

Pioneer Trail Research

Report #1

June 1, 1990

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PREFACE

Research has been completed on the topographic location of the Bird-Truax Trail -- also called the Lolo Trail of 1866. This report documents the original microfilm records in that national archives. The draft version of this report was copyrighted in 1988.

Steve F. Russell
June 1, 1990

VIRGINIA CITY - LEWISTON WAGON ROAD

Records of the Office of the Secretary of the Interior
relating to the
Virginia City, Montana - Lewiston, Idaho Wagon Road, 1865-1870

Compiled from the file microcopies of records
of the National Archives No. 95, Roll 13

Compiled and Edited by:

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February 28, 1988

File Microcopies of Records in the National Archives: No. 95

Roll 13

RECORDS OF THE OFFICE OF THE SECRETARY OF THE INTERIOR
RELATING TO WAGON ROADS, 1857-1881

LETTERS RECEIVED RELATING TO THE VIRGINIA CITY,
MONTANA-LEWISTON, IDAHO WAGON ROAD, 1865-1870

THE NATIONAL ARCHIVES

Washington: 1948

INTRODUCTORY NOTE

The records microcopied on this roll consist of communications relating to the construction of the Virginia City-Lewiston Wagon Road that were received in the Office of the Secretary of the Interior in the period, 1865-1867. These records are divided into two categories which have been filmed in the following order:

(1) Incoming communications, March 17, 1865 - September 10, 1870, including letters of recommendation for the position of superintendent; a letter of resignation from John Connell, the first Superintendent and Disbursing Agent of the Road; communications from Wellington Bird, the second Superintendent and Disbursing Agent, regarding the work, transmitting vouchers and other records of disbursements, and explaining his return to Iowa without leave after placing the expedition in charge of Major Sewall Truax; communications charging Superintendent Bird with swindling the Government; communications from Treasury Department officials regarding the accounts of Superintendent Bird; communications from G. B. Nicholson, Engineer of the wagon road expedition; a letter from Secretary of War Edwin M. Stanton, March 3, 1866, regarding a military escort for the Bird expedition; several letters written in 1870 urging the use of unexpended funds for improving the Road; and various miscellaneous letters.

(2) Memorandum of an outfit for making a wagon road in Montana and Idaho Territories (supplies for 60 men six months), undated, and report of Superintendent Bird (submitted under covering letter of February 9, 1867) with appendices as follows:

Appendix A, copy of memorial of Idaho Legislature, January 9, 1866.

Appendix B, report of reconnaissance by Oliver Marcy, Geologist, July 18, 1866.

Appendix C, report of reconnaissance by G. B. Nicholson, Civil Engineer, July 26, 1866.

Appendix D, report by Nicholson, January 31, 1867.

Appendix E, report by Marcy, January 31, 1867.

The material in the first category is arranged in roughly chronological order. Those communications dated between March 17, 1865 and November 11, 1867 are registered in a volume reproduced on Roll 2 of this microcopy. Copies of letters sent concerning this wagon road are included on Roll 1.

The accounting records pertaining to this road have not been filmed. No maps have been found in the files, and no letters and reports concerning this wagon road appear to have been published.

The records microcopied on this roll are part of a body of records in the National Archives designated as Record Group 48, General Records of the Department of the Interior.

Cincinnati. O.
Feb. 22^d 1866

J. H. Simpson:

L^t Co^l Engrs:

Sir,

Yours of the 19th Inst. has been rec^d. If the instruments are to be supplied under your direction, I would like very much to have an aneroid barometer included amongst them. A young man, Cyrus Mendenhall, anxious to go on the expedition in some general business capacity desired me to speak for him. I know little of his attainments, but character is excellent. I mention his name for your consideration as he requested it.

I have the honor to be,

Very Respectfully

Your Obedt. Serv^t

Geo. B. Nicholson

Wagon Roads

Lewiston I. T.

Sept. 15th 1866

Sir:

I have the honor to report to You the progress of the work I have in hand since the first of August. I informed You in a former communication that having concluded my explorations in a general way of the mountainous region lying between this point and the Bitter Root Valley the latter part of July. I had absolved to at once commence work in opening a pack trail on a Wagon Road grade on what is known here as the Lou Lou fork route. Within the first ten days of August I had over Sixty men at work and have kept about that force employed up to the present time and shall continue the work now going on until [sic] the close of the present month. The work done is chiefly with axes in cutting out a road way through the forest of from twelve to twenty feet wide. Some grading is necessary on the mountain sides to make a trail. This I am also having done as we proceed on the way. At the rate the work was progressing when I left it in the mountains a few days ago, I shall probably complete it to Warm Springs on the Bitter Root Lou Lou, by the end of the month. This brings us within 25 or 30 miles of the Bitter Root River and leaves little or no heavy or difficult work to do to complete a practicable trail for loaded pack trains by this route to Virginia City or any other point in Montana.

I have continued to employ Col. Craig who is rendering efficient service in exploring the mountain passes in detail in advance of the workmen. Mr. Nicholson with a sufficient party of assistants is diligently prosecuting his survey in detail of the whole road as we are now locating it, and Major Truax is rendering me important service as Manager and Overseer of the workmen on the line. As all our Subs, Stores and Camp fixtures with the blankets of the workmen are moved on pack mules it requires a considerable train of animals and a number of men to act as packers and camp men to keep things moving, but so far we have had but little bad weather and have succeeded in a very satisfactory manner in prosecuting the work, and have also succeeded in obtaining a better wagon road grade through the mountains than I anticipated and I also find that the distance when actually measured in the new route is much less than I had estimated when first going over it. I now think that the distance from Lewiston to Hell Gate or Fort Owen will probably fall below two hundred miles.

In consequence of a number of my employees being detached from the main body of workmen, with Col. Craig and Mr. Nicholson, it was impossible for me to obtain their names to my payroll at the end of August. I have therefore deferred making out or completing my Aug. returns until the end of the present month when returns for both months will be forwarded together.

I shall leave here sometime in October as work cannot be prosecuted in the mountains with a train of animals after the middle of October with safety and shall give a contract to some one here for the expenditure of whatever amount of the appropriation may be left in prosecuting or completing some portion of the unfinished work on the road next spring.

*I have received a certificate of deposit from the U.S. Treasurer at San Francisco for twenty two thousand five hundred dollars (\$22500) and have also this day received your communications of the 13th Aug. and herewith enclose a corrected voucher [No.] 9 for May from Dwight
[& Bro.]*

Your communications may hereafter be addressed to me at Mt Pleasant Iowa from whence after my return I will make out and forward to you a full report of my work with that of Mr. Nicholson and Prof. Marcy.

*I have the honour to be
Very Respectfully
Your Obt Servant*

*Brig. Genl J. H. Simpson
Engineer Dpt.
Washington City
D. C.*

*W. Bird
Supt. & Disbj agt
Va City & L.W.R.*

[Report of Superintendent Bird]

[Virginia City and Lewiston Wagon Road]

[February 9, 1867]

Sir:

I have the honor to herewith transmit to you my report on the Virginia City and Lewiston Wagon Road with accompanying appendices.

Pursuant to my appointment of Superintendent and Disbursing Agent of the above named wagon road made December 30th 1865 and to my instructions received from your department dated February 21st 1866, I proceeded to New York and after buying the necessary supplies of Instruments, stationary etc, I embarked on steamer March 10th 1866 with Mr. Nicholson and Prof. Marcy who accompanied me on the voyage to Portland Oregon by way of San Francisco California.

A portion of my supplies of subsistence I purchased in San Francisco, a portion in Portland Oregon together with some mules and wagons, and the remainder of what I needed to complete my outfit was procured at Walla-walla and Lewiston, arriving at the latter place on the 30th of April.

On my arrival in Lewiston I learned that in consequence of the heavy fall of snow during the winter just past, the mountain country through which it was necessary for me to make [R2] my preliminary explorations was still too deeply covered with snow to make any active progress with the work before me. I therefore employed the time in procuring and getting ready the necessary outfit and materials and in organizing a small exploring party.

During this time I also endeavored by all means within my reach to ascertain the condition of the country generally in relation to roads, having especial reference in my investigations to the country lying between Lewiston, Idaho Ter. and Virginia City, Montana Ter. From this investigation the following facts were ascertained.

The routes open for any kind of transit between the waters of the Columbia River and Montana Territory are, beginning at the South,

From Umatilla and Wallula by way of Walla-walla and Boisee [sic] to Virginia City.

2nd From Lewiston by way of Elk City on the Southern Nez Perces Trail to the head waters of the Bitter Root River in Montana.

3rd From Lewiston by the Lou-lou Fork Trail to the Bitter Root Valley entering that valley near its lower end, nearly midway between Fort Owen and Hell Gate.

4th The Coeur d' Alene or Mullan route from Walla-walla by way of the Coeur d' Alene [R3] Lake and Mission and the St. Regis Borgia and Bitter Root river to Hell Gate or Missoula.

5th and last by the Pend d' Oreille route starting from White Bluffs or Priest Rapids on the Clark Fork of the Columbia River and thence by land transit to Pend

d' Oreille Lake and the Bitter Root river to Missoula where all three of the last named routes come together to find a way through the Gap of the Hell Gate mountains at this point to either Helena, Fort Benton or Virginia City.

Over the first named route by the way of Boise, wagons and stages constantly travel from Walla-walla to Salt Lake and also to Virginia City, the roads to the two points named separating at Fort Hall. But over neither of the other routes could wagons be taken and were only used for transportation by pack trains.

I early came to the conclusion that either the Coeur d' Alene or Pend d' Oreille route was too circuitous to be considered practicable for a route for a wagon Road from Lewiston to Virginia City while any other more direct route was possible, and this left me the Loulou Fork and Southern Nez Perces routes to decide upon by exploration, which was the most desirable or whether either were practicable at all.

I should say perhaps as [R4] preliminary here that between the plains on the eastern side of the Columbia River and the Bitter Root Valley (to some point in which any direct road to Virginia City must go) there is a belt of very rough, rugged mountains from seventy five to one hundred miles in width, know as the Salmon River Mountains at the Southern end, the Clearwater and Bitter Root mountains in the middle terminating in the Coeur d' Alene mountains at the north end of the range. The whole range is a series of mountains broken up and intersected by the Salmon and Clearwater rivers with their tributaries on one side and the various tributaries of the Bitter Root river on the other. Any route for a road except the extremely circuitous one of the Pend d'Oreille Lake at the north or by way of Boise at the south must go over or among these broken masses of mountains to get from Lewiston to Bitter Root valley or Virginia City.

As a route to Virginia City, the one by way of the Southern Nez Perces Trail seemed most direct, but the one by way of the Loulou Fork was endorsed and recommended by the territorial legislature of Idaho at their last session, a copy of whose memorial I herewith append marked "Appendix A". I therefore decided to commence my explorations on that route. [R5]

My expedition being organized which consisted of myself, Mr. Nicholson, the Engineer and Prof. Marcy as Geologist [sic] with Col Wm. Craig and an Indian as guides with a sufficient number of camp men, packers and axemen to manage and take care of by subsistence train and cut out and open a way for travel through the heavily timbered country in the mountain region. I left Lewiston on the 24th day of May and found a passable wagon road from our starting point to the crossing of the Clearwater River at what is now know as Schultz, formerly Bell's Ferry, at which point Mr. Nicholson with part of the expedition had already arrived. My first investigation was given to the hills bordering on the Clearwater on either side at this point, and after pretty thoroughly exploring and examining these hills I was convinced of the practicability of grading a road down to the river and up again to the plain on the other side at a moderate cost.

On the 30th day of May, I left the ferry and following in an easterly

direction over an undulating plateau not unlike that on the south western bank of the river, generally covered with grass and grassy pine openings, interrupted by level grassy meadows or prairies known by the Indians as "camas grounds", a distance of twenty five miles when we reached at Muscle Creek the foot of the [R6] mountain region proper, beyond which the country is covered with dense forests of evergreen timber, pine, larch, fir, white cedar, Norway spruce, hemlock etc. At Muscle Creek I went into camp on the 6th of June in order to make explorations ahead and and [sic] around us before advancing farther.

In travelling from the ferry to this point our course lay on the North bank of the Lolo Fork of the Clearwater which enters into the latter nearly a mile above the ferry. It was impossible however to follow up this creek near the bed of the stream as in its course from the mountains to the river it traverses most of the way a deep cañon with in many places almost perpendicular sides of fifteen hundred feet or more above the water.

The first exploring party sent in advance some fifteen miles reported too much snow to travel over with safety at present, besides about this time almost incessant rains began falling, which rendered explorations and work of any kind in the way of opening a trail through the dense forest quite impossible for some time; accordingly some of the time spent here was lost for all practical purposes. Still I had explorations made in different directions whenever it was possible to do so, and upon the whole during the time made a pretty thorough exploration of several different lines leading to the summit of the mountain range before us, distant as I afterward [R7] ascertained by measurement, twelve miles. On the 26th of June I broke up camp at Muscle Creek and continued our march for Bitter Root valley, where I arrived without loss or accident on Saturday the 7th of July.

The course travelled was generally East and the point of entrance into the valley where we first met the Bitter Root river being near Fort Owen which is almost precisely the same latitude as that of Lewiston. As I afterward adopted this line and made a definite survey of it, a more particular description of the country passed over will be given hereafter in this report as well as in the report of the topographical survey and maps of the Engineer.

On arriving in Bitter Root valley I came to the following conclusions, viz: Any wagon road from Lewiston to Virginia City must enter the Bitter Root valley somewhere on its way, and that a road by the Loulou Fork route was practicable. That any wagon road from Lewiston into this valley would cost more money than the amount of the appropriation in my hands. That beyond this valley to Virginia City roads were not only practicable in two or three different directions at small cost, but that from the mouth of the Loulou Fork of the Bitter Root by way of Missoula and Hell Gate pass, a road was now in practical [R8] operation, over which wagons and stages were continually passing.

I therefore decided to make no further personal explorations in that direction and directed Mr. Nicholson to take our Indian guide with a small party including Maj. Truax and return by way of the Southern Nez Perces Trail. I also instructed Prof. Marcy who here left me on his return homeward by way of the

Missouri river, to take with him a small party so far as Virginia City and make such observations as he could on the route by way of Hell Gate pass and Deer Lodge, a report of which reconnoissance is herewith appended marked "B".

I also then started on my return trip to Lewiston on the 12th of July arriving at Lapwai on the 23rd of July and met the report of Mr. Nicholson unfavorable to the Southern Nez Perces route, attached herewith, marked "C".

I therefore decided to proceed at once to practical operations on the road by the Loulou Fork route. To carry out this design I directed my Engineer to commence his survey immediately while I immediately hired what laborers I could procure and send them with a train of supplies to the camp at Muscle Creek to there begin the work under the direction of Maj. S. Truax who from this time served me as a most efficient general overseer of the work on the line. [R9]

When I was in Bitter Root valley, I found from personal observation what I had before learned as a fact at second hand, that the pass or gap in the Hell Gate mountains through which the Hell Gate river finds its way is the only available pass for a wagon road for a long distance north or south, through which a practicable road way can be found to either Blackfoot, Helena, Fort Benton or Virginia City. There is a route from the head of Bitter Root valley by way of Big Hole Pass over which a road could be made; and if a feasible route for a road could be obtained from Lewiston by the Southern Nez Perces Trail, to the head of the valley would probably be the shortest route for a road from Lewiston to Virginia City. But the Loulou Fork route proving the better one for a road, it strikes the open valley so near Hell Gate pass that as a route for a road it is equally advantageous to Blackfoot and Helena - which is really the heart of the territory - as to Virginia City.

In deciding upon the character of the work it was better for me to do under the circumstances, several considerations were taken into account.

1st It was apparant [sic] that with labor costing from four to six dollars per day, with the heavy cost of subsisting men it was impossible to grade an available wagon road bed for the whole distance [R10] with the means at my command, and an unfinished road or a road graded for a part of the way would be of no present utility whatever as the road is really only needed and would be only used for travel over the entire distance and but little for any local business or travel.

2nd A track opened and graded throughout to admit the passage of loaded pack trains over it would be of great and immediate utility in transporting goods from the Columbia river to Montana that being the only present method by which goods can be transported to the territory from the Columbia river by any practicable route, and the opening of this route would make the distance near a hundred miles less than any route travelled from Lewiston to Hell Gate, Helena, Fort Benton or Virginia City.

I believed I could open such an available trail the entire distance with the money in my charge. I therefore decided to commence work to this intent.

But the surveys and explorations have been constantly to locate a wagon road grade over which loaded wagons can be readily transported when the necessary grading is done around and on the mountain sides among which we were obliged to pass. The work done has consisted principally in cutting a road way through the forest on this location and survey, and doing so much grading only as was requisite to make the road available [R11] for pack trains. The force employed from the beginning and early part of August consisted of near seventy men, all told. With this force I should have been able to complete the opening of the road in this manner the entire length, could I have had the time, but the season growing late for work in the mountains I was obliged to quit active operations on the road with the close of the month of September and accordingly discharge most of my men at that time retaining only a sufficient number to take the train & camp fixtures, with the baggage and blankets of the workmen down to Lewiston according to agreement made with them, leaving the unfinished work to be completed next summer.

The country travelled over from Lewiston to Bitter Root valley presents three tolerably distinct natural divisions. The first from Lewiston to Craig's mountain, the second from Craig's mountain to Muscle Creek and the third from Muscle Creek to Bitter Root valley or rather the valley of the Bitter Root Loulou.

A road has been opened and travelled over for a number of years from Lewiston to Oro Fino. That part of the road between Lewiston and Lapwai distance of twelve miles has been constructed with some considerable labor for the accommodation of the military post and Indian Agency at Lapwai, passing over a [R12] grass covered plateau of some six hundred feet elevation above the river. From Lapwai the road follows up a creek of the same name to where the ascent of what is known as Craig's mountain begins. This mountain is not a mountain ridge in the ordinary sense of the term, but the ascent by easy grade of fifteen hundred feet leads to a broad plateau, elevated some two thousand feet above the level of the river and extending at about the same elevation to Muscle Creek, a distance of seventy miles. Through this plain the Clearwater river flows in a north westerly direction and is crossed by a ferry at Schultz, sixty two miles nearly due east from Lewiston.

After reaching the elevation on the east side of the river a general easterly course is followed to Muscle Creek. The plateau on the west side of the river is an open grassy plain, with but six or seven miles of pine openings after first reaching the summit level at Craig's mountain. East of the Clearwater we find a succession of pine openings and camas meadows for the balance of the distance included in this second division.

The road to Oro Fino was opened as a wagon road the entire distance, but the difficulty of crossing the Clearwater hills renders it unavailable as a wagon road and is only used for the [R13] transit of pack trains. I availed myself of this Oro Fino road and included it in my survey to a point fifteen miles east of the ferry at the Clearwater, where the road bearing off towards the north, I leave it continuing on across a camas meadow (Oyipe Prairie) three miles and then passing through a succession of narrow belts of timber alternating with meadows,

reach Muscle Creek the end of the second division; following this eastwardly course I leave Oro Fino about twelve miles to the north.

Muscle Creek is an inconsiderable stream which I had bridged but which can be easily forded at almost any season when the road can be travelled. At this point begins the third division, and here an ascent commences which within twelve miles reaches an additional elevation of about three thousand feet or about fifty eight hundred (5800) feet above the level of the sea, making one of the highest points on the route. At this point also begins the dense evergreen forest which continues to Warm Springs in the upper end of the valley of the Bitter Root Loulou, a distance of ninety two miles.

Five miles from Muscle Creek the Clearwater Loulo is reached and one branch of the stream is here crossed. It is quite rapid and has a rocky bottom but can easily be forded at any season. Here we [R14] meet a hill of about four hundred feet but the ascent is made by an easy grade, after which the ascent is gradual but nearly constant along the top of the ridge or back bone until the summit is reached seven miles farther on. After crossing the Lolo no streams except small spring branches are crossed for a distance of seventy miles when one of the branches of the South Fork of Clearwater is reached near its head. This stream is nearly always fordable. It is however very rapid, one hundred feet wide and should be bridged which can be done at a moderate cost as an abundance of magnificent timber of hemlock, fir, white cedar and larch thickly cover its border on either shore.

We forded this stream at our first crossing when it was probably near its highest. Pack trains also passed over it from Blackfoot to Lewiston the latter part of the summer. The road over this distance of seventy five miles follows the "divide" between the North and South Fork of the Clearwater river. This divide is not a continuous mountain ridge, but a succession of mountains or "buttes" connected together by low saddles, some less than a mile, some several miles in length being a narrow ridge, forming when the timber is removed a good natural roadway. Between these and around the sides or base of these mountain buttes, will require continuous [R15] grading for a wagon road, but by our explorations through the mountains I was very generally enabled to find locations for the road where the grading will not be costly or difficult, there being as I believe but little of the distance so rocky as that a good road bed cannot be made with the pick, shovel and crow-bar.

The question may be asked, why not follow the bottom of the valleys along the streams traversing this mountain country? I answer, the streams for the most part flow through narrow gorges or cañons with nearly perpendicular rocky sides many times a thousand or more feet high rendering them impassable for a road, therefore the necessity for following the ridges or sides of the mountains.

Abundance of pure spring water is obtainable almost every mile of the route. Over the open country of course grass is abundant, and through the timbered region open places are formed among the mountains of from a few to several hundred acres in extent where an abundance of excellent grass for feed can be obtained.

The opening of the road was prosecuted to a point four miles beyond the crossing of the upper Clearwater, at Takon meadows at the head of the valley of the Bitter Root Loulou. The opening of this end of the road and some [R16] additional grading and the construction of some small bridges is the work left undone. It is confidently expected that the money left unexpended will be quite sufficient to complete this thoroughly and well and also to do some grading for the wagon road on the Clearwater hills at Schultz Ferry.

This of course leaves an unfinished wagon road, and the question arises is the route for a road of sufficient importance to justify the appropriation of an additional sum of money necessary to complete it. I have no hesitation in giving it as my opinion that the expenditure of such an additional sum of money on the road is not only justifiable but is due to the interests of the country through which it passes, and the large commercial interest at either end, which would be connected and improved by its completion. It is true and may as well be admitted that in consequence of the elevation of the mountain range traversed by the road, there will be a portion of the year in winter when it will be impassable without a great deal of labor on account of the snows. But the same objection will hold good against any other route that can be opened between Lewiston and Virginia City, excepting only the extremely circuitous one by way of Boise.

But a good [R17] road made and kept open for half of each year would in my opinion be of sufficient importance to justify the expenditure of all the money it would cost and more than this, can, I believe be done with the road I have located.

An examination of any recent map of Montana and Idaho Territories including the country drained by the Columbia river, will give the best idea of this route as a public thoroughfare. Lewiston will be found located at the junction of the Snake or Lewis fork of the Columbia and Clearwater rivers. And to this point the first named stream has been navigable for steamboats carrying freight during the past year from early in February to about the 10th of September. This is the highest and most easterly point to which boats can be taken on this or any other river on the Pacific coast. This then being the most easterly point of river navigation indicates it as a proper and desirable starting point from which to open a wagon road to the heart or business center of Montana Territory. This heart or commercial center at present is unquestionably not Virginia City but Helena and the Blackfoot country. But as I said before to reach this point or even Virginia City the most available route from any part of the Bitter Root valley is through Hell Gate Pass, and I believe a road [R18] from Lewiston to Hell Gate by the route I have followed is the most direct, is shorter by near a hundred miles and can be made an available and durable road for less money than by any route between these points that can be obtained.

From what I have been able to observe in regard to the commerce between the Columbia river and Montana during the last year, few if any goods are carried from any point on the river direct to Virginia City, but large quantities are carried by pack trains from Lewiston, Walla-Walla and Wallula to Blackfoot, Helena, Missoula and Fort Owen, and I think if there was a direct air line road from Lewiston to Virginia City, the trade between those points would not be

increased in near the same proportion as would that between Lewiston and Blackfoot and other points, to reach which it would be necessary to go through Hell Gate Gap.

I would not however claim this as any justification in diverting an appropriation for a road from Lewiston to Virginia City from being expended on a direct route between the two points when such a direct route was practicable.

But when we find the best and most available route to the latter place diverging somewhat from a direct line, yet so as to accommodate a much larger commercial interest at other points on the line of the road, then, I suppose that this can be claimed [R19] in justification.

This then can be stated in short as the true state of the case. The Loulou Fork road when completed will open up from the most easterly available shipping point on the Columbia river, the nearest and best route to Virginia City that now exists or that can probably be obtained. It also opens from the same point a near route to other places in Montana of larger commercial interests which would not be reached at all by the road if opened up from the upper or South end of Bitter Root valley instead of by way of Hell Gate.

It is perhaps proper to say that I was informed by Major John Owen, who has been a resident of Bitter Root valley for fifteen years or more, that he believes a route for a road feasible, starting from the mouth of the Loulou on the Bitter Root river and running south east to an opening in the range of mountains immediately east of Fort Owen, there finding a pass through or among this range to Cotton Wood and Deer Lodge beyond and thence on to Virginia City. This would probably shorten the distance a little but I did not feel justified in spending the time in making an exploration on that route while the fact stared me in the face, that an available wagon road was already in practical operation [R20] between Hell Gate and Virginia City.

The length of the road from Lewiston to the Bitter Root river by actual and approximate measurement is two hundred and two miles; extended to Missoula would be two hundred and twelve (212) miles and to Fort Owen would be two hundred and twenty miles, making the entire distance from Lewiston to Virginia City by way of Missoula and Hell Gate pass about four hundred miles.

This distance can be shortened by crossing the Clearwater at Lewiston and following the north bank of the river to where it is joined by the North Fork and there crossing this fork and the Oro Fino creek, four miles beyond, make the ascent of the hill on the east side of the river joining the surveyed routes of the road at Texas Creek, eight miles east of Schultz Ferry. This gives a shorter road but will require a large sum to construct it as at a number of points along the river it is closely embraced by high walls of basaltic rock. Pack trains do now pass over this route during the low stages of water in the river.

The road as located from Craig's mountain to the ferry will be seen to make a detour to the south out of a direct line. This is made in consequence of a deep and impassable cañon which would have to be crossed in a direct line and

therefore [R21] necessitated the detour referred to. Details as to topography will be found more at length in the report of the Engineer.

The expedition was fortunate throughout in meeting no serious accident or loss of property, one mule and one horse being the only actual loss by death. The severe and continuous labor however to which I was obliged to subject my animals in keeping up the supply of subsistence and in moving up the camp as the work progressed reduced them low in flesh so that many sold for lower prices for that reason in part but chiefly for the reason that the working season was over and the market was everywhere crowded with horses and mules for sale. I did not feel justified however in incurring the high cost of keeping them over winter with all the risk in order to sell them for a higher price in the spring.

I have already informed you of the arrangement made with Major Truax to prosecute the work in the spring. It is proposed that the major will employ John Howarton an old pioneer road builder in the territory who served me as one of my foremen on the work until I quit. He agrees to work with a force of ten or twelve workmen in addition, and prosecute the work already laid out, beginning at Bitter Root valley as early in the spring as possible, under the direction and [R22] supervision of Maj. Truax, who will at the end of each month pay the men their wages and look after the work to see how it progresses, for which he is to receive six dollars per day for the time he is actually employed. Both of these men are well known at Lewiston and in the territory. The arrangement and the men were recommended to me by citizens of Lewiston who were most deeply interested in the road, as the best that could be made to secure a judicious and economical expenditure of the money yet remaining. I have entire confidence that the arrangement is a good one, and will prove in the ultimate result satisfactory to all concerned.

I desire in conclusion to here express my appreciation of the valuable service rendered by my Engineer Mr. Nicholson. His work was always prosecuted with intelligence, cheerfulness and energy. The field of operation and the means to prosecute his work by Prof. Marcy was necessarily somewhat limited, but it is believed his report will constitute a valuable addition to what is already known of the Geology and Natural History of the country drained by the upper Columbia and Missouri rivers.

To Maj. S. Truax and Col. Wm. Craig, I am also under obligations for valuable assistance rendered by them in the exploration of the country and in [R23] prosecuting the work of locating the road. The general report of Mr. G. B. Nicholson my Engineer, with a map of his survey and the topography of the route from Lewiston to Bitter Root valley by way of both the Loulou fork and Southern Nez Perces Trail, and also another map with the same in a condensed form, including the two hundred miles east of Bitter Root valley, embracing the whole distance from Lewiston to Virginia City, marked, "Appendix D", and also the Geological Report of Prof. O. Marcy marked "Appendix E" is herewith transmitted.

*I have the honor to be
Very respectfully
Your Obt. Servt.
W. Bird*

*Supt. and Disbg. Agent
Va City and Lewiston
Wagon Road*

To

Brig. Genl. J. H. Simpson

*Engineer Office
Dept. of the Interior
Washington City
D.C.*

Appendix "B"

Virginia City and Lewiston

Wagon Road

*Report of Reconnaissance from
Hell Gate to Va City*

Oliver Marcy, Geologist

July 18th 1866

Virginia City M.T. July 18th 1866

Sir,

I have the honor to report the completion of the reconnoissance of that portion of the route for a Waggon [sic] Road Between Virginia City M.T. and Lewistown [sic] Idaho which extends from Missoula on the Hell's Gate to Virginia City M.T.

The whole route is direct and surprisingly well fitted for a great thoroughfare. It is in four sections. The first Section includes that portion of the "Mullan Road" which extends from Mazzula to Deer Lodge, a distance of 91 miles as nearly as we could judge without the means of measuring it. On this section there are but two artificial grades of noticeable importance and they are in good condition. The road along the Hells Gate for much of the way runs upon a dry river terrace and when it crossed the lower bottom, though occasionally muddy presents no serious difficulties. The toll bridge across the Big Blackfoot is in good repair but Mullin's Bridge [sic] across the Hell's Gate had been swept away a few weeks previous to our passing and a Ferry [B2] extemporized. From Gold Creek to Deer Lodge the road passes over a range of low hills. Over these, easy, natural grades have been selected with great skill and carefulness. Over the whole of this first section heavily loaded teams are constantly passing. We met one train from Ft. Benton of Eleven waggons [sic] some of which were carrying forty hundred (40 cwt.).

The Second Section of the route passed over includes that portion of the Old road from Deer Lodge to Virginia City which extends from Deer Lodge to a point within a few miles of Silver Bow a distance of 30 miles. This section though not much used for freighting is much traversed by emigrant waggons and is as good as the first section.

The third section is across the divide between the waters of the Columbia and the waters of the Missouri. It is called the new road to Virginia and connects the old road from Deer Lodge to Virginia with the great thoroughfare from Virginia to Helena and Ft. Benton. The distance is 35 miles. The route is up the Silver Bow creek to the modest divide, on the west side of which there is not more than a half mile of grading and that very easy and all that is required. On the east side of the divide [B3] is perhaps, two and a half miles of grading and the remainder of the route to the Jefferson, a distance of about fifteen miles is a natural slope of a very even and not very heavy grade for a rail road.

The fourth and last section of the route goes up the Jefferson and Passamari ("Stinking Waters") a distance of 45 miles on the road from Virginia City to Helena and Ft. Benton. We need only say of this section that loaded waggons and stage coaches are daily passing over it.

The whole distance from Missoula to Virginia City is about 201 miles.

In my opinion the expense of keeping a good road over the whole route must be small and the local interests will readily and always sustain it without aid from the general government.

Yours Obediently

To

*W. Bird
Supt and Disbg Agt.
Va. City and Lewiston Wagon Road*

Oliver Marcy

Appendix "C"

Virginia City and Lewiston

Wagon Road

*Report of Reconnaissance
of Southern Nez Perces Trail*

G. B. Nicholson C.E.

July 26th 1866

Schultz Ferry, Idaho Ter.

July 26th 1866

*W. Bird, Supt & Disbg. Agt
Va City and L. Wagon Rd*

Sir:

I have the honor to submit the following report of a reconnoissance of the Southern Nez Perces or Elk City Trail to determine its relative advantages as compared with the Northern Nez Perces or Loulou Trail as a site for a wagon road.

(the figure goes here)

In accordance with instructions from you, I left your camp ("A" in sketch) in the Bitter Root at the mouth of the Loulou fork, July 12th 1866 in company with Maj. Truax and the Nez Perces guide Tah-tu-tash. I followed up the valley of [C2] the Bitter Root in almost a due southwardly course finding a nearly level or very gently undulating belt of country from two to five miles in width between the Bitter Root mountains on the west and the river on the east, sometimes in the form of prairies covered with luxuriant grass and again thinly timbered with

forests of pine. Up to the forks of the Bitter Root, 70 miles from the Loulou Fork or 80 miles from Hell Gate. I found a good natural wagon road almost the entire distance and used as such for a good part of the way by some half dozen ranchmen settled there.

I forded about 30 streams varying in size from mere rills to more pretentious creeks and one near the forks of the river was crossed with no little danger, while a week previous 3 of them were impassable.

In this journey up the valley, I paid particular attention to the chain of mountains on the west with the object of ascertaining whether an available route might not be found in the vicinity of Fort Owen through some of the valleys or cañons of the several streams I crossed. I satisfied myself from observations as I rode along that the subject should be dismissed without farther waste of time and means in exploration.

The dividing ridge of the Bitter Root mountains which is the boundary between Montana and Idaho shoots out [C3] a series of parallel spurs running eastwardly, rough and rugged as you have remarked in the Loulou reconnoissance, and terminating abruptly at the Bitter Root valley in rocky and semi-perpetual snow peaks far higher in altitude than the main divide of the chain.

The streams before mentioned emptying into the river and separating these spurs find their way through narrow and difficult cañons entirely unlike the valley of the Loulou.

Reaching the forks of the river (B) the course bends southwestwardly keeping up the left bank of the West Fork. The trail here assumes the character of all Indian roads being nothing more than a path wide enough to accommodate a single animal. The West Fork is a stream about 150 feet wide by 4 feet deep flowing through a narrow valley. I passed occasionally along its flat bottoms and then over the foot hills of the mountains which bank up the river, proceeding up this branch for a distance of 26 miles from the forks to (C).

Here the mountains are first encountered. So far no difficulty would be had in locating a good and cheap road with easy grades to either the forks of the Bitter Root (which I should call the point of entrance into the valley by this trail) or the entire distance down to Hell Gate. [C4]

Now we meet the same character of country found on the mountain section of the Loulou trail.

Leaving the West Fork which we have followed thus far to almost the head of one of its branches, we ascend a mountain about 1900 feet, run along a ridge and soon strike the main divide or water shed of the Bitter Roots.

It might here be remarked that the general elevation of the Bitter Root valley is about 2800 feet above the sea. The trail continues along the said divide, keeping with many ups and downs the common altitude, for 3 miles, leaves the divide and crosses Brush Creek or Sock-o-nane cañon (D) by a depression of 1360

feet.

Then up and down over the summits of many peaks still keeping the general altitude of 6000 feet which it has gradually reached until we meet the South Fork of the South Fork (Sel-wie) of Clearwater. The trail descends 4000 feet into its cañon (E) and fords the stream (the same in volume and character as the North Fork of the South Fork which crosses the Loulou trail) and mounts immediately up to the summit of Mt. Magruder regaining the lost elevation only to go down again 2770 feet to a creek.

Should a road be located on this trail, though it would not be necessary to go over the very crest of Magruder, still from what I could learn from personal observation and from inquiries afterward [C5] at Elk City, the great chasm of the Clearwater and its attendant long grades must be faced. Ascending the mountains again to nearly the elevation of Mt. Magruder and continuing my up and down progress over them, I came down 2350 feet into the valley of the head waters of Salmon river (F) and running over a handsome little patch of grazing country 3 miles, left it for another ascent onto the mountains which I traversed for 21 miles more until making a descent of 2250 feet (G) I struck the Red River 15 miles from Elk City, and where I found the first human habitation since leaving the vicinity of Fort Owen in the Bitter Root. Following down the Red river bottom and then over easy hills I arrived at Elk City the center of a mining district at the close of the 8th day of the tour having travelled 177 miles and made the quickest time on record.

Here I rested two days and occupied the leisure in platting my notes and gathering such information of the country as the citizens could furnish, in which I was greatly assisted by Mr. Learned of Elk City.

Here Maj. Truax and the Indian left me. Maj. T. taking to you my verbal opinion of the route examined, in substance as here given. I then resumed by journey and climbing two more mountains, the first 18 miles long (H) [C6] with an ascent and descent of 2450 feet to Newsom creek, the second (I) 25 miles long with an ascent and descent of 2500 feet to Silverwoods Mountain House. The height of the summit of the latter is 5110 feet above Kam-i-ah River, five miles from Silverwoods, which stream must be crossed to reach Lewiston.

At Silverwoods I left the mountains entirely and struck the general plateau which extends westwardly towards Lewiston and is the border of that designated in Gov. Stevens explorations as the "Plain of the Columbia".

Here my examinations ended for from Silverwoods to Lewiston a good natural stage road is already in operation and I made my way without delay through the Indian settlements of Kam-i-ah and down the main South Fork of Clearwater, 26 miles to Schultz Ferry.

Now for the relative advantages of the two routes.

By the Loulou Trail the distance from Lewiston to Bitter Root is 200 miles, 92 miles being mountain section. By this trail the distance is 233 miles, 125 miles

being mountain section.

Here to begin with is a difference of 33 miles in distance in favor of the Loulou Trail and 33 miles less of mountain section. Though as I feel pretty confident that a saving of 15 miles on the Elk City Trail between Elk City and the [C7] Clearwater cañon might be made; there would be left still a difference of 18 miles of mountain region to the credit of the Loulou trail.

The altitude is almost the same, the barometer standing generally lower on the Elk City Trail as exhibited in the following table of observations taken on several of the mountain peaks and at the most prominent places.

Elk City Trail	Barometer	Thermometer
Bitter Root valley near Forks	26.02	56
Cascade Creek Mt.	23.10	70
Divide of Mountains	23.44	69
Cone Mountain	23.20	75
Mt. Magruder	23.20	76
Elk City	25.90	62
Elk City Mountain	24.03	80
Silverwoods Mountain	23.886	52
Kam-i-ah River	28.82	52

Loulou Trail	Barometer	Thermometer
Bitter Root valley mouth Loulou	26.55	83
Divide of Mountains	24.87	42
Mount Simpson	23.802	54
Mt. Marcy	23.644	68
Mt. Romeo	23.902	70
Meadow Mountain	23.83	42
Squirrel Mountain	24.342	66
Muscle Creek	27.104	52
Clearwater at Schultz Ferry	28.775	64

By these tables you may observe that the mountains on this trail are usually a little higher than on the other. The reading "23.20" was common to a great number of points, though the difference compared with relatively similar points on the Loulou trail is so slight as to be worthy of little notice.

On both trails we have Craigs mountain about 20 miles from Lewiston and the hills [C8] at Schultz Ferry on the Loulou Trail are offset by those at Kam-i-ah river on this.

On the Loulou trail the only other cañon crossed after leaving Schultz's is that of the Clearwater 1550 feet deep which is partially offset by the Brush Creek cañon here.

Then there is left on the Elk City Trail for which we have no compensating features on the other, the cañon of Clearwater 4000 feet deep; the depression down to and elevation from the head waters of Salmon river 2350 feet; the depression down to Elk City and ascent over the Silverwoods mountain of 2500 feet.

The Elk City mountain, I think might be avoided by a slight detour.

The other ups and downs would probably balance each other.

Here then is a list of four other arguments against the adoption of this trail.

The Loulou Trail follows a divide from Lolo Creek to Clearwater 76 miles - a divide remarkably straight and direct.

This trail traverses the country as direct in line but regardless of divides, thus striking the cañons and depressions before alluded to. If it should be attempted to follow a divide on the Elk City Trail in order to avoid the objections spoken of, the course would be so tortuous as to almost double the distance. [C9]

Yet the Elk City Trail has one good feature, grass grows more abundantly than along the Loulou owing to the large number of deadenings among the timber. But as this has been accomplished by the Indians firing the woods the same might be effected on the other route. In character of country, rock, soil and timber, I found the exact counterpart of what you saw on the Northern Trail.

In view of the facts above enumerated, [sic] I give my opinion candidly and unhesitatingly [sic] in favor of the adoption of the Loulou trail as the more proper location for a wagon road. I have taken much pains to make careful barometrical observations perhaps on an average of every half mile of distance and have the notes with which to make an approximately correct profile of the route, should it be deemed of sufficient importance to devote the time for reducing them.

I here append a table of distances which may be of use at this or some future time.

From Hell Gate to mouth of		Aggregate miles from H.G.
Loulou	10	10
Fort Owen	18	28
Forks Bitter Root River	52	80

[C10]

From Forks of Bitter Root to		Aggregate miles from Forks Bt. R
Foot of Mountains	26	26
Dividing Ridge	5	31
Cone Mountain	4	35
Brush Creek	3	38
Clearwater River	11	49
Summit of Magruder	6	55
Cascade Creek Mt.	11	66
Head waters of Salmon	3	69
Summit Prairie	14	83
Red River	10	93
Elk City	15	108
Newsom Creek	18	126
Silverwoods	25	151
Lewiston	82	233

In conclusion, I may add that the opinion of Maj. Truax a civil engineer eminently qualified to judge coincides fully with my own, as to the comparative advantages of the two routes.

I have the honor to be,

Very Respectfully

Your Obedt. Servt.

Geo. B. Nicholson, C.E.

Va Cy and L. Wagon Road

"D"

Appendix "D"

Virginia City and Lewiston

Wagon Road

Report of G. B. Nicholson C.E.

Jan 31st 1867

Mt. Pleasant, Iowa

Jan. 31st 1867

W. Bird, Supt. & Disbg. Agt.
Va. City and L. Wagon Road,

Sir:

I have the honor to submit the following report with accompanying maps of my operations as connected with the Virginia City, Montana and Lewiston, Idaho Wagon Road.

Having received written instructions from you at Lewiston to proceed to Schultz Ferry on the Clearwater by way of the military post at Lapwai and await your arrival and to "make careful notes by the way as to distance and character of ground over which the road passes and at the crossing of the Clearwater make a thorough and careful examination of the hills on both sides of the river for such distance as you may deem necessary in order to ascertain the best and easiest grade to get to and from the river." I left Lewiston May 19th 1866 with a small party with pack train and wagon, taking with me the proper surveying instruments.

Having as directed made very careful notes, and as these were subsequently used as the final survey for this part of the road when the route had been determined upon, I commence here [a description of the road]. [D2]

From Lewiston to Fort Lapwai, thirteen miles, the road is an excellent one and much traveled. The first three miles out from Lewiston is built on the Clearwater bottoms and then ascends by a grade of 6 feet in 100 to a plateau of 600 feet elevation above the river; crosses said plateau in gentle undulations and makes a descent of 578 feet by a grade of 3.48 feet to 100 to Lapwai Creek. Thus far no timber is found but the country is covered with a rich quality of bunch grass. Thence up the left bank of Lapwai fording Sweetwater Creek at two miles and fording Lapwai three times until the foot of Craigs mountain is reached, 22 1/2 miles from Lewiston. So far the road is unexceptionable. It then ascends Craigs mountain, 1755 feet above the creek reaching the summit at the end of four miles, being an average grade of 8.3 feet in 100 feet. We took our wagon on a natural road up the side of the mountain but for such a long distance the grade is entirely too heavy and can be easily bettered by a little side hill grading. Craigs mountain is the border of a second table land with a general elevation of 2100 feet above Clearwater. The road passes through a strip of timber seven miles in width which fringes the summit of the mountain and over a grazing country similar to the lower table land. At Cold Spring 36 miles from [D3] Lewiston about 1000 feet requires grading and near Davidson's, 57 miles from Lewiston, about the same amount. From Davidson's to Schultz Ferry the distance is five miles. We took our wagon down to the ferry by a descent in four miles of 2446 feet. The hill on the north side of the river is 1932 feet above the

river and wagons have gone over it. But on either side as at present, it is a road on which to exhibit the powers of horse flesh or a teamster's dexterity more than one of any utility.

From Davidson's there is a rise of 668 feet in one mile to the top of the hill before any descent is made to the river. Undoubtedly the best route would be down

Davidson's creek, but this partakes of the nature of a cañon and like all such in this country would require a large amount of blasting all the way down to the river, but would save the 668 feet rise which cannot be avoided any other way. But a good road with easy grades can be made in the vicinity of the present trail, taking out the same spur with a little work. The north side hill can be readily surmounted. By the present trail, the ascent is 1932 feet in 3 miles. The better route is to commence the rise at the ferry proceeding southeastwardly and swinging [D4] to the left over the spur projecting towards the mouth of Lolo creek, keeping an even grade until it joins the present trail at the saddle and following up said trail to the crag. This is the first point to be reached and beyond this some little distance is a second hill 880 feet higher which is the main crest of the mountain, but up to which from the crag the selection of a route is very simple. By the route named there would be a good deal of blasting from the ferry for nearly a half mile to where it swings round the spur. But a good road can be made by keeping the vicinity of the present trail, making one or two zig-zags to where the horse-shoe commences, so requiring little or no blasting.

May 28th You arrived at the ferry and then commenced the reconnoissance of the mountain section of the Loulou Trail of which as you are yourself familiar it is unnecessary for me to speak. I might however say a word concerning the road from the top of Schultz hill to the end of the Oyipe Prairie where work on the road was commenced. The citizens of Oro Fino distant 30 miles from the ferry have already cut a road through the timber to their town over ground well adapted for it requiring no grading. Your road follows it to the beginning of the Oyipe Prairie, 15 miles from the ferry [D5] there leaves it and crosses said prairie 3 miles to the timber, also a natural road not requiring even any clearing of timber.

After the reconnoissance across the mountains, I returned to Schultz Ferry by way of Bitter Root valley and the Southern Nez Perces trail. [??ide] report on that reconnoissance. You having determined on the selection of the Loulou Trail I proceeded to the vicinity of Muscle Creek to begin my work in locating.

To one unacquainted with the country it is almost impossible to comprehend the difficulties of laying out a road. It was impossible to use the common surveyor's instruments. In many places I could not see fifty feet ahead owing to the density of the timber and the thickness of the under-growth which in the Bitter Root mountains grows with tropical luxuriance. The only instrument that could be used was a common hatchet to blaze the way for the wood choppers through the timber. Every part of the ground had to be carefully walked over. Alignments were made by my assistant and self blazing in many instances toward each other by sound of voice, from points previously selected.

I spent the month of August thus locating for the workmen and leaving it for Col. Craig to finish, commenced the instrumental survey, beginning at Oyipe Prairie. I marked mile trees [D6] numbering them from Muscle Creek, the most prominent point on the road after leaving Lewiston, as there we leave the level country and enter the mountain region. From Oyipe Prairie to Muscle creek the road runs over some small hills but principally over prairie and timbered bottoms.

From Muscle Creek to Lolo Creek, 5 1/4 miles it passes over hills whose highest altitude above Muscle Creek is 525 feet. Crossing Lolo Creek it ascends a spur of the main divide between the North and South Forks of Clearwater to an immediate height of 410 feet and keeping as a general thing the back bone of the spur gradually rises to the Neck 11 1/4 miles from Muscle Creek and of 1850 feet elevation above Lolo. From the Neck a gradual rise of 980 feet is made to the summit of Mt. Truax, reaching which it runs along its back bone and makes a descent of 740 feet to saddle or sag between it and Squirrel Mountain.

It then ascends Squirrel or Mus-coe-max mountain 780 feet above saddle follows its lengthened summit and falls 670 feet to Huston creek, an unimportant stream with a marshy bottom. From this it rises gradually but sometimes falling to the saddle on the west of Mt. Juliet. Thence it winds around the north side of this butte striking the saddle between it and Mt. Romeo, winds around the north side of Romeo to saddle on the east. The entire distance [D7] around these buttes is 6 1/2 miles. Then rising 1074 feet to top of ridge follows it one mile; thence along north side of Mt. Henderson to Prairie saddle. Thence, ascends 250 feet by side hill grade to a ridge and gently undulating along its summit reaches Meadow Mt. 37 miles from Muscle Creek at an altitude of 6000 feet the highest yet reached. It then descends to saddle between it and Mt. Bird, thence along the north side of the latter to a ridge, follows it past Castle Rock to where it leaves ridge 43 1/2 miles from Muscle Creek. Thence along the north side of Mt. Woods to saddle at head of Snow Bridge Gulch.

From here it ascends 610 feet, runs along a ridge passing Tower Rock and descends 480 feet to near Duck Creek. Then winds around north side of one and south side of two small buttes to Leaning Tree Camp; gradually ascends 990 feet from here to a ridge which it follows some distance and with several ups and downs descends to Lake Templin saddle. From this it winds and turns around the west, south, and east sides of Mt. Marcy avoiding the high peak until it reaches an altitude of 6000 feet on the ridge to the east; runs along the back bone of the most level parts of the ridge, sweeps along the north and south sides of many

small buttes and makes a very gradual descent of 1250 feet [D8] to saddle at Independence Camp. Thence along the north side of Independence ridge one mile to back bone of said ridge and along back bone to Mt. Simpson. Thence sweeping around the north side of Mt. Simpson it descends to Clearwater river, fords Clearwater, ascends 1550 feet to hill on east side. Thence proceeding along its summit descends 420 feet to Takon Creek, 85 miles from Muscle Creek and 173 miles from Lewiston.

At this place the work ended for the season. The timber was cleared out in sufficient width for a road and only enough grading done to make it a good pack trail. There was thus worked, 8 1/2 miles from Muscle Creek to Oyipe Prairie and 85 miles from Muscle Creek to Takon Creek, making a total of 93 1/2 miles. Of side hill grading along this route whenever the means are appropriated to work it, taking it in two divisions, the first or Western, between Muscle Creek and Meadow Mountain a distance of 37 miles and the second or Eastern between Meadow mountain and Takon Creek, 48 miles, there will be 17 miles in the first named and 28 miles in the second, making a total of 45 miles, some of which will be excavation of decomposed granite and, solid rock blasting, with a very large proportion of surface soil. Granite and gneiss are the only kinds of rock which appear in these mountains. [D9]

Owing to the rapidity with which the work was being pushed I could not find the time to take the proper cross sections for estimates, but will give a very rough approximation of cubic yards of excavation. For a roadway 12 feet wide there will be in the

Western Division,	19,950	cub. yds @	\$1.50	=	\$29,925
Eastern Division,	32,850	"	"	"	= 49,275
Total	52,800	"	"	"	\$79,200
Add 10 per cent for contingencies					7,920
Total					\$87,120

For a roadway 15 feet wide there will be:

Western Division,	31,200	cub. yds @	\$1.50	=	\$46,800
Eastern Division,	51,200	"	"	"	= 76,800
Total	82,400	"	"	"	\$123,600
Add 10 per cent for contingencies					12,360
Total					\$135,960

The above number of cubic yard is excavation, but as the whole is side hill

grading the same number of cubic yards are in embankment and the labor of embankment is performed by casting.

I think a roadway of 12 feet with occasional widenings is of full sufficient width. Little rain falls in these mountains and the only damage at all likely to occur from water would be from melting snows. These however go off very gradually and with proper drainage would do no injury, and from the nature of the soil [D10] a road in the Bitter Root mountains would last for years. I was almost going to say ages.

In estimate of cost, I have taken \$1.50 per cubic yard. This is not absolute but would vary with the constantly fluctuating prices of labor.

Of important bridges necessary to make the road complete there is but one needed - that at Clearwater, 81 miles from Muscle Creek. The river there is 100 feet wide and 3 feet deep at high water. The river is generally but not always fordable. Timber for constructing a substantial bridge grows in abundance close to the locality. Lolo creek might be bridged by a slight structure or by improving the bed of the creek and making the proper grading down its banks, be made fordable at highest stages of water. Of culverts or unimportant bridges of the simplest description, for 10 to 30 feet span, there will be required in the

Western Division	27
Eastern Division	21
Total	<hr/> 48

I have spoken of the density of the forests. There are however in many places openings covered with rich grass. A list of such places along the line of the road, I made out and caused to be posted at the ranch of Mr. H. Tinkham at Muscle Creek, for the guidance [D11] of travellers and pack trains passing over the road a copy of which I herewith append. The miles reckon from Muscle creek.

Camping Places from Muscle Creek to Takon Creek

Miles

11 1/4		The Neck down gulch to the north.
12 1/2		Horse Gulch, to the north; old trail dips into it.
15		Pond Saddle; gulch to north.
16 3/4		Shepherdson's Gulch on east; tree blazed.
18 1/2		Excellent grass and plenty of it.
20 1/2		Huston Creek " " " " " down gulches to N. or S.
21		Swamp Grass Prairie.
33		Prairie Saddle, down gulch to south.
37		Meadow Mt. best grass & plenty. Good midway place for rest.
43 1/2		Swampy Saddle 100 yards to north.
47		At head of Snow Bridge Gulch, 100 yards down gulch to S.
50		Duck Creek, 100 yards to N. & down creek.
52		Leaning Tree Camp, grass on hill side - camp on saddle.
55		An inferior kind of grass on high dry ridge in this neighborhood.
60		Swan's Springs; 1/2 mile up ridge to N., Good grass & plenty.
62		Moose Lake, 100 yards north, A little.
63 1/2		Lake Templin Saddle; down gulch to north; abundance.
68 1/4		"Hole in the Ground" 200 yards to south, under hill; tree blazed.
70 1/4		Good grass and plenty
73 1/4		Independence Camp, down gulch to north.
85		Takon Creek; good grass in abundance on prairies.

N. B. Water to be had any where a short dist. down from top of all ridges.

[D12]

The Bitter Root mountains which cover the country in a tangled mass, extending 120 miles north and south and 75 miles east and west are cut up by cañons from 1000 to 5000 feet deep. These cañons are not really enclosed by perpendicular walls of rock but V shaped valleys with rugged outcroppings of granite, having none of the bottom lands usually found adjacent to the banks of streams.

Along these cañons the labor and cost of building a road would be immense and for this reason the route of the Virginia City and Lewiston road over the mountains was located on a divide or water shed and kept as near as possible on the back bones of ridges.

To go back to the first part of the road running out from Lewiston. The present road by way of Fort Lapwai and Schultz Ferry to Oyipe has been adopted as part of the Va; City and Lewiston road. There is however a shorter way to reach Oyipe. It is by the North Fork Trail, crossing the Clearwater at Lewiston, keeping the bank of the river up to Oro Fino creek and striking into the present road at Texas creek, 8 miles from Schultz. Not having the time to examine it

myself, by your direction I made inquiries among the citizens of Lewiston. I here give the opinion of Mr. Lowenberg, merchant, which agrees substantially with that of several others.

"Road would have to be made on river bottom. [D13] "About five different points which cañon the river would have to be blasted under or overcome by grades over the hills. To go over them would take from 1/4 to one mile of grading each. There would be much grading besides. It would require two ferries one at Lewiston, another at the North Fork and two bridges, one at Potlatch creek, the other at Oro Fino creek, which are unfordable three months in spring. Would have to be substantial bridges to withstand the floods. You climb no mountains until Oro Fino creek is crossed and there it is the same height as Schultz hill but is more easily surmounted. After that it is on rolling and timbered lands with easy grades until it meets present road at Texas creek. Trail is 15 miles shorter than present wagon road and about the same length as Cañon Trail between the river and travelled road. Has travelled all three frequently and thinks this the best route with an additional expenditure of \$50,000.00."

I examined the route myself for 12 miles as far as Lapwai creek and taking it as a sample of the whole would endorse the above opinion. I remarked that wherever it follows the river bottoms there is a layer of large basaltic boulders from one to three feet deep which would have to be removed or covered with other material to make the ground available. [D14]

I also examined the Cañon Trail alluded to. It is from 10 to 15 miles shorter than the travelled road. It runs from Craigs mountain to Davidson's and cuts off the large bend between those places; but the very objectionable feature of two cañons, one 600 feet and the other 1500 feet deep makes it unworthy of notice.

Of the route from Takon Creek over the divide of the Bitter Root mountains and down the Loulou Fork past the Hot Springs to the Bitter Root, on which no work has yet been done on account of the closing in of the season there is little to say. Very little labor is needed to make it a good road, the divide of the mountains is an unimportant thing compared with what has been passed over and the 7 miles to the Hot Springs, which in the report of the Southern Trail reconnoissance, I included in the mountain section, goes over nothing worse than good sized hills. From Hot Springs it follows 22 miles down the Loulou Fork much of the distance over prairies, but sometimes requiring grading on the sides of hills where the valley narrows.

I here append a list of distances from Lewiston to Hell Gate. [D15]

From Lewiston to	miles	Aggregate from Lewiston
Fort Lapwai	13	
Foot of Craigs mountain	9 1/2	22 1/2
Top " " "	4	26 1/2
Cold Spring	9 1/2	36
Davidson's	21	57
Schultz Ferry	5	62
Texas Creek	8	70
Commencement of Oyipe Prairie	7	77
" " Timber Cutting	3	80
Muscle Creek	8	88
Meadow mountain	37	125
Clearwater Ford	44	169
Takon creek	4	173
Hot Spring	7	180
Mouth of Loulou Fork	22	202
Hell Gate	10	212
Fort Owen	--	220

The instruments used in the survey were the surveyors and prismatic compasses, pocket level, odometer, chain, and mercurial and aneroid barometers. The latter instrument was tested thoroughly in altitudes of 6000 feet, with the mercurial barometer as a standard and found to agree as closely with it as any two mercurials are known to. I would recommend it for its portability, accuracy and cheapness, to all [D16] having need of the barometer in topographical work.

With pleasure I acknowledge the valuable assistance rendered me by Maj. S. Truax and Col. Wm. Craig, citizens of Idaho territory. Also those immediately with me and all on the road with whom I have had dealings for their cheerful and willing help whenever it was needed - my cordial thanks.

I have the honor to be,

Very Respectfully

Your Obt. Servt.

Geo. B. Nicholson, C.E.

Va City and L. W. R.

Appendix "E"

Evanston Jany 31st 1966

Sir

*I have the honor to transmit to you a report
on the subjects assigned to my care during the reconnoissance
for the construction of the Virginia City and Lewistown [sic]
wagon Road under Your direction.*

Yours Respectfully

Oliver Marcy

To

W. Bird

Supt. and Disbursing Agt.

Va. City & Lewiston Wagon Road

*Our field duties in connection with the expedition commenced at
Lewiston Idaho Territory Lat 46° 32' N. Long 117° (nearly) W. Lewiston was the
western terminus of the road.*

We accompanied the party making the reconnaissance over the Northern Nez Perces trail to the valley of the Bitter Root or St. Mary's river. There leaving the party we passed over the remainder of the route to Virginia City Montana Territory. From that place we reported to you the observations made, according to your instructions upon the character of that part of the route and from thence we passed to the States by way of Fort Benton and the Missouri river.

In the last part of the route we had no instruments. On the first part we were charged with the barometer, with determining the altitudes indicated by it and with collecting such information as was of economical and scientific value.

We have tabulated the observations on the barometer and computed the altitude of thirty two Stations along the route. To these stations we shall constantly refer in describing other facts and phenomena and we therefore present the table at once for the readers convenience. [E2]

*Table of Barometric Observations and altitudes
on the Northern Nez Perces Trail
_____ 1866 _____*

[E3-E6]

Station	Locality	Date	Hour	Distance Miles	Barometer Readings	Attached Thermom.	Detached Thermom.	Mean Cor. Barometer	Altitude
1	Lewiston	May 3	2 pm	--	29.186	64°	62°	--	--
"	"	" 4	" "	--	29.244	58°	57°	--	--
"	"	" 5	" "	--	29.264	65°	62°	--	--
"	"	" 6	" "	--	29.504	74°	71°	--	--
"	"	" 7	" "	--	29.564	75°	75°	--	--
"	"	" 9	" "	--	29.350	74°	75°	--	--
"	"	" 10	" "	--	29.222	78°	75°	--	--
"	"	" 11	" "	--	29.206	73°	70°	--	--
"	"	" 12	" "	--	29.220	74°	73°	--	--
"	"	" 13	" "	--	29.132	76°	76°	--	--
"	"	" 14	" "	--	29.150	69°	68°	29.155	852.3
2	Craigs House	" 25	11 am	19.25	28.228	59°	59°	28.145	1834.3
3	" Mountain	" 25	4 pm	26.5	26.158	47°	47°	--	--
"	" "	" 26	6½ am	--	26.126	48°	47°	26.092	3898.2
4	Cold Spring	" 26	11 "	36.	26.960	49°	49°	--	--
"	"	" 26	8 pm	--	26.054	48°	48°	--	--
"	"	" 27	6 am	--	26.060	45°	45°	25.947	4052.5
5	Davidson's	" 27	1 pm	57.	27.004	68°	68°	26.923	3102.1
6	Summit W. Clearwater	" 27	3 "	--	26.374	65°	65°	26.322	3726.5
7	Schultz Ferry	" 27	4½ "	62.	28.638	71°	71°	--	--
"	" "	" 28	7 am	--	28.688	47°	47°	--	--
7	Schultz Ferry	May 28	2 pm	--	28.570	77°	80°	--	--
"	" "	" "	8 "	--	28.534	64°	64°	--	--
"	" "	" 29	7 am	--	28.604	54°	54°	--	--
"	" "	" "	12 m	--	28.800	63°	60°	--	--
"	" "	" "	2 pm	--	28.760	67°	66°	--	--
"	" "	" "	10 pm	--	28.840	66°	56°	--	--
"	" "	" 30	6 am	--	28.912	57°	52°	28.610	1376.4
8	Summit E. Clearwater	" "	12 m	--	26.860	66°	60°	26.779	3225.9
9	Texas Ranch	" "	1½ pm	70.4	26.906	60°	60°	--	--
"	" "	" "	6 "	--	26.862	61°	58°	--	--
"	" "	" 31	7½ am	--	26.848	54°	52°	26.802	3192
10	Camas Prairie	" "	10½ "	--	26.884	62°	62°	--	--
"	" "	" "	8 pm	--	26.802	53°	53°	--	--
"	" "	June 1	6 am	--	26.934	43°	43°	26.753	3228.1
11	Oyipe Prairie	" "	1 pm	77.4	26.850	68°	68°	--	--
"	" "	" "	7 "	--	26.820	57°	57°	--	--
"	" "	" 2	6 am	--	26.744	46°	46°	--	--
"	" "	" "	12 m	--	26.876	50°	57°	--	--
"	" "	" 3	6 am	--	26.880	42°	42°	--	--
"	" "	" "	12 m	--	26.880	43°	44°	--	--
"	" "	" "	8 pm	--	26.818	42°	42°	--	--
"	" "	" 4	6 am	--	26.888	38°	38°	--	--
"	" "	" "	12 m	--	26.868	52°	52°	26.755	3278.3
12	Muscle Creek	June 5	4-30 pm	--	--	--	--	--	--
"	"	" 6	7 am	--	--	--	--	--	--
"	"	" "	2 pm	--	--	--	--	--	--
"	"	" "	6 pm	--	--	--	--	--	--
"	"	" "	7 5-15 am	--	--	--	--	--	--
"	"	" "	2 pm	--	--	--	--	--	--
"	"	" 8	6-30 am	--	--	--	--	--	--
"	"	" "	2 pm	--	--	--	--	--	--
"	"	" "	8 "	--	--	--	--	--	--
"	"	" 9	6-30 am	--	--	--	--	--	--
"	"	" "	1-30 pm	--	--	--	--	--	--
"	"	" "	8 "	--	--	--	--	--	--

"	"	"	10	7-30	am	--	--	--	--	--	--	
"	"	"	11	5-30	"	--	--	--	--	--	--	
"	"	"	12	2	pm	--	--	--	--	--	--	
"	"	"	15	8	am	--	--	--	--	--	--	
"	"	"	"	1	pm	--	--	--	--	--	--	
12	Muscle Creek	June	15	5	pm	--	26.918	75°	--	--	--	
"	"	"	16	6	am	--	26.884	50°	--	--	--	
"	"	"	"	4	pm	--	26.752	88°	--	--	--	
"	"	"	17	6	am	--	26.752	60°	--	--	--	
"	"	"	"	2	pm	--	26.752	86°	--	--	--	
"	"	"	18	6	am	--	26.478	57°	--	--	--	
"	"	"	"	12	m	--	26.466	57°	--	--	--	
"	"	"	"	6-20	pm	--	26.626	49°	--	--	--	
"	"	"	19	6	am	--	26.708	44°	--	--	--	
"	"	"	"	2	pm	--	26.752	55°	--	--	--	
"	"	"	"	6	pm	--	26.752	55°	--	--	--	
"	"	"	20	6	am	--	26.752	34°	--	--	--	
"	"	"	"	2	pm	--	26.752	70°	--	--	--	
"	"	"	"	6-30	pm	--	26.654	61°	--	--	--	
"	"	"	21	6	am	--	26.654	46°	--	--	--	
"	"	"	"	2	pm	--	26.654	57°	--	--	--	
"	"	"	22	6	am	--	26.416	47°	--	--	--	
"	"	"	"	2	pm	--	26.416	56°	--	--	--	
"	"	"	"	7	pm	--	26.422	53°	--	--	--	
"	"	"	23	6	am	--	26.422	45°	--	--	--	
"	"	"	"	2	pm	--	26.572	57°	--	--	--	
"	"	"	"	7	pm	--	26.508	49°	--	--	--	
"	"	"	24	6	am	--	26.610	[42°]	--	--	--	
12	Muscle Creek	June	24	3	pm	--	26.668	55°	54°	--	--	
"	"	"	25	6	am	--	26.936	42°	41°	--	--	
"	"	"	"	2-30	pm	--	27.168	61°	60°	--	--	
"	"	"	"	6	pm	--	27.068	52°	52°	--	--	
"	"	"	26	5-45	am	--	27.104	32°	32°	--	--	
"	"	"	"	7-45	"	--	27.104	51°	48°	26.627	3367.5	
13	Lo Lo Ford	"	"	---	93.65	--	26.920	--	68°	--	--	
14	Hill E. Lo Lo	"	"	---	--	--	26.504	--	--	--	--	
15	Cold Spring	"	"	3-20	pm	97.95	25.568	66°	--	--	--	
"	"	"	"	7	"	--	25.568	60°	--	--	--	
"	"	"	27	4-45	am	--	25.488	59°	--	25.407	4659.27	
16	Mt. Truax	"	"	7	"	100.95	24.378	56°	--	24.276	5944.5	
17	Squrrel Mt. [sic]	"	"	---	104.4	--	24.342	66°	--	24.268	6015.5	
18	Butte Camp	"	"	2	pm	110.9	24.736	68°	68°	--	--	
"	"	"	"	8	pm	--	24.782	64°	62°	--	--	
"	"	"	28	5	am	--	24.656	67°	64°	24.638	5575.2	
19	First Butte	"	"	7	"	112.4	23.902	60°	--	23.792	6532.2	
20	Second Butte	"	"	---	113.9	--	23.902	78°	--	23.824	6616.3	
21	Meadow Mt	"	"	8	pm	125.4	23.836	57°	54°	--	--	
"	"	"	29	7-30	am	--	23.846	54°	48°	--	--	
"	"	"	"	3	pm	--	23.854	60°	58°	--	--	
"	"	"	30	4	am	--	23.830	42°	42°	23.783	6528.	
22	Leaning Tree Camp	"	"	4	pm	141.15	24.25	63°	58°	--	--	
22	Leaning Tree Camp	July	1	4-15	am	--	24.270	46°	46°	24.201	6000.89	
23	Lake Templin	"	"	5	pm	151.9	24.94	71°	68°	--	--	
"	"	"	"	2	5	am	--	24.916	43°	42°	24.865	5272.09
24	The Chief	"	"	7	"	153.4	23.644	61°	--	23.532	6845.54	
25	Camp Independance	"	"	7	pm	161.65	24.392	69°	--	--	--	
"	"	"	"	3	5	am	--	24.392	59°	--	--	
"	"	"	"	12-20	pm	--	24.392	80°	80°	--	--	
"	"	"	"	7-30	"	--	24.316	76°	--	--	--	
"	"	"	"	4	6	am	--	24.182	60°	78°	--	--
"	"	"	"	6-30	pm	--	24.038	72°	78°	--	--	
"	"	"	"	5	5	am	--	24.028	48°	48°	24.113	6195.5

26	Point of rocks	"	"	7-15 "	165.65	23.802	54°	48°	23.705	6551.8
27	Clearwater Ford	"	"	9 "	169.4	25.948	64°	61°	25.838	4229.
28	Hill East Cl. W. Ford	"	"	---	--	24.522	70°	--	24.459	5819.7
29	Takon Creek Camp	"	"	4-30 pm	174.9	24.886	69°	60°	--	--
"	"	"	"	6 5 am	--	24.900	30°	30°	24.846	5291.7
30	Mullan's Camp	"	"	5 pm	183.4	26.076	76°	76°	--	--
"	"	"	"	7 5-30 am	--	26.076	34°	34°	25.809	4016.
31	Lu Lu Prairie	"	"	12-50 pm	--	26.312	86°	82°	26.190	3937.8
32	" Camp	"	"	5-15 pm	203.4	26.550	83°	80°	--	--
"	" "	"	"	8 6 am	--	26.590	55°	54°	26.457	3590.6

[E7]

The altitudes were computed by the use of Guyots tables published by the Smithsonian Institution. For the lower station, the line of mean tide at Benicia California was taken; at which the barometer has been found to average thirty and fifty seven one thousandths inches (30.057 inches) when corrected for a temperature of 64 F for air and 32 F for Mercury.

The [??ary] corrections of Leut. H. L. Abbot (P.R.R. Rep. Vol. VI. p. 715) have also been used.

As no provision was made for simultaneous observations (there being but one barometer) the altitudes are given in the table as they are modified by the varying state of the weather, which would depress them in some [E8] places and elevate them in others. The observations at Station 2. Col. Craigs was taken at the commencement of a heavy rain and is probably much lower than the average for the year at that place. Gov. Stevens, in December 1853 took sum observations at the same place giving a mean corrected reading of 28.716 in. for the barometer and an altitude of 1240.5 feet. This altitude is undoubtedly too low by at least 200 feet. The difference in time between Stations 2 and 3 was five hours and there was no probable change in the normal height of the barometer. Station 3. is 2007.2 feet above Station 2. and assuming Stevens altitude of the lower Station to be correct. The Station on the top of the Lapwai Mountains, as they are called, is 3347 feet above the sea.

But Station 3 was not on a proper Mountain as it appears to be from places below, but upon a margin of a plateau extending nearly fifty miles east and west and of greater dimensions north and south.

From the great distance the Clearwater has cañoned its eastern margin, this plateau should be called the Plateau of the Clearwater. Beyond the Clearwater and from the eastern and southern margins of this plateau [E9] rose the True Mountains which at the time of our passing (May 26) were capped with snow.

This whole plain was intersected by the wooded cañons of streams causing us to make long detours to pass their heads. our ride across it was delightful though in the midst of much snow, it being through luxuriant grass and abundant flowers. The soil is good and is destitute of stones as the prairies of

Illinois, but its altitude will, probably, forbid the culture of our nutritious [sic] grains.

We crossed the cañon of the Clearwater about twelve miles above the point where Lewis and Clark left their horses and made canoes in which they descended to the mouth of the Columbia. Station Six (6) was immediately upon the margin of the Cañon while Station five (5) was down upon a creek which ran into the Clearwater.

The depth of the Cañon at this place was, as indicated in the table something more than two thousand feet, and the sides too precipitous in most places to be practicable, even for a mule train without grading.

The river here is 524 feet above Lewiston distant by way of the river about sixty miles giving [E10] the fall of the stream nearly nine feet to the mile.

The great amount of erosion by which this cañon was formed is not more wonderful than the fact that the river bed at such depths should have become so uniformly inclined as it is. The plain of the river bed grows more and more deep as we approach the sources among the mountains but we saw fewer rapids than we anticipated and no cascades except upon the smallest branches.

Station 9 was about the same altitude as the plateau on the other side of the river but we were now among larger pines with a beautiful herbage underneath. We were also upon a little stream which at that point went tumbling down into a cañon a thousand feet deep - a half mile below. There it spent its force amid a chaos of huge fragments of rock which concealed it from our view.

Stations 11 and 12 though not varying much in altitude from the preceding were by small creeks amid the foot hills of the mountains. Along these creeks were narrow glades in the dense forest of fir and spruce which covers the country. [E11] These hills are quite unique in their character. They cover a considerable area of territory along the base of the mountains. Their altitude is from two to seven hundred feet above the streams which run between them. They are not in ranges but have only that irregular arrangement that gulches formed by streams coming from the mountains produce. There is no curve or roll in their outline but their faces are steep planes which make a sharp angle at the apex.

The beds of the larger creeks, like the Lo Lo are much deeper than the beds of the smaller ones and consequently the hills on either side appear correspondingly higher.

The gold mines of Oro Fino are amid these hills. The diggings are in the Oro Fino Creek bottom and consists mostly as in the other Creek bottoms here of quartz gravels and pebbles which have come down from the Mountains.

It rained nearly every day of the twenty which we delayed at Station (12) twelve, but the last five observations of the forty six taken on the barometer at that place were very high - the highest 662/1000 (.662) inches higher than the lowest and 541/1000 (.541) inches higher [E12] than the corrected mean of the

whole. This rise closed the rain. We had not even a shower in traversing the mountains. Such a variation is probably not uncommon here at this season of the year.

I noticed in the reported observations during six months at Fort Owen a variation of $1 \frac{6}{10}$ (1.06) inches. The barometer there, while among the mountains, was running higher than the average during the year but while across the plateau it was lower.

Station 15 is 4600 feet above the sea. It was here that Lewis and Clark on their return from the mouth of the Columbia on the 17th of June 1806 were "enveloped in snow from 12 to 15 feet deep." It was from this Station or very near it that they returned to Station ten or eleven and waited for nine days. They passed this point again June 26th just sixty years to a day before we made our encampment here. They still found the snow seven feet deep. We found it only in patches at the camp but the next day we found it as deep as they.

This camp was on the divide between the Clearwater and its north fork and this divide we continued to follow to the ford of the Clearwater. [E13]

Station 16 Mt. Truax is 5900 feet high. It is completely wooded and at this time covered with snow. Here began that series of fine views which continued to inspire us during the week we were struggling [sic] with the rocks and the snows of this Alpine region. We are tempted here to quote from our Journal at the risk of change of style and of probably repeating what may appear in the general reports.

June 27th Camp 11.

We broke camp this morning at a few minutes before five. Our course has been almost continuously over snow from two to seven feet deep. We ascended a thousand feet above the camp and took observations on at least seven feet of snow which was well exposed to the sun at all hours of the day. And yet the snow must leave some time in the year for the trees about us were of good size.

The view from this point and a little farther on is worthy of a longer time than we could give to it. Snow Capped Mountains filled the whole horizon for a hundred and twenty degrees extending from East of south to west.

The grassy plateau which we crossed nearly [E14] a month ago appeared to be low smooth [sic] land; only dark lines marked the cañons which we took so much pains to avoid and which then looked so deep as we stood upon their margin and peered into them. Beyond this plateau were the Seven Devils, the Salmon river Mountains, the Flonna Mountains and others. Nearer is one tumultuous sea of hills green with firs and spotted with snow though far below us. Through the woods and over the deep snow furrowed by avalanches, when the snow was lighter we descended to a deep ravine and then up, up again to the summit of Muscoemax or Squirrel Mountain which has one side not only bare of trees but nearly bare of snow also. Here the view opens again and we take bearings of the principal mountains of interest. Grande Ronde S20° W., Seven Devils on the Snake fifty miles above the mouth of the Salmon, a hundred miles and more away, white and

jagged S9° W., Flonna Mountains, this side of the Salmon S 20° E. beautifully while with jagged points against the sky & at S50° E. are high points of the Bitter Root. They are nearer but beyond the Cañon of the "North Fork of the South Fork of the Clearwater". In the morning the tops of these do not look massive but like thin [E15] cliffs of slate sat upon end. In the N.E. quarter (N40° E) is a lofty Snow Spur. These high points fill the horizon for 180° degrees from N20° E to S20° W. and within this range there are interminable convolutions of hills and mountains covered with dark forests and brilliant snow. The cañon of the Clearwater is below us sweeping from the South East to the South west: and passing to the north side of the mountain top, there is below us the basin of the North Fork - an immense corrugated country with Snowy Mountain peaks beyond."

The scenery was full interest varying with every hour but minute descriptions is outside the object of this report.

The barometer stood at the same figure on the top of each Butte but the difference in the temperature makes the computed altitude of the second a little higher.

The depth of the Saddles and all the minor inequalities were left to the aneroid and we have not the notes and they do not appear in the tables.

The trail passed over the highest points on the divide and the angle of ascent and descent was sometimes very sharp. That of the East face of [E16] the first Butte down which we plunged through the snow we measured with [some care] and found it to average 30° though in places it was steeper.

The lowest point of the divide was at camp Lake Templin whose altitude is 5200 feet. The lake itself is some 300 feet below on the north side of the saddle and near the bed of the North Fork. Where we saw the first level acre of land since we left the Muscle Creek seventy three miles to the west. The lake was quite shallow and covered a probable area of four acres. As we were descending to this place the trail ran on the sharp angle between rocky gulches on either side. At one point we saw a lake some seven hundred feet below enclosed by a rocky rim, and fastened to the side of the precipitous ravine like the nest of the chimney swallow upon the inner wall of the chimney. Its surface was mostly covered with ice but the blue waters appeared about the margin. It was a strange and beautiful sight - a lake in mid air.

We passed the highest point on the divide immediately after leaving Lake Templin in Station 24 where altitude is 6800 feet. Two other points

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[E17] still. Camp Independence and Station 26, (Point of Rocks) are above six thousand feet making in alt beside Squirrel Mountain which comes very near to it. Eight points within sixty miles above that line and no point falls below 5000 feet except the ford of the Clearwater. The Clearwater at this point is 3853 feet above the same stream as at Schultz Ferry 107 miles to the west. Our trail kept the inside curve of the river but in the crookings of both trail and river it is not possible to say which course is the longer. Should they be the same

we have an average fall of thirty six (36) feet to the mile instead of nine (9) feet which the stream has between Schultz Ferry and Lewiston. At this crossing it was a tumbling torrent but there were no cascades or falls.

After crossing the ford the trail rose one thousand six hundred (1600) feet and then descended in the main quite rapidly.

At two miles from Takon Creek Camp were the Hot Springs mentioned by Lewis and Clark & by Stevens. They present the most interesting physical phenomena on this declivity. There is much discrepancy in [E18] regard to the temperature given to these springs. The narative [sic] of Lewis and Clark says (Sept 13th 1805) "At the distance of two miles we came to several springs issuing from large rocks of course hard grit, and nearly boiling hot.

Stephens reports that Capt. Mullan found the temperature of these springs Sept. 1854 to be 132°. On his return June 1806 Capt. Lewis remained with difficulty in the larger baths nineteen minutes and the other springs were much hotter. July 8th 1866 by placing the thermometer in the water as it gushed from the crevice we found all the springs to have the temperature 114°.

It is possible that there is another set of springs in the same rock formation not far distant. I have not access to Capt. Mullins [sic] Report and Stephens account (P.R.R. Rep. Vol XII part 1 page 180) is far from being clear to me.

Lewis and Clarke [sic] are always consciously [?] deffinite [sic]. We quote their remarks on this place. "These warm springs are situated at the foot of a hill on the north side of the Travelers Rest [E19] Creek which is ten yards wide at this place. They issue from the bottoms and through the interstices of a gray freestone rock which rises in irregular masses round their lower side. The principal spring which the Indians have formed into a bath by stoping [sic] the runs with stones and pebbles is of about the same temperature as that of the warmest bath used at the Hot Springs in Virginia. Capt. Lewis could with difficulty remain in it nineteen minutes and was then affected with a profuse perspiration. The two other springs are much hotter their temperature being equal to that of the warmest Hot Springs in Virginia. Our men as well as the indians amused themselves by going into the bath, the latter according to universal custom among them. first entering the hot bath where they remained as long as they could bear the heat. then plunging into the creek which was now of an icy coldness and repeating this several times but always ending with the warm bath."

We will now quote our own notes written at the next camp from which it will be evident [E20] the two descriptions apply to the same place. "At 11 A.M. we came to the Hot Springs near the Lu Lu. This is a remarkable place in feature as well as in the Springs. The stream has a little bottom here sufficient to camp on and graze a few horses but it is in a granite cañon which rock here is very decomposable so much so that there are piles of rounded and boulder looking masses two hundred feet high. We ascended one which measured that altitude by the Aneroid.

The topmost part of it seemed a boulder set on the others but in reality it was a portion of the original rock eroded into the boulder form and still adhering at the base. We could not mount it - it being fifteen feet high and twenty five feet long swelling its egg shaped sides over our heads.

On the other side of the stream is a mass of rocks equally high with several rounded masses on their tops. The hot water of the springs comes out of the same granite rock which has there an irregular surface. not steeper than ten degrees nor higher than thirty feet above the stream. Over an area of [E21] about 40 square rods the water is issuing from every joint and crevice. In one place the stream was as large as a man's [sic] arm and in another a little jet not larger than a pipe stem was shooting up six or eight inches. The temperature of nearly all was precisely 114°. The water looked very clear as it stood in the basins which Indians or white man had made for bathing but all over the rocks was a [conf??va] and there was an iron rust stain mingled with the green vegetable [sic]. The water is soft and in the mouth gives evidence of sulphid [sic] of hydrogen. It deposits no mineral as I could see. The source of the water must be deep for its supply is constant. The hill above rises, I judge two thousand feet."

*At the time we were there the snows were still upon the mountains and the streams were high. It is possible that cold waters mingled with the hot before they came to the surface and reduced their temperature, and in the fall of the year when the surface waters become warmer the temperature of the springs increase. *** rest of microfilm not photocopied ****

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