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SURVEY WEST OF THE ROCKY MOUNTAINS

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THE HISTORY OF THE FORTY-NINTH PARALLEL SURVEY WEST OF THE ROCKY MOUNTAINS

By OTTO KLOTZ

The object of this paper is to tell the—one may almost say—romantic story of the survey in 1857-61 of the boundary between the United States and Canada along the forty-ninth parallel west of the summit of the Rocky Mountains and to relate how the final report, which had been lost until that time, was found in July, 1898.

In order to give adequate meaning to that discovery, it is necessary to review briefly the history of the boundary line. By the treaty of June 15, 1846, signed by James Buchanan and Richard Pakenham, between the United States and Great Britain, Article I, describing the boundary line, reads¹:

From the point on the forty-ninth parallel of north latitude where the boundary laid down in existing treaties and conventions between the United States and Great Britain terminates, the line of boundary between the territories of the United States and those of Her Britannic Majesty shall be continued westward along the said forty-ninth parallel of north latitude to the middle of the channel which separates the continent from Vancouver's Island, and thence southerly through the middle of said channel and Fuca's Straits, to the Pacific Ocean: *Provided, however*, That the navigation of the whole of said channel and straits south of the forty-ninth parallel of north latitude remain free and open to both parties.

In the official correspondence of the time the section of the boundary between the summit of the Rocky Mountains and the Strait of Georgia is spoken of as the "land boundary" to distinguish it from its western continuation through the strait separating Vancouver Island from the mainland, which was designated the "water boundary." Throughout this article the land boundary, along the forty-ninth parallel, is alone considered.

It was not until ten years later, on August 11, 1856, that Congress authorized the appointment of a commission which, with a similar commission to be appointed by Great Britain, was to carry out the provisions of the above Article I. Archibald Campbell was appointed the United States commissioner and Col. J. S. Hawkins the British commissioner, and Major J. G. Parke and Capt. R. W. Haig were appointed the respective astronomers. Field operations were begun in 1857 and concluded in 1861. It is interesting to note the arrangement made August 13, 1858, by the joint commission²:

After discussing plans for determining and marking the line as far eastward [from the Strait of Georgia] as the Cascade Mountains, it was concluded to be inexpedient

¹ Treaties and Conventions Concluded between the United States and Other Powers, State Dept., Washington, 1899, p. 438; also *U. S. Geol. Survey Bull.*, 225, 1904, p. 19.

² Foreign Office Correspondence, Part III, p. 16, Office of the Chief Astronomer, Dept. of the Interior, Ottawa, 1899 (see also footnote 6).

at the present time, in consequence of the great expense, consumption of time, and the impractical nature of the country, to mark the whole boundary by cutting a track through the dense forest. It was therefore agreed to ascertain certain points on the line by the determination of astronomical points at convenient intervals on or near the boundary, and to mark such astronomical stations, or points fixed on the parallel forming the boundary, by cutting a track of not less than 20 feet in width on each side for the distance of half a mile or more, according to circumstances. Further, that the boundary be determined and similarly marked where it crosses streams of any size, permanent trails, or any striking natural features of the country. In the vicinity of settlements on or near the line, it is deemed advisable to cut the track for a greater distance, and to mark it in a manner to be determined hereafter.

Although the survey was completed late in 1861 it was not until May 7, 1869, that the final report was signed at Washington by the two commissioners. A very important agreement² was reached on that day by the two commissioners, when they decided—

that, between any two successive defined points, marked on the ground, shown on the maps, and set forth in the accompanying lists, the line of boundary above described is to be considered a right or straight line; and that this rule is to apply throughout the entire boundary without regard to the distances between the consecutive points or to the course of the parallel in such intervals.

Colonel Hawkins, writing on May 10, 1869, to the Foreign Office and referring to this agreement, says: "We were induced to do this upon consideration that it was of the greatest importance nothing should be left for *future* discussion or settlement and that our operations should be final and conclusive."

It should be observed that the observations of the two commissions were made with the utmost attainable precision and are comparable with the best field work of today. The position of the parallel in the 410 miles of its length was determined from twenty-eight astronomical stations, eleven of which were established by the British commission, fourteen by the United States commission, and three by joint observations. The total expense of the United States commission was approximately \$600,000, equivalent to about \$1,460 per mile. We may assume that the expense of the British commission was about the same, although the figures are not available. Ultimately the maps of the survey were published, seven sheets on the scale of 1:60,000 (see index map, Fig. 1).⁵

Such were the methods used in establishing the boundary line, which cut across a wild, generally forested country with no population save in isolated spots. Where is the boundary? and Which line is it? were questions that arose later with the advent of settlers in the more open country between the Similkameen River and the Columbia.

As squatters and settlers began to occupy lands on both sides of the boundary line they found in places three lines cut through the woods, as well as two sets of stone cairns, which naturally left them in a quandary

² *Ibid.*, Part IV, p. 7.

⁴ *Ibid.*, p. 5.

⁵ And publication cited in footnote 9, pp. 22-23.

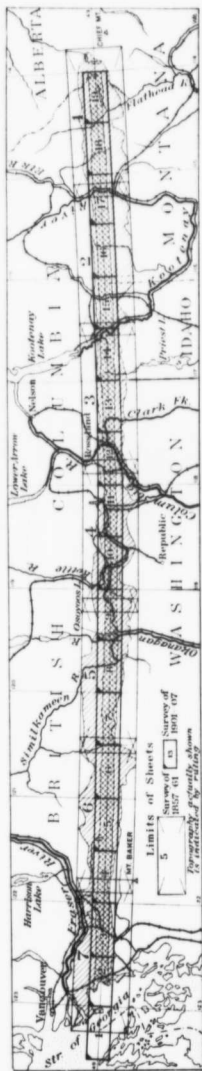


FIG. 1.—Index map showing the limits and arrangement of the map sheets of the 1857-61 and 1867 surveys of the forty-ninth parallel boundary between the United States and Canada west of the summit of the Rocky Mountains. Scale, 1:4,000,000, or about 63 miles to 1 inch. The ruling indicates the extent of the topography actually shown in each case.

as to where the definite boundary line was. Settlers on the Canadian side applied to the provincial government at Victoria for the necessary information. But none could be supplied from that source. That government referred the question to the federal authorities at Ottawa, but here, too, no records were available. It seemed obvious that it would only be necessary to write to London to obtain the desired information and a copy of the final report of the survey of 1857-61. Now the extraordinary happened. This final report was not to be found in London. Time and again search was made by different persons for the missing documents, but all to no avail. To add to the remarkable situation, the duplicate final report was not to be found in any of the government archives in Washington. Does history record any similar circumstance? Two governments are engaged for years on an expensive international work, a boundary survey; the respective commissioners sign joint final reports and transmit them to their respective governments; and the reports are nowhere to be found! The apparently impossible had happened, and the outlook was that in the near future a new survey under another international commission would have to be made.

Such was the situation in 1898 when the writer was sent by the Dominion Government to London and Petrograd on a special mission, in which was included the obtaining of information regarding the records and final report of the survey. All the Government offices in London were visited in which there was the faintest likelihood that the records might be stored, but all to no avail, and no one seemed to be able to give any assistance. Before leaving England, however, the writer, as astronomer for the Dominion Government, naturally paid a visit to the Royal Observatory at Greenwich. By chance his eye caught the initials B. N. A. on some boxes on top of

the library shelves—letters at once interpreted as possibly standing for "British North America." The boxes were taken down, the dust of years removed, and in them lay the long-lost records of the international survey of the forty-ninth parallel.

The final report, dated May 7, 1869, and jointly signed by the two commissioners, together with other official correspondence pertaining to the boundary, has since been published by the Office of Chief Astronomer, Department of the Interior, Ottawa.⁶

With the material found it was now possible to understand all the operations of the survey, the method of placing the monuments, the reason for the existence of diverging lines cut through the forest, and the meaning of duplicate cairns. The occurrence of the last was due to the non-removal by the men as instructed of those cairns which no longer indicated the position of the accepted boundary line.

In order to understand how and why unavoidable difficulties arose in making the demarcation of the boundary line continuous, it is necessary to say a word about astronomical observations for latitude. The zero from which latitude observations are made is indicated by the "level," and its position in turn is the resultant of all the gravitational forces acting on it. Mountainous regions generally show deflections of the plumb line, due to anomalous distribution of matter. Were there no anomalies it would be possible theoretically, after establishing an individual point on any parallel of latitude, to establish other points on the parallel from it. Or we may say that, if two points are established, the direction a straight line must take from the one point to the other is simply a matter of computation. In the present case the effect of this condition was most noticeable in the 96 miles from the Similkameen River to the Columbia, where most of the duplicate cuttings in the forest were found. In a letter dated March 28, 1861, and addressed to the Secretary of State, Colonel Hawkins said:⁷

If the actual boundary was to be defined by the joint commission in any part of the space intervening between the waters of the Pacific and the Rocky Mountains, the interval between the Similkameen and the Columbia Rivers is not only of as much importance as, if not of greater importance than, any other part of the line, but it also presented greater facilities for the performance of the necessary operations, while it embraces about a fourth of the whole extent of land boundary comprehended in the treaty under which the commission was appointed.

The astronomic stations in this section of the boundary were, in order from west to east: Similkameen ($119^{\circ} 35' W.$; U. S.); Osoyoos ($119^{\circ} 24'$; Br.); First Crossing, or Newhoilpitkw ($118^{\circ} 44'$; U. S.); Second Crossing, or Inshwointum ($118^{\circ} 28'$; Br.); Third Crossing, or Statapoosten ($118^{\circ} 16'$; U. S.); Columbia ($117^{\circ} 38'$; Br. and U. S.). It will be remembered that it was agreed to project the boundary line a short distance east and west from each astronomic station. This was done. From the British

⁶ Foreign Office Correspondence, Parts III and IV, Ottawa, 1899.

⁷ *Ibid.*, Part III, p. 41, Ottawa, 1899.

station at Osoyoos, the British commission ran lines—cutting the forest where encountered—west and east to meet the United States astronomic stations respectively at Similkameen and at the First Crossing, and similarly from the Second Crossing again to the First Crossing and eastward to the Third Crossing. The not-unexpected happened—the lines did not meet, owing to “local deflection of the plumb line,” although the discrepancies were greater than expected. At Similkameen the line came 509 feet north of the United States station; at the First Crossing the Osoyoos line came 364 feet north of the United States station, but the line projected from the Second Crossing westward came 300 feet south of this same United States station; i. e., the two British lines run from British stations were 664 feet apart. This was not attributable to any error in the work, for the work was well done, but to the inherent idiosyncrasies of the environing mass distribution. Because of this operation of connecting or trying to connect the astronomic stations there now were two lines cut at each of the three United States stations. Things could not be left in this condition. After discussion by the officers of the two commissions on March 4, 1861, “it was agreed that a mean parallel should be adopted, and a new line run and marked from the Similkameen to Statapoosten.”⁸ And this new line was run and marked by the United States commission. Thus in places a third line was cut; this was the definitive line. This explains why on the ground several vistas through the woods existed side by side. From the position of the mean parallel at Statapoosten the British commission subsequently ran the line to connect with the astronomic stations on the Columbia. Here, too, the line suffered a deflection to the north, namely, of 212 feet. As already mentioned the cairns should all have been removed from the preliminary lines joining astronomic stations and only those left which were on the final line. The circumstance that this was not done added to subsequent mystification; but the finding of the original records and final report cleared up everything.

It may be interesting to continue the story and recount what happened in Washington. Marcus Baker, cartographer, made a report⁹ on June 9, 1900, to the director of the U. S. Geological Survey on this boundary line. He searched the various departments in Washington for documents pertaining to the survey and had personal interviews and correspondence with men then living who had been officially connected with the boundary survey, with a view to throwing light, if possible, on “the most important document of all,” the final report, but failed. Baker quotes¹⁰ from the 1889 report of Capt. George M. Wheeler, U. S. A., as follows:

I have been unable to trace the manuscript of the final report, including that of the chief astronomer and the specialists, which it was believed was made. According to the Journal of the Senate of February 9, 1871, this report was called for by the Senate,

⁸ Foreign Office Correspondence, Part III, p. 57, Ottawa, 1899.

⁹ Survey of the Northwestern Boundary of the United States, *U. S. Geol. Survey Bull.* 175, Washington, 1900.

¹⁰ *Ibid.*, p. 11.

but a search of the Senate records and also those of the State Department, made at my request by Mr. Dwight, librarian of the State Department, remained unavailing on June 15, 1887. Mr. William J. Warren, secretary of the commissioner [and] now chief clerk [in the office] of the [Chief of] Engineer[s], [War] Department, recollects to have seen the manuscript of this report at the office of the Northern Boundary [Survey], established in 1873, as does also Major J. F. Gregory, Corps of Engineers, a member of that commission, but it could not be found by Mr. Dwight in the records transmitted at the close of the latter survey to the State Department.

Baker adds to the above: "The search above mentioned I have now repeated and with like result. The manuscript has not been found." Farther on¹¹ Baker writes: "But the report, unfortunately, was not published, and the manuscript has for many years been lost to view. Its whereabouts are still unknown. The reason it was not published, I am informed, is that Mr. Fish, Secretary of State at that time, deemed its publication too expensive. The war had brought a mountain of debt, and under these conditions he refused to sanction so costly a publication."

Such were the vicissitudes of the 1857-61 survey. In 1900 it was decided to re-mark the boundary in order that there might be no doubt as to its exact position—a condition made necessary by the increased settlement and economic development of the region. Commissioners were appointed as follows: Dr. W. F. King, Chief Astronomer of the Canadian Department of the Interior, for Great Britain; and Dr. C. D. Walcott, Director of the U. S. Geological Survey, and Dr. O. H. Tittmann, Superintendent of the U. S. Coast and Geodetic Survey, for the United States. The survey was carried out in the years 1901-07, and the final map, in 19 sheets on the scale of 1:62,500, was published in 1913 (see index map, Fig. 1).¹² A network of triangulation was established,¹³ monuments were placed at frequent intervals, and in the forested areas a clear sky-line was cut. However, the line, as now marked and cleared throughout, is based on the monuments and positions established in the original survey of 1857-61. The fortunate find of the lost report "doubtless prevented complications which might otherwise have arisen as to the details of the boundary and obviated the necessity of a new treaty or of special provisions in the general treaty."¹⁴

¹¹ *Ibid.*, pp. 17-18.

¹² And review under "North America, General" in the section "Geographical Publications," below.

¹³ See diagram in *Rept. Sup. Coast and Geodetic Survey, 1903-1907*, p. 149. For account of the operations of the Survey see the annual reports of this bureau from that for 1902-03 to that for 1908-09.

¹⁴ O. H. Tittmann: Our Northern Boundaries, *Journ. Washington Acad. of Sci.*, Vol. 4, 1914, No. 3.