

That the following tract of land, being a part of the said Great Reservation of the Sioux Nation, in the Territory of Dakota, is hereby set apart for a permanent reservation for the Indians receiving rations and annuities at the Lower Brule Agency, in said Territory of Dakota, namely: Beginning on the Missouri River at Old Fort George; thence running due west to the western boundary of Presho County; thence running south on said western boundary to the forty-fourth degree of latitude; thence on said forty-fourth degree of latitude to western boundary of township number seventy-two; thence south on said township western line to an intersecting line running due west from Fort Lookout; thence eastwardly on said line to the center of the main channel of the Missouri River at Fort Lookout; thence north in the center of the main channel of the said river to the original starting point.

3. B. H. Sullivan, United States Surveyor General for the District of Dakota, issued special instructions to Edwin H. Van Antwerp, United States Deputy Surveyor, dated March 12, 1890, for the purpose of establishing the linear boundaries of the Lower Brule Reservation, which read in part as follows:

The present western terminus of the established 1st. standard parallel north is the standard corner to townships 5 north of ranges 75 and 76 west. From this standard township corner, if it can be completely identified, you will extend said standard parallel on a true latitude curve. If said standard township corner cannot be assuredly determined, you will go to the most westerly established standard corner which can be completely identified and from it retrace the standard to the line between ranges 75 and 76 west, T. 105 N. restoring the missing corners, and then continue the standard parallel as stated to the S. W. standard corner for T. 105 N., R. 79 W. The correct establishment of this corner must have your special attention and it should so appear in your notes, as both the west boundary of the Lower Brule Indian reservation and line upon which two systems of survey close, depend upon its determined position.

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From the standard corner for west boundary of range 79 west, on the 1st. standard parallel north, * * * you will run the range line due north, establishing at the legal distances, the usual quarter-section, section and township corners until at 24 miles you will establish the closing corner of said range line upon the 2nd standard parallel. Thence you will run due west on said 2nd. standard parallel 35.57 chains and establish the standard 1/4 section corner on south boundary of section 31, T. 109 N., R. 79 W., marked in the usual manner and at 75.57 chains, set the S. W. standard corner for T. 109 N., R. 79 W. of the 5th P. M. From the last named standard corner, you will continue the west boundary of range 79 due north establishing at the legal distances the usual quarter section, section and township corners until you arrive at a point due west from Old Fort George as near as you can estimate, where you will set a temporary point for the northwest corner of said reservation.

You will then proceed to Old Fort George. As no diagram of the Post or plan of the buildings can be found, you will determine the middle point of the ruins as the place for the initial point of the boundary of the Lower Brule Indian reservation, * * *. You will then return to the said initial point at Old Fort George and run thence due west establishing half-mile and mile corners at each 40 and 80 chains counting from the initial point, and at intersection with the west boundary of range 79, you will establish the permanent northwest corner of the said reservation, destroy the temporary corner so stating in your notes, and perfect your range boundary entries.

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Measurements of the west boundary of range 79 and of connecting lines will be carefully made. Measurements along the 1st standard parallel and the north and south boundaries of said reservation will be made by two sets of chainmen; and you will do what may be necessary to prevent collusion, the object being to obtain two independent reports from your chainmen, which may thereby serve as a check on possible error.

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I enclose herewith copies of the Act approved March 2, 1889 and of the President's proclamation of February 10, 1890, giving effect to said Act. You will carefully read

both and ascertain the rights of resident Indians upon the ceded lands set forth * * *.

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* * * you are advised that the position of the S. W. corner of said reservation, the same being the intersection of the parallel of 44° with the west boundary of range 79 west, is to be established by you at a point on said range boundary distant 11 miles 38.34 chs. north from the S. W. standard corner to T. 105 N., R. 79 W. on the 1st standard parallel, * * *.

4. Geodetic Triangulation is the most modern and exact method known for establishing the ground location of Meridians and Parallels. In 1890 the Coast & Geodetic Survey had prosecuted its triangulation station network westward only as far west as Central Kansas and was then more than 400 miles from Presho. It was therefore necessary to survey the Lower Brule reservation as a detached individual project and by astronomic observations.

In 1890, there was in general use by field surveyors of the General Land Office, transits with a solar attachment graduated to 1' on the vernier, which is the equivalent of 6000 ft. on the ground. Measurements were then made with the now archaic link chain. They also used a sextant to check their ground location but that instrument also was too crude to enable the surveyor to detect so small an error as one mile on the ground.

The first Standard Parallel is a surveyed mommented line established by the General Land Office. It was officially located at $43^{\circ} 50'$ north latitude. During 1877-88 it had been surveyed and mommented westward to Tp. 76.

In conformity with his instructions, Van Antwerp surveyed and monumented the First Standard Parallel westward from range 75 to 79 by two sets of chainmen working independently and from that intersection, similarly surveyed a line due north 11 miles 38.34 chains (10' of latitude translated by Sullivan into horizontal distance) and thus located the 44th parallel of latitude — the southwest corner of the reservation.

At the point so determined he confirmed his position as being on the 44th parallel by the Solar Transit, however the degree of refinement of the instrument — 1' on the vernier — meant a possible deviation of 6000 ft. on the ground. In 1890 no deviation within 6000 ft. of the theoretically correct position was susceptible of detection. Neither the Sextant nor solar transit permitted any greater degree of exactitude.

5. . Since the year 1890 the Coast and Geodetic Survey and the United States Geological Survey each has established many new and adjusted triangulation points from which the geographical location of meridians and parallels may be more accurately determined. These points, and the more improved surveying instruments available, have from time to time altered the position of the lines of latitude and longitude as represented upon topographical maps. These changes on the maps did not in fact change the location of the monuments actually placed on the ground at the time of the survey of the lands in 1890.
6. The 44th parallel as established in 1890 and as marked by monuments was and is the officially determined and approved

southern boundary of the Lower Brule Reservation, and was an official declaration of the correct position on the ground of the southern boundary of the reservation. The boundary as then determined, laid out, and monumented was mutually recognized for 44 years, and was consistently acted upon by both parties and is today the recognized southern boundary of the reservation.

7. In drawing meridian and parallel lines upon maps, the compiler locates them by reference to fixed points established. As these fixed established points are revised with the progress of the geodetic work, the position of latitude lines upon maps changes correspondingly. This inconstant or ambulatory character of meridians and parallels is an inherent attribute of longitude and latitude lines appearing upon maps.
8. No actual survey on the ground has ever been made locating the 44th parallel of latitude.

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