



Oakland Alameda Co. Cal.

December 29<sup>th</sup> 1865.

To the

Hon. James M. Edmunds,  
Commissioner of General Land Office.

Sir:

I have the honor to transmit to your office this book (Copy No. 1.) of Observations, Reductions, Discussion of Final Results and Field Notes, being an authentic report of the proceedings attending the location, survey and demarcation of the Oregon<sup>and</sup> Washington boundary between the Columbia & Snake Rivers.

Very respectfully submitted  
David G. Major,  
Astronomer & Surveyor

75<sup>th</sup> mile



## Affidavits.

I, Frederick G. Hesse, Astronomer do solemnly swear that I made & reduced the principal series of observations taken on Cottonwood Creek Oregon during the months of November & December 1863, and that every care and diligence was used in the field for the correct determination of the 46<sup>th</sup> parallel of North latitude, I further certify to the best of my knowledge & belief that the requirements of the contract entered into between the Honorable Commissioner of the General Land Office & D. G. Major dated Washington D. C. April 25<sup>th</sup> 1863, with regard to the number & character of the astronomical observations have been more than complied with.

F. G. Hesse.

Subscribed by said Frederick G. Hesse, astronomer and sworn to before me a Justice of the Peace for the County of Alameda in the State of California this 29<sup>th</sup> day of December 1865.

Geo. H. Fogg,  
Justice of the Peace

2 Cent  
U.S.  
Int. Revenue  
Stamp

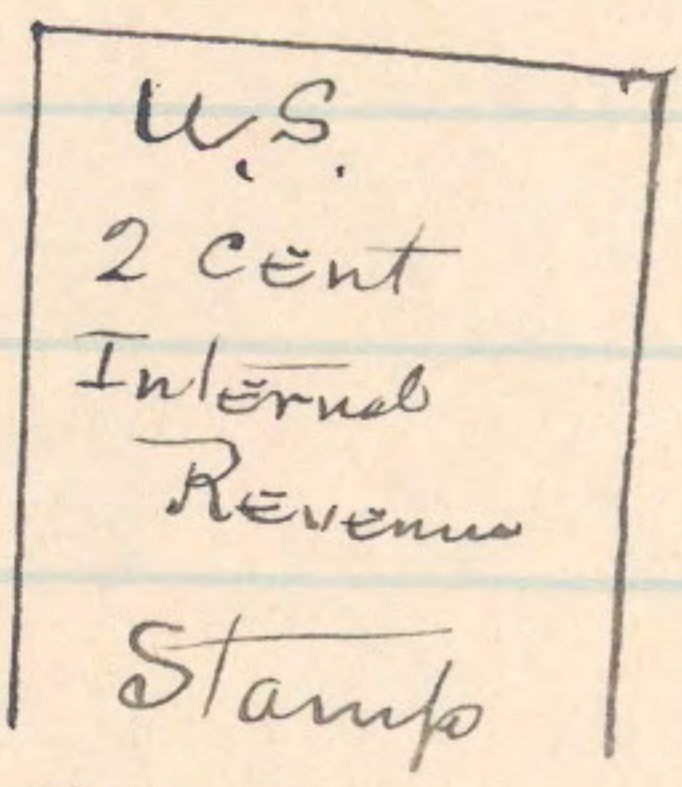
I, John Major, do hereby certify that I have assisted D. G. Major astronomer & Surveyor, to determine & mark the 46<sup>th</sup> parallel of latitude between the Columbia & Snake Rivers and to the best of my knowledge & belief the boundary has been well determined and surveyed and substantial monuments built at the termination of each mile, and half mile from the Columbia River to Mill Creek in Blue Mountains. I do further certify that it was impracticable to chain and establish mile monuments through the Blue Mountains, but the boundary line has been faithfully marked by cuttings through timber, blazing & marking trees and building durable monuments of stone, on the prominent ridges and important points through out



the whole distance to Snake River,  
John Major.

Subscribed by said John Major & Brown to  
before me a Justice of the Peace for the  
County of Plameda in the State of  
California, this 29<sup>th</sup> day of December 1865,

Geo. H. Fogg,  
Justice of the Peace.



I Daniel G. Major, Astronomer and  
Surveyor, do solemnly swear, that I  
have truly, faithfully and impartially  
executed to the best of my skill and  
ability, the observations, calculations, &  
surveys mentioned in the Contract  
entered into on the 25<sup>th</sup> of April 1863,  
between James M. Edmunds, Commissioner  
of the General Land Office & myself;  
so far as it was possible to carry out  
the spirit & letter of 'Instructions' forming  
a portion of said Contract, and I further  
swear that I made and caused to be  
made more than double the number of  
observations agreed upon, in order to get  
the most reliable results for Latitude;  
that the measurements and chainings were  
carefully made, and in <sup>all</sup> cases of doubt,  
repeated. Deeply marked, durable posts  
were erected in every instance, where  
they were to be had, without regard to  
the expenses incurred or labor expended.

The monuments were all of larger  
size than were required by the terms  
of the Contract. After putting in monuments  
to the 42<sup>nd</sup> mile, it was not possible to  
continue accurate measurements with  
the chain, nor to erect monuments at  
the end of each mile; but they were  
erected, as the field notes show, on all  
prominent ridges &c. I hereby certify

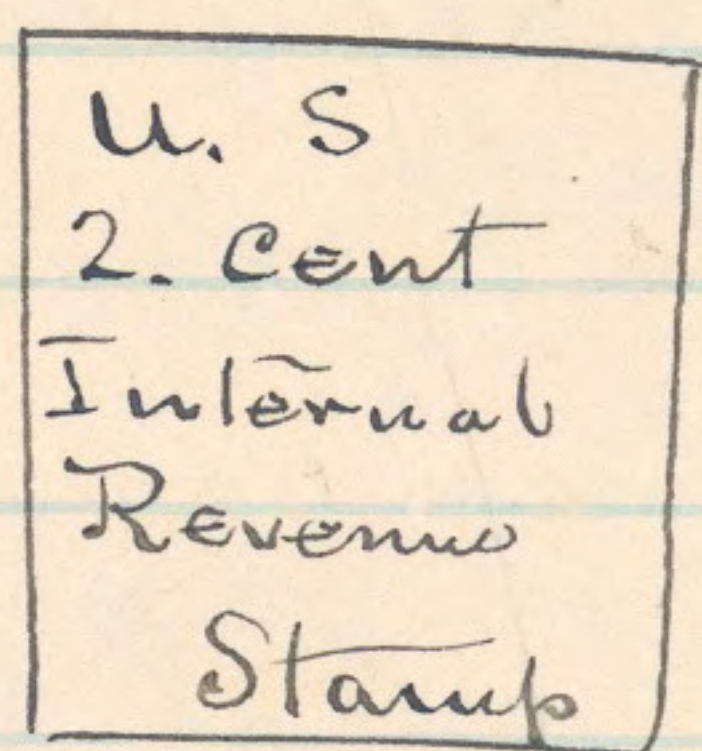


that this is a correct report of the observations, Calculations, & Field notes; & further, that I have suffered heavy loss pecuniarily, in the faithful execution of the terms of the agreement aforementioned even and above the amount of \$4,500 due me by terms of said agreement. All the duties of this Survey except portions of the astronomical series at First Station, were performed by myself in person.

Daniel G. Major,  
Astronomer & Surveyor.

Subscribed by said D. G. Major, astronomer & Surveyor and sworn to before me a Justice of the Peace, for the County of Alameda in the State of California this 29<sup>th</sup> day of December 1865,

Jos. H. Fogg,  
Justice of the Peace



A List of the names of persons assisting in the location survey & marking of the Oregon and Washington boundary between the Columbia and Snake Rivers.

Daniel G. Major	Astronomer & Surveyor
Frederic G. Hesse	Observer at First Station
P. C. Hannay	Recorder " "
John Major	Superintendent of monuments
George Perrin	Chairman
Henry Bays	"
M. Manning	"
William Henry	Arxman
William Haws	Flagman
Mr Wood	"



I, George H. Perrin do solemnly swear that I have faithfully executed the duties of Chairman in the survey just completed by Daniel G. Major U.S. Astronomer & Surveyor of the boundary between Oregon & Washington Territory that the chain was levelled on uneven ground, that the tally pins were plumbed; that the true distance was reported to all notable objects to the best of my skill & ability, and I do hereby certify that the said boundary line has to the best of my knowledge & belief been well & faithfully surveyed and boundary monuments & posts marked & planted according to instructions.

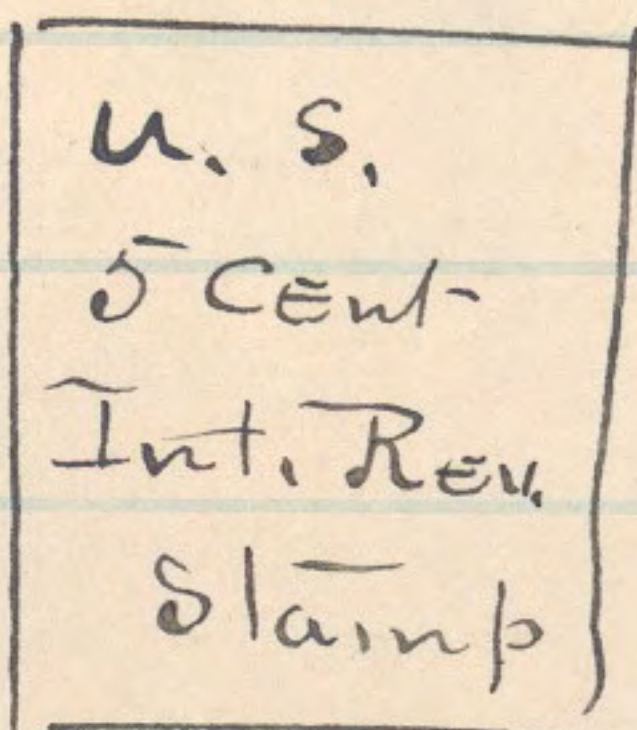
Geo. H. Perrin  
Chairman.

Subscribed & sworn to by the above named party before me, a Notary Public for the County of Walla Walla in the Territory of Washington.

Chas. A. White

September 26<sup>th</sup> 1864

Notary Public of Wash. Terr. and  
County Surveyor of Walla Walla  
County W. T.





6  
Field Notes

of  
Survey of Oregon and Washington  
Boundary from the Columbia  
to  
Inash Rivers.

- 1863  
November 17 Established astronomical Camp on the North East branch of Cottonwood Creek, foot of the Blue mountains, and began observations for the determination of the 46<sup>th</sup> parallel of latitude.
- December 12, Completed the series of observations and determined the position of Camp to be  $45^{\circ} 59' 26''.5$  dependent upon the results from the reduction and discussion of 228 observations of Circum-polar and Circum-meridian Stars, for latitude, 159 independent altitudes of Stars near the prime vertical for time; 80 measurements of suns diameter &c. for instrumental corrections, also the necessary observations for refraction and elevation above mean sea level.
- December 14 Compared two-pole chain of thirty three feet length and consisting of 50 links with Standard Chains, the latter being used throughout the whole survey, only for comparisons measured north from Camp of observation 116 Chains of 33 feet each. Ran west on tangent to parallel several miles until interrupted by heavy snow and intense cold weather; the thermometer for many days marking  $10^{\circ}$  to  $15^{\circ}$  below zero F<sup>h</sup>.
- 1864  
March 2 The weather having moderated, began to mark off the tangent to 46<sup>th</sup> parallel (at the intersection of North and South line between Ranges 36 and 37, East of Willamette Meridian) and the approximate boundary line, dependent upon the above written results, prolonging this tangent, on the 6<sup>th</sup> of May I reached the Columbia River. Length of tangent 35 miles, equal to a Southern departure from the 46<sup>th</sup>



parallel at the Columbia River of 12.90 Chains of 66 feet, consequently ran due north 12.90 Chains or 283.8 yards and set temporary stakes near the east bank of the Columbia River as the 46<sup>th</sup> parallel of latitude from the determination of Astronomical Station first, Cottonwood Creek Oregon

1864

May 7<sup>th</sup>

2<sup>nd</sup> Astronomical Station:  
 Encamped on east bank of Columbia River at the foot of Cathedral rock which is about 400 feet high, almost perpendicular, and has a stone slide; near also road to Wallula distant about 6 miles situated also 1/2 of a mile S. S. W. of mouth of big Canon coursing east

May 20

The position of this station is dependent upon the results of 352 observations for latitude, 107 altitudes for time, 67 measurements of suns diameter for instrumental corrections, and 26 readings for refraction and elevation above mean sea level.

Magnetic declination 20° 20' East. The Compass needle was rather sluggish and non sensitive and although this determination does not merit full confidence is correct for all practical purposes.

May 23,

Final result for latitude of this station 46° 00' 33" 6. The boundary would therefore be south 33" 6 equal to 51.5 Chains of 66 feet which distance was measured and temporarily marked as the 46<sup>th</sup> parallel according to the observations at station second.

The difference between the two determinations of the 46<sup>th</sup> parallel as resulting from the Cottonwood series station 1<sup>st</sup> prolonged to Columbia River and the Columbia River series station 2<sup>nd</sup> was four seconds combining both series the most probable determination is obtained by equations of condition



vide pages 133 to 137.

The initial point of the boundary being thus determined is dependent upon the results of 580 observations for latitude and over 250 altitudes for time. All necessary measurements and examinations being made to correct instrumental errors and personal equations.

The objects were so selected that any imperfection in measurement or unknown error in instrument if not entirely eliminated would produce at most a minimum effect.

### Initial Monument of the Boundary between Oregon and Washington

1864

May 23

The position selected for this monument is a slightly elevated bench rising from the rocky bank of Columbia River which bears S. W. and is a mile wide having two channels, the main one being 20 chains from the east bank & 27 Chs. from the initial monument.

With regard to the Public Land Surveys the monument is situated 74 chains east of "Guide Meridian" on line north and south between ranges 30 and 31 east of Willamette Meridian; also 202 chains south of east and west line between townships 6 and 7 north:

Measurements having been made from Range line 31 & 32 to Guide Meridian 30 & 31, in one chain and 50 links west of monument the line crosses the old emigrant road to the Falls and in seven chains enters the Columbia River.

The following bearings were noted

Pl. 30431



'40 M. "1864" 46° L.

40 M Bearings: to large pine blazed & marked  
 W. N 86° E distance 2 Chains, to one of  
 2 dried firs S 77° 30' E distance 60 links  
 blazed & marked "O" 2 feet diameter  
 to pine tree S 22° N, distance 3 Chains  
 to pine 2 feet diameter N 48° N, distance  
 65 links. Boundary thence descends steep  
 mountain side to ravine bearing N. E.  
 blazed trap pines 10 inches diameter, 50  
 links from Boundary one north with  
 mark "W" the other south with "O"  
 Cross ravine and ascend through very  
 dense woods of pine, fir & tamarack  
 blazing & marking two more large fir  
 trees, 3 feet diameter. Planted post &  
 erected 1/2 mile mound in dense undergrowth

amid fallen timber. Blazed many trees  
 close to the boundary in this vicinity.  
 The line leaving timber descends & crosses  
 ravine. Course down to E. S. E. ascending  
 along the side of steep rocky mountain  
 ridge. blazed and marked "O" three  
 pines just south of line and also 3  
 near top of ridge and north of line  
 with "W" Mile terminates at a lone pine on ridge. The tree

is 24 inches diameter & marked on east  
 side "46° L. 1864" and on west "41" M.  
 Bearings: to N. E. rock N. 36° 50' E, distance  
 90 links to middle point between 2 blazed  
 pines each 10 inches diameter N 26° 20' N

1864 distance 1 1/2 Chains, to large rock projecting  
 June 24 from back bone of ridge bearing down to  
 Mill Creek from the N. E. S 64° 58' E.  
 distance 2 miles to a pine blazed &  
 marked "O" S 64° 24' N. distance 2 1/2 Chains  
 The boundary descends north side of  
 very steep rocky ridge 950 Chs. Cross a  
 rock 3 feet long & 2 feet wide, 10 Chs.  
 descend steep hill. blazed & marked a  
 pine 18 inches diameter "W" and a  
 fir 2 feet diameter "O". Thence through



then ascent and cross ridge N. by W. Placed a prominent lone pine tree, 120 links south of line & marked it with "O". Descending near head of deep ravine, the line passes along for about 15 Chains, the steep side of mountain, then up very abrupt rocky ridge to monument of stone on top of spur ridge bearing down south to Mill Creek.

4 2 3/4 M.

About 3/4 of a mile south of the crossing of Mill Creek by the Boundary the stream comes from the east so that the Boundary is nearly parallel here for some distance with the Creek. Bearings from monument to center of rock projecting from N. hill side N 60° 35' E, distance 15 Chs. to top of bald hill in Blue Mts. S 26° 08' E, distance 10 m. to peak in Yaluma Range Mts. N 74° 26' W. distance 65 m. To pine tree on point of descending ridge S. 0° 34' W dist. about 15 Chains. Built a large stone monument around a 7 foot pine post, 18 inches diameter. Top beveled, sides square, & marked on north face "W" on south "O" on east "46° I, 1864" on west "46° I, 1864"

1864

The position of this post is very prominent Observed Polaris at greatest eastern elongation, Azimuth angle 2° 52'

June 27

Observed double altitudes for time Leaving rocky ledge descend deep ravine bearing S. S. W. to Creek. line crosses near head of two small ravines and ascends in 30 Chains to timber on top edge of mountain.

Marked many pine & fir trees with "O" or "W" according as they were south or north of boundary.

Thence through belt of timber which crosses top of mountain & bears north and south terminating in spur ridges &



Carries putting down to Mill Creek on the south.

The line follows <sup>an</sup> old Indian trail for a short distance descending through timber in about 40 Chains Cross small ravine, bearing S. E. to a larger one S. then ascent & Cross Indian trail, crossing N. E.

43 M. 61 ch. 10

Placed at the east end of timber and on decline to ravine, a heavy pine post 6 feet long & 12 inches diameter.

Deposited Charred wood & erected a mound of stone & earth, dug trench & pits, post marked in deeply cut characters as preceding.

The pine stump from which post was cut is N. by N. 1 Chain. near it (6 links) a small pine: south of post 30 links blazed & marked "O" a pine 3 feet in diameter, another W. S. W. 150 links, same size, also blazed & marked with "W" 2 pines 2 & 2 1/2 Chs. W. by N. the near one 15 inches diameter, the other 2 feet diameter.

The elevated mountain tops bear off to N. E. and leaving this mound begin crossing a very broken country of steep ridges & deep ravines, putting down to Creek. The former crossing S. S. W. the latter coming from east by north.

1864 June 24 Descending from post 43 miles 61 chs. to small ravine, ascent and in 10 Chains cross ridge bearing S by E, descent cross small ridge and descent for 40 Chains to steep rocky decline and deep ravine bearing S. ascent steep precipitous and rocky side to top of ridge, putting down to Creek south, and then S. W. The boundary crosses midway between rocky bluffs. This position being very prominent, erected a heavy pine post 6 1/2 feet long, 10 inch square at top



44 5/8 M.

marked on north side "N" on south "S" on east  
"46" L 1864" and west side the same. Could  
make no excavation trench or pits on  
account of rocky formation.

Deposited a quantity of Charcoal,  
Built a most substantial mound of  
large stones six feet square & 6 feet high  
tapering to post in center, distance of  
this mound by triangulation, 44 miles &  
fifty chains. (EAST FROM COLUMBIA RIVER)

Bearings: to center of grove of timber  
in gorge of mts. near top: N 65° 53' E,  
distance 8 miles. Conical mound on top  
of Mtn. ridge. S 73° 17' E, distance 5 miles  
to center of rocky ledge abutting, from  
near top of hill N 16° 40' W, distance  
60 chains to large <sup>rock</sup> on bluff near foot of  
ridge S 40° 26' W, distance 2/3 mile.

Descend in 3 chains over loose stone  
side of ridge, thence down deep ravine  
bearing S. S. W, then ascend S. W. spur of  
ridge, then descend through brush to  
deep ravine bearing S. by W, with pine  
& tamarack timber & thence up to main  
ridge, course S. S. E. erecting a heavy  
pine post 7 1/2 feet long & 10 inches  
square.

Made excavation & deposited Charcoal  
& also pine stave 2 1/2 feet long & 3  
inches diameter.

45 1/3 M.

Built a large mound of earth well  
packed & sodded; dug deep quadrangular  
trench & 4 pits Post marked as preceding  
Mound, pits & trench similar in all respects  
to those heretofore or often described.

Blazed & marked two large tamarack  
trees 3 feet & 20 inch diam. 60 & 70 links  
from post, bearing N 60° E; blazed and  
marked "O" a pine 3 feet diam. distance  
1 2/3 chains bearing S 65° E.

Bearings: to largest rock on ledge N 9°  
52' E, dist. 8 chains, to center of mound



on Mt. ridge S 81° 25' E, distance 3 1/2 miles  
 to a large pine 5 feet diameter distance  
 4 Chains N 12° W to highest point of  
 ridge distance 1 2/3 mile S 21° 47' W.  
 In 25 links east began descent to steep  
 ravine with dense brush & sparse timber:  
 Blazed & marked with "O" 3 pines & a  
 tamarack all south of line, and  
 2 tamaracks north of line "VV" 5 Chains  
 to ravine.

Ascend steep rocky side of ridge. 11  
 Chains to top.

A few pines north of line on ridge  
 Blazed and marked "O", a pine 25  
 links south of line.

1864  
 June 30 to Creek.  
 Proceeding east a chain, the line  
 passes 50 links, south of ledge of  
 rock, this ridge is covered with loose  
 stone and is very precipitous down

The boundary in 16 Chains enters  
 timber blazed & marked "W" a pine  
 18 inches diameter, also pine 2 1/2  
 feet diameter "O"

Thence through timbered bottom,  
 blazing & marking many trees close  
 to boundary, in 21 Chains, Mill Creek  
 50 links wide; a rapidly flowing  
 Mtn. stream of excellent water  
 The "bottom" land is very narrow  
 & densely covered with large timber  
 and undergrowth, course of Creek W. S. W  
 & E. N. E

46 M. on route,  
 Ascend bluff east & timbered Mtn. side  
 in 55 Chains cross a succession of  
 three steep ridges cut by deep  
 ravines, leaving flowing water from  
 S & S. E. Blazed & marked trees

At 46 miles erected a monument  
 of stone on back bone of ridge descending  
 to N. by N. Post a fir 9 inches diameter



60  
properly trimmed & marked, blazed &  
marked "O" a fir 40 links S of line also  
the nearest tree, a fir, 75 links north  
with "W". Thence east the line traverses north  
side of main ridge crossing several  
lateral spurs & ravines. The whole  
covered with sparse fir & pine timber  
Almost perpendicular descent to  
main branch of Mill Creek putting  
in from south 20 links wide, distance  
from last mound 30 Chains.

Passing through much dead timber  
in this ravine, ascend rocky side to  
steep ridge.

The boundary crosses main branch  
about 1/2 mile from Mill Creek. Passing  
at 56 Chains into pine & fir timber  
thence north of steep rocky bluffs and  
up north side of ridge through timber  
blazing & marking many trees adjacent  
to line at 47.60 Chs. Erected a most durable stone  
47<sup>3</sup>/<sub>4</sub> M. monument on prominent peak of ridge.  
Planted a heavy pine post properly  
marked in duply cut characters  
Could make no trench or pits  
because of rocky formation.

Deposite charcoal.

Bearings: To Cone of Mt. top N 55° 14' W  
distance 60 miles to Council mound  
S 33° 17' W distance 5 miles to sharp  
point of high ridge N 7° 44' E distance  
8 miles to rocky mound on ridge  
distance 55 Chains S 81° 13' E.

Blazed & marked 2 pines below post  
"W" also 2 with "O".

Thence the boundary crosses ridge  
descends & traverses steep side of mountain  
cutting timber and ascends bluff  
with timber, thence up to ridge  
top and to a large monument of

1864  
July 2 stone with heavy crosswise post  
durably marked on north face "W".



Department of the Interior.  
General Land Office.  
February 6<sup>th</sup>. 1866.

The foregoing field notes of the survey of the Oregon and Washington Boundary on the 46<sup>th</sup> Parallel of North Latitude from the Columbia to Snaw Croix, together with astronomical observations, reductions, & discussions of final results, executed by Daniel G. Major, Astronomer Surveyor under his Contract of April 25<sup>th</sup> 1863, having been examined they are hereby approved.

J. M. Edmunds  
Commissioner

Department of the Interior.  
General Land Office

Washington D C February 17, 1897

I hereby certify that the foregoing transcript of the field notes of the survey of the Oregon and Washington boundary line (omitting astronomical computations and deductions,) is a correct copy of the original field notes of said survey on file in this office.

S. M. Edmunds  
Commissioner.