for the next fiscal year.

2. Copy of my order No. 18, (marked No. 4,) issued on the arrival of Lieut. Saxton at Fort Benton.

3. Copy of my instructions to Lieut. Grover, (marked No. 5,) direct-

ing him to reconnoitre Cadot's pass, ascertain whether Lieut. Saxton had arrived at Fort Benton, and directing him, on completing his mission, to return to Fort Benton, to complete the survey of the Missouri and pass with a dog train over the mountains in the winter.

4. Copy of my instructions to Lieut. Mullan, (marked No. 6,) directing him to repair to the Flathead camps on the Muscle Shell river, and from that point to survey a route to St. Mary's through one of the passes leading from the forks of the Missouri.

5. Copies of three letters of instructions to Lieut. Donelson, (marked 7, 8 and 9,) the two former based on continuing the exploration with wagons and providing for the exploration of the Marias pass by Mr. Lander, and the third changing the train from wagons to packs, and deferring to another season the exploration of the Marias pass.

6. Copy of my instructions to Lieut. Saxton, (marked No. 10,) directing him to take charge of the returned men and to repair to Washington to prepare his report and give information to the department, &c.

7. Copy of my instructions to Mr. Doty, (marked No. 11,) placing him in charge of the meteorological and supply post at this point.

8. Copy of my general order No. 11, (marked No. 12,) abandoning two lines of operations from Big Muddy river, and returning thanks to the men for their previous services.

9. All the remaining orders issued by myself or Lieut. Donelson in connection with the main party, viz: orders No. 10, No. 12 to No. 17, and marked consecutively to 27.

10. Copy of copy of camp regulations, (No. 28.)

11. Copy of my letter to Capt. Gardiner, June 30, (No. 29,) relieving him from duty in consequence of ill health, and stating that I would assume the duties of quartermaster and commissary.

I am, sir, very respectfully,

Your most obed't serv't,

ISAAC I. STEVENS,

*Governor of Washington Territory,
in charge of Expedition.*

HON. JEFFERSON DAVIS,

Secretary of War, Washington, D. C.

No. 4.

[ORDER No. 18.] NORTHERN PACIFIC R. R. EXPL. AND SURVEY,
Camp Dobbin, near Fort Benton, Sept. 15, 1853.

The chief of the expedition congratulates Lieutenant Saxton and his party for their safe arrival at Fort Benton, from the mouth of the Columbia. For indomitable energy, sound judgment, and the most crowning accomplishment, Lieutenant Saxton has the thanks of all his associates, and deserves honorable mention at the hands of all men who seek to advance the honor and renown of their country.

Lieutenant Grover, in command of the advance party to open a communication with the parties west of the mountains, and who met Lieutenant Saxton near the dividing ridge, also receives the thanks and

congratulations of his associates in the great work now so ripe for success.

Daylight now breaks through the struggles of three months.

On the 8th of June the supply train left camp Pierce, on Lake Amelia, and on the 8th of September the parties from the Mississippi and the Pacific shook hands across the continent. The pass of the Rocky mountains is found to be more than one thousand feet below the South Pass, and is not only practicable, but expressly made to our hands for the great northern railroad.

ISAAC I. STEVENS,
Governor Washington Territory, in command of exploration.

No. 5.

FORT BENTON, UPPER MISSOURI,
September 5, 1853.

DEAR SIR: With a select party of seven men and sixteen animals, you are assigned to the duty of reconnoitering the Blackfoot trail to the St. Mary's village, and of the route from that point to the Kootonais post. You will then return to this point and make the survey of the Upper Missouri, from the Falls, to connect with Lieutenant Donelson's survey, which extended some distance above Fort Union. You will then return from Fort Union and reconnoitre the country between the Milk and Missouri rivers. At Fort Benton you will get up a dog train and cross the mountains in the winter, make the best of your way to Puget sound, and report to me at Olympia.

In the reconnaissance to the St. Mary's village observe carefully camping grounds, the general practicability of the route for wagons, the particular difficulties, and how they are to be overcome, and send back by two of your voyageurs, H. Beaubien and Cadot, a report in relation to the same—instructing them to deliver the report to myself or the officer in charge of the main train. Also give information as to whether a depôt has been established by Lieutenant Saxton at the Flathead village, and the provisions and animals in store there.

The object in going to the Kootonais post is two-fold. First, to open the communication with Captain McClellan; and second, to open a connexion with the Hudson's Bay posts, in order to draw upon them for supplies for the prosecution of the survey west of the mountains, in the event Lieutenant Saxton has failed to establish a depôt at the St. Mary's village.

Upon your return I shall be able to give some general instructions in relation to the survey of the Missouri and the remaining work assigned to you.

It is important that I should meet Captain McClellan at the St. Mary's village, and about the 25th of September. If practicable, get word to him to this effect.

Truly yours,
ISAAC I. STEVENS,
Governor Washington Territory, in command of exploration.

Lieut. C. GROVER,

4th Artillery, U. S. army, Fort Benton, Upper Missouri.

After the above letter was written—

NOTE.—Very full verbal instructions were given to Lieutenant Grover, that should he meet Lieutenant Saxton, either on the way or at St. Mary's, to return immediately and apprise me of such fact. In case Lieutenant Saxton had not established the depôt at St. Mary's, he was to push forward to the Kootonais post, and from that point fit out, by the assistance of the Hudson's Bay company, an express with a note to Captain McClellan, asking him, if practicable, to meet me on the 25th September, at the village of St. Mary's. After which Lieutenant Grover was to return at once to Fort Benton.

No. 6.

FORT BENTON, UPPER MISSOURI,
September 8, 1853.

DEAR SIR: With a select party, consisting of the Pegan guide, the White Crane, Mr. Rose, Mr. Burr, and two voyageurs, you will visit the Flathead camp, on the Muscle Shell river, about one hundred miles south of this place; and procuring the most intelligent and reliable Flathead guides, will make your way to the St. Mary's village, exploring the best pass to that point from the head waters of the Missouri river. You will collect every possible information as to routes, streams, prominent land-marks, and characteristic features of country—noting particularly the general quality of the soil, the forest trees, grasses, quality of water, and practicability of the route for the passage of wagon trains. With the barometer you will make the best profile the time will allow of the route you pass over, and such facts as your limited means will allow, as to the feasibility of the route for a railroad.

But the great duty which I place in your hands, is to carry from me a message of the Great Father to the Flatheads. Assure them that the Great Father appreciates their services and understands their merits; that he will hereafter protect them from the incursions of the Blackfeet, and other Indians east of the mountains, and make them live as friends; that he will send to them, each year, certain articles which they most need; and that a faithful and intelligent agent shall live among them.

Speak of your own duties and of your occupation of the St. Mary's post. I want to meet the prominent Flathead chiefs and braves at the St. Mary's village, at the close of the present month; and I rely on your energy and tact to induce them to accompany you to that point.

It is my determination to bring the tribes north of the Missouri, and those west of the mountains, into a general council at this point next year, and to make a lasting peace between all the tribes of Indians not included in previous arrangements. Dwell on this in the Flathead camp.

You understand well the general character of the Flatheads: the best Indians of the mountains or the plains. Honest, brave, docile, they need only encouragement to become good citizens. They are christians; and we are assured by the good Father De Smet they live up to the christian code.

Dwell on the good Father and say that his words in their favor have reached the Great Father and made all good men their friends.

I want to build up anew the village of St. Mary's. Let the Flat-heads understand I am their friend—one who will join hands with former friends for their good. No labors will be more sweet than those which will enable me to place in permanent homes, in that beautiful valley, these interesting children of the mountains.

Truly yours,

ISAAC I. STEVENS,

Governor Washington Territory, in charge of exploration, &c.

Lieut. J. MULLAN, JR.,

1st Artillery, United States army.

No. 7.

FORT BENTON, *September 7, 1853.*

DEAR DONELSON: I am satisfied you should take the advance with the odometer party, a barometer, a sextant, two wagons, twenty to twenty-five men, and examine carefully the approaches to Cadot's pass. The country, and particularly the river crossings, the plateau, east of the Teton to the Missouri, and from the same plateau to the plateau between the Sun river and the next considerable tributary of the Missouri, will especially require careful examination. On leaving the Sun river to reach the base of the first dividing ridge, several streams are crossed, and it is probable a wide range of country should be taken. It is probable you will be obliged to halt every alternate day in order to do the side work. The detached parties for this work should not exceed three men. Two will often be sufficient.

The whole train will reach you by the time you are at the base of the first dividing ridge, and then the advance party must be turned into a pioneer party to remove obstructions. Whatever reports are sent to me, I am now determined to push a wagon train through—nor shall a mule be packed, except for side work, till we reach the point where we are compelled to unload our wagons.

It is impossible to give more definite instructions than those indicated in my letter of day before yesterday, and given in this note. Much is left, of necessity, to the judgment of the officer charged with the work.

It involves a constant exercise of judgment and a careful study of every new fact. The country is not known except in a general way. But enough is known to say that the approaches to Cadot's pass must be over a large space of country, and the examinations must be such that the main features shall be given with accuracy.

When Mr. Tinkham gets in, he can at once join you, giving to the region you pass over in advance a careful examination for facts, and general views of construction. With his work, and that of Mr. Lander and Lieutenant Grover, the connexion from the Milk river valley with your work will be complete.

I wish you to throw yourself into this work with your whole force. It is important not a day should be lost.

As regards Lieutenant Mullan, unless his services are indispensable, he should go to the Flathead camp, reaching St. Mary's village by a new and more southern pass. The force placed at his disposal must of necessity be small. Including one Indian (Pegan) and Mr. Rose, (Mr. Culbertson's storekeeper,) I cannot assign more than two men. Yet it must be certain that he can be spared from the magnetic observations and from the main train. He will, at all events, find his field on reaching the St. Mary's village.

You must go in advance and if possible to-morrow. The main train should move not longer than four days after you. It will consist of twelve mule wagons, not loaded more than 1,200 lbs. each.

I shall push all my business through to-day, and have not the time to consult I desire. When you come in, and come early, have your programme complete for the advance party, and I will decide at once.

* * * * *

[Here follow some unimportant paragraphs, relating to duty for next day, &c.]

Truly yours,

ISAAC I. STEVENS,
*Gov. Wash. Ter., in charge of exploration.**

No. 8.

FORT BENTON, UPPER MISSOURI,

September 7, 1853.

SIR: You are placed in charge of the survey of the railroad route from this point through Cadot's pass to the St. Mary's village, and your force will consist of the odometer party, in charge of Mr. Lambert, assisted by Sergeant Collins; the astronomical party, in charge of Mr. Stevens, assisted by Sapper Roach; the magnetic party, in charge of Mr. Doty, assisted by Sapper Wilson; Dr. Suckley, the surgeon and naturalist of the expedition, assisted by Sapper Hornor; the meteorological party, in charge of Mr. Moffett, assisted by Mr. Burr and the trained sappers of your detachment; Mr. Tinkham, estimating engineer; Mr. Osgood, the disbursing quartermaster and commissary agent and acting quartermaster and commissary of the party, and especially in charge of the baggage and supply train, with Sergeant Higgins, Corporal Coster, Simpson and Pierson, assistant wagon and pack-masters; Sergeant Lindner, in command of dragoons, Corporal Causser, with the mountain howitzer, and fourteen non-commissioned officers and men of the dragoon detachment; Mr. French and Mr. Morgan, artificers; Bashall, the blacksmith, Meckleback, saddler, and twenty-seven quartermaster employées, &c.

You will form an advance party, consisting of the odometer party, the estimating engineer, (as soon as he shall have returned from his reconnaissance of the Three Buttes,) and Mr. Adams, assistant artist; an assistant from the meteorological party, a small detachment of dragoons,

with the necessary employees of the quartermaster's department, two wagons, rations for fifteen days, will move forward at once towards Cadot's pass, moving slowly, covering the ground with great care from the dividing ridge east of the Big Teton to the Missouri river, and including a rapid reconnaissance of the falls of the Missouri river.

The approaches to Cadot's pass must be examined with care, and full information gained as to river crossings and side approaches. The space to be covered, at first large, will undoubtedly narrow towards the entrance to the pass. Advantage must be taken of hills to gain views of country. Small detached parties of one, two, or at most three men, must be thrown out for purposes of reconnaissance. In the pass the lateral valleys and passes should be examined to the extent of the force at your disposal. More definite instructions cannot be given. The field will open and the right methods will be suggested as you advance. Much may be left, of necessity, to your own judgment. I refer you, in relation to this matter, to my letter of this morning which will be considered as a portion of these instructions, and in which my views are given as to the method of conducting operations.

For information as to the details of the work, I refer you to my printed instructions, to the written instructions addressed to and in possession of the chiefs of parties, and to the methods actually in use since your connexion with the main party.

The supply and baggage train will move forward on the 11th or 12th instant, in charge of Mr. Osgood, and the marches will be so arranged between the two portions of the command, as that the whole shall be brought together at the foot of the first dividing ridge, and where the greatest obstructions to the passage of wagons are said to be found. All the baggage will be carried in wagons, and the train will consist of twelve mule teams and one ox-wagon.

On reaching the point where serious difficulties may occur to the passage of wagons, an efficient pioneer party should be organized, kept well ahead to remove obstructions, and prepare for the passage of the train. Ample supplies of rope and tackle should be provided. You are instructed to direct your energies to the passage of the train, though not to involve serious detriment to the prosecution of the survey. All the pack saddles will be taken along to provide for the possible necessity of abandoning the wagons. The wagons will not, however, be abandoned without my direct order, and you are authorized when, in your judgment, the task of pushing through the wagon train shall endanger the making the survey, to make a report in writing to me to that effect, and to turn over the train to Mr. Osgood, taking the rations necessary for reaching the St. Mary's village, and leaving to me the responsibility of deciding upon the question of continuing the effort to get the train to the St. Mary's. In drawing rations, however, you will leave with the train at least double the amount taken for the party you may organize under your immediate charge for the survey. I cannot authorize, however, the separation of the party, and the placing the entire responsibility of the train with Mr. Osgood, without your written report, referred to above, addressed to me, and placed in his hands. That report will authorize Mr. Osgood to take such measures for the care of the train and animals as, in his judgment, may be necessary.

On reaching the St. Mary's village, you will rest your animals and await my arrival—conforming, however, to instructions you may receive from Captain McClellan. It is probable Lieutenant Mullan may reach that point not long after your arrival, bringing excellent Flat-head guides, acquainted with the several passes to the Hudson's Bay posts on the Columbia river, and to Fort Hall. No time should be lost in gaining every possible information as to routes. In case of a depot not having been established at the St. Mary's village by Lieutenant Saxton, Dr. Evans, the geologist of the expedition, has instructions to bring up supplies from the Dalles for the service of the parties that may operate from the St. Mary's village.

It is my intention to establish at the St. Mary's village a winter post in charge of Lieutenant Mullan, to operate in the passes of the mountains till driven out by snow, and then to explore the lateral valleys and passes. Its establishment is essential to secure success to the contemplated survey, by Lieutenant Grover, of Cadot's pass, with a dog train, in the month of January.

Lieutenant Grover has already preceded you to reconnoitre the pass, and to open a communication with Captain McClellan. On reaching Medicine river, you may expect to meet his express, consisting of Cadot and H. Beaulieu, with a letter to me, giving information as to camps, water, difficulties of the route, and as to the arrival of Lieutenant Saxton at St. Mary's. This you will open and copy, and will then send the express forward with it to the supply train, and thence to meet me.

Should Lieutenant Grover meet you on his return, before you reach St. Mary's, you will furnish him with such men as he may select for his winter's work, not exceeding eight in his whole party, and render such assistance as he may require on his way to Fort Benton.

The most vigilant attention must be given to issues of provisions, and only half rations of hard bread and flour will be allowed when fresh meat is in abundance. This rule will apply to the gentlemen as well as men of the party. Single rations of sugar and coffee only can be allowed, except on extraordinary occasions.

I need not enlarge upon the necessity of care of animals, and keeping daily reports, as it is already well understood by you, and has been made the occasion of issuing an excellent order.

The scientific parties left behind will all move with the supply train. It is my expectation to return from the Pegan camp about the 18th instant; to move from Fort Benton not later than the 20th, and to reach the St. Mary's valley by the close of the month.

Yours, &c.,

ISAAC I. STEVENS,
Governor Territory of Washington,
and in command of exploration.

Lieutenant A. J. DONELSON,
Corps of Engineers.

No. 9.

NORTHERN PACIFIC RAILROAD EXPLORATION AND SURVEY,
Camp Dobbin, near Fort Benton, September 14, 1853.

DEAR SIR: The arrival of Lieutenant Saxton, with information of the establishment of the St. Mary's post, of the practicability of Cadot's pass, and of the route pursued by him for a railroad, but with the information that the Bitter Root range of mountains cannot with certainty be crossed after the 20th of October, makes it necessary to use all possible despatch in crossing the Rocky range, and get the exploring parties at work on their general routes westward to the Columbia.

The survey of the Marias pass will be deferred until next year. Mr. Lander's party, assigned to this duty, have been directed to report to you. The whole party will move through the pass under your direction, with pack train. Two efficient parties, under the associate engineers, Messrs. Lander and Tinkham, will get in side-work, and make the necessary estimates. Mr. Graham will report to you for astronomical duty, and Mr. Bixby to Mr. Lambert, in charge of the odometer party, for running the base line. All the dragoons, except Sergeant Lindner, Corporals Coster and Rummell, will be ordered to report to Lieutenant Saxton. Mr. Doty will be directed to report to me with Corporal Coster, and will occupy Fort Benton as a meteorological and supply post. An observer may be kept at Fort Union. The two Osbornes, the blacksmith and saddler, will also report to Lieutenant Saxton.

Mr. Stevens will report to me with the portable transit, and the necessary astronomical instruments, for special duty. When your train is in readiness to move, all the stores and baggage left behind will be turned over to Mr. Osgood, who will report to me for his duties, in connexion with all the parties, as the disbursing, quartermaster and commissary agent of the expedition.

You will press on, carrying out my instructions of the 8th instant, with all your vigor, and reach Saint Mary's at the earliest practicable moment. If I do not arrive within three days, organize your parties to explore, and survey routes to the Columbia, directing more especially towards and beyond Fort Colville, to meet Captain McClellan, and establish the Saint Mary's post under Lieutenant Mullan, with a force of ten to twenty, consisting of the seven soldiers of the 4th infantry, and such employées and voyageurs of the original party, operating from the Mississippi, as may consent to remain with their present pay, and of an experienced meteorologist, and if practicable, a good topographer. Lieutenant Mullan has had verbal instructions from me as to his duties, and you will, on conference with him, have all the information to enable you to give the necessary written instructions.

I shall endeavor to leave this place in six days, and hope to reach St. Mary's within three days after your arrival.

Yours truly,

ISAAC I. STEVENS,

Governor of Washington Territory, in charge of exploration.

To Lieutenant A. J. DONELSON,

Corps of Engineers.

No. 10.

N. P. R. R. EX. AND SURVEY.

Fort Benton, September 19, 1853.

DEAR SIR: You are instructed to take charge of the enlisted men who have reported to you to be returned from this point, and with the keel boat which has been purchased on account of the quartermaster's department, proceed down the Missouri with the greatest possible dispatch, in execution of the following duties:

First. To return the enlisted men to their appropriate army service, either at Fort Leavenworth, or at St. Louis, as may be deemed by you the most advisable, and in like manner to discharge and pay off the employées of the quartermaster's department, affording, however, to all who may desire it, transportation to St. Louis.

Second. To turn over the keel boat for the service of the quartermaster's department at Fort Leavenworth, or dispose of the same by sale, as the public interest may require.

Third. To proceed to Washington, organize your office force, which will consist of your assistant in the quartermaster's department, Mr. Hoyt, and Sergeant Collins, of the detachment of sappers and miners. This report you are requested to prepare with great care, and to send it at the earliest possible period to me at Olympia; at the same time you will send a copy of it in my name to the Secretary of War.

It is suggested that in this report you give in separate chapters the results of your observations in botany, natural history, and geology, and you are requested not only to report, in great detail, your experience with the Indians, but to enter fully into the several questions of Indian policy, especially those relating to their being reclaimed from a wandering life to permanent homes.

Fourth. Sergeant Collins, of the detachment of sappers and miners, is assigned to duty as an assistant in the work, and on resuming the survey, and you are authorized to continue Mr. Hoyt in the service of the expedition for the same purpose.

Fifth. One of your most important duties in Washington will be to afford information to the departments and to Congress, as to this hitherto unexplored region of country, and to show how the interests and the honor of the country require the continuance of three great geographical explorations.

Sixth. You have had opportunities to observe the Indian tribes, and your experience in connexion with that gained by our parties moving westward from the Mississippi, has established in all our minds the conviction that a council should be held next year at this point, to enter into a treaty with all the Indians north of the Missouri not included in existing arrangements, and those immediately west of the mountains, providing that hereafter they should cease warring upon each other, and continue, for all time to come, the friends of the whites. The time is ripe for such a consummation. I desire you to devote your energies to call the attention of the department and of Congress to this subject. In a letter which I shall send by you to the commissioner of the Indian Bureau, I shall urge that Congress be asked to appropriate money early in the session to defray the expenses of this council, and that a steamer

applicable to the service generally of the Indian Bureau on the Missouri be chartered or purchased to reach this point.

Seventh. It is hoped that appropriations will also be made early in the session to continue the survey, in which case you are requested to make the best practicable arrangements to reach this point with the assistants, Mr. Hoyt and Sergeant Collins, now on duty with you, for the purpose of exploring the region west. If appropriations be made early in the session for continuing the survey and for holding a council, it is believed that the best interests of the two services would make it absolutely necessary to secure a steamer to insure efficiency to each. To that end, much is expected from your experience and judgment.

Eighth. On reaching Puget sound, and ascertaining the condition of the work at the close of the season, I shall send more full instructions in relation to the place of continuing the survey and the supplies, instruments, and assistance required to be brought to this point. One thing is certain: a letter from Washington addressing me that appropriations have been made, and that a steamer will be placed upon the river, will give me notice two weeks before it will be necessary to leave Olympia for Fort Benton to meet it.

Ninth. Going down the Missouri, you will be able to collect many valuable facts in reference to its general character, as to the steamer adapted to navigate it, as to depôts for wood and the best method of supplying them, as to the probable time required to make the trip, both up and down the river, which will add much to the value of your report.

Tenth. I shall, at the earliest practicable moment, submit a report on the navigability of the Missouri, based on the surveys of Lieutenants Donelson and Grover, and your own observations; but should not this report be received before you have to act, I will express the opinion that you can reach Fort Benton by the middle of June, leaving St. Louis early in May, with a steamer drawing eighteen inches of water.

Eleventh. A. Culbertson, special agent among the Blackfeet Indians, goes with you under instructions from me, to repair to Washington as soon as his other arrangements will permit, to urge the importance of entering, without delay, into treaty arrangements with these Indians and those west of the mountains. His experience of twenty years among these Indians, and his known force of character, will give great weight to his views. I expect that there will be the most cordial co-operation between you in relation to these Indian questions. He knows thoroughly the river, and will put his hand to the helm.

Twelfth. William Graham and Henry Beaubien, who have at this point, at their request, been relieved from their connexion with the expedition, will accompany you, and be furnished with transportation and subsistence to St. Louis.

Yours, &c.,

ISAAC I. STEVENS,
Governor Washington Territory,
and in charge of exploration.

Lieutenant RUFUS SAXTON,
Fourth Artillery, Fort Benton.

No. 11.

Instructions to James Doty, left in command of the meteorological and supply post of the Northern Pacific Railroad exploration and survey established at Fort Benton, September.

SIR: You are placed in command of the meteorological and supply post at Fort Benton. Corporal Coster, Sapper Lint and Hugh Roby, are placed under your command. Coster to assist in taking care of the property left at this post, Lint to assist in observations, Roby as cook and laborer.

Observations will be made with the barometers, thermometers and hygrometer three times each day. The amount of rain will be determined by the river gauge. It is desirable to ascertain the general character of the winter: as the depth, and continuance of snow; time at which the river is frozen; time of breaking up; floating ice; freshets, &c.

It is important that all opportunities for observations of the Indian tribes in this vicinity should be improved. Information is desired concerning their habits, customs and tradition; the boundaries of their country; their wintering places, and their hunting-grounds in summer. It is supposed that these Indians are often found upon the California emigrant trail, and even as far south as Taos in New Mexico. Ascertain, if possible, whether their predatory excursions have this range.

Topographical explorations may be made when practicable.

The winter trading posts of the American Fur Company may be visited whenever the company's employées go there to trade during the winter, at which time much valuable information may be acquired concerning the Indians and the general features of their country.

It is desirable to make collections in natural history, mineralogy and botany, and to keep a full journal of all of interest that transpires.

You will remain in charge of this post until the 1st of July next, or until relieved by orders from myself. I shall make every exertion to reach Fort Benton, per Puget sound, in June next.

I leave with you the printed instructions and a copy of the letter of the Commissioner of the Indian Bureau, authorizing me to enter into negotiations with all Indians north of the Missouri, not included in existing arrangements.

Very truly and respectfully,

ISAAC I. STEVENS,

Governor of Washington Territory, in charge of expedition.

MR. DOTY.

No. 12.

[ORDER NO. 11.] NORTHERN PACIFIC RAILROAD EX. & S.,
Camp Atchison, mouth of Milk river, August 19, 1853.

The plan of continuing the survey to Fort Benton in two parties, determined upon at Fort Union and announced in a letter to the Secretary of War, dated August 8, 1853, under the respective directions

of Lieuts. Donelson and Grover, having been abandoned in the junction of the two camps on the west side of Big Muddy river, the following arrangements are made, adapted to the plan now in execution of moving in one line by Milk river:

1. Lieut. Donelson is the executive officer of the expedition. Under the direction of the chief of the expedition, he will exercise a general supervision on the march, and in camp regulate the details of guards, supervise the inspection of arms, and see generally that the orders of the chief of the expedition are executed. He will take general charge of all the observations, connecting them with the odometer survey, the work of the reconnoitering officers and that of the civil engineers, and will make a daily report in relation to this connexion, its character, scope, and completeness, and will, as the assistant of the chief of the expedition in charge of the observations, submit such other reports and give, in his name, such directions as may be required. Corporal Cunningham and Artificer Smith, of the engineer detachment, are especially assigned to duty with Lieut. Donelson.

2. Lieuts. Grover and Mullan are placed in charge of the magnetic observations, and Mr. Stevens is relieved therefrom. Daily observations of declination, dips, and intensity, should be made whenever practicable. These observations, in importance and interest, are secondary to none in the expedition, and from the joint labors of Lieuts. Grover and Mullan the best results are expected. Private Roach, of the engineer detachment, is assigned to duty with these observations, as an aid. This opportunity must be availed of to acknowledge the services of Mr. Stevens in this department.

3. Lieut. Grover is also requested to make such astronomical observations as his time and circumstances will admit of, in order to be ready to take charge personally of all observations on detached service, to which he at any moment may be assigned. Much is expected from his known energy, activity, and ability in all departments of the expedition. He is directed to do such reconnoitering as may be compatible with his other duties, and, by examination of guides and Indians, and particularly by a free interchange of views with the civil engineers, gain every possible information in reference to probable routes—reporting daily to the chief of the expedition in relation thereto.

4. Mr. Stevens is continued on duty as the astronomer of the expedition. Great attention must be given to these observations, particularly those of lunar distances, and with the portable transit. This instrument should be mounted as often as practicable, and it is believed that on reaching Fort Benton, the longitude of that point, and the rates of the chronometers can by it be determined with great accuracy.

Messrs. Doty and Graham are continued on duty in the astronomical department as assistants, and thanks are returned to them for the efficient aid they have already rendered. Mr. West is especially commended for his great patience and fidelity in the performance of his duty, and, with private Wilson, of the engineer detachment, is also continued on duty as an aid.

5. The meteorological observations are continued in charge of Mr. Moffett, with Mr. Burr as an assistant, and artificers Davis and Lynt, and private Broadwell, of the engineer detachment, as aids. Mr. Mof-

fett's industry, perseverance, and success in overcoming many practical difficulties, and in faithfully making and recording a large number of observations, are acknowledged. In addition to faithfully assisting in the camp observations, Mr. Burr has, on detached duty, shown a high spirit, and rendered efficient service.

6. The civil engineer party is placed on the following basis: Mr. Lander, with Mr. Evelyn as assistant, is charged with the duty of taking large views of country, with collecting information in reference to supplies, the location of the road, and questions of transportation, and, in connexion with data afforded by the odometer survey, and by detached parties, estimates and reports upon the general construction and location of the road. In these duties, Mr. Tinkham will be associated with Mr. Lander.

Mr. Lambert is placed in charge of the odometer survey, with Sergeant Collins, of the engineer detachment, as assistant topographer, and Mr. Bixby to run the compass line. The civil engineers and the topographer will make daily reports to the chief of the expedition.

7. The artist and naturalist of the expedition will act under the immediate instructions of the chief of the expedition, who may, however, communicate instructions through the senior officer, Lieutenant Donelson. The same remarks will apply to the quartermaster and commissary agent of the expedition, Mr. Osgood, who will also, in relation to camps and marches, act under the immediate direction of the executive officer. Mr. Kendall is continued on duty, with Mr. Osgood, as general assistant, and corporal Coster, of the dragoon detachment, in the details of quartermaster and commissary duties. Mr. Adams, whose services as assistant topographer, from the Mississippi to Fort Union, both on the line of the odometer survey and on reconnaissance, have been of great value, is assigned to the artist as an assistant. Private Horner, of the engineer detachment, is continued on duty with the naturalist as an aid. The services he has rendered are entitled to notice.

8. All matters pertaining to Indians will be referred, in all cases where practicable, to the chief of the expedition; and all persons are enjoined to carry out the mild, humane, but firm policy, as instructed by those having charge of our Indian affairs. To this end reasonable issues of provisions will be made, and, under regulation, free access to camp will be permitted. But all men are enjoined to be on their guard, and the general deportment of the camp should be vigilant to prevent stampede of animals, and the loss of single men.

The interpreters employed must be used in intercourse with the Indians, to guard against misunderstanding, and that their real wants may be known. In the absence of the chief of the expedition, reference must be had to Mr. Culbertson, special agent among the Blackfeet Indians.

9. The chief of the expedition cannot omit this opportunity to acknowledge the great services of Lieutenants Donelson and Grover. The former, for his elaborate survey of the Missouri river to above Fort Union, and his reconnaissance of the country in the vicinity of Fort Union, from the White Earth to the Big Muddy rivers. The survey of the Missouri, prosecuted under great difficulties, was not only very complete, affording even the data for prosecuting operations to

make it more navigable, but was enriched with large collections in geology and natural history, and illustrated by characteristic views. The reconnaissance from the White Earth to the Big Muddy was necessary to complete the work of the overland parties. In this work the services of Lieutenant Mullan and Mr. Graham have largely contributed, and their services deserve special commendation. The services of Sergeant Collins, of the engineer detachment, particularly in the topographical survey of the Missouri river, deserve notice; they not only reflect credit on the company to which he belongs, but bespeak for him a career of future usefulness.

Lieutenant Grover, deflecting from the course of the main party at an early stage in its march, and taking charge of a small detached party, at a period when such service was considered one of peril, steadily contended with and overcame all obstacles and difficulties, and, with the eye of an engineer marking out his course, reached Fort Union seven days before the main party. The chief of the expedition would do injustice to his appreciation of Lieutenant Grover's services, if he failed to express his admiration and respect for them. In this connexion is noticed the valuable aid afforded to Lieutenant Grover by Mr. Evelyn, in charge of the team, and corporal Cunningham, of the sappers and miners, in charge of the odometer and compass on that line. Their services are deserving of warm commendation.

The services of Lieutenant Mullan, in relation to the survey of the Missouri, and the reconnaissance from the White Earth to the Big Muddy rivers, have been of the most marked character, and entitle him to especial commendation. Particularly has he brought up the meteorological observations to a proper standard, and taken charge of the collections. His services in training assistants have been most valuable.

Mr. Graham, who had charge of the astronomical observations under direction of Lieutenant Donelson, deserves especial notice for his efficient services, rendered amidst many trying difficulties.

Acknowledgments are due to the civil engineers, Messrs. Lander and Tinkham. Mr. Lander, for his examination and report on the crossing of the Mississippi, his reconnaissance of the Cheyenne valley, of the Dog's House, and of the Mouse river, and the Coteau du Missouri, and for the consummate judgment and great experience which he has brought to his department of the work; and Mr. Tinkham, for the admirable compass line, connecting the geographical positions, which he has run half across the continent, and for valuable topographical and statistical information collected on the route. Mr. Bixby, in charge of the compass, did not even seem conscious of difficulties or obstructions in his course.

The expedition has been most fortunate in its surgeon and naturalist, Dr. Suckley. Not only a scholar and gentleman, beloved by all, but eminent for his genius, his energy, his diligence—whose efforts have been felt in all departments of the expedition.

The artist, Mr. Stanley, has illustrated, in the most faithful manner, all that has been done and seen. The topographer, Mr. Lambert, has shown his extraordinary talent in his department of the work, and to great professional excellence has added untiring application.

The most emphatic acknowledgments are due to Mr. Stevens, the

astronomer of the expedition, for his perseverance amidst many practical difficulties, and for his cheerful performance of duty when overtaken with work; and overloaded with the duties of a new and difficult department not contemplated to be assigned to his charge, and for the valuable results which he has contributed to the expedition.

The sound judgment, steady course, and great integrity of the disbursing quartermaster and commissary agent, Mr. Osgood, has not only done much towards overcoming many difficulties in the expedition, and to establishing kindly relations between its several parts, but has commanded the respect and won the affection of both the officers and men. Mr. Everett, the quartermaster and commissary clerk, a veteran in the public service, has been to all an example of constancy and diligence. Mr. Kendall's services, in difficult confidential business, at the early stage of the expedition, in connection with instruments and supplies, and, at a later period, in charge of the feeble animals, and preparing them for a return to service, were in the highest degree of advantage to the expedition, and are gratefully acknowledged.

Mr. Evans, the assistant of the chief of the expedition in the custody and preparation of papers, orders, &c., has cheerfully performed his varied duties, and has, in all departments, rendered efficient service.

The sappers and miners on duty with the expedition have, by their labors, added to its results, and will, before its close, identify themselves and their arm with every one of the scientific departments, and with the collections and surveys.

Thanks have already been returned to the guides and hunters, the detachment of dragoons, and the several employées of the quartermaster's department, but the present occasion is availed of to repeat the grateful acknowledgments of services, and to say that, with such men, all obstacles will surely be overcome in the accomplishment of the great objects of the expedition.

In closing this order, the efficiency of sergeant Lindner, of the dragoon detachment; of sergeant Higgins, the wagon master; and of sergeant Simpson, the pack master, on duty with the main party; and of corporal Coster and Mr. Pierson, with Lieutenant Grover's party—are especially commended.

ISAAC I. STEVENS,

Governor Washington Territory, in charge of exploration.

No. 13.

[ORDER No. 1.]

CAMP PIERCE, May 30, 1853.

Lieutenant Grover, having requested to be relieved from the duties of acting assistant quartermaster and commissary of the expedition for the survey and exploration of a railroad from the Mississippi to Puget sound, in order to devote his time to the performance of the scientific duties of the expedition, and Captain Gardiner having consented to act in that capacity, Lieutenant Grover is relieved from that duty, and Captain Gardiner will, from this date, act as quartermaster and commissary.

ISAAC I. STEVENS,

Governor of Washington, in command of expedition.

No. 14.

[ORDER No. 2.]

CAMP PIERCE, *May 30, 1853.*

The astronomical and magnetic observations are entrusted to the charge of George W. Stevens, Esq., and Captain A. Remenyi, who will alternate daily in taking charge of each class of observations. Mr. Stevens will at first take charge of the astronomical, whilst Captain Remenyi will have care of the magnetic, and thereafter, alternate each day. Both will assist in these branches of labor, and freely confer with and consult each other.

Mr. B. F. Kendall, who is expected to arrive shortly, and one sapper will be assigned to Mr. Stevens, and one sapper and Mr. Jekelfalusay will assist Captain Remenyi.

Messrs. Stevens and Remenyi are expected to instruct their respective assistants in the astronomical and magnetic observations, the use of instruments, and each to make a daily report in writing while in camp of their observations and labors, particularly stating the progress each man makes under their instructions, with the view to ascertain the character of the duties which such assistants are best adapted to perform.

ISAAC I. STEVENS,

Governor Washington Territory, in command of expedition.

No. 15.

[ORDER No. 3.]

CAMP PIERCE, *May 31, 1853.*

Mr. Tinkham, with his civil engineers, will move off at 12 o'clock, with one common wagon, (to be replaced hereafter by a spring wagon,) and the second mule team brought up on the Shenandoah, four well broken riding mules, one good teamster, provisions for fifteen days, forage for five days, one wall and one common tent, two Colt's revolvers, two Sharp's and two ordinary rifles, with the necessary ammunition.

Captain Gardiner will have Mr. Tinkham fitted out as above, so that he may move promptly at 12 o'clock.

ISAAC I. STEVENS,

Governor Washington Territory, in command of expedition.

No. 16.

[ORDER No. 4.]

CAMP PIERCE, *May 31, 1853.*

If practicable, six wagons, with stores not needed till the main body reaches the crossing of the Mississippi, above Sauk rapids, will move early to-morrow morning, in charge of a suitable person to be designated by Captain Gardiner, should the weather be propitious; it will be well to load the wagons, and do something towards breaking in the animals to-day.

Instructions have been given to Mr. Lander to make arrangements

for the crossing of the Mississippi, and the wagon master will, if practicable, move his animals across the river, and place them in a good camping ground to await the arrival of the main body.

Suitable arms and ammunitions will be issued to the train, and good care must be taken of the stores.

ISAAC I. STEVENS,
Governor Washington Territory, in command of expedition.

No. 17.

[ORDER No. 5.]

CAMP PIERCE, *June 5, 1853.*

Arrangements will be made to move camp on Monday morning, and every exertion will be made to reach Sauk rapids on Friday, and cross the river on Saturday.

The officers and gentlemen of the scientific corps will take the boat at the Falls on Monday, which will enable them to reach Sauk rapids on Tuesday evening; one wagon, and the riding mule of each person of the party, will accompany them.

An astronomical and magnetic station will be established west of the Sauk rapids

ISAAC I. STEVENS,
Governor Washington Territory, in command of expedition.

No. 18.

[ORDER No. 6.]

CAMP DAVIS *near Sauk rapids.*

There will be an inspection of camp at 10 this morning. This will include an inspection of personal baggage and camp equipage, and property of all descriptions.

The officers of scientific corps, the dragoon detachment, and the quartermaster's will be drawn up.

Lieutenant Du Barry will make the necessary arrangements, and give the proper notifications.

ISAAC I. STEVENS,
Governor Washington Territory, in command of expedition.

No. 19.

[ORDER No. 7.]

CAMP DAVIS, *June 13, 1853.*

For purposes of convenience in detailing guards, and to give a military organization to the entire expedition, the following gentlemen are appointed to the grade of lieutenant: Isaac T. Osgood, J. M. Stanley, A. W. Tinkham, F. W. Lander, A. Remenyi, G. W. Stevens, John Lambert.

The following assimilated to the grade of non-commissioned officers:

Joseph F. Moffett, James Doty, James Evelyn, James Gear, B. F. Kendall, Thomas Adams, M. Strobel, Tekelfolensy, Simpson, Higgins, E. Evans.

The remainder will be detailed with artificers, and privates of sappers and miners, and privates of dragoons.

The medical, Dr. Suckley's, position is assimilated to that of an assistant surgeon in the army, and dates from the period of his joining the expedition.

The parties organized under the several chiefs will, on coming together, preserve their distinctive organization. The chief of the expedition, in his absence the senior officer present, regulating the general mode of encampment, police, and supervising the details of guard; the principle of the foregoing encampment must be complied with.

It is considered of great consequence that the several trains should not be intermingled, and the dragoons attached to the several parties will continue with them camping, and working with them, receiving their orders only from their particular chiefs, even when the whole force is brought together.

ISAAC I. STEVENS,
Governor Washington Territory, in command of expedition.

No. 20.

[ORDER No. 8.]

CAMP NEAR LIGHTNING LAKE,
July 19, 1853.

The most rigid economy in the consumption of provisions being necessary, the caterer of each mess will carefully note in a book, kept for the purpose, the daily amount consumed of the various articles constituting the ration, which book shall be daily inspected by the chief of each party.

Whilst in the game country, the quantity of pork and bacon must be diminished. Where the supply of game and fish is sufficient to furnish as much as each man can eat, the quantity of pork and bacon should be reduced to the minimum—one-eighth of a pound a day.

Caterers of messes are enjoined also to note the amount of game, fish, &c., furnished to their respective messes.

When parties come together, the hunters and guides will report to the chief of the expedition, or in his absence to the senior officer. The reason for this is obvious: they are employed to benefit the whole expedition, and this course will insure the best result in procuring and securing an equitable distribution of supplies.

It is made the duty of the senior officer to see that the game is equitably distributed, as between the parties, and of the chief of each party between the several messes.

No. 21.

[ORDER No. 9.] NORTHERN PACIFIC RAILROAD EX. & S.,
9° N. W. Fort Union Camp, August 16, 1853.

The most careful attention to animals is enjoined upon all persons engaged in the expedition, and will be rigidly enforced. The animals must not go beyond a walk, except in case of necessity, and each mounted man must walk some four or five miles each day to rest his animal, unless it be impracticable, in consequence of his duties. At halts, men must dismount. This direction will be enforced, as well in regard to private as to public animals.

I. I. STEVENS,
Governor of Washington Territory, in command of expedition.

[ORDER No. 10.] NORTHERN PACIFIC RAILROAD EX. & S.,
Camp Atchison, mouth of Milk river, Aug. 19, 1853.

In addition to the regular nightly guard, there will, commencing with to-day, be hereafter detailed one non-commissioned officer and four sentinels, who shall constitute a day guard, and whose duties shall be regulated as follows:

1. The detail shall be made from a roster, consisting of all persons who now go on guard as non-commissioned officers—who shall be detailed, in turn, as non-commissioned officers of this day guard, and of all persons who are now subject to detail as sentinels, who shall be detailed, in turn, as sentinels of the day guard—except that the chief wagon masters, the persons in charge of the horses and of the pack train, the carpenters and blacksmiths, and the cooks, shall be excused from this duty.

2. The tour of the day guard shall commence when the sentinels of the night guard are taken off post in the morning, and shall terminate when those sentinels go on post in the evening. They shall be divided into reliefs, and regularly posted, prior to leaving camp in the morning, and after encamping in the afternoon, as well as at halts made during the day.

3. The officer of the guard on any night shall have charge of the guard of the subsequent day, and shall enforce the orders in reference thereto. The two guards should otherwise be kept separate and distinct. The day guard should be so arranged that it shall include no person who may be on the night guard, and the day tour ought, if possible, to be intermediate between two of his night tours.

ISAAC I. STEVENS,
Governor of Washington Territory, in charge of expedition.

No. 22.

[ORDER No. 12.] NORTHERN PACIFIC RAILROAD SURVEY,
Camp Atchison, mouth of Milk river, Aug. 20, 1853.

On the march the train will keep as much together as possible; the speed of the wagons will be regulated by Governor Stevens' ambulance or wagon, or by the instrument wagon. The acting quartermaster will regulate the pace of the leading team in such a manner that all other teams can keep up without forcing the mules. No person except guides, or those having permission, will precede the train by more than one-fourth of a mile, or go further from it than that distance, unless in case of necessity or for the performance of some duty.

ISAAC I. STEVENS,
Governor of Washington Territory, in charge of expedition.

 No. 23.

[ORDER No. 13.] CAMP No. —, MILK RIVER,
September 1, 1853.

The undersigned, on the part of the government, of the chief of the expedition, and for himself, as being directly responsible, returns thanks to the members of this party for the *energy* and *promptitude* they displayed in taking precautionary measures against the prairie fires on the night of the 30th and morning of the 31st of August.

A. J. DONELSON,
Lieut. Engineers, Executive Officer.

 No. 24.

[ORDER No. 14.] CAMP No. —, MILK RIVER,
September 1, 1853.

I. No animal should go beyond a walk, except in case of necessity. No man should leave the line without permission of the officer in charge.

II. The mules and horses, after being watered, are to be picketed within the line of tents and wagons, at the first bugle call after coming into camp; oxen to be hobbled at the same time. Daily reports of animals to be rendered to the quartermaster, according to the following programme: 1. Report to be rendered immediately after the animals are picketed in the evening. 2. The report to state the number and condition of the animals, and whether they have been properly picketed. 3. Mr. Higgins to report concerning all the animals at present under his charge, including that ridden by the cook of the teamster's mess; Mr. French, concerning all loose horses, those ridden by persons of his party, those ridden by the hunters, and that of the cook of his mess; Mr. Pearson to report concerning all mules, horses and oxen belonging to the cart train; Sergeant Collins and Sergeant Lindner, concerning all mules

and horses ridden respectively by sappers and dragoons; Mr. Simpson to report upon all loose mules, all mules ridden by persons of his party, including that of the cook of his mess and those driven in the carts. The other reports to be rendered by messes, the chief of each to report concerning the horses and mules ridden by persons of the mess, including cooks and attendants, and excepting any which are to be accounted for by other persons. 4. The persons in charge, or who render the above reports, are also held responsible for a compliance, both in camp and on the march, with all the orders in reference to animals. 5. The quartermaster will, in the evening, after receiving the above reports, state in general terms their substance to the senior officer present.

III. Extra issues of flour are not to be made, except in reference to the chief of the expedition, or, in his absence, to the senior officer present.

IV. No changes will be made in the employment of persons, or in the use of animals which come under the charge of the quartermaster, except by his permission, and he will report any such changes to the senior officer as soon after they are made as practicable. The quartermaster will also report to the senior officer prior to the abandonment of any portion of the train, or in cases of a similar nature which may arise. No changes will be made in the employment of persons, or in the use of the animals not under the direction of the quartermaster, except by permission of the senior officer present.

V. While in camp, no person will fire within one hundred yards of the line of wagons and tents. No person will fire while on the march without special permission of the senior officer present. All persons are required to keep within at least one-quarter of a mile of the wagon train, except those who belong to the cart train, which is generally separate, unless they leave for the performance of some duty, or by special permission. This requires that all persons should halt when the train does, and leave camp, and halt, at the same time with it.

VI. Every one riding, or having charge of horses and mules, is required to take every precaution for preserving them in good order and condition, dismounting at halt, taking the bits from the animals' mouths when occasion offers for grazing, and resting them by walking some portion of every day's march—so much of the order now in existence as requires the walking to take place immediately after the noon halt is, for the present, suspended.

On account of the danger of losing animals by Indians, the greatest vigilance is required on the part of guard and sentinels, and the greatest care on the part of those who have charge of picketing the mules and horses.

VII. The foregoing—partly new orders, partly orders already in existence—are here published, in order that every one may know what is required of him, and what restrictions are adopted for the safety and good order of the train while in camp and on the march.

A. J. DONELSON,
Lieut. Engineers, S. Officer.

Endorsements on above.

This order, which is no more or less than a salutary and reasonable restriction, imposed for the general good on every person of the command, must hereafter be obeyed. As a matter of course, the senior officer present with the train is responsible for the orderly march thereof; every person having the command, assimilated or otherwise, of a body of men, is responsible that they obey orders, and all persons who are not under the command or charge of any second person, are directly accountable for a compliance with existing orders to the senior officer actually present with the train.

A. J. DONELSON,
Lieut. Engineers, S. Officer.

CAMP No. 59, *September 3, 1853.*

The within orders not having been carried by the orderly to all the persons concerned, they are now sent around again. Attention is called to the paragraph in reference to firing on the march. While no objection exists to hunting or shooting game where those wishing to do so are by permission, or on duty, away from the line, it is manifestly injurious to the service that the march of a line of 80 men and 192 animals should be exposed to accident or delay by persons firing indiscriminately at game which may come near the train, particularly when there are hunters, whose duty it is to kill and bring in fresh meat.

No. 25.

[ORDER No. 15.] CAMP No. 60, *September 5, 1853.*

To-morrow morning, before starting, and after the mules are hitched to the wagons, all the horses and mules which are ridden, as well as all loose horses and mules, will be arranged in a line for being inspected. The team mules and oxen will be inspected while they are harnessed up. The cooks will be awakened at day break, the animals will be turned loose to graze at the same time, breakfast will be at 5½ o'clock, tents struck and teams harnessed at six.

A. J. DONELSON,
Lieutenant Engineers, E. Officer.

No. 26.

[ORDER No. 16.] CAMP DOBBIN, NEAR FORT BENTON,
September 9, 1853,

In obedience to the assignment of the chief of the expedition, as expressed in instructions dated the 7th instant, and received this day, the undersigned hereby assumes charge of the party for the survey of

the railroad route from this point, through Cadot's pass to the St. Mary's village, as designated in said instructions, or in others of a similar nature, this party consists of the following persons, viz :

Lieutenant A. J. Donelson, in charge ; Dr. George Suckley, surgeon and naturalist ; Mr. A. W. Tinkham, estimating engineer ; Mr. G. W. Stevens, astronomer ; Mr. John Lambert, in charge of odometer survey ; Mr. Joseph F. Moffet, meteorologist, &c. ; Mr. James Doty, assistant astronomer ; Mr. Thomas Adams, assistant artist ; Mr. B. F. Kendall, assistant to quartermaster ; Mr. P. Higgins, wagon master ; Mr. James Simpson, pack master and in charge of loose mules ; Mr. Henry Pierson, assistant wagon master ; Mr. French, in charge of loose horses ; Mr. West, carrying chronometers ; Sergeant Collins, sapper, assistant in odometer survey ; Artisan Davis, sapper, assistant to meteorologist ; Artisan Lynt, sapper, assistant to meteorologist ; Artisan Smith, sapper, second assistant on odometer survey ; Private Broadwell, sapper, assistant to meteorologist ; Private Horner, sapper, assistant to Dr. Suckley ; Private Roche, sapper, assistant to Mr. Stevens ; Private Wilson, sapper, ass tant to Mr. Doty ; Sergeant Lindner, dragoon, commissary sergeant and assistant guide ; Corporal Roaster, dragoon, assistant commissary sergeant and assistant guide ; Corporal Cosser, dragoon, in charge of howitzer ; Corporal Lake, dragoon, in command of rear guard ; Corporal Chowming, dragoon, in charge of pitching and striking tents ; Private Magruder, dragoon, on detail for tents ; Privates Ashcroft, Dittman, Otes, Hoggins, Smith, Donovan, Goerkey, Gauss, Flinn, Magahran, and Maxfield ; Teamsters McGee and Wilson, Lieutenant Donelson's team ; Teamsters McGinnis, Bell, and Monroe, Mr. Osgood's team ; Teamsters Gear and Agnew, instrument wagon ; Teamsters Davis, Bracken, Saint Louis, Dume, Winn, and Michelle ; Saddler, Michelback ; Blacksmith, Bashall ; Pelissier and Camartin, in charge of loose mules ; Benoit, Duprey, Corri, Seeley, Nye, Farnham, Simpson, jr., Dauphin, William, Hudson, Osborne 1st, Osborne 2d, George Smith, Hugh Robey, and Baptiste ; Indian, Yellow Hair, guide.

A. J. DONELSON,

Lieutenant Engineers in command.

No. 27.

[ORDER No. 17.]

CAMP DOBBIN, *September 11, 1853.*

The quartermaster having reported that the repairs and other arrangements which were required would be completed this day, the scientific parties and the train will start for the Flathead village as early as possible to-morrow morning. Attention is called to the orders which exist in reference to duties in camp and on the march. These must hereafter be obeyed. Persons in charge are held responsible for those who compose their parties ; thus the quartermaster is responsible for all employed in that department, Mr. Higgins for the teamsters, Mr. Simpson for the packers, &c. The principal of the orders are herewith sent around by the orderly to the chiefs of parties, and their contents will by them be communicated to those under their charge.

The portion of the command which has been designated as an advance, will, for reasons growing out of the approach of Lieutenant Saxton and return of Lieutenant Grover, for the present accompany the main train

A. J. DONELSON,
Lieutenant Engineers in command.

No. 28.

Camp Regulations.

1. There is no such thing as an escort to this expedition. Each man is escorted by every other man. The chiefs of the scientific corps will equally with the officers of the army act as officers of the guard. The aids will assist in this duty equally with the non-commissioned officers of the sappers and miners, and of the dragoon detachment. The quartermaster employées will stand guard equally with the privates, and sappers and miners, and of dragoons. It is confidently believed that every member of the expedition will cheerfully do his duty in promoting all the objects of the expedition, sharing its toils of every description.

2. Each man of the expedition will habitually go armed. The chief of each party and detachment will rigidly inspect arms each morning and evening; except in extraordinary cases, there shall be no march on Sunday. On that day there will be a thorough inspection of persons and things. Clothes should be washed and mended, and, if water can be found, each man will be required to bathe his whole person. This course is taken to secure health.

3. The Indian country will be reached in ten days. There is no danger to be apprehended, except from the want of vigilance of guards, and the carelessness of single men. The chief of a party or detachment will inspect the guard from time to time in the night, and report every case of inattention to duty.

4. It will be the habitual rule of each member of the scientific corps to take charge of his own horse, and to take from and place in the wagon his own personal baggage, as private servants are not allowed, the necessity of this rule will be apparent. There are exceptional cases, however, as the chief of a party, or where great labor has to be performed.

5. There will be no firing of any description, either in camp or on the march, except of the hunters and guides, and certain members of the scientific corps, without permission of the chief of the expedition, or in case of detachments, of the officer in charge of the detachment.

No. 29.

CAMP PIERCE, *June 3, 1853.*

DEAR SIR: It is with great regret that I learn from your letter of this date, enclosing the certificate of Dr. Suckley, the medical officer

of the expedition, that in consequence of your health you are obliged to ask to be relieved from duty with the expedition under my command.

I have looked forward to your co-operation as a great element in the success of the expedition, bringing as it would the very experience to the work in which the other officers associated with us and myself are deficient. But I see no alternative, observing as I have done the state of your health, with your application and the certificate of Dr. Suckley before me, than promptly to comply with your request.

You may be sure I shall never forget the lively interest you have taken in the success of the expedition, the exertion you have made to forward it, and your efficient assistance in making the preparations for the field; you are accordingly relieved from duty with the command, and are directed to repair to Washington city and report for duty.

[Unimportant paragraph omitted.]

I will personally discharge the duties of quartermaster and commissary of the expedition, and will sign the necessary papers whenever they shall be prepared.

Truly your friend,

ISAAC I. STEVENS,

Governor Washington Territory, and in command of expedition.

NORTHERN PACIFIC RAILROAD EX. & SURVEY,
Olympia, W. T., December 5, 1853.

SIR: I have the honor to report my arrival at this place, and to submit the following statement of operations since my report from Fort Benton. Before entering upon the narrative it will be proper for me to state that I feel the greatest satisfaction at the complete success of the exploration, and that the report will show an amount of work reflecting the highest credit upon my associates. No disaster or untoward circumstance has marred the work. The parties have reached the Columbia river in the highest spirits—no man broken down by over-exertion or unnecessary exposure. The three great western ranges have been crossed in the fall; no snow whatever seen except on the topmost peaks till the last days of October, and then only for a few inches, passing away in two or three days. I can pronounce with the greatest confidence the route to be eminently practicable, and in so doing I feel repaid for the great exertions I have made, and the great anxiety which at times has almost overcome me, in preparing for and conducting the exploration. I am confident that when our contributions in the way of general geography and in the development of the resources and character of the country passed over, are given to the public, it will be conceded that a public advantage has accrued far outweighing the expenditure, even should other railroad routes be finally determined on. Moreover the exploration has been a vital element in the management of the Indian tribes, restraining their predatory habits, and disposing them to rely upon the general government to guaranty to them peace and protect them in their rights.

In the narrative of operations which I shall now present, the several

letters of instructions will be referred to, and copies of the same given in an appendix ; and such results will be stated as can be relied on, previous to a careful analysis and comparison of all the data in the office.

In my report from Fort Benton, my reasons were given for pushing all the parties through Cadot's pass, and for abandoning the examination of the Marias.

Previous, however, to this conclusion, Lieut. Mullan had set out from Fort Benton to visit the Flathead camp on the Muscle Shell river, and thence to explore a more southern route to the St. Mary's valley.

Lieutenant Donelson moved from his camp on the Teton river September 16, and pressed forward vigorously to his work, with two efficient civil engineer parties under Messrs. Lander and Tinkham for side reconnaissance and the general estimate, and an odometer party under that most able topographer, Mr. Lambert. I remained at Fort Benton till Mr. Stanley returned, on the 20th September, with a large delegation of the Blackfeet Indians, when a most amicable and satisfactory council was held with them on the next day, at which they agreed to respect all whites travelling through their country, to cease sending their war parties against the neighboring tribes, and to submit to the Great Father the settlement of their difficulties. One of their principal chiefs, Low Hone, in a speech of great eloquence and power, implored his people, now for the first time they had experienced the protecting care of the Great Father, to listen to his words; and he commanded them to abide by the promises just made in council. He desired me to say to all the Indians west of the mountains that the Blackfeet were no longer their enemies, and that they desired to meet them in council at Fort Benton next year. This I deem a measure essential to the establishing a general peace, and have, in a communication to the Commissioner of Indian affairs, earnestly recommended it.

This business brought to so satisfactory a conclusion on the 21st September, I set out early on the 22d with a select party, consisting of Mr. Stanley, the artist, Mr. Osgood, the disbursing agent, Dr. Suckley, our surgeon, who, leaving Lieutenant Donelson's command to visit the falls was not able to rejoin it, and returned to Fort Benton. Messrs. Evans and Kendall, two young gentlemen, kept behind to assist me in my correspondence, and five voyageurs and an Indian guide, and camping with Lieutenant Donelson at the end of the fourth day, I reached the St. Mary's village at noon on the 28th instant, making a distance of about two hundred and forty-three miles in six and a half days. Lieut. Donelson reached the village on the 29th instant, and Lieutenant Mullan on the 30th. In Lieutenant Donelson's exploration of the route from Fort Benton to the St. Mary's village, Mr. Lander was very successful in approaching the mountains high up at the Marias river, and towards the sources of the Teton, Medicine, and Dearborn rivers, and entered the mountains, finding in each case excellent railroad crossings, and crossed the dividing ridge some miles north of the pass pursued by both Lieutenants Donelson and Saxton, bringing with him an excellent railroad line to the junction of the two routes in the main pass. As regards both entrances to the pass, a small tunnel will be required in each case, not however exceeding one

mile in length, and the grades approaching the passes will not probably exceed forty or forty-five feet per mile. The descent down the Hellgate river was mostly through an open valley, till the Hellgate passage is reached, where the river winds in a narrow defile, requiring for a railroad expensive sustaining walls and embankments, and probably some small tunnels to avoid short curves.

It is practicable, though expensive, for a railroad.

It can be turned, however, two ways—1st, by tunnelling a marble mountain south of it on the route of Lieutenant Saxton, and in relation to which I shall soon receive a report; and 2d, by crossing over from a tributary of the Hellgate in the open valley of the pass to the valley of the river Jocko, one of the principal southern tributaries of Clarke's fork. Mr. Tinkham was assigned by Lieutenant Donelson to this duty, and with his detached party left the main party on the 26th September, with instructions to reach Fort Benton in six days. Reserving to a future paragraph a notice of this important side route of Mr. Tinkham, (I will notice Lieutenant Mullan's route,) simply stating that the two routes come together at the Hellgate passage, and that the St. Mary's valley affords an excellent railroad line, not only to the St. Mary's village, but high up towards its source.

Lieutenant Mullan, as the department has already been advised, left Fort Benton on the 9th instant, and struck the Muscle Shell river on the 13th. After following the trail of the Flathead camp eastward twenty miles to a pond, and thence twenty miles further in a south-eastern direction, over a rough and difficult country, he found it still five days ahead of him, and determined to place his party in camp, and with his Indian guide follow on the trail. The Flathead camp was found sixty or seventy miles distant, in a beautiful valley, and he was received with the greatest hospitality. Four of the principal chiefs agreed to accompany him to the St. Mary's village. His route was by the north fork of the Muscle Shell, thence by an excellent prairie road to Smith's river, which flows into the Missouri in a northeasterly direction, and which he followed for a considerable distance; when finding it to lead too far to the north, he left it and crossed to the Missouri over an easy divide, and struck it at a point where a most excellent road led westward some twenty miles to the dividing ridge, whence rises the main fork of the Bitter Root river. This dividing ridge he crossed the second day after leaving the Missouri, the divide being only four hundred feet high and three miles across; and proving the only difficult point of passage in his route from Fort Benton. Thence his route was by the Blackfoot fork of the St. Mary's river, and the St. Mary's river to Fort Owen, the valleys open the whole distance, except in the case of a single mountain shutting down upon the river bank, and making a light side cutting necessary to a good wagon road, and the grades scarcely perceptible either for rails or wagons the whole distance.

Immediately on reaching the St. Mary's village, Lieutenant Arnold, in charge of the post left there by Lieutenant Saxton, sent for Victor, the Flathead chief, (the small remnant of the tribe not on the hunt east of the mountains, and in camp some forty miles down the river,) for a conference in reference to the condition of the tribe, its disposition

towards meeting the Blackfeet in council, and to communicate the determination of the government to protect them in their rights. A portion of the camp moved up to the village and met the chiefs who accompanied Lieutenant Mullan. Victor, however, was absent on business to the Cœur d'Eleine mission, and I did not meet him for some days. The conference was satisfactory, and impressed me very favorably as regards the truthfulness and worth of these Indians. The spirit of my conference, as well as that of Lieutenant Mullan, will appear from my instructions to him at Fort Benton, which have already been communicated to the department, and his report, a copy of which I herewith enclose. I will particularly call your attention to his account of the fertile valleys of the Muscle Shell and Smith's rivers; to the mild climate west of the Missouri, and the rich and abundant grass on the whole route. The same luxuriance of the grasses is every where found in the valleys of the Rocky mountains and the adjacent prairies.

On my arrival at Fort Owen, the importance of establishing the winter post already determined upon was only the more apparent, and fifteen men were placed on duty with Lieutenant Mullan. Unfortunately but few of the animals left by Lieutenant Saxton were fit for service, and were all needed for the parties going westward over the Cœur d'Eleine mountains.

The remaining animals were, however, gradually improving, and would, it was believed, furnish Lieutenant Mullan in the course of ten weeks the means of running a line down to Fort Hall to connect our surveys with those of Fremont. By referring to a copy of his instructions, herewith enclosed and marked 2, it will be seen that he has likewise had assigned to him the duty of extending the survey northward, of making all possible examination of the passes, and to occupy a meteorological post during the winter. Very good specimens of gold have been found in the St. Mary's valley, and Lieutenant Mullan's attention has been specially called to it in these instructions.

Lieutenant Donelson was placed in command of the principal party with the civil engineer Mr. Lander, and Lieutenant Arnold's associated with Mr. Stevens in the astronomical observations, and also in charge of a separate party for side reconnaissance. It was now important to give such directions to the operations as to ensure a connection between the eastern and western divisions of the survey, and whilst Lieutenant Donelson was moving along the general line of Clarke's fork, I determined with a little party, consisting of Mr. Stanley, Mr. Osgood, and four men, to push over the Cœur d'Eleine mountains by the Cœur d'Eleine mission, and thence to proceed to Colville to bring about a connection. To guard against Captain McClellan passing us, Lieut. Donelson was instructed to send Lieut. Arnold to Colville from the crossing of Clarke's fork by the northern trail, and to repair to the Spokane house on the Spokane river to receive additional instructions. He was directed in his instructions to Lieut. Arnold to provide for his not meeting Capt. McClellan or receiving instructions from me, and was likewise directed, in case of a similar experience on his own part, to push forward on his own route, either by Wallah-Wallah or the valley of the Yakima, and thence over the military road to Nisqually,

taking the precaution, however, to communicate in any event with Wallah-Wallah for instructions.

I likewise determined to assign that resolute and intelligent civil engineer, Mr. Tinkham, to the duty of examining the Marias pass, of returning by the main Flathead trail to St. Mary's, thence by the southern Nez Perces trail to Wallah-Wallah, and thence on the military road to Nisqually and Olympia.

To bring about a thorough understanding as to the mutual relations of the work entrusted to Lieutenant Mullan and Mr. Doty, on the two sides of the Rocky Mountains, it seemed to me important that Mr. Doty should accompany Mr. Tinkham to St. Mary's to confer with Lieutenant Mullan, and then to return by a known trail to Fort Benton.

This general plan being determined upon, the necessary verbal instructions were given to Lieutenants Donelson and Mullan on their arrival. Under Lieutenant Donelson's instructions, Mr. Lander was assigned to the duty of exploring the whole of the St. Mary's valley, and of meeting the main party in the Horse plain, nearly opposite the confluence of the two streams. But a serious embarrassment now occurred in consequence of the non-arrival of Mr. Tinkham. Fortunately all the parties had a common route down the valley for some thirty odd miles to opposite Hellgate. On the 2d instant they were all in motion, with an extra supply of provisions for Mr. Tinkham's party, in charge of three men of Lieutenant Mullan's command, and proceeded in slow marches down the valley. We were in camp opposite Hellgate on the 5th instant, and I then determined the next day to push forward Lieutenant Donelson and remain in camp till Mr. Tinkham's party returned, or some decisive steps could be taken to recover it. It was obvious to my mind that Mr. Tinnham had got involved in a difficult, perhaps impracticable country, as he took no guide with him, and my great fear was that he might suffer for want of food. Accordingly that evening I dispatched a Flathead guide to Port Owen, with instructions to Lieutenant Mullan to come to my camp with additional provisions and men; and in a conference with Victor, who had now returned from the mission, secured the services of good Flathead guides. Lieutenant Donelson and Mr. Lander moved off on the sixth; but scarcely had Lieutenant Mullan reached my camp, about four in the afternoon, before Mr. Tinkham came in. The provisions had held out, and the route examined by him had an important bearing on our railroad question. In the absence of Lieutenant Donelson's written report and the barometric profile, I can only say that it will probably furnish a practicable mode of avoiding the Hellgate defile, and of passing from the valley of the Pass to that of Clarke's fork. The trail not being much in use was difficult to follow, and the party frequently became entangled in boggy ground and dense thickets.

They finally struck into a valley passing between impracticable mountains, and so crowded with wood that their route had to be cut. They proceeded down the valley to near Clarke's fork, and then succeeded in crossing over to the valley of the Jocko river, where a much-used trail led to the St. Mary's valley. In his course Mr. Tinkham passed by a winter post of the Hudson's Bay Company, and fell in with a small party of Indians.

The same evening Mr. Tinkham made his arrangements to reach Lieutenant Donelson's camp the next day, and exchange his tired animals for fresh ones.

He started on his duty with the greatest alacrity, and will, I am confident, do most thoroughly the work entrusted to his charge.

I omitted to mention in the proper place, that Dr. Suckley was directed to remain at the valley with a small party of the men to complete his specimens in natural history, and then to go down the St. Mary's, Clarke's fork and Columbia rivers in a boat, continuing the collection of the animals, and making the best survey his limited means would allow.

For my additional instructions to Lieutenant Donelson, Dr. Sackley, Mr. Tinkham, and Mr. Doty, and for additional instructions to Lieutenant Grover, see appendix 3, 4, 5, 6, and 7.

On the 7th my little party was in motion, and on the 12th I reached the Cœur d'Eleine mission.

The route on the mountain was much obstructed by fallen timber, and at times passed through dense underbrush. Mr. Stanley made a most excellent survey of the route, but the want of instruments rendered it impossible to get the barometric profile.

Two streams, having their sources in lakes only one-half mile apart, and flowing due east and west in opposite directions from the route. The ascent is along the stream to within about five miles of the dividing ridge, when the trail rises two thousand feet by estimation in that distance, and thence passing along the ridge of a spur for a considerable distance, and falls suddenly at least two thousand five hundred feet. Its course thence to the mission is generally along the river called by the Jesuit fathers St. Ignatius, but known more generally as the Cœur d'Eliene.

We camped within one mile of the top of the mountain on the night of the 10th and 11th November, in a rain storm, and looked forward to snow in the morning. But to our agreeable surprise, we awoke to the clearest skies and the most genial breezes we ever experienced. Not a cloud was to be seen. The vast solitude of the Cœur d'Eleine mountains, covered with heavy forest trees, the Rocky mountains in the far east, and the Kontenay mountains to the north in British territory, formed a *coup d'œil* imposing and magnificent. The slow and lazily rising belts and lines of fog, indicated the position of the lakes and streams. A year ago, at this very time, the blasts of winter howled in these solitudes, and the drifting and rapidly falling snow completely obstructed the traveller.

Whether this route will come into competition with that by Clarke's fork, can only be determined by more accurate observation than we were able to make. It is probable that by following up on either side the stream itself, the length of the tunnel could be reduced to six and perhaps four miles, without involving impracticable grades. It will considerably abridge the distance, but the difficulties from snow should be carefully investigated.

The route was good in grass even on the mountain tops, except for some miles in the valley of the Cœur d'Eline. It is a favorite route of the Spokanes and Nez Perces on their way to the buffalo hunt.

At the Cœur d'Eleine mission I got no information as to Captain McClellan; but from a Cayuse Indian who reached the mission the day my people rested there, I learned of the arrival of a party from the mountains, which I supposed to be Lieutenant McFeely's, and of thirty-five emigrant wagons having started on the new military road to Steilacoom.

On the 15th of October I left the Cœur d'Eleine mission, where I was most hospitably entertained by the Father Gazzile, and proceeded down the Cœur d'Eleine river on my way to Colville. Various rumours reached me as to parties moving through the country, but nothing of a definite shape till about noon on the 18th of that month, when within fifty miles of Colville, an old Spokane only four days from the Yakima country joined me, and gave me information that a party of some thirty men had reached the Columbia opposite to Colville the day before, and would cross that day. This satisfied me that by pushing to Colville that night I would join Captain McClellan before he moved to the eastward, and thus at once combine all the operations. Securing two good, fresh, fat Indian horses and an Indian guide, I started at two o'clock, and succeeded in reaching Colville at nine, and in a few moments the information in all its parts was completely verified, and Captain McClellan and myself were congratulating each other upon our most fortunate meeting. Not a word had we heard of each other since the 9th May, when he received my instructions, and when in conversation Colville was referred to as a probable point where he would first get information of the eastern parties. We reached Colville the same day, the 18th October.

You have already received a communication from Captain McClellan, stating the principal facts in regard to the Nah-chez and Sno-qual-me passes, and his action in regard to the military road. Reserving to a future communication a more full report of his work, I will state that he found the country erroneously laid down on the maps, and that the country north of the Sno-qual-me pass is very rugged, the mountains in many cases extending to the Columbia river. Very little information of the country was obtained from the Indians as Captain McClellan went north; but all the streams were examined towards their sources till the ascent became several hundred feet per mile, and the ground thoroughly explored to above the 49th parallel. Good railroad crossings of the Columbia river have been found above the mouth of the Yakima. I apprehend no difficulty whatever in the Sno-qual-me pass to the passage of a railroad, and from information I have received from old residents here, particularly from Major Goldsborough, a civil engineer who has examined carefully the country, it will be an easy matter to carry it to a good harbor on the sound.

Through Garey, the Spokane chief, a man of education, of strict probity, and great influence over his tribe, I sent Indian runners to Lieutenant Donelson, appointing a little valley south of the Spokane river, near the junction of the routes from Colville and Lieutenant Donelson's place of crossing of Clarke's fork to Wallah-Wallah, as the place for bringing together both divisions, designing if the state of the animals and the condition of the instruments would authorize it, to continue, under the direction of Captain McClellan, the odometer survey over

the Cascades to Puget's sound, and submitting that portion of the route to the inspection and estimate of Mr. Lander, one of the civil engineers. It was also designed to send a small party across the Columbia, a little above the mouth of the Snake river, and follow the north bank of the Columbia to the Dalles and Vancouver. The remainder of the party were to proceed to Wallah-Wallah and the Dalles, and then receive instructions as to the discharge of men and the arrangement for office-work.

The juncture was effected on the 28th October, Captain McClellan and myself reaching the camp, which I named Camp Washington, only the day before Lieutenant Donelson, and the greatest joy was in every heart at the unlooked-for and extraordinary good fortune which had attended every step of the exploration.

The meeting of parties from the Mississippi and the Pacific in the passes of the mountains and in the valleys of the interior, on the great railroad routes, each in the vigorous examination of his part of the work and to within a single day, the peaceful relations which had been established with all the Indian tribes, the health, good conduct, and harmony of action of all the men engaged in the difficult fields of this exploration, extending over a sphere of country two thousand miles long by two to four hundred wide, and of the admirable and triumphant solution of the great railroad problem entrusted to our hands, repaid each man for his arduous labors, and relieved all minds of further doubt and anxiety.

Two barometers now only remained, and the animals were thin and leg-weary from their long labors. The known want of grass for some three days, immediately west of the Cascades, required grain to be taken along which could not be procured, and the lines already extended through the two practicable passes, could be taken up on reaching Puget sound and carried to a good harbor; accordingly, in an order which is marked 8 in the appendix, I sent the whole force to Wallah-Wallah and the Dalles.

Lieutenant Donelson reports the route from the debouche of the pass at Hellgate to the banks of the Spokane, at the junction of the route from Colville, and that one by the Cœur d'Eleine mountains, taken by me as practicable for a road, involving no other difficulties than are usually met with in the Atlantic States, and that it will well connect with a route through the Marias pass, should a practicable one be ascertained by Mr. Tinkham. The grass generally on his route was good, there having been a scarcity only two nights. He fitted out Mr. Tinkham's party for this difficult work to his entire satisfaction, and at the last crossing of Clarke's fork he dispatched, in conformity with my instructions, Lieutenant Arnold to Fort Colville, with a thoroughly organized detached party, with instruments for the determination of the barometric profile and the latitude. At Colville I left instructions to Lieutenant Arnold to place his animals and most of his men in camp, to ascend the main Columbia in canoes to the 49th parallel, and there ascertain the important facts of the geography, and to send word by Indian runners to Dr. Suckley to cross by land from the Pend d'Oreille mission to Colville, the navigation thence to Colville being dangerous and almost impracticable, and I left it discretionary with Lieutenant

Arnold to go to Wallah-Wallah from Colville, either by land along its left bank, or in boats, leaving also Dr. Suckley a like discretion in reference to my original instructions.

For my instructions to Lieutenant Arnold, see paper 9 from Colville, (this paper has been mislaid,) paper 10 from camp Washington, and to Dr. Suckley, see paper 11; also, from camp Washington. I will here observe that on the route from St. Mary's valley I met many Pend d'Oreille Indians, and took measures which I trust secured Dr. Suckley an Indian guide the whole distance from Fort Owen to the Pend d'Oreille mission. I also was able to do something towards bringing into relations with Lieutenant Mullen all the Indians going to the Buffalo hunt. They have a common route through the St. Mary's valley, and pass within a short distance of Fort Owen.

In a letter received from Lieutenant Arnold by the Hudson's Bay express, and which is given in paper 12 in the appendix, (this has been mislaid,) I learned that he reached Colville with his party, on the 31st of October, and that after making the examinations required of the Columbia, in the vicinity of the 49th parallel, he should decide to go to Wallah-Wallah by land, and I am assured by that chivalric and American-hearted man, A. McDonald, esq., the factor in charge of the Colville post, that he would render him every assistance in his power. With it and the examination already made, we shall have an excellent general knowledge of the country from Colville to Wallah-Wallah, and the several crossings of the Columbia, Spokane, and Snake rivers, and be able to connect the best pass of the Cascades with that of the Cœur d'Eleine range. It was in moving from Colville and the Clarke river crossing on the morning of the 26th of October that the only snow on the entire route fell. It was to the depth of some three to six inches and disappeared in a few days.

Camp Washington was broken up on the 29th, 30th, and 31st of October, and Wallah-Wallah was reached by myself on the 2d of November, by Lieutenant Donelson on the 6th, and Captain McClellan on the 7th of that month.

Here I learned that the emigrant wagons had succeeded in crossing to the sound by the Nah-ches pass, and learning from Pu-Pu-Mux-Mux, the Wallah-Wallah chief, that his people were now going through it on horseback, and being satisfied from the known height of the pass, the general character of the season, as shown in the quantity of snow on the Blue mountains, and the inferences to be drawn from the extraordinary mildness of the Puget sound climate, that it would be practicable for some twenty days, I assigned Mr. Lander to the duty of carrying over it the odometer survey, of observing the general character of that range as regards railroad constructions, and of adding to our knowledge of the meteorology of that region. I have not a copy of that order with me, but will send it in a future communication.

To fit out Mr. Lander for that duty, I got horses and grain, but the day after my departure Indians came in with information that snow had fallen in the pass, that the last emigrants had lost their animals in it, and that even Indians had been compelled to turn back. Mr. Lander then determined to follow in the trail of the other parties to the Dalles.

Although I regret Mr. Lander did not persevere, I do not censure him for his course. In a new country it is very difficult to get the truth from the information given, and it has been found our most vexatious experience on the whole march. But it would have proved, in my judgment, an entirely practicable undertaking, and would have made our information more complete. I have reason to believe that even at this time; there is but little snow in that pass.

At Wallah-wallah, I learned definitely of the arrival of Lieutenant McFeely in charge of Lieutenant Saxton's return party from Fort Owen, and of Dr. Evans, the geologist of the expedition. Lieutenant McFeely had much difficulty in finding suitable camps, they being in some cases off the route, and he having no guide with him, and for want of grass, lost many of his animals. Dr. Evans came through rapidly, and brought all his animals in in excellent condition. These gentlemen are now preparing their reports, Lieutenant McFeely at Columbia barracks, and Dr. Evans at Oregon city.

I reached the Dalles on the 12th of November, Columbia barracks on the 16th, and this place on the 26th, and have made the following arrangements for continuing the survey to this point, for office work and for the wintering of animals, and the discharge of men.

1. Forty-five feeble animals placed in good grazing in the Wallah-Wallah valley, under the charge of a herdsman, pay thirty dollars per month and subsistence.

2. About one hundred and twenty-five animals in grazing at the Dalles, in charge of a master herder, pay sixty dollars per month, and three men each, forty-five dollars per month, with their subsistence.

3. Two small parties by land to Vancouver, under, respectively, Captain McClellan and Lieutenant Donelson, and the remainder by the Columbia river.

4. Quartermaster, employées, and gentlemen of the survey, whose services are no longer required, discharged at Columbia barracks.

5. The office established at Olympia, and the odometer survey continued by the line of the Coultitz to that point.

6. The railroad line to be run from the Sno-qual-me pass to the sound by Captain McClellan, and a winter post to be established near the pass.

The parties of Captain McClellan and Lieutenant Donelson have reached Columbia barracks, the men not needed have been discharged, and the remainder are on their way to this place.

The parties of Lieutenant Arnold, Dr. Suckley, and Mr. Tinkham, are expected to reach this point in all this month. Lieutenant Grover is not expected till late in February or early in March, at which time I hope to receive from Lieutenant Mullan a report of his route to Fort Hall. I propose in February to send Lieutenant Arnold through the Nez Perces country to the Cœur d'Eleine mission, and from that point make arrangements to ascertain the snows in the Cœur d'Eleine mountains.

Apologizing for this hastily written and desultory report, I remain, very respectfully, your most obedient,

ISAAC I. STEVENS,

Gov. Wash. Ter. in charge of exploration.

HON. JEFFERSON DAVIS, *Sec. of War.*

No. 1.

ST. MARY'S VILLAGE, WASHINGTON TERRITORY,
October 2, 1853.

SIR: I have the honor to report my arrival at this place on the noon of the 30th of September. In conformity to your letter of instructions to me, dated at Fort Benton, September 8, 1853, I left Fort Benton on the morning of the 9th, and struck the Muscle Shell river on the 13th, passing between the Highwood and Girdle mountains, near the base of the western slope of the Highwood mountains. Here I found a most excellent prairie road from the Missouri to the point where I struck the Muscle Shell river, with the exception of about three miles of "bad land" crossing. On my route from the Missouri, I crossed the headwaters of the Shonkee creek, or Shonkee river, Arrow river, Judith river, and Hammell Island creek, before striking the Muscle Shell river. All of these streams referred to are tributaries of the Missouri from the south, but lose their importance when compared with the Muscle Shell river. This last mentioned stream I found to be one of the most important tributaries of the Missouri. It takes its rise in the main chain of the Belt or Girdle mountains, a chain of the Rocky mountains east of the Missouri. This river winds through a very beautiful, level valley, well wooded along the borders of the stream, from its headwaters to the point where I struck it at a distance of sixty miles, and I have every reason to believe that it is well wooded thence to its mouth. The valley through which it flows is about one mile wide, bounded on east side by low prairie bluffs. There are two trails across the mountains by this river—one by the northern and the other by the southern fork of the river. In coursing the southern fork of the Muscle Shell river, you cross the headwaters of the Missouri; in crossing along the northern fork, you pass through the Girdle mountains, by a very excellent pass, to the Missouri.

I did not fall upon the Flathead trail when I first struck the river, but found it four miles above, which I saw tended towards the east. This trail I followed for a distance of twenty miles to a ford. I thence followed it southeast to the Muscle Shell, for a distance of twenty miles further, over a very rough, rugged, and difficult road. There I found that the Flatheads were five days ahead of me, and that it would be perfectly impossible for me to overtake them with my pack animals. Therefore, I deemed it advisable to go into camp, which I left in charge of Mr. Burr, to go in search of the Flatheads, with my Indian guide. To this effect, the Indian guide and myself, mounted on two of my best horses, followed on their trail for a distance of sixty or seventy miles, and found them encamped in a very beautiful valley. Here I was received by them with the greatest hospitality and kindness. I explained to the principal men of the camp in detail the object of my visit. I told them that I came among them to secure a delegation of their most intelligent and reliable men to accompany me across the Rocky mountains, to meet you at the St. Mary's village. I told them that you had visited the camp of the Blackfeet Indians, and that your intention and determination was to bring all the tribes, both east and west of the mountains, into one general peace; that your determina-

tion was to protect them from the incursions of the Blackfeet Indians, who for years have been their enemies to the knife; that your determination was to build anew the village of St. Mary's, and cause the valley, where had been their homes for years, again to teem with beauty; that, in the beautiful valley of St. Mary's, a foundation had been laid, and that upon it you intended to build, if possible, a superstructure that all the Indian tribes of North America could look upon and imitate, and that would be a monument which our government could view with feelings of pride and credit. After much persuasion, the chief of the tribe delegated five of his principal men to accompany me, to be their representatives to you. Four of them accompanied me to this village, and I am compelled to bear witness on an occasion to their noble and Christian character. Did what Father De Smet has told of the Flathead Indians need confirmation, I am ready and willing to add my evidence in the behalf of these interesting children of the mountains.

From the Flathead camp I followed up the Muscle Shell river to its head waters, by its northern fork. I there fell upon the headwaters of Smith river, flowing into the Missouri from the south, and running in a northwesterly course by a very excellent prairie road across the dividing ridge. This river takes its rise in the same range of mountains as the Muscle Shell, and flows in the opposite direction. This river winds through a very beautiful prairie valley, well wooded. The current of the stream is rapid, bed rocky, and water about eighteen inches deep. This valley I followed down for many miles, and finding it to take a course too far to the north, I left it and crossed to the Missouri by a very excellent road. Here I found the Missouri to be five feet deep, and about thirty yards wide, and flowing, with a very rapid current, towards the north. The water here is perfectly clear and limpid. From the point where I struck the Missouri, there is a very excellent prairie road leading westward; but being unable to ford the stream where I struck it, I was compelled to follow down the course of it for eight miles to find a ford, and then crossed a high ridge of mountains west of the Missouri, in order to cut off the distance to my left. This prairie extends about twenty miles to the west, to the dividing ridge, where rises the main fork of the Bitter Root river. This dividing ridge, from which flows the waters of the Missouri and the Columbia, I crossed on the second day from the Missouri, and it proved the only difficult point of passage in my route from Fort Benton. This divide is about four hundred feet high, and about three miles across. I here fell upon the headwaters of the main fork of the Bitter Root river, the valley of which I followed down till it unites with the Blackfeet fork of the Bitter Root river at Hellgate. This valley is about a mile wide, and well wooded with the pine and cotton-wood tree, and affords a most excellent road for the passage of wagons. There is a well-beaten trail along this valley, made by the Flatheads in their course to their hunting grounds east of the Missouri. I would here mention that this same trail leads along the north fork of the Muscle Shell river, thence down the river to its mouth. The grade of this valley is scarcely perceptible, and along it you pass along the slope of but one mountain, which, with but little trouble, would allow wagons to pass over it.

After leaving the main fork, I crossed the Blackfeet fork of the Bitter Root, and followed along it for six or eight miles, and thence crossed to the St. Mary's, by a most excellent prairie road. I found good grass and water for my animals on nearly the whole route, and slept but one night without wood, which was between the Missouri and Muscle Shell. I would mention particularly the valleys of the Muscle Shell and the main fork of the Bitter Root rivers as being well grassed. I found, in both valleys, the grass green, rich, and luxuriant, and water and wood in abundance. This wood I found to be principally the pine, cottonwood, spruce, cedar, and hemlock. I would also mention that game, in the greatest abundance, is to be found along the whole route—buffalo, elk, antelope, and bear. I would also mention that I found the weather much more mild west of the Missouri than I found east of it. For full details as to the character of the country, for each day's march, and the streams and rivers passed, I would refer you to my journal.

I have the honor to be, sir, your obedient servant,

J. MULLAN,

Lieutenant United States Army.

HON. I. I. STEVENS,

Governor of Washington Territory.

No. 2.

N. P. R. R. EX. AND SURVEY,

Fort Owen, St. Mary's valley, October 3, 1853.

DEAR SIR: You are placed in charge of the meteorological and supply post established in this valley, with Mr. Adams and Mr. Burr, assistants; Sergeant Simpson, in charge of the animals; Corporal Rose, privates Wolfe Williams, and Toohill Isham, of the 7th infantry; and Simpson, Farnham, Osborne, Osborne jr., Mechelbach, and Bell, quartermaster employées, and Gates, to be chargeable to the survey.

The object in establishing this post is twofold: 1st, to ascertain the character of the seasons in this valley, and the adjacent ranges of mountains, by numerous and carefully made meteorological observations; and, 2d, to continue the exploration and survey of the country between the Rocky and Bitter Root ranges of mountains, extending it to Fort Hall, to connect with the survey of Frémont, and northward to the Flathead lake, and even to the upper waters of Clark's fork; as much time as practicable should be given to the examination of entrances to passes. It is believed you will be able to work late, and to resume operations at an early period in the spring. It is important that attention should be given to collections, and particularly to the mineral wealth of the region. Gold is said to be found in the neighborhood of the Hellgate fork. I desire you to pay especial attention to the Indian duties connected with your position. You are authorized to pay an interpreter at the rate of \$500 per year. He should, as you have suggested, be a guide; and the Flathead, Gahiel, is recommended as competent and reliable; endeavor to secure his services. Your attention is called to the several particulars in relation to which I am directed to

make reports in the instructions of the Commissioner of Indian affairs, and any information you can afford will be of service. Make an estimate of the probable cost of establishing a sub-agency, and the general cost of keeping it up. I shall, however, endeavor to communicate with you again this fall, and may be able to send you additional Indian goods.

To Lieutenant Grover, who has volunteered to conduct a dog train over these mountains in the winter, and to Mr. Tinkham, who has volunteered to cross the mountains twice by the Marias pass to Fort Benton, and thence by some southern pass to this point, and thence by the southern Nez Perces trail to Wallah-Wallah, you will, of course, render all the assistance in your power. Ample supplies have been provided for them, and I do not think any contingency will arise making it necessary that they should encroach upon your stores.

By Lieutenant Grover and Mr. Tinkham, I hope you will be able to send reports of your operations, or detached reports, with a statement of your route from Fort Benton to this point, and of your survey to Fort Hall, should it be accomplished before the arrival of Lieutenant Grover.

You may rely upon my establishing at least a bi-monthly express there this winter, if practicable, and by which I shall be able to hear from you twice, and perhaps three times, before I see you in the spring. I shall endeavor to visit this place previous to the 15th of June.

Of the animals (horses and mules) left in your charge, I am confident that as many of them will be serviceable, in a few days, as your duties will require. Should the winter prove mild, all the animals will probably be serviceable in the spring. For the meat rations, you will rely mainly upon beef, which is in abundance in this valley. Lieutenant Saxton established the tariff at \$60 per head, which meets my approval.

Yours truly,

ISAAC I. STEVENS.

Lieutenant MULLEN.

No. 3.

FLATHEAD VILLAGE OF ST. MARY'S,
Territory of Washington, October 2, 1853.

SIR: According to the verbal instructions you have already received, you are placed in command of the principal party to continue the work westward from this point, to connect with Capt. McClellan's work eastward, through the Cascade range. The party will be composed as follows: Lieut. Arnold, U. S. A., assisted by Mr. Lyman Arnold, and Mr. G. W. Stevens, assisted by Sapper Roach, associated in the charge of the astronomical observations.

Mr. Lambert, the topographer of the expedition, in charge of the odometer survey, assisted by Mr. Bixly.

Mr. Landers, civil engineer; Mr. Moffitt, in charge of meteorological observations, assisted by Sapper Davis; Messrs. Kendall, Evans, Evelyn and West, as general assistants; Sergeant Higgins, packmaster,

assisted by Mr. Henderson and Sergeant Martin; Sergeant Lindez, quartermaster, commissary, and ordnance sergeant; Private Horner, assistant in making collections; Private Goercky, of the dragoons, hospital steward; Corporal Cunningham, Privates Brandnell and Smith, of the sappers and miners; Privates Mathers and Bowers, of the fourth infantry; Gear, Hudson and Williams, chargeable, to the survey, and twenty-seven employées of the quartermaster and commissary department. Camille is assigned as an interpreter, with an Indian guide of the Flathead tribe.

Your general course will be by the Jocko river to the Clark's fork of the Columbia, thence to where the fork was crossed by Lieutenant Saxton, westward of the Pend d'Oreille lake, taking either the route passed over by Lieutenant Saxton or some practicable route between Clark's fork and the Contenay river, and thence to near the Spokane house, at the crossing of the Spokane river. Assign to Mr. Landers such duties in connection with the railroad estimate and inside reconnaissance as will give the best result. The Bitter Root river should be examined, and the route by Clark's fork reviewed, even should the general route be more to the north. At the Pend d'Oreille lake, a detached party, sent to Colville by the northern trail, might intercept Captain McClellan; and at Colville, would be in a position to move westward to open a connexion with his work. The Spokane crossing, near the Spokane house, is a central position, trains leading therefrom both to Colville and Wallah-Wallah. At the crossing, you may expect intelligence of Captain McClelland's movements, and additional instructions either from Captain McClellan or *myself*. Failing to receive intelligence or instructions, your general course will be Olympia, by Wallah-Wallah, and the military road to Nisqually, and thence to Olympia. But you have full discretion to reach Olympia, from the Spokane house, by any other practicable route which may be detected in your progress through the country, taking the precaution, however, to communicate with Wallah-Wallah, where instructions may await you to the end, and by express purpose generally. At least six good horses should be reserved by you. The party to Colville by the northern trail, from the crossing west of the Pend d'Oreille lake, place under the charge of Lieutenant Arnold, and instruct him, if he fail to hear from Captain McClellan at Colville, to push beyond Colville to the base of the Cascade range; and thence move to the south, along the eastern base of that range. Recollect the great object to be accomplished, in the direction given by your operations, including those to Lieutenant Arnold, is to connect your work with that of Captain McClellan, through the most practicable pass found in the Cascade range by him. And to this, every movement should tend. To this end you will instruct Lieutenant Arnold, as he moves south, either to reach Olympia by Wallah-Wallah and the military road, or by some other practicable route, as you may judge most judicious.

In reference to Lieutenant Arnold's party, I will suggest that it be immediately organized, to be prepared for any duties of reconnaissance, on which it may be desirable to detach him, previously to arriving at the Clark's fork crossing. It should be a most efficiently organized party. Besides his brother's assistance, in astronomical observations,

it is desirable he should have an assistant for the compass line and topography, and an assistant for barometrical observations. Endeavor so to organize his party, unless the deficiency of instruments renders it impossible. I am of opinion that Mr. Lander's party should consist of not more than three men, besides himself. As you approach the country of the Contenay Indians, every exertion should be made to secure their services as guides, as they are said to be well acquainted with the routes you will take. You are requested to obtain every information possible in reference to the Indian tribes you may meet, and I can recommend Mr. Kendall as one who would render much assistance in this important branch of the work. You are also requested to learn what you can in reference to the missions situated in the vicinity of your route, and also of the Hudson's bay settlements; of both whether their influence is beneficial or prejudicial to American interests in their neighborhood.

Enclosed you will find letters of introduction to officers in charge of Hudson Bay posts, at Colville and Wallah-Wallah.

Truly yours, &c.,

ISAAC I. STEVENS,

Governor of Washington Territory, in charge of expedition.

Lieutenant A. J. DONELSON,

U. S. Corps of Engineers.

No. 4.

NORTHERN PACIFIC R. R. EX. AND SURVEY.
Flathead Village, St. Mary's Valley, October 2, 1853.

SIR: You will remain at this point until the 25th instant or thereabouts, when you will proceed in a canoe down the Bitter Root and St. Mary's rivers, through by lake Pend d'Oreille, and down Clark's fork of the Columbia river to the main river, and following the latter to the mouth of Corlitz; and from that point make your way by the most practicable route to Olympia.

During your stay at this place you will employ your time to the best advantage, collecting such specimens in zoology, botany, ichthyology, &c., as may be rare and interesting; and in your intercourse with the natives making yourself familiar with their past and present history, language, traditions, &c., as fully as possible. Henry Berry and George Smith, two experienced boatmen, will be placed at your disposal, and where necessary you are empowered to hire an Indian guide. During your trip, in addition to collections in natural history, you will note carefully the general direction of these rivers and of their main tributaries, the various falls and rapids, and their approximative distances; note also the width and depth of the stream, the character of its banks at various points, and any other interesting and valuable facts. You will also make a set of meteorological observations at regular intervals, for which purpose the proper instruments will be furnished you.

You will collect all the information you can concerning the various missions on your route, noting carefully their influence, both in connec-

tion with the settlement of the country and as tending to promote the civilization of the native tribes.

I will place at your disposal letters of credit and introduction to the agents of the Hudson's Bay Company at the posts of Fort Colville, Wallah-Wallah, and Vancouver, with discretionary powers as to their use.

Very truly yours, &c.,

ISAAC I. STEVENS,

Governor Washington Territory, in charge of expedition.

DR. GEORGE SUCKLEY.

No. 5.

NORTHERN PACIFIC RAILROAD EX. AND SURVEY.

St. Mary's Valley, Washington Territory, Oct. 3, 1853.

DEAR SIR: With your party, you are assigned to the duty of examining the Marias pass, and returning either by Cadot's pass or by the pass pursued by Mr. Mullan, or by that entering the valley above this point, from the Jefferson fork of the Missouri, and known as the main Flathead trail, and thence by the southern Nez Perces trail to Wallah-Wallah, and the military road to Olympia. Fort Benton will be visited by you to confer with Mr. Doty, and make known to him the several routes examined, and to advise in relation to points requiring examination; should it be practicable, it would be desirable that Mr. Doty should accompany you to St. Mary's, and thence return by Cadot's pass to Fort Benton.

It is desirable that you should return by the broad Flathead trail, but the season is late, and it may be found necessary to come here by the shortest route, that of Cadot's pass. It is probable that with good pack animals, the route by Cadot's pass will occupy ten days; that by Mr. Mullan's, twelve; and the broad Flathead trail, fifteen days. In addition to the railroad reconnaissance and estimate, estimate as to the cost, and report as to the best practicable method of establishing a wagon route from Fort Benton to this point.

Your guide will be a Flathead Indian, who will accompany you to the entrance of the Marias pass, and the voyageurs Monroe and Dauphin are assigned to your party. Mr. Doty and Lieutenant Mullan will be directed to afford you every assistance in their power, particularly in giving you good animals. Lieutenant Mullan will furnish a Nez Perces guide, and additional instructions will await you at Wallah-Wallah.

Your labors will be arduous, and will contribute greatly to the value and interests of the expedition, and you enter upon them with my entire confidence as to their successful accomplishment.

Yours, &c.,

ISAAC I. STEVENS,

Mr. TINKHAM.

No 6.

NORTHERN PACIFIC RAILROAD EX. & SURVEY,
St. Mary's Valley, Oct. 3, 1853.

MY DEAR SIR: I send you by Mr. Monroe a sketch of the several routes already examined from Fort Benton to this point, to which Mr. Tinkham will add, on his arrival at Fort Benton, the routes examined by him.

1st. A route from the Blackfeet fork to the Jocko river; and 2d, a route by the Marias Pass, from this point to Fort Benton. I have requested Mr. Tinkham to make known to you the character of these several examinations, and to confer with you in relation to the best direction to be given to your work from Fort Benton. Should it be deemed by you practicable or compatible with your other duties, you will accompany Mr. Tinkham to this point to confer with Mr. Mullan, and then return to Fort Benton. My object is to bring the operations, by way of conference between the two parties, and the communicability of information, into connexion, so that the best results may be accomplished. I earnestly desire this to be done, and I am satisfied it is entirely practicable. The Flatheads pass the mountains all through the fall, and till after new year's. All this is, however, left to your own judgment and discretion, in which I place entire confidence. It will be necessary that the animals be kept in the best possible condition, oxen, horses, and mules. The operations of the winter will be more extensive than was anticipated, and it is of the greatest consequence that every animal be in condition for service. You may expect Mr. Tinkham by the 20th instant, and it is important that he should have an effective train to return. The two ponies which I left with you must not be put to the hard work of crossing the mountains, but the remaining animals may be brought into requisition. At this point we leave nearly eighty animals, sixty of which will be effective in the course of this month, and will be sufficient for Mr. Tinkham's route to the Pacific from this point, to provide for your return to Fort Benton, and for the operations of Mr. Mullan, who has with him fifteen men.

Our operations to this point have been very successful. The principal party under Lieutenant Donelson moved yesterday. I move to day to visit Colville, and thence make the best of my way to the sound.

Yours truly,

ISAAC I. STEVENS.

CAMP ON ST. MARY'S RIVER,
33 miles below St. Mary's Village, Oct. 7, 1853.

Mr. Tinkham got in last evening, and starts on his examination this morning.

Since writing the above I have met Victor, the chief of the Flatheads and nine lodges of Flathead Indians. He starts in two days across the mountains on a buffalo hunt, and will return in November. His people remain till after Christmas—so much for these horrible mountains.

Monroe, Baptiste and the two Pegans go by Cadot's pass. One of the Pegans has agreed to accompany you to St. Mary's, and to return with you to Fort Benton. He is the most delicate Indian of the two,

and the best Indian. He guided me to St. Mary's and is very trustworthy. In reference to the service of Monroe, Baptiste and the two Indians, I shall write a special letter.

Yours, &c.,

ISAAC I. STEVENS.

Mr. Doty.

No. 7.

NORTHERN PACIFIC RAILROAD EX. & SURVEY,
St. Mary's Valley, Oct. 3, 1853.

MY DEAR GROVER: We have had good success in coming through the mountains. Fine weather and no snow. All the parties were here on the 30th September, except that of Mr. Tinkham, who is out examining a route from the valley of the Blackfeet river, to the Jocko river, to see if the defile ending in Hellgate cannot be avoided. Donelson left yesterday in charge of the principal party, and I shall move off in the morning, and hope to reach Fort Colville in ten to twelve days.

In your examination of the Dalles, I will thank you to examine as to the site of a suitable depot, for emigrant purposes, and for the continuation of the survey. It should be in the neighborhood of grass and wood, and as near as practicable to the head of steamboat navigation. I have left a good store of provisions for you at this point, and shall make every exertion to send here an express in November from the sound. I am decidedly of the opinion that you will accomplish the undertaking of the dog train.

Lieutenant Mullan is left in charge here with Mr. Adams and Burr as assistants. Sergeant Simpson in charge of animals, and twelve men. He will assist you in every way in his power.

The doctors will also remain here some twenty days with two men, and then go down the St. Mary's river and Columbia in a boat.

I shall expect to see you in Olympia some time in February, and to congratulate you on the success of your enterprise.

Yours, &c.,

ISAAC I. STEVENS.

CAMP ST. MARY'S VALLEY,
33 miles below St. Mary's Village, Oct. 7, 1853.

Mr. Tinkham got in last evening and starts on his examination to-morrow. He will reach Fort Benton by the 20th instant, and is accompanied by a good Flathead guide.

No. 9.

[ORDERS.]

N. P. R. R. EX. SURVEY,
Camp Washington, October 29, 1853.

The chief of the exploration congratulates his associates upon the junction of the eastern and western divisions on the banks of the Spokane river, and for the successful accomplishment of the great object of their joint labors. To Captain McClellan, his officers and men, too much credit cannot be ascribed for their indefatigable exertions, and the great ability of all kinds brought to their division of the work. They can point with just pride to the determination of two practicable passes in that most formidable barrier from the Mississippi to the Pacific, of the Cascade range, and to a most admirable development of the unknown geography of the region eastward to the Columbia, as showing the unsurpassed skill and devotion which has characterized the chief of the division and all of his associates.

To Lieutenant Donelson and his command thanks have already been tendered for their previous services; but special commendation is now due for the constancy and success which have crowned their labors on their difficult line of Clark's fork, from the St. Mary's village to this point; the detached parties under Lieutenant Grover, engaged in the survey of the upper Missouri, and about to cross the mountains with a dog train, under Lieutenant Arnold, now at Fort Colville; under Lieutenant Mullan, now exploring the route from the St. Mary's valley to Fort Hall; under Dr. Suckley, on his way in a boat with two men from the St. Mary's valley by that river, Clark's fork, and the Columbia to Fort Colville; to Mr. Tinkham, engaged in the exploration of the Marias pass and the broad Flathead trail; and to Mr. Doty, in charge of a meteorological party at Fort Benton, must not be forgotten. They have developed ability of a high order in the progress of the exploration. No one doubts that success will crown their labors.

The chief of the exploration would do injustice to his own feelings if he omitted to express his admiration for the various labors of Mr. Stanley, the artist of the exploration. Besides occupying his professional field with an ability above any commendation which we can bestow, Mr. Stanley has surveyed two routes from Fort Benton to the Cypress mountain, and from the St. Mary's valley to Fort Colville over the Bitter root range of mountains, to the furtherance of our geographical information, and to ascertaining of important points in the question of a railroad; and he has also rendered effectual services in both cases, and throughout his services with the exploration in intercourse with the Indians.

Our labors are near their conclusion for the present season, and it only remains to go into quarters. The two divisions, under the respective commands of Captain McClellan and Lieutenant Donelson, will proceed to the Columbia barracks by way of Wallah-Wallah and the Dalles, and then await instructions as to the discharge of their men and the arrangements for the office work. The animals will be left at

Wallah-Wallah and the Dalles, in the charge of trust-worthy men, to be cared for the winter in readiness for operations in the spring.

Yours, &c.,

ISAAC I. STEVENS,
Governor Washington Territory,
in charge of exploring expedition for Pacific railroad.

No. 10.

CAMP WASHINGTON,
Twelve miles south of Spokane house, Oct. 29, 1853.

SIR: We met the party of Lieutenant Donelson at this place yesterday, and from him I learned that you probably reached Colville yesterday. Besides the instructions which I left there for you with Mr. McDonald, I have only to suggest that in your route to Wallah-Wallah it will be well to examine the Grande Coule. It is left free with you however, to decide, should the lateness of the season, or the condition of your animals make it advisable whether you will take this route or pursue the best known trail to Wallah-Wallah, concerning which you can receive full information from Mr. McDonald. You are authorized, should your judgment dictate it, to leave your animals at Colville, making arrangements with McDonald for their safe keeping, and in connexion with Dr. Suckley to descend the Columbia river in a boat, making the best survey you can. I send you a memorandum of points, in the line of the Columbia, particularly requiring attention, which has been proposed by Captain McClellan. Although it is desirable to meet Dr. Suckley, and with him confer upon your own and his future operations, it must not be done at the expense of too much time, and you are authorized, should you not meet him at Colville on your return from the the upper Columbia, to move at once to Wallah-Wallah. At Wallah-Wallah, you will receive additional instructions. We have met Garsey, the chief of the Spokanes, and I am highly pleased with him. He is a man of entire honesty and great energy, and well calculated to be chief of his tribe. Under his auspices I think his people will improve rapidly. You are aware of my wish to establish a meteorological post between the Cascade and Bitter Root mountains.

I wish you would consider this matter and endeavor to advise me in regard to its location and the manner in which it should be conducted. Three places come into competition, Wallah-Wallah, Fort Colville, and the Spokane river; and I am at present inclined to the opinion that Wallah-Wallah is the most suitable.

Give all the attention you possibly can to the Indians, particularly to the Spokane and Nez Perces.

Yours, &c.,

ISAAC I. STEVENS.

Lieut. R. ARNOLD, *4th artillery.*

No. 11.

CAMP WASHINGTON,
Twelve miles south of Spokane house, Oct. 29, 1853.

DEAR SIR: I have learned from Mr. McDonald, at Colville, that the Hudson Bay people never attempt the passage of the Columbia in boats from the Pend d'Oreille mission, and I have therefore requested Lieutenant Arnold, now at Colville, to send to the mission a guide, and with the suggestion that you come from that point by land.

My object in this is to inform you, so far as I learn, of the dangers ahead, that you may not be exposed to unnecessary risk. I have also suggested to Lieutenant Arnold, that in your meeting him at Colville you should mutually confer in reference to your future operation.

You may deem it advisable to accompany him by land, and I have given to him authority, should the lateness of the season or the condition of his animals forbid his journey by land, to descend the river in a boat; in which case I shall wish to have you go together. My object in making these suggestions is to guard yourself and your men from unnecessary risk, and not to interfere in the slightest degree with the field you wish to occupy. I wish that field should be occupied as fully as the lateness of the season and the means in your power will permit, that the best results may be gained.

Yours truly,

ISAAC I. STEVENS,
Governor Washington Territory, &c.

Dr. GEORGE SUCKLEY.

No. 13.

CAMP WASHINGTON,
Twelve miles south of Spokane house, Oct. 29, 1853.

DEAR SIR: Our eastern and western divisions have met at this point, and the train has now been carried entirely across. Captain McClellan has discovered two passes in the Cascade range, north of Mount Ranier, and has explored the whole range from the Columbia to the 49th parallel. He and the officers with him are in excellent health, and have done an immense amount of work. Last evening we had a little supper or meeting of the gentlemen of the two divisions, at which your name, and those of other gentlemen in detached service, were not forgotten. I have borne constantly in mind what I told you in regard to making provisions and Indian goods, and I will avail the very first opportunity to do so.

I hope to meet Mr. Owen, by whom I will send some powder, and I think you will be able to get from him some sugar, coffee, and other indispensable articles. As regards the expresses, I shall make every endeavor to establish them, but may not succeed.

It is a matter which I deem of very great importance, that you should receive intelligence from us, and that we should hear of your

movements, and you may rest assured that no effort on my part will be wanting.

Our parties are all now to move to Wallah-Wallah and the Dalles, where we shall leave the animals ; thence to Columbia barracks, when the men will be discharged and the office force made up, which will proceed to Olympia by way of Columbia and Coultitz river.

Lieut. MULLEN, *St. Mary's village.*

No. 14.

CAMP WASHINGTON,

Twelve miles south of Spokane house, Oct. 29, 1853.

DEAR STR: We have met at this place the eastern and western divisions, and our success is complete. Captain McClellan has found two passes through the Cascade ridge, north of Mount Ranier. Last evening we had a supper, at which you were particularly remembered, and your services referred to.

I have met Jack, the guide of Lieutenant McFeely, who speaks of the Nez Perces trail to Wallah-Wallah as quite severe. They were twenty-two days in going ; stopping two days, however, for a missing man, and lost twenty animals. They did not get on to the true trail, however ; in the words of the guide, they struck too high up. This letter will probably reach St. Mary's about the time of your arrival there ; and I think before deciding to go by the southern Nez Perces route, in conformity with instructions already received, you should get all possible information from the Indians.

There seems to be no doubt that the route by Clark's fork, taken by Lieutenants Saxton and Donelson, is the best in a severe season, and you have authority, should your information lead you to the belief that the Nez Perces route will expose you to too much risk, to take the route.

In reference to the goods for your guide, I have them together, and will send them by Mr. Owen if we meet him, as I trust we shall ; but if not, you had better arrange with Mr. Owen, at St. Mary's, to pay him there.

All parties will move from this point to Wallah-Wallah and the Dalles, where the animals will be left over winter ; thence to Columbia barracks, when the men will be discharged, and then to Olympia for office work.

Truly yours, &c.

N. B. The goods for your guide are as follows : four blankets, four pair leggins (cloth).

A. W. TINKHAM.

OLYMPIA, WASHINGTON TERRITORY,
December 19, 1853.

SIR: During the last week, the parties of Captain McClellan and Lieutenant Donelson have reached Olympia, and are now prepared to enter upon the office work. During this week, Captain McClellan will leave this place to explore the region west of the Cascade mountains, with a view of bringing the railroad line down to a good harbor on Puget's sound; to determine the proper location of the military road, and to examine the work already executed on it. The mild weather we are now experiencing will favor his operations greatly. I shall here establish a meteorological post, keeping up a series of complete observations during the winter. The latitude and longitude will also be determined with all possible accuracy. I am pleased to be able to report the arrival of Dr. Suckley, with his little party. His trip by canoe from the St. Mary's village has been entirely successful, having accomplished the entire distance to Fort Vancouver by water, with the exception of about sixty miles above Fort Colville, where the rapids are so frequent and dangerous in their nature, that its passage by water is seldom attempted. I will, in the following extract from his report, give the results achieved by him:

“ * * * Agreeable to instructions received from you, dated October 2, I had considerable difficulty in making a canoe which would answer the purpose. A skin boat, made of three bullocks' hides, was at length constructed, and on the 15th of the same month I embarked with two white men and an Indian, to descend the Bitter Root river. The inhabitants of St. Mary's were entirely unacquainted with the nature of the river, and its capabilities for canoe navigation, no boats ever having been known to have ascended the river higher than the Horse Plain just below the junction of the St. Mary's and Pend d'Oreille rivers. My trip being considered so hazardous, I was obliged to proceed with great caution, and it was not until the eleventh day that I reached the latter river. On the twenty-fifth day after my departure from St. Mary's, I reached the Pend d'Oreille mission. My provision had entirely given out, but thanks to the kindness and hospitality of the good missionaries at that point, my stock was replenished. Here I found that the skin canoe had become so rotten, that it became necessary, in case I proceeded further by water, to obtain a new boat. Owing to the miscarriage of some letters of instruction which had been sent to me from you, and from a wrong impression on the minds of the priests, to the effect that they had heard of your having sent positive orders to me to relinquish the trip, I was reluctantly compelled to take horses and proceed to Fort Colville, on the Columbia river, distant sixty miles by land. The distance by the river may be a little more. It is my opinion, from what I could learn from observation and report, that I could have descended the Clark river to that point, although, of course, I should have been obliged to use great caution, as nothing definite is known by the Indians or others concerning this part of the river. I suppose that the river would be navigated by the Indians in their canoes, if there was any inducement. Their hunting grounds lie in an opposite direction, and they are too indolent to travel for the sake of exploring or for pastime. On the 13th of November I arrived at Fort Colville,

where I obtained further supplies, two canoes, and three Indians. On the 17th I again embarked, reaching Fort Vancouver on the 6th of December. On the route I stopped at Fort Okanagan, Fort Wallah-Wallah, the Dalles, and Cascades, and obtained such supplies as I needed. The time occupied in making the whole distance was fifty-three days, or two days less than were occupied by the main train under Lieutenant Donelson between the same points. The running time, exclusive of stops, was $285\frac{1}{2}$ hours, and the distance, (approximative,) as measured by the course of the rivers, including the greater and lesser bends, one thousand and forty-nine miles. This will give the average speed of 3.774 miles per hour. There were but three portages on the whole route of any magnitude, one of thirteen hundred paces on the Clark river, above Lake Pend d'Oreille, one on the Columbia, at the Dalles, of eight hundred paces, and lastly, one on the Cascades, one and one-half miles in length. On the latter, I made use of the wooden railway to convey the canoes and their loads. It should be borne in mind that this passage was made at the lowest stage of water, when the current was proportionately feeble.

The Bitter Root river was quite shallow in many places, and my canoe, which, when loaded, drew about ten inches of water, had frequently to be lightened. After reaching the St. Mary's river, formed by the junction of the last mentioned stream and the Hellgate river, I always had sufficient depth of water. About sixty miles (by the river) below the mouth of the Hellgate river, the mountains approach very closely to the bed of the stream, rendering its current very swift, and tortuous, abounding in rapids. Farther down it is straighter, with large flats on one or both sides, channel deeper, and current more sluggish. At a point about sixty miles above the Pend d'Oreille mission (of Saint Ignatius) is the Pend d'Oreille or Kulispelum lake, formed by a dilatation of the river. It is a beautiful sheet of water, about forty-five miles in length. Below this the river is sluggish and wide for some twenty-six miles, when rapids are again encountered during low water. From a point nine miles above the lake to these rapids, a distance of about eighty miles, steamboats drawing from twenty to twenty-four inches can readily ascend. In higher water, of course, the distance will be lengthened. There would then be but one bad obstacle between the Cabinet, twenty-five miles above Lake Pend d'Oreille, and a point some ten miles below the mission, a distance of one hundred and forty miles. The obstacle alluded to is where the river is divided by a rock island, with a fall of six and one-half feet on each side. At this point a lock might readily be constructed.

The Hudson Bay Company's large freight boats are in the habit of ascending from the lower end of the Pend d'Oreille lake to the Horse Plain, a distance of 135 miles; this involves two portages.

On the Columbia river between the mouths of the Spokane and De Chute's rivers, a distance of about 350 miles, there are but three bad obstacles to navigation for steamboats drawing from 20 to 30 inches. The principal of these are the Priest and Bucklands rapids. These might probably be locked, or so modified by art, as to render them passable for steamboats or other craft. The mouth of the De Chute's river is about 8 miles above the present steamboat landing at the Dalles. I have dwelt on these particulars, knowing how important

this matter will prove, in relation to questions of railroad construction and the transportation of supplies.

From the Horse Plain, before spoken of, the river, so far as I examined it, would be excellent for rafting purposes. Timber in this manner could be transported a great distance. Above this to the St. Mary's village, I cannot give a decided opinion in its favor, but am inclined to the opinion that rafts might run. At any rate, logs could be readily driven down by the current from an immense distance. While on the subject of timber, I will briefly allude to its quantity and quality. Along the Bitter Root and Hellgate rivers, and the mountains in their vicinity, the "red" pine and larch, favorite trees in ship building, are found in great quantity. The white pine, cotton-wood, and wild cherry are also found, although not in such quantity. Farther down these streams we find in addition, cypress or cedar, hemlock, spruce and fir, besides several hard wood trees. The timbered country extends from the main range of Rocky mountains, to a point about 80 miles below Fort Colville. From that to the Dalles there is no timber. At the Dalles it again appears, and trees of many descriptions, and frequently of enormous size, are found thickly covering the valleys and surrounding hills.

Excellent building stone is found along nearly the whole route. There are pieces of excellent land along the rivers. Their waters are clear and beautiful, and filled with thousands of the different kinds of the salmon family. The country above the Dalles is remarkably healthy." * * *

Dr. Suckley reports that Lieutenant Arnold had reached Wallah-Wallah, and would immediately come on. Lieutenant A. had been entirely successful—had accurately determined the latitude of the mouth of the Clark's fork of the Columbia, and had made an examination of the Grand Coullé, which in its character is found to differ essentially from published results. Mr. Tinkham, now on his way from St. Mary's, is probably through the mountains and within six to ten days of Wallah-Wallah. Our examinations down the line of the Columbia prove it entirely practicable for a railroad, and the line Coultitz river and thence to Puget sound, is remarkably cheap as well as easy of construction. Puget sound can certainly be reached by two practicable routes, the line of the Sno-qual-me pass with a single tunnel—say three thousand yards long, and with grades not exceeding forty feet, and the line of the Columbia and Coultitz with somewhat easier grades, with no tunnels, but involving an increased distance of, in round numbers, one hundred and fifty miles.

The office work is commenced with great vigor, and I hope to be able to dispatch my preliminary report in a month's time.

I am sir, very respectfully, your most obedient,

ISAAC I. STEVENS,
Governor Washington Territory.

HON. JEFFERSON DAVIS,
Secretary of War, Washington.

WAR DEPARTMENT,

Washington, December 1, 1853.

SIR: I have received, with your letter of the 28th of September, a duplicate of that of September 8th, (the original has not come to hand) in which you state that the funds allotted for the survey under your charge would be exhausted by the middle of October, from which time to the 30th of June next, you would require \$30,000, in monthly instalments; and you add an estimate of \$40,000, for the operations of your party for the next fiscal year, ending June 30, 1855.

The department very much regrets that, with a full knowledge of the extent of the means at the disposal of the department for the survey entrusted to you, you have so made your arrangements as to absorb all your funds so long before the completion of the work. I have no means of meeting any further demands for the expenses of your party.

In the instructions from this department of April 8, you were directed to bring your operations to a close, and submit a general report before the first Monday in February next, when the law requires all reports to be laid before Congress. All arrangements looking to the extension of your operations beyond the time indicated in those instructions are without authority; and you are directed to close your work in the manner therein prescribed.

Very respectfully, your obedient servant,

JEFF'N DAVIS,

Secretary of War.

Governor I. I. STEVENS.

II.

SURVEY OF THE ROUTE NEAR THE 38TH PARALLEL, IN CHARGE OF CAPTAIN GUNNISON.

CAMP, SHAWNEE RESERVATION,
June 20, 1853.

SIR: I have the honor to say that I have organized my party for the survey assigned to my command, and, with the escort under Brevet Captain Morris, propose to proceed along the Smoky Hill, until necessary to deflect from it, nearly as possible in a direct line, to the mouth of the Huerfano. This will give a new exploration a part of the way, and very desirable to meet the views of those advocating the route, and, I hope, it will not much delay me. It will also be useful for the new fort on the Republican, in order to know whether a short route to Santa Fé may be taken across to the Arkansas. I submit the following names as assistants on the survey:

Dr. Jas. Schiel, surgeon and naturalist.

Sheppard Homans, astronomer.

The gentleman engaged as civil engineer was taken ill at Elmira, New York, and has not yet joined; but I hope he will yet be able to reach us, as our marches, for a few days, will be short.

I have the honor to be, sir, your most obedient servant,

J. W. GUNNISON,

Captain Topographical Engineers.

HON. JEFFERSON DAVIS,
Secretary of War.

CAMP, UTAH CREEK,
Near Fort Massachusetts, August 22, 1853.

SIR: Availing myself of your permission to keep you acquainted with my progress on the survey, I have the honor to say that my party has crossed the first great range of the Rocky mountains safely and easily to the valley, of San Luis.

My exploration on the west side of the Kansas was eminently successful, in developing the existence of a plain, slightly inclined, which cuts off the eastern bend of that river at the Smoky Hill. Thence I came, in the same course, to Walnut creek, and descended to its lower part, and afterward reconnoitered above. The result would be that a road should take this more direct line from Fort Centre to Walnut creek, and cross to Pawnee fork, following it and branches to within five or six miles of the Arkansas; thus cutting off the "Big Bend," and strike the latter river near "Aubrey's crossing." I beg leave to refer to Captain (Lieutenant) Woodruff's map of the Pawnee fork in explanation—a manuscript copy of which I saw at Fort Atkinson.

Those in my command who had been in this country in winter, could not recognize places and streams in a different season. Misled by the maps of the Upper Arkansas, I took the Abispah for the Huerfano and

thoroughly explored the country below, and have added to the geography of that region at the expense of much personal labor.

An intelligent man, of thirty years' mountain experience, was procured at the Greenhorn ranch, for a guide to the "Sangre del Christo" pass. By a circuitous route we were led to the mule-path crossing over a high mountain or ridge, which the guide declared the only way. But I reconnoitered the dividing ridge from near Sierra Blanca to the Spanish peaks, while the train was cutting through bushes and working a road, under my able assistant officer, down the Sangre del Christo creek to this valley.

My efforts were rewarded by finding a summit level, very low, and over which a road can easily be made, with almost a single grade of a few feet to the mile, to the Arkansas plains. As an obstacle to a railroad, it deserves not the name; and the pass can be made without going up what would be called a hill—a mere slope. The work bestowed on the Muleteer mountain track would have opened a feasible road for supplies to this post from the States, and, perhaps, ultimately the route to Santa Fé.

There is a good wagon-track now made, where we have come with heavily loaded teams. A large flock and herd are closely following us. The owner has been to one of my camps, and returned to the Arkansas to bring on his stock, as the grass is extremely good, and this route will not require wintering in the Basin.

My observations on the east side lead me to think there is a pass to the north, more direct and as feasible, which I shall soon examine.

We are to start early to-morrow morning for the north and Cocha-tope. I have secured the services of W. Leroux to the Spanish trail, when he will return to guide Lieutenant Whipple. All accounts agree in presenting greater difficulties ahead; but I hope to report in a few weeks from the Great Basin.

Great press of business, and a severe headache, must plead my apology for the style of this letter.

I have the honor to be your most obedient servant,

J. W. GUNNISON,

Captain Topographical Engineers.

Commanding centre Pacific railroad survey.

HON. JEFFERSON DAVIS,
Secretary of War.

CAMP, UTAH CREEK, NEAR FORT MASSACHUSETTS,

August 22, 1853.

SIR: I have the honor to report my arrival in the San Luis valley, having crossed the Rocky mountain eastern range without accident. We have had much labor in removing trees and bushes, and cutting down banks, to work up the east side of a high ridge, over which my guide carried me, assuring me that it was the only practicable wagon route to the Sangre del Christo. But I have discovered, in searching along the summit level, a very low depression, by which we can pass through, instead of over the hills, where the muleteer paths usually go.

This new pass, to a branch of the Huerfano, presents no real obstruction to any kind of a road.

The route is well grassed, and our animals are in fine condition, having recruited, while our labors in road making and exploring the mountains have been more onerous than in the plains.

The character and place of my duties have prevented the usual reports on the 1st of the month. Should our exertions be favored, as thus far, I hope to make the September report, and forward by the California mail, from some place in Utah. But all representations concur in presenting a difficult region to traverse to the Great Basin.

I beg leave to enclose a communication to the honorable Secretary of War, with the request that it be presented to him.

It was my desire to make a more detailed account, but illness prevents my writing more to-night, and the train has received orders, and is prepared for an early departure towards the north to-morrow morning. I will only add that I followed the Kansas River valley to the new fort (Centre) on Pawnee river, and crossing, took a very level and plain route on the northerly side; crossed the Nepehalla (Solomon's fork) and Saline rivers by ferrying on rafts of logs, as they were swollen by recent rains; and then, cutting off the eastern bend of the Kansas at the Smoky hill, passed in the same direction to the Walnut creek and Pawnee forks of the Arkansas. Availing myself of Captain Woodruff's sketches, and the reconnaissance I made, the true route for a military road would be by way of those creeks, to a point on the Arkansas, above Fort Atkinson, which would subserve both the Santa Fé and Fort Massachusetts, or Taos directions.

I now proceed to the north, to the Coo-chi-tope pass, intending to survey the Roubidoux pass on the way, which, I think, must present a more direct route to California than the one I have discovered, the latter being on the Taos course, and too far south, if any place of crossing the mountains feasible for a road can be had further north.

Then, under guidance of Watkins Leroux, we are to go to the Spanish trail, from which place he is to return in order to join Lieutenant Whipple.

I have the honor to be, colonel, your obedient servant,

J. W. GUNNISON,

Captain Topographical Engineers,

Commanding Central Pacific R. R. Survey.

Colonel J. J. ABERT,

Chief Topographical Engineers.

CAMP No. 70, GRAND RIVER, UTAH TERRITORY,

September 20, 1853.

SIR: I have the honor to report the operations upon the Central Pacific Railroad Survey, since it was placed under my direction in May.

The party for the survey was organized and directed to St. Louis, where the requisite purchases were made. By the aid of Colonel R. Campbell, the business of fitting out was much expedited. The teams

were bought and rendezvoused near Westpört, and I proceeded to Fort Leavenworth for the escort, which has proved very efficient in many respects of guard and for labor, under the command of Brevet Captain Morris, and Lieutenant Baker, of the mounted rifles. In the march, and other duties, I have been greatly assisted by an experienced officer, Lieutenant E. G. Beckwith, of the artillery.

I considered it necessary to demonstrate practically the character of the route, by taking a wagon train for the supplies. The main part was sent, under charge of Lieutenant Beckwith, on the Arkansas road, and, with one team, I proceeded by the Kansas to the Smoky Hill valley, and nearly direct in a westerly course to Walnut creek, on new ground much of the way, where I found a very eligible site for any description of road. Thence my route was along and in the vicinity of the Arkansas to the Abispah creek, where I crossed the river, and explored the Huerfano country up to the pass of Sangre del Christo. The train passed over the usual mountain track, but, after a careful reconnaissance, I found a very low depression in the mountain ridge, by way of a small creek of the Huerfano valley, which makes the crossing very easy into the valley of San Luis, provided a little labor is bestowed to cut the small bushes and level the banks on the creek. It requires much labor on the higher pass, and also to cut the road out on the Sangre del Christo creek. And on the unbroken track generally, the work has been severe in the mountain region, particularly for sixty miles along Grand river, where we were forced over a connecting mountain between the Elk and San Juan mountains.

The Musca (Roubidoux) and Williams' passes were reconnoitred, and found very inadmissible for roads.

I heard of and explored one, however, at the head of San Luis valley of the Del Norte, which led down the Puncha creek to the Arkansas plains, above its first cañon, or defile. The approach to it would be either by way of the Wet Mountain valley, Hardscrabble creek, or, if found practicable, through the defile along the Arkansas. It is far superior to either the Musca or Williams' passes for crossing the dividing ridge.

The Coo-chi-tope pass was not very difficult for our teams, and thence to Grand river the descent easy. That river runs in deep gorges, with only now and then a small valley, which forced us upon the rocky hills, cut through transversely by creeks, whose gullies were difficult to cross without much labor. This delayed us considerably on sixty miles to the Aug-com-pah-gree, since arriving at which our route has been easier, but we have lost the fine grass that kept our animals in good condition up to that point. The Grand and Nah-oon-kara rivers are large, rapid streams, and only at low stages can they be easily forded.

A summary result may be thus stated of the operations: One thousand and fifty (1,050) miles en route travelled with 18 wagons; 520 miles of new road made on unbroken ground; 4 rivers (besides smaller streams as difficult) ferried or forded; 79 new or rare varieties in the botanical department in the plains, and 48 in the mountains; 27 varieties of mammals and birds; 26 of reptiles and fishes; 50 or 60 of insects; 213 observations for astronomical stations.

The topography of the line, and all the prominent hills in sight, are taken and daily plotted with approximate accuracy.

The geology of the route has also been carefully noted, and specimens collected.

The Utah Indians have appeared friendly, and the health of the party has been pretty good. I secured the services of S. Leroux and — Michael, two of the most competent men in the mountains, who are to take us to the Spanish trail; from thence I shall be without a guide. They are to return in a few days to Taos, by whom I expect to forward my dispatches.

Most respectfully submitted,

J. W. GUNNISON,

Captain Top. Engineers, in charge of C. P. R. R. Survey.

Colonel J. J. ABERT,

Chief Topographical Engineers.

CAMP 72, BITTER CREEK, UTAH TERRITORY,

September 23, 1853.

SIR: I have the honor to submit a succinct report of our operations to the 20th instant. Amid the bustle of camp duties, it is necessarily a mere abstract, for a strong necessity urges us forward. We have miserable grass and water, much of the last one hundred miles, neither very accessible, and it is growing late for crossing the Wahsatch range, and any great delay might be injurious. I have caused a copy of the field work map to be made, which I am sorry to send in such a rough dress, but the guide is about ready to leave for Taos.

In three weeks I hope to reach the Mormon settlements. From thence it will be requisite to our subsistence that funds be estimated for, to be placed in the hands of Colonel R. Campbell, at St. Louis, which will be available in the mountains.

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

J. W. GUNNISON,

Captain Topographical Engineers.

Colonel J. J. ABERT,

Chief Topographical Engineers.

CAMP NEAR FILLMORE, UTAH TERRITORY,

October 29, 1853.

COLONEL: The death of the late Captain J. W. Gunnison, topographical engineers, in charge of the central Pacific railroad survey, whose death, with the particulars, is being communicated by Captain R. M. Morris, mounted rifles, officially to the Adjutant General, devolves upon me the duty of requesting instructions from the Hon. Secretary of War for my future guidance. The short time allowed me before the departure of the express, which goes hence in time to reach the great Salt Lake city before the departure from that place on the first proximo for

the States, does not admit of my making any detailed statement, even of the operations of the surveying party during the season, which is closing so disastrously and painfully to us. Besides the report which the late captain made on, I think, the 20th of September last, of his operations up to that date, (an annual statement of operations as an officer of topographical engineers, in charge of public duties,) and forwarded through New Mexico, and which, it is presumed, came safely to hand, makes any statement as to the preceding part of his survey unnecessary. On that date, we were on or near Grand river, travelling towards the Spanish trail, which we struck between that river and the Green; following it but a few miles beyond the latter stream, we left it, passing north and west to White river, (a small branch of Green river,) which we followed up a few days, and then skirted along the base of the Wahsatch mountains, crossing the St. Rafael, also a small stream, with its numerous branches, to the pass in that mountain, known as the Wahsatch gap. We returned again to the Spanish trail, after leaving it to examine White river, after travelling a very circuitous route for seventy or seventy-five miles, soon after passing the St. Rafael. This trail, as it is well known to you, passes through the Wahsatch pass, a few miles beyond which we left it and struck off directly for the Sereir river, distant from the pass about thirty miles, and then followed down that stream to where it is crossed by the road leading from great Salt Lake city to California, via Vegas de Santa Clara. We here crossed the Sereir and the range of mountains lying to the south and west of that stream, probably at the point at which Frémont crossed them in 1844, into the valley of the Sereir lake. Leaving this range of mountains, we passed north-west to the Sevier river again, a few miles above, where it enters the lake which Captain Gunnison was about to explore, with the country to the west of it, when he was killed. This survey, it was supposed, would not detain him beyond two or three days, thence he proposed to go north, if possible, turning the range of mountains through which the Sevier passes, but if not practicable, then to go through the pass of that river north to the Utah lake or Salt Lake city, examining, if possible, the Zimpanagos pass, when opposite it. You will see, therefore, that but a trifle of labor remained to be accomplished in the field, when operations were so suddenly terminated, for it is no longer deemed safe to explore those districts in the present hostile condition of nearly all of the Indians of the territory, did not the condition of our supplies and the advanced state of the season forbid it.

A few of Captain Gunnison's notes, those since October 8th, when we were on the St. Rafael, he had with him, and they were carried off by the Indians. Also, some of the topographical notes and sketches of his assistant, Mr. Kern, but I have not yet been able to ascertain to what precise point, but hope the loss will not be great. I have, through Mr. Cole, the president of the settlement, now here, who extends to us all the assistance we require, sent an express to the chief of the band which was engaged in the massacre, and entertain a faint hope that I may recover these papers and books, also the instruments, with which we can illy dispense. I shall keep the assistants left of the party busily employed during the winter in bringing up their observations and notes,

and if possible, employ a draughtsman to supply the vacancy left by Mr. Kern's death. Should no other instructions be received, intended for Captain Gunnison, than those furnished him before commencing the survey, and should I receive none myself before the proper season arrives for commencing spring operations, I shall, if I am able to get the means, continue the survey, in conformity with those instructions. Captain Gunnison's party were employed for the trip, and cannot, therefore, be discharged until we again arrive in the States. As all the funds for this survey were in Captain Gunnison's hands, I am left without the means of paying assistants and employées, as I am without those for subsisting during the winter, &c., &c. I have, therefore, the honor to request that I may be furnished with authority to draw upon the proper department for the amount necessary to meet the demands against the survey, present and prospective. Could this arrangement be effected, it would relieve me from the risk and responsibility of transporting money with me over vast districts of uncivilized territory, loss by mails in coming to me, &c. If this may not be done, however, I have then the honor to request that drafts for small amounts may be sent to me without delay, to be used from time to time, as the mails cannot be depended upon to arrive with any regularity. I am not able to estimate accurately the amount of money expended by Captain Gunnison in this survey up to the time of his death, but believe it will not vary materially from eighteen thousand dollars, and I estimate the expense of the party, including wages and subsistence of men, and wear and tear of transportation, at ten or twelve hundred dollars per month. It may be necessary that I should be furnished with an order, directing me to pay the dues against the survey, previous to the death of Captain Gunnison. If so, I have to request that it may be furnished to meet the unpaid amounts due the men of the party, and one thousand dollars, in addition to the monthly estimate above, furnished me to meet these amounts.

The public accounts of Captain Gunnison will be forwarded to the bureau of topographical engineers, as soon after arriving in Salt Lake city as it is possible to select them from his other papers.

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

E. G. BECKWITH,
First Lieutenant 3d Artillery.

COL. J. J. ABERT,
Chief of the Corps Top. Eng., Washington city, D. C.

III.

SURVEY OF THE ROUTE NEAR THE 35TH PARALLEL, IN CHARGE OF LIEUTENANT WHIPPLE.

CHOCTAW AGENCY.

July 23, 1853.

COLONEL: I beg leave to submit the following preliminary report, giving a sketch of the commencement of operations, for the exploration and survey of the New Mexico route, for a railroad to the Pacific ocean.

I have the honor to remain, very respectfully, your obedient servant,
A. W. WHIPPLE,
First Lieutenant, corps Topographical Engineers.

Colonel J. J. ABERT,
Chief corps Topographical Engineers.

REPORT.

From the Mississippi river to Fort Smith, the appearance of the country bordering the river Arkansas is generally flat and favorable for the location of a railroad.

Under a charter of the Cairo and Fulton railroad, the State of Arkansas proposes to construct two branches from Little Rock—one to Fort Smith, the other to the Mississippi river, either at Memphis or Helena. I am sorry that the time at my disposal would not permit me to pass over this line from Memphis to Fort Smith. From information, however, that seems reliable, it appears that from the point opposite Memphis to river St. Francis, forty miles, the route proposed would pass swamp lands and marsh, subject to annual inundation, rendering necessary an embankment, ten, twelve, perhaps fifteen feet in height! From river St. Francis to Little Rock, one hundred and fifteen miles, the country consists of high prairie, peculiarly adapted to the object in view.

Little Rock is elevated upon a plateau, about fifty feet above the river Arkansas. Its height above Napoleon, at the junction of this river with the Mississippi, according to reading of barometers, is 395 feet. The total ascent from Memphis, 155 miles, would therefore average less than two and a half feet of elevation to the mile.

There is a strong desire among the people of this State to terminate this road upon the river Mississippi at Helena, ninety-one miles from Little Rock. They claim that thereby the length of the road would be less, the expense of embanking the swamp lands would be avoided, and instead of making the State tributary to Memphis, a town would be built up within her own limits. The State of Mississippi is willing to aid in this work, by constructing through her borders connecting links with roads north, east and south. Fortunately this question has but a local bearing. Equally through Memphis or Helena, by railroads al-

ready projected to Charleston, Norfolk or Washington, the route would be quite direct from the Pacific coast.

From Little Rock to Fort Smith, 165 miles, the barometer shows an elevation of 112 feet, averaging in elevation less than seven-tenths of a foot per mile. At several places mountain spurs, as "La Fourche" and "Petit Jean," infringe upon the river; still, if it were required, cuttings might be made without extraordinary expense. But the direct and favorable route for a railroad is supposed to cut off a bend of the river, leaving these mountains to the north. In such case, the expense of construction would probably be small.

The accompanying report of Jules Marron, geologist of this expedition, refers to some of the rich mineral resources of this State. Lead, copper, silver and iron, are said to be abundant. Beds of coal are of great extent, cropping out in various places near the river Arkansas. The veins are thick, and the quality excellent; they are easily worked and apparently inexhaustible. The report of Dr. Bigelow, botanist, will show something of the luxuriant productions of the soil. Timber of the best quality, for the purposes of a railroad, this country furnishes in abundance. Wheat, maize and cotton, are staple productions of the State. With a market or an outlet for trade, population would increase, and the virgin soil of Arkansas would yield as rich harvests as the now more prosperous neighboring States.

Dr. Shumard, formerly naturalist in the exploring expedition of Captain R. Marcy, has kindly presented to me his thermometrical observations at Fort Smith, extending for a period of more than a year. These show a climate most favorable to our purposes. The results obtained from them follow: From June 1, 1851, to June 1, 1852, the mean temperature for the year is $65^{\circ} 47'$. August was the warmest month, having a mean temperature of $89^{\circ} 4'$. The least, $34^{\circ} 84'$, is the mean for January. But one storm of snow is recorded during the year; that was two inches in January. Rain occurred every month. The least in September, October and January, the last two having $1\frac{3}{8}$ inches each, the former $1\frac{2}{3}$ inches. May appears the rainy season, $12\frac{1}{8}$ inches having been noted during the month. For the year, the fall recorded is $51\frac{1}{4}$ inches. There were 219 moist days, 82 rainy days, 126 dry days, and 21 not noted. Nimbus clouds predominated, next in order came cirri and cumuli. The mean temperature of summer is $80^{\circ} 98'$; of autumn $69^{\circ} 11'$; of winter $42^{\circ} 23'$; of spring $63^{\circ} 57'$. The highest temperature recorded is 104° in August. The least, 4° , occurred in January. The summer referred to is that on which this place was visited by the scourge of cholera.

It seems evident that no natural obstacle exists to prevent the proposed railroad from being terminated upon the Mississippi, in the State of Arkansas. But should the main trunk be constructed along the river Canadian, a glance at the map will show how advantageously branches might be constructed from some point near the north bend, or the headquarters of the Washita, to connect—the one with the St. Louis and Springfield road, already projected to the southwestern limits of the Missouri—the other to Shreveport, Louisiana, and thence, by roads already contemplated, to the river Mississippi. As yet, I have been able to learn nothing calculated to throw a doubt upon the practicability of

constructing these two branches. In future explorations, I hope to gain information more precise upon these points.

A. W. WHIPPLE,

First Lieutenant, corps Topographical Engineers.

PORT SMITH, ARKANSAS,

July 15, 1853.

CHOCTAW AGENCY, July 23, 1853.

SIR: In compliance with your request I submit the following report. It can hardly be presumed that I should make out a complete report from the scanty materials already collected, in addition to the disadvantage of having no authenticated specimens for comparison, nor a publication of the plants already collected and described. The botany of Arkansas is very similar to that of western Virginia, Kentucky, and southern Ohio. The pecan and Osage orange, and, probably, a southern oak, are nearly all the trees that can be found here and not there. I have made no list of herbaceous plants, because it is not so important in view of the proposed railroad route; and, although probably few are undescribed, (being a part of the field of Nuttall's labors,) it is quite impossible for me to do so, with accuracy, without reference to specimens and books on this subject.

The following is a list of the forest trees and shrubs I have met since I arrived at Napoleon, Arkansas. I have collected most of them in the vicinity of Fort Smith, specimens of which are transmitted to the Smithsonian Institute, by your order:

Quercus Alba, *Q. rubra*, *Q. tinctoria*, *Q. coccinea*, *Q. macrocarpa*, *Q. castanea*, *Q. nigra*, and one or two others undetermined; *Negundo aceroides*; *Ulmus Americanus*, *U. fulva*, *U. alata*; *Populus monilifera*; *Fraxinus acuminatus*, *F. juglandifolius*; *Celtis occidentalis*; *Gleditschia triacanthos*, *Dyospyros Virginiana*, *Tecoma radicans*, *Vitis Vulpina*, *V. cordifolia*—another species undetermined; *Ampelopsis*, *quinquifolia*—another species undetermined; *Carya oliaformis*, *C. tomentosa*, *C. alba*, *Platanus occidentalis*, *Rhus Toxicodendron*, *R. glabra*, *R. copallina*, *R. aromatica*; *Sambucus Canadensis*; *Salix*—two or three species undetermined; *Liquidamber Styraciflua*, *Acer rubrum*, *Morus rubra*, *Cornus florida*—two other species undetermined; *Taxodium distichium*; *Pinus mitis*, *P. brevifolia*; *Zanthoxylum Americanus*, *Z. Carolinianum*; *Vaccinum*—two or three species undetermined; *Aquafoliana*, genera and species undetermined; *Asimina triloba*, *Berchemia Volubilis*, *Robenia pseudo-acacia*, *Juglans nigra*; *Cerasus serotina*, *C. minutiflora*; *Sassafras officinale*, *Ceanothus Americanus*; *Rubus frondosa*, *R. Canadensis*; *Viburnum prunifolium*; *Crataegus*—three undetermined species; *Juniperus Virginianus*; *Amorpha*—species undetermined; *Cephalanthus Occidentalis*; *Rosa litigera*—one or two other species undetermined; *Rhododendron*—species undetermined; *Prinos*—species undetermined; *Cercis Canadensis*; *Rhamnaceae*, genera undetermined, large shrub; *Benzoin odoriferum*, *Amelanchier Canadensis*; *Menispermum Canadensis*; *Maclura aurantiaca*; *Prunus Americanus*, *P. Chicasa*; *Gymnocladus Canadensis*; *Betula nigra*; *Hyperic-*

cum fruticosum, Hamamelis Virginica, Nyssa multiflora, Ostrya Virginica, Acer rubra, Cocculus Carolinus—another species undetermined; Symphoria cerassus; Racemosa; Apios tuberosa.

Of the timbers indicated in the above list, black locust and post oak are most extensively used for railroad purposes; both of which are abundant, and, I believe, extensively diffused. Locust, which is the very best kind of timber for ties to be had in this country, I believe, exists in sufficient quantities to supply all purposes for which it is adapted.

Most respectfully,

JOHN W. BIGELOW.

First Lieut. A. W. WHIPPLE,
Corps U. S. Topographical Engineers.

GALISTEO, NEW MEXICO, CAMP 56,
October 1, 1853.

COLONEL: I have the honor to report my arrival at this place, in prosecution of the duty upon which I am engaged. The main survey is in progress from Anton Chico, via San Antonio, directly toward Albuquerque, and will reach that place probably to-morrow; but a reconnaissance by the head waters of Rio Galisteo was deemed advisable, in order to determine which may be the better route.

In haste to dispatch this by a courier, I must defer, until our arrival at Albuquerque, any specific report upon the country thus far explored. I believe, however, that the map and profile that I shall be enabled to submit will satisfy, thus far, the most sanguine expectations of the friends of this route.

I am told here that Lieutenant Ives has not arrived at Albuquerque. I hope that nothing has occurred to retard the continuation of operations west of Rio del Norte. Two or three weeks will, I think, be sufficient to recruit our mules, enable us to obtain supplies, and recommence our explorations.

In haste, very respectfully, your obedient servant,

A. W. WHIPPLE,

First Lieutenant Corps Topographical Engineers.

Colonel JAMES J. ABERT,
*Chief Corps Topographical Engineers,
Topographical Bureau, Washington.*

PAJARITA, EIGHT MILES BELOW ALBUQUERQUE, N. MEXICO.

October 29, 1853.

COLONEL: I take the liberty, in great haste, to write, that a mail may not leave us without bearing to you some intelligence of our movements.

I regret that my time has been necessarily so fully occupied in preparations for our departure westward, that I have been unable to report more fully the results of our operations. For the want of an

escort, Lieutenant Ives was detained until after my arrival here, in Texas; thereby destroying the main object of his mission—which was to gather all reliable information of the country westward, and make all needful preparations for the continuance of our explorations.

In consequence of this failure we were somewhat embarrassed with newspaper reports, which greeted our arrival here, stating that the route discovered by Mr. Aubrey was perfectly practicable for a wagon road or a railway.

Mr. Aubrey himself advised us, however, to avoid his trail as impracticable, except for mules. His opinion, that elsewhere exist passes through this region, is entitled to the same weight as that of Mr. Walker or Mr. Leroux. All have searched for the route proposed, but have failed to find it. Therefore we anticipate labor and difficulty in our explorations, but do not despair of success.

Lieutenant Ives and myself are now en route for the Indian Pueblo of Isleta, to survey the passage of the valley of the Rio del Norte, at that place, which appears more favorable than any other point examined.

Soon I will have the honor to report more fully.

Very respectfully, your obedient servant,

A. W. WHIPPLE,

First Lieutenant Corps Topographical Engineers.

Colonel JAMES J. ABERT,

Chief Corps Topographical Engineers,

Topographical Bureau, Washington, D. C.

CAMP No. 70, NEAR PUEBLO ZUNI,
November 25, 1853.

COLONEL: I have the honor to enclose a geological and a pencilled sketch of a general profile of our route from Fort Smith to Rio del Norte. The vertical scale of the latter not being exaggerated, the minor deflections are inappreciable. However, it may serve, like the rough topographical sketches already sent, in the charge of Señor Don Ambrosio Armijo, to guard against a total loss of our work, in case, by any accident, the notes we carry should be destroyed. By examination you may perceive that no great obstacle is opposed to the construction of a railway along the route traversed by the wagons, the profile of which is given from barometric observations, taken at every point wherever occurred a change in grade. This profile, however, is intended merely as the basis for a reconnaissance upon which the profile of deflections for a better route may be projected. Several such deviations have been made, but not yet represented upon the profile: One through a level prairie south of the road and extending nearly from the Poteau to the Sans Bois; another passes over a slightly undulating country, from the head waters of Coal creek to the waters of Boggy, leaving the Shawnee villages north. It is a question, also, whether the valley of the Canadian should not be kept nearly the whole way to the mouth of Tummari creek, thus avoiding the ascent to the Llano estecado, and proceed to the Pecos, north of Anton Chico, where the cañon is believed to be

narrow enough to be spanned by a bridge. From Rio Pecos to the valley of the Rio del Norte is doubtless the most expensive of the first division of our route. Still the ground is difficult only in comparison with that previously passed over. Two passes of the Rocky mountains were examined, one leading by Rio Galisteo to the Pueblo de San Felipe, the other by Carmel pass to Pueblo de Isleta. The first makes a short deflection to the north, by which a blind man would never suspect the vicinity of a range of mountains. A branch of the Galisteo is encountered about twenty-five miles east of the mountain range, and makes a broad open valley, with a descent, inappreciable by the eye, to Rio del Norte. The Carmel pass is more directly west, and its cañon, with some slight cutting, will afford a good route. Debouching from the mountains, a wide arroyo, with a grade of about fifty or sixty feet to the mile, leads to Isleta. At these pueblos, San Felipe and Isleta, are found the two best crossings of the Rio del Norte. At both places the diluvium drift infringes upon each side of the river, affording natural abutments for a bridge. From the latter point the survey has been continued, with a sweep to the south, to ascend the Mesa, nearly seven hundred feet in height, which divides Rio del Norte from Rio Puerco. Thence we ascend Rio de Gallo to near its head waters, where parts the road leading to Fort Defiance. Sending a party to reconnoitre that route, we proceeded by the Canino del Obispo to our present camp, near the Zufi. Upon the route of the survey, toward the southern slope of the mountain, by a gradual ascent of about sixty feet to the mile, we arrived at the foot of the hill which forms the summit of the Sierra Madre. Here might be required a tunnel about a mile in length, which would reach a similar ravine upon the Pacific side, leading by a beautiful slope, not exceeding in any part sixty-one feet to the mile, three days' journey to Zufi. The party which explored the northern pass reports much more favorably. The summit is said to have been passed unperceived, and a grade of twenty-five feet to the mile will conduct from Ojo Azul, which flows toward the Gulf of Mexico to Rio Puerco of the West, which, emptying into the Rio Colorado, seeks the Pacific ocean. We are, therefore, now upon the Pacific waters, having found excellent passes through the range of Rocky mountains and the Sierra Madre. Timber for the construction of a railroad is abundant from Choctaw nation to Walnut and Deer creeks, also from Rio Pecos to Sandia mountain, and in the Sierra Madre. For masonry, there is excellent material over the whole route. Coal is abundant in the Choctaw nation, on Rio Galisteo, in the Carmel cañon, on Rio Puerco, and at Ojo de Gallo. Extensive beds of gypsum also occur in various localities. From the headquarters of the Washita, which approach within two or three miles of the Canadian, an excellent route for a railway extends E. S. E. as far as that river was followed by us. Well-wooded valleys, flowing streams, fertile soil and charming climate, all invite the emigrant thither. To pursue the stream to its mouth, and thence to New Orleans, would doubtless form one of the main branches of a railway from California, by way of the Canadian. The appearance of the country north of the Canadian, in the direction toward the western part of Missouri, showed nothing to lead us to infer greater obstacles in the construction of a branch from the great bend of

the Canadian to Springfield than we had found on our route. Indeed, our geologist, Mr. Marron, having previously paid particular attention to the geological character of that section of country, assures me that it is highly favorable for the object proposed. Without doubt, therefore, a main branch of this road would lead to St. Louis. Water for camping purposes, on the whole route from Fort Smith to this place, has failed us but once. That was on the Sierra Madre, where water could easily be obtained by pipes from a magnificent spring, a few miles above. We believe that thus far want of water will form no obstruction to the construction of a railway. In some places water may easily be obtained by tanks, in others by aqueducts, while in a few places Artesian wells may be resorted to with greater advantage. To-morrow we proceed hence, taking a due west course, which we hope will lead us to the Pacific in time to lay before Congress a more full report in February next.

In great haste, I remain, very respectfully, your obedient servant,

A. W. WHIPPLE,

First Lieutenant Corps Topographical Engineers.

Colonel J. J. ABERT,

Chief Corps Topographical Engineers, Washington.

P. S.—The reports of the botanist and geologist of the expedition I have the honor to enclose.

IV.

SURVEY OF PARTIAL ROUTES ON THE PACIFIC SIDE, IN CHARGE OF
LIEUTENANT WILLIAMSON.

BENICIA BARRACKS, CALIFORNIA,

July 9, 1853.

COLONEL: I have the honor to state that I shall cross the straits of Carginez for Martinez (a town opposite this place) this day, and will commence with dispatch the explorations and surveys for a route for a railroad from the Mississippi river to the Pacific ocean, as directed to be made under my direction, and in accordance to the instructions from the War Department, dated May 6, 1853.

My party consists of the following persons, viz.:

W. P. BLAKE, esq., mineralogist and geologist.

Dr. A. L. HEERMANS, physician and naturalist.

ISAAC W. SMITH, esq., civil engineer.

CHARLES KAPPELL, esq., civil engineer.

CHARLES PREUSS, esq., draughtsman.

The two first-named gentlemen I have engaged at \$150 per month, the remaining three at \$125 per month. I have also a party of employées, such as teamsters, packers, and one pack and acting wagon-master, in all fourteen persons, whose compensation will average about \$55 per month each. I am in hopes that I shall be able to perform the duties assigned to me with this force. Should I be under the necessity to employ more subordinate employées, I shall immediately inform you of it.

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

R. S. WILLIAMSON,

Lieut. U. S. Top. Engineers.

To Col. J. J. ABERT,

Chief of Bureau Top. Engineers, Washington, D. C.

DEPOT CAMP, POSE CREEK,

August 30, 1853.

SIR: I have the honor to report to you that I have just returned here from a tour of reconnaissance of twenty days in the Sierra Nevada, and have examined every pass from Walker's pass on the north to the coast range. This tour has given me thorough information with regard to these mountains, their altitudes, &c., and I am now prepared to commence a survey of those passes which seem to offer the greatest facilities for a railway. Walker's pass is far inferior to others, being difficult of access and 4,500 feet above the Tulare valley.

I shall be able to finish the exploration assigned to me, and discharge the party at San Diego, about the middle of December, and can send by the steamer of the 1st of January a skeleton report stating the result. But a full report cannot be expected till some time later. I shall make out this report and the accompanying maps at Benicia or San Francisco, where I shall have much greater facilities for gaining information that I may require than anywhere else.

Should it be designed to continue this survey during the next year, it will be exceedingly desirable that the animals and other public property, now in my charge, should not be sold. Else great delay and expense will be necessarily incurred in a new outfit. Still more desirable is it that the geologist, naturalist, and other members of the scientific corps should be retained in service, as they could not be replaced.

I beg leave to mention this, as there is time to forward instructions to me at San Diego before the 1st of January, at which time the sale would probably take place.

To keep a party in the field or office for the twelve months of the next year, would require the sum of \$60,000, and I respectfully submit this as an estimate, in case an estimate should be called for.

In a circular received from the bureau, a monthly statement of expenditures is required. This is evidently impossible when a party is in the field, far removed from white settlements. I will have my accounts made out, however, up to the 1st of September, and will endeavor to have them mailed at Los Angeles.

All letters that will reach San Diego by January 1st, should be directed to me there; subsequent ones to San Francisco.

I have the honor to be, very respectfully,

R. S. WILLIAMSON,

Lieut. U. S. Top. Engineers.

Col. J. J. ABERT.

Notes for the information of the Secretary of War.

DEPOT CAMP, POSE CREEK,

August 31, 1853.

I have just returned here from a twenty day's examination of the various passes of the Sierra Nevada, and give the results so far.

I started from this point, which is eight miles north of Kern river, and went through Walker's pass, the northernmost point of the Sierra, where it is supposed possible to carry a railroad across. Then re-ascending to the summit of the pass, I wished to follow the back bone of the mountain, southwardly, till it joined the coast range; thus necessarily seeing every depression in the ridge. Having thus ascertained the lowest points, I then intended to ascertain if they were accessible from both bases. This plan I followed most successfully, and I have now a good knowledge of these mountains—am certain that no pass exists (within the above limits) that I have not examined—and am now prepared to commence a survey of the best of them.

I regret to say that the difficulty of crossing the mountains is much greater than I anticipated; but I think there is no doubt of the practicability. I have been through eight passes, most of which are very bad, and I will briefly describe some of them. You must understand, however, that my opinions here expressed may be modified, when I get a more accurate knowledge from surveys.

With this understanding, I will commence by saying that Walker's pass is out of the question. To reach this we ascend Kern river (properly, the Po-tum-ko-la) for some fifty miles, where a branch comes in from the east. This we ascend, in a wide and gently ascending valley,

for some twelve miles, when we leave it, cross the divide, and enter the plain or basin beyond. The difficulties are: 1st, ascending Kern river; 2d, ascending to the summit from the valley of the branch; 3d, descending to the basin.

1st. On Kern river high mountains come down abruptly on each side, forming a cañon of five or six miles in length, impassable for mules, and probably for footmen, since there is no Indian trail through it—and these mountains cannot be turned. Hence, to go by Kern river, an immense deal of cutting, blasting, &c., would have to be done. Rock, granite. This river falls in this fifty miles—fifty feet to the mile on an average.

2d. The ascent to the summit for five miles is over three hundred feet to the mile, and rugged rocky mountains on each side, cut up by precipitous ravines, prevent a winding course to gain distance.

3d. The descent from the summit to the basin is eight miles, and over two hundred and fifty feet to the mile. The altitude of Walker's pass is over 4,500 feet above the Tulare valley, and over 5,000 above the sea. The basin is 2,500 feet above the valley.

Proceeding south, the next pass worthy of note is one never before passed through, so far as I can ascertain. The ascent from the basin is uniform, and not more than a hundred feet to the mile, arriving at the lowest point but one of the Sierra Nevada—3,100 feet above the Tulare valley. A creek runs from the summit to the valley, but the descent for ten miles is three hundred feet to the mile. Possibly, by winding in the hills, a more gradual descent could be found—still it would be difficult and very expensive. Instead of following this creek we can follow along the crest of the mountain, on nearly a level for fifteen miles, and then descend nearly the whole vertical distance in three or four miles. If inclined planes, with stationary engines, have to be resorted to, this would be a good point.

Still further south there are two passes leading into the head of the Tulare valley, at a place called Tejon. A wagon road passes through one, which is beginning to be known as the Tejon pass, and it is the worst wagon road I ever saw. The pass, fortunately, presents some good features for a railroad. Two small streams run from near the summit—one into the basin, the other into the Tejon—but their sources are separated by a narrow divide over 1,500 feet high. I have great hope that a survey will show that should this ridge be tunneled, the road can pass up one creek through the tunnel, and down the other. The summit of the Tejon pass is 4,500 feet above the Tulare valley.

The other pass coming into the Tejon is called the cañada de las uvas (grape ravine.) In this a small brook descends into the Tejon, fourteen hundred feet in four miles, while the rest of the pass is of gentle ascent and descent. The summit is 3,100 feet above the Tulare valley—the same height as that of the passes before mentioned. Two modes would naturally suggest themselves for making a road through this pass. One, a system of inclined planes with stationary engines over the four miles above mentioned; a second, by following along the side hills. Before I express an opinion on these points, I must wait till a survey of the pass is made.

I intend to leave here to-morrow for the Tejon, twenty-five miles

distant, and shall run a line of levels through the Tejon pass and the cañada de las uvas, at the same time making an accurate sketch of the hills and ravines on each side. From the data thus obtained, I shall be able to give full information on the subject. So much for passes.

I expect to reach San Diego sometime in December, when I shall discharge the party (scientific corps excepted) and proceed to San Francisco or Benicia, establish an office and make maps and a report. A skeleton report I will mail before the first of January. Upon arriving at San Diego and without further instructions, I would naturally dispose of all the public property at auction. Now supposing (and I hope it will be the case) that the party is again to be sent into the field next spring, either under another appropriation for Pacific railroad survey, or to gain general topographical information concerning the unexplored portions of this country, it would be exceedingly desirable to keep this property on hand to prevent the loss incident to an auction sale, and the delay, difficulties, and expense of getting another outfit. Still more desirable would it be to retain the members of the scientific corps, as their places could never be refilled here. They, however, will necessarily be kept till the report be made out. But without authority, I cannot keep this property on hand, merely with the hope that it will be required in the spring, and the quartermaster having once sold it, will not receive it again. The wagons, &c., can be stored in San Diego, and the mules turned out on a grazing rancho for the winter, and be in fine order for service in the spring.

R. S. WILLIAMSON.

MOHAVE RIVER, November 7, 1853.

SIR: I have the honor to transmit herewith my accounts for the quarter ending September 30, 1853. It will be observed that these accounts do not present the actual amount of money expended during the quarter, for none of the party (except in the case of one or two men who were discharged) have been paid, their pay being reserved till the end of the exploration.

I leave here to-morrow, with the escort to follow down this river to its junction with the Colorado, and thence down that river to Fort Yuma. Lieutenant Parke leaves at the same time with a surveying party to go through the Casson, thence through the pass of San Gregorio to Warner's pass, where he will commence a survey, and where I expect to join him early in December.

An examination of the coast range, south of Warner's pass, and the country lying between it and San Diego, will complete the examination. I expect to be in San Diego by the first of January, and then, if no instructions are received to the contrary, I shall proceed to San Francisco, where I shall establish an office and make out my report.

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

R. S. WILLIAMSON,

Lieut. U. S. Typographical Engineers.

Col. J. J. ABERT,

Chief of Bureau Typographical Engineers.

V.

SURVEY NEAR THE 32^d PARALLEL, IN CHARGE OF LIEUTENANT PARKE.

CAMP NEAR MISSION SAN DIEGO,
December 20, 1853.

SIR: I have the honor to acknowledge the receipt of instructions from the War Department, November 18, 1853, detailing me for the prosecution of a survey, "in connection with examination of railroad routes to the Pacific," through Northern Mexico and Texas, together with the passport and a copy of the instructions relative to the organization of an escort. They arrived at a most opportune moment. Lieutenant Williamson, about completing his field work, and Lieutenant Stoneman encamped at this place with his escort. Of Lieutenant Whipple's movements or whereabouts, we have heard nothing definite, and I will therefore proceed to organize and equip my party, without counting upon any assistance from the latter officer; receipting to Lieutenant Williamson for such instruments and property as I shall need, and at the same time can be spared by him.

But to complete my outfit, it is absolutely necessary that I should go to San Francisco, mainly to procure barometers. This trip I shall make with all possible dispatch.

In my instructions no mention is made of either an assistant or a physician.

Deeming both of these essential to the rapid prosecution of the work and well-being of the expedition, I will secure their services, in case they can be obtained at such salaries as will not cause my expenditures to exceed the amount of appropriation allowed me.

Very respectfully, your obedient servant,
JNO. D. PARKE,
Bvt. 2d Lt. Corps Top. Eng.

HON JEFFERSON DAVIS,
Secretary of War.

WAR DEPARTMENT,
Washington, December 9, 1853.

SIR: On the eighteenth ultimo, instructions were addressed to you at San Diego from this department to make preparations for, and take charge of a survey for a railroad route from a point on the Gila, near the Pima villages, to the Rio Grande, partly passing through Mexican territory, for which authority had been obtained from the Mexican government. Since those instructions were dispatched, intelligence has been received here of a hostile expedition against the Mexican province of Sonora having sailed from California, and it is apprehended that this lawless conduct on the part of our misguided citizens may excite a feeling among the Mexican people which would render it unsafe for your party with its military escort to make its appearance among them, especially as it is not known whether the Mexican government has

advised its officers or people along the line of your route that the survey is made by its permission.

Although the examination of the route in question is a matter of much importance, and earnestly desired by the department, it is unwilling to incur any serious risk of a collision between your party and the Mexicans. You are therefore directed to consider well all the circumstances before proceeding to carry into effect the instructions above referred to, and unless you are fully satisfied that you can perform the exploration without any serious interruption, you will relinquish the undertaking for the present. With this general direction the matter must be left to your discretion, with the injunction to let no undue confidence lead you to overlook or underrate the possible danger before you, and as you will when these instructions reach you be in possession of information later by from thirty to sixty days than that which has reached this city, it is hoped that it may be of such a character as will enable you to form a correct and safe conclusion as to the course to be pursued.

Very respectfully, your obedient servant,
JEFFERSON DAVIS,

Secretary of War.

Lieut. JOHN G. PARKE,
Corps Topographical Engineers.

P. S.—Accompanying your instructions was sent a passport from the State Department, which it was intended to have countersigned by the Mexican minister. His absence however prevented it. Herewith you will find a duplicate, with the countersign of General Almonte.