FIELD NOTES
AND
ASTRONOMICAL NOTES
OF THE
UTAH-ARIZONA
BOUNDARY LINE

2628

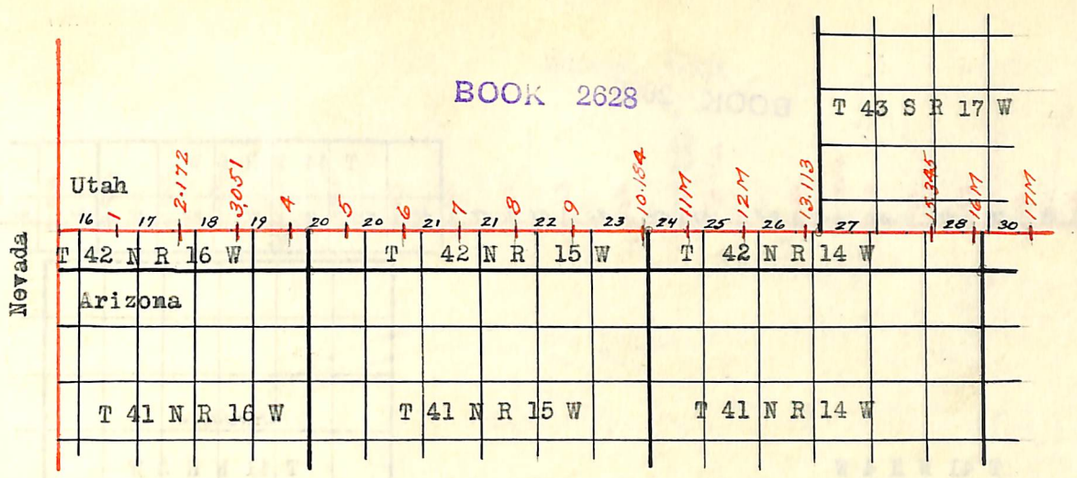
BOOK 2628

Property of the U.S.

Rec'd. Oct. 8, 1902.

U. S. Sur. Gen'l. of Ariz.

BOOK 2628


Utah
Nevada
Arizona
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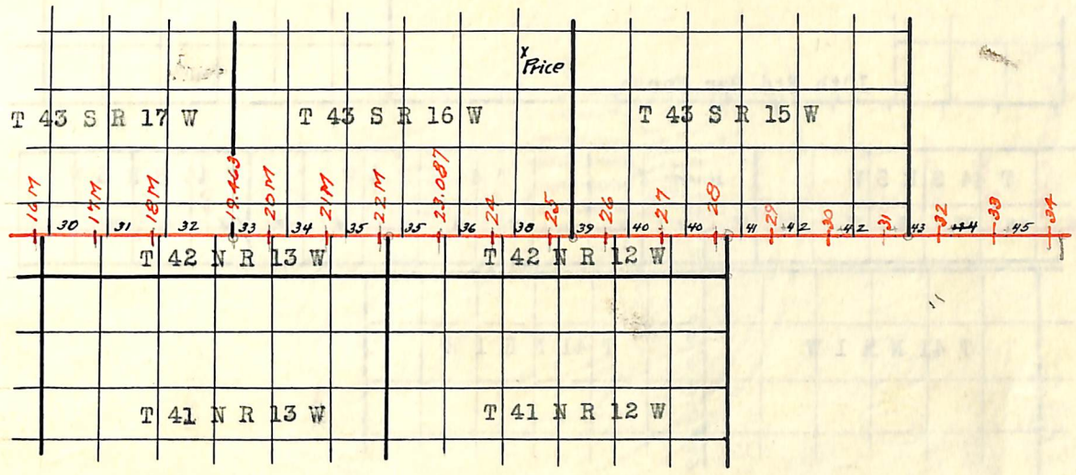
T 42 N R 16 W
T 42 N R 15 W
T 42 N R 14 W
T 41 N R 16 W
T 41 N R 15 W
T 41 N R 14 W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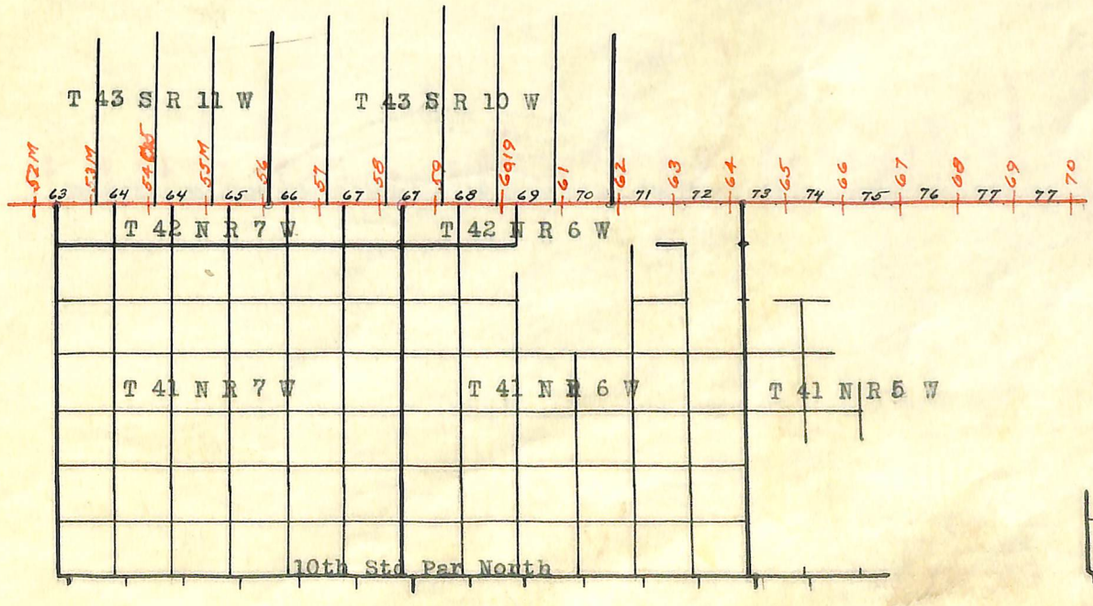
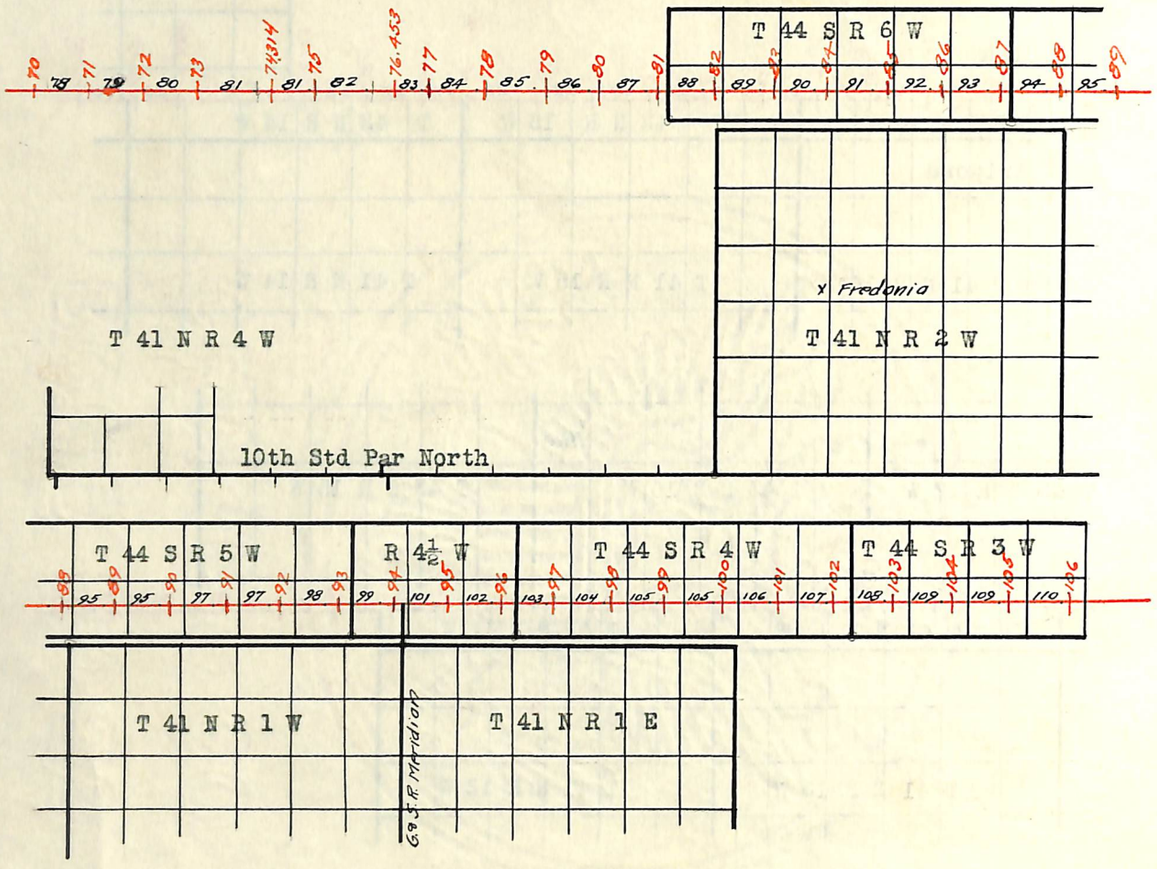
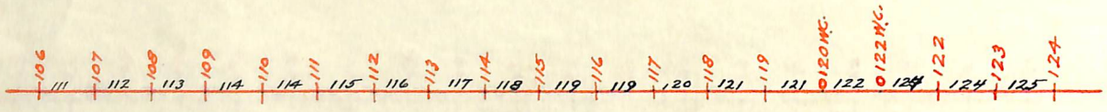
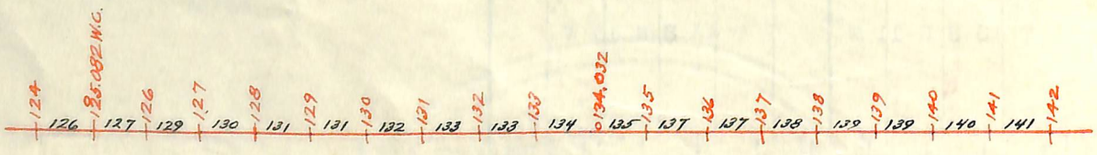
T 43 S R 16 W
T 43 S R 15 W
T 42 N R 13 W
T 42 N R 12 W
T 41 N R 13 W
T 41 N R 12 W


T 43 S R 11 W
T 43 S R 10 W
T 42 N R 7 W
T 42 N R 6 W
T 41 N R 7 W
T 41 N R 6 W
T 41 N R 5 W
10th Std Par North

BOOK 2628

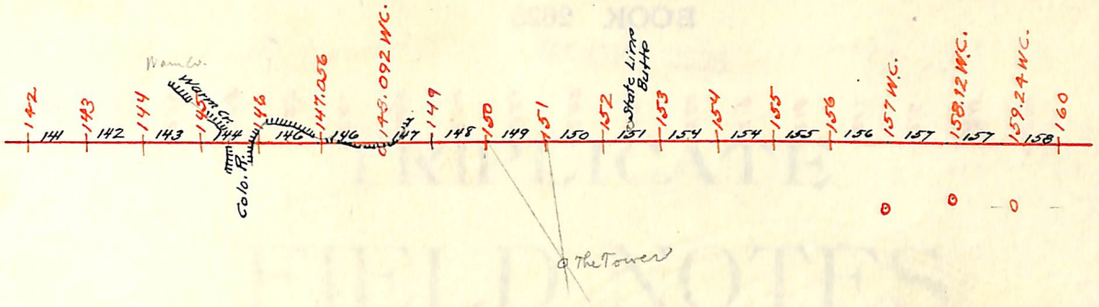

T 44 S R 6 W
T 41 N R 4 W
T 41 N R 2 W
x Fredonia
10th Std Par North
T 44 S R 5 W
R 4½ W
T 44 S R 4 W
T 44 S R 3 W
T 41 N R 1 W
T 41 N R 1 E
6th S.L.M. Meridian

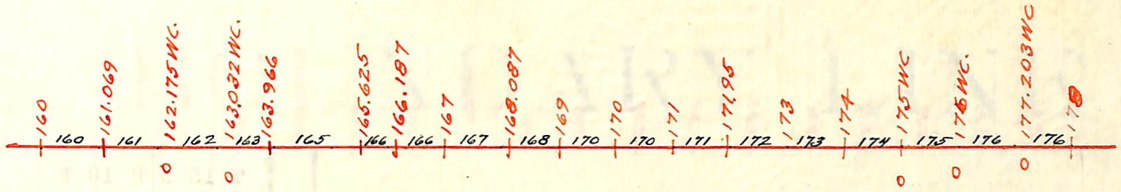


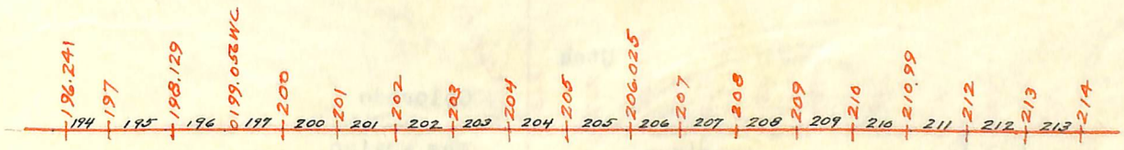


BOOK 2628

3
1B



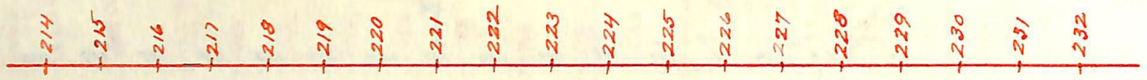


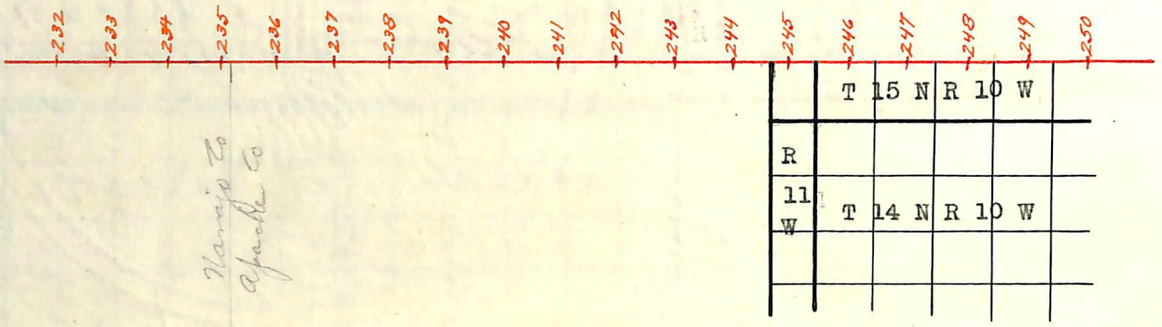


4

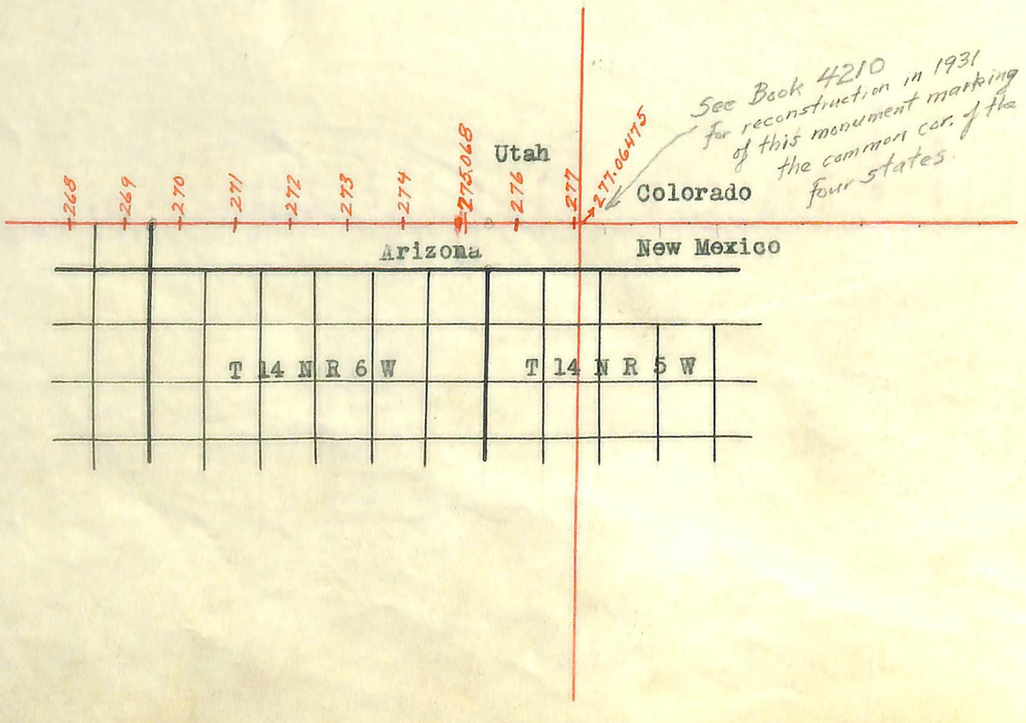
1C

BOOK 2628





Navajo Co
Apache Co



See Book 4210 for reconstruction in 1931 of this monument marking the common cor. of the four states.

BOOK 2628

10

TRIPLICATE

FIELD NOTES

Of the Survey of the

BOUNDARY LINE

BETWEEN THE

STATE OF UTAH AND TERRITORY OF ARIZONA

AS SURVEYED BY

HOWARD B. CARPENTER,
U. S. Surveyor and Astronomer

UNDER HIS CONTRACT DATED
OCTOBER 13th, 1900.

Survey Commenced March 24, 1901.
Survey Completed July 1, 1901.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	

NAMES AND DUTIES OF ASSISTANTS.

Augustus MacConnel	Assistant Astronomer.
J. Frank Warner	Transit Man.
Rex G. Schnitger.	Chainman.
Ed P. Blanchard	Chainman.
H. W. Gilbert	Chainman.
Karl A. Snyder	Chainman.
A. J. Smoots	Axeman.
M. A. Shumway	Moundman.
Bert Johanson	Moundman.
I. V. Warner	Rodman.
Murray H. Gilcrest	Flagman.
A. L. Lemmon	Flagman.

Oscar McClellan	In charge of transportation and supplies.
J. C. Crosby	Cook.
M. W. Andrus	Teamster.
Thomas Andrus	Teamster.
G. W. Ashby	Packer.
Geo. Averett	Packer.
John T. Little	Packer.
Bradford Shumway	Packer.
Peeveek	Pah Ute Indian Guide.
Tom Holliday	Navajo Indian Guide and Interpreter.

BOOK 2623

ALTITUDE	CHAINS	

DESCRIPTION OF INSTRUMENTS.

Astronomical observations were made with a würdemann Zenith Telescope 25 inches focal length 2.1 inches aperture, loaned me by the Department of the Interior.

The line was projected with a transit having six inch horizontal and five inch vertical limbs, graduated to 20' of arc and the horizontal limb having double verniers placed opposite to each other and reading to 30" of arc, which is also the least count of the vertical limb. This transit was made to order by Heller & Brightly of Philadelphia, Pa., especially for this line and is provided with Stadia wires placed at the ratio of 1 in 100.

A leveling rod graduated to feet tenths and hundredths and reading by vernier on target to thousandths of a foot.

Two steel tapes 1/4 inch wide, 66 feet or one chain in length graduated in links.

One standard Chesterman steel tape for comparison and adjustment of measuring tapes.
Two rod levels or plumb levels for guides in holding the rods vertical.

Two Aneroid barometers one 2 3/4 inches diameter with thermometer, - one 2 inch diameter.

Two chronometers No. 1051 Hiatt sidereal time and No. 333 Barraud mean time.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

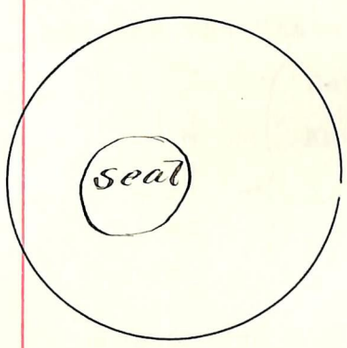
PRELIMINARY OATHS.

I, Augustus MacConnel do solemnly swear that I will well and faithfully perform the duties of assistant Astronomer in the establishment of the 37th Parallel of North Latitude, between the 32nd, and 37th Meridian West from Washington, D. C. The same being the boundary line between the State of Utah and the Territory of Arizona.

(Signed) Augustus MacConnel.
Asst. Astronomer.

Subscribed and sworn to before me this 20th day of March, 1901.

(Signed) Arthur F. Miles.
Clerk Dist. Court.
Washington Co. Utah

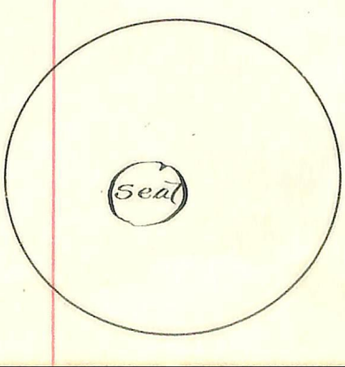


I, J. Frank Warner do solemnly swear that I will well and faithfully perform the duties of Transitman to the best of my ability in the survey of the Boundary line between the State of Utah and the Territory of Arizona.

(Signed) J. Frank Warner.
Transitman.

Subscribed and sworn to before me this 20th day of March, 1901.

(Signed) Arthur F. Miles.
Clerk Dist. Court.
Washington Co. Utah.



BOOK 2628

PRELIMINARY OATHS.

We, Rex G. Schnitger, Karl A. Snyder, E. P. Blanchard, and H. W. Gilbert do solemnly swear that we will well and faithfully execute the duties of chainmen. That we will level the chain upon even and uneven ground and plumb the tally pins either by sticking or dropping the same: That we will report the true distance to all notable objects and the true lengths of all lines that we assist in measuring, to the best of our skill and ability and in accordance with the instructions given us in the survey of the Boundary Line between the State of Utah and the Territory of Arizona.

(Signed) Rex G. Schnitger. Chainman.
Karl A. Snyder. Chainman.
E. P. Blanchard. Chainman.
H. W. Gilbert. Chainman.

Subscribed and sworn to before me this 20th day of March, 1901.

(Signed) Arthur F. Miles.
Clerk Dist. Court.
Washington Co. Utah.

Seal

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

PRELIMINARY OATHS.

I, A. J. Smoots do solemnly swear that I will well and truly perform the duties of Axeman according to instructions given me, to the best of my skill and ability, in the survey of the Boundary Line between the State of Utah and the Territory of Arizona.

(Signed) A. J. Smoots. Axeman.

Subscribed and sworn to before me this 20th day of March, 1901.

(Signed) Arthur F. Miles.
Clerk Dist. Court.
Washington Co. Utah

Seal

We, Bert Johanson and M. A. Shumway do solemnly swear that we will well and faithfully perform the duties of Moundman in the establishment of corners according to the instructions given us in the survey of the Boundary Line between the State of Utah and the Territory of Arizona.

(Signed) Bert Johanson. Moundman.
M. A. Shumway. Moundman.

Subscribed and sworn to before me this 20th day of March, 1901.

(Signed) Arthur F. Miles.
Clerk Dist. Court.
Washington Co. Utah.

Seal

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

PRELIMINARY OATHS.

We, Murray H. Gilcrest and A. L. Lemmon do solemnly swear that we will well and truly perform the duties of Flagman, according to instructions given us, to the best of our skill and ability, in the survey of the Boundary Line between the State of Utah and the Territory of Arizona.

(Signed) Murray H. Gilcrest. Flagman.
Alfred L. Lemmon. Flagman.

Subscribed and sworn to before me this 20th day of March, 1901.

(Signed) Arthur F. Miles.
Clerk Dist. Court.
Washington Co. Utah

Seal

I, I. V. Warner do solemnly swear that I will well and faithfully execute the duties of Rodman to the best of my skill and ability, and according to the instructions given me, in the survey of the Boundary Line between the State of Utah and the Territory of Arizona.

(Signed) I. V. Warner. Rodman.

Subscribed and sworn to before me this 20th day of March, 1901.

(Signed) Arthur F. Miles.
Clerk Dist. Court.
Washington Co Utah

Seal

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Pursuant to instructions received from the Honorable the Acting Commissioner of the General Land Office W. A. Richards, - bearing date Washington, D. C. October 20th, 1900.
		I proceeded to St. George, Utah, arriving there March 18th, 1901.
		The Wheeler Monument placed in the town of St. George in 1872, the record of the latitude and longitude of which was furnished me by the Hon. Commissioner, has entirely disappeared and I was unable to find any trace of it.
		Having learned from people living on the Virgin river near where it is crossed by the line between Nevada and Arizona, that old corners on that line were still in existence and that the sandstone shaft erected by Mr. James in 1870 to mark the 37th parallel was still standing. I therefore perfected my organization of a complete surveying and astronomical corps and moved to the Beaver Dam wash.
		March 24th I retraced a portion of the line between Nevada and Arizona as established by Isaac P. James in 1870.
		Beginning at a cottonwood post about 3 ins. square, much decayed, the marks on which were illegible, standing on the south side of the old road from St George to St Joseph about 3 miles west of the Beaver Dam Wash.
		By the side of this old post there stands another post about two inches square evidently placed there at a later date; on the newer post are the following marks: on the east side 'Arizona', on the west 'Nevada', and on the south, rather indistinct figures, which I took to be 303.
		There were some faint traces of a mound, no pits

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		visible.
		Referring to a copy of the field notes of the James line, furnished me by the Hon. Commissioner I find that Mr. James set a post just south of this road at the 60 chain mark on his 303rd mile but the notes do not state what marks if any, were placed upon it. Assuming this post to be at the 60 chain mark on the 303rd mile, I ran north retracing the line between Nevada and Arizona, as follows:
	1.15	Old road from St. George to St. Joseph bears N.E. and S.W. not now in use.
	21.30	Wash, course S.W.
	37.50	Top of low ridge bears N.E. and S.W.
	60.00	After a careful search, I failed to find any trace of the 302nd mile porner.

		North retracing the 302nd mile.
	20.50	Wash, course S.W.
	80.00	After a careful search, I failed to find any trace of the 301st mile corner.

		North retracing the 301st. mile.
	62.30	Wash, course S. W.
	80.40	Old cottonwood post, about 3 ins. square, 6 lks. east. Mounds and pits still visible, post much weathered, marks barely le gible. Nevada on the west, Arizona on the east, 300 M. on the south. As this line was run from the north, the number of the mile should have been on the north side.
		Course back to last corner found S. 0° 0' W.

		North retracing the 300th mile.
		I set instrument over this corner and ran north re-
		tracing the 300th mile over rolling ground sloping W.

ALTITUDE	CHAINS	
	79.60	Old mound on this line - Old cottonwood post about 3 ins. square rotted off, lying on the mound, some marks still visible but illegible. Pits have disappeared. I take this to be the 299th mile corner.

		North retracing the 299th mile.
	24.03	A red sandstone shaft on this line. This shaft is 6 1/2 feet long by 16 ins. broad by 12 ins. thick, set about 12 ins. in the ground and surrounded by a mound of stone about 4 ft. high (See Photo Page 30) This shaft is dressed triangular for about 12 ins. down from the top and marked with letters 1 1/2 ins. square graven in the stone, UTAH on N.E. ARIZONA on the S.E. NEVADA and 37 N.L. and 37 L.W. on the west faces. A round yellow limestone hill bears west about 20 chains, a small gulch heads about 2 chains west and runs south, and there is a flat top hill with a ledge of limestone along its crest to the east. This corner agrees with the description furnished by the Hon. Commissioner, and I believe it stands in its original position as established by Mr. James in 1870. I fail to find any closing corners for sub-divisions in Nevada said to have been set on this line.
		March 24th, 1901.

		I establish an astronomical station here and take observations for latitude on the nights of March 25th, 26th and 27th, using the Würdemann Zenith Telescope No. 8 loaned me by the Department of the Interior. This instrument we mounted on an iron stand, which is the frustum of a cone, set 2 1/2 ft. in the ground, hollow, and filled with sand. We make the latitude of this station (which is 1.04 chs. south of the James monument) 37° 01' 12.1"

ALTITUDE	CHAINS	
		north lattitude. This shows the James Monument to stand 1' 12.1" = 110.47 chs. + 1.04 = 111.51 chs. too far north. Therefore, pursuant to instructions I destroy the James corner and proceed to establish the initial corner at the intersection of the 37th Parallel with the James line. I carefully adjust the Heller and Brightly transit and at a point near and directly north of the James monument at 6h, 59m. P. M. l.m.t. March 27th 1901, I observe Polaris at western elongation in accordance with instructions in the manual and marked the line thus determined on a plug driven in the ground north of my station.
		March 28th, at 7h. 15m. A.M. I lay off the azimuth of Polaris 1 31.6' to the east and mark the true meridian thus determined on a plug driven in the ground north of my station.
		The magnetic bearing of the said true meridian is N. 15° 51' W. which reduced by the table page 100 of the manual gives the mean Magnetic declination 15° 48' E.
		I project this meridian to the south with fore and back sight taking double sights each way and reversing the telescope at each sight.
	24.03	Old 299th mile corner on the James line.
	103.63	Old 300th mile corner of the James line.
		Thence S. 0° 1' W. following the James line 7.88 chains, making
	111.51	South of the James Monument which is 1.04 chs. north of the observation station at latitude 37° 01' 12.1" = 110.47 + 1.04 = 111.51 chs.
		Intersect the 37th parallel of north latitude 7.88 chs. south of the James 300th mile corner.
		At the intersection of the east boundary line of the State of Nevada as established by Isaac P. James in 1870 with the 37th degree of north latitude as established by our astronomical observations.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		March 28th 1901 at 6h.55m. P.M. l.m.t. I observe Polaris at western elongation and mark a point in the line thus found on a plug driven in the ground 16 chs. north of my station.
		March 28th, 1901.

		March 29th, 1901 at 8h. A.M. I lay off the azimuth of Polaris 1° 31.6' to the east and mark the true meridian thus found on a plug driven in the ground 16chs. north of my station. The magnetic bearing of the said true meridian is N. 15° 51' W. which reduced by the table on page 100 of the manual gives mean declination 15° 48' east.
		I now lay off from the said true meridian an angle from the north to the east of 90° 00'. for the tangent to the parallel.
		In each of these observations and the subsequent turning of angles, the mean of four sights was taken, reversing the instrument at each sight.
2560		At the intersection of the 37th parallel north latitude with the James line I set a red sandstone shaft 6 ft. long 16 ins. broad and 12 ins. thick, dressed 8 ins. down from the top, diagonally in the ground, for the Initial Monument, marked with letters 1 1/2 ins. square deeply graven in the stone NEVADA on the N. W. UTAH on the N. E. ARIZONA on the S. E. and INTL. MONT. 37 N. L. 1901 on the S. W. faces. Raised a mound of stone 5 1/2 ft. base 3 ft. high around the shaft and dug pits 36x36x18 ins. N. E. and S. of corner 6 ft. dist. No trees within limits.
		A mountain peak on the north end of range about 20 miles distant bears N. 83° 37' W.
		South twin peak on same range bears S. 69° 10' W.
		Highest peak in sight south of Virgin River bears S. 7° 12' W.

ALTITUDE	CHAINS	
		South end of table land about 1/2 mile east bears N. 81 24' E.
		Barometer reads 2560 ft. above sea level.
		Thermometer 68° Fahr.
		This corner stands near the head of little dry gulch, course S. W. land sloping gently west, rolling and sandy. The S. W. corner of a table land about 125 ft. higher than the corner lies a little north of east about 1/2 mile distant.

		1st Mile.
		Ran east on the tangent to the parallel taking double back and fore sights, reversing the instrument at each sight. This method of producing the tangent was adhered to during the whole survey of this boundanry line.
		Ascend over rolling land.
	15.75	Top of divide about 75 ft. above the corner bears N. and S. Descend steep bank.
	21.75	Dry ravine, course S. E. about 100 ft. below divide. Ascend.
	43.60	Top of small round butte about 50 ft. high, S. E. cor. of table land bears N. E. about 10 chs. dist.
	45.30	Bottom of gulch, course S. E. Ascend.
	57.76	Top of spur, slope S. E. Descend.
	59.00	Dry gulch, course S.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs. the mean of which is
2500	80.00	North .76 of a lk. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 1st mile cor. A brass cap on top of the pipe has raised letters, UTAH on N. ARIZ. on S. and 1 M. stamped in the center.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		No bearing trees within limits. Dug pitts 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling and broken.
		Soil sandy and gravelly, 4th rate.
		Vegetation scanty, grass, greasewood, and a few yucca dragonis or Spanish bayonet trees.
		Barometer reads 2500 ft.
		Thermometer 65° .

		2nd Mile.
		S. 89° 59' E. on the tangent to the parallel.
		Descend along the S. E. slope over broken gravelly land.
	35.50	Bottom of dry gulch about 30 ft. deep, course S. E. ascend, enter bad lands.
	45.00	Top of spur, slope S. E. about 50 ft. above gulch. Descend.
	55.30	Dry gulch, course S. E. 50 ft. deep. Ascend.
	56.00	Top of spur slope S. E. Descend.
	59.00	Dry bed of creek 1 chain wide 150 ft. below last cor. course S. E. Ascend over bad land hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. By 1st set 79.96 chs. By 2nd set 80.04 chs. The mean of which is
	80.00	On steep west slope of bad land hill, impracticable to establish permanently.
		Land broken bad lands.
		Soil alkali and gypsum, 4th rate.
		Vegetation, very scanty, a little grass, greasewood, and soap weed.
		Barometer 2300 ft.
		Thermometer 60°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		3rd Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend over bad land hill.
2330	13.76	North 3 1/2 lks. from the tangent set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 2nd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on the S. and 2.172 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the Cor. 6 ft. distant and raised a mound of earth 5 ft. base and 2 ft. high around the post. This corner stands on the north Slope of a bad land hill overlooking the Beaver Dam wash. No trees within limits.
		Descend steep north slope.
	22.76	Dry gulch, course S. E. Descend gradually.
	39.76	S. E. end of spur sloping from N. W. Enter creek bottom about 150 ft. below last cor. Bears N. W. and S. W.
	52.76	A channel of Beaver Dam wash. 50 lks. wide, dry, course S.
	71.00	Main Channel of Beaver Dam Wash. 50 lks. wide dry courses. Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs. The mean of which is.
2200	80.00	End of 3rd mile comes in another channel of Beaver Dam wash. Impracticable to establish the Cor: This wash is 30 lks. wide, dry, course S.
		Land rolling and creek bottom.
		Soil sandy and gravelly, 3rd and 4th rate.
		Vegetation, grass, sage and willow in creek bottom.
		Barometer 22[illegible] ft.
		Thermometer 58° .
		March 29th, 1901.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		4th Mile.
		Test instruments, tape, stadia wires and telemeter rod, find all in adjustment.
		S. 89° 58' E. on tangent to the parallel.
		Ascend over rolling hills.
2215	4.10	North 71 lks. from the tangent. Set a lava stone 30x16x16 ins. 10 ins. in the ground for 3rd mile cor. Marked 3.051 M. on the W. UTAH on the N. 37 N.L. on the E. and ARIZ. on the S. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. distant and raised a mound of earth and stone 5 1/2 ft. base and 2 1/2 ft. high east of cor. This cor. stands on east bank of Beaver Dam wash about 15 ft. high. No bearing trees within limits.
		Ascend.
	29.00	Top of bench about 100 ft. above wash, course N. and S. Ascend.
	69.00	Top of second bench about 180 ft. above wash course N. and S. Thence along gentle south slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is.
2500	80.00	End of 4th mile. North 12 lks. from the tangent set an iron pipe 2.ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 4th mile corner. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 4 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post. This cor. stands on a plain sloping gently to the S. W.
		Land rolling.
		Soil gravelly and sandy, 3rd rate.
		Vegetation, grass, greasewood and cactus.
		Barometer 2500 ft. Thermometer 60°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		5th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Along gentle south slope.
	1.00	Descend, course N. and S.
	9.00	Bottom of dry gulch 60 ft. deep, course S. Ascend.
	14.00	Top of spur slope S. Descend.
	17.75	Bottom of dry gulch, course S. Ascend.
	30.00	Top of spur slope S. Descend.
	53.00	Bottom of dry gulch, course S. Ascend.
	65.00	Top of spur slope S. Descend.
	70.00	Bottom of wash, course S. W. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is.
2520	80.00	North 19 lks. from the tangent set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 5th mile cor. A brass cap on top of pipe has raised letters, UTAH on N. ARIZ. on S. and 5 m. stamped in center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land sloping south and cut by gulches about 30 ft. deep.
		Soil gravelly and broken limestone, 4th rate.
		Vegetation greasewood, cactus and yucca.
		Barometer 2520 ft. Thermometer 62°.

		6th Mile.
		S. 89 57' E. on tangent to the parallel.
		along gentle south slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle post

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is.
2560	80.00	North 27lks. from the tangent set a limestone 30x15x6 ins. 20 ins. in the ground for the 6th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 6 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Land sloping gently S. W.
		Soil gravelly, 4th rate.
		Vegetation, greasewood, cactus and yucca.
		Barometer 2560 ft. Thermometer 62° .

		7th Mile.
		S. 89° 56' E. on tangent to the parallel.
		Along gentle S. W. slope.
	28.50	Old emigrant road bears N. 63 E. and S. 63 W.
		Difference between two measurements of 80 chs. by two sets of chainmen is nothing. The mean is.
2620	80.00	North 37 lks. from the tangent set a granite stone 30x12x9 ins. 20 ins. in the ground for the 7th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 7 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 21/2 ft. high east of cor.
		Pits impracticable.
		Land sloping gently south.
		Soil gravelly and rocky, 4th rate.
		Vegetation, greasewood, cactus and yucca.
		Barometer 2620 ft. Thermometer 63 .

		8th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend gradually over gentle S. W. Slope.
	50.00	Dry gulch, course S.
	51.12	Wagon road from St. George to Bunkerville, course N. and S.

BOOK 2628

ALTITUDE	CHAINS	
	65.00	Dry gulch course S. W.
	74.00	Dry gulch course S. W.
		Difference between measurements of 80chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is.
2750	80.00	North 49 lks. from the tangent set a limestone 33x12x12 ins. 22 ins. in the ground for the 8th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on the S. and 8 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Land sloping south.
		Soil gravelly and rocky, 4th rate.
		Vegetation, greasewood, cactus and yucca.
		Barometer 2760. Thermometer 63°.
		This cor. stands on the plain near the foot of the Beaver Dam range.

		9th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend gradually over S. W. slope.
	2.00	Dry gulch, course S. W.
	17.75	Wagon road bears N. E. and S. W.
	37.00	Foot of Beaver Dam Mountains bears N. and S. Ascend. From here use stadia measurements. The stadia wires are placed at the proportion of 1 to 100. The distance C = focal length of lens, which for this instrument is 1.15 ft. when telescope is level and proportional when telescope is elevated or depressed. See explanation in report. Angles of elevation marked + and of depression -. Von Geldern's table of constants used for computing horizontal distance.

BOOK 2623

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Rod graduated in feet, tenths and hundredths of a foot, and by tangent vernier reads to thousandths of a foot. Rod held vertically as indicated by rod level. Vertical angle 23°+ Rod reads 8.71 ft. multiplied by Constant for 100 ft. for angle 23° = 84.73 x 8.71 = 737.90 + C. = 1.05 = 738.95 ft. = 11.20 chs.+ 37.00 chs. = 48.20 chs.
	48.20	Stadia point, thence by steel tape.
	50.95	Point on rocks, thence by stadia. Angle 8° 30'+ Rod 10.15 ft. Constant 97.82 x 10.15 ft = 992.87 + C. = 1.14 ft. = 994 ft. = 15.05 chs. + 50.95 chs. = 66.00 chs.
3350	66.00	Top of rocky spur slopes south. Descend. Angle 5° - Rod 6.60 ft. Constant 99.24 x 6.60 ft. = 654.98 ft. + C. = 1.14 = 656.12 ft. = 9.94 chs. + 66.00 chs = 75.94 chs.
	75.94	Thence by steel tape. Difference between measurements of 43.81 chs. by two sets of chainmen 1s 4 lks. Position of middle point by 1st set 43.83 chs. By 2nd set 43.79 chs. The mean of which is. 43.81 chs. + stadia measurement 36.19 80.00 chs.
3100	80.00	North 62 lks. from the tangent set a limestone 36x9x9 ins. on solid bed rock in stone mound for 9th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 9 M. on W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of the cor. Pits impracticable. Land mountainous, rough and broken. Soil rocky, 4th rate. Vegetation, grass and sage. Barometer 3100 ft. Thermometer 60°.

March 30th 1901.

10th Mile.

Test the tape lines with the standard and find them

ALTITUDE	CHAINS	
		correct. I examine the levels, collimation, and stadia wires of the transit and find them all in adjustment.
		S. 89° 54′ E. on tangent to the parallel.
		Descend over broken rocks.
	12.00	Deep ravine, course South. Ascend along S. slope.
	38.00	Top of spur, slopes S. Descend.
	50.00	Dry gulch, course south. Ascend.
	54.14	Top of spur, slopes S. Descend.
	56.00	Dry ravine, course S. Ascend rocky slope.
	71.22	Top of spur, slopes N. W. Thence by stadia measurement, Angle 16° - Rod 8.40 double = 1680 ft by Constant 92.40 x 1680 = 1552.32 + C. = 1.10 = 1553.42 ft. = 23.53 chs. + 71.22 chs. = 94.75 chs.
	80.00	Falls on steep rocky north slope. End of 10th mile.
		Impracticable to establish cor.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Vegetation very scant, a little grass and moss.

		11th Mile.
		S. 89° 53' E. on tangent to the parallel,
		Over very rough, broken ground.
3640	14.75	North 79 lks. from the tangent set a limestone 30x10x10 ins. on solid rock in a mound of stone for the 10th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 10.84 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft high east of cor. Pits impracticable.
		Barometer 3640. Thermometer 58° .
		Thence by stadia measurement across cañon Angle 9°+ Rod. 12.90 ft. double = 2580 ft Constant 97.55 x 2580 = 25 16.79 ft. + C = 1.13 = 2517.92 ft. = 38.15 chs. + 14.75 chs. = 52.90 chs.
	20.75	Bottom of cañon 300 ft. deep, course N. Ascend.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	24.75	Top of spur, slope N. Descend.
3000	34.00	Bottom of rocky cañon, course N.W. about 600 ft. below cor. Ascend.
	52.90	Stadia point. Thence measurement by tape. Ascend.
4200	62.50	Top of high spur, bears N. and S. Descend.
		Difference between measurements of 27.10 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 27.11 chs. By 2nd set 27.09 chs.
		The mean of which is 27.10 chs. + 52.90 chs. =
4020	80.00	North 92 lks. from the tangent set a limestone 31x 12x10 ins. 21 ins. in the ground for 11th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 11 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Land mountainous, very rough and broken.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 4020 ft. Thermometer 65°.

		12th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Descend along north slope.
	2.00	Dry gulch, course N. Ascend along north slope.
	26.11	Point on rocky spur, slope north. Thence by stadia measurement Angle 12° + Rod 7.20 double = 1440 ft. Constant 95.68 x 1440 = 1377.79 ft. + C = 1.12 ft. = 1378.91 ft. = 20.89 chs. + 26.11 chs. = 47.00 chs.
	47.00	Stadia point on rocks. Thence by stadia measurement Angle 19° + Rod 11.70 ft. Constant 89.40 x 1170 ft. = 1045.98 ft. + C = 1.08 = 1047.06 ft. = 15.86 chs. + 47.00 chs. = 62.86 chs.
5020	62.86	Top of ridge, summit of Beaver Dam range, bears N. E. and S. W. Descend along south slope. Thence by tape measurement.
	72.00	Hollow, drains S. E. Thence along S. W. slope.

BOOK 2628

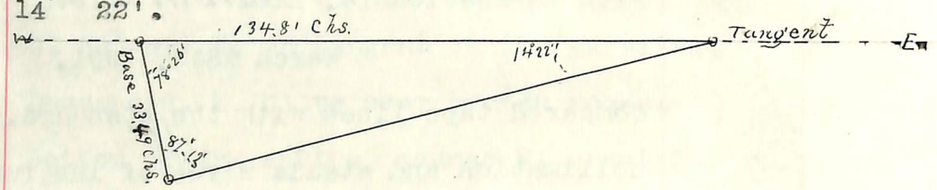
BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Difference between measurements of 43.25 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 43.27. By 2nd set 43.23 chs. The mean of which is 43.25 chs. + stadia measurement 36.75 chs. =
5000	80.00	North 110 lks. from the tangent set a limestone 30x16x8 ins. on bed rock for 12th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 12 M. on W. faces in a stone mound. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Land mountainous, rough and broken.
		Soil 4th rate, very rocky.
		Vegetation: grass and sage, scattering cedar and piñon.
		Barometer 5000 ft. Thermometer 70° .

		13th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Descend S. E. slope over broken rocks.
	8.50	Bottom of dry ravine, course S. about 300 ft. deep. ascend.
	12.60	Top of spur slops S. about 200 ft. above bottom of ravine. Descend.
	34.40	Bottom of dry ravine, course S. 250 ft. deep. Ascend.
	43.00	Top of spur slopes S. 100 ft. above bottom of ravine. Descend.
		Difference between measurements of 53.03 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 53.06 chs. By 2nd set 53.00 chs. The mean of which is.
	53.03	Brow of cliffs, bear N. E. and S. W. thence by stadia measurement. Descend angle 19 - Rod 12.95 ft double = 2590 ft. Constant 89.40 x 2590 ft = 2316.46 + C = 1.08 = 2317.54 ft. = 35.11 chs + 53.03

ALTITUDE	CHAINS	
	80.00	Comes on cliff sloping S. Impracticable to establish cor.
		Land mountainous, very rocky and percipitious.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		14th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Descend.
	8.00	Bottom of gulch, course from N. W. to S. Ascend.
	8.14	Stadia point. Thence by tape measurement.
4200	9.08	North 132 lks. from the tangent set a granite stone 32x12x10 ins. 22 ins. in the ground for the 13th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 13.113 M. on W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable. Barom 4200. Therm 60°.
		March 13th, 1901.
		Compared tape lines with the standard. Tested levels collimation and stadia wires of instrument and find all correct.
		Ascend along foot of rocky south slope. 15 chs. top
	15.00	Top of spur slope S. Descend.
	19.00	Dry gulch, course S. Ascend along steep S. W. slope.
	27.73	On spur slopes S. Stadia measurement from this point. Angle 17° + Rod 8.665 double = 1733 ft. Constant 91.45 x 1733 = 1584.83 + C. = 1.10 = 1585.93 ft. = 24.03 chs. + 27.73 chs. = 51.76 chs.
	51.76	Stadia point. Thence by tape measurement.
	52.71	On sharp rocky spur sloping south. From this point the line runs over a country very much broken. Many of the rocky points are inaccessable and too far apart for measurement by stadia and impossible to measure by tape, therefore I run a base line

ALTITUDE	CHAINS	
		down the ridge or spur. First I set a flag on the tangent line on a high bluff across a very deep canon. From this line I turn an angle to the south of 78° 26' and run a base line, measuring the same with great care 33.49 chs. Impracticable to get a longer base owing to the roughness of the country. Set instrument at south end of base, back sight on north end and measure angle to the flag on high bluff at east end of tangent across the canon. I repeat this angle four times with telescope reversed each time and find the angle to be 87° 12'. I now leave flags at each end of base line and proceed to the flag at east end of tangent across the canon. Take back sight on flag on north end of base line and measure angle to flag at south end of base line. After careful repetitions I find this angle to be 14° 22'.



Then. Sin. 14°22':Sin. 87° 12' ::33.49 chs.
a.c. log. Sin. 14° 22' 0.605327
log. Sin. 87° 12' 9.999481
log. 33.49 chs. 1.524915
2.129723 = 134.81 chs.

52.71 Chs
134.81 Chs.
187.52 = 2 miles and 27.52 chs.

	80.00	Inaccessable. End of 14th mile.
		Land mountainous, very rough and broken.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.

ALTITUDE	CHAINS	
		15th Mile.
		S.89°51'E. on tang to parallel.
2800	68.50	At about this point bottom of deep dry cañon, course South. Ascend.
	80.00	End of 15th mile comes on steep west slope of cañon wall. Inaccessable.
		Land mountainous, very rough.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.

		16th Mile.
		S. 89° 50' E. on tangent to the parallel.
		Ascend cañon wall.
4800	27.52	Point to which triangulation was made, on top of high rocky bluff. About 1/2 mile east of bottom of cañon which is 2000 ft. deep, bears N. and S.
		Thence by tape measurement.
	27.60	North 180 lks. from the tangent set a limestone 36x16x6 ins. on bed rock in a mound of stone for 15th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 15.345 M. on W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Barometer 4800 ft. Thermometer 60° .
		Thence continuing on tangent.
		Descend over N. E. slope, measurement by steel tape.
	52.00	Bottom of dry ravine. About 300 ft. deep. Course S. E. Ascend.
	62.00	Top of spur, slopes S. E. About 300 ft. above bottom of gulch. Descend.
	75.50	Bottom of dry gulch, course S. E. Ascend.
		Difference between measurements of 52.40 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 52.46 chs. By 2nd set 52.34 chs. The mean of which is 52.40 chs. + 27.60 chs. =

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
4650	80.00	North 196 lks. from the tangent set a limestone 33x10x7 ins. 22 ins. in the ground for the 16th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 16 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Land mountainous.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 4650 ft. Thermometer 60° .

		At 16th mile corner. at 6h 39m P.M. l.m.t. I observe Polaris at the western elongation in accordance with instructions in the manual and mark a point in the line thus determined on a plug driven in the ground north of my station.
		April 1st, 1901.

		April 2nd, 1901 at 7h A. M. I set instrument on point at 16th mile cor. sight on point determined last night by observation on Polaris at western elongation and lay off the azimuth 1° 31.6' to the east and establish a true meridian. From this meridian I lay off 90° 00' to the east, taking the mean of four repetitions of the angle with the telescope reversed at each sight. The magnetic bearing of the meridian is N. 15° 58' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 55' E.

		17th Mile.
		Ran east on the tangent to the parallel.
		Descend along S. E. slope.
	3.00	Bottom of dry gulch, course S. E. Ascend.
	17.00	Top of spur falls S. E. Descend.

BOOK 2628

ALTITUDE	CHAINS	
	57.00	Bottom of dry gulch, course S. E. Ascend.
	63.00	Top of spur or ridge, bears N. W. and S. E.
	70.00	Dry gulch, course N. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is .4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is.
4300	80.00	North .76 of 1k. from the tangent.
		Set a conglomerate stone 31x18x6 ins. 10 ins. in the ground to bed rock and built a pile of stone around it for the 17th mile cor. Marked UTAH on the N. 37 N.L. on E. ARIZ. on S. and 17 M. on the W. faces Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Land mountainous.
		Soil very rocky, 4th rate.
		Vegetation scanty, grass and sage.
		Barometer 4300 ft. Thermometer 70°.

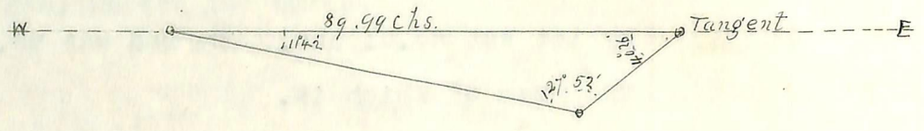
		18th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over north slope, broken rocky land.
	24.00	Bottom of cañon, course N. E. about 200 ft. deep. Ascend.
	30.00	Top of spur, slope N. E. Descend.
	60.25	Dry ravine, course N. E. Ascend.
	75.00	Top of spur, slope N. E. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is.
3950	80.00	North 3 lks. from the tangent.
		Set a limestone 30x16x7 ins. 20 ins. in the ground for 18th mile cor. Marked UTAH on the N. 37 N.L. on E. ARIZ. on S. and 18 M. on W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Pits impracticable.
		Land mountainous.
		Soil rocky, 4th rate.
		Vegetation: grass, sage and greasewood.
		Barometer 3950 ft. Thermometer 70° .

		19th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend S. E. slope.
	19.00	Dry gulch, Course N. E. Ascend.
3825	28.00	Top of spur, slope N. near the edge of cañon, bears N. and S. This is the Virgin River Cañon. The walls are too nearly perpendicular to measure with tape and too far across to measure with stadia.
		The country on this side of the river is too rough to admit of measuring a base line. I therefore set a flag across the river on the top of the opposite cañon wall on this tangent and leaving a flag at this point I crossed the cañon and setting at the flag, sight back to the flag on the west side of the cañon and turn an angle to the south of 40° 26' for a base line. I measure this base line very carefully; 22.86 chs. is the longest base line possible and see the flag across the cañon. I set instrument at the south end of the base and taking a back sight on the north end, measure the angle to the flag across the cañon. The mean of repeated angle gives 127° 52' for this angle.



BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Then. Sin. 11° 42' : 127° 52' :: 22.86 chs.
		a. c. log. Sin. 11° 42' 0.692959 log. Sin. 52° 08' 9.897320 log. 22.86 chs. 1.359076 1.949355 = 88.99 chs.
		Thence east from the 28.00 chain point west of the river.
	30.00	Top of perpendicular wall. Descend.
		Thence over cliffs.
	50.00	About foot of cliffs 1000 below the top bears N. E. and S. W.
2650	65.00	Virgin River 1.50 chs. wide, 2 [illegible] ft. deep, swift, muddy stream, course S. W. Ascend cliffs.
	80.00	End of the 19th mile. Inaccessable.
		Land mountainous.
		Soil rocky, 4th rate.
		Vegetation: grass, sage and mesquite and willow brush along the river.

		20th Mile.
		S. 89° 58' E on tangent to the parallel.
		Ascend.
3650	36.99	Triangulation point on top of ridge, river bluffs bears N. E. and S. W.
		North 9 lks. from the tangent.
		Set a limestone 30x24x6 ins. 20 ins. in the ground for 19th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 19.463 M. on W. face. Raised mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor.
		Pits impracticable.
		Barometer 3650 ft. Thermometer 75° .
		April 2nd, 1901.
		S. 89° 58' E. on tangent to the parallel.
		Descend over sandy and rocky ground.
	49.00	Dry rocky gulch, course N. E. Ascend.
	73.35	Top of ridge, bears N. and S. Descend.
		Difference between measurements of 43.01 chs. by two sets of chainmen is 4 lks. Position of middle point

ALTITUDE	CHAINS	
		by 1st set 43.03 chs. By 2nd set 42.99 chs.
		The mean of which is 43.01 chs. + 36.99 chs. =
3500	80.00	End of 20th mile.
		North 12 lks. from the tangent.
		Set a limestone 32x10x6 ins. 22 ins. in the ground for 20th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 20 M. on W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft high east of cor.
		Pits impracticable.
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass and sage.
		Barometer 3500 ft. Thermometer 70°.

		21st Mile.
		I compare the tapes with the standard and find them correct. I examine the instrument and correct the level and collimation errors and test the stadia wires.
		Thence S. 89° 57' E. on tangent to the parallel.
		Descend over rolling sandy and rocky ground.
	9.00	Dry gulch, course S. E. Ascend.
	19.00	Top of spur, slope N. E. Descend.
	48.50	Dry gulch, course N. E. Ascend.
	54.00	Top of spur, slope N. Descend.
	64.75	Dry gulch, course N. E. Ascend.
	70.00	Top of spur or hill bears N. and S. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is.
3100	80.00	North 19 lks. from the tangent.
		Set a limestone 31x12x6 ins. 21 ins. in the ground for the 21st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 21 M. on W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor

BOOK 2628

ALTITUDE	CHAINS	
		Pits impracticable.
		Virgin River about 1 1/2 miles north.
		Land rolling and broken.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 3100 ft. Thermometer 75° .
		———
		22nd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Descend over broken and rolling land.
	0.75	Dry gulch, course N. E. Ascend.
	4.00	Top of round hill. Descend.
	13.00	Dry gulch, course N. E. about 30 ft. below top of hill Ascend.
	32.00	Top of knoll about 40 ft. above gulch. Descend.
	73.00	Bottom of dry gulch, course N. E. 50 ft. below top of knoll. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is.
2950	80.00	North 27 lks. from the tangent.
		Set a limestone 31x18x7 ins. 21 ins. in the ground. for 22nd mile cor. Marked UTAH on N. 37 N.E. on E. ARIZ. on S. and 22 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 1/2 ft. base 2 1/2 ft. high east of corner.
		Land rolling and broken.
		Soil sandy and rocky, 3rd rate.
		Vegetation: grass and sage.
		Barometer 2950 ft. Thermometer 82° .
		———
		23rd Mile.
		S. 89° 56' E. on tangent to the parallel.
		Descend.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	0.10	Dry gulch, course S. W. Ascend
	18.00	Top ofspur, slope S. W. Descend.
	22.00	Dry gulch, course S. W. Ascend.
	24.00	On ridge, bears N. and S. Thence by stadia measurement Angle 12°+ Rod 6.28 ft. Constant 95.68 x 628 ft. = 600.87 + C = 1.12 = 601.99 ft. = 9.12 chs. + 24.00 chs. = 33.12 chs.
	33.12	Top of rock capped butte about 125 ft. high, thence by steel tape measurement.
	46.00	East edge of flat topped butte, bears N. and S. Descend.
	56.00	Bottom of wash about 100 ft. deep, course N. E. Ascend.
		Difference between measurements of 70.88 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 70.90 chs. By 2nd set 70.86 chs.
		The mean of which is. 70.88 chs. + 9.12 chs =
	80.00	Falls on side of steep cliff. Impracticable to establish corner.
		Land rolling and broken.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.

		24th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend.
3200	7.00	Top of cliffs, bear N. E. and S. W. about 100 ft. above wash.
		North 38 lks. from the tangent.
		Set a limestone 30x12x10 ins. on bed rock in a mound of stone for 23rd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 23.087 M. on W. faces.
		Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high East of cor. Pits impracticable.
		Land rolling and broken.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 3200 ft. Thermometer 75° .
		Descend east slope over rolling land.
	8.63	Edge of rocky bluff bears S. W. and N. E. north end 1 ch. dist. Descend.
	36.00	Bottom of wash, course N. E. about 100 ft. below corner. Ascend.
	37.00	Wagon road bears N. and S. from St. George to Black Rock Springs.
	47.00	Top of hill about 50 ft. above road, bears N. and S. Thence along north slope over rolling hills. Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is.
3150	80.00	North 49 lks. from the tangent. Set a limestone 36x12x10 ins. 6 ins. in the ground to bed rock. Built a stone mound around it for 24th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 24 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable. The corner of sections 26, 27, 34 and 35 T. 43 S. R. 16 W. Salt Lake Meridian bears N. 35° 39' W. 58.78 chs. This cor. is a limestone 5x10x8 ins. above ground. Marked with 1 notch on the S. and 2 notches on the E. edges with a mound and pits.
		Land rolling.
		Soil sandy and rocky, 3rd rate.
		Vegetation: grass and sage.
		Barometer 3150 ft. Thermometer 70° .
		At 6h. 31m P.M. l.m.t. I observe Polaris at western elongation at the 24th mile corner in

ALTITUDE	CHAINS	
		accordance with instructions in the manual and mark a point in the line thus determined on a plug driven in the ground north of my station.
		April 3rd 1901.

		April 4th, 1901 at 7h, 10m, A. M. I lay off the azimuth of Polaris 1° 31.6' to the east and establish the true meridian. From the meridian so established I lay off an angle of 90° 00' to the east taking the mean of 5 repetitions of the angle. The magnetic bearing of the meridian is N. 15° 53' W. which reduced by the table page 100 of the manual gives the mean magnetic declination 15° 50' E.

		25th Mile.
		I compare the steel tapes with the standard and test the stadia wires for correct measurements.
		Ran east on the tangent to the parallel.
		Descend over rolling land.
	10.00	Enter flat, bears N. and S.
	59.00	Dry bed of creek 1.50 chains wide course N. Ascend.
	71.00	On flat about 40 ft. above creek bed bears N. and S. Thence over nearly level land.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is.
2750	80.00	North .76 of lk. from the tangent.
		Set a black lava stone 30x14x7 ins. 20 ins. in the ground for 25th mile corner. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 25 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		Land nearly level.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Soil sandy, 3rd rate.
		Vegetation grass and sage.
		Barometer 2750 ft. Thermometer 48°.
		Virgin River about 2 miles north. Foot of Mountains about 5 miles south.

		26th Mile.
		S. 89° 59 E. on tangent to the parallel.
		Across nearly level land.
	2.00	Wagon road bears N. and S.
	12.75	Wagon road bears N. and S.
	17.50	Dry gulch, course N.
	57.00	Dry gulch, course N. W.
	69.75	Dry gulch, banks 6 ft. high, course N. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
2800	80.00	North 3 lks. from the tangent.
		Set an iron pipe 2 ins. diam 5 ft. long with flanges at the bottom 3 ft. in the ground for the 26th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 26 M. stamped in the center. Dug pits 36X36X18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post. This cor. stands in a little valley. Low hills about a mile north and foot of mountains about 5 miles south. Price City about 2 1/2 miles north.
		Land nearly level.
		Soil sandy, 3rd rate.
		Vegetation grass, sage and greasewood.
		Barometer 2800 ft. Thermometer 48°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		27th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Over gently rolling land.
	50.80	Top of white hill about 20 ft. high. Descend.
	75.50	Dry gulch, course S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing. The mean is
2850	80.00	North 7 lks. from thetangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 27th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 27 M. stamped in the center. Dug pits 36X36X18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation grass and sage.
		Barometer 2850 ft. Thermometer 50°

		28th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Ascend over low hills.
	15.50	Top of hill about 30 ft. high, bears N. E. and S. W.
	19.00	Bottom of wash, course S. W.
	37.00	Top of bench, bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
2800	80.00	North 12 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 28th mile corner. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 28 M. stamped in the center.

ALTITUDE	CHAINS	
		[illegible] Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. This cor. stands at the west edge of low limes tone hill.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage, very scanty.
		Barometer 2800 ft. Thermometer 50° .

		29th Mile.
		S. 89° 57 ' E. on tangent to the parallel.
		Ascend over rolling hill.
	17.47	Top of ridge nears N. and S. From this point with back sight on tangent to the west, and turning north to the spire of the Mormon Temple in St. George makes an angle with the tangent of 72° 29' or the spire of the Temple bears north 17° 28' west.
	34.50	Dry gulch, course N. E. Ascend.
	40.00	Top of spur, slope N. E. Descend.
	47.00	Wagon road, bears N. and S.
	51.25	Dry gulch, course N. about 50 ft. below spur. Ascend
	58.00	Top of spur, slope N. Descend.
	74.25	Bottom of wash, course N. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is.
2790	80.00	North 19 lks. from the tangent.
		Set a limestone 32x12x11 ins. 22 ins. in the ground for 29th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 29 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east
		[illegible] rock impracticable.

ALTITUDE	CHAINS	
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 2790 ft. Thermometer 56° .

		30th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend.
	10.00	Top of spur, slope N. W. Thence ascend along N.slope
		Difference between measurements of 80 chs. by two
		sets of chainmen is 10 lks. Position of middle point
		by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is.
2900	80.00	North 27 lks. from the tangent.
		Set a lava stone 30x14x14 ins. 20 ins. in the ground
		for 30th mile cor. Marked UTAH on N. 37 N.L. on
		E. ARIZ. on S. and 30 M. on the W. faces. Raised
		a mound of stone 5 1/2 ft. base 2 1/2 ft. high east
		of cor. Pits impracticable. There is a lava capped
		butte about 1/2 mile south of this cor.
		Land rolling.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 2900 ft. Thermometer 60° .

		31st Mile.
		S. 89° 56' E. on tangent to the parallel. Ascend.
	20.42	Top of black lava spur about 200 ft. above last cor.
		slope N. Descend along N. slope.
	39.50	Dry gulch, course N. W. Ascend.
3100	55.17	Top of spur, slope N. spire of Mormon Temple in
		St. George makes angle with tangent of 55° 59' of
		the Temple bears N. 33° 57' W. Descend.
	74.00	Bottom of wash, course N. E.
		Difference between measurements of 80 chs. by
		two sets of chainmen is/2 lks. Position of middle

BOOK 2628

ALTITUDE	CHAINS	
		point by 1st set 80.06 chs. By 2nd set 79.94 chs. The mean of which is.
2800	80.00	North 37 lks. from the tangent. Set a black lava stone 33x12x11 ins. 22 ins. in the ground for 31st mile cor. Marked UTAH on the N. 37 N. L. on the E. ARIZ. on the S. and 31 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable. This cor. stands on the east slope of black spur among angular blocks of lava. Land rolling and broken. Soil rocky, 4th rate. Vegetation: grass and sage. Barometer 2800 ft. Thermometer 60° .

		32nd Mile.
		S. 89° 55' on tangent to the parallel. Descend over broken rock.
	3.00	Foot of hill bears N. and S. Enter gumbo flat.
	12.20	Dry gulch 15 lks. wide, course N. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is.
2750	80.00	North 49 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 32nd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 32 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. distant and raised a mound of earth 5 ft. base 2 ft. high around the post. This cor. stands in a flat. The cor. of Tps. 43 and 44 S. Rs. 14 and 15 W. Salt Lake Meridian bears S. 44° 57' W. 44.43 chs. dist.

BOOK 2628

ALTITUDE	CHAINS	
		This cor. is of limestone 10x8x6 ins. above ground.
		properly marked and notched. *with mound and pits.*
		Land nearly level.
		Soil clay and sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 2750 ft. Thermometer 62° .

		At the 32nd mile cor. 6h. 27m. P.M. l.m.t. I observe Polaris at western elongation in accordance with instructions in the manual and mark the line thus determined on a plug driven in the ground north of my station.
		April 4th, 1901.

		April 5th, 1901, at 8h. A.M. I lay off the azimuth of Polaris 1° 31.7' to the east and mark the true meridian thus determined upon a plug driven in the ground north of my station. The magnetic bearing of the said true meridian is N. 16° 05' W. This reduced by the table page 100 of the manual gives mean magnetic declination 16° 02' E. From this meridian I lay off 90° to the east taking the mean of 4 repititions of the angle, for the tangent to the parallel.
		I compare the steel tapes with the standard. Test the levels, stadia wires and collimation of the instrument and find all correct.

		33rd Mile.
		East on the tangent to the parallel.
		Along flat.
	2.00	Leave flat, bears N. and S. Ascend.
2850	8.50	Top of spur about 100 ft. high, slope N. Descend.
2750	20.30	Pierce wash, dry, 75 lks. wide, course N. W. An old stone corral about 5 chs. S. thence following

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		up the Pierce wash.
	22.00	Water hole and spring in creek bed 25 lks. north known as the Herd House Spring.
	24.00	Leave dry bed of Pierce wash, comes from S. E.
	39.00	Wagon road bears N. 80° W. and S. 80° E.
	67.00	Leave flat, bears N. W. and S. E. Ascend along south slope.
	79.80	Dry gulch, course south.
		Difference between measurements of 80 chs by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is.
3050	80.00	North .76 of 1k. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 2 ft. to bed rock for 33rd mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 33 M. stamped in the center. Raised a mound of stone around the post 5 1/2 ft. base and 3 ft. high. Pits impracticable. This corner stands on the point of a low spur between two gulches.
		Land rolling.
		Soil sandy and stony, 3rd rate.
		Vegetation: grass and sage.
		Barometer 3050 ft. Thermometer 48° .
		April 5th. 1901.
		34th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend.
	0.25	Bottom of dry gulch 20 lks. wide, course S. W.
		Ascend.
	36.00	Top of spur, slope S. W. Descend.
	61.00	Pierce wash 50 lks. wide, water about 20 lks. wide and 2 ins. deep, course S. W. Banks 6 ft. high

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	70.50	Wagon road bears S. 70° W. and N. 70° E. Ascend. Difference between measurements of 80 chs by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs. The mean of which is.
3060	80.00	Top of round knoll about 20 ft. high. North 3 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in very stony ground for 34th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 34 M. stamped in center. Raised a mound of stone 5 1/2 ft. base 2 ft. high around the post. Pits impracticable. This cor. stands on a knoll about 5 chains south of the Pierce wash. A red sandstone cliff about 200 ft. high about 10 chs. north. Land rolling. Soil rocky and sandy, 3rd rate. Vegetation: grass and sage, a few willows along the creek. Barometer 3060 ft. Thermometer 50° .

		35th Mile.
		S. 89° 59' E. on tangent to the parallel. Descend.
	6.00	Dry gulch, course N.
	30.00	Stadia measurement from this point. Angle 15°+ Rod 6.93 ft. double = 1386 ft. Constant 93.30 x 1386 = 1293.14 + C. = 1.11 = 1294.25 ft. = 19.60 chs.+ 30.00 chs. = 49.60 chs.
	38.00	Foot of cliffs bears S. and N. about 10 chs. and then N. E.
3400	49.60	Top of black lava cliff 350 ft. high, bears S. 20° E. and N. 20° W. about 10 chs. then drops to Pierce wash. Thence by tape measurement over broken lava rocks sloping north

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	68.75	Dry rocky gulch, course N. About 100 ft. deep.
	71.47	Ruins of old Ft. Pierce, bears N. 28° 40' E.
	75.00	Rocky gulch about 30 ft. deep, course N.
	79.00	Rocky gulch about 30 ft. deep, course N. W. Ascend.
		Difference between measurements of 60.40 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 60.42 chs. By 2nd set 60.38 chs.
		The mean of which is 60.40 chs. + 19.60 chs. =
3400	80.00	North 7 lks. from the tangent.
		Set a sandstone 33x12x12 ins. on bed rock for 35th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 35 M. on W. faces. Raised a mound of stone 5 1/2 ft. base 2 ft. high around the cor. and raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable. This cor. stands on steep rocky west slope, under a rock cliff.
		Land rough and broken.
		Soil very rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 3400 ft. Thermometer 60° .

		36th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Ascend.
	2.00	On top of cliffs about 20 ft. above the corner, bears N. and S. Thence over broken N. slope.
	24.00	Dry rocky gulch about 50 ft. deep, course N.
	34.45	On rocky spur slope N. Ruins of Old Ft. Pierce bears N. 23° W.
	43.50	Bottom of rocky gulch 80 ft. deep, course N.
	58.00	Bottom of rocky gulch 60 ft. deep, course N.
	71.70	Bottom of rocky gulch 80 ft. deep, course N.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle

ALTITUDE	CHAINS	
		point by 1st set 80.08 chs. By 2nd set 79.92 chs.
		The mean of which is.
3450	80.00	North 12 lks. from the tangent.
		Set a sandstone 36x13x11 ins. 1 ft. in the ground
		to bed rock for the 36th mile cor. Marked UTAH
		on the N. 37 N. L. on the E. ARIZ. on the S. and
		36 M. on the W. faces. Raised a mound of stone 5
		ft. base 2 ft. high around the cor. and raised a
		mound of stone 5 1/2 ft. base and 2 1/2 ft. high
		east of cor. Pits impracticable.
		The [illegible] end of a red cliff 500 or 600 ft. high
		N. 26° W. about 5 miles dist.
		Land rough and broken.
		Soil very rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 3450 ft. Thermometer 72°.

		37th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over broken rocky north slope.
	11.00	On top of cañon wall, course N. and S. Descend.
	13.00	Bottom of cañon about 100 ft. deep, course N.
	20.00	Top of spur, slope N. Descend.
	27.00	Bottom of wash 60 ft. deep, course N.
	65.25	Dry bed of stream 50 lks. wide, course N. Ascend.
		Leave rocks and enter sand plain, bears N. W. and S.E.
		Difference between measurements of 80 chs. by two
		sets of chainmen is 12 lks. Position of middle point
		by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is.
3200	80.00	North 19 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for 37th mile cor.
		A brass cap on top of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 37 M. stamped in the

ALTITUDE	CHAINS	
		center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling and broken.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass and sage.
		Barometer 3200 ft. Thermometer 65°.
		April 6th 1901.

		38th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over gently rolling sand hills.
	27.00	Wagon road from St. George to Knab, bears N. W. and S. E.
	38.50	Pierce wash 75 lks. wide, dry, course N. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is.
3350	80.00	North 27 lks. from the tangent.
		Set a sandstone 33x16x6 ins. 22 ins. in the ground for 38th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 38 M. on the W. faces. Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable. This cor. stands on the south side of a rocky point.
		Land slightly rolling.
		Soil, sand and clay, 3rd rate.
		Vegetation: grass and sage.
		Barometer 3550 ft. Thermometer 70°.

		39th Mile.
		I compare the tape lines with the standard, test the stadia wires and examine the adjustments of the instrument and find all in adjustment.
		S. 89° 56' E. on tangent to the parallel.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		S89°55'E on tangent to the parallel Over gravelly rolling land.
	54.00	Top of gravelly hill, bears N. and S. Descend.
	65.00	Bottom of dry gulch, course S. W. Ascend.
	75.25	Top of hill about 40 ft. high, bears N. E. and S. W. Descend Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs. The mean of which is.
3350	80.00	North 37 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 39th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 39 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base and 2 ft. high around the post. Land rolling. Soil gravelly, 3rd rate. Vegetation: grass and sage. Barometer 3350 ft. Thermometer 70°.

		40th Mile.
		S. 89° 55' E. on tangent to the parallel. Over rolling gravelly land.
	23.00	Dry gulch, course S. W. Ascend.
	53.50	N. W. end of spur slopes N. Thence along N. slope Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs. The mean of which is.
3450	80.00	North 49 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at bottom 3 ft. in the ground for the 40th mile cor. A brass cap on top of the pipe has raised letters UTAH on the N. ARIZ. on S. with 40 M. stamped

ALTITUDE	CHAINS	
		in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling.
		Soil sandy and gravelly, 4th rate.
		Vegetation scanty, grass and greasewood.
		Barometer 3450 ft. Thermometer 72°.

		41st Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend gradually.
	15.25	Dry gulch, course S. W.
	58.00	End of red hill slopes to N. and bears S. Descend.
	68.00	Bottom of same wash, course N. 80° E. Ascend.
	70.00	Top of spur, bears N. W. and S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By second set 79.97 chs.
		The mean of which is.
3650	80.00	North 62 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 41st mile cor. A brass cap on top of the pipe has raised letters UTAH on the N. ARIZ. on S. and 41 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base and 2 ft. high around the post.
		This corner [illegible] near the foot of the Hurricane ridge.
		Land rolling.
		Soil gravelly, 4th rate.
		Vegetation scanty, grass and greasewood.
		Barometer 3650. Thermometer 70°.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		42nd Mile.
		S. 89° 54' E. on tangent to the parallel.
		Stadia measurement to top of cliff. Angle 17°+ Rod 8.195 double = 1639 ft. Constant 91.45 x 1639 = 1498.87 + C = 1.10 = 1499.97 ft = 22.72 chs.
	1.80	Wagon road bears N. and S.
	10.00	Foot of Hurricane ridge, bears N. and S. Ascend. steep cliffs.
	22.72	Stadia point on top of cliffs about 500 feet above the corner, bears N. and S. Ascend. Thence by tape measurement.
	28.66	Wagon road from St. George to Knab bears N. and S.
	31.50	Same road bears N. W. and S. E.
	36.00	Top of spur, slope S. Descend.
	37.00	Same road bears N. E. and S. W.
	38.00	Bottom of gulch, course S. W. Ascend over rocks.
	51.00	Top of spur, slope N. Descend.
	58.75	Dry gulch, course, course N. Ascend.
4675	74.00	Top of spur, slope S. Descend.
		Difference between measurement of 57.28 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 57.31 chs. By 2nd set 57.25 chs.
		The mean of which is 57.28 chs. + 22.72 chs. =
4650	80.00	North 76 lks. from the tangent.
		Set a limestone 30x12x10 ins. 8 ins. in the ground to bed rock for 42nd mile cor. Marked UTAH on the N. 37 N. L. on the E. ARIZ. on S. and 42 M. on the W. faces. Raised a mound of stone 5 ft. base 18 ins. high around the cor. and raised a mound of stone 5 1/2 ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 4650 ft. Thermometer 65°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		43rd Mile.
		S. 89° 53' E. on tangent to the parallel.
		Descend.
	6.50	Dry gulch, course S. W. Ascend.
	12.20	Top of spur, slope S. Descend.
	17.75	Dry gulch, course S. W. Ascend.
4700	43.00	Summit of Hurricane ridge about 50 ft. above last cor- bears N. and S. Descend.
	51.00	Dry gulch, course S. W.
	55.00	Top of spur, slope S. W.
	64.15	Dry ravine, about 30 ft. deep, course S. Wagon road in bottom bears N. and S. Runs from St. George road S. and E. to Knab via Antelope Springs and Pipe Springs.
		Difference between measurements of 80 chs. by two sets of chainmen is 18 lks. Position of middle point by first set 80.09 chs. By 2nd sets 79.91 chs.
		The mean of which is
4650	80.00	North 92 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 43rd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 43 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land mountainous, rolling and broken.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 4650. Thermometer 60°.

		At the 43rd mile corner at 6h 15m P.M. l.m.t. I observe Polaris at western elongation though there is still some daylight, the star is plainly visible. I marked the line thus determined on a plug driven in the ground north of my station'

ALTITUDE	CHAINS	
		April 7th, 1901.
		April 8th, 1901, at 7h. A.M. I lay off the azimuth of Polaris 1° 37.7' to the east and mark the true meridian thus determined on a plug driven in the ground north of my station. The magnetic bearing of said meridian is N. 16° 57' W. This reduced by the table page 100 of the manual gives mean magnetic declination 16° 54' E. From this meridian I lay off 90° to the east for tangent to the parallel. I compare the steel tapes with the standard, test the stadia wires and examine the adjustments of the instrument. Find all correct.

		44th Mile.
		East on the tangent to the parallel.
		Descend over rolling land.
	5.00	Dry gulch, course S. Ascend.
	10.00	Top of spur, slope S. Descend.
	30.00	Dry gulch, course S. W. Ascend
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
4520	80.00	North .76 lks. from the tangent.
		Set a sandstone 34x14x10 ins. on bare rock for 44th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 44 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5 1/2 ft. base 2 ½ ft. high east of cor. Pits impracticable. This cor. stands on a low cliff west of a rocky draw that drains S.
		Land rolling and broken.
		Soil sandy and stoney, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4520 ft. Thermometer 36°.

BOOK 2628

ALTITUDE	CHAINS	
		45th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend.
	3.00	Bottom of draw drains S. Ascend.
	10.00	Top of ridge, bears W. and S. Descend
	18.00	Dry gulch, course S. about 100 ft. below ridge.
		Thence along gentle south slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st. set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
4500	80.00	North 3 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 45th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 45 M. stamped in center. Dug pits 36x36x18 ins. N. E. S. and W. of cor. and 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		West end of red cliffs about 600 ft. high bears N. 23° 20 W. about 1½ miles dist. and west end of red cliffs south of the line bears S. 45° E. about 4 miles dist.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass, sage and a few cedar trees about ½ mile N. E.
		Barometer 4500 ft. Thermometer 40°.

		46th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Along gentle south slope.
	42.25	Wash 20 lks. wide, 6 ft. deep, dry, course S.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing. The mean is
4450	80.00	North 7 lks. from the tangent.

ALTITUDE	CHAINS	
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 46th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 46 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land gently rolling.
		Soil sand and clay, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4450 ft. Thermometer 48°.

		47th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Over gently rolling land, along south slope.
	5.00	Dry gulch, course S.
	70.00	Dry gulch, course S.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs. The mean of which is
4500	80.00	North 12 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 47th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 47 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		West point of cliff bears N. 57° 51' W' and west point of cliffs on the south bears S. 12° 30' E.
		Land gently rolling.
		Soil sandy, 3rd rate.
		Vegetation, grass and sage.
		Barometer 4500 ft. Thermometer 55°.

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ALTITUDE	CHAINS	
		48th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Descend.
	0.30	Dry gulch, course S. Thence over rolling land sloping south.
	4.31	Wire fence bears N. 12° W. and S. 12° E.
	6.00	Dry gulch, course S.
	21.25	Dry gulch, course S. 10 ft. deep.
	50.00	Enter flat bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by ist set 80.03 chs. By 2nd set 79.97,chs.
		The mean of which is
4510	80.00	North 19 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 48th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 48 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		A south salient of the line of cliffs on the north bears N. 63° 55' W. Westernmost point of cliffs on south bears S. 8° 56' W. A north salient of the south line of cliffs bears S. 76° 55' E.
		This corner stands in valley bottom on the flat. It is about 3/4 of a mile north to the St. George and Kanab wagon road that goes via Canaan Springs.
		Land gently rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass, sage and greasewood.
		Barometer 4510 ft. Thermometer 60°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		49th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Across valley bottom.
	19.30	Bottom of deep dry gulch, main drainage of valley.
		12 ft. deep, 20 lks. wide, course S. 70° W.
	24.00	Leave flat bears N. 70° E. and S. 70° W. Ascend.
		over rolling north slope.
		Difference between measurements of 80 chs. by two
		sets of chainmen is 2 lks. Position of middle point
		by 1st set 80'01 chs. By 2nd set 79.99 chs.
		The mean of which is
4600	80.00	North 27 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for the 49th mile
		cor. A brass cap on the top of the pipe has raised
		letters UTAH on the N. ARIZ. on the S. and 49 M.
		stamped in the center. Dug pits 36x36x18 ins. N. S.
		E. and W. of the cor. 6 ft. dist. and raised a mound
		of earth 5 ft. base 2 ft. high around the post.
		A south salient of the north line of cliffs bears
		N. 12° 30' W. A. N. W. salient of the south line of
		cliffs bears S. 65° 20' E.
		Land gently rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4600 ft. Thermometer 72°.

		50th Mile.
		S. 89° 56' E. on tangent to the parallel.
		Over gently rolling land, along north slope. Ascend
		gradually.
		Difference between measurements of 80 chs. by two
		sets of chainmen is 2 lks. Position of middle point
		by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
4620	80.00	North 37 lks. from the tangent.

BOOK 2628

ALTITUDE	CHAINS	
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 50th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 50 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. raised a mound of earth 5 ft. base 2 ft. high around the post.
		The 2nd Astronomical Observatory Station was not placed here, owing to the light sandy nature of the soil making it difficult to secure a firm foundation for the pier.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4620 ft. Thermometer 75°.

		51st Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend gradually over rolling land along north slope.
	8.00	Enter low white hills, bears N. E. and S. W.
	30.00	Top of ridge bears N. E. and S. W. about 50 ft. above last cor. Descend.
	77.00	Dry gulch, 15 ft. deep, course N.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is 80.00 chains.
		Near this point I set up the pier and establish temporary astronomical Station No. 2 - 2.50 chs. north of the tangent.
		April 8th, 1901.

		April 13th 1901, we make the latitude of temporary observatory 37° 00' 02.5" = 3.83 chs. north of the

ALTITUDE	CHAINS	
		parallel. Our offset for this point is 49 lks. north of the tangent, placing it 2.01 chs, south of the temporary observatory, consequently this point is 1.82 chs. north of the true parallel, this being within the limit of 3" of arc allowed by the Hon. Commissioner, I continue this line.
4650	80.00	North 49 lks. from the tangent.
		The point for the 51st mile corner April 13th 1901 at 5h 58m A.M. l.m.t. I observe Polaris at eastern elongation in accordance with the instructions in the manual. It is nearly full daylight, but the star is plainly visible through the telescope of the transit but not to the naked eye. I mark the line thus determined by a point on a plug driven in the ground 10 chs. north of my station. At 7h A. M. I lay off the azimuth of Polaris 1° 31.7' to the west and mark the true meridian thus found by a point on a plug driven in the ground north of my station. The magnetic bearing of the said true meridian is N. 15° 20' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 17' E.
		From this meridian I turn an angle of 90° to the east for the tangent to the parallel. In all these observations I use the mean of from four to eight sights reversing the telescope at each sight.
		At the point for the 51st mile cor. I set a sandstone shaft 6 ft. long 14 ins. broad and 12 in. thick, dressed square 8 ins. down from the top, set 3 ft. in the ground for the 51st mile cor. and the 2nd Astronomical Monument marked with letters 1½ ins. square deeply graven in the stone, UTAH on the N. 37 N. L. on the E. ARIZONA on the S. and 51 M. on the W. faces. Raised a mound of stone 6 ft. base 2 ft. high around the shaft. Dug pits 36x36x18 ins.

BOOK 2628

ALTITUDE	CHAINS	
		N. S. E. and W. of cor. 6 ft. dist.
		North salient of high table land to the east bears
		N. 84° 30' E. about ½ mile dist.
		S. W. angle of same table land bears S. 24° 45' E.
		about 1½ miles dist.
		High and sharp north salient of table land bears
		S. 33° 10' W. about a mile dist. and south salient
		of table land fartherest west on north side of valley
		bears N. 75° W.
		This station is at the mouth of a little valley
		that joins the larger one from the south and is
		about 3 miles north of the new pasture spring.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation very scanty, grass and sage.
		Barometer 4650 ft. Thermometer 50°.

		From the 51st mile the boundary line was projected
		as a true line but from the astronomical observations
		at the 94th mile cor. the temporary observatory at
		that point was found to be in latitude 36° 59' 51.6"
		or 12.87 chs. south of the 37th parallel and our pro-
		jected line fell 8.14 chs. north of he observatory,
		therefore our line at that point was 4.73 chs.
		south of the true parallel and outside of the limit
		of 3" of are (which amounts to 4.596 chs.) allowed
		by the Hon. Commissioner. This answers to a correc-
		tion of 11 lks. north per mile for the 43 miles from
		the 51st mile to the 94th mile. I therefore return
		to the 51st mile corner and re-run the line, applying
		the said correction of 11 lks. north per mile, thereby
		placing the corners on the true parallel.

		52nd Mile.
		East on the tangent to the parallel.
		Over nearly level land.

ALTITUDE	CHAINS	
	25.00	From this point use stadia measurement to the top of cliffs. Angle 25°+ Rod 12.11 ft. Constant 82.14 x 1211 ft. = 994.72 + C. = 1.04 = 995.76 ft. = 15.09 chs. + 25.00 chs. = 40.09 chs.
	27.00	Foot of cliffs bears N. and S. Ascend.
5100	40.09	On top of cliff, stadia point about 450 ft. above the valley, bears S. and N. about 3.50 chs. Where they turn east, enter cedar and piñon timber, bears N. and S. Thence by steel tape measurement. Difference between measurements of 39.91 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 39.92 chs. By 2nd set 39.90 chs. The mean of which is 39.91 chs. + 40.09 chs. =
5050	80.00	North .76 lk. from the tangent + correction 11 lks. = 11.76 lks. Set a sandstone 36x10x6 ins. 24 ins. in the ground for 52nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 52 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft high east of cor. Pits impracticable. A cedar tree 12 ins. diam bears N. 30° E. 16 lks. dist. marked UTAH 52 M. B. T. A piñon tree 10 ins. diam. bears S. 59° 30' E. 74 lks. dist. marked ARIZ. 52 M. B. T. A piñon tree 5 ins. diam. bears S. 60° W. 79 lks. dist. marked ARIZ. 52 M. B. T. A cedar tree 10 ins. diam. bears N. 33° W. 119 lks. dist, marked UTAH 52 M. B. T. Land rough and broken. Soil rocky and sandy, 3rd and 4th rate. Vegetation: grass, sage and cactus, piñon and cedar timber. Barometer 5050 ft. Thermometer 55°.

BOOK 2628

ALTITUDE	CHAINS	
		53rd Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over rocky ground through timber.
	1.00	Dry gulch, course N. ascend gradually.
	10.00	Descend gradually.
5075	25.00	On top of rock wall bears N. about 15 chs. and S. W. about a mile, drops off perpendicularly about 200 ft. Then a steep slope, leave timber, bears N. and S.W. Descend.
		Stadia measurement. Angle 21°- Rod 10.73 Constant 87.16 x 1073 = 935.23 + C = 1.07 = 936.30 ft. = 14.18 chs. + 25.00 chs. = 39.18 chs.
4650	39.18	Foot of cliffs about 350 ft. below top, bears N. and S. Thence by tape measurement.
	56.00	Dry gulch, course N.
		Difference between measurements of 65.82 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 65.84 chs. By 2nd set 65.80 chs.
		The mean of which is 65.82 chs. + 14.18 chs. =
4650	80.00	North 3 lks. from the tangent + correction 22 lks. = 25 lks.
		Set a sandstone 30x8x8 ins. 20 ins. in the ground for the 53rd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 53 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A north salient of table land about 500 ft high bears south about 15 chs. dist.
		Land rough and broken.
		Soil rocky and sandy, 3rd and 4th rate.
		Vegetation: grass and sage in the valley; scrub cedar and piñon on table land.
		Barometer 4650 ft. Thermometer 60°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		54th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Over valley land.
	40.00	Bottom of wash, course N. W.
4700	50.00	Foot of bluffs, bears N. W. and S. E. Ascend.
5000	65.00	Top of cliff on rocky mesa bears N. W. and S. E.
		About 300 ft. above the valley. Enter scrub timber,
		bears N. W. and S. E.
	70.00	Top of wall bears N. W. and S. E. Descend.
		Leave timber. bears N.W. and S.E.
	80.00	Falls on N. slope among rock cliffs. Impracticable
		to establish cor.
		Land broken and rocky.
		Soil sandy and rocky, 3rd and 4th rate.
		Vegetation: grass and sage, and scrub cedar and
		piñon.

		55th Mile.
		S89°58'E. on tangent to the parallel.
		Descend.
4800	4.04	North 7 lks. from the tangent + correction 33 lks. =
		40 lks.
		Set a sandstone 36x8x7 ins. 24 ins. in the ground
		for 54th mile cor. Marked UTAH on the N. 37 N. L.
		on E. ARIZ. on S. and 54.05 M. on the W. faces. Pits
		impracticable. Raised a mound of stone 5½ ft.
		base 2½ ft. high east of cor. This cor. stands
		at foot of north slope from cliff among large
		blocks of sandstone.
		A small valley to the north about 20.00 chs. wide
		runs N. W.
		Barometer 4800 ft. Thermometer 60°
		Continuing on tangent S. 89° 58' E.
		Descend.
	8.00	Dry gulch, course N. Ascend.
4900	19.00	Top of spur, slope N. Descend.

BOOK 65
2628

ALTITUDE	CHAINS	
4800	46.00	Dry gulch, course N. W. Ascend over rocks and through scattering scrub timber. Difference between measurements of 75.96 chs, by two sets of chainmen is 6 lks. Position of middle point by 1st set 75.99 chs. By 2nd set 75.93 chs. The mean of which is 75.96 chs. + 4.04 chs. =
4990	80.00	North 12 lks. from the tangent + correction 44 lks.= 56 lks. Set a sandstone 38x26x10 ins. 25 ins. in the ground for the 55th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on the S. and 55 M. on the W. faces. Pits impracticable. Raised a mound of stone 5½ ft. base 2½ ft high east of cor. A cedar tree 6 ins. diam. bears S. 50° 15' W. 273 lks. dist. marked ARIZ. 55 M. B. T. and a cedar tree 6 ins. diam. bears N. 57° 30' W. 211 lks. dist. marked UTAH 55 M. B. T. No other trees within limits Land rocky and broken. Soil rocky and sandy, 4th rate. Vegetation: grass and sage, scattering scrub cedar and pinon. Barometer 4990 ft. Thermometer 60°. April 13th, 1901.

		I examine the adjustment of the Heller and Brightly transit and compare the tapes with the standard. Find everything correct.
		56th Mile.
		S. 89° 57' E. on tangent to the parallel. Leave scattering scrub timber, bears N. and S. Thence over gently rolling sand hills.
	38.60	Wagon road to Trumble Mountain saw-mills bears S. 10° E and N. 10° W. Difference between measurements of 80 chs. by two sets of chainmen is 5 lks. Position of middle point by 1st set 80.02½ chs. By 2nd set 79.97½ chs.

ALTITUDE	CHAINS	
		The mean of which is
5050	80.00	North 19 lks. from the tangent + correction 55 lks. = 74 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 56th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on the S. and 56 M. stamped in center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 5050 ft. Thermometer 60°.

		57th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over sandy plain.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing. The mean is
5100	80.00	North 27 lks. from the tangent + correction 66 lks. = 93 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 57th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 57 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. The S. W. end of high rock cliff bears N. 12° 30' E. and a red rock peak bears N. 39° 26' E.
		Land nearly level.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 5100 ft. Thermometer 70°

BOOK 2623

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		58th Mile.
		S. 89° 56' E. on tangent to the parallel.
		Over sandy plain.
	49.50	Wagon road from St. George to Kanab bears S. E. and N. W. with branch going north, from this point to Canaan Springs. About 4 miles dist.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
5350	80.00	North 37 lks. from the tangent + correction 77 lks. = 114 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 58th mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 58 M. stamped in center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		A cedar tree 12 ins. diam bears N. 60° 35' E. 172 lks. dist. Marked UTAH 58 M. B.T.
		No other trees within limits.
		Land gently rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass, sage, with some cedar north of line.
		Barometer 5350 ft. Thermometer 75°.

		59th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over rolling south slope along south edge of scrub cedar.
	15.35	Telephone line between Canaan and Pipe Springs, bears S. 35° E. and N. 35° W.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which 1s
5300	80.00	North 49 lks. from the tangent + correction 88 lks. = 137 lks.
		Set a limestone 32x12x12 ins. 22 ins. in the ground for the 59th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 59 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft base 2½ ft high east of cor.
		A cedar tree 10 ins. diam bears N. 68° 45' E. 164 lks. dist. marked UTAH 59 M. B.T.
		No other trees within limits.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation grass, sage and cactus, with scrub cedar on north side of line.
		Barometer 5300 ft. Thermometer 80°.

		60th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Descend gradually over gently rolling land.
		Leave timber on north side of line.
	76.00	Short creek 3 chs. wide, here dry, springs about a ¼ mile above, course S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
	80.00	Comes on east bank of creek in drifting sand.
		Impracticable to establish corner.
		Land rolling.
		Soil sandy and rocky, 4th rate.
		Vegetation: grass and sage, a few cottonwood trees along the creek.

BOOK 2323

Erratum.

61st mile.

In the examination of the 60th mile the examiner found the actual distance to be 95.16 chs. Acting upon this discovery H. B. Carpenter, U. S. Surveyor, changed the marking on the 60th mile corner to read 60.19, thus throwing the excess into the 61st mile. See report of examination.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		61st Mile.
		S. 89° 54' E. continuing on tangent.
	5.00	Enter timber bears N. and S. Ascend.
		North 65 lks from the tangent + correction 99 lks. = 164 lks.
5400	15.18	Set a sandstone 30x22x6 ins. 20 ins. in the ground for 60th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 60.19 M. on the W, faces. Raised a mound of stone 5½ ft base 2½ ft high east of cor. Pits impracticable. A cedar tree 10 ins. diam. bears N. 74° E. 28 lks. dist. marked UTAH 60.19 M. B.T. and a piñon tree 12 ins. diam. bears S. 64° 30' W. 21 lks. dist. Marked ARIZ. 60.19 M. B.T. Other trees too rough to mark. This cor. stands in the edge of timber at the foot of the mountain on the east side of Short creek. A corral across the creek about a ½ mile north.
		Baron. 6400ft. Therm 80°.
		April 14th 1901.

		I examine and test the adjustments of the transit and compare the tapes with the standard. Find all in adjustment.
		Ascend steep rugged mountain through scattering timber.
6450	50.00	Top of rocky spur slopes to N. and runs nearly level to the S. about 1050 ft. above the cor.
		Descend.
	70.00	Bottom of rocky cañon about 650 ft. deep, dry, course N. W. Ascend over broken rock.
		Difference between measurements of 80 chs. by two sets of chainmen is 24 lks. Position of middle point by 1st set 80.12 chs. By 2nd set 79.88 chs.
		The mean of which is
6150	80.00	North 76 lks. from the tangent + correction 110 lks.= 186 lks.
		Set a sandstone 30x12x8 ins. 20 ins. in the ground for 61st mile cor. Marked UTAH on N. 37 N.L. on E.

BOOK 2623

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		ARIZ. on S. and 61 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. No trees within limits suitable to mark.
		Land very rough and broken.
		Soil rocky, 4th rate.
		Timber, scrub cedar and piñon.
		Barometer 6150 ft. Thermometer 52°.
		62nd Mile.
		S. 89° 53' E. on tangent to the parallel.
		Ascend over broken rock through scattering scrub timber.
6850	50.00	Top of high sandy and rocky ridge bears N. and S. Cone shaped red buttes to the south. Descend.
6150	76.00	Bottom of rocky cañon about 700 ft. below top of ridge, dry, course S. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 22 lks. Position of middle point by 1st set 80.11 chs. By 2nd set 79.89 chs.
		The mean of which is
6250	80.00	North 92 lks. from the tangent + correction 121 lks.= 213 lks.
		Set a sandstone 34x18x6 ins. on bed rock for 62nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 62 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. and raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 10 ins. diam. bears N. 9° E. 133 lks. dist. Marked UTAH 62 M. B.T. A cedar tree 8 ins. diam. bears S. 80° E. 43 lks. dist. marked ARIZ. 62 M. B.T. A piñon tree 10 ins. diam bears S. 45° W. 123 lks. dist. Marked ARIZ. 62 M. B.T. and a cedar tree 12 ins. diam, bears N. 72° 30' W. 160 lks. dist.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Marked UTAH 62 M. B.T. This cor. stands on a rocky west slope. Cottonwood springs about a mile south and Cane Bed Spring about 3 miles S. E.
		Land very rocky and much broken.
		Soil rocky and sandy, 4th rate.
		Timber, scrub, piñon and cedar, valuable only for fire-wood,
		Barometer 6250 ft. Thermometer 65°.
		April 15th, 1901.

		63rd Mile.
		S. 89° 53' E. on tangent to the parallel.
		Ascend west slope through timber.
	13.00	Top of ridge, bears N. and S. about 150 ft. above the last cor. Descend.
	50.00	Bottom of dry rocky cañon, course S. about 850 ft. below top of ridge. Ascend.
	70.00	Top of spur about 250 ft. above cañon. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 20 lks. Position of middle point by 1st set 80.10 chs. By 2nd set 79.90 chs.
		The mean of which is
5750	80.00	North 110 lks. from the tangent + correction 132 lks.= 242 lks.
		Set a sandstone 30x24x6 ins. on bed rock for 63rd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 63 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. and raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable, Trees too rough to mark.
		This cor. stands on east slope of rocky cañon about 200 ft. above the bottom.
		Land very much broken.
		Soil very rocky, 4th rate.
		Timber: scrub cedar and piñon.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Barometer 5750 ft. Thermometer 60°.

		64th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Descend very steep over rocks and through scattering timber.
	77.00	Foot of cliff about 200 ft. below the cor., bears N, and S.
	10.00	Wash, 10 lks. wide, dry, course S.
	14.20	Foot of cliffs bears N. and S. Ascend over rough rocks and brush.
6350	51.00	Top of red rocky ridge bears N. and S. about 800 ft. above bottom of gulch. Descend.
		Difference between measurements of 80.00 chs by two sets of chainmen is 18 lks. Position of middle point by 1st set 80.09 chs. By 2nd set 79.91 chs.
		The mean of which is
6310	80.00	North 129 lks. from the tangent + correction 143 lks.= 272 lks.
		Set a sandstone 30x15x6 ins. on bed rock for the 64th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 64 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor, Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 10 ins. diam. bears N. 50° 30' E. 40 lks. dist. Marked UTAH 64 M. B.T. A yellow pine tree 8 ins. diam. bears S. 78° E. 120 lks. dist. Marked ARIZ. 64 M. B.T. A yellow pine tree 10 ins. diam. bears N. 63° W. 35 lks. dist marked UTAH 64 M. B.T.
		No other trees within limits suitable to mark.
		This cor. stands on the south slope of bare rock.
		Cone shaped red buttes to the S. E.
		Land very rough and broken.
		Soil very rocky, 4th rate.
		Timber and brush, scrub pinon, yellow pine and cedar.

BOOK 2628

ALTITUDE	CHAINS	
		Barometer 6310.ft. Thermometer 50°.

		65th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Descend over rough rocky cliffs, through scattering timber.
	10.00	Bottom of rocky ravine, course S. Ascend.
	34.00	Top of spur, slope S. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by first set 80.08 chs. By 2nd set 79.92 chs.
		Mean of which is
5650	80.00	North 150 lks. from the tangent + correction 154 lks.= 304 lks.
		Set a sandstone 32x14x6 ins. 22 ins. in the ground at foot of cliffs for 65th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 65 M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 10 ins. diam. bears N. 82° W. 38 lks. dist. marked UTAH 65 M. B.T. No other trees within limits suitable to mark.
		Land mountainous, rough and broken.
		Soil very rocky, 4th rate.
		Timber, scrub cedar, yellow pine and piñon.
		Barometer 5650 ft. Thermometer 50°.
		April 16th, 1901.

		April 17th, 1901, at 5h.43m.A.M. l.m.t. at the 65th Mile cor. I observe Polaris at eastern elongation in accordance with instructions in the manual and mark a line thus determined by a point on a plug driven in the ground north of my station.
		At 7h.15m. A.M. I lay off the azimuth of Polaris 1° 31.7' to the west and mark the true meridian thus found by a point on a plug driven in the

ALTITUDE	CHAINS	
		ground north of my station. The magnetic bearing of the said meridian is N. 15° 38' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 35' E.
		I examine and test the adjustments of the instrument and compare the tapes with the standard and find everything correct and in adjustment. From the true meridian I lay off an angle of 90° from the north to the east for tangent to the parallel. In all these observations I take the mean of four sights reversing the telescope at each sight.
		66th Mile.
		East on the tangent to the parallel.
		Leave timber bears N. and S. Thence over valley land.
	27.50	Wagon road from Pipe Springs to Long Valley bears N. E. and S. W.
	29.50	Ascend rolling hills, bears N. E. and S. W. Enter scattering timber.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by first set 80.05 chs. By 2nd set 79.95 chs. The mean of which is
5600	80.00	North .76 of 1k. from the tangent + correction 11 lks.= 11.76 lks.
		Set a sandstone 34x14x7 ins. 6 ins. in the ground to bed rock for 66th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 66 M. on the W. faces.
		Raised a mound of stone 5 ft. base 2 ft. high around the cor. and raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Trees too rough to mark for bearing trees.
		Land rolling.
		Soil sandy and rocky, 3rd rate.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Vegetation, grass and sage, and scattering cedar and piñon.
		Barometer 5600 ft. Thermometer 46° .

		67th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend.
	3.50	Top of ridge about 50 ft. high bears N. and S.
		Descend.
	10.00	Bottom of draw, drains N. Ascend.
	24.00	Top, of rocky ridge, bears N. and S. about 800 ft. above draw.
	30.00	Top of cliff bears N. W. and S. E. Descend over broken rock cliffs.
		Difference between measurements of 80.00 chs. by two sets of chainmen is 22 lks. Position of middle point by 1st set 80.11 chs. By 2nd set 79.89 chs.
		The mean of which is
5700	80.00	North 3 lks. from the tangent + correction 22 lks.= 25 lks.
		This point falls on smooth, bare rock, Marked the point with a cross, thus: 67 M. UTAH + ARIZ. 37 N. L.
		for the 67th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 67 M. on W. of the cross.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cross. Pits impracticable. This cor. comes on smooth bare rock, sloping S. W. about 200 ft. above the head of a little valley that opens to the S. W.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Timber, scattering scrub cedar and piñon.
		Barometer 5700 ft. Thermometer 50°.

BOOK 2623

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		68th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend over rocky S. W. slope, through scattering timber.
	12.00	Top of ridge bears N. and S. Descend.
	33.00	Foot of slope, enter little valley, bears N. E. and S. W.
	35.00	Dry gulch, course S. W.
	45.00	Wagon trail, course N. E. and S. W.
	47.00	Leave valley, course N. E. and S. W. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by 1st set 80.08 chs. By 2nd set 79.92 chs.
		Mean of which is
5710	80.00	North 7 lks. to the tangent + correction 33 lks.= 40 lks.
		Set a sandstone 31x16x6 ins. 21 ins. in the ground for 68th mile cor. Marked UTAH on N. E. 37 N. L. on E. ARIZ. on S. and 68 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor. A cedar tree 10 ins. diam. bears S 31° 30' E. 88 lks. dist. marked ARIZ 68 M. B.T. A cedar tree 12 ins. diam. bears S. 55° 10' W. 71 lks. dist. marked ARIZ. 68 M. B.T. A cedar tree 10 ins. diam. bears N. 42° 15' W. 85 lks. dist. marked UTAH 68 M. B.T. No other trees within limits suitable for bearing trees.
		Land mountainous, rocky and broken.
		Soil sandy and rocky, 4th rate.
		Timber, scrub cedar, piñon and yellow pine and live-oak brush.
		Barometer 5710 ft. Thermometer 60°.

BOOK 2628

ALTITUDE	CHAINS	
		69th Mile.
		S. 89° 58' E. on the tangent to the parallel.
		Ascend through scattering pine timber.
	5.00	Top of spur, slope N. Descend.
	20.00	Dry ravine, course N. Ascend. About 100 ft below top of spur. Water pockets about ¼ mile S.
		Difference between measurement of 80 chs. by two sets of chainmen is 18 lks. Position of middle point by 1st set 80.09 chs. By 2nd set 79.91 chs.
		The mean of which is
6175	80.00	North 12 lks. from the tangent + correction 44 lks.= 56 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 69th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 69 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		A piñon tree 6 ins. diam. bears S. 65° 45' E. 17 lks. dist. marked ARIZ. 69 M. B.T. A piñon tree 12 ins. diam. bears N. 46° 10' W. 71 lks. dist. marked UTAH 69 M. B.T. No other trees within limits.
		Land mountainous, rough and broken.
		Soil rocky and sandy, 4th rate.
		Timber, scrub cedar and piñon, and live-oak brush.
		Barometer 6175 ft. Thermometer 66 °.

		70th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend over rocky and sandy land through scrub timber.
	2.00	Top of high ridge bears N. and S. about 20 ft. above the cor. Descend along S. E. slope.
		Difference between measurements of 80 chs. by two

ALTITUDE	CHAINS	
		sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs. The mean of which is
5950	80.00	North 19 lks. from the tangent + correction 55 lks.= 74 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom, 3 ft. in the ground for 70th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 70 M stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		A cedar tree 10 ins. diam. bears N. 34° E. 124 lks. dist. marked UTAH 70 M. B.T. and a cedar tree 8 ins. diam. bears S. 36° W. 81 lks. dist. marked ARIZ. 70 M. B.T. No other trees within limits suitable to mark.
		Land mountainous.
		Soil sandy, 3rd rate.
		Timber, scrub piñon, cedar and live oak.
		Barometer 5950 ft. Thermometer 70°.

		71st Mile.
		S. 89° 57' E. on tangent to the parallel.
		Descend gradually over rolling sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 7 lks. Position of middle point by 1st set 80.03½ chs. By 2nd set 79.96½ chs. The mean of which is
5930	80.00	North 27 lks. from the tangent + correction 66 lks.= 97 lks.
		Set an iron pipe 2 ins. diam 5 ft. long with flanges at the bottom 3 ft. in the ground for 71st mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 71 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor.

BOOK 2628

ALTITUDE	CHAINS	
		and 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. A cedar tree 10 ins. diam. bears N. 56° 15' E. 78 lks. dist. marked UTAH 71 M. B.T. A cedar tree 12 ins. diam. bears S. 48° 40' W. 119 lks. dist. Marked ARIZ. 71 M. B.T. A cedar tree 10 ins. diam. bears N. 27° W. 58 lks. dist. marked UTAH 71 M. B.T. No tree S. E. within limits suitable to mark. Land rolling. Soil sandy, 3rd rate. Timber: scrub piñon and cedar, live oak and sage brush. Barometer 5930 ft. Thermometer 73°.

		72nd Mile.
		S. 89° 56' E. on tangent to the parallel. Descend gradually through scrub timber.
	40,00	Dry gulch, course S. E. Ascend. Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs. The mean of which is
5875	80.00	North 37 lks. from the tangent + correction 77 lks.= 114 lks. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 72nd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 72 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. Trees too rough to mark for bearing trees. Land rolling. Soil sandy, 3rd rate. Timber: scrub cedar and piñon; brush, live oak and sage.

BOOK 2628

ALTITUDE	CHAINS	
		Barometer 5875 ft. Thermometer 75°.

		73rd Mile.
		S. 89° 55' E. on the tangent to the parallel.
		Descend gradually along S. E. slope through scrub cedar timber.
	73.00	Bottom of dry ravine, course S. E. Wagon road bears N. W. and S. E. follows general course of ravine.
		Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. by 2nd set 79.95 chs.
		The mean of which is
5600	80.00	North 49 lks. from the tangent + correction 88 lks.= 137 lks.
		Set a sandstone 33x18x6 ins. 22 ins. in the ground for 73rd mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 73 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A cedar tree 8 ins. diam. bears N. 31° 10' E. 136 lks. dist. marked UTAH 73 M. B.T. A cedar tree 6 ins. diam. bears S. 70° 30' W. 35 lks. dist. marked ARIZ. 73 M. B.T. A cedar tree 10 ins. diam. bears N. 16° 20' W. 124 lks. dist. marked UTAH 73 M. B.T. No tree S. E. within limits suitable to mark.
		Land rolling.
		Soil sandy, 3rd rate.
		Timber: scrub cedar and piñon; brush, love-oak and sage.
		Barometer 5600 ft. Thermometer 70°
		April 17th, 1901.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		I test and carefully adjust the transit as to collimation levels and stadia wires and compare the steel tapes with the standard, and find them correct.
		74th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend over mountainous land and through timber.
	30.00	Top of spur, slope S. W.
		From this point use stadia measurements.
		Angle 25° + Rod 11.53 ft. constant 82.14 x 1153 = 947.07 + C = 1.04 = 948.11 ft. = 14.36 chs. + 30 chs.= 44.36 chs.
6600	44.36	Top of cliffs, course N. and S. about 1000 ft. above last cor. Thence by tape measurement. Descend
6400	52.00	Bottom of deep rocky gulch, course S. Ascend.
6850	80.00	Falls among broken rocks. Impracticable to establish the cor.
		Land mountainous.
		Soil sandy and rocky, 4th rate.
		Timber, piñon, yellow pine and cedar, live oak, sage and squaw brush.

		75th Mile.
		S. 89° 54' E. continuing on tangent to parallel.
		Ascend over rocks.
6910	25.14	North 66 lks. from the tangent + Correction 102 lks.= 168 lks.
		Set a sandstone 36x18x6 ins. 24 ins. in the ground for 74th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 74.314 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft. base 2½ ft. high east of cor. A yellow pine tree/6 ins. diam. bears N. 35° E. 108 lks. dist. marked UTAH 74.314 M. B.T. A yellow pine tree 24 ins. diam. bear S. 78° E. 35 lks. dist. marked ARIZ. 74.314 M. B. T.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		No other trees within limits suitable to mark for bearing trees.
		Barometer 6910 ft. Thermometer 50°.
		Ascend over sandy and rocky land through timber.
7060	41.00	Top of sand mountain, sometimes called Moquitch mountain, bears N. and S. Descend gradually.
		Difference between measurements of 54.86 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 54.90 chs. By 2nd set 54.82 chs.
		The mean of which is 54.86 + 25.14 chs. =
6975	80.00	North 76 lks. from the tangent + correction 110 lks.= 186 lks.
		Set a sandstone 42x14x6 ins. 28 ins. in the ground for 75th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 75 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft base 2½ ft high east of cor.
		A piñon tree 10 ins. dia. bears N. 36° 30' E. 72 lks. dist. marked UTAH 75 M. B.T. A piñon tree 10 ins. diam. bears S. 19° 30' E. 74 lks. dist. marked ARIZ. 75 M. B.T. A piñon tree 10 ins. diam. bears S. 67° 30' W. 136 lks. dist. marked ARIZ. 75 M. B.T. A yellow pine tree 30 ins. diam. bears N. 32° 30' W. 246 lks. dist. marked UTAH 75 M. B.T.
		Land mountainous.
		Soil sandy and rocky, 4th rate.
		Timber: yellow pine, piñon and scrub cedar; live oak and squaw brush.
		There is some good saw timber on this mountain.
		Barometer 6975 ft. Thermometer 60°.

		76th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Ascend over rocky land through timber.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	12.00	Top of ridge bears N. E. and S. W. Descend.
	50.00	Wall of cañon about 5 chs. N. drops of perpendicularly bears N. W. and S. E.
	60.00	On wall of cañon bears N. W. and S. E. Thence along wall.
6750	79.00	Wall turns to south. Descend perpendicularly 300 ft. Thence descend over cliffs. Difference between measurements of 79 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set is 79.05 chs. By 2nd set 78.95 chs. The mean of which is 79.00 chs. stadia measurement from this point Angle 22° - Rod 12.995 ft. Double = 2599 ft. Constant 85.97 x 2599 = 2234.36 + C = 1.06= 2235.42 ft. = 33.86 chs.
	80.00	Comes on cliff. Inaccessable. Impracticable to establish corner. Land mountainous, rough and broken. Soil rocky, 4th rate. Timber: yellow pine, cedar and piñon.

		77th Mile.
		S. 89° 53' E. continuing on tangent to the parallel. Descend.
	32.86	Stadia point; thence by tape measurement.
5600	36.28	North 100 lks. from the tangent + correction 126 lks.= 226 lks. Set a sandstone 30x13x12 ins. 20 ins. in the ground for 76th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 76.453 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. A piñon tree 10 ins. diam. bears N. 20° 10' E. 13 lks. dist. marked UTAH 76.453 M. B.T. A piñon 10 ins. diam. bears S. 24° 10' W. 36 lks. dist. marked ARIZ. 76.453 M. B. T. Other trees too rough to mark for bearing trees.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		This cor. stands at foot of cliff on spur sloping S. E.
		Barometer 5600 ft. Thermometer 60°.
		April 18th, 1901.
		I examine the adjustments of the instrument and compare the tapes with the standard and find all correct. Descend through timber.
	42.28	Dry ravine, course N. E. Ascend along N. slope.
		Difference between measurements of 43.72 chs. by two sets of chainmen is 5 lks. Position of middle point by 1st set 43.74½ chs. By 2nd set 43.69½ chs.
		The mean of which is 43.72 chs. + 36.28 chs. =
5775	80.00	North 110 lks. from the tangent + correction 132 lks.= 242 lks.
		Set a sandstone 33x10x7 ins. on bed rock for 77th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 77 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor., and raised a mound of stone 5½ base 2½ ft. high east of cor. Pits impracticable. Trees too rough to mark for bearing trees.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Timber: yellow pine, cedar and piñon.
		Barometer 5775 ft. Thermometer 50°.

		78th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Ascend along steep N. slope through scrub timber.
	9.00	Top of spur slope N. E. Descend.
	22.00	Foot of spur, bears N. and S. about 300 ft. below top. Descend gradually.
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		The mean of which is
5310	80.00	North 129 lks. from the tangent + correction 143 lks.= 272 lks.
		Set a sandstone 36x12x10 ins. 24 ins. in the ground for the 78th mile cor. Marked UTAH on N. 3Z N. L. on E. ARIZ. on S. and 78 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 12 ins. diam. bears N. 36°30' E. 178 lks. dist. marked UTAH 78 M. B.T. A cedar tree 10 ins. diam. bears S. 43° E. 152 lks. dist. marked ARIZ. 78 M. B.T. A cedar tree 8 ins. diam. bears S. 52° 10' W. 118 lks. dist. marked ARIZ. 78 M. B.T. No tree N. W. within limits suitable to mark.
		Land mountainous.
		Soil rocky, 4th rate.
		Timber: scrub piñon and cedar, fit only for fire wood and fence posts.
		Barometer 5310 ft. Thermometer 50°
		———
		79th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Descend gradually over rolling land.
	16.00	Dry gulch, course S. E.
	40.00	Leave timber, bears N. and S.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5050	80.00	North 150 lks. from the tangent + correction 154 lks.= 304 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 79th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 79 M. stamped in the

ALTITUDE	CHAINS	
		center. Raised a mound of stone 5 ft. base 2 ft. high around the post. Pits impracticable.
		This corner stands on the west bank of Cottonwood Creek. Cottonwood spring in creek bottom about 5 chs, north.
		Land rolling.
		Soil sandy, 3rd rate.
		Timber: scrub cedar and piñon.
		Vegetation: east ½ of mile grass, sage and cactus.
		Barometer 5050 ft. Thermometer 50°.
		April 19th, 1901.

		April 20th, 1901, at the 79th mile cor. at 5h 31m A.M. l.m.t. I observe Polaris at eastern elongation in daylight, star plainly visible through the transit telescope. I mark the line so found by a point on a plug driven in the ground north of my station. At 7h A.M. I lay off the azimuth of Polaris 1° 31.8' to the west and mark the true meridian thus determined by a point on a plug driven in the ground north of my station. The magnetic bearing of the said meridian is N. 15° 28' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 25' E. I now lay off an angle of 90° from this meridian from the north to the eastfrom the tangent to the parallel. In all these operations the mean of at least four sights are taken, reversing the telescope at each sight.
		80th Mile.
		East on the tangent to the parallel.
		Descend.
	0.50	Dry bed of Cottonwood creek, 50 lks. wide, course S.E.
		Ascend.
	4.13	Stockade fence bears N. about 5 chs. and S. 1 ch.'
		Enter enclosure.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	7.67	East fence corral or enclosure bears N. about 5 chs. and S. about 1.25 chs. Ascend. enter scattering timber, bears N. and S. Wagon bears trail N. and S.
	20.00	On top of bench about 40 ft. above the creek, bears N. and S. Thence over gentle S. slope,
	57.30	Road bears N. W. and S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5100	80.00	North .76 of lk. from the tangent + correction 11 lks.= 11.76 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long flanges at the bottom 3 ft. in the ground for the 80th mile cor.
		A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 80 M. stamped in the center
		Raised a mound of stone 5ft base 2 ft high around the post. Pits impracticable.
		A cedar tree 10 ins. diam. bears N. 28° 30' W. 173 lks. dist. marked UTAH 80 M. B.T. No other trees within limits suitable to mark.
		A south salient of the vermillion cliffs bears N. 11° 45' E. about 1½ miles dist.
		Land rolling.
		Soil sandy and stony, 3rd rate.
		Timber: scattering scrub cedar.
		Vegetation: grass, sage and cactus,
		Barometer 5100 ft. Thermometer 45°.

		81st Mile.
		S. 89° 59' E. on tangent to the parallel.
		Over gently rolling land, through scattering timber.
	2.00	Telephone line from Kanab to Pipe Springs bears N.E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle

ALTITUDE	CHAINS	
		point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5050	80.00	North 3 lks. from the tangent + correction 22 lks. = 25 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long flanges at the bottom 3 ft. in the ground for 81st mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 81 M. stamped in the center. Raised a mound of stone 5 ft. base 2 ft high around the post. Pits impracticable.
		A cedar tree 6 ins. diam. bears N. 63° E. 76 lks. dist. marked UTAH 81 M. B.T. A cedar tree 24 ins. diam. bears S./7 ° 10' E. 226 lks. dist. marked ARIZ. 81 M B.T. A cedar tree 10 ins. diam. bears N. 82° W. 84 lks. dist. marked UTAH 81 M. B.T. No tree within limits S. W. suitable to mark. This corner stands on W. bank of dry gulch, that runs S. E.
		Land rolling.
		Soil sandy and stony, 3rd rate.
		Timber: scrub cedar.
		Vegetation: grass and sage.
		Barometer 5050 ft. Thermometer 48°.

		82nd Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend.
	0.50	Dry gulch, course S. E. Thence over rolling land
		Descending gradually.
	20.00	Dry gulch, course S. E.
	47.65	Wagon road bears N. E. and S. W. leave scattering timber, bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
5000	80.00	North 7 lks. from the tangent + correction 33 lks.= 40 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 82nd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 82 M. stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. distant. Raised a mound of earth 5 ft base 2 ft high around the post.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage, scattering scrub cedar.
		Barometer 5000 ft. Thermometer 52°.

		83rd Mile.
		S. 89° 58' E. on tangent to the parallel.
		Descend gradually over gently rolling land.
	33.35	Wagon road bears N. E. and S. W.
	70.00	Top of bench bears N. and S. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing.
		The mean is
4900	80.00	North 12 lks. from the tangent + correction 44 lks.= 56 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 83rd mile cor. A brass cap on top of pipe has raised letters UTAH on N. ARIZ. on S. and 83 M. stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2ft. high around post.
		Land gently rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass, sage and greasewood.
		Barometer 4900 ft. Thermometer 60°.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		84th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Across Kanab creek flats.
	17.00	West bank of Kanab creek bears N.E. and S. W.
		About 20 feet high.
	17.50	Kanab creek, a muddy stream about 25 lks. wide, and
		3 ins. deep, course S. 10° W.
	22.50	East bank of Kanab creek about 20 feet high bears
		N. E. and S. W. Ascend gradually.
	45.50	Top of ridge, bears N. and S. Descend.
	61.50	Wagon road from Kanab to Fredonia, bears N. and S.
		Ascend.
	64.00	Top of rocky spur, slope S. W. Descend.
		Difference between measurements of 80 chs. by two
		sets of chainmen is 8 lks. Position of middle point
		by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5100	80.00	North 19 lks. from the tnagent + correction 55 lks.=
		74 lks.
		Set a section of the trunk of a petrified tree 36x10x
		10 ins. on bed rock for 84th mile cor. Marked UTAH on
		N. 37 N.L. on E. ARIZ. on S. and 84 M. on the W.
		faces. Raised a mound of stone 5 ft base 2 ft high
		around the cor. Raised a mound of stone 5½ ft base
		2½ ft high east of cor. Pits impracticable.
		A cedar tree 6 ins. diam. bears N. 39° 30' E. 167 lks.
		dist. marked UTAH 84 M. B.T. A piñon tree 8 ins.
		diam. bears S. 72° 30' E. 28 lks. dist. marked ARIZ.
		84 M. B.T. A cedar tree 5 ins. diam. bears N. 35°
		30' W. 72 lks. dist. marked UTAH 84 M. B.T.
		No tree S. W. within limits suitable to mark. This cor.
		stands in a little rocky hollow that opens to the
		south, from this cor. the stone marked B. L. in N. W.
		cor. in Tithing House yard in town of Kanab

Land rolling
Soil sandy. 3rd rate
Vegetation. grass. sage and
scattering cedar.

BOOK 2628

ALTITUDE	CHAINS	
		bears N. 4° 33' W. 271.10 chs. dist. by traverse line measured on the ground. The latitude and longitude of a point in the street 76 ft. west of this stone is given by Wheeler as lat. 37° 2' 25.43". long. 112° 31' 39" in the notes sent me by the Hon. Commissioner from Washington. The same point is given as lat. 37° 2' 55.85" long. 112° 31' 50.83" in field notes received from the U. S. Surveyor General of Utah at Salt Lake. Our line agrees very closely with the latitude as given by the Salt Lake office. We make the line 270.24 chs. south of the given point by measurement, while the difference of latitude would indicate 269.43 chs. This shows our line to be 81 lks. south of the 37th parallel, as indicated by the figures received from the Salt Lake office.
		April 20th, 1901.

		85th Mile.
		I examine and carefully adjust the transit in all its parts, and compare the tape lines with the standard.
		S. 89° 57' E. on tangent to the parallel.
		Ascending over rolling land.
	34.40	Top of ridge bears N. and S. Thence along the north slope.
		Difference between measurements of 80 chs. between two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs. The mean of which is
5175	80.00	North 27 lks. from the tangent + correction 66 lks= 93 lks.
		Set a conglomerate stone 36x10x6 ins. 24 ins. in the ground for 85th mile cor. Marked UTAH on N. 3L N. L. on E. ARIZ. on S. and 85 M. on the W. faces.

ALTITUDE	CHAINS	
		Raised a mound of stone 5½ ft base 2½ ft high east of cor. Pits impracticable.
		Land rolling.
		Soil sandy and stony, 3rd rate.
		Vegetation: grass and sage.
		Barometer 5175 ft. Thermometer 50°.
		The ¼ sec. cor. on N. and S. line between secs. 10 and 11 T. 44 S. R. 6 W. Salt Lake Meridian bears S. 74° 22' E. 20.77 chs. dist. This corner is a conglomerate sandstone 10x12x6 ins. above ground, marked ¼ on W. face.
		A flag-staff on south salient of Vermillion cliffs a Wheeler latitude point, called Mansard, bears N. 55° E.

		86th Mile.
		S. 89° 56' E. on tangent to the parallel.
		Over rolling hills and along north slope.
	70.00	Enter scrub cedar timber, bears N. and S.
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs.
5250	80.00	The mean of which is
5250	80.00	North 37 lks. from the tangent + correction 77 lks.= 114 lks.
		Set a conglomerate stone 30x12x8 ins. 20 ins. in the ground for the 86th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 86 M. on W. faces. Raised a mound of stone 5½ ft base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 6 ins. diam. bears N. 70° 40' E. 73 lks. dist. marked UTAH 86 M. B.T. A cedar tree 12 ins. diam. bears S. 44° 20' E. 64 lks. dist. marked ARIZ. 86 M. B.T. A cedar tree 10 ins. diam. bears S. 81° 15' W. 111 lks. dist. marked ARIZ. 86 M. B.T.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		A cedar tree 6 ins. diam. bears N. 47° 30' W. 24 lks. dist. marked UTAH 86 M. B.T.
		Land rolling.
		Soil sandy and rocky, 3rd rate.
		Vegetation: grass and sage and scrubby cedar timber, good only for fire wood and fence posts.
		Barometer 5250 ft. Thermometer 55°.

		87th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Descend over rolling land through timber.
	2.00	Brow of bluff bears N. W. and S. E. Descend.
	12.00	Foot of bluff bears N. W. and S. E. about 75 ft. below top. Thence across little valley, leave timber, bears N. W. and S. E.
	21.00	Wagon road from Johnson Creek to Fredonia, bears N. E. and S. W.
	22.00	Dry gulch, course S. W.
	45.00	Leave little valley, ascend bluff, bears N. E. and S. W.
	48.00	Top of bluff about 60 ft. high, bears N. E. and S. W. Enter scattering timber, bears N. E. and S. W. Thence along N. slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks.. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5275	80.00	North 49 lks. from the tangent + correction 88 lks.= 137 lks.
		Set a conglomerate stone 48x14x6 ins. 32 ins. in the ground for the 87th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 87 M. on W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft base 2½ ft. high east of cor. A cedar tree 10 ins.

ALTITUDE	CHAINS	
		diam. bears N. 81° E. 115 lks. dist. marked UTAH 87 M. B.T. A cedar tree 8 ins. diam. bears S. 76° 30' E. 38 lks. dist. marked ARIZ. 87 M. B.T. A cedar tree 6 ins. diam. bears S. 14° W. 107 lks. dist. marked ARIZ. 87 M. B.T. A cedar tree 8 ins. diam. bears N. 43° W. 98 lks. dist. marked UTAH 87 M. B.T.
		A flag staff on south salient of Vermillion cliffs Wheeler lat. point, Mansard, bears N. 39° 18' E.
		Land rolling.
		Soil rocky and sandy, 3rd rate.
		Vegetation: grass, sage and scrubby cedar, timber.
		Barometer 5275 ft. Thermometer 58°.

		88th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over rolling land and through timber.
	26.00	Dry gulch in rocky cañon 50 ft. deep, course S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by 1st set 80.08 chs. By 2nd set 79.92 chs.
		The mean of which is
5350	80.00	North 62 lks. from the tangent + correction 99 lks.= 161 lks.
		Set a sandstone 30x13x10 ins. 20 ins. in the ground for 88th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 88 M. on W. faces. Dug pits 36x36x 18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft base 2½ ft. high east of cor.
		No trees within limits.
		Land rolling.
		Soil sandy and rocky, 3rd rate.
		Vegetation: grass, sage and scattering cedar timber.
		Barometer 5350 ft. Thermometer 60°.

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ALTITUDE	CHAINS	
		89th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Over rolling land, along N. slope, through scrubby cedar and piñon timber.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5500	80.00	North 76 lks. from the tangent + correction 110 lks.= 186 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 89th mile cor.
		A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 89 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		A cedar tree18 ins. diam. bears N. 81° 40 E 79 lks. dist. Marked UTAH 89M B.T. A cedar tree 14 ins. diam. bears S. 46° 36' E. 58 lks. dist. marked ARIZ. 89 M. B.T. A piñon tree 6 ins. diam. bears S. 36° 20' W. 70 lks. dist. marked ARIZ. 89 M. B.T. A piñon tree 14 ins. diam. bears N. 16° 37' W. 61 lks. dist. marked UTAH 89 M. B.T.
		Land rolling.
		Soil sandy, 3rd rate.
		Timber, piñon and cedar.
		Barometer 5500 ft. Thermometer 58°.
		April 21, 1901.

		90th Mile.
		I examine and test the adjustments of the transit and compare the tapes with the standard and find them correct.
		S. 89° 53' E. on tangent to the parallel.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Ascend over rolling land through timber.
	7.00	Top of sand ridge bears N. and S. Descend.
	21.00	Leave timber, bears N. and S.
	30.00	Dry gulch, course N.
	45.00	Enter scattering timber, bears N. E. and S. W.
	59.80	Dry gulch, course N.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set is 80.02 chs. By 2nd set 79.98 chs. The mean of which is
5350	80.00	North 92 lks. from the tangent + correction 121 lks.= 213 lks.
		Set a sandstone 36x12x8 ins. 24 ins. in the ground for 90th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 90 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. No trees within limits.
		Land rolling.
		Soil sandy, 3rd rate.
		Timber: piñon and cedar.
		Barometer 5350 ft. Thermometer 50 °.
		The flag staff called "Mansard" bears N. 5° 30' W.
		The notes describing this point were obtained from the U.S. Surveyor General for, Utah at Salt Lake City, and read as follows:
		"Mansard, a white conspicuous sandstone knob on the Vermillion cliffs, 5½ miles east of Kanab and 3½ S.W. of Johnson. The station overlooks the road from Kanab to Johnson, but cannot be approached with horses from that side.. A conoid boss of eroded sandstone was used for a monument, and on this was perched a short staff, lat. 37° 2' 52.36" long. 112° 25' 21.99". This staff can be seen through the telescope from different points along the boundary line. The given latitude places this point 263.93 chs. north

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ALTITUDE	CHAINS	
		of the 37th parallel. I make it by triangulation 262.38 chs.

		91st Mile.
		S. 89° 53' E. on tangent to the parallel.
		Along gentle north slope, through scattering timber.
	78.00	Dry gulch, course N.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5410	80.00	North 110 lks. from the tangent + correction 132 lks.= 242 lks.
		Set a sandstone 38x19x6 ins. 25 ins. in the ground for 91st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. 91 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Trees too rough to mark.
		This corner stands on steep rocky N. slope under point of rocks.
		Land rolling,
		Soil rocky and sandy, 3rd rate.
		Timber: piñon and cedar.
		Barometer 5410 ft. Thermometer 53°.
		The ¼ sec. cor. on N. and S. line, between secs. 10 and 11 T. 44 S. R. 5 W. Salt Lake meridian bears S. 73° 47' E. 21.20 chs. dist. This cor. is a sandstone 12x8x3 ins. above ground, marked ¼ on W. face.

		92nd Mile.
		S. 89° 52' E. on tangent to the parallel.
		Along steep north slope.
	3.50	Top of cliff bears N. and S. Leave timber. Descend.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	8.50	Foot of bluff about 150 ft high bears N. and S.
		Thence descend gradually.
	30.00	Wagon trail bears N. W. and S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5220	80.00	North 129 lks. from the tangent + correction 144 lks.= 271 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 92nd mile cor.
		A brass cap on top of pipe has raised letters UTAH on N. ARIZ. on S. and 92 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist.
		Raised a mound of earth 5 ft. base 2 ft. high around the post.
		The most westerly point of White cliffs across Johnson creek bears N. 38° 20' E. about a mile dist.
		South point of red cliff bears N. 72° 05' W. about ½ a mile dist.
		Land nearly level, except first 10 chs.
		Soil sandy, 2nd rate.
		Vegetation: grass and sage; scrub cedar on ridge.
		Barometer 5220 ft. Thermometer 60°.

		93rd Mile.
		S. 89° 51' E. on tangent to the parallel.
		Over rolling, sandy valley land.
	7.90	Johnson creek here dry, 30 lks. wide, banks 12 ft. high, course S.
	20.00	A few scattering cedar trees south of the line.
	65.00	Leave valley, enter rolling white hills, bears N. W. and S. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		The mean of which is
5300	80.00	North 150 lks. from the tangent + correction 154 lks= 304 lks.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 93rd mile cor. A brass cap on top of pipe has raised letters UTAH on the N. ARIZ. on the S. and 93 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		A stone monument on the top of a red butte bears N. 72° 22' E. about ½ mile dist.
		S. W. point of white cliff east of Johnson creek bears N. 16° 19' W. about a mile dist.
		Corner on 9th Special Standard T. 44 S. R. 4½ and 5 W. Secs. 7 and 12, bears S. 67° 24' E. 50.07 chs. dist.
		This cor. is a decayed post, notched and marked properly with mound and pits.
		Land mountainous.
		Soil sandy, 3rd rate.
		Vegetation: grass and greasewood and a few cedar trees.
		Barometer 5300 ft. Thermometer 66°.

		94th Mile.
		S. 89° 51' E. on tangent to the parallel.
		Along south slope over gently rolling white hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set is 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5450	80.00	North 172 lks. from the tangent + correction 165 lks.= 337 lks.
		Point for the 94th mile cor.
		The Astronomical Station was placed here rather

ALTITUDE	CHAINS	
		than at the 100th mile cor. because the water at the Navajo well near the 100th mile cor. was found to be unfit for use.
		April 22nd, 1901.
		Temporary astronomical observatory No 3 was South of this point on favorable ground from april 22nd to 29th We were employed in making astronomical observations and adjusting the line. For latitude of Station and position of temporary observatory - See page 61
		April 29th, 1901, I examine and carefully adjust the instrument and compare the steel tapes with the standard, and find them of correct length.
		April 30th, 1901, at 4h 51m A.M. l.m.t. at the point for the 94th mile cor. I observe Polaris at eastern elongation in accordance with instructions in the manual, and mark the line so determined on a plug driven in the ground north of my station.
		At 8h A.M. I lay off the azimuth of Polaris 1° 31.8' to the west and mark the true meridian so determined on a plug driven in the ground north of my station.
		The magnetic bearing of the said meridian is N. 15° 18' W. This reduced by the table page 100 in the manual gives the mean magnetic declination 15° 15' E. From the said true meridian I lay off an angle of 90° from the north to the east for the tangent to the parallel.
		In all these operations, the mean of at least four sights was taken with the telescope reversed at each sight.
		At the point for the 94th mile cor. I set a sandstone shaft 6 ft. long, 15 ins. broad and 12 ins. thick dressed and squared 10 ins. down from the top. for the 3rd Astronomical Monument, set 3 ft. in the ground and marked with letters 1½ ins. square, deeply graven in the stone, UTAH on the N. 37 N. L. on E. ARIZONA on S. and 94 M. on the W. faces. Raised a mound of stone 5½ base 2 ft high around the shaft.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Dug pits 36x36x18 ins. N. S. E. and W. of the shaft 6 ft. dist.
		A round red butte bears N. 37° 30' W. about 25 chs. dist. A stone monument on top of long red butte bears N. 70° [illegible] 15' W. about ½ mile dist.
		Flag staff on flag point top of Vermillion cliffs north of Navajo well. A point established by Wheeler bears N. 41° 05' E. This Astronomical Monument stands in a little valley about 2½ miles S.W. of the Seepes Springs.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 5450 ft. Thermometer 65°.
		---÷---
		95th Mile.
		E. on tangent to the parallel.
		Across little valley. Descend.
	6.60	Wagon trail bears N. and S. Ascend.
	15.00	Leave valley, bears N. and S. Ascend. Enter scattering scrub cedar, bears N. and S.
	21.00	Top of rocky spur, slope S. descend.
	30.00	Leave timber, bears N. E. and S. W. Ascend.
	52.20	Enter dense cedar timber, bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs. The mean of which is
5500	80.00	North .76 of a lk. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 95 mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 95 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.

ALTITUDE	CHAINS	
		A cedar tree 10 ins. diam. bears N. 70°15' W. 130 lks. dist. marked UTAH 95 M. B. T.
		A cedar tree 6 ins. diam. in clump of cedars, bears N. 47° 40' E. 170 lks. dist. marked UTAH 95 M. B.T.
		Other trees too rough to mark. Many of these trees are 12 ins. or more in diam. at the bottom, but they branch out right at the surface of the ground and the branches are very numerous, making it impossible to get a surface free from knots.
		Land rolling.
		Soil sandy, 3rd rate.
		Timber, scrub cedar and pinon.
		Barometer 5500 ft. Thermometer 70°.

		96th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend gradually.
	12.45	Top of sand ridge bears N. W. and S. E.
		Flag on Vermillion cliffs called Flag Point, north of Navajo well, bears N. 30° 34' E.
		Flag staff on Mansard bears N. 59° 07' W.
	65.00	Top of low ridge bears N. and S. Descend.
	70.00	Dry gulch, course S. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Postion of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is
5775	80.00	North 3 lks. from the tangent.
		Set a sandstone 30x15x6 ins. 20 ins. in the ground for 96th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 96 M. on W. faces. Raised a mound of stone 5½ ft base 2½ ft. high east of cor. Pits impracticable. Trees too rough to mark for bearing trees.
		Land rolling.

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ALTITUDE	CHAINS	
		Soil sandy, 3rd rate.
		Timber: scrubby cedar and pinon.
		Barometer 5775 ft. Thermometer 75°.

		97th Mile.
		S. 89° 59 ' E. on tangent to the parallel.
		Ascend along south slope over rocky ground and through timber.
	4.00	Top of spur slope S. E. Thence along a rocky south slope.
	21.50	Top of rocky bluff, bears N. E. and S. W. Descend.
	25.00	Foot of bluff about 100 ft. high, bears N. E. and S. W. Descend gradually.
	37.50	Dry gulch, course S. W.
	45.00	Dry gulch, course S.
	63.40	Dry gulch, course S.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5650	80.00	North 7 lks. from the tangent.
		Set an iron pipe 2 ins. in diam. 5 ft. long with flanges at the bottom, 3 ft. in the ground for 97th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 97 M stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post.
		A cedar tree 6 ins. diam. in clump of cedars bears N. 48° 20' E. 243 lks. dist. marked UTAH 97 M. B.T.
		A cedar tree 10 ins. diam. bears S. 80° E. 196 lks. dist. marked ARIZ. 97 M. B.T. A cedar tree 12 ins. diam. bears S. 8° W. 149 lks. dist. marked ARIZ. 97 M. B.T. A cedar trade 5 ins. diam. bears N. 68° 20' W. 121 lks. dist. marked UTAH 97 M. B. T.

ALTITUDE	CHAINS	
		Land rolling.
		Soil rocky and sandy, 3rd rate.
		Timber nearly all cedar.
		Barometer 5650 ft. Thermometer 75°.

		98th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Descend along S. W. slope through timber.
	32.30	Dry gulch, course S.
	37.70	Dry gulch, course S. leave timber, bears N. E. and S.W
	38.42	Flag point on Vermillion cliff north of Navajo well bears N 1° 44' E. The field notes describing flag point were obtained from the U. S. Surveyor General for Utah at Salt Lake City, and are as follows:
		"A southward salient of the vermillion cliffs overlooking the Navajo well. The station is on the highest point of a peninsular mass, the flat top of which slopes gently to the N. W. and is an acre in extent. It can be reached only from the north. The peninsula was cleared of trees and the station was marked by a cairn of stone and wood 10 ft. in diam. and 10 ft. high with a staff projecting from the apex. Lat. 37° 3' 36.73". Long. 112° 16' 44.95".
		The given lat. places this point 332.08 chs. north of the 37th parallel. I make it by triangulation 330.93 chs.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of the middle point by 1st set is 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5650	80.00	North 12 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom, 3 ft. in the ground, for 98th mile cor.
		A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 98 M. stamped in the

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ALTITUDE	CHAINS	
		center. Dug pits 36x36x18 ins. N. S. E. & W. of cor.
		6 ft. dist. Raised a mound of earth 5 ft. base 2 ft.
		high around the post. No trees within limits.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 5650 ft. Thermometer 75°

		99th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Descend gradually.
	50.00	Leave rolling hills, enter little flat, bears N.E. and S. W.
	63.40	*Bottom of wash, dry course S.W.*
		Difference between measurements of 80 chs. by two
		sets of chainmen is 6 lks. Postion of middle point
		by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5625	80.00	North 19 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for 99th mile cor.
		A brass cap on the top of pipe has raised letters UTAH
		on N. ARIZ. on S. and 99 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft.
		dist. and raised a mound of earth 5 ft base and 2 ft.
		high around the post. This cor. stands on a red
		gumbo clay flat.
		Land rolling and level.
		Soil, sand and clay, 2nd rate.
		Vegetation: grass and sage.
		Barometer 5625 ft. Thermometer 75 °.

		100th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Across flat.
	19.25	Dry gulch, course S. W. Ascend., leave flat, bears

ALTITUDE	CHAINS	
		N. E. and S. W.
	27.62	Top of ridge, bears N. E. and S. W. About 75 ft. above flat.
		Flag point on south salient of vermillion cliffs north of Navajo well, bears N. 22° 54' W. thence along south slope.
	65.00	Enter little valley, bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set is 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5630	80.00	North 27 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 100th mile cor. A brass cap on the top of pipe has raised letters UTAH on N. ARIZ. on S. and 100 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6ft dist ^ Raised a mound of earth 5 ft base 2 ft. high around the post.
		Land rolling.
		Soil sandy, 2nd rate.
		Vegetation: grass and sage.
		Barometer 5630 ft. Thermometer 65°.
		¼ sec. cor. on N. and S line between secs. 9 and 10, T. 44 S. R. 4 W. Salt Lake meridian bears S. 71°38'E! 19.50 chs. dist. A sandstone 14x3x10 ins. above ground, marked from W face one bearing tree.

		101st Mile.
		S. 89° 56' E. on tangent to the parallel.
		Descend gradually.
	5.00	Main wash, dry, course S. W.,banks 15 ft. high. Ascend.
		Difference between measurements of 80.00 chs. by two sets of chainmen is 6 lks. Postion of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.

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ALTITUDE	CHAINS	
		The mean of which is
5790	80.00	North 37 lks. from the tangent.
		Set a limestone 30x18x8 ins. 20,ins. in the ground for 101st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 101 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land rolling.
		Soil sandy, and stony, 3rd rate.
		Vegetation: grass and sage.
		Barometer 57.90 ft. Thermometer 67°.

		102nd Mile.
		S 89° 55' E. on tangent to the parallel.
		Ascend gradually along north slope.
	21.25	Wagon road from Kanab to Lee's Ferry, bears N. and S.
		20 mile cor. on road survey from Kanab about 10 chs. S.
		Enter scattering timber, bears N. and S.
	37.00	Top of little butte, bears N. and S.
	69.75	Top of spur, slope N. Descend.
		Flag point on Vermillion cliffs north of Navajo well bears N. 45° 54' W. Molly's Nipple bears N. 23° 24' E. about 20 miles dist.
	75.00	Rocky cañon, dry, course N. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by 1st set 80.08 chs. By 2nd set 79.92 chs.
		The mean of which is
5875	80.00	North 49 lks. from the tangent.
		Set a limestone 31x15x8 ins. 21 ins. in the ground for the 102 nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 102 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A piñon tree 8 ins. diam. bears N. 50° E. 30 lks. dist. marked UTAH 102 M. B.T. A piñon tree 8 ins. diam.

ALTITUDE	CHAINS	
		bears S. 17° 15' E. 19 lks. dist. marked ARIZ. 102 M. B.T. A cedar tree 4 ins. diam. bears S. 10 ° W. 55 lks. dist. marked ARIZ. 102 M. B.T. A cedar tree 10 ins. diam. bears N. 76° 10' W. 115 lks. dist. marked UTAH 102 M. B.T.
		Land rolling and broken.
		Soil rocky, 3rd rate.
		Timber: cedar and pinon.
		Barometer 5875 ft. Thermometer 70°.
		April 30, 1901.
		----------
		103 Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend.
	19.00	Top of ridge, bears N. and S. Descend.
	30.00	Hollow, drains N. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5800	80.00	North 62 lks. from the tangent.
		Set a limestone 30x10x12 ins. 20 ins. in the ground for 103rd mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. 103 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 10 ins. diam. bears N. 20° 40' E. 129 lks. dist marked UTAH 103 M. B.T.
		A pinon tree 8 ins. diam. bears S. 37° 10' E. 201 lks. dist. marked ARIZ. 103 M. B.T.
		A cedar tree 10 ins. diam. bears S. 75° 20' W. 143 lks. dist. marked ARIZ. 103 M. B.T. No tree within limits N. W. suitable to mark.
		Land mountainous.
		Soil rocky, 3rd rate.

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ALTITUDE	CHAINS	
		Timber: cedar and piñon.
		Barometer 5800 ft. Thermometer 72°.

		104th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Descend through timber.
	42.50	Bottom of dry ravine, course N. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 22 lks. Position of middle point by 1st set 80.11 chs. By 2nd set 79.89 chs.
		The mean of which is
6200	80.00	North 76 lks. from the tangent.
		Set a limestone 40x15x12 ins. on bed rock for 104th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 104 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. and raised a mound of stone 5½ ft. base 2½ ft high east of cor. Pits impracticable.
		A cedar tree 12 ins. diam. bears N. 30° E. 40 lks. dist. marked UTAH 104 M. B.T. A piñon tree 8 ins. diam. bears S. 15° W. 27 lks. dist. marked ARIZ. 104 M. B.T. Other trees too rough to mark.
		Land rough and rocky.
		Soil rocky, 4th rate.
		Timber scrubby piñon and cedar.
		This cor. stands on W. slope of Buckskin Mountain near the top about 400 ft. above last cor.
		Barometer 6200 ft. Thermometer 70°.

		105th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Ascend rocky west slope.
	5.00	Top of bluff bears N. E. and S. W. about 40 ft. above last cor. Thence ascend gradually over Buckskin plateau.

ALTITUDE	CHAINS	
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs. The mean of which is
6230	80.00	North 92 lks. from the tangent.
		Set a limestone 30x15x12 ins. 20 ins. in the ground for 105th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 105 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A piñon tree 6 ins. diam. bears N. 24° 40' E. 21 lks. dist. marked UTAH 105 M. B.T.
		A cedar tree 14 ins. diam. bears S. 55° 40' E. 50 lks. dist. marked ARIZ. 105 M. B.T.
		A cedar tree 16 ins. diam. bears S. 6° 20' W. 60 lks. dist. marked ARIZ. 105 M. B.T.
		A cedar tree 12 ins. diam. bears N. 84° 30' W. 55 lks. dist. marked UTAH 105 M. B.T.
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Timber: cedar and piñon.
		Barometer 6230 ft. Thermometer 65°.

		106th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Descend through timber.
	3.00	Dry gulch, course N. W. Ascend.
	33.00	Top of ridge about 300 ft. above gulch, course N. E. and S. W. Thence over mountain top.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs. The mean of which is
6430	80.00	North 110 lks. from the tangent.
		Set a limestone 31x15x6 ins. 21 ins. in the ground for 106th mile cor. marked UTAH on N. 37 N. L. on

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		E. ARIZ. on S. and 106 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 10 ins. diam. bears N. 2° 36' E. 50 lks. dist. Marked UTAH 106 M. B.T.
		A pinon tree 10 ins. diam. bears S. 35° 20' E. 50 lks. dist. Marked ARIZ. 106 M. B.T.
		A cedar tree 6 ins. diam. bears S. 38° 50' W. 49 lks. dist. Marked ARIZ. 106 M. B.T.
		A cedar tree 8 ins. diam. bears N. 71° 45' W' 70 lks. dist. marked UTAH 106 M. B.T.
		Top of Buckskin plateau.
		Land mountainous.
		Soil sandy and rocky, 4th rate.
		Timber: cedar and pinon.
		Barometer 6430 ft. Thermometer 60°
		May 1st, 1901.

		I examine the transit in all its parts and test the adjustments, compare the tapes with the standard and find all correct this morning.

		107th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Ascend gradually through timber.
	40.15	Old wagon road bears N. and S.
6500	73.00	Top of ridge about 50 ft. above last cor. bears N. and S. Descend.
	79,75	Bottom of dry ravine about 100 ft. deep course S. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
6400	80.00	North 129 lks. from the tangent.
		Set a limestone 30x12x7 ins. 20 ins. in the ground

BOOK 2628

ALTITUDE	CHAINS	
		for 107th mile cor. Marked UTAH on N. 37 N. L. on E, ARIZ. on S. and 107 M. on W. faces. Raised a mound of stone 5½ ft base 2½ ft. high east of cor. Pits impracticable. No trees within limits suitable for bearing trees.
		Land mountainous.
		Soil rocky, 4th rate.
		Timber: cedar and piñon.
		Barometer 6400 ft. Thermometer 62°.

		108th Mile.
		S. 89° 51' E. on tangent to the parallel.
		Ascend along rocky south slope.
	5.50	Top of spur, slope S. Descend.
	19.20	Bottom of dry ravine course N. E. Ascend along N. slope.
	35.00	Top of spur, slope N. Descend.
	50.00	Bottom of dry ravine, course N. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 18 lks. Position of middle point by 1st set 80.09 chs. By 2nd set 79.91 chs. The mean of which is
6500	80.00	North 150 lks. from the tangent.
		Set a Lime stone 32x12x6 ins. 21 ins. in the ground for 108th mile cor. Marked UTAH on N. 37 N. L. on E, ARIZ. on S. and 108 M. on W. faces, and raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		A piñon tree 6 ins. diam bears N. 52° 15' E. 72 lks. dist. marked UTAH 108 M. B.T.
		A cedar tree 10 ins. diam. bears S. 31° E. 47 lks. dist. marked ARIZ. 108 M. B.T.
		A cedar tree 12 ins. diam. bears S. 43° W. 113 lks. dist. marked ARIZ, 108 M. B.T.
		A piñon tree 8 ins. diam. bears N. 64° 20' W. 40 lks. dist. marked Utah 108 M. B.T.

BOOK 2628

ALTITUDE	CHAINS	
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Timber: cedar and piñon.
		Barometer 6500 ft. Thermometer 65°.

		109th Mile.
		S. 89° 51' E. on tangent to the parallel.
		Descend along N. slope in timber.
	7.00	Dry gulch, course N. Ascend.
	13.00	Top of spur, slope N.
	18.00	Bottom of dry ravine, course N.
	22.50	Top of spur, slope N.
	31.50	Bottom of dry ravine about 100 ft. deep, course N.
6575	70.00	Top of high ridge, bears N. and S. Descend E. slope of Buckskin mountain.
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs.
		The mean of which is
6525	80.00	North 172 lks. from the tangent.
		Set a limestone 30x18x6 ins. 20 ins. in the ground for 109th mile cor. marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 109 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		A cedar tree 5 ins. diam. bears N. 48° 10' E. 171 lks. dist. marked UTAH 109 M. B.T.
		A cedar tree 5 ins. diam. bears S. 11° 35' E. 94 lks. dist. marked ARIZ. 109 M. B.T.
		No other trees within limits.
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Timber: cedar and piñon.
		Barometer 6525 ft. Thermometer 70°.

BOOK 2628

ALTITUDE	CHAINS	
		110th Mile.
		S. 89° 50' E. on tangent to the parallel.
		Descend through scattering timber.
	40,00	Leave timber, bears N. E. and S. W.
	60.00	Bottom of dry rocky cañon about 300 ft. deep, course N. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 20 lks. Position of middle point by 1st set 80.10 chs. By 2nd set 79.90 chs.
		The mean of which is
6300	80.00	North 196 lks. from the tangent.
		Set a limestone 30x15x8 ins. 20 ins. in the ground for the 110th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S, and 110 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands on a sharp spur that slopes N. E.
		Land mountainous.
		Soil rocky, 4th rate.
		Timber, cedar and piñon.
		Barometer 6300 ft. Thermometer 60°.

		111th Mile.
		S. 89° 49' E. on tangent to the parallel.
		Descend steep east slope.
	26.00	Bottom of rocky cañon, course N. E.
	36.80	Top of spur, slope N. E. Descend.
	48.00	Foot of Buckskin Mountain. Enter House Rock valley, bears N. and S, Descend gradually.
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs.
		The mean of which is
5250	80.00	North 221 lks. from the tangent.
		Set a conglomerate stone 32x16x6 ins. 22 ins. in the ground for 111th mile cor. Marked UTAH on N. 37

BOOK 2628

ALTITUDE	CHAINS	
		N. L. on E. ARIZ. on S. and 111 M. on W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land mountainous.
		Soil rocky and sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 5250 ft. Thermometer 58°.
		May 2nd, 1901.
		May 3rd, 1901, at 4h 40m A.M. l.m.t., at the 111th mile cor. I observe Polaris at eastern elongation in accordance with instructions in the manual and mark the line thus determined on a plug driven in the ground north of my station.
		May 3rd, 1901, at 7h A.M. I lay off the azimuth of Polaris 1° 31.8' to the west and mark the true meridian thus determined on a plug driven in the ground 5 chs. north of my station. The magnetic bearing of the said meridian is N. 15° 07' W. *This reduced by the table page 100 of the Manual gives the Mean magnetic declination 13° 04 E.* I lay off from this meridian an angle of 90° from the north to the east for the tangent to the parallel.
		In all these operations the mean of at least four sights is taken, being careful to reverse the instrument at each sight.
		I test the stadia wires in the transit and compare the steel tapes with the standard, and find them correct.

		112th Mile.
		East on tangent to the parallel.
		Ascend gradually.
	5.22	Top of rocky ridge bears N. and S. Descend.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	15.00	Wagon road bears N. and S.
5100	15.50	Bottom of House Rock wash, dry, course N. Ascend.
	27.64	Top of rocky ridge, bears N. and S. From this point use stadia measurement. Angle 12°+ Rod 11.86 double= 2372 ft. Constant 95.68 x 2372 = 2269.53 + C.= 1.12 = 2270.65 ft. = 34.40 chs. + 27.64 = 62.04 chs.
	62.04	On cliffs, bears N. and S. Stadia again. Angle 20° + Rod 6.75 double = 1350 ft. Constant 88.30 x 1350 = 1192.05 + C = 1.08 = 1193.13 ft. = 18.08 chs.+ 62.04 chs. = 80.12 chs. I measure back west 12 lks. and at.
6250	80.00	North .76 of lk. from the tangent.
		On top of sharp red cliff about 1150 ft. above House Rock valley, cliff bears N. and S.
		Set a sandstone 36x10x9 ins. on bed rock for 112th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 112 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land mountainous.
		Soil very rocky, 4th rate.
		Vegetation: grass and sage.
		Barometer 6250 ft. Thermometer 65°.

		113th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Across chasm by stadia measurement. Angle 5° - Rod 8.235 double = 1647 ft. Constant 99.24 x 1647= 1634.48 + C = 1.14 = 1635.62 ft. = 24.78 chs.
5650	12.50	Bottom of rock chasm about 600 ft. deep, course N.
6000	24.78	To stadia point on sharp ledge of rocky spur, slope N. Descend.
		Stadia measurement Angle 22° - Rod 11.10 Constant 85.97 x 1110 = 954.27 + C. = 1.06 = 955.33 ft. = 14.47 chs. + 24.78 chs. = 39.25 chs.

116A

BOOK 2623

chains	NOTE
15.50	This wash should be noted as Coyote Wash, course N. Houserock Wash heads approx. 16 miles south of the 112 mile mon. and drains S.

January 22, 1937 (W)

BOOK 2628

ALTITUDE	CHAINS	
	39.25	To rocky bench bears N. and S. about 5 chs. S. of a great bell shaped rock. Descend. Stadia measurement Angle 10° - Rod 11.48 double = 2296 ft. Constant 96.98 x 2296 = 2226.76 + C = 1.13 = 2227.89 ft. = 33.75 chs. + 3925 chs. = 7300 chs.
5000	68.00	Bottom of sand wash about 1000 ft. below top of spur, course N. Water pocket about 10 chs. N. Ascend over bare rock.
	73.00	To stadia point on bare rock. Thence by tape measurement.
5400	80.00	North 3 lks. from the tangent. Set a sandstone 36x18x6 ins. on smooth bed rock for 113th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 113 M. on W. faces. Raised a mound of stone 5½ ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. Land mountainous. Soil very scanty, all bare rock. Vegetation: a little grass and sage in the crevices of the rock. Barometer 5400 ft. Thermometer 75°.

		114th Mile.
		S. 89° 59' E. on tangent to the parallel. Ascend over bare sandstone and broken rock. A lot of cone shaped red buttes south of the line.
	20.60	Top of sandstone ridge, bears N. and S. About ½ mile N. to Buckskin Gulch. A narrow chasm about 20 ft. wide and 300 ft. deep worn in the sandstone, course N. E. for about 3 miles, then easterly and southerly till it falls into the Paria Cañon. Thence over rolling sand hills and bare sandstone. Difference between measurements of 80 chs. by two

ALTITUDE	CHAINS	
		sets of chainmen is 12 lks. Position of middle point by 1st set is 80.06 chs. By 2nd set 79.94 chs. The mean of which is
5600	80.00	North 7 lks. from the tangent. Set a sandstone 30x12x6 ins. 20 ins. in the ground for 114th mile cor. Marked UTAH on N. 37 N. L. on E, ARIZ. on S. and 114 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft. base 2½ ft. high east of cor. Land rolling sand hills. Many conical red buttes south of the line. Soil very sandy, 4th rate. Vegetation: grass and sage, and a few stunted cedars in the rock crevices. Barometer 5600 ft. Thermometer 80°.

		115th Mile.
		S. 89° 58' E. on tangent to the parallel. Over rolling sand hills.
	22.00	South one of twin sandstone buttes about 100 ft. base and 30 ft. high, the tangent line strikes the south side about ½ way between the base and summit. Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is
5625	80.00	North 12 lks. from the tangent. Set a sandstone 48x12x6 ins. 32 ins. in the ground for 115th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 115 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. Land rolling, sand hills and rock buttes. Soil sandy, 4th rate. Vegetation: grass, sage and scattering cedar.

BOOK 2628

ALTITUDE	CHAINS	
		Barometer 5625 ft. Thermometer 75°.

		116th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend over rolling sand hills.
	40.00	South end of rough sandstone butte. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5550	80.00	North 19 lks. from the tangent.
		Set a sandstone 3x15x6 ins. 24 ins. in the ground for 116th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 116 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		A cedar tree 12 ins. diam. bears N. 38°20' W.
		35 lks. dist. marked UTAH 116 M. B.T.
		A piñon tree 14 ins. diam. bears S. 58° E. 412 lks. dist. marked ARIZ. 116 M. B.T.
		A cedar tree 5 ins. diam. bears S. 36° 40' W. 182 lks. dist. marked ARIZ. 116 M. B.T.
		No trees within limits N.E.
		Land rolling sand hills.
		Soil sandy, 4th rate.
		Vegetation: grass, sage and scattering piñon and cedar timber.
		Barometer 5550 ft. Thermometer 58°.

		I examine the adjustments of the instrument and compare the steel tapes with the standard and find all correct.

		117th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over rolling sand hills.
		Difference between measurements of 80 chs. by two

ALTITUDE	CHAINS	
		sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs. The mean of which is
5510	80.00	North 27 lks. from the tangent. Set a sandstone 36x18x6 ins. 24 ins. in the ground for 117th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 117 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft. base 2½ ft. high east of cor. Land rolling sand hills and sandstone croppings. Soil sandy, 4th rate. Vegetation: grass, sage, and scattering cedar and piñon timber. Barometer 5510 ft. Thermometer 60°.
		118th Mile. S. 89° 56' E. on tangent to the parallel. Over rolling sand hills and sandstone croppings. Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs. The mean of which is
5475	80.00	North 37 lks. from the tangent. Set a sandstone 30x18x6 ins. 20 ins. in the ground for 118th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 118 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. from cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor. A cedar tree 10 ins. bears N. 10° 40' E. 130 lks. dist. Marked UTAH 118 M. B.T. No other trees within limits. Land rolling, sand hills and sandstone croppings. Soil sandy, 4th rate. Vegetation: grass and sage and scattering cedar and

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ALTITUDE	CHAINS	
		pinon.
		Barometer 5475 ft. Thermometer 65°.

		119th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over rolling sand hills and sandstone croppings.
		Ascending.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 7997 chs.
		The mean of which is
5550	80.00	North 49 lks. from the tangent.
		Marked a sand rock in place 12x20 ft. base and 20 ft. high of mushroom shape, marked with a cross on E. face thus: ARIZ. 119 M. + UTAH for 119th mile cor. UTAH on N. ARIZ. 37 N.L. on S. 119 M. above and 37 N. L. below the cross. Raised a mound of stone 5½ ft. base 2½ ft. high east of cross.
		Land rolling sand hills and sandstone croppings.
		Soil sandy, 4th rate.
		Vegetation: grass, sage and scattering scrub cedar and pinon.
		Barometer 5550 ft. Thermometer 70°.

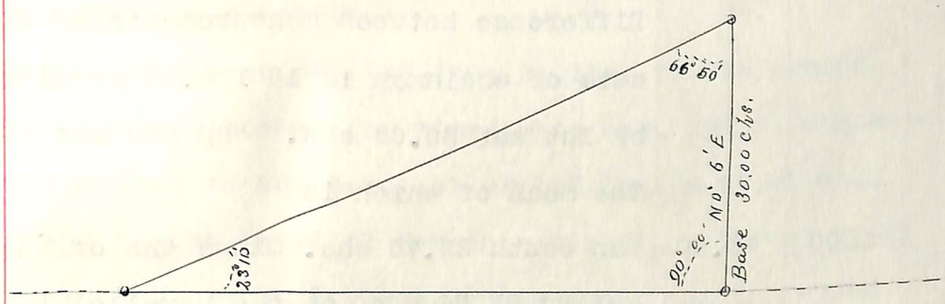
		120th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend over rocks.
	2.35	Top of rocky spur, slope N. Descend. Mollie's Nipple bears N. 64° 09' W.
	24.00	Deep dry gulch, course N. Ascend over sand hills.
	65.00	Foot of wall, course N. and S. Nearly perpendicular. about 1000 ft. high. Top inaccessable. Offset North 22.76 chs. to avoid the wall and in order that this offset line may hit the south edge of the high table land across the Paria River Canon; thence ran S. 89° 55' E. parallel to the tangent.

BOOK 2628

ALTITUDE	CHAINS	
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs. The mean of which is
5250	80.00	Ran scuth to the foot of the rocks 9.39 chs. thereby placing this cor. 13.37 chs. N. of the tangent. Offset at this point 62 lks. north of tangent and 12.75 chs. N. of its true place on the parallel, which is inaccessable. Set a sandstone 36x15x6 ins. 24 ins. in the ground for witness cor. for the 120th mile cor. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 120 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft. base 2½ ft. high east of cor. This cor. stands at foot of cliffs that raise S. of it and bear E. and W. Land: sand hills and rugged cliffs. Soil rocky and sandy, 3rd rate. Vegetation: grass, sage and scrub cedar and pinon. Barometer 5250 ft. Thermometer 65°.
		May 3rd, 1901.

		121st Mile.
		On the offset line 22.76 chs. north of the tangent I ran S. 89° 54' E. parallel to the tangent.
	10.00	To sand ridge that slopes to canon wall west side of Paria River Canon. I set a flag on this line at the south end of high table land across the canon. Erect a flag at this point and go to the one across the river. In order to do this I have to make a detour around the head of Buckskin Gulch and 5 or 6 miles north to cross the canon of the Paria.
		May 4th, 1901.
		I go to the flag on the offset line on the high table

ALTITUDE	CHAINS	
		land, east of the Paria Cañon and measure a base at right angles to said offset line which is parallel to the tangent., Said base bearing N. 0°·6' E. 30.00 chs. This being the longest base possible. From N. end take back sight on base line and measure angle to west to the flag on west side of canon, the mean of four sights gives this angle 66° 50'. Bearing of flag S. 66° 56' W.



Then log. 30.00 chs. = 1.477121
log. Tang 66° 50' =10.368645

1.845766= 70.11 chs.+
10.00 chs. = 80.11 chs.

Ran back to the west 11 lks.= 80 chs.

From flag on W. side of river coming S. 89° 54' E. Descend.

4300	40.00	Bottom of Paria Cañon about 2 chs. wide and about 1350 ft. deep, here dry, course S. E.
5650	80.00	Set a sandstone 36x15x12 ins. 24 ins. in the ground on the high mesa east of the Paria Cañon for witness corner, for the 121st mile cor. The true point for this corner being inaccessable. This point is on the offset line 22.76 chs. north of the tangent, the offset to the parallel is 76 lks. north of the tangent for this point; hence this witness corner is 22.00 chs. north of the true point on the parallel. Marked W. C. UTAH on N. 37 N. L. on E., ARIZ. on S., and 121 M. on the W. faces. Raised a mound of stone 5½ ft base 2½ ft. high east of cor. Pits impracticable. This cor. stands on S.W. corner of high mesa. The true point on the parallel is about 500 ft. lower.

BOOK 2623

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Land very much broken.
		Soil rocky, 4th rate.
		Vegetation: grass, sage and scattering scrub cedars.
		Barometer 5650 ft. Thermometer 40°.

		122nd Mile.
		S. 89° 53' E. on offset line 22.76 chs. N. of tangent and parallel with it over mesa, gently rolling, through scrub cedar.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by 1st set 80.08 chs. By 2nd set 79.92 chs.
		The mean of which is
5500	80.00	Ran south 22.76 chs. minus the offset which is 92 lks. making 21.84 chs. to the parallel.
		Set a sandstone 30x12x6 ins. 20 ins. in the ground for 122nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 122 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A cedar tree 12 ins. diam. bears N. 29° 30' E. 91 lks. dist. marked UTAH 122 M. B.T. A cedar tree 12 ins. diam. bears S. 34° 50' W. 114 lks. dist. marked ARIZ. 122 M. B.T. No other trees within limits suitable for bearing trees.
		Land high mesa, rolling, and with rock croppings.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass, sage and scrub cedar.
		Barometer 5500 ft. Thermometer 40°.

		123rd Mile.
		Ran south 92 lks. to the tangent to the parallel.
		Thence S. 89° 53' E. on tangent to the parallel.
		Over gently rolling sand hills.
	25.00	On the west wall of cañon, bears N. E. and S. W.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Descend.
	35.00	Bottom of cañon about 400 ft. deep, course S. Ascend.
	50.00	On east wall of cañon, bears N. and S.
	62.30	On west wall of another cañon, bears N. E. and S. Country ahead, impassable. Offsett north 22.91 chs. Thence ran S. 89° 53' E. Parallel with the tangent. Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs. The mean of which is
5075	80.00	Set a sandstone 32x10x7 ins. 21 ins. in the ground for witness corner for 123rd mile cor. 22.91 chs. MINUS the offset to the parallel of 110 lks. = 21.81 chs. north of the parallel for this corner. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 123 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		No trees within limits.
		Land mountainous, broken and rocky.
		Soil rocky and sandy, 4th rate.
		Vegetarion: grass, sage and scattering cedar.
		Barometer 5075 ft. Thermometer 42°.

		124th Mile.
		S. 89° 52' E. on the offset line 22.91 chs. North of the tangent and parallel with it over broken land.
	28.00	Edge of impassable cañon, course South. Offset north 20.79 chs. + 22.91 chs. = 43.70 chs. north of the tangent to the parallel. Thence S. 89° 52' E. on the offset line parallel with the tangent.
	34.50	On west wall of cañon about 200 ft. deep bears N. and S. Thence by stadia measurement. Level. Rod 12.29 ft. + C = 1.15 = 1230.15 ft. = 18.63 chs.+ 34.50= 53.13 chs.

ALTITUDE	CHAINS	
	45.00	Bottom of cañon, course S. Ascend.
	53.13	On E. wall of cañon, bears N. and S. Stadia point.
		Thence by tape measurement.
	77.10	On brow of bluff, bears N. and S. Descend.
		Difference between measurements of 61.37 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 61.41 chs. By 2nd set 61.33 chs.
		The mean of which is 61.37 + 18.63 chs.=
5350	80.00	Comes on E. wall of cañon, bears N. and S.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for witness corner for 124th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and W. C. 124 M. stamped in the center. Raised a mound of stone 5 ft. base 2 ft. high around the post.
		Pits impracticable.
		This offset line is 43.70 chs. north of the tangent. The offset for this corner is 129 lks. N. Therefore this witness corner is 42.41 chs. north of the true place on the parallel.
		About 3/4 of a mile south to the Paria Cañon.
		Land much broken.
		Soil rocky, 4th rate.
		Vegetation: grass, sage and scattering scrub cedar.
		Barometer 5350 ft. Thermometer 45°.

		125th Mile.
		S. 89° 51' E. on offset line 43.70 chs. north of the tangent and parallel with it.
		Descend, use stadia measurement. Level. Rod 9.66= 966 ft. + C. = 1.15 = 967.15 ft. = 14.64 chs.
	6.50	Bottom of rock cañon, about 200 ft. deep extends N. about 5 chs. and S. to the Paria.
	14.64	East wall of cañon bears N. and S. Thence by tape measurement. Ascend.
	18.00	Top of rocky spur. Extends south about 30 chs. and

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ALTITUDE	CHAINS	
		ends in sharp rock point.
	22.30	West wall of cañon bears N. and S. Descend. Use stadia measurement. Angle 8°- Rod 12.985 double = 2597 ft. Constant 98.06 x 25.97 = 2546.62 + C = 1.14 = 2547.76 ft. = 38.60 chs. + 22.30 = 60.90 chs.
	60.90	Stadia point. Thence angle 10° + Rod 8.355 double = 1671 ft. Constant 96.98 x 1671 = 1620.54 + C. = 1.13= 1621.67 ft. = 24.57 chs. + 60.90 chs. = 85.47 chs.
	80.00	Comes on steep side of cañon wall. Impracticable to establish the corner. Land rough, rocky and much broken. Soil rocky and sandy, 4th rate. Vegetation: grass, sage and scattering scrub cedar.

		126th Mile.
		S. 89° 51' E. on offset line 43.70 chs. north of the tangent and parallel with it. Ascend over broken land.
	5.47	Stadia point on E. wall of cañon, course N. E. and S. W. about 350 ft. above the bottom. Thence by tape measurement.
5400	6.57	Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for witness corner for 125th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and W.C. 125.082 M. stamped across the middle. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2 ft. high around the post. This corner is on the offset line 43.70 chs. north of the tangent. The offset for this corner is 152 lks. N. from the tangent. Therefore this witness corner is 42.18 chs. north of its true place on the parallel.

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ALTITUDE	CHAINS	
		Barometer 5400 ft. Thermometer 45°.
		S. 89° 51' E. continuing on the offset line.
		Ascend over rough, rocky land.
	21.43	On top of wall bears N. E. and S. W. Descend.
		Thence by stadia measurement. Angle 11°- Rod 10.54 double = 2108 Constant 96.38 x 2108 = 2031.27 + C = 1.13 = 2032.40 ft. = 30.79 chs. + 21.43 = 52.22 chs.
	52.22	Stadia point in rolling sand hills about 400 ft. below top of wall. Thence by tape measurement.
		Difference between measurements of 42.64 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 42.66 chs. By 2nd set 42.62 chs.
		The mean of which is 42.64 chs. + 30.79 + 6.57=
4975	80.00	Thence I run south 43.70 chs. - the offset north from the tangent for this cor. which is 172 lks.= 41.98 chs. to the 37th parallel of latitude.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 126th mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S, and 126 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		The Paria Canon is about 3/4 of a mile south, and about a $\frac{1}{4}$ of a mile further east the canon turns more to the south.
		Land very rough and much broken.
		Soil sandy and rocky, 4th rate.
		Vegetation: grass, sage and scattering scrub cedar.
		Barometer 4975 ft. Thermometer 40°.
		I examine and carefully adjust the transit and compare the steel tapes with the standard.
		May 5th, 1901.

BOOK 2628

ALTITUDE	CHAINS	
		May 6th, 1901, at the 126th mile corner at 4h 28m A.M. l.m.t., I observe Polaris at eastern elongation in accordance with instructions in the manual and mark the line so determined on a plug driven in the ground 5 chs. north of my station.
		At 7h 20m A.M. I lay off the azimuth of Polaris 1° 31.8' to the west and mark the true meridian thus determined on a plug driven in the ground 10 chs. north of my station. The magnetic bearing of the true meridian is N. 15° 03' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 00' E. I now lay off an angle of 90° from this meridian turning from the north to the east for the tangent to the parallel. In all of these operations the mean of at least four sights was taken, the telescope reversed at each sight.
		----:--------
		127th Mile.
		East on the tangent to the parallel.
		Over rolling land.
	10.00	Dry gulch, course S.
	30.40	On rocky point of spur, sloping S. Descend.
		A cliff 300 ft. high about 1.50 chs. north.
		Stadia measurement, angle 6°- Rod 7.925 double = 1585 ft. Constant 98.91 x 1585 = 1567.72 + C = 1.14 = 1568.86 ft. = 23.77 chs. + 30.40= 54.17 chs.
	45.00	Bottom of cañon about 300 ft. deep, course S. W.
	54.17	On bluff east side of cañon, bears N. E. and S. W.
		Thence by tape measurement.
		Difference between measurements of 56.23 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 56.27 chs. By 2nd set 56.19 chs.
		The mean of which is 56.23 chs, + 23.77chs =
5500	80.00	North .76 of lk. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 127th

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ALTITUDE	CHAINS	
		mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 127 M. stamped in center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling and broken.
		Soil sandy, 4th rate.
		Vegetation: grass, sage and scattering cedar.
		Barometer 5500 ft. Thermometer 45°.

		128th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascending gradually over broken rocky land, through scattering cedar timber.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs. The mean of which is
5800	80.00	North 3 lks. from the tangent.
		Set a sandstone 30x16x6 ins. 20 ins. in the ground for 128th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 128 M. on W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft base 2½ ft. high east of cor.
		A cedar tree 10 ins. diam. bears N. 20° E. 18 lks. dist. Marked UTAH 128 M. B.T.
		No other trees within limits suitable for bearing trees
		Land mountainous. *rough and broken.*
		Soil sandy and rocky, 4th rate.
		Vegetation: grass, sage and a few cedars.
		Barometer 5800 ft. Thermometer 50°.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		129th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascending gradually over rocky land through cedar timber.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5875	80.00	North 7 lks. from the tangent.
		Set a sandstone 36x18x6 ins. 24 ins. in the ground for 129th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 129 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A cedar tree 12 ins. diam. bears S. 18° 40' E. 69 lks. dist. marked ARIZ. 129 M. B.T.
		No other trees within limits suitable for bearing trees.
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass, sage and a few cedars.
		Barometer 5875 ft. Thermometer 55°.

		130th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Ascend gradually over broken rocky land, through timber.
6000	40.00	On top of high ridge, divide between the Paria and Sentinel Rock Creek. Bears N. E. and S. W.
		Culminates in a round peak about ½ mile N.E.
		Leave timber, bears N. E. and S. W. Thence along gentle south slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle

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		point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5900	80.00	North 12 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for 130th mile cor.
		A brass cap on the top of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 130 M. stamped in the center
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6
		ft. dist. Raised a mound of earth 5 ft. base 2 ft.
		high around the post.
		Land mountainous.
		Soil sandy and stoney, 4th rate.
		Vegetation: grass, sage and cedar timber.
		Barometer 5900 ft. Thermometer 60°.
		May 6th, 1901.

		131st Mile.
		I examine the adjustments of the transit and compare
		the steel tapes with the standard and find everything
		correct.
		S. 89° 57' E. on tangent to the parallel.
		Descend gradually along gentle south slope.
		Difference between measurements of 80 chs. by two
		sets of chainmen is 4 lks. Position of middle point
		by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5850	80.00	North 19 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for 131st mile cor.
		A brass cap on the top of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 131 M. stamped in the
		center. Dug pits 36x36x18 ins. N. S. E. and W. of
		the cor. 6 ft. dist. Raised a mound of earth 5 ft.
		base 2 ft. high around the post.

ALTITUDE	CHAINS	
		Land mountainous.
		Soil sandy, 4th rate.
		Vegetation: grass and sage.
		Barometer 5850 ft. Thermometer 50°.

		132nd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Descend over rocky land along E. slope.
	41.45	On rocky slope on N. W. side of rough cañon.
		Stadia measurement. Angle 8°- Rod 12.415 double =
		2483 ft. Constant 98.06 x 2483 = 2435.03 ft. + C =
		1.14 = 2436.17 ft. = 36.91 chs. + 41.45 chs. = 78.36
		chs.
	68.00	Bottom of rocky chasm about 400 ft. deep, course N.E.
		Ascend.
	78.36	On rocky spur, slope N. E. Thence by tape measurement.
		Difference between measurements of 43.09 chs. by two
		sets of chainmen is 4 lks. Position of middle
		point by 1st set 43.11 chs. By 2nd set 43.07 chs.
		The mean of which is 43.09 chs. + 36.91 chs.=
5000	80.00	North 27 lks. from the tangent.
		Set a sandstone 36x11x7 ins. 24 ins. in the ground
		for 132nd mile cor. marked UTAH on N. 37 N. L. on E.
		ARIZ. on S. and 132 M. on W. faces. Raised a mound
		of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rough and broken.
		Soil very rocky, 4th rate.
		Vegetation: grass, sage and scattering cedar.
		Barometer 5000 ft. Thermometer 60°.

		133rd Mile.
		S. 89° 56' E. on tangent to the parallel.
		Descend over crags.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Stadia measurement. Angle 12° - Rod 11.215 double = 2243 ft. Constant 95.68 x 2243 = 2146.10 + C. = 1.12 = 2147.22 ft. = 32.53 chs.
	32.53	On rocky ledge, bears N. E. and S. W. Stadia. Angle 10°- Rod 9.79 double = 1958 ft. Constant 96.98 x 1958 = 1898.87 + C = 1.13 = 1900 ft. = 28.78 chs. + 32.53 = 61.31 chs.
4300	50.83	Foot of mountain, bears N. E. and S. W.
	61.31	Stadia point. Thence by tape measurement.
	62.00	Dry gulch, course N. E.
		Difference between measurements of 18.69 chs. by two sets of chainmen is nothing.
		Mean is 18.69 chs. + 61.31 chs. =
4350	80.00	North 37 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 133rd mile cor. A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 133 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft, high around the post.
		Land mountainous.
		Soil sandy and rocky, 4th rate.
		Vegetation: grass, sage and scrub cedar.
		Barometer 4350 ft. Thermometer 75°.

		134th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over rolling sand hills.
	22.50	Dry gulch, course N. E.
	27.50	Dry gulch, course N. E.
4300	44.50	On sand ridge, bears N. E. and S. W. Offset south 15.39 chs. to avoid a mass of rock, the base of which is 10 chs. ahead on the line and bears N. and S.
		The walls are nearly perpendicular and rise to a

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		height of about 400 ft. The top is inaccessable. There is a cave in the sandstone on the line of the tangent on the west side. At the base of the rock west of the cave are the water pockets known as the blue pools. A dry gulch at the west base drains N. From the point 15.39 chs. south of the tangent I ran S. 89° 55' E. on the offset line parallel with the tangent. Stadia. Angle 12°+ Rod 13.00 ft. double = 2600 ft. Constant 95.68 x 2600 = 2487.68 + C. = 1.12 = 2488.80 ft. = 37.71 chs. + 44.50 chs. = 82.21 chs.
	80.00	Comes on W. slope of wall. Impracticable to establish the corner.
		Land mountainous, much broken.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass and sage.

		135th Mile.
		S. 89° 55' E. continuing on offset line.
		Ascend.
	2.21	On top of wall on mesa bears N. W. and S. E. Stadia point. Thence by tape measurement.
		Difference between measurements of 44.86 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 44.87 chs. By 2nd set 44.85 chs.
		The mean of which is 44.86 chs. + 37.71 chs. = 82.57 chs. - 80.00 chs.=
4830	2.57	Set off from this line 1.51 chs. N. to edge of cliff that bears E. and W. This beigg as near the parallel as we can get. This offset south of the tangent is 15.39 chs. The offset north from the tangent for this cor. is 49 lks. then 15.39 chs. + 0.49 chs.= 15.88 chs. - 1.51 chs. = 14.37 chs. which is the distance of this point south of the true parallel.
		Set a sandstone 36x15x8 ins. on bed rock for witness corner for 134th mile cor. marked W. C. UTAH on N.

ALTITUDE	CHAINS	
		37 N. L. on E. ARIZ. on S. and 134.032 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. And raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. This cor. stands on N. W. corner of high mesa. Barometer 4830 ft. Thermometer 80°

		S. 89° 55' E. continuing on offset line which is 15.39 chs south of the tangent and parallel with it. Over rocky mesa.
	44.24	Set back north 15.39 chs. to the tangent to the parallel, Thence S 89°55 E. on the tangent to the parallel, on rocky mesa.
4830	57.30	East edge of mesa, top of wall bears N. and S. Descend Stadia measurement. Angle 17°- Rod 9.20 double = 1840 ft. Constant 91.45 x 1840 = 1682.68 + C = 1.10 = 1683.78 ft. = 25.51 chs. + 57.30 chs. = 82.81 chs. Measured back west 2.81 chs. leaving 80.00 chs.
4400	80.00	North 62 lks. from the tangent. Set a sandstone 30x18x6 ins. 20 ins. in the ground for 135th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 135 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. This cor. stands at the foot of wall that bears N. and S. and at the head of a dry gulch, course N. E. Land mountainous, broken and rocky. Soil rocky, 4th rate. Vegetation: grass and sage. Barometer 4400 ft. Thermometer 80°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		136th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Descend over rolling sand hills.
	3.00	Dry gulch from cor. course S. E.
	9.00	Same gulch, course N. E.
	24.25	Dry gulch, course N. E.
	77.00	Dry gulch, course N. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is
4375	80.00	North 76 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 136th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 136 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling sand hills.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4375 ft. Thermometer 81°
		Sentinel Rock bears N. 57° 49' E.

		137th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Over rolling sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs. The mean of which is
4350	80.00	North 92 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 137th mile cor. A brass cap on the top of the pipe has raised

ALTITUDE	CHAINS	
		letters UTAH on N. ARIZ. on S. and 137 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4350 ft. Thermometer 75°.
		Sentinel Rock bears N45°35' E.

		138th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Over rolling sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
4000	80.00	North 110 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 138th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 138 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. from the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4000 ft. Thermometer 70°.
		May 7th, 1901.

		I examine the adjustments of the transit and compare the steel tapes with the standard and find all correct this morning.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		139th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Over rolling sand hills. Descending.
	48.50	Rocky cañon, dry, about 50 ft. deep, course N. E.
		Ascend along N. slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
4040	80.00	North 129 lks. from the tangent.
		Set a sandstone 32x21x6 ins. 21 ins. in the ground for the 139th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 139 M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land rolling.
		Soil sandy and rocky, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4040 ft. Thermometer 55°.

		140th Mile.
		S. 89° 51' E. on tangent to the parallel.
		Ascending along north slope.
	45.50	Narrow rock cañon 30 ft. deep, dry, course N. Ascend.
4100	57.50	Top of rocky ridge, bears N. and S. Descend.
	60.00	Dry gulch, course N. E. Ascend along N. W. slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
4200	80.00	North 150 lks. from the tangent.
		Set a sandstone 30x12x10 ins. 20 ins. in the ground for 140th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 140 M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high

ALTITUDE	CHAINS	
		east of cor. Pits impracticable.
		This cor. stands on north edge of mesa.
		Castle Rock bears N. 74° E. Sentinel Rock bears
		N. 33° 20' W. North end of Table Mountain bears
		S. 51° E.
		Land rough and broken.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass and sage.
		Barometer 4200 ft. Thermometer 60°.

		141st Mile.
		S. 89° 51' E. on tangent to the parallel.
		Descend over rock cliffs, bears N. W. and S. E.
	22.00	Foot of steep slope about 250 ft. below top, bears
		N. W. and S. E. Descend gradually.
	61.00	Dry gulch course N.E.
		Difference between measurements of 80 chs. by two
		sets of chainmen is 16 lks. Position of middle point
		by 1st set 80.08 chs. By 2nd set 79.92 chs.
		The mean of which is
3900	80.00	North 172 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 18 ins. in the ground to bed rock
		for 141st mile cor. A brass cap on top of the
		pipe has raised letters UTAH on N. ARIZ. on S. and
		141 M. stamped in the center. Dug pits 36x36x18 ins.
		N. S. E. and W. of the cor. 6 ft. dist. and raised a
		mound of earth and stone 5½ ft. base 2½ ft. high
		around the post.
		Castle Rock bears N. 67° 10' E.
		Sentinel Rock bears N. 51° 15' W.
		Land sloping N. E.
		Soil rocky and sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 3900 ft. Thermometer 75°.

1408
BOOK 2628

Erratum.

142d mile.

The length of the 142d mile found by the examiner to be 77.71 chs. in length. See report of examination.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		142nd Mile.
		S. 89° 50' E. on tangent to the parallel.
		Descending along N. E. slope.
	53.00	West bank of Sentinel Rock Creek.
		Stadia measurement. Level, Rod 3.19 ft. = 319 ft. + C = 1.15 = 320.15 ft. = 4.85 chs. + 53.00 = 57.85 chs.
3600	55.00	Dry bed of creek 75 lks. wide, banks 80 ft. high, course S. E. for about 5 chs. then S.
	57.85	Stadia point, tape measurement from here. Ascend. Difference between measurements of 75.15 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 75.18 chs. By 2nd set 75.12 chs. The mean of which is 75.15 + 4.85 chs. =
3825	80.00	North 196 lks. from the tangent
		Set a sandstone 36x18x12 ins. 24 ins. in the ground for 142nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 142 M. on W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land broken and rocky, 3rd rate.
		Vegetation: grass and sage.
		Barometer 3825 ft. Thermometer 79°.

		143rd Mile.
		S. 89° 49' E. on tangent to the parallel.
		Ascend over rolling sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
3950	80.00	North 221 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 2 ft. in the ground to bed rock for 143rd mile cor. A brass cap on top of the

ALTITUDE	CHAINS	
		pipe has raised letters UTAH on N. ARIZ. on S. and 143 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth and stone 5½ ft. base 2½ ft. high around the post.
		Land rolling.
		Soil rocky and sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 3950 ft. Thermometer 82°.
		Castle Rock bears N. 7 ° 30' E. about a mile dist.
		144th Mile.
		S. 89° 49' E. on tangent to the parallel.
		Ascend over rolling land.
4025	27.60	Top of ridge bears N. and S. Castle Rock bears N. 10° 55' W. Thence over rolling ground.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
3975	80.00	North 247 lks. from the tangent.
		Set a sandstone 30x10x7 ins. 20 ins. in the ground for the 144th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 144 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. and raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 3975 ft. Thermometer 78°.
		Castle Rock bears N. 43° 15' W.
		May 8th, 1901.

BOOK 2628

ALTITUDE	CHAINS	
		At the 144th mile corner, May 9th, 1901, at 4h 16m A.M. l.m.t. I observe Polaris at eastern elongation in accordance with instructions in the manual and mark the line so determined on a plug driven in the ground north of my station.
		At 8h A.M. I lay off the azimuth of Polaris 1° 31.9' to the west and mark the true meridian so determined on a plug driven in the ground north of my station.
		The magnetic bearing of the true meridian is N. 14° 59' W' This reduced by the table page 100 of the manual gives the mean magnetic declination 14° 56' E.
		I now lay off an angle of 90° to the east from the said meridian for the tanget to the parallel.
		In all these operations the mean of at least four sights is taken with the telescope reversed at each sight, taking care beforehand, that the instrument is in perfect adjustment. I compare the tapes with the standard and find them correct.
		145th Mile.
		East on tangent to the parallel.
	34.60	Ascen gradually. Top of ridge, bears N. and S. Descend gradually.
4100	72.00	Colorado River bluff, bears N. E. and S. W. Descend.
		The Tower bears S. 71° 38' E. across the river about 7 miles dist. A red point south salient of cliffs bears N. 55° 02' E.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point
		by ist set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
4035	80.00	North .76 of 1k. from the tangent.
		Set a sandstone 33x8x7 ins. 22 ins. in the ground for 145th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 145 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.

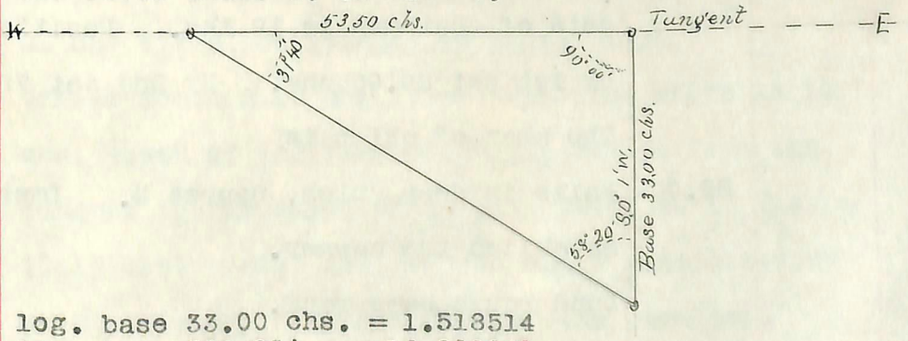
ALTITUDE	CHAINS	
		Pits impracticable.
		Land rolling and broken.
		Soil sandy, 3rd rate.
		Vegetation: grass and sage.
		Barometer 4035 ft. Thermometer 60°.

		146th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over rugged bare sandstone.
	1.00	Stadia measurement from this point. Angle 6° - Rod 10.42 double = 2084 ft. Constant 98.92 x 20.84 = 2061.49 + C. = 1.14 = 2062.63 ft. = 31.25 chs. + 1 ch.= 32.25 chs.
3875	32.25	On west wall of Colorado River cañon, perpendicular 600 ft. above the water at the mouth of Warm creek that comes in through a cañon from the N. W. This wall bears S. and N. W. along the west side of Warm creek. The river cañon wall comes from the N. E. and turns S. at this point. Chimney Rock bears N. 51° 54' E. A south salient of red cliffs bears N. 49° 55' E.
		I set a flag across the river on this line and as it is impossible to get a base from this point for triangulation, I set a flag at this point in a mound of stone and proceed to transport the outfit across the river.
		May 9th, 1901.
		For the next few days we are busy getting the pack train down to the water's edge at the old Ute Crossing or what is known as the "Crossing of the Fathers," about 3 miles north and five miles east of this point. The river was nearly at high water mark, deep, swift and full of whirlpools. We had a four oared boat from Lees Ferry and carried the provisions, camp outfit, the men and the burros over in the boat and

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Swam the seventeen horses one at a time behind the boat.
		Established the 4th Astronomical Station on a little rocky butte at a bend in the river on the N. W. side. The water can be reached at this point. Owing to the walls of the cañon being nearly perpendicular, there are very few places where the water can be reached on the west side of the river and none on the east side from the Ute crossing down several miles below where the boundary line crosses. I set a flag at the Astronomical Station.
		May 17th, 1901, went to the flag on the tangent line on the east side of the Colorado River. Set the instrument at this point and take a back sight on the flag on the west side of the river. Turn an angle of 90° from this flag to the south and measure a base line of 33.00 chs. course S. 0° 01' W.
		Set instrument at south end of base line and sight to flag on north end. Measure the angle to the west to the flag on the west side of the river. Find the mean of four sights to be 58° 20' . The flag across the river bears N. 58° 19' W.



log. base 33.00 chs. = 1.518514
log. tan. 58° 20' =10.209849
1.728363 = 53.50 chs. +

32.25 chs. = 85.75 chs.

Ran [illegible] from N. end of base 5.75 chs. = 80.00chs

The water in the river is inaccessable from the east side of the river which is about 10.00 chs. wide at this point. Elevation of the water in the river is 3275 ft.

3275

BOOK 2623

BOOK 2628

ALTITUDE	CHAINS	
4100	80.00	North 3 lks. from the tangent.
		Set a sandstone 31x12x6 ins. on bare rock for 146th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 146 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor, and raised a mound of stone 5½ ft. base 2½ ft. high east of cor. *Pits impracticable.*
		Land nearly all bare rock.
		Soil none.
		Vegetation none.
		This cor. stands on bare rock near the top of the river cañon on the east side of the river that bears S. and N. about 3 chs. then turns to the N. E. The cañon wall slopes to the west. Water worn sandstone to the water's edge.
		Barometer 4100 ft. Thermometer 80°.

		147th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend over bare san dstone.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
	80.00	Falls in deep gulch, course N. Impracticable to establish the corner.
		Land rough bare rock.
		Soil very little, nearly all rock.
		Vegetation very scanty.

		148th Mile.
		S. 89° 58' E. continuing on the tangent.
4275	4.52	North 7 lks. from the tangent.
		Set a sandstone 36x18x6 ins. on bare rock for the 147th mile cor. Marked UTAH on N. 37 N. L. on E.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		ARIZ. on S. 147.056 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		About 2 chs. north to the cañon wall, drops nearly vertical about 1000 ft. to the water's edge.
		Barometer 4275 ft. Thermometer 80°.
		S. 89° 58' E. continuing on the tangent.
		Over broken rock along the cañon wall.
	9.50	Offset 10.00 chs. south to avoid river cañon.
		Ran S. 89° 58' E. parallel with the tangent.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
	80.00	Point for 148th mile cor. comes on broken cliff.
		Impracticable to establish the corner.
		Land rough, rocky and broken.
		Soil very scanty, nearly all solid rock.
		Vegetation very scanty, grass and sage.

		149th Mile.
		S. 89° 57' E. continuing on offset line.
4300	7.32	Offset north 2.90 chs. from this line which is 10 chs. south of the tangent. The offset from the tangent to the parallel at this point is 13 lks. = 10.13 chs. - 2.90 chs. = 7.23 chs. The distance which this cor. stands south of the parallel.
		Set a sandstone 38x21x6 ins. on the bare rock for witness cor. for the 148th mile cor. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 148.092 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		The true point on the parallel falls in the canon about 800 ft. lower.
		Land rough, rocky and broken.
		Barometer 4300 ft. Thermometer 80°.
		S. 89° 57' E. continuing on offset line 10.00 chs. south of the tangent and parallel with it.
		Along south wall of canon.
	35.32	Leave bare rock, enter sand hills, bears N. and S. Set back north 10.00 chs. to the tangent. Thence S. 89° 57' E. on the tangent to the parallel.
	72.32	On spur, slopes N. Chimney Rock bears N. 17° 07' E. The Tower bears S. 49° 00' E.
		Difference between measurements of 72.68 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 72.71 chs. By 2nd set 72.65 chs.
		The mean of which is 72.68 chs. + 7.32 chs. =
4500	80.00	North 19 lks. from the tangent.
		Set a sandstone 30x18x6 ins. 20 ins. in the ground for 149th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 149 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land rolling and broken.
		Soil rocky and broken, 4th rate.
		Vegetation: grass and sage.
		Barometer 4500 ft. Thermometer 85°
		River Canon about 20.00 chs. N.

		150th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over sand hills along N. slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.

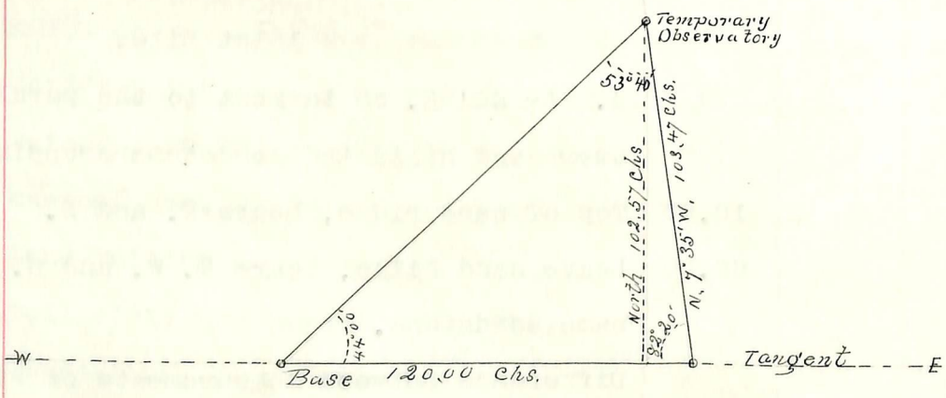
BOOK 2628

ALTITUDE	CHAINS	
		The mean of which is
4550	80.00	North 27 lks. from the tangent.
		Set a sandstone 30x15x6 ins. 20 ins. in the ground for 150th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 150 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Chimney Rock bears N. 0° 40' W. The Tower bears S. 32° 10' E. Red point south salient of cliffs, bears N. 43° W. From the point of the tangent 27 lks. south of the corner I turn an angle from the tangent line produced, course S. 89° 56' E. to the north of 44° to the flag at the temporary astronomical observatory across the river. Flag bears N. 46° 04' E.
		Land rolling.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass and sage.
		Barometer 4550 ft. Thermometer 85°.

		151st Mile.
		S. 89° 56' E. on tangent to the parallel.
		Over sand hills and sandstone croppings. Ascend.
	10.00	Top of sand ridge, bears N. and S. Descend.
	62.00	Leave sand hills, bears N. W. and S. E. Thence over bare sandstone.
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs.
		The mean of which is
4520	80.00	North 37 lks. from the tangent.
		Set a sandstone 34x12x6 ins. on bare rock for 151st mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 151 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high

ALTITUDE	CHAINS	
		east of cor. Pits impracticable.
		The Tower bears S.8° 20' E.
		Chimney Rock bears N. 15° W.
		Land rolling and broken.
		Soil sandy and rocky, 4th rate and none.
		Vegetation: grass and sage.
		Barometer 4520 ft, Thermometer 85°.

		152nd Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over bare sandstone on which there are many cone shaped buttes of sandstone about 30 ft. high.
	40.00	At this point I take a back sight along the tangent which bears N. 89° 55' W. and measure the angle towards the north of 82° 20' to the flag at the temporary astronomical station across the river. Flag bears N. 7° 35' W. Then taking the angles as measured from the tangent we have 44° 00' + 82° 20' + 53° 40' = 180° 00'.



Then Sin. 53° 40': Sin. 44° 00' :: base 120.00 chs.

log, sin. 44° 00' = 9.841771
log. 120 chs. = 2.079181
a. c. sin. 53° 40' = 0.093889
2.014841 = 103.47 chs. N. 7° 35' W.

This by latitude and departure gives 102.57 chs. north of the tangent. The latitude found at the temporary observatory by astronomical observation is 37° 01' 06.8". This equals 101.77 chs. north of the parallel. The tangent south of the parallel at the 151st mile cor. is 37 lks. Consequently this cor. stands 43 lks.

BOOK 2628

ALTITUDE	CHAINS	
		south of the true parallel as determined by astronomical observation. This being within the limit of 3" of arc allowed in the instructions I continue the line.
4300	48.00	On west brink of chasm, bears N. W. and S. E. Stadia measurement. Level. Rod 10.79 ft. = 1079 ft.+ C = 1.15 = 1080.15 ft. = 16.36 chs. + 48 chs. = 64.36 chs.
3900	50.00	Bottom of narrow chasm worn in the sandstone about 75 lks. wide and about 400 ft. deep, course N. W.
4300	64.36	Stadia point. Thence by tape measurement. Difference between measurements of 63.64 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 63.67 chs. By 2nd set 63.61 chs. The mean of which is 63.64 chs. + 16.36 chs. =
4300	80.00	North 49 lks. from the tangent. Set a sandstone 32x20x6 ins. on bare rock for the 152nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 152 M. on the W. faces. Raised a mound of,stone 5 ft. base 2 ft. high around the cor. and raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. Land rocky and broken. Soil none; bear rock. Vegetation none. Barometer 4300 ft. Thermometer 88°.

		153rd Mile.
		S. 89° 55' E. on tangent to the parallel. Ascend over ledges of sandstone. Difference between measurements of 26.60 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 26.61 chs. By 2nd set 26.59 chs. The mean of which is 26.60 chs.
4350	26.60	North 53 lks. from the tangent. Set a sandstone shaft 6 ft. long by 28 ins. broad by

ALTITUDE	CHAINS	
		12 ins. thick dressed 8 ins. down from the top set 3 ft. in the ground for the 4th Astronomical Monument, marked UTAH on N. 37 N. L. on E. ARIZONA on the S. and 152.332 M. deeply graven in the stone on the W. faces. Raised a mound of stone 6 ft. base and 2 ft. high around the shaft. Dug pits 36x36x18 ins. N. S. E. and W. from the cor. This cor. stands at the west base of the detritus from a great sandstone butte with a spire top that raises over a 1000 ft. above the plain and the pinnacle of which is nearly on the parallel. I have called it the State Line Butte. From this monument Chimney Rock bears N. 32° W' The Tower bears S. 25° W. The Tower is a great rock about 10 chs. square and flat on the top that rises out of the plain to a height of 1300 ft. This Astronomical Monument was not erected directly south of the temporary observatory for the reason that there was no stone there suitable for the shaft. The sandstone being coarse and friable and easily disintergrated, and owing to deep chasms, it was found impracticable to transport a stone of sufficient size to that point.
		From the tangent at this point I offset south 6.43 chs. to avoid the State Line Butte, the top of which is inaccessable. Ran S 89° 55' E. on the offset line parallel to the tangent. Stadia measurement. Angle 8° + Rod 7.715 ft. double = 1543 ft. Constant 98.06 X 1543 = 1513.06 + C = 1.14 = 1514.20 ft. = 22.94 chs. + 26.60 = 49.54 chs.
4600	49.54	On top of ledge of sandstone, bears N. W. and S. Top of spire of State Line Butte about 8 chs. N. W. Elevation of top of spire about 5600 ft. Stadia measurement. Angle 10°- Rod 12.00 ft. Constant 96.98 x 1200 = 1163.76 + C = 1.13 = 1164.89 ft. = 17.65 chs. + 49.54 chs. = 67.19 chs.
	55.00	Foot of rock bears N. and S.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	67.19	Stadia point on plain. Set back, North 6.43 chs. to the tangent line. Thence S. 89° 55' E. on the tangent to the parallel, by tape measurement. Descend gradually. Difference between measurements of 39.41 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 39.43 chs. By 2nd set 39.39 chs. The mean of which is 39.41 chs. + 40.59 chs. =
4400	80.00	North 62 lks. from the tangent. Set a sandstone 30x14x6 ins. 20 ins. in the ground for 153rd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 153 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. Land rolling and broken. Soil rocky, 4th rate. Vegetation: grass and sage. Barometer 4400 ft. Thermometer 76°. May 17th, 1901.

May 18th, 1901, at 153rd mile cor. at 3h 41m A.M. l.m.t. I observe Polaris at eastern elongation in accordance with instructions in the manual and marked the line so determined on a plug driven in the ground north of my station. At 7h A. M. I lay off the azimuth of Polaris 1° 31.9' to the west and mark the true meridian so determined on a plug driven in the ground north of my station. Magnetic bearing of the true meridian is N. 15° 28' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 25' E. I now lay off an angle of 90° from the north to the east for the tangent to the parallel. In all these observations the mean of four sights is taken, the telescope reversed at each sight. I compare the tapes with the standard and find them correct.

BOOK 2628

ALTITUDE	CHAINS	
		154th Mile.
		East on the tangent to the parallel.
		Descend along N. E. slope.
	50.00	Dry gulch, course N. E. Ascend.
	74.00	Point of spur, slope N. E. Descend over bare sandstone.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
4350	80.00	North .76 of 1k. from the tangent.
		Set a sandstone 30x16x10 ins. on bare rock for 154th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 154 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling and broken.
		Soil sandy, 4th rate.
		Vegetation: grass and sage.
		Barometer 4350 ft. Thermometer 70°.

		155th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Over bare sandstone worn by water in cone shaped hills.
4350	52.28	On rocky spur, slope N. W. Stadia from this point.
		Angle 3° - Rod 8.80 double = 1760 ft. Constant 99.73 x 1760 ft. = 1755.25 ft. + C = 1.15 = 1756.40 ft. = 26.61 chs. + 52.28 chs. = 78.89 chs.
3950	63.00	Bottom of chasm about 400 ft. deep 50 lks. wide with a little water in the bottom, course N. W.
	78.89	Stadia point on rock; thence by tape measurement.
		Difference between measurements of 53.39 chs. by two sets of chainmen is 8 lks. Position of middle point

BOOK 2628

ALTITUDE	CHAINS	
		by 1st set 53.43 chs. By 2nd set 53.35 chs.
		The mean of which is 53.39 chs. + 26.61 =
4250	80.00	North 3 lks. from the tangent.
		Set a sandstone 36x16x10 ins. on bare rock for 155th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 155 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rough and broken, bare sandstone.
		Soil none.
		Vegetation none.
		Barometer 4250 ft. Thermometer 82°.

		156th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend over broken rocks.
	45.00	Foot of rugged cliffs, bears N. W. and S.E. Ascend.
		Stadia measurement, Angle 10°+ Rod 10.00 Constant 96.93 x 1000 ft. = 969.80 + C = 1.13 = 970.93 ft. = 14.71 chs. + 45.00 chs. = 59.71 chs.
	59.71	Stadia point. Angle 30° + Rod 8.00 double = 1600 ft. Constant 75.00 x 1600 = 1200 + C = 0.99 = 1200.99 ft = 18.19 chs. + 59.71 chs. = 77.90 chs.
	77.90	Top of wall, bears N. W. and S. E. Thence by tape measurement.
		Difference between measurements of 47.10 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 47.13 chs. 2nd set 47.07 chs.
		The mean of which is 47.10 chs. + 32.90 chs. =
5250	80.00	North 7 lks. from the tangent.
		Set a sandstone 34x16x7 ins. on bare rock for 156th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 156 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. and raised

ALTITUDE	CHAINS	
		a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. on cliffs about 1000 ft. high.
		Land rugged and broken.
		Soil none.
		Vegetation - a little sage in crevices of the rocks.
		Barometer 5250 ft. Thermometer 80°.

		157th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Over broken rock.
	5.00	I find it impossible to proceed any further on this line owing to the great chasms and cliffs, therefore I offset south 89.00 chs. from the tangent; thence I run S.89° 58' E. on the offset line parallel with the tangent over bare sandstone.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by 1st set 80.08 chs. By 2nd set 79.92 chs.
		The mean of which is
4600	80.00	North 12 lks. from the offset line.
		Set a sandstone 33x14x6 ins. on bare rock for witness cor. for 157th mile cor. 89.00 chs. south of the parallel. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 157 M. on the W. faces.
		Raised a mound of stone 5 ft. base and 2 ft. high around the cor. Raised a mound of stone 5½ ft. base and 2½ ft. high east of cor.
		Pits impracticable.
		Land mostly bare rock.
		Soil none.
		Vegetation none.
		Barometer 4600 ft. Thermometer 77°.
		May 18th, 1901.

BOOK 2628

ALTITUDE	CHAINS	
		I examine the adjustments of the instrument and compare the tapes with the standard and find them correct.
		158th Mile.
		S. 89° 57' E. on offset line 89.00 chs. south of the tangent and parallel with it. The line traversed by the parallel is wholly inaccessable.
		Ascend over bare sandstone.
	80.00	Comes in saw tooth gap of great wall that bears N.W. and S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 20 lks. Position of middle point by 1st set 80.10 chs. By 2nd set 79.90 chs.
		The mean of which is 80.00 chs.
		Impracticable to establish the cor.
		Land very rough and much broken.
		Soil - sand and bare sand rock.
		Vegetation - grass and sage in crevices of the rocks.

		159th Mile.
		S. 89° 57' E. on offset line 89.00 chs. south of the tangent.
		Descend.
4400	9.60	North 20 lks. from the offset line.
		Set a sandstone 40x16x8 ins. 27 ins. in the ground for witness cor. for the 158th mile cor. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 158.12 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands 89.00 chs. south of the parallel at foot of cliffs on east side of great wall and at the head of a rock chasm, course N. E.
		Impracticable to get any nearer the parallel.
		Barometer 4400 ft. Thermometer 72°

ALTITUDE	CHAINS	
		S. 89° 57' E. on offset line 89.00 chs. south of the tangent and parallel with it.
		Over rough broken country across chasm and over denuded sandstone.
	11.60	Stadia measurement. Angle 9°- Rod 12.84 single = 1284 ft. Constant 97.55 x 1284 = 1252.54 + C = 1.13 = 1253.67 ft. = 18.99 chs. + 11.60 chs. = 30.59 chs.
	30.59	Rock spur, slopes N. W. Descend. Thence by tape measurement.
		Difference between measurements of 51.41 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 51.44 chs. By 2nd set 51.38 chs.
		The mean of which is 51.41 chs. + 18.99 chs. + 9.60=
	80.00	Comes in dry bed of creek 1 ch. wide, course N. W.
		Impracticable to establish cor.
		Land rough, broken and rocky.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.

		160th Mile.
		S. 89° 56' E. on offset line 89.00 chs. south of the tangent.
		Ascend.
4500	19.21	North 29 lks. from the offset line.
		Set a sandstone 30x16x6 ins. on bare rock on top of a cone shaped butte for witness corner for 159th mile cor. 89.00 chs. south of the parallel. It is impracticable to get any nearer the parallel. This cor. marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 159.24 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. and raised a mound of stone 5½ ft. base 2½ ft. high east of the cor. Pits impracticable.
		Barom 4500 ft. Ther 80°
		May 19th, 1901.

BOOK 2628

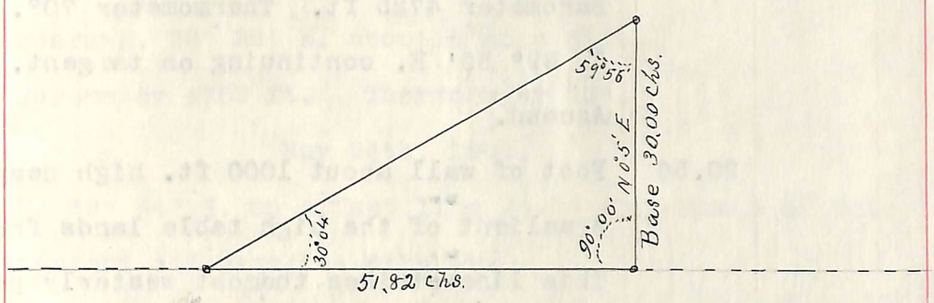
BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		S. 89° 56' E. on the offset line 89.00 chs. south of the tangent and parallel with it.
		Stadia measurement. Level. Rod 11.25 double = 2250 ft. + C = 1.15 = 2251.15 ft. = 34.10 chs. + 19.21 chs. = 53.31 chs.
	53.31	Stadia point. Angle 9° + Rod 11.95 double = 2390 ft. Constant 97.55 x 2390 = 2331.84 ft. + C = 1.13 = 2332.97 ft. = 35.34 chs. + 53.31 chs. = 88.65 chs.
	80.00	End of 160th mile comes in rock gulch. Impracticable to establish corner.
	88.65	Comes in gap of rock wall that bears N. W. and S. E. Rocks on each side of gap rise to a height of 700 or 800 ft. above the gap. From this point I run north 89.00 chs. to intersect the tangent to the parallel. Thence I run N. 89° 55' W. back to the westward on the tangent to the parallel 8.65 chs. leaving 80.00 chs.
4475	80.00	The end of the 160th mile.
		North 37 lks. from the tangent.
		Set a sandstone 30x19x6 ins. on bare sandstone on the boundary line for 160th mile cor. Marked UTAH on N. 3L N. L. on E. ARIZ. on S. and 160 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rough and broken.
		Soil none: all bare sandstone.
		Vegetation - none.
		This cor. stands on bare sandstone sloping N. about 15 chs. west to foot of inaccessable cliffs, that bear N. W. and S. E. and rise to a height of more than 1000 ft. above the cor.
		Barometer 4475 ft. Thermometer 70°.

ALTITUDE	CHAINS	
		161st Mile.
		S. 89° 55' E. on tangent to the parallel.
		Descending over denuded sandstone.
		Stadia measurement. Angle 4° - Rod 10.37 single = 1037 ft. Constant 99.51 x 1037 = 1031.92 + C = 1.15 = 1033.07 = 15.65 chs.
	10.00	Bottom of chasm, course N. E.
	15.65	Stadia point on spur, slopes N. E. Angle 4°- Rod 11.99 ft. = 1199 ft. ft. Constant 99.51 x 1199 = 1193.12 + C = 1.15 = 1194.27 ft. = 18.09 chs. + 15.65 chs. = 33.74 chs.
	33.74	On the east side of a rounded sandstone butte, there is a very deep chasm about 10.00 chs. ahead, too far across for stadia measurement and no chance for a base line on this side. I build a sight mound here and erect a flag at this point.
		May 20th, 1901.
		We spend the next three days trying to get the camp outfit somewhere near the line, but the country is so rough that we cannot get the animals within 6 miles of the line at the point where we left it.
		May 24th, 1901, succeeded in reaching the line at last. Had to use the men for transporting a light camp outfit. By difficult and dangerous climbing succeeded in crossing the chasm from the east side and projected the tangent eastward. Set a flag on the line on the bluff across the chasm, went to it and sighting on flag on west side on the tangent line turned an angle to the north of 90° for a base line, course N. 0° 05' E. Measured base 30.00 chs. from north end of base sight on flag at south end and measure the angle to the flag across the chasm. The mean of four sights with instrument reversed at each sight gives this angle 59° 56'.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		
		Then base = 30.00 chs. X tan. 59° 56'.
		log. 30.00 chs. = 1.477121 log. tan. 59° 56' =10.237394 1.714515= 51.82 chs. +
		33.74 chs. = 85.56 chs.
		Continuing from flag at west side of chasm.
3900	45.00	Bottom of chasm about 800 ft. deep, about 1 ch. wide at bottom between the wall, a small stream of water 20 lks. wide, course N. W.
	80.00	Comes on inaccessable cliffs. Impracticable to establish the corner.
		Land very rough, bare sandstone.
		Soil none.
		vegetation none.

		162nd Mile.
		Continuing on tangent S. 89° 55' E.
		Ascend.
4725	5.56	On top of bluff or bench, bears N. W. and S. E. about 800 ft. above bottom of chasm, the triangulation point.
		North 50 lks. from the tangent.
		Set a sandstone 30X14X12 ins. 20 ins. in the ground for 161st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 161.069 M. on the W. faces.
		Raised a mound of stone 5 1/2 ft. base 2 1/2 ft. high east of cor. Pits impracticable.
		West edge of rock wall bears N. 15° 08' E. about a mile dist. East edge of high rock wall west of chasm bears S. 6° 12' E. abot 5 miles dist.

ALTITUDE	CHAINS	
		Barometer 4725 ft. Thermometer 70°.
		S. 89° 55' E. continuing on tangent.
		Ascend.
	20.56	Foot of wall about 1000 ft. high nearly perpendicular.
		A salient of the high table lands from the east.
		This line strikes the most westerly point. Impassable.
		Offset south 10.00 chs. Thence S. 89° 55' E. on
		offset line parallel with the tangent.
	55.56	Foot of wall, bears N. W. and S. E. Impassable.
		Offset south 14.00 chs.+ 10.00 chs. = 24.00 chs.
		south of the tangent. Ran S. 89° 55' E. on the off-
		set line parallel with the tangent. A vertical wall
		of sandstone about 1000 ft. high on the north and
		an eroded chasm about 600 ft. deep on the south.
	80.00	Point for 162nd mile cor. comes on sloping sand stone
		Impracticable to establish the cor.
		Difference between measurements of 74.44 chs. by two
		sets of chainmen is 14 lks. Position of middle point
		by 1st set 74.51 chs. By 2nd set 74.37 chs.
		The mean of which is 74.44 + 5.56 = 80.00 chs.
		Land broken and rocky.
		Soil rocky, 4th rate.
		Vegetation grass and sage.

		163rd Mile.
		S. 89° 54' E. on offset line 24.00 chs. south of
		the tangent.
		Ascend.
4750	14.00	North 64 lks. from the offset line.
		Set a sandstone 33X10X6 ins. 22 ins. in the ground
		for witness cor. for 162nd mile cor. Marked W. C.
		UTAH on N. 37 N. L. on E. ARIZ. on S. and 162.175 M.
		on the W. faces. Raised a mound of stone 5 1/2 ft.
		base 2 1/2 ft. high east of cor. Pits impracticable.
		This cor. stands on a sharp rocky spur, sloping S.

ALTITUDE	CHAINS	
		24.00 chs. south of the parallel. A sandstone peak bears S. 38° 26' E. about a mile dist.
		Barometer 4750 ft. Thermometer 70°.
		May 24th, 1901.
		S. 89° 54' E. on offset line 24.00 chs. south of the tangent and parallel with it.
		Over broken, rugged south slope.
		Stadia measurement Angle 3° + Rod 11.48 = 1148 ft.
		Constant 99.73 x 1148 = 1144.90 ft. + C = 1.15 =
		1146.05 ft. = 17.36 chs. + 14.00 = 31.36 chs.
	31.36	Stadia point. Level. Rod 9.095 double = 1819 ft.
		+ C. = 1.15 = 1820.15 ft. = 27.58 chs. + 31.36 chs.=
		58.94 chs.
	58.94	Foot of great wall about 1000 ft. high, bears N. W.
		and S. E. Impassable. Offset south 20.00 chs.
		making 44.00 chs. south of the tangent, thence S.
		89° 54' E. on offset line parallel with the tangent.
		Stadia. Level. Rod 7.80 double = 1560 ft. + C = 1.15=
		1561.15 ft. = 23.65 chs. + 58.94 chs. = 82.59 chs.
	60.30	Dry gulch course S.W. Ascend.
	80.00	Point for 163rd mile cor. comes on steep end slope.
		Impracticable to establish corner.
		Land rocky and broken.
		Soil rocky, 4th rate.
		Vegetation: grass and sage.

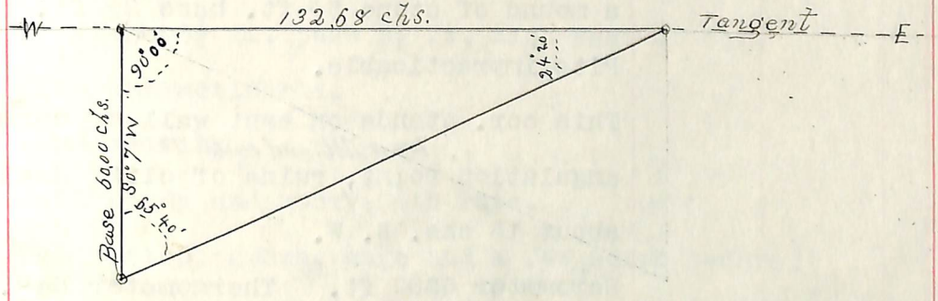
		164th Mile.
		Continuing on offset line S. 89° 53' E.
4800	2.59	North 76 lks. from the offset line.
		Set a sandstone 30x12x10 ins. 20 ins. in the ground for witness corner for 163rd mile cor. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 163.032 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. This cor. stands on rocky spur sloping S. W.

ALTITUDE	CHAINS	
		opposite mouth of canon that comes from S. E.
		This cor. stands 44.00 chs. south of the parallel.
		Barometer 4800 ft. Thermometer 70°.
		Thence S. 89° 53' E. on offset line 44.00 chs. south
		of the tangent and parallel with it.
		Stadia. Angle 15° + Rod 11.775 double = 2355 ft.
		Constant 93.30 x 2355 = 2197.22 + C = 1.11 =
		2198.33 ft. = 33.30 chs. + 2.59 chs. = 35.89 chs.
	35.89	Stadia. Angle 31°+ Rod 13.00 = 1300 ft. Constant
		73.32 x 1300 = 955.76 + C = 0.98 = 956.74 ft. =
		14.49 chs. + 35.89 chs. = 50.38 chs.
5800	50.38	Top of bluffs, west edge of mesa bears N. W. and
		S. E. Ran north 44.00 chs. to the tangent line.
		Thence S. 89° 53' E. on the tangent to the parallel.
		Over high mesa, gently rolling sand hills.
		By tape measurement.
		Difference between measurements of 26.94 chs. by two
		sets of chainmen is 2 lks. Position of middle point
		by 1st set 26.95 chs. By 2nd set 26.93 chs.
		The mean of which is 26.94 chs. + 50.38 = 77.32 chs.
5850	77.32	On the west edge of a very deep canon, bears N. W.
		and S. E. over 1000 ft. deep. Though it lacks 2.68
		chs. of the 164th mile cor. the point where it comes
		being inaccessable, I place the cor. at this point.
		North 91 lks. from the tangent.
		Set a sandstone 36x18x7 ins. on bare rock for 164th
		mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on
		S. and 163.966 M. on the W. faces. Raised a mound
		of stone 5 ft base 2 ft. high around the cor.
		Raised a mound of stone 5½ ft. base 2½ ft. high east
		of cor. Pits impracticable.
		Barometer 5850 ft. Thermometer 60°.
		May 25th, 1901.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		May 26th, 1901, I examine and carefully adjust the transit and compare the tapes with the standard. I set a flag on the line across the cañon and turn 90° to the south from the tangent line, for a base which bears S. 0° 07' W. I leave a flag at this cor. and measure the base line 60.00 chs. From the south end of the base take a back sight on the flag at the north end and measure the angle to the flag on the east side of the cañon. The mean of four sights with the telescope reversed at each sight is 65° 40' I now leave a flag at the south end of the base and go to, the flag at the east side of the cañon. Back sight on flag at north end of base and measure the angle to the flag at the south end. This angle is 24° 20'



Then base 60.00 chs. x tan. 65° 40'.

log. 60.00 chs. =1.778151
log. tan. 65° 40' =10.344652

2.122803 = 132.68 chs.

Thence continuing from flag on west side of cañon. Descend.

	80.00	Point for 164th mile cor. Inaccessable.
		Land mountainous, rolling and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage and a few scrub cedars.

165th Mile.

S. 89° 53' E. on tangent to the parallel.

5750	42,00	Bottom of cañon, course N. W. about 1000 ft. deep.
		Ascend.

ALTITUDE	CHAINS	
	80.00	Point for 165th mile cor. falls on N. slope of cañon wall. Inaccessable.
		Land mountainous, rough and broken.
		Vegetation: grass, sage and scrub cedar.

		166th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Over broken north slope of cañon wall.
	30.00	Bottom of another cañon about 600 ft. deep near its head, course N. W.
6200	50.00	North 122 lks. from the tangent.
		Set a sandstone 33x11x7 ins. 22 ins. in the ground for 165th mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 165.625 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands on east wall of cañon at the triangulation point, bears N.W. and south 20. links thru S.W. ruins of cliff dwellers' houses about 15 chs. N. W.
		Barometer 6200 ft. Thermometer 64°.
		Thence continuing on the tangent to the parallel
		Over high mesa. Descend.
	75.00	Rocky gulch, course S. W. Ascend.
	80.00	End of 166th mile falls on rocky west slope.
		Impracticable to establish the corner.
		Land rolling and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation: grass, sage and a few scrub cedars.

		167th Mile.
		S. 89° 51' E. on tangent to the parallel.
		Ascend.
6225	15.00	North 133 lks. from the tangent.
		Set a sandstone 31x12x10 ins. on bare rock for 166th mile cor. Marked UTAH on N. 3L N.L. on E. ARIZ. on S. and 166.187 M. on the W. faces. Raised a

BOOK 2628

ALTITUDE	CHAINS	
		mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Barometer 6225 ft. Thermometer 65°.
		Continuing on tangent to the parallel.
		Over rolling high mesa. Ascend.
	55.00	On ridge, bears N. and S. Thence nearly level. Difference between measurements of 65.00 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 65.02 chs. By 2nd set 64.98 chs. The mean of which is 65.00 chs. + 15.00 chs. =
6400	80.00	North 150 lks. from the tangent. Set a sandstone 30x12x6 ins. 20 ins. in the ground for 167th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 167 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling.
		Soil sandy and rocky, 4th rate.
		Vegetation: grass, sage and a few scrub cedars.
		Barometer 6400 ft. Thermometer 60°.
		May 26th, 1901.

		168th Mile.
		At the 167th mile cor. May 27th, at 3h 6m A. M. l.m.t. I observe Polaris at eastern elongation in accordance with instructions in the manual. I mark the line so found on a plug driven in the ground north of my station.
		At 7h A. M. I lay off the azimuth of Polaris 1° 31.9' to the west and mark the true meridian thus determined on a plug driven in the ground north of my station. The magnetic bearing of the said meridian is N. 15° 08' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 05' E.

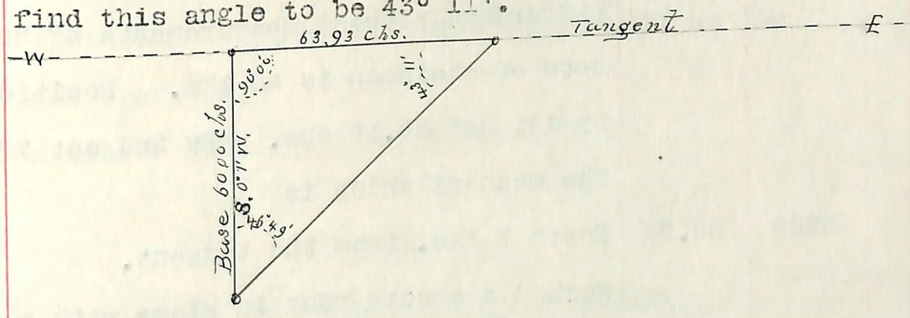
ALTITUDE	CHAINS	
		I now lay off an angle of 90° from the north to the east for the tangent to the parallel. In all of these observations and operations great care is taken to have the transit in perfect adjustment and I take the mean of at least four sights with the telescope reversed at each sight. I compare the steel tapes with the standard and find them correct.
		East on the tangent to the parallel.
		Over high mesa. Ascend.
	21.00	Top of ridge, bears N. and S. Thence over gently rolling land.
	80.00	The end of the 168th Mile.
		As there is a very deep cañon not very far ahead, I advance this cor. to the cañon wall.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is 80.00 chs.
		Land high mesa.
		Soil rocky and sandy, 4th rate.
		Vegetation: grass, sage and scrub cedar.

		169th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Over mesa.
6400	7.00	North .76 of 1k. from the tangent.
		Set a sandstone 48x12x10 ins. 32 ins. in the ground for 168th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 168.087,M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands on the west wall of the cañon about 1500 ft. deep, bears N. and S.
		Barometer 6400 ft. Thermometer 60°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		I set a flag on this line in the bottom of the cañon and turn from it an angle to the south of 90° and measure a base line of 60.00 chs. bearing of base S. 0° 01' W. I leave a flag at the north end and go to the south end of the base, back sight on north end and measure the angle to the flag in the bottom of the cañon. The mean of three sights gives this angle 46° 49'
		May 27th, 1901.
		May 28th, I reached the flag in the bottom of the cañon and measured the angle from the flag on the north end of the base line, on top of the cañon wall to the flag at the south end of the base. I find this angle to be 43° 11'.



Then base 60.00 chs. x tan. 46° 09'.

log. 60.00 chs. = 1.778151
log. tan. 46° 49' =10.027559
1.805710 = 63.93 chs. +

7.00 chs. = 70.93 chs.

	70.93	Triangulation point in cañon. Thence by tape measurement.
4900	78.70	Bottom of cañon 50 lks. wide, small stream of water, course N. W. Ascend.
4930	80.00	North 3 lks. from the tangent. Set a sandstone 30x12x8 ins. on smooth rock sloping S. W. for the 169th mile cor. Marked UTAH on N. 3/ . N. L. on E. ARIZ. on S. and 169 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. Land mountainous, very rough and precipitious. Soil rocky 4th rate.

BOOK 2628

ALTITUDE	CHAINS	
		Vegetation - grass and sage and a few cedars in the crevices of the rocks.
		This cor. stands in a cañon the west wall of which is nearly vertical and 1500 ft. high. East side rises in benches that have been denuded of soul and eroded in cone shaped buttes.
		Barometer 4930 ft. Thermometer 70°.

		170th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend over rounded sandstone buttes.
	35.00	Top of conical sandstone buttes. *Descend.*
	58.00	Deep chasm, dry in the bottom, course N. W.
		Difference between measurements of 80. chs. by two sets of chainmen is 20 lks. Position of middle point by 1st set 80.10 chs. By 2nd set 79.90 chs.
		The mean of which is
5200	80.00	North 7 lks. from the tangent.
		Marked a smooth rock in place with a cross at the point for the 170th mile cor. thus: 170 M. UTAH + ARIZ. 37 N.L.
		Utah on N. 37 N. L. on E. ARIZ. on S. and 170 M. on the W. of the cross. Raised a mound of stone 5½ ft. base 2½ ft. high east of cross. Pits impracticable.
		Land rough and broken.
		Soil none except in crevices.
		Vegetation - grass, sage and cedar in crevices.
		Barometer 5200 ft. Thermometer 70°.
		May 28th, 1901.

		171st Mile.
		S. 89° 58' E. on tangent to the parallel.
		Ascend over bare sandstone.
	30.00	South side of rounded butte.
	50.00	Top of oblong butte bears N. E. and S. W. Descend.

BOOK 2628

ALTITUDE	CHAINS	
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs. The mean of which is
5375	80.00	North 12 lks. from the tangent.
		Set a sandstone 40x20x6 ins. on smooth sandstone sloping E. for 171st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 171 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land mountainous.
		Soil very scanty, mostly bare rock.
		Vegetation - grass, sage and scrub cedar in the rock crevices.
		Barometer 5375 ft. Thermometer 72°.

		172nd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over rough broken rocky land.
		From a point on the tangent 3.60 chs. west of the 171st mile cor. take stadia measurement. Angle 11°+ Rod 7.45 double = 1487 ft. Constant 96.36 x 1487 = 1432.87 + C = 1.13 = 1434.00 ft. = 21.73 chs. - 3.60 chs. = 18.13 chs.
	2.00	Bottom of rock cañon, dry, 100 ft. deep, course N. W. Ascend.
	18.13	On N. side of round sandstone butte about 300 ft. high. Ascend.
		Stadia. Angle 11°+ Rod 1.94 = 194 ft. Constant 96.36 x 194 = 186.93 + C = 1.13 = 188.06 ft. = 2.85 chs. + 18.13 chs. = 20.98 chs.
	20.98	Stadia level Rod 11.27 double = 2254 ft. + C = 1.15 = 2255.15 ft. = 34.17 chs. + 20.98 = 55.15 chs. Descend.
	30.00	Bottom of cañon about 250 ft. deep, course N. W.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Ascend. Leave bare sandstone, bears N. W. and S. E.
	55.15	On W. slope of hill. Thence by tape measurement.
	64.00	On top of gravel bluff, bears N. W. and S. E.
		Ascend gradually.
		Difference between measurement of 20.85 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set is 20.86 chs. By 2nd set 20.84 chs.
		The mean of which is 20.85 chs. + 55.15 chs.=76.00 chs.
6000	76.00	On top of steep bluff, bears N. W. and S. E. Point for 172nd mile cor. will come on steep north slope among large boulders. I therefore established the cor. at this point.
		North 19 lks. from the tangent.
		Set a sandstone 33x16x10 ins. 22 ins. in the ground for 172nd mile cor. Marked UTAH on N. 3L N. L. on E. ARIZ. on S. and 171.95 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Barometer 6000 ft. Thermometer 72°.
		Continuing on tangent.
		Descend steep N. E. slope.
	80.00	Point for 172nd mile cor. Impracticable to establish the cor. about 150 ft. below top of bluffs.
		Land rough and broken.
		Soil rocky, 4th rate.
		Vegetation- grass and sage.

		173rd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend along N. slope.
	36.00	Top of same bluff, bears N. E. and S. W. Thence across mesa.
6200	60.00	Top of same bluff bears N. E. and S. W. Descend.
6100	61.50	Bottom of rocky cañon, dry, 100 ft. deep, course S. W. Ascend.
		Difference between measurements of 80. chs. by two

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs By 2nd set 79.93 chs. The mean of which is
6450	80.00	North 27 lks. from the tangent. Set a sandstone 48x30x10 ins. 32 ins. in the ground for 173rd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 173 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. This corner on rocky spur, slope S. W. Land rough and broken. Soil rocky, 4th rate. Vegetation - grass and sage. Barometer 6450 ft. Thermometer 70°. May 29th 1901.
		174th Mile.
		S. 89° 56' E. on tangent to the parallel. Descend along south slope.
	17.43	On west wall of cañon bears N. E. and S. W. Descend.
6100	27.00	Bottom of main cañon that comes from west side of Navajo Mountain. Here dry, course S. W. about 350 ft. deep. Ascend. Enter cedar brush, bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By second set 79.96 chs. The mean of which is
7100	80.00	North 37 lks. from the tangent. Set a sandstone 36x30x7 ins. 24 ins. in the ground for 174th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 174 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		A cross on a sandstone, which is 12x12 ft. square and 15 ft. high bears N. 37° 05' W. 34 lks. dist. marked UTAH above the crsss and B.O. below the cross and 174 M. west of the cross, thus: 174 M. UTAH. + B. O. Sandstone cones and water pockets about 3/4 of a mile S. E.
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass, sage and scrub cedar.
		Barometer 7100. Thermometer 65°

		175th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend along south slope of mountain.
	10.00	West edge of rocky canon, course S. W. offset south 50 chs. to avoid impassable cliffs on south slope of Navajo Mountain.
		Thence 89° 55' E. on offset line 50 chs. south of tangent and parallel with it.
		Ascend along south slope.
	54.64	Trail bears N. W. and S. E. to spring about ¼ of a mile N. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
6850	80.00	North 49 lks. from the offset line.
		Set a sandstone 30x12x10 ins. 20 ins. in the ground for witness cor. for 175th mile cor. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 175 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. is 50 chs. south of the parallel and stands on the south slope of Navajo mountain about 1000 ft. lower than its true place on the parallel.

BOOK 2628

ALTITUDE	CHAINS	
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass, sage, scrub cedar and pinon.
		Good timber on the mountain about a mile distant north.
		Barometer 6850 ft. Thermometer 65°.
		May 30th, 1901.

		I examine the adjustments of the transit in all its parts and find it in adjustment.
		Compare the steel tapes with the standard and find them of correct length.
		176th Mile.
		S. 89° 55' E. on offset line 50 chs. south of the tangent and parallel with it.
	50.00	Foot of steep slope bears N. W. and S. E. Ascend.
	63.00	Top of spur, slope S. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
6550	80.00	North 62 lks. from the offset line.
		Set a sandstone 30x16x8 ins. 20 ins. in the ground for witness cor. for 176th mile cor. marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 176 M on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land mountainous.
		Soil rocky, 4th rate.
		Vegetation - grass, sage and scattering scrub cedar and pinon.
		This cor, stands 50 chs. south of the parallel.
		Barometer 6550 ft. Thermometer 66°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		177th Mile.
		S. 89° 54' E. on offset line 50 chs. south of the tangent and parallel with it.
		Along south slope of mountain.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
	80.00	Falls on rocky slope. Impracticable to establish the corner.
		Land mountainous.
		Soil rocky, 4th rate.
		Vegetation - grass, sage, scattering scrub cedar and pinon.

		178th Mile.
		S. 89° 53' E. on offset line 50 chs. south of the tangent and parallel with it.
7100	16.25	Ran north toward the parallel 30.79 chs. which from 50.79 chs. = 20.00 chs. south of the parallel at this point. 50.00 chs. + offset 0.79 chs. = 50.79 chs. - 30.79 chs. = 20.00 chs.
		Set a sandstone 32x14x8 ins. on bare rock for witness corner for 177th mile cor. Marked W. C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 177.203 M. on W. faces. Raised a mound of stone 5 ft base 2 ft. high around the cor. and raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands on rocky spur, sloping S. E. 20.00 chs. south of the boundary line which runs over a precipice of rock.
		Barometer 7100 ft. Thermometer 66°.
		Thence S. 89° 53' E. on offset line 20 chs. south of the parallel and parallel with the tangent.

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ALTITUDE	CHAINS	
		Descend.
	21.25	Foot of rock, bears N. E. and S. W.
	33.25	Dry gulch, course S. W.
	37.25	Dry gulch, course S. W.
	63.30	Dry gulch, course S. W.
		Difference between measurements of 63.75 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 63.77 chs. By 2nd set 63.73 chs. The mean of which is 63.75 chs. + 16.25 chs. =
7000	80.00	North 20.13 chs. to the 37th parallel. The boundary line between UTAH and ARIZONA 20.00 chs. + offset 13 lks. = 20.13 chs.
		Set a sandstone 30x15x10 ins. 20 ins. in the ground for 178th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 178 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A pinon tree 6 ins. diam. bears N. 21° E. 42 lks. dist. marked UTAH 178 M. B.T.
		A pinon tree 6 ins. diam. bears S. 35° E. 24 lks. dist. marked ARIZ. 178 M. B.T.
		A cedar tree 5 ins. diam bears S. 19° 30' W. 79 lks. dist. marked ARIZ. 178 M. B.T.
		A cedar tree 5 ins. diam. bears N. 61° 20' W. 66 lks. dist. marked UTAH 178 M. B.T.
		Land mountainous.
		Soil rocky and sandy, rate.
		Vegetation - grass, sage, cedar and pinon timber.
		Barometer 7000 ft. Thermometer 68°.
		May 31st, 1901.

June 1st, 1901.

At the 178th mile cor. 2h 46m A.M. l.m.t., I observe Polaris at eastern elongation in accordance with instructions in the manual, and mark the line so determined on a plug driven in the ground north of my station.

ALTITUDE	CHAINS	
		7h A.M. I lay off the azimuth of Polaris 1° 31.9' to the west and mark the true meridian thus found on a plug driven in the ground north of my station. The magnetic bearing of the said meridian is N. 15° 13' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 10' E. I now lay off an angle of 90° from this meridian from the north to the east for the tangent to the parallel. In all these observations the mean of at least four sights was taken with the telescope reversed at each sight.
		179th Mile.
		East on the tangent to the parallel.
		Descend over rocky land and through scrub timber.
	17.00	Bottom of rocky ravine about 400 ft. deep. Dry, course S. E. Ascend.
	51.00	Top of bluff, east side of ravine, course N. W. and S. E. Descend gradually.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs. The mean of which is
6750	80.00	North .76 of 1k. from the tangent.
		Set a sandstone 30x16x6 ins. 20 ins. in the ground for the 179th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 179 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A cedar tree 5 ins. diam. bears N. 39° 09' E. 63 lks. dist. marked UTAH 179 M. B.T.
		A cedar tree 4 ins. diam. bears S. 43° 40' E. 57 lks. dist. marked ARIZ. 179 M. B.T.
		A cedar tree 4 ins. diam. bears S. 55° 34' W. 56 lks. dist. marked ARIZ. 179 M. B.T.
		A cedar tree 4 ins. diam. bears N. 11° 35' W. 29 lks.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		dist. marked UTAH 179 M. B.T.
		Land rolling and broken.
		Soil rocky, 4th rate.
		Timber - scrub cedar and pinon.
		Barometer 6750 ft. Thermometer 60°.

		180th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Over rolling land, through timber.
	26.00	Dry gulch, course S. E.
	65.00	Indian trail, bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
6725	80.00	North 3 lks. from the tangent.
		Set a limestone 30x11x10 ins. 20 ins. in the ground for 180th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 180 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A cedar tree 12 ins. diam. bears N 76° 50' E. 111 lks. dist. marked UTAH 180 M. B.T.
		A pinon tree 13 ins. diam. bears S 69° 46' W. 210 lks. dist. marked ARIZ. 180 M. B.T.
		No other trees within limits.
		Land rolling.
		Soil sandy, 3rd rate.
		Timber - cedar and pinon.
		Barometer 6725 ft. Thermometer 70°.

		181st Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over rolling land.
		Difference between measurements of 80 chs. by two

ALTITUDE	CHAINS	
		sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs. The mean of which is
6700	80.00	North 7 lks, from the tangent. Set a sandstone 30x19x6 ins. 20 ins. in the ground for the 181st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. 181 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor. A cedar tree 10 ins. diam. bears N. 42° 42' E. 19 lks. dist. marked UTAH 181 M. B.T. A cedar tree 10 ins. diam. bears S 37° 20' E. 65 lks. dist. marked ARIZ. 181 M. B.T. Other trees too rough to mark for bearing trees. Land rolling. Soil rocky and sandy, 3rd rate. Timber - scrub cedar and pinon. Barometer 6700 ft. Thermometer 68°.
		June 1st, 1901.

		Examine and adjusted the transit and compared the steel tapes with the standard and find them of correct length.
		182nd Mile.
		S. 89° 58' E. on tangent to the parallel. Descend over broken land.
6600	33.70	Top of wall of canon, bears S. E. and N. W. Stadia measurement. Angle 5°- Rod 12.265 double = 2453 ft. Constant 99.24 x 2453 = 2434.36 ft. + C = 1.14 = 2435.50 ft. = 36.90 chs. + 33.70 = 70.60 chs.
6300	36.00	Bottom of gulch, course S. E. Indian trail bears N. and S. E.
6450	70.60	On wall of canon, bears N. W. and S. E. Thence along the wall by tape measurement.

ALTITUDE	CHAINS	
6450	74.33	To edge of wall, bears N. E. and S. W. Descend.
		Stadia measurement. Angle 22° - Rod 7.74 = 774 ft.
		Constant 85.97 x 774ft. = 665.50 + C = 1.06 = 666.56 ft. =
		10.10 chs. + 74.33 chs. = 84.43 chs.
		Measured back west toward cliff. 4.43 chs. leaving
6165	80.00	North 12 lks. from the tangent.
		Set a sandstone 32x14x10 ins. 21 ins. in the ground
		for 182nd mile cor. marked UTAH on N. 37 N. L. on E.
		ARIZ. on S. and 182 M. on W. faces. Raised a mound
		of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands at foot of wall, bears N. E. and S.W.
		about 300 ft. high.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass and sage, scrub cedar and piñon.
		Barometer 6165 ft. Thermometer 62°.

		183rd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Descend.
6075	11.00	Bottom of cañon, dry bed of stream 20 lks. wide,
		course N. E. Ascend.
	28.00	Stadia measurement. Angle 7° + Rod 11.095 double =
		2219 Constant 98.51 x 2219 = 2185.73 + C = 1.14 =
		2186.88 ft. = 33.13 chs. + 28.00 chs. = 61.13 chs.
	61.13	Top of south wall of cañon, bears N. E. and S. W.
		Thence by tape measurement.
6400	65.00	Top of rock cliffs, bears N. E. and S. W. Descend.
		Difference between measurements of 46.87 chs. by two
		sets of chainmen is 6 lks. Position of middle point
		by 1st set 46.90 chs. By 2nd set 46.84 chs.
		The mean of which is 46.87 chs. + 33.13 chs. =
6160	80.00	North 19 lks. from the tangent.
		Marked a sandstone in place, 6½x3½x2 ft.

ALTITUDE	CHAINS	
		above ground with a cross on top for 183rd mile cor. Marked UTAH on N. 37 N.L. on E. ARIZ. on S. and 183 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. A cedar tree 10 ins. diam. bears south 19 lks. dist. marked ARIZ 183 M. B.T.
		No other trees within limits.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, sage, scrub cedar and piñon.
		Barometer 6160 ft. Thermometer 71°.

		184th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend along N. E. slope over broken rocks.
	16.00	Dry gulch, course N. E. Ascend.
6460	32.00	Top of wall about 300 ft. high, bears N. W. and S. Enter timber, same bearings. Thence over high mesa
6500	53.50	Top of ridge bears N. E. and S. W..
		Difference between measurements of 80 chs. by two sets of chainmen is 20 lks. Position of middle point by 1st set 80.10 chs. By 2nd set 79.90 chs.
		The mean of which is
6500	80.00	North 27 lks. from the tangent.
		Set a sandstone 30x13x7 ins. 20 ins. in the ground for 184th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. 184 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		A cedar tree 12 ins. diam. bears N. 46° 30' E. 26 lks. dist. marked UTAH 184 M. B.T.
		A cedar tree 12 ins. diam. bears S. 28° 10' E. 68 lks. dist. marked ARIZ. 184 M. B.T.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		A cedar tree 11 ins. diam. bears S. 59° W. 70 lks. dist. marked ARIZ. 184 M. B.T.
		A cedar tree 10 ins. diam. bears N. 20° 20' W. 51 lks. dist. marked UTAH 184 M. B.T.
		Land mountainous.
		Soil rocky, 4th rate.
		Timber - scrub cedar and piñon.
		Barometer 6500 ft. Thermometer 68°.
		June 2nd, 1901.
		185th Mile.
		S. 89° 56' E. on tangent to the parallel.
		Over rock mesa, through timber.
	15.00	Rocky gulch, course N. E.
6500	54.00	Top of west wall of Pah Ute cañon, bears N. and S. E.
	61.39	Stadia measurement. from point of cliff. Angle 35° - Rod 9.395 double = 1879 ft. Constant 67.10 x 1879= 1260.80 ft. + C (=0.94) = 1261.74 ft. = 19.12 chs. + 61.39 chs. = 80.51 chs.
		Measured back west 51 lks. leaving 80.00 chs.
		Difference between measurements of 61.39 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 61.41 chs. By 2nd set 61.37 chs.
		The mean of which is 61.39 chs. + 19.12 chs. = 80.51 chs. - 51 lks. = 80.00.
5575	80.00	North 37 lks. from the tangent.
		Set a sandstone 38x18x7 ins. on bed rock for 185th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 185 M. on the W, faces. Raised a mound of stone 5 ft base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands at foot of steep slope from west wall of cañon.

ALTITUDE	CHAINS	
		Land mountainous,
		Soil rocky, 4th rate.
		Vegetation - grass, sage and scrub cedar.
		Barometer 5575 ft, Thermometer 75°.

		186th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Descend.
	10.00	Stadia. Angle 25°+ Rod 11.65 double = 2330 ft.
		Constant 82.14 x 2330 = 1913.86 + C = 1.04 = 1914.90
		ft. = 29.01 chs. + 10.00 chs. = 39.01 chs.
5500	18.25	Bottom of Pah Ute cañon, dry bed of stream 20 lks.
		wide, course N. Ascend.
6500	39.01	Top of cliffs, east wall of cañon bears N. E. and
		S. W. Thence across rough mesa.
	80.00	In head of rocky cañon, course S. W. Impracticable
		to establish the cor.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, sage, cedar and piñon.

		187th Mile.
		S. 89° 55' E. on tangent to the parallel.
6450	1.38	North 49 lks from the tangent.
		Set a sandstone 31x20x6 ins. on bare rock for 186th
		mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on
		S. and 186.017 M. on W. faces. Raised a mound of
		stone 5 ft. base 2 ft. high around the cor. and raised
		a mound of stone 5½ ft. base 2½ ft, high east of cor.
		Pits impracticable.
		A piñon tree 10 ins. diam. bears N. 51° 20' E. 178
		lks. dist. marked UTAH 186.017 M. B. T.
		A piñon tree 8 ins. diam. bears S. 20° 05' E. 121 lks.
		dist. marked ARIZ. 186.017 M. B.T.

ALTITUDE	CHAINS	
		No other trees within limits, suitable for bearing trees.
		This cor. stands on east wall of rocky cañon near the head, bears N. W. and S. W.
		Barometer 6450 ft. Thermometer 75°.
		June 3rd, 1901.
		I examine and carefully adjust the transit as to level collimation and stadia wires. Compare the steel tapes with the standard and find them of correct length.
		Ascend over high mesa through scrub timber.
	16.40	Top of spur slope S. Descend.
	26.50	Head of cañon, course S. W. Ascend.
	78.50	Top of ridge, bears N. W. and S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
6750	80.00	North 62 lks. from the tangent.
		Set a sandstone 36x19x6 ins. 24 ins. in the ground for 187th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 187 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor., 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A piñon tree 8 ins. diam. bears N. 11° 20' E. 151 lks. dist. marked UTAH 187 M. B.T.
		A piñon tree 8 ins. dia. bears S 31° W. 146 lks. dist. marked ARIZ. 187 M. B.T.
		No other trees within limits suitable for bearing trees
		Land mountainous.
		Soil rocky, 4th rate.
		Timber - piñon and cedar.
		Barometer 6750 ft. Thermometer 61° .

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		188th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Over rough mesa, through timber.
6750	19.41	On west wall of cañon, bears N. W. and S. E. Descend,
		Stadia measurement. Angle 29° - Rod 12.15 double =
		2430 ft. Constant 76.50 x 2430 = 1858.95 + C. = 1.00
		= 1859.95 ft. = 23.18 chs. + 19.41 chs. = 47.59 chs.
	47.59	Stadia point. Thence by tape measurement.
5590	75.00	Bottom of cañon, dry bed of stream 20 lks. wide, course
		N. W. There is a spring in the head of this cañon
		about 1½ miles S. E. Ascend.
	80.00	Falls on steep west slope among sliding rocks. Im-
		practicable to establish corner.
		Difference between measurements of 51.82 chs by two
		sets of chainmen is 6 lks. Position of middle point
		by 1st set 51.85 chs. By 2nd set 51.79 chs.
		The mean of which is 51.82 chs. + 28.18 = 80.00 chs.
		Land mountainous.
		Soil rocky, 4th rate.
		Vegetation - grass, sage, scrub cedar and piñon.

		189th Mile.
		S. 89°,53' E. on tangent to the parallel.
		Ascend.
6025	16.60	North 79 lks. from the tangent.
		Set a sandstone 46x16x9 ins. 30 ins. in the ground for
		188th mile cor. marked UTAH on N. 37 N. L. on E.
		ARIZ. on S. and 188.207 M. on W. faces. Raised a
		mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		A piñon tree 6 ins. diam. bears N. 51° 40' E. 90 lks.
		dist. marked UTAH 188.207 M. B.T.
		A piñon tree 7 ins. diam. bears S. 30° E. 9 lks. dist.
		marked ARIZ. 188.207 M. B.T.
		No other trees within limits.
		Barometer 6025 ft. Thermometer 68°

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ALTITUDE	CHAINS	
		June 4th, 1901.
		S. 89° 53' E. on tangent to the parallel.
		Ascend over rocks. Stadia measurement. Angle 23°+ Rod 10.76 double = 2152 ft. Constant 84.73 x 2152 = 1823.39 + C = 1.05 = 1824.44 ft. = 27.64 chs. + 16.60 chs. = 44.24 chs.
6800	44.24	On east wall of cañon, bears N. W. and S. E. Thence over high mesa and through timber by tape measurement. Difference between measurements of 35.76 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 35.78 chs. By 2nd set 35.74 chs. The mean of which is 35.76 chs. + 27.64 chs. + 16.60 chs. =
6550	80.00	North 92 lks. from the tangent.
		Set a sandstone 33x16x6 ins. 22 ins. in the ground for the 189th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 189 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		A piñon tree 8 ins. diam. bears N. 29° 20' E. 58 lks. dist. marked UTAH 189M .B.T.
		A piñon tree 13 ins. diam. bears S. 71° E. 114 lks. dist. marked ARIZ. 189 M. B.T.
		No other trees within limits suitable for bearing trees This cor. stands 1 ch. north of the head of the cañon course S. W.
		Land mountainous.
		Soil rocky, 4th rate.
		Timber - scrub cedar and piñon.
		Barometer 6550 ft. Thermometer 60°.

		190th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Ascend over rolling sand hills through timber.

ALTITUDE	CHAINS	
	48.00	Leave timber, bears N. and S.
	53.10	Wagon trail from Tuba City to Bluff City, bears N. E. and S. W. Ascend.
	56.00	Enter timber, bears N. and S.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
6650	80.00	North 110 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 190th mile cor.
		A brass cap on the top of the pipe has raised letters UTAH on N. ARIZ. on S. and 190 M. stamped in the center
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		A piñon tree 10 ins. diam. bears N. 42° 40' E. 215 lks dist. marked UTAH 190 M. B.T.
		A piñon tree 10 ins. diam. bears S. 29° 40' W. 240 lks dist. marked ARIZ. 190 M. B.T.
		No other trees within limits suitable for bearing trees
		Land mountainous.
		Soil sandy, 4th rate.
		Vegetation - grass, sage, cedar and piñon.
		Barometer 6650 ft. Thermometer 60°.
		June 5, 1901.

		191st Mile.
		At the 190th mile cor. June 6th, 1901, at 2h 26m A.M. l.m.t. I observe Polaris at eastern elongation in accordance with instructions in the manual and mark the line so determined on a plug driven in the ground north of my station.
		At 7h 14m, A.M. I lay off the azimuth of Polaris 1° 32' to the west and mark the true meridian so

BOOK 2628

ALTITUDE	CHAINS	
		determined on a plug driven in the ground north of my station. The magnetic bearing of this meridian is N. 15° 03' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 00' E. I lay off 90° from this meridian from the north to the east for the tangent to the parallel.
		In all these operations the mean of four sights is taken with the instrument reversed at each sight.
		East on tangent to the parallel.
		Ascend over rolling sand hills,,through timber.
	19.00	Top of ridge, bears N. and S. Descend.
	33.50	Dry gulch, course S. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
6790	80.00	North .76 of 1k. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom, 3 ft. in the ground for 191st mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 191 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5 ft base 2 ft. high around the post.
		A piñon tree 10 ins. diam. bears S. 66° 40' E. 219 lks. dist. marked ARIZ. 191 M. B.T.
		No other trees within limits suitable for bearing trees
		Land rolling.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage, cedar and piñon timber.
		Barometer 6790 ft. Thermometer 65°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		192nd Mile.
		S. 89° 59' E. on tnagent to the parallel.
		Over rolling sand hills. Ascend.
6900	9.00	Top of ridge, bears N. and S. Descend.
	21.00	Dry gulch, course N. E.
	36.00	Bottom of rocky cañon, dry, course N. about 50 ft. deep.
	43.00	Bottom of dry cañon, course N. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
6875	80.00	North 3 lks. from the tangent.
		Set a sandstone 33x12x6 ins. on bare rock for 192nd mile cor. Marked UTAH on N. 37 N, L. on E. ARIZ. on S. and 192 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Trees too small and scrubby for bearing trees.
		This cor, stands on the edge of a great wall that bears N1 and S.
		Land mountainous.
		Soil rocky and sandy, 4th rate.
		Timber - scrubby cedar and pinon.
		Barometer 6875 ft. Thermometer 80°.
		June 6th, 1901.

		I examine the adjustments of the transit and compare the tapes with the standard and find all correct.
		193rd Mile.
		S. 89° 59' E. on the tangent to the parallel.
		Leave timber, bears N. and S. Descend the great wall.
		Stadia measurement. Angle 26° - Rod 12.295

ALTITUDE	CHAINS	
		double = 2459 ft. Constant 80.78 x 2459 = 1986.38 + C = 1.03 = 1987.41 ft. = 30.11 chs.
5800	30.11	Stadia point, foot of steep slope, bears N. and S.
		Thence by tape measurement. Descend.
	74.00	Bottom of rocky gulch, course N. E. Thence over rocky flat, enter scattering timber.
		Difference between measurements of 49.89 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 49.92 chs. By 2nd set 49.86 chs.
		The mean of which is 49.89 chs. + 30.11 chs. =
5875	80.00	North 7 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 1 ft. in the ground to bed rock for 193rd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 193 M. stamped in the center. Raised a mound of stone 5½ ft. base 2½ ft. high around the post. Pits impracticable
		A piñon tree 10 ins. diam. bears S. 41° 30' E. 174 lks. dist. Marked ARIZ. 193 M. B.T. A piñon tree 7 ins. diam. Bears N. 77° W. 63 Lks. dist. Marked UTAH 193 M B.T.
		No other trees within limits suitable for bearing trees
		Land mountainous, broken.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass, sage, scattering cedar and piñon.
		Barometer 5875 ft. Thermometer 63°.

		194th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Over rolling and broken country, through scattering timber.
	0.35	Indian trail, bears N. and S.
5800	23.72	On west wall of canon. About 150 ft. deep, bears N. E. and S. W.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Thence by stadia measurement. Level. Rod 3.60 = 360 ft. + C = 1.15 = 361.15 ft. = 5.47 chs. + 23.72 = 29.19 chs.
	26.00	Bottom of cañon, dry, course N. E. Ascend.
	29.19	Stadia point, east wall of cañon, bears N. E. and S. W. Thence by tape measurement.
5800	35.84	On west wall of cañon, bears N. E. and S. W. Thence by stadia measurement. Angle 6°- Rod 9.95 double = 1990 ft. Constant 98.91 x 1990 = 1968.31 + C = 1.14 = 1969.45 ft.=29.84 chs. + 35.84 chs. = 65.68 chs.
5600	45.00	Bottom of cañon about 200 ft. deep, course N. E.
	65.68	Stadia point on spur, slope N. E. Stadia. Angle 6° + Rod 9.22 double = 1844. Constant 98.91 x 1844 = 1823.90 ft. + C = 1.14 = 1825.04 ft. = 27.65 chs. + 65.88 chs.= 93.33 chs.
5200	80.00	Bottom of Knock-Eye Cañon, course N. dry bed of stream 30 lks. wide, walls smooth sandstone 75 ft. high. Impracticable to establish the corner. Land mountainous. Soil rocky, 4th rate. Vegetation - grass, sage, scattering cedar and piñon. A water pocket in the cañon about 15 chs. S. E.

		195th Mile.
		Continuing on tangent. Ascend.
5500	13.33	On rocky bench among angular blocks of stone. About 300 ft. above the bottom of cañon. North 13 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 194th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 194.166 M. stamped in the center. Raised a mound of stone 5 ft. base 2 ft. high around

BOOK 2628

ALTITUDE	CHAINS	
		the post. Pits impracticable.
		Barometer 5500 ft. Thermometer 70°.
		S. 89° 57' E. continuing on tangent to the parallel.
		Ascend along rocky south slope.
		Stadia measurement. Angle 8°+ Rod 12.57 double = 2514 ft. Constant 98.06 x 2514 = 2465.23 + C = 1.14= 2466.37 ft. = 37.37 chs. + 13.33 chs. = 50.70 chs.
	50.70	Stadia point. Angle 9° + Rod 8.58 = 858 ft. Constant 97.55 x 858 = 836.98 ft, + C = 1.13 = 838.11 ft. = 12.70 chs. + 50.70 chs. = 63.40 chs.
6000	63.40	On point of north wall of cañon that juts out to the south, bears N. W. and N. E. Stadia. Level. Rod 10.095 double = 2019 ft. + C. = 1.15 = 2020.15 ft. = 30.61 chs. + 63.40 chs. = 94.01 chs.
	80.00	Falls on south slope of cañon wall. Inaccessable.
		Land mountainous, broken and precipitious.
		Soil rock, 4th rate.
		Vegetation - grass, sage, and scattering scrub cedar and piñon.

		196th Mile.
		Continuing on tangent.
		Ascend.
6000	14.01	Top of north wall of cañon.
		North 20 lks. from the tangent.
		Set a sandstone 33x10x6 ins. 22 ins. in the ground for the 195th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 195.175 M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Barometer 6000 ft. Thermometer 76°.
		S, 89° 57' E. on tangent to the parallel.
		Over broken ground.

ALTITUDE	CHAINS	
		Stadia. Level. Rod 7.99 double = 1598 ft. + C = 1.15 = 1599.15 ft. = 24.23 chs. + 14.01 chs. = 38.24 chs.
	38.24	West wall of canon, bears N. W. and S. E. about 6 chs. and then S. W. Descend.
		Stadia. Angle 10°- Rod 12.86 = 1286 ft. Constant 96.98 x 1286 = 1247.16 + C = 1.13 = 1248.29 ft. = 18.91 chs. + 38.24 = 57.15 chs.
	47.00	Dry ravine, course S. about 150 ft. deep. Ascend.
	57.15	Stadia point on rocky spur, slope S. Stadia. Angle 10°+ Rod 12.915 double = 2583 ft. Constant 96.98 x 2583 = 2504.99 + C = 1.13 = 2506.12 ft. = 37.97 chs. + 57.15 chs. = 95.12 chs.
	80.00	Falls on steep rocky slope of cañon. Impracticable to establish the corner.
		Land rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, sage and scrub cedar and piñon.

		197th Mile.
		Continuing on tangent.
		Descend.
5500	4.00	Bottom of dry rock cañon, about 500 ft. deep, course S. W. about $\frac{1}{4}$ of a mile where it meets a cañon from the S. E. Thence course W. Ascend.
	15.12	Stadia point on S. E. wall of cañon, bears N. E. and S. W. Thence by tape measurement.
6200	19.28	North 29 lks. from the tangent.
		Set a sandstone 31x16x6 ins. on bare rock for 196th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 196.241 M. on the W. faces. Raised a mound of stone $5\frac{1}{2}$ ft. base $2\frac{1}{2}$ ft. high east of cor.
		Pits impracticable.

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ALTITUDE	CHAINS	
		Barometer 6200 ft. Thermometer 76°.
		S. 89° 56' E. continuing on tangent to the parallel.
		Over rough, broken, rock mesa, through scrubby cedar and piñon timber.
		Difference between measurements of 60.72 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 60.76 chs. By 2nd set 60.68 chs.
		The mean of which is 60.72 chs. + 19.28 chs. =
6350	80.00	North 37 lks. from the tangent.
		Set a sandstone 36x8x8 ins. 24 ins. in the ground for 197th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 197 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist.
		Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A cedar tree 10 ins. diam. bears N. 33° 40' W. 51 lks. dist. marked UTAH 197 M. B.T.
		A cedar tree 12 ins. diam. bears S. 69° E. 261 lks. dist. marked ARIZ. 197 M. B.T.
		No other trees within limits suitable for bearing trees.
		Land broken and rocky.
		Soil rocky, 4th rate.
		Timber - piñon and cedar.
		There are some water pockets in a cañon that runs west about a mile N. W.
		Barometer 6350 ft. Thermometer 80°.
		June 7th 1901.
		I test the adjustments of the transit and compare the tapes with the standard and find all correct.
		198th Mile.
		S. 89° 55' E. on tangent to the parallel.

ALTITUDE	CHAINS	
		Over rolling sand hills and rock croppings.
	1.00	Indian trail, bears N. W. and S. E.
		Difference between measurements of 75 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 75.03 chs. By 2nd set 74.97 chs.
		The mean of which is
6300	75.00	On west wall of Copper cañon, bears S. and N. W.
		Thence stadia. Angle 38°- Rod 8.14 double = 1628 ft. Constant 62.10 x 1628 = 1010.99 + C 0.90= 1011.89 ft = 15.33 chs. + 75.00 chs. = 90.33 chs.
	80.00	Comes on slope of cañon wall. Inaccessable.
		Land mountainous and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, cedar and piñon.

		199th Mile.
		Continuing on tangent.
		Descend.
5650	10.33	North 51 lks. from the tangent.
		Set a sandstone 31x18x6 ins. 21 ins. in the ground for 198th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 198.129 M. on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands in Copper cañon on the slope at the foot of the wall on west side of the gulch.
		35 chs. north of this point I set up the iron pier and establish the temporary Astronomical observatory No. 5. There is a small spring at the head of the east branch of this cañon about 2½ miles S. E.
		June 8th, 1901.
		June 14th, 1901, we take the latitude of this temporary observatory 37° 00' 23.8" north latitude.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		This equals 36.46 north of the parallel.
		As our cor. is 35 chs. south of this point, we are within the limit of 3" of arc allowed in the instructions, therefore I continue this line.
		This being an impracticable place to erect the Astronomical Monument, I proceed on the boundary line.
		The top of the cañon wall to the east being inaccessable, I offset north 10.51 chs. from the tangent.
		Thence S 89° 55' E. on the offset line parallel with the tangent. Stadia measurement. Angle 25°+ Rod 12.145 double = 2429 ft. Constant 82.14 x 2429 = 1995.18ft + C = 1.04 = 1996.22 ft. = 30.24 chs. + 10.33 chs. = 40.57 chs.
		Descend.
5500	21.33	Bottom of Copper cañon, dry bed of stream, 50 lks. wide, course N. W. Ascend.
6400	40.57	Top of east wall of Copper cañon bears N. and S.
		Thence by tape measurement ove rough, broken country, through scrub cedar.
6400	43.33	Top of wall about 100 ft. high, bears N. E. and S. W.
		Descend.
	60.00	Bottom of chasm 100 ft. deep, drains S. Ascend.
	80.00	Falls on rough S. W. slope among big angular blocks of stone. Impracticable to establish cor.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass and sage, scrub cedar and piñon timber.

		200th Mile.
		S. 89° 54' E. on offset line 10.51 chs. north of the tangent and parallel with it.
		Ascend.
	3.83	Same wall bears N. W. and S. E. about 150 ft. high.
		Ascend.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
6600	4.52	North 13 lks. from the offset line. Set a sandstone 30x10x6 ins. 20 ins. in the ground for witness corner for the 199th mile cor. Marked W.C. UTAH on N. 37 N. L. on E. ARIZ. on S. and 199.056 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. This offset is 10.51 chs. north of the tangent to the parallel, and the offset for this station is 53 lks. Thereby placing this cor. 10 chs. north of the parallel. Barometer 6600 ft. Thermometer 60°. Continuing on offset line. Ascend.
6650	13.00	On the west wall of cañon, bears N. and S. Descend. Stadia measurement. Angle 27°- Rod 12.59 double 2518 ft. Constant 79.39 x 2518 = 199804 ft. + C = 1.02 = 2000.06 ft. = 30.30 chs. + 13.00 chs. = 43.30 chs.
5750	43.30	Stadia point on slope east of foot of wall, offset south 10.51 chs. to the tangent to the parallel. Thence S. 89° 54' E. on the tangent to the parallel. Descend along N. E. slope. Thence by tape measurement. Difference between measurements of 25.18 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 25.19 chs. By 2nd set 25.17 chs. The mean of which is 25.18 chs. + 30.30 chs. + 4.52 chs. = 60.00 chs.
5700	60.00	North 73 lks. from tangent. Set a shaft of sandstone 6 ft. long, 30 ins. broad and 12 ins. thick, dressed 8 ins. down from the top, 3 ft. in the ground, for Astronomical Monument No. 5. Marked with letters 1½ ins. square, deeply graven in the stone, UTAH on the N. 37 N. L. on E. ARIZONA on the S. and 199.75 M. on the W. faces.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Raised a mound of stone 6 ft. base 2 ft. high around the shaft, and dug pits 36x36x18 ins. N. S. E. and W. of the shaft 6 ft. dist.
		This cor. stands in open country in wide cañon about 1½ miles north of where the cañon heads.
		It is on the N. E. slope.
		Obelisk bears N. 41° E. about 1 mile dist. This is a great square column of stone about 700 ft. high; there are two more about ¼ mile S. E. of this one near a west salient of the high mesa.
		A sharp N. W. salient of the mesa bears N. 86° 30' E. about 1000 ft. above the valley.
		A sharp spur of the cliffs bears S 16° 20' E. This monument was placed here rather than at the 200th mile cor, because it was found that the 200th mile point falls near the bottom of a wash, practically out of sight and in danger in time of flood.
		Continuing on tangent to the parallel.
		Descend.
		Difference between measurements of 20 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 20.01 chs. By 2nd set 19.99 chs.
		The mean of which is 20.00 chs. + 60.00 chs. =
5650	80.00	North 76 lks. from the tangent.
		Set a sandstone 30x15x10 ins. 20 ins. in the ground for the 200th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 200 M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land mountainous, rolling and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage and scrub timber on the cliffs
		Barometer 5650 ft. Thermometer 65°.
		June 14th, 1901.

ALTITUDE	CHAINS	
		June 15th, at the 200th mile cor. at 1h, 51m, A. M. l.m.t. I observe Polaris at eastern elongation in accordance with the instructions in the manual; and marked the point so determined on a plug driven in the ground north of my station.
		At 6h, 50m, A. M. I lay off the azimuth of Polaris 1° 32' to the west and mark the true meridian thus determined on a plug driven in the ground 10 chs. north of my station. The magnetic bearing of the said meridian is N. 15° 0' W. This reduced by the table page 100 gives the mean magnetic declination 14° 56' E.
		From the said meridian I lay off an angle of 90° from the north to the east for the tangent to the parallel.
		In all these operations the mean of four sights was taken with the telescope reversed at each sight.
		201st Mile.
		E. on the tangent to the parallel.
		Descend.
	0.75	Bottom of wash, dry, course N. W.
		Ascend over rolling land.
	7.00	Obelisk bears N. 22° 24' E.
	49.00	Dry gulch, course N. W. Foot of slope bears N. W. and S. E. Ascend.
		Difference between measurements of 80. chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set is 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
5900	80.00	North .76 of a lk. from the tangent.
		Set a sandstone 30x12x6 ins. 20 ins. in the ground for 201st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 201 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands near the foot of a steep slope among

BOOK 2628

ALTITUDE	CHAINS	
		angular fragments of rock.
		Land rolling.
		Soil sandy, 3rd rate.
		Vegetation - grass and sage.
		Barometer 5900 ft. Thermometer 65°.

		202nd Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend very steep over broken rock and sandstone cliffs Not being able to see the top of the wall from the cor. I move back on the tangent 2.77 chs. to the 77.23 ch. mark; thence by stadia measurement. Angle 23° + Rod 13.00 double = 2600. Constant 84.73 x 2600 = 2202.98 + C = 1.05 = 2204.03ft = 33.39 chs. - 2.77 chs.= 30.62 chs.
6835	30.62	Top of wall bears N. W. and S. E. About 1000 ft. above the cor. This point is on a long narrow salient of the high mesa. Thence by tape measurement.
	32.59	Top of ridge bears N. W. and S. E. Descend. Stadia. Angle 4°- Rod 12.60 = 1260 ft. Constant 99.51 x 1260 = 1253.83 + C = 1.15 = 1254.98 ft. = 19.01 chs. + 32.59 chs. = 51.60 chs.
	51.60	On the top of rocky spur, slope N. Stadia. Angle 6- Rod 7.91 double = 1582 ft. Constant 98.91 x 1582 = 1564.76 + C= 1.14 = 1565.90 ft. = 23.73 chs. + 51.60 chs. = 75.33 chs.
6100	65.00	Bottom of rock chasm about 700 ft. deep, course N. W. Ascend.
	75.33	Stadia point on rock bench, bears N. W. and S. E. Thence by tape measurement. Ascend.
6900	80.00	North 3 lks. from the tangent. Set a sandstone 36x12x6 ins. 24 ins. in the ground for 202nd mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 202 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.

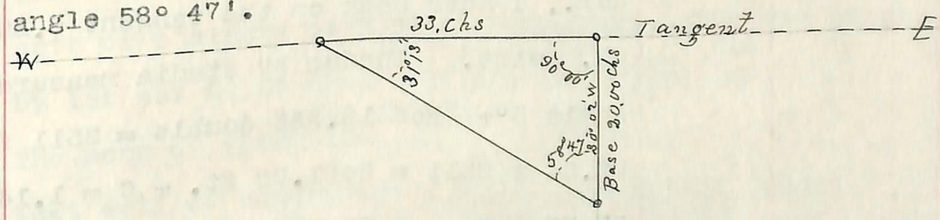
ALTITUDE	CHAINS	
		Pits impracticable.
		Land mountainous, broken and precipitious.
		Soil rocky, 3rd rate.
		Vegetation - grass and sage, with scattering scrub cedar and piñon.
		Barometer 6900 ft. Thermometer 80°.

		203rd Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend over rocks, through scrub cedar.
6950	23.00	On west wall of canon about 200 ft. deep, course N. E. and S. W. Thence by stadia measurement.
		Angle 2°+ Rod 11.635 double = 2327 ft. Constant 99.88 x 2327 = 2324.21 + C.$^{=1.15}_{\wedge}$ = 2325.36 ft. = 35.23 chs.
		+ 23.00 chs. = 58.23 chs.
7100	58.23	On same wall, bears N. W. and S. E. Thence ascend over sand hills and through scrub cedar by tape measurement.
		Difference between measurements of 21.77 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set is 21.78 chs. By 2nd set 21.76 chs.
		The mean of which is 21.77 chs. + 58.23 chs. =
7240	80.00	North 7 lks. from the tangent.
		Set a sandstone 36x20x6 ins. 24 ins. in the ground for 203rd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. 203 M on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands on top of high mesa, bears N. and S.
		Trees too rough to mark for bearing trees.
		Land mountainous, rough and broken.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass and sage; scrub cedar and piñon.
		Barometer 7240 ft. Thermometer 81°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		204th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Descend gradually over rolling sand hills, through scrub cedar and piñon.
7180	40.71	Top of high west wall of cañon, bears N. and S.
		Descend.
		The distance to the bottom of the cañon being too great for the stadia rod, I set a flag on the line in the bottom of the cañon, and leaving the flag at this point I descend to the one in the cañon. Measure a base S. 0° 02' W. at right angles to the tangent 20 chs. from the south end of the base, sight to the north end and measure the angle to the flag on the top of the cliffs. I find the mean of four sights with the telescope reversed at each sight, gives this angle 58° 47'.



Then base 20.00 chs. x tan. 58° 47' = 1.301030
log. 20.00 chs. = 10.217514
log. tan. 58° 47' ——————
1.518544 = 33.00 chs. +

40.71 chs. =

	73.71	Triangulation point, foot of steep slope east edge of cliffs, about 1000 ft. below the top of same, bears N. and S. Thence by tapemeasurement.
		Difference between measurements of 47 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 47.03 chs. By 2nd set 46.97 chs.
		The mean of which is 47.00 chs. + 33.00 chs. =
5950	80.00	North 12 lks. from the tangent.
		Set a sandstone 30x12x6 ins. 20 ins. in the ground for 204th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 204 M. on W. faces. Raised a mound

ALTITUDE	CHAINS	
		of stone 5½ ft. base 2½ ft. high east of the cor.
		Pits impracticable.
		This cor. stands in a narrow cañon that bears N. and S
		Walls to the east, rough, about 200 ft. high.
		Land mountainous, rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, sage, and scrub cedar and piñon,
		on high mesa.
		Barometer 5950 ft. Thermometer 77°.
		June 15th, 1901.

		205th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend over rough sandstone cliffs.
		As I cannot see the top of the ridge ahead from the
		cor., I move back on the tangent 6.29 chs. to the 73.71
		ch. point. Thence by stadia measurement.
		Angle 5°+ Rod 12.555 double = 2511 ft. Constant
		99.24 x 2511 = 2491.92 ft. + C = 1.14 = 2493.06 ft. =
		37.77 chs. - 6.29 chs. = 31.48 chs.
6175	31.48	On top of rocky ridge, bears N. and S. Descend.
		Thence by tape measurement.
	33.40	On wall of rock, bears N. and S. overlooking a little
		valley.
		Agatha Needle bears S. 26° 15' E. Descend.
		Stadia. Angle 24°- Rod 7.35 double = 1470 ft.
		Constant 83.46 x 1470 = 1226.86 + C = 1.05 = 1227.91
		ft. = 18.60 chs. + 33.40 chs. = 52.00 chs.
5600	52.00	Foot of steep slope, bears N. and S.
		Thence over gently rolling land by tape measurement.
		Difference between measurements of 29.92 chs. by two
		sets of chainmen is 2 lks. Position of middle point
		by 1st set is 29.93 chs. By 2nd set 29.91 chs.
		The mean of which is 29.92 chs. + 50.08 chs. =
5675	80.00	North 19 lks. from the tangent.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Set a sandstone 33x10x6 ins. 22 ins. in the ground for 205th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 205 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands in little valley.
		Land rolling and broken.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5675 ft. Thermometer 75°.
		206th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over gently rolling valley.
		Difference between measurements of 44.33 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 44.35 chs. By 2nd set 44.31 chs.
		The mean of which is
5675	44.33	West wall of cañon, bears N. E. and S. W. About 150 ft. deep. Descend.
		Stadia measurement. Level. Rod 12.15 double = 2430 ft. + C = 1.15 = 2431.15 ft. = 36.83 chs. + 44.33 chs. = 81.16 chs.
5525	48.00	Foot of slope bears N. E. and S. W.
5400	60.00	Dry bed of sand creek 3 chs. wide, dry, course N. E. about 150 ft. below top of wall, There is a water hole at the mouth of Moonlight Cañon about 1½ miles north.
	66.00	Foot of slope, bears N. and S. Ascend.
	80.00	On slope of rock wall. Impracticable to establish the corner.
		Land rolling and broken.
		Soil rocky and sandy, 3rd rate.
		Vegetation - grass, sage and scattering scrub cedar.

BOOK 2623

ALTITUDE	CHAINS	
		207th Mile.
		Continuing on tangent.
		Ascend.
	1.16	On top of wall, bears N. and S. about 150 ft. above bottom of creek. Thence by tape measurement.
5600	2.00	North 27 lks. from the tangent.
		Set a sandstone 40x10x7 ins. on bed rock for 206th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 206.025 M. on W. faces. Raised a mound of stone 5 ft. base 2 ft. high aroung the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling and broken.
		Soil sandy and rocky, 3rd rate.
		Vegetation - grass, sage and scrub cedar.
		Barometer 5600 ft. Thermometer 80°.
		June 16th, 1901.
		S. 89° 56' E. continuing on tangent to the parallel.
		I examine the adjustments of the transit and compare the steel tapes with the standard and find everything correct.
		Ascend over rocky and sandy land, through scattering scrub cedar and piñon.
	20.20	Dry cañon, course S. E. about 50 ft. deep.
	42.30	Bottom of cañon, course S. W. Ascend.
		Top of east wall of cañon bears N. E. and S. W.
	63.55	Agatha Needle bears S. 16° 18' E.
		Difference between measurements of 78.00 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 78.03 chs. By 2nd set 77.97 chs.
		The mean of which is 78.00 chs. + 2.00 chs. =
5690	80.00	North 37 lks. from the tangent.
		Set a sandstone 30x12x6 ins. 20 ins. in the ground for 207th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 207 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor.

ALTITUDE	CHAINS	
		6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		No trees within limits suitable for bearing trees.
		Land mountainous.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage and scattering cedar and piñon.
		Barometer 5690 ft. Thermometer 82°.

		208th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend over rolling sand hills through scattering scrub timber.
5800	32.84	Stadia point. Angle 10°- Rod 13.00 = 1300 ft.
		Constant 96.98 x 1300 = 1260.74 + C = 1.13 =
		1261.87 ft. = 19.12 chs. + 32.84 chs. = 51.96 chs.
	34.00	On west wall of cañon, bears N. E. and S. W. about 200 ft. deep. Descend.
	40.00	Foot of slope, bears N. E. and S. W.
	51.96	Stadia point. Thence by tape measurement.
	70.50	Dry gulch, course N. E.
	79.00	Dry gulch, course N. W.
		Difference between measurements of 60.88 chs. by two sets of chainmen is 8 lks. Position of middle point
		by 1st set 60.92 chs. By 2nd set 60.84 chs.
		The mean of which is 60.88 chs. + 19.12 chs. =
5700	80.00	North 49 lks. from the tangent.
		Set a sandstone 30x14x6 ins. 20 ins. in the ground for 208th mile cor. Marked UTAH on N. 37 N. L. on E.
		ARIZ. on S. and 208 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands at foot of rocky S. W. slope in bottom of cañon.
		Land rolling and broken.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Soil rocky and sandy, 4th rate.
		Vegetation - grass, sage and scattering scrub cedar and piñon.
		Barometer 5700 ft. Thermometer 82°.

		209th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend rocky S. W. slope.
	11.09	Top of spur, slope S. W. Descend.
	14.00	Deep rocky ravine, course S. W. Ascend.
5900	19.45	On east wall of cañon, bears N. E. and S. W.
		Thence over rocky mesa.
5910	58.44	On west wall of cañon, bears N. and S. about 10.00 chs. then N. W.
		Stadia measurement. Angle 24°- Rod 9.50 ft.= 950 ft. Constant 83.46 x 950 = 792.87 + C = 1.04 = 793.91 ft. = 12.03 chs. + 58.44 chs. = 70.47 chs.
5500	68.00	Foot of slope, bears S. and N. W.
	70.47	Stadia point. Thence by tape measurement.
	73.00	Indian trail, bears N. W. and S. E.
	75.50	Bottom of wash, dry, course N. W.
		This is the upper end of Moonlight Cañon.
		Difference between measurements of 67.97 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 67.99 chs. By 2nd set 67.95 chs.
		The mean of which is 67.97 chs. + 12.03 chs. =
5550	80.00	North 62 lks. from the tangent.
		Set a sandstone 30x10x6 ins. 20 ins. in the ground for 209th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 209 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A black volcanic butte bears N. 2° 16' W. about 3/4 of a mile dist.

BOOK 2628

ALTITUDE	CHAINS	
		Agatha Needle bears S. 6° 08' E.
		A round butte with a crown of rocks on top bears
		S. 49° 02' E. about 1 mile dist.
		Land broken and rocky.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage, and scattering cedar and
		piñon.
		Barometer 5550 ft. Thermometer 83°.

		210th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Over rolling sand hills.
	21.00	Stadia measurement. Angle 8°+ Rod 10.06 double =
		2112 ft. Constant 98.06 x 2012 = 1972.97 + C = 1.14 =
		1974.11 ft. = 29.91 chs. + 21.00 chs. = 50.91 chs.
	35.00	Foot of rocky slope, bears N. W. and S. E. Ascend.
	50.91	On sharp rock spur, slopes S.
		Stadia. Level. Rod 9.70 double = 1940 ft. + C. = 1.15
		= 1941.15 ft. = 29.41 chs. + 50.91 chs. = 80.32 chs.
		- 32 lks. = 80.00 chs.
6000	80.00	North 76 lks. from the tangent.
		Set a sandstone 38x12x11 ins. on bare rock on point
		of spur, a south salient of cliffs, for 210th mile
		cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and
		210 M. on W. faces. Raised a mound of stone 5½ ft.
		base 2½ ft. high around the cor., and raised a mound
		of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land mountainous, rough and broken.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass and sage.
		Barmometer 6000 ft. Thermometer 75°.
		June 17th, 1901.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		211th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Descend over rocky, broken ground.
		I examine and adjust the transit and compare the steel tape with the standard and find them of correct length.
	0.40	Top of cliffs, bearing N. E. and S. W. Descend.
		Stadia measurement. Angle 9°- Rod 12.98 = 1298 ft.
		Constant 97.55 x 1298 = 1266.20 + C 1.13 = 1267.33 ft.
		= 19.20 chs. + 0.40 chs. = 19.60 chs.
	10.00	Foot of cliffs, bears N. E. and S. W. about 200 ft. below the top.
	19.60	Stadia point. Thence by tape measurement.
5790	41.00	Dry gulch, course S. W.
	42.33	Stadia measurement. Ascend over steep cliffs, bears N. E. and S. W. Angle 11°+ Rod 8.25 double = 1650 ft. Constant 96.36 x 1650 = 1589.94 + C.=1.13 = 1591.07ft= 24.10 chs. + 42.33 chs. = 66.43 chs.
	66.43	On rocky spur, slopes N. Descend Angle 5°- Rod 7.95 = 795 ft. Constant 99.24 x 795 = 788.96 + C. = 1.14 = 790.10 ft. = 11.97 chs. + 66.43 chs. = 78.40chs.
	78.40	Stadia point. Thence by tape measurement.
6220	79.20	Comes on edge of cliff. As the point for the cor. at 80 chs. falls on a slope too steep to admit the establishment of the cor., I place it at this point. N. 92 lks. from the tangent.
		Set a sandstone 33x10x6 ins. 22ins. in the ground for the 211th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 210.99 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands on a wall that bears N. and S. in a pass or saddle.
		Barom. 6220 ft. Therm. 70°

BOOK 2628

ALTITUDE	CHAINS	
		Continuing on tangent.
		Descend.
	80.00	Comes on steep rocky slope. Impracticable to establish the cor.
		Land mountainous.
		Soil rocky, 4th Rate.
		Vegetation - grass and sage.

		212th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Descend over broken, rocky country.
		Stadia measurement. Angle 11°- Rod 7.065 double = 1413 ft. Constant 96.36 x 1413 ft. = 1361.57 + C. = 1.13 = 1362.70 ft. = 20.64 chs. - 80.00 lks. = 19.84 chs. This stadia measurement is taken from the corner 80 lks. W. of the 80 ch. mark.
	9.00	Foot of cliffs, about 250 ft. below the top, bears N. and S.
5970	19.84	Stadia point. Thence over rolling sand hills by tape measurement.
	21.00	Dry gulch, course S.
	40.50	Dry gulch, course S. W. Ascend along south slope of smooth sandstone butte.
6070	54.20	On south slope of butte about 70 ft. high. Descend.
6000	58.50	Foot of butte, bears N. E. and S. W. Thence over sand hills.
		Difference between measurements of 60.16 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 60.17 chs. By 2nd set 60.15 chs.
		The mean of which is 60.16 chs. + 19.84 chs. =
6000	80.00	North 110 lks. from the tangent.
		Set a sandstone 30x12x10 ins. 20 ins. in the ground for 212th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 212 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor.

BOOK 2628

ALTITUDE	CHAINS	
		6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A cross on the south wall of the canon bears south 436 lks. dist. marked ARIZ. + 212 M. B. O.
		Land rolling and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass and sage; few scattering cedar trees.
		Barometer 6000 ft. Thermometer 76°.
		213th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Ascend over sand hills, following up valley, about 12 chs, wide, with perpendicular walls, about 300 ft. high, on north and south.
	2.00	Dry bed of stream, 1 ch. wide, course S. W.
	44.24	Offset south 8 chs. to avoid impassable butte about 250 ft. high. Thence ran S. 89° 52' E. on the offset line parallel with the tangent.
	61.74	Set back north 8 chs. to the tangent. Thence S 89° 52' E. on tangent to the parallel.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
6040	80.00	North 129 lks. from the tangent.
		Set a sandstone 32x12x7 ins. 21 ins. in the ground for 213th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 213 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Trees too rough to mark for bearing trees.
		Land rolling valley.
		Soil sandy, 4th rate.

ALTITUDE	CHAINS	
		Timber - scattering cedar.
		This mile follows up a little valley from 10 to 15 chs. wide, with perpendicular walls of sandstone about 300 ft. high.
		Barometer 6040 ft. Thermometer 82°.

		214th Mile.
		S. 89° 51' E' on tangent to the parallel.
		Ascend over sand hills, following up the little valley
	40.00	Offset 1 ch. north to avoid smooth sandstone wall, about 300 ft. high. Ran S. 89° 51' E. on offset line parallel with the tangent.
	48.74	Foot of wall rising to the south; thence by stadia. Angle 10°+ Rod 3.03 = 303 ft. Constant 96.98 x 303 = 293.85 + C. = 1.13 = 294.98 ft. = 4.47 chs. + 48.74 chs. = 53.21 chs.
6500	53.21	Top of rounded sandstone butte about 75 ft. high, on the north side, and 150 ft. high on the south side, At the head of little valley that runs west. About 5 chs. north a cave in the cliff wall contains ruins of ancient cliff dwellers. Descend. Stadia. Angle 14°- Rod 7.265 double = 1453 ft. Constant 94.13 x 1453 = 1368.00 ft. + C = 1.11 = 1369.11 ft. = 20.74 chs. + 53.21 chs. = 73.95 chs.
	73.95	Stadia point. Thence by tape measurement. Difference between measurements of 54.79 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 54.83 chs. By 2nd set 54.75 chs. The mean of which is 54.79 chs. + 4.47 chs. + 20.74 chs. =
6000	80.00	North 50 lks. from the offset line which is 100 lks. north of the tangent, give 150 lks. north from the tangent. Set a sandstone 30x14x7 ins. 20 ins. in the ground for 214th mile cor. Marked UTAH on N. 37 N. L. on E.

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ALTITUDE	CHAINS	
		ARIZ. on S. and 214 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 10 ins. diam. bears N. 11° 44' E. 78 lks. dist. marked UTAH 214 M. B.T.
		No other trees within limits.
		Land rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, sage and a few cedar trees.
		Barometer 6000 ft. Thermometer 85°.

		215th Mile.
		S. 89° 51' E. on offset line 100 lks. north of the tangent and parallel with it.
		Descend over rolling land.
	20.00	Foot of hill, bears N. E. and S. W.; thence across valley.
	60.80	Bottom of wash, 25 lks. wide, course N., dry.
		Difference between measurement of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5910	80.00	North 72 lks. from the offset line, which is 100 lks. north of the tangent, making 172 lks. north of the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 215th mile cor. a brass cap on top of the pipe has raised letters, UTAH on N. ARIZ. on S. and 215 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		The most northern pinnacle of Monument Pass bears N. 28° 55' E.
		Ragged topped monument in the pass bears S. 83° 00' E.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		A large flat topped monument west of the pass bears
		S. 89° 30' E.
		Land nearly level.
		Soil sandy, 3rd rate.
		Vegetation - grass, sage and greasewood.
		Barometer 5910 ft. Thermometer 85°.

		216th Mile.
		S. 89° 50' E. 100 lks. north of the tangent and
		parallel with it.
		Over gently rolling valley.
	38.00	Dry gulch, course N. W.
	51.40	Dry gulch, course N. W.
	54.50	The same gulch, course S. W.
	56.90	The same gulch, course N. W.
		Difference between measurements of 80 chs. by two sets
		of chainmen is 2 lks. Position of middle point by
		1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
6050	80.00	North 96 lks. from the offset line, which is 100 lks.
		north of the tangent, making 196 lks. north from the
		tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for the 216th mile
		cor. A brass cap on top of the pipe has raised let-
		ters, UTAH on N. ARIZ. on S. and 216 M stamped in the
		center. Dug pits 36x36x18 ins. N. S. E. and W. of
		cor. 6 ft. dist. Raised a mound of earth 5 ft. base
		2 ft. high around the post.
		The most northern pinnacle of Monument Pass bears N.
		15° 50' E.
		Ragged topped monument bears S. 80° 30' E.
		Flat topped monument bears S 6° 18' W. Vertical angle
		to the top of this monument 8°+.

BOOK 2628

ALTITUDE	CHAINS	
		Land nearly level.
		Soil sandy, 2nd rate.
		Vegetation - grass and sage.
		Barometer 6050 ft. Thermometer 83°.

		217th Mile.
		S. 89° 49' E. on offset line 100 lks. north of the tangent and parallel with it.
		Over valley land, ascending gradually.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing.
		The mean is
6100	80.00	North 121 lks. from the offset line, which is 100 lks. north of the tangent, making 221 lks. north from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 217th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 217 M. stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land nearly level valley.
		Soil sandy, 2nd rate.
		Vegetation - grass and sage.
		Barometer 6100 ft. Thermometer 75°.
		June 18th, 1901.

		At the 217th mile cor. June 19th, 1901, at 1h 35m A.M. l.m.t. I observe Polaris at eastern elongation in accordance with instructions in the manual, and mark the line so determined on a plug driven in the ground north of my station.
		At 6h 40m A.M. I lay off the azimuth of Polaris 1° 32' to the west and mark the true meridian thus

ALTITUDE	CHAINS	
		determined on a plug driven in the ground 10 chs. north of my station. The magnetic bearing of the said meridian is N. 15° 16' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 15° 12' E. I now lay off an angle of 90° from the north to the east for the tangent to the parallel. In all these observations the mean of four sights is taken with the instrument reversed at each sight. The instrument was placed in perfect adjustment previous to taking the Polaris observation. I compare the steel tapes with the standard and find them of correct length.
		218th Mile.
		East on the tangent to the parallel.
		Ascend gradually.
	47.00	Dry gulch, course N. W. Ascend.
		Leave valley, bears N. and S. Enter scattering cedar timber, bears N. and S.
6200	53.00	Top of ridge, bears N. and S.
		Monument pass about 20.00 chs. south; thence by stadia measurement. Angle 10°+ Rod 9.50 = 950 ft.
		Constant 96.98 x 950 = 921.31 + C. = 1.13 = 922.44 ft. = 13.98 chs. + 53.00 chs. = 66.98 chs.
6100	62.00	Bottom of rocky gulch, course S. E. about 100 ft. deep. Ascend.
6350	66.98	Stadia point on sharp rocky spur, slope S. about 300 ft. high. Descend Angle 17°- Rod 10.46 = 1046 ft.
		Constant 91.45 x 1046 = 956.57 + C = 1.10 = 957.67 ft. = 14.51 chs. + 66.98 = 81.49 chs. - 1.49 chs. = 80 chs
		Difference between measurements of 53 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 53.01 chs. By 2nd set 52.99 chs.
		The mean of which is 53.00 chs. + 14.51 chs. + 13.98 chs. = 81.49 chs. - 1.49 chs. =
6050	80.00	North .76 of a lk. from the tangent.

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ALTITUDE	CHAINS	
		Set a sandstone 30x16x6 ins. 20 ins. in the ground for 218th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 218 M on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands near foot of S. E. slope of big red butte north side of Monument pass.
		Land rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, sage and scattering cedar.
		Barometer 6050 ft. Thermometer 65°.

		219th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over rolling land.
	19.00	Dry gulch, course S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5900	80.00	North 3 lks. from the tangent.
		Set a sandstone 30x22x6 ins. 20 ins. in the ground for 219th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 219 M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		The round tower bears N. 24° 55' E.
		Ragged topped monument bears S. 11° 15' W.
		Flat topped monument, bears S. 65° 15' W.
		Land rolling.
		Soil sandy and bad lands, 4th rate.
		Vegetation very scanty - grass and greasewood.
		Barometer 5900 ft. Thermometer 71°.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		220th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over rolling bad land country.
	48.50	Wash, dry, course S. E.
	72.00	Wash, dry, course S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By,2nd set 79.94 chs. The mean of which is
5800	80.00	North 7 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 220th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 220 M. stamped in the center. Raised a mound of stone 5 ft. base 2 ft. high around the post. Pits impracticable.
		Land rolling.
		Soil gypsum, bad lands, 4th rate.
		Vegetation very scanty - grass and greasewood.
		Barometer 5800 ft. Thermometer 85°.

		221st Mile.
		S. 89° 58' E. on tangent to the parallel.
		Descend over rolling bad lands.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs. The mean of which is
5750	80.00	North 12 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 221st mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 221 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base

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ALTITUDE	CHAINS	
		2 ft. high around the post.
		Land, rolling bad lands.
		Soil sandy, bad lands, 4th rate.
		Vegetation very scanty - grass and greasewood.
		Barometer 5750 ft. Thermometer 90°.
		------:----
		222nd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over rolling hills.
	5.00	Leave bad lands and enter sand hills, bears N. W. and S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5775	80.00	North 19 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom, 3 ft. in the ground for 222nd mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 222 M. stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor.
		6 ft. dist. Raised a mound of earth 5 ft. base and 2 ft. high around the post.
		Round tower bears N. 38° 30' W.
		Ragged topped monument bears S. 81° 44' W.
		Land rolling sand hills.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5775 ft. Thermometer 90°.

		223rd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over rolling sand hills.
	32.00	Dry gulch, course S. E.

BOOK 2628

BOOK 2628

ALTITUDE	CHAINS	
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs. The mean of which is
5740	80.00	North 27 lks. from the tangent. Set an iron pipe 2 ins. diam 5 ft. long with flanges at the bottom 3 ft. in the ground for 223rd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 223 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. Land rolling sand hills. Soil sandy, 4th rate. Vegetation - grass and sage. Barometer 5740 ft. Thermometer 90°'

		224th Mile.
		S. 89° 56' E. on tangent to the parallel. Over rolling sand hills. Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is
5760	80.00	North 37 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 224th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 224 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. Land rolling, sand hills. Soil sandy, alkali, gypsum, 4th rate. Vegetation scanty - grass and greasewood.

ALTITUDE	CHAINS	
		Barometer 5760 ft. Thermometer 89°.

		225th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over alkili and gypsum bad lands.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5700	80.00	North 49 lks. from the tangent.
		Set an iron pipe 2 ins, diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 225th mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 225 M. stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land, rolling bad lands.
		Soil sand, alkali and gypsum, 4th rate.
		Vegetation scanty - grass and greasewood.
		Barometer 5700 ft. Thermometer 87°.

		226th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over bad land hills.
	7.00	On spur, slope N.
	25.00	Foot of hills, bears N. W. and S. E. Enter gypsum valley.
	74.00	Bottom of wash, dry, course N. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5500	80.00	North 62 lks. from the tangent.
		Set a sandstone 30x10x6 ins. 20 ins. in the ground

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ALTITUDE	CHAINS	
		for 226th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 226 M. on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land rolling.
		Soil, sand, alkali and gypsum, 4th rate.
		Vegetation - scanty,-grass and greasewood.
		Barometer 5500 ft. Thermometer 85°.

		227th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Over gently rolling valley land.
	29.00	Dry gulch, course N. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
5350	80.00	North 76 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 227th mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 227 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base and 2 ft. high around the post.
		Land gently rolling.
		Soil sandy, alkali and gypsum, 4th rate.
		Vegetation scanty - grass and greasewood.
		Barometer 5350 ft. Thermometer 78°.
		June 19th, 1901.

		228th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Over rolling land.

ALTITUDE	CHAINS	
	9.50	Dry gulch, course N. E.
	14.00	Same gulch, course S. E.
	17.50	Same gulch, course N. E.
5300	67.00	Dry bed of alkali creek, 2 chs. wide. Water in holes about a mile above, course N. E. Banks about 30 ft. high. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5325	80.00	North 92 lks. from the tangent.
		Set a sandstone 36x13x6 ins. 24 ins. in the ground for 228th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 228 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling.
		Soil sandy, alkali and gypsum, 4th rate.
		Vegetation - grass and greasewood.
		Barometer 5325 ft. Thermometer 70°.

		229th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Over rolling land.
	60.25	Dry gulch, course N.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5325	80.00	North 110 lks. from the tangent.
		Set a sandstone 36x10x6 ins. 24 ins. in the ground for 229th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 229 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high

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ALTITUDE	CHAINS	
		east of cor.
		Land rolling.
		Soil sandy, alkali and gypsum, 4th rate.
		Vegetation scanty - grass and greasewood.
		Barometer 5325 ft. Thermometer 72°.

		230th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Over rolling land.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5350	80.00	North 129 lks. from the tangent.
		Set a sandstone 41x14x7 ins. 28 ins. in the ground for 230th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 230 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling.
		Soil sandy, alkali and gypsum, 4th rate.
		Vegetation scanty - grass and sage.
		Barometer 5350 ft. Thermometer 74°.

		231st Mile.
		S. 89° 51' E. on tangent to the parallel.
		Over rolling land.
	40.50	Dry gulch comes from S. W. Thence down the same.
	51.00	Leave gulch, course N. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5250	80.00	North 150 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges

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ALTITUDE	CHAINS	
		at the bottom 3 ft. in the ground for 231st mile cor.
		A brass cap on top,of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 231 M,stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft.
		dist. Raised a mound of earth 5 ft. base 2 ft. high
		around the post.
		A red butte bears N. 69° 30' E.
		The round tower bears N. 77° 38' W.
		Land rolling.
		Soil alkali and gypsum, 4th rate.
		Vegetation - grass and greasewood.
		Barometer 5250. Thermometer 80°.

		232nd Mile.
		S. 89° 51' E. on tangent to the parallel.
		Over rolling sand hills.
5150	29.00	Bottom of wash, dry, 2 chs. wide, course N. Ascend.
	56.00	On spur, slope N. 30 ft. high. Descend.
	72.00	Bottom of wash, dry, 2 chs. wide, course N. W. Ascend.
		Difference between measurements of 80 chs. by two sets
		of chainmen is 10 lks. Position of middle point by
		1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5200	80.00	North 172 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for 232 mile cor.
		A brass cap on top of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 232 M,stamped in the center
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor.
		6 ft. dist. Raised a mound of earth 5 ft. base 2 ft.
		high around the post.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5200 ft. Thermometer 80°.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		233rd Mile.
		S. 89° 50' E. on tangent to the parallel.
		Ascend over broken land.
		Stadia measurement. Angle 11°+ Rod 8.85 double = 1770. Constant 96.36 x 1770 = 1705.57 + C. = 1.13 = 1706.70 ft. = 25.86 chs.
5300	23.00	Foot of wall about 300 ft. high, bears N. and S. Ascend
	25.86	On top of wall, bears N. and S. Ascend gradually.
		Stadia. Angle 2°+ Rod 7.40 double = 1480 ft.
		Constant 99.88 x 1480 = 1478.23 + C = 1.15 = 1479.38 ft. = 22.41 chs. + 25.86 chs. = 48.27 chs.
5650	48.27	On top of rocky ridge. Descend, bears N. and S.
		Thence by tape measurement.
		Difference between measurements of 31.73 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 31.74 chs. By 2nd set 31.72 chs.
		The mean of which is 31.73 chs. + 48.27 chs. =
5500	80.00	North 196 lks. from the tangent.
		Set a sandstone 30x12x8 ins. 20 ins. in the ground for 233rd mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 233 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass and sage.
		Barometer 5500 ft. Thermometer 80°.

		234th Mile.
		S. 89° 50' E. on tangent to the parallel.
		Descend over rolling land.
	45.00	Wash 30 lks. wide, dry, course N. W. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.

ALTITUDE	CHAINS	
		The mean of which is
5500	80.00	North 221 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for the 234th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 234 M. stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor.
		Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5500 ft. Thermometer 80°.

		235th Mile.
		S. 89° 49' E. on tangent to the parallel.
		Ascend over sand hills.
	76.75	On ridge near base of wall, bears N. and S.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5600	80.00	North 247 lks. from the tangent.
		Set a sandstone 33x12x7 ins. 22 ins. in the ground for 235th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 235 M on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands about 6.50 chs. west of perpendicular wall about 400 ft. high, at head of little gulch, course W.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5600 ft. Thermometer 70°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		236th Mile.
		S. 89° 48' E. on tangent to the parallel.
		Ascend.
		As I cannot see on top of the wall from the cor., I set back on the tangent 3.25 chs. to the 76.75 ch. mark. Thence by stadia. Angle 26°+ Rod 8.53 = 853 ft Constant 80.78 x 853 = 689.05 + C. = 1.03 = 690.08 ft. = 10.45 chs. - 3.25 chs. = 7.20 chs.
	6.50	Foot of wall, bears N. and S.
5600	7.20	Stadia point on top of wall, about 375 ft. high, bears N. and S.
		Stadia. Angle 3°+ Rod 9.90 = 990 ft. Constant 99.73 x 990 = 987.33 + C = 1.15 = 988.48 ft. = 14.98 chs. + 7.20 chs. = 22.18 chs.
6000	22.18	On top of rocky ridge bears N. and S. To stadia point. Thence by tape measurement.
		Descend over sand hills.
		Difference between measurements of 57.82 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 57.84 chs. By 2nd set 57.80 chs.
		The mean of which is 57.82 chs. + 22.18 chs. =
5900	80.00	North 275 lks. from the tangent.
		Set a sandstone 31x11x6 ins. 21 ins. in the ground for 236th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 236 M. on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. and 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land - rock croppings and sand hills.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage, scrub cedar and piñon.
		Barometer 5900 ft. Thermometer 70°.

		237th Mile.
		S. 89° 48' E. on tangent to the parallel.

BOOK 2623

ALTITUDE	CHAINS	
		Descend over rolling sand hills and rock croppings, through scattering scrub cedar and piñon timber. Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs. The mean of which is
5840	80.00	North 305 lks. from the tangent. Set a sandstone 30x10x6 ins. 20 ins. in the ground for 237th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 237 M on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land rolling.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass, sage and scattering piñon.
		Barometer 5840 ft. Thermometer 65°.
		June 20th, 1901.

		June 21st, at 1h 28m A.M. l.m.t. at the 237th mile cor. I observe Polaris at eastern elongation in accordance with instructions in the manual, and mark the line so determined on a plug driven in the ground north of my station. At 6h 40m A.M. I lay off the azimuth of Polaris 1° 32' to the west and mark the true meridian so determined on a plug driven in the ground north of my station. The magnetic bearing of the said meridian is N. 14° 54' W. This reduced by the table page 100 of the manual, gives the mean magnetic declination 14° 50' E. I lay off an angle of 90° from the meridian from the north to the east for the tangent to the parallel.
		The instrument was placed in perfect adjustment previous to taking these observations, and the

ALTITUDE	CHAINS	
		mean of four sights was taken with the telescope reversed at each sight.
		I compare the steel tapes with the standard and find them of correct length.
		238th Mile.
		East on tangent to the parallel.
		Descend over rolling sand hills and rock croppings.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5730	80.00	North .76 of 1k. from the tangent.
		Set a sandstone 40x17x6 ins. on bare rock for 238th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 238 M on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		A cedar tree 10 ins. diam. bears S. 24° 57' E. 108 lks. dist. marked ARIZ. 238 M. B.T.
		No other trees within limits suitable for bearing trees.
		Land rolling, sand hills.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass, sage and scattering cedar trees.
		Barometer 5730 ft. Thermometer 60°.

		239th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over rolling sand hills and rock croppings.
	57.00	Point of spur, slope S. Descend more rapidly.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		The mean of which is
5650	80.00	North 3 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom on bare rock for 239th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 239 M. stamped in the center. Raised a mound of stone 6 ft. base 3 ft. high around the post. Pits impracticable
		Land rolling.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass, sage and scattering cedar.
		Barometer 5650 ft. Thermometer 66°.

		240th Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over bare sandstone, along S. W. slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5450	80.00	North 7 lks. from the tangent.
		Set a sandstone 33x10x7 ins. on bare rock for 240th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 240 M. on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rough and broken.
		Soil rocky, 4th rate.
		Vegetation - a few scrub cedars in crevices of the rocks.
		Barometer 5450 ft. Thermometer 75°.

		241st Mile.
		S. 89° 58' E. on tangent to the parallel.
		Descend over bare rocks.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
	1.65	On rock bluff, bears N. E. and S. W. Descend. Stadia measurement. Angle 4°+ Rod 9.46 double = 1892. Constant 99.51 x 1892 = 1882.73 + C. = 1.15 = 1883.88 ft. = 28.54 chs. + 1.65 chs. = 30.19 chs.
5200	15.00	Bottom of Chin Lee Cañon, 350 ft. below last cor. Stream of clear, good water, 5 lks. wide, course N.E. Ascend over rocks.
5450	30.19	Stadia point on top of bare rock point, about 300 ft. above bottom of cañon, slope N. The forks of Chin Lee creek, about 25 chs. north. Stadia. Level. Rod 7.25 = 725 ft. + C. = 1.15 = 726.15 = 11.00 chs. + 30.19 chs. = 41.19 chs.
5450	41.19	On point of rocks, sloping N. Stadia. Angle 15°- Rod 12.67 = 1267 ft. Constant 93.30 x 1267 = 1182.11 + C = 1.11 = 1183.22 ft. = 17.93 chs. + 41.19 chs. = 59.12 chs.
	51.00	Foot of wall, about 300 ft. high, bears N. and S.
	59.12	On bench in main cañon, bears N. and S. Stadia. Angle 13°+ Rod 13.00 = 1300 ft. Constant 94.94 x 1300 = 1234.22 + C. = 1.12 = 1235.34 ft. = 18.72 chs. + 59.12 chs. = 77.84 chs.
5200	68.50	Bottom of cañon, main fork of Chin Lee creek. Stream 10 lks. wide, course N. W. Indian gardens about ¼ mile S. Ascend
	75.00	Foot of rock wall of canon, bears S. and N. W. Ascend.
	77.84	Stadia point on west slope of cañon wall. Thence by tape measurement.
5520	80.00	North 12 lks. from the tangent. Set a sandstone 33x12x7 ins. on bare rock for 241st mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 241 M on the W. faces. Raised a mound of stone 5 ft. base 3 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.

BOOK 2623

ALTITUDE	CHAINS	
		Land broken and rocky.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass and sage, and a little cottonwood and willow along the Chin Lee Creek.
		Barometer 5520 ft. Thermometer 80°.

		242nd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend over bare rock.
5550	4.20	Top of bluff, east wall of Chin Lee cañon, bears N.W. and S. E. Thence over rolling hills.
5350	20.00	Top of ridge, bears N.E and S. W. Deseend
	35.00	Bottom of dry ravine, 150 ft. deep, course S. W. Ascend
5450	56.50	On top of spur, bare sandstone, slope S. W. Thence along S. W. slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by 1st set 80.08 chs. By 2nd set 79.92 chs.
		The mean of which is
5450	80.00	North 19 lks. from the tangent.
		Set a sandstone 32x14x7 ins. 21 ins. in the ground for 242nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 242 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling and rocky.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5450 ft. Thermometer 85°.

		243rd Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over rolling hills.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5600	80.00	North 27 lks. from the tangent.
		Set a sandstone 31x14x8 ins. on bare rock for the 243rd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 243 M on the W. faces. Raised a mound of stone 5 ft. base 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land rolling sand hills and rock croppings.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5600 ft. Thermometer 86°.

		244th Mile.
		S. 89° 56' E. on tangent to the parallel.
		Ascend over rolling hills.
	16.00	Top of spur, slope S. Thence descend along south slope.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5625	80.00	North 37 lks. from the tangent.
		Set an iron pipe 2 ins. diam 5 ft. long with flanges at the bottom 3 ft. in the ground for 244th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 244 M. stamped in the center Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.

BOOK 2623

BOOK 2628

Altitude	Chains	
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5625 ft. Thermometer 88°.

		245th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over nearly level land.
	40.00	Old Indian trail, bears N. E. and S. W.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
5560	80.00	North 49 lks. from the tangent.
		Set a sandstone 30x8x8 ins. 20 ins. in the ground for 245th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 245 M on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land nearly level.
		Soil sandy and gypsum, 4th rate.
		Vegetation - grass and greasewood.
		Barometer 5560 ft. Thermometer 78°.
		This cor. stands at foot of oblong hill, that bears N. W. and S. E.
		June 21, 1901.

		I examine and adjust the transit, and compare the steel tapes with the standard, and find them of correct length.
		246th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend.
	10.00	Top of hill near N. end, bears S. E. about a mile.
		Descend.

BOOK 2628

ALTITUDE	CHAINS	
	19.85	Dry gulch, course N. W. Ascend.
	39.72	Point of spur, slope N. W. Descend.
	70.00	Dry gulch, course S. E. about 175 ft. below top of hill. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs.
		The mean of which is
5525	80.00	North 62 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 246th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 246 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass and sage.
		Barometer 5525 ft. Thermometer 80°.

		247th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Over rolling land.
	58.00	Dry gulch, course S. Ascend.
	61.00	Top of spur, slope S. Indian trail, bears N.E. and S. W. Descend.
	62.30	Dry gulch, course S. W. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5640	80.00	North 76 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 247th mile cor.

BOOK 2628

ALTITUDE	CHAINS	
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 247 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling, sand hills.
		Soil sandy, 4th rate.
		Vegetation - grass, sage and greasewood.
		Barometer 5640 ft. Thermometer 85°.

		248th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Ascend over rolling hills.
	8.00	Top of spur, slopes S. W. Descend.
	9.00	Dry gulch, course S. W. Ascend.
	30.00	Foot of bluff, bears N. E. and S. W. Ascend.
	56.50	Top of bluff, bears N. E. and S. W. about 200 ft. above last cor. Indian trail bears N.E. and S.W. Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set is 80.06 chs. By 2nd set 79.94 chs. The mean of which is
5825	80.00	North 92 lks. from the tangent.
		Set an iron pipe 2 ins. diam, 5 ft. long with flanges at the bottom 3 ft. in the ground for 248th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 248 M stamped in the center Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		A cluster of volcanic pinnacles, called El Capitan, bears N. 22° 30' E.
		A round peak in low range to the south bears S. 16° 26' E.
		Land rolling.

ALTITUDE	CHAINS	
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5825 ft. Thermometer 88°.
		---:-------
		249th Mile.
		S. 89° 53' E. on tangent to the parallel.
		Over gently rolling hills.
	63.00	Top of ridge, bears N. and S.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5830	80.00	North 110 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 249th mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 249 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		El Capitan bears N. 11° 10' W.
		Turret butte, bears N. 30° 08' E.
		A round peak in low range to the south bears S. 6° 33' W.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5830 ft. Thermometer 92°.

		250th Mile.
		S. 89° 52' E. on tangent to the parallel.
		Descend.
	19.50	Reef of black volcanic rock bears N. W. and S. E.
		Descend.
	25.00	Foot of ridge, bears N. W. and S. E. Thence over

BOOK 2623

ALTITUDE	CHAINS	
		sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5700	80.00	North 129 lks. from the tangent.
		Point for 250th mile cor. falls in drifting sand hills. The ground too unstable to set up the temporary astronomical observatory, therefore, I place the pier for the zenith telescope at a point 86.00 chs. north on firmer ground, east of a rocky butte.
		June 22nd, 1901.
		June 25th, 1901, we make the latitude of the temporary observatory by astronomical observation 37° 00' 54.6" North latitude, which equals 83.64 chs. north of the 37th parallel.
		The point for our 250th mile cor. is therefore within the limits of 3" of arc allowed in the instructions.
		June 26th, 1901, at the point for the 250th mile cor. at 1h 8m A.M. l.m.t. I observe Polaris at eastern elongation in accordance with the instructions in the manual, and mark the line so determined on a plug driven in the ground north of my station.
		At 7h A.M. I lay off the azimuth of Polaris 1° 32' to the west and mark the true meridian thus determined on a plug driven in the ground north of my station.
		The magnetic bearing of the said meridian is N. 15° 04' W. This reduced by the table page 100 of the manual gives mean magnetic declination 15° 00' E.
		I lay off an angle of 90° from this meridian from the north to,the east for the tangent to the parallel.
		In all the observations great care is taken to have the transit in perfect adjustment. The mean of four sights is taken with the telescope reversed at each sight.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		I compare the steel tapes with the standard and find them of correct length.
		At the point for the 250th mile cor.
		I set a sandstone shaft 6 ft. long 12 ins. broad and 12 ins. thick, dressed square 12 ins. down from the top, 3 ft. in the ground, for the 6th Astronomical Monument, marked with letters 1½ ins. square deeply graven in the stone, UTAH on N. 37 N. L. on E. ARIZONA on S. and 250 M on the W. faces.
		Raised a mound of stone 5½ ft. base 2 ft. high around the shaft, and dug pits 36x36x18 ins. N. S. E. and W. of the shaft and 6 ft. dist.
		Turret butte bears N. 16° 14' E. about 4 miles dist.
		A butte of trap rock about 100 ft. high bears north 88.00 chs. *dist.*
		El Capitan bears N 40° W. about 2 miles dist.
		A sharp peak bears S. 27° 18' W. about 4 miles dist.
		Highest peak of Carriso mountains bears S. 64° 12' E. about 16 miles dist.
		Land rolling sand hills.
		Soil nearly pure sand, 4th rate.
		Vegetation - grass and greasewood.
		Barometer 5700 ft. Thermometer 85°.

		251st Mile.
		East on tangent to the parallel.
		Ascend over rolling sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5750	80.00	North .76 of a lk. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 251st mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 251 M. stamped in the

ALTITUDE	CHAINS	
		center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling sand hills.
		Soil nearly pure sand, 4th rate.
		Vegetation - grass and sage.
		Barometer 5750 ft. Thermometer 90°.

		252nd Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend over sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing.
		The mean is
5840	80.00	North 3 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long, with flanges at the bottom 3 ft. in the ground for 252nd mile cor.
		A brass cap on top of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 252 M stamped in the center
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		El Capitan bears N. 64° 35' W.
		Peak on Carriso mountains bears S. 61° 50' E.
		Land rolling sand hills.
		Soil sandy, 4th rate.
		Vegetation - grass, sage and greasewood.
		Barometer 5840 ft. Thermometer 95°.

		253rd Mile.
		S. 89°,59' E. on tangent to the parallel.
		Ascend over rolling sand hills.
5950	77.00	Top of ridge, bears N. and S. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.

ALTITUDE	CHAINS	
		The mean of which is
5890	80.00	North 7 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with falenges
		at the bottom 3 ft. in the ground for 253rd mile cor.
		A brass cap on top of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 253 M. stamped in the center
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6
		ft. dist. Raised a mound of earth 5 ft. base 2 ft.
		high around the post.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass, sage and greasewood.
		Barometer 5890 ft. Thermometer 96°.

		254th Mile.
		S. 89° 58' E. on tangent to the parallel.
		Descend gradually over rolling sand hills.
		Difference between measurements of 80 chs. by two
		sets of chainmen is 2 lks. Position of middle point
		by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
5800	80.00	North 12 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges
		at the bottom 3 ft. in the ground for 254th Mile cor.
		A brass cap on top of the pipe has raised letters
		UTAH on N. ARIZ. on S. and 254 M stamped in the center
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6
		ft. dist. Raised a mound of earth 5 ft. base 2 ft.
		high around the post.
		Land rolling sand hills and rock croppings.
		Soil sandy, 4th rate.
		Vegetation - grass, sage and greasewood,
		Barometer 5800 ft. Thermometer 98°.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		255th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Over gently rolling land.
	64.00	In hollow, drains N. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing.
		The mean is
5750	80.00	North 19 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 255th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 255 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		A peak of the Carriso mountains bears S 57° 10' E.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5750 ft. Thermometer 100°.

		256th Mile.
		S. 89° 57' E. on tangent to the parallel.
		Ascend gradually through a sandy valley, about 20 chs. north to base of rock ridge, about 4 miles south to foot of mountains.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5810	80.00	North 27 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 256th mile cor. A brass cap on top of the pipe has raised letters

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		UTAH on N. ARIZ. on S. and 256 M stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land gently rolling.
		Soil sandy, 4th rate.
		Vegetation - grass, sage and greasewood.
		Barometer 5810 ft. Thermometer 100°.
		÷----------
		257th Mile.
		S. 89° 56' E. on tangent to the parallel.
		Ascend over rolling land.
	25.00	Point of rocks, slopes S. Descend.
	30.00	Hollow, drains S. E. Ascend.
	46.00	Top of sandstone croppings, about 50 ft. high, bears N. W. and S. E. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5900	80.00	North 37 lks. from the tangent.
		Set a sandstone 30x12x6 ins. 20 ins. in the ground for 257th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 257 M. on W. faces. Dugs pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5900 ft. Thermometer 98°.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		258th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Over gently rolling land, sloping south.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5950	80.00	North 49 lks. from the tangent
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 258th mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 258 M stamped in the center.
		Du pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass, sage and greasewood.
		Barometer 5950 ft. Thermometer 97°.

		259th Mile.
		S. 89° 55' E. on tangent to the parallel.
		Ascend gradually over sand hills.
		Difference between measurements of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs.
		The mean of which is
6000	80.00	North 62 lks. from the tangent.
		Set a sandstone 36x12x6 ins. 24 ins. in the ground for 259th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 259 M on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.

ALTITUDE	CHAINS	
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation -,grass and sage.
		Barometer 6000 ft. Thermometer 95°.

		260th Mile.
		S. 89° 54' E. on tangent to the parallel.
		Ascend.
	2.00	Foot of bare rock, sloping W., bears N. W. and S.E.
		Ascend.
	7.00	Top of rocky ridge, bears N. W. and S. E. Ascend over sand and gravel ridges.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
6200	80.00	North 76 lks. from the tangent.
		Set a sandstone 30x10x6 ins. 20 ins. in the ground for 260th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 260 M on W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		Land rolling.
		Soil sandy and stony, 4th rate.
		Vegetation - grass and sage.
		Barometer 6200 ft. Thermometer 80°.
		June 26th, 1901.

		I examine the adjustments of the transit, and compare the steel tape with the standard, and find all correct
		261st Mile.
		S. 89° 53' E. on tangent to the parallel.
		Ascend.
	6.60	Top of ridge bears N. and S. W. Descend.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		About 1 ch. ahead a dry gulch, course S. W. About 3 chs. ahead, foot of a great wall of rocks, bears N. and S. about 400 ft. high. Impassable on this line. From this point I run south on an offset line 71.00 chs. to avoid the cliffs. Thence S. 89° 53' E. on offset line 71.00 chs. south of the tangent and parallel with it.
	40.00	South end of wall, dry gulch, course south.
	70.00	Set back north 71.00 chs. to the tangent. Thence S. 89° 53' E. on tangent to the parallel.
		25.00 chs. back west to foot of wall, bears N. and S. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
5950	80.00	North 92 lks. from the tangent.
		Set a sandstone 32x10x7 ins. 21 ins. in the ground for 261st mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 261 M on the W. faces.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		A peak of the Carriso mountains bears S. 42° 47' E.
		Land broken and rocky.
		Soil sandy and stony, 4th rate.
		Vegetation - grass, sage and scrub cedar on top of rocks.
		Barometer 5950 ft. Thermometer 73°.

		262nd Mile.
		S. 89° 53' E. on tangent to the parallel.
		Descend over rolling sand hills.
	74.00	Bottom of wash, dry, 25 lks. wide, course N. E. Ascend

BOOK 2628

ALTITUDE	CHAINS	
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs. The mean of which is
5840	80.00	North 110 lks. from the tangent. Set an iron pipe 2 ins. diam, 5 ft. long with flanges at the bottom 3 ft. in the ground for 262nd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 262 M.stamped in the center Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. Land rolling. Soil sandy, 4th rate. Vegetation - grass, sage and greasewood. Barometer 5840 ft. Thermometer 80°.

		263rd Mile.
		S. 89° 53' E. on tangent to the parallel. Ascend over sand hills, along N. slope. Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs. The mean of which is.
5800	80.00	North 139 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 263rd mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 263 M stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. and raised a mound of earth 5 ft. base 2 ft. high around the post. Land rolling. Soil sandy, 4th rate.

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ALTITUDE	CHAINS	
		Vegetation - grass and greasewood.
		Barometer 5800 ft. Thermometer 85°.
		This cor. stands on north slope, about 20 chs. south to the foot of cliffs, about 300 ft. high, that extend about ¼ mile west and 3/4 mile east.

		,264th Mile.
		S. 89° 51' E. on tangent to the parallel.
		Ascend over sand hills along N. slope.
	10.00	Top of spur, slope N. Descend.
	71.00	Bottom of wash, dry, course N. E.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by 1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5875	80.00	North 150 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 264th mile cor.
		A brass cap on top of the pipe has raised letters UTAH on the N. ARIZ. on S. and 264 M. stamped in the center. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5 ft. base and 2 ft. high around the post.
		A peak of the Carriso mountains bears S. 31° 54' E.
		N. W. cor. rock bluff, bears S. 27° E' about 1 mile dist.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and greasewood.
		Barometer 5875. Thermometer 88°.

		265th Mile.
		S. 89° 51' E. on tangent to the parallel.
		Over gently rolling land.

ALTITUDE	CHAINS	
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs. The mean of which is
5800	80.00	North 172 lks. from the tangent. Set a sandstone 30x18x6 ins. on bare rock for 265th mile cor, marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 265 M. on W. faces. Raised a mound of stone 5 ft. base and 2 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. A peak of the Carriso mountains bears S. 27° 30' E. A low butte bears S. 56° 42' E. Land rolling. Soil sandy, 3rd rate. Vegetation - grass and sage. Barometer 5800 ft. Thermometer 92°.

		266th Mile.
		S. 89° 50' E. on tangent to the parallel. Over nearly level land. Difference between measurement of 80 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 80.01 chs. By 2nd set 79.99 chs. The mean of which is
5725	80.00	North 196 lks. from the tangent. Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom, 3 ft. in the ground, for 266th mile cor. A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 266 M. stamped in the center Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5 ft. base 2 ft. high around the post. Land nearly level. Soil sandy, 3rd rate

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ALTITUDE	CHAINS	
		Vegetation - grass and sage.
		Barometer 5725 ft. Thermometer 98°.

		267th Mile.
		S. 89° 49' E. on tangent to the parallel.
		Over nearly level land.
		Difference between measurements of 80 chs. by two sets of chainmen is nothing.
		The mean is
5750	80.00	North 221 lks. from the tangent.
		Set an iron pipe 2 ins. diam. 5 ft. long with flanges at the bottom 3 ft. in the ground for 267th mile cor.
		A brass cap on top of the pipe has raised letters UTAH on N. ARIZ. on S. and 267 M stamped in the center.
		Dug pits 36x36x18 ins. N. S. E. and W. of the cor. and 6 ft. dist. Raised a mound of earth 5 ft. base and 2 ft. high around the post.
		Course down Arido creek bottom, N. 32° 25' E.
		Peak of the Carriso mountains bears S. 17° 37' E.
		Top of low butte bears S. 33° 15' E.
		N. W. Cor. of rock bluff bears S. 76° 45' W.
		Land nearly level.
		Soil sandy, 3rd rate.
		Vegetation - grass and sage.
		Barometer 5750 ft. Thermometer 100°.

		268th Mile.
		S. 89° 49' E. on tangent to the parallel.
		Ascend gradually.
	78.50	Top of spur, slope N.
		Difference between measurements of 80 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 80.02 chs. By 2nd set 79.98 chs.
		The mean of which is
5800	80.00	North 247 lks. from the tangent

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Set a sandstone 31x20x6 ins. 21 ins. in the ground for 268th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 268 M on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of the cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Land nearly level.
		Soil sandy, 3rd rate.
		Vegetation - grass and sage.
		Barometer 5800 ft. Thermometer 90°.

		269th Mile.
		S. 89° 48' E. on tangent to the parallel.
		Over rolling land.
	20.00	Dry gulch, course N. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 10 lks. Position of middle point by
		1st set 80.05 chs. By 2nd set 79.95 chs.
		The mean of which is
5875	80.00	North 275 lks. from the tangent.
		Set a sandstone 30x10x6 ins. 20 ins. in the ground for 269th mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 269 M on the W. faces. Dug pits 36x36x18 ins. N. S. E. and W. of cor. 6 ft. dist. Raised a mound of earth 5½ ft. base 2½ ft. high east of cor.
		Carriso peak bears S 6° 00' E.
		Low butte bears S. 11° W.
		Land rolling.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5875 ft. Thermometer 83°.
		June 27th, 1901.

BOOK 2628

ALTITUDE	CHAINS	
		June 28th, 1901, at 1h 00m A.M. l.m.t. at the 269th mile cor., I observe Polaris at eastern elongation, in accordance with instructions in the manual, and mark the line so determined on a plug driven in the ground north of my station.
		At 6h 45m A.M. I lay off the azimuth of Polaris 1° 32' to the west, and mark the true meridian thus determined on a plug driven in the ground 10 chs. north of my station. The magnetic bearing of the said meridian is N. 15° 02' W. This reduced by the table page 100 of the manual gives the mean magnetic declination 14° 58' E. I lay off from this meridian an angle of 90° from the north to the east for the tangent to the parallel. In all these observations the mean of four sights is taken, with the telescope reversed at each sight, the transit being in perfect adjustment. I compare the steel tape with the standard and find them to be of correct length.
		270th Mile.
		East on tangent to the parallel.
		Ascend over rolling land.
5950	57.00	Dry gulch, course N. W. Foot of rocky butte bears N.W. and S. E. Ascend.
		Difference between measurements of 80 chs. by two sets of chainmen is 14 lks. Position of middle point by 1st set 80.07 chs. By 2nd set 79.93 chs.
		The mean of which is
6100	80.00	North .76 of 1k. from the tangent.
		Set a sandstone 30x12x7 ins. 20 ins. in the ground for 270th mile cor. Marked UTAH on N. & N. L. on E. ARIZ. on S. and 270 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands on W. slope of rocky butte.

ALTITUDE	CHAINS	
		Land rolling and broken.
		Soil rocky and sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 6100 ft. Thermometer 78°.

		271st Mile.
		S. 89° 59' E. on tangent to the parallel.
		Ascend rocky buttes.
6200	7.40	Top of butte, bears N. and S. about 200 ft. high;
		thence over rocky mesa, through scrub cedar timber.
6200	41.50	Top of rock cliffs, east edge of buttes, bears N. and
		S. Descend.
6075	54.00	Top of spur, slope S. E.
		Stadia measurement. Angle 9°- Rod 12.995 double =
		2599. Constant 97.55 x 2599 = 2534.32 + C. = 1.13 =
		2535.45 ft. = 38.41 chs. + 54.00 chs. = 92.41 chs. -
		12.41 chs. = 80.00 chs.
5650	80.00	North 3 lks from the tangent.
		Set a sandstone 30x12x6 ins. 20 ins. in the ground
		for 271st mile cor. Marked UTAH on N. 37 N. L. on E.
		ARIZ. on S. and 271 M. on the W. faces. Raised a
		mound of stone 5½ ft. base 2½ ft. high east of cor.
		Pits impracticable.
		This cor. stands at foot of steep bad land slope,
		bears N. S. and S. E.
		Land rough and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage and cedar on the cliffs.
		Barometer 5650 ft. Thermometer 80°.

		272nd Mile.
		S. 89° 59' E. on tangent to the parallel.
		Descend over bad land hills.
	4.00	Hollow, course S. E. Ascend.
	8.00	Top of spur, slope S. E. Descend.

BOOK 2628

ALTITUDE	CHAINS	
5550	18.00	Bottom of main wash, dry, course N. W. Ascend. Over broken rocky W. slope through scattering cedar and piñon. Difference between measurements of 80 chs. by two sets of chainmen is 16 lks. Position of middle point by 1st set 80.08 chs. By 2nd set 79.92 chs. The mean of which is
5875	80.00	North 7 lks. from the tangent. Set a sandstone 32x12x8 ins. 22 ins. in the ground for the 272nd mile cor. Marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 272 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable. This cor. stands on N. W. slope near the top of a rough ridge just west of the gap. Land mountainous. Soil rocky, 4th rate. Vegetation - grass, sage and scattering cedar and piñon timber. Barometer 5875 ft. Thermometer 83°.

In pursuance of instructions from the Hon. Commissioner, I produce this tangent as a random line. From this point to the intersection with a meridian line, passing through the corner common to Colorado, New Mexico, Utah and Arizona, as established by Chandler Robbins in 1875.

I set temporary corner with the proper offset north to the parallel at each 80 chs. and at 5 miles and 5.18 chs. my tangent intersects the meridian which passes through the said corner, 1.64 chs. north of said corner, and as the offset here to the parallel is 49 lks. north of my tangent, it makes said corner 2.13 chs. south of the 37th parallel as indicated by my line. This falling answers to a correction of 0°18'

BOOK 2628

ALTITUDE	CHAINS	

or 42 lks. south per mile counting from the 272nd mile, and would make the course of the true line S. 89° 42' E.

This cor. which is the S. W. cor. of Colorado, the S. E. cor. of Utah, the N. E. cor. of Arizona, and the N. W. cor. of New Mexico, consists of a shaft of limestone 7x7 ins. square 2½ ft. above ground, firmly set, marked COLORADO on the N. E. NEW MEXICO on the S. E. ARIZONA on the S. W. and UTAH on the N. W. faces, and is surrounded by a mound of stone 6 ft. base 2 ft. high. This corner stands on a level mesa or table land, about 10 chs. wide, E. and W. by about 25 chs. long N. and S. about 1½ miles south of the San Juan river, and about 300 ft. above it. This mesa is entirely devoid of vegetation. This cor. was recently (March 26th and 27th 1899) restored by H. D. Page, U. S. Deputy Surveyor of Salt Lake City, Utah. From this cor. Chimney Rock on the Latra mountains bears N. 45° 40' E. about 20 miles dist. Darling's Peak on the Latra mountains bears 36° 53' E. about 20 miles dist. Wilson's Peak, now called Ship Rock, bears S. 28° 12' E. N. W. point of Sierra Carriso bears S. 54° 00' W. about 12 miles dist. Conical point on mesa, which bears N. E. and S. W. bears N. 37° 20'W about 3/4 of a mile dist. Conical point on north end of this mesa bears N. 52° 20' E. 28.65 chs. dist. This course and distance practically agrees with that given by Chandler Robbins. The cone shaped hill, being rounded over the top, there is no well defined point from which to measure, though the summit does not cover an area of over 20 square ft. After a careful search, I failed to find any evidence of there ever having been any other corner

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ALTITUDE	CHAINS	
		established on this mesa, or in this vicinity, and I feel satisfied that the Page corner stands on the spot where Chandler Robbins erected his corner in 1875.
		June 28th, 1901.

		June 29th, 1901, I examine the adjustments of the transit and find it in perfect adjustment. I compare the steel tapes with the standard and find them of correct length.
		I now return to the 272nd mile corner. Thence I ran on the 273rd Mile.
		S. 89° 42' E. on a true line toward the terminal corner
		Ascend.
	2.00	On steep north slope in gap of rough ridge, which rises to a peak about ¼ mile S. E. Bottom of gulch about 1½ chs. N. W. Then the ridge rises to a peak about 15 chs. N. W.
	10.48	Top of bench bears N. and S., slopes N. Descend.
	35.00	Bottom of wash, dry, course N., about 300 ft. below the bench.
	37.00	Top of low ridge, bears N. and S.
	42.50	Bottom of wash, dry, course N. Ascend along N. slope in scattering cedar.
	68.00	Top of rocky spur, slope N.
		Difference between measurements of 80 chs. by two sets of chainmen is 8 lks. Position of middle point by 1st set 80.04 chs. By 2nd set 79.96 chs.
		The mean of which is
5700	80.00	Set a sandstone 31x12x7 ins. 21 ins. in the ground for 273rd mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 273 M. on the W. faces. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor.

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BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		Pits impracticable.
		A cedar tree 12 ins. diam. bears S. 28° 50' W. 72 lks. dist. marked ARIZ 273 M. B.T.
		A cedar tree 10 ins. diam bears N. 20° 50' W. 38 lks. dist. marked UTAH 273 M. B.T.
		No other trees within limits suitable for bearing trees
		Land rolling and broken.
		Soil sandy and rocky, 4th rate.
		Vegetation - grass, sage, and scattering scrub cedar.
		Barometer 5700 ft. Thermometer 85°.
		274th Mile.
		S. 89° 42' E. on a true line.
		Ascend over bad lands, through scattering timber.
		Stadia. Angle 9°+ Rod. 13.00 = 1300 ft. Constant 97.55 x 1300 = 1268.15 + C = 1.13 = 1269.28 ft. = 19.23 chs.
5900	19.23	To top of sharp white bad land ridge, bears N. E. and S. W. Descend.
		Stadia. Angle 2°- Rod 12.99 double = 2598 ft. Constant 99.88 x 2599 = 2594.88 + C. = 1.15 = 2596.03 ft. = 39.33 chs. + 19.23 chs. = 58.56 chs.
5700	40.00	Bottom of dry ravine at foot of white ridge, course S. W. about 200 ft. below top of ridge. Ascend.
5820	58.56	Stadia point on broad spur, slope S. Thence by tape measurement.
	68.00	Leave scattering timber, bears N. and S.
		Difference between measurements of 21.44 chs. by two sets of chainmen is 2 lks. Position of middle point by 1st set 21.45 chs. By 2nd set 21.43 chs. The mean of which is 21.44 chs. + 58.56 chs. =
5850	80,00	Set a sandstone 30x13x8 ins. 20 ins. in the ground for 274th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 274 M. on W. faces.

ALTITUDE	CHAINS	
		Raised a mound of stone 5½ ft, base 2½ ft. high east of cor. Pits impracticable.
		Carriso peak bears S. 22° 15' W.
		Land rough, broken bad lands.
		Soil sandy and alkali, 4th rate.
		Vegetation - grass, sage and scattering cedar.
		Barometer 5850 ft. Thermometer 92°.

		275th Mile.
		S. 89° 42' E. on a true line.
		Descend over rolling sand hills.
	60.00	On north slope of rocky butte. Descend.
	75.00	Hollow, drains S. E. Ascend S. W. slope of another butte.
		Difference between measurements of 80 chs. by two sets of chainmen is 12 lks. Position of middle point by 1st set 80.06 chs. By 2nd set 79.94 chs.
		The mean of which is
	80.00	Falls on steep rocky slope of butte. Impracticable to establish the cor.
		Land rolling and broken.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.

		276th, Mile.
		S 89° 42' E. on a true line.
		Ascend.
5900	5.46	On south slope of rocky butte near the top. Set a sandstone 37x10x7 ins. on bare rock against north side of boulder for 275th mile cor. marked UTAH on N. 37 on E. ARIZ. on S. and 275.068 M on the W faces. Raised a mound of stone 5 ft. base 3 ft. high around the cor. Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Barometer 5900 ft. Thermometer 102°.

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

Altitude	Chains	
		Continuing on true line.
		Descend.
5700	13.50	Foot of rocky butte, bears N. and S. W. Thence over rolling sand hills.
	65.00	Top of bluffs, bears N. E. and S. E. Descend.
		Difference between measurements of 80 chs. by two sets of chainmen is 6 lks. Position of middle point by 1st set 80.03 chs. By 2nd set 79.97 chs.
		The mean of which is
5650	80.00	Set a sandstone 36x10x7 ins. 24 ins. in the ground for 276th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 276 M. on the W. faces. R
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		This cor. stands in a little valley that drains N. E.
		Land rolling and broken.
		Soil sandy, 4th rate.
		Vegetation - grass and sage.
		Barometer 5660 ft. Thermometer 102°.
		After a careful search, I fail to find any trace of E. N. Darling's 331st mile corner mentioned in the field notes furnished me by the Hon. Commissioner.

		277th Mile.
		S 89° 42' E. on a true line.
		Along north slope.
5650	32.14	On W. wall of cañon about 100 ft. deep, bears N. and S. Descend.
		Stadia measurement. Angle 2°+ Rod 10.77 double = 2154 ft. Constant 99.88 x 2154 = 2151.42 + C = 1.15 = 2152.57 ft. = 32.61 chs. + 32.14 chs. = 64.75 chs.
	48.00	Bottom of wash, dry, 1 ch. wide, course N. Ascend.
	64.75	Top of ridge, bears N. and S. Descend. Thence by

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ALTITUDE	CHAINS	
		tape measurement.
	75.00	Dry gulch, course S. Ascend.
		Difference between measurements of 47.39 chs. by two sets of chainmen is 4 lks. Position of middle point by 1st set 47.41 chs. By 2nd set 47.37 chs.
		The mean of which is 47.39 chs. + 32.61 chs. =
5650	80.00	Set a limestone 30x10x8 ins. 20 ins. in the ground, for 277th mile cor. marked UTAH on N. 37 N. L. on E. ARIZ. on S. and 277 M. on the W. faces.
		Raised a mound of stone 5½ ft. base 2½ ft. high east of cor. Pits impracticable.
		Land rough and broken.
		Soil rocky, 4th rate.
		Vegetation - grass, sage and a few scrub cedars among the rocks.
		Barometer 5650 ft. Thermometer 100°.

		278th Mile.
		S. 89° 42' E. on a true line.
		Ascend.
	1.30	Top of bluff on edge of mesa, bears N. and S.
5675	5.18	The terminal corner being the S. W. corner of Colorado, the N. W. corner of New Mexico, the N. E. corner of Arizona, and the S. E. corner of Utah, previously page 257 described, making the total length of this line from the initial corner 277 miles and 5 chains and 18 links. or 277.06475 miles
		Land nearly level mesa.
		Soil- alkali and gypsum, 4th rate.
		Vegetation - none.
		Barometer 5675 ft. Thermometer 100°.
		June 29th, 1901.

		Howard B. Carpenter. U.S. Surveyor and Astronomer

BOOK 2628

ASTRONOMICAL FIELD NOTES.

BOOK 2628

ASTRONOMICAL NOTES.

DESCRIPTION OF INSTRUMENTS.

The Zenith Telescope furnished by the Land Office was No. 8 made by William Würdemann and was a very old instrument.

The telescope was 25 inches focal length and 2.1 inches aperture, its optical performance was good for one of its size. The circles, levels and clamps were not well arranged for the convenient working of the instrument.

The micrometer value was one revolution, equal to 66".22 (seconds) and the level, one division equals 00".85 (seconds) . The instrument was mounted on an iron stand, a frustum of a cone five feet high buried two and one half feet, in the ground, the whole filled with earth and tamped within six inches of the top of the stand.

This arrangement was the same at all the stations except No 4. Colorado River Station where the rock was near the surface, there the upper half of the stand only was used and was filled with earth as before stated.

The Chronometers were my own. No, 1051 Hiatt and No. 333 Barraud, the first sidereal and the other mean time.

The corrections were obtained by observing bright stars in the day time and when there was time between stars observed for latitude, a time star was taken.

No. 1051 performed well with a small rate and gave the time for the latitude stars so that they were found without difficulty.

The reductions of all the observations were made in the field.

(Signed) AUGUSTUS MACCONNEL.

ASSISTANT ASTRONOMER.

BOOK 2628

ASTRONOMICAL NOTES.

Mean places of stars for 1901.0
Used for determining Latitude along Utah-Arizona
Boundary Line.

Star.	Right Ascension. h	m	s	Declination.	Authority.
η Cancri	8	26	59.1	+20°46'39.4"	B. A. Jahrbuch 1901.
Gr. 1460	8	31	57.5	+53 03 31.3	" " "
38 Lyncis	9	12	41.2	+37 13 18.1	" " "
10 Leo. Min.	9	28	09.7	+36 50 14.2	" " "
30H.Urs. Maj.	10	16	59.8	+66 04 02.1	" " "
χ Leonis	10	59	54.6	+ 7 52 16.9	" " "
σ Leonis	11	16	01.9	+ 6 34 18.9	" " "
3 Draconis	11	36	57.4	+67 17 34.3	" " "
4127 B. A. C.	12	11	20.1	+24 29 43.4	Safford 1875.
4148 B. A. C.	12	14	56.3	+49 32 00.9	" "
4203 B. A. C.	12	22	52.6	+56 15 37.8	" "
4248 B. A. C.	12	32	00.	+17 38 05.6	" 1892
4287 B. A. C.	12	40	28.	+45 58 52.4	" "
31 Comae Ber.	12	46	52.6	+28 04 45.8	Amer. Ephemeris 1901.
4384 B. A. C.	13	00	47.	+36 19 42.0	Safford 1875.
4479 B. A. C.	13	19	25	+37 33 02.5	" "
4600 B. A. C.	13	42	44.	+39 02 17.0	" "
4632 B. A. C.	13	47	25.5	+34 56 05.1	" "
4649 B. A. C.	13	50	13	+54 12 55.5	" 1892.
α Bootis.	14	11	08.7	+19 41 51.8	Amer. Ephemeris 1901.
4797 B. A. C.	14	24	10	+36 38 23.3	Safford 1875.
4816 B. A. C.	14	29	17.6	+37 23 50.3	" "
ξ Bootis.	14	40	39.8	+27 29 29.2	Amer. Ephemeris 1901.
4903 B. A. C.	14	45	47.	+46 31 42.2	Safford 1892.
4953 B. A. C.	14	57	46	+25 23 56.1	" 1875.
4980 B. A. C.	15	2	09.	+48 31 59.6	" "
5075 B. A. C.	15	19	07.	+30 38 42.8	" "
5157 B. A. C.	15	31	46.	+43 29 42.5	" "

BOOK 2628

ASTRONOMICAL NOTES.

Star.	Right Ascension. h	m	s	Declination.	Authority.
χ Serpentis.	15	44	17.	+18°26'49.8"	B. A. Jahrbuch 1901.
5248 B. A. C.	15	45	14.	+55 40 47.1	Safford 1892.
5523 B. A. C.	16	25	23.	+42 05 59.7	" 1875.
ζ Herculis.	16	37	33.	+21 46 55.5	B. A. Jahrbuch 1901.
π Herculis.	17	11	36.	+36 55 13.7	" " "
5847 B. A. C.	17	14	16.	+37 23 42.6	Safford 1892.
ι Herculis.	17	36	40.	46 03 31.6	B. A. Juhrbuch 1901.
μ Herculis	17	42	35.	+27 46 42.0	" " "
o Draconis.	18	49	44.	+59 16 02.1	" " "
ε Aquilae.	18	55	08.	+14 56 0.7	" " "
ν Lyrae.	19	12	56.	+37 57 25.6	" " "
6651 B. A. C.	19	20	33.	+36 15 29.0	Safford 1892.

Remarks.- The list of stars observed for latitude was taken from Prof. Stafford's catalogues 1875 and 1892. The first was published by the U. S. Engineer Department 1879 and the second by the Mexican Boundary Commission in 1898. The other stars taken from the American Ephemeris 1901, and Berliner Astronomisches Jahrbuch 1901.

BOOK 2628

ASTRONOMICAL NOTES.

STATION NO 1.

Date 1901	Star.	Microm. Reading R.	Level N. d	Level S. d	Half-sum of Declination	Corrections Microm.	Corrections Level	Latitude 37°01'
March 25	30H Urs.Maj.	+0.50	21.5	27.0				
	χ Leonis	+6.60	20.5	30.2	36°57'57.5"	+3'21.9"	-2.2"	17.2"
	σ Leonis	+6.96	37.5	23.0				
	3 Draconis	-6.91	31.5	28.0	36 55 42.1	+5 32.4	+3.8	18.3
March 26	η Cancri	+6.02	33.0	25.8				
	Gr. 1460	-4.77	36.5	22.0	36 54 58.4	+6 12.2	+4.6	15.2
	38 Lyncis	+2.42	33.0	35.8				
	10Leo.Min.	+1.73	27.0	43.5	37 01 36.9	-0 22.5	-4.1	10.3
	30H Urs.Maj.	-9.62	28.0	44.0				
	χ Leonis	+5.57	37.0	37.8	36 57 57.6	+3 17.3	-3.6	11.3
	4287 B.A.C.	+2.58	40.0	38.8				
	31 Comae Ber	+1.96	35.8	44.0	37 01 32.6	-0 20.5	-1.4	10.7
March 27	η Cancri	+7.77	37.0	28.0				
	Gr. 1460	-6.65	29.5	26.0	36 54 58.2	+6 08.2	+0.5	06.9
	38 Lyncis	+9.54	46.2	30.0				
	10Leo.Min.	+8.56	36.0	40.0	37 01 36.9	-0 32.4	+2.6	07.1

Latitude. +37°01'12.1"

Probable error final result. ±1.04"

Remarks.- No. 1 was located about three miles west of Beaver Dam Wash near the James sandstone shaft mentioned in the instructions.

The country was much broken and sandy,- Water twelve miles distant.

When this station was occupied in March very little rain and snow fell, but clouds interfered, making it impossible to obtain many observations at this station.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ASTRONOMICAL NOTES.

STATION NO. 2.

Date 1901	Star	Microm. Reading R	Level N. d	Level S. d	Half-sum of Declination	Corrections Microm.	Corrections Level	Latitude 37°00'
April 11	36 Lyncis	+3.69	35.0	35.6				
	10Leo.Min.	+0.86	33.0	39.0	37°01'38.8"	-1'33.3"	-1.4	04.1"
	σ Leonis	+6.83	32.0	29.0				
	3 Draconis	-9.14	32.0	27.5	36 55 44.8	+4 14.3	+1.6	00.7
	4127 B.A.C.	+0.82	26.0	33.0				
	4148 B.A.C.	+2.02	33.5	27.0	37 00 43.1	-0 39.7	-0.1	03.3
	4203 B.A.C.	+2.85	21.0	40.5				
	4248 B.A.C.	-9.02	34.0	28.0	36 56 38.9	+3 23.9	-2.9	36°59' 59.9
	4287 B.A.C.	+4.97	29.5	37.5				
	31Comae Ber.	+2.43	24.0	44.0	37 01 36.2	-1 24.1	-5.9	06.2
April 12	η Cancri	+8.88	32.0	15.0				
	Gr. 1460	-9.75	16.0	22.0	36 54 59.6	+5 01.9	+2.4	03.9
	38Lyncis	+4.73	28.0	30.0				
	10LeoMin.	+1.79	29.5	29.5	37 01 38.8	-1 37.3	-0.4	01.1
	30HUrs.Maj.	+1.04	32.0	30.0				
	χ Leonis	+4.77	28.0	36.0	36 57 59.8	+2 03.2	-1.3	01.7
	σ Leonis	+6.96	31.0	35.0				
	3 Draconis	-9.16	29.0	37.5	36 55 44.8	+4 18.3	-2.6	00.5
	4127 B.A.C.	+0.96	30.0	30.0				
	4148 B.A.C.	+2.18	30.0	31.0	37 00 43.1	-0 40.4	-0.2	02.5
	4203 B.A.C.	+0.76	29.0	32.0				
	4248 B.A.C.	+6.80	33.0	29.0	36 56 39.0	+3 24.0	+0.2	03.2
	4297 B.A.C.	+7.13	22.0	42.0				
	31ComaeBer.	+4.37	35.0	29.0	37 01 36.4	-1 31.4	-3.0	02.2

Latitude ±37°00'02.5"

Probable error final result. ±0.35"

Remarks,- Station No. 2 was located in a sandy basin on line near fifty first mile. Cloudy weather and sand storms made work at this station exceedingly difficult, main camp three miles south at New Pasture Springs.

BOOK 2628

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

ASTRONOMICAL NOTES.
STATION NO. 3.

Date 1901	Star	Microm. Reading R	Level N. d	Level S. d	Half-sum of Declinations	Corrections Microm.	Corrections Level	Latitude. 36°59'
April 22	4649 B.A.C.	+0.99	33.0	29.0				
	α Bootis	+5.88	32.0	32.0	36°57'11.8"	+2'41.6"	+0.8"	54.2"
	4797 B.A.C.	-9.49	36.0	36.0				
	4916 B.A.C.	+1.49	44.0	27.0	37 00 54.9	-1 06.2	+3.6	52.3
	ε Bootis	-9.39	36.0	35.0				
	4903 B.A.C.	+0.44	39.0	32.0	37 00 23.8	0 34.4	+1.7	51.1
	4953 B.A.C.	+1.91	33.0	39.5				
	4980 B.A.C.	-8.17	42.0	31.0	36 57 46.9	+2 03.8	+1.0	51.7
April 23	38Lyncis	+0.21	13.0	37.5				
	10Leo.Min.	-7.28	-19.5	32.5	37 01 39.8	-1 36.7	-8.0	55.1
	30H.Urs.Maj.	-8.92	27.0	32.0				
	χ Leonis	+2.29	34.0	28.0	36 58 01.0	+1 51.2	+0.2	52.4
	σ Leonis	+4.25	32.5	30.0				
	3 Draconis	-6.84	29.0	32.0	36 55 46.6	+4 05.0	-0.1	51.5
	4127 B.A.C.	-8.22	26.0	37.0				
	4148 B.A.C.	-9.57	25.0	38.0	37 00 41.5	-0 45.0	-5.1	51.4
	4203B.A.C.	-7.87	19.0	45.0				
	4248 B.A.C.	+3.59	44.5	19.5	36 56 41.1	+3 09.4	-0.2	50.3
April 24	30H.Urs.Maj.	+0.82	29.5	20.0				
	χ Leonis	+4.04	28.5	24.0	36 58 00.5	+1 46.6	+3.0	50.1
	σ Leonis	+3.86	33.0	20.0				
	3 Draconis	-6.54	23.0	30.0	36 55 46.6	+4 02.4	+1.7	50.7
	4127 B.A.C.	-6.93	36.0	32.0				
	4148 B.A.C.	-8.58	40.0	27.5	37 00 41.5	-0 54.3	+3.5	50.7
	4203 B.A.C.	-7.42	39.0	29.0				
	4248 B.A.C.	-3.09	34.5	34.5	36 56 41.1	+3 07.4	+2.1	50.6
	4287 B. A.C.	+0.88	35.0	33.5				
	31ComaeBer.	-7.54	40.0	29.5	37 01 38.2	-1 50.6	+2.5	50.1

Latitude. +36°59'51.6"

Probable error final result ±0.27"

Station No. 3 was most favorable as to position and weather conditions of any along the line, was near the 94th mile.

BOOK 2628

ASTRONOMICAL NOTES.
STATION NO. 4.

Date 1901	Star	Microm. Readings R	Level N. d	Level S. d	Half-sum of Declination	Correction Microm.	Correction Level	Latitude. 37°01'
May 10	σ Leonis	+4.21	32.0	23.5				
	3 Draconis	-4.81	33.0	24.5	36°55'48.8"	+5'11.2"	+3.6"	03.6"
	4127 B.A.C.	-9.29	32.5	27.0				
	4148 B.A.C.	-8.48	21.0	39.0	37 00 46.6	+0 26.5	-3.0	08.1
	4203 B.A.C.	-7.66	20.0	40.0				
	4248 B.A.C.	+5.72	30.0	31.0	36 56 44.2	+4 26.9	-4.5	06.6
	4287 B.A.C.	+1.53	34.0	26.0				
	31ComaeBer.	+0.32	32.0	29.0	37 01 41.8	-0 39.7	+2.3	04.4
	4384 B.A.C.	+5.47	29.0	32.5				
	4479 B.A.C.	-6.74	34.0	27.0	36 56 14.8	+4 48.7	+0.8	04.3
	4649 B.A.C.	-8.11	17.5	32.0				
	α Bootis	+4.98	33.0	27.0	36 57 15.8	+3 47.1	-1.8	01.1
	4797 B.A.C.	-9.87	32.0	20.0				
	4816 B.A.C.	-9.79	31.0	21.0	37 00 59.3	+0 02.6	+4.7	06.6
	4953 B.A.C.	+3.43	16.0	36.0				
	4980 B.A.C.	-7.09	13.0	39.5	36 57 51.1	+3 29.9	-9.9	11.1
May 11	4127 B.A.C.	+0.24	16.0	29.0				
	4148 B.A.C.	-9.34	22.0	23.5	37 00 44.8	+0 29.8	-0.9	13.7
	4203 B.A.C.	-6.49	31.0	15.0				
	4248 B.A.C.	-4.28	25.5	20.0	36 56 44.4	+4 18.3	+4.6	07.3
	4287 B.A.C.	+2.71	22.5	23.5				
	31Comae Ber.	+1.79	18.0	28.5	37 01 42.0	-0 30.4	-2.5	09.1
	4384 B.A.C.	+5.83	23.0	23.0				
	4479 B.A.C.	-6.96	24.0	25.0	36 56 15.0	+4 54.0	-0.2	08.8
	4649 B.A.C.	-9.42	49.0	08.0				
	α Bootis	+5.96	36.0	21.0	36 57 16.0	+3 36.5	+11.9	04.4
	4797 B.A.C.	+1.50	30.0	27.5				
	4816 B.A.C.	+1.20	31.0	27.0	37 00 59.6	+0 09.9	+1.4	10.9
	ε Bootis	-15.45	35.0	23.0				
	4903 B.A.C.	-14.39	27.0	32.0	37 00 28.4	+0 36.1	+2.1	05.6
	4953 B.A.C.	+5.06	35.0	23.5				
	4980 B.A.C.	-9.11	25.0	33.0	36 57 51.3	+3 13.3	+0.8	05.4

BOOK 2628

ASTRONOMICAL NOTES.
STATION NO. 4.

Date 1901	Star	Microm. Reading R	Level N. d	Level S. d	Half-sum of Declination	Corrections Microm.	Corrections Level	Latitude. 37°01'
May 12	σ Leonis	+7.74	39.0	46.0				
	3 Draconis	-8.02	41.5	43.0	36°55'48.9"	+5'21.8"	-2.0"	08.7"
	4127 B.A.C.	-8.66	40.0	29.5				
	4148 B.A.C.	-8.14	36.0	32.5	37 00 45.0	+0 17.2	+3.0	05.2
	4203 B.A.C.	-5.71	36.0	33.5				
	4248 B.A.C.	+3.57	39.0	30.0	36 56 44.6	+4 20.2	+2.4	07.2
	4287 B.A.C.	+1.06	38.0	31.5				
	31Comae Ber.	+0.01	35.0	34.0	37 01 42.1	-0 34.4	+1.6	09.3
	4384 B.A.C.	+5.49	32.5	37.0				
	4479 B.A.C.	-6.59	35.0	36.0	36 56 15.2	+4 54.7	-1.4	08.5
	4649 B.A.C.	-8.59	41.0	30.0				
	⍺ Bootis	+5.57	32.5	38.5	36 57 16.1	+3 44.5	+1.0	01.6
	4797 B.A.C.	-8.75	39.0	33.0				
	4816 B.A.C.	-8.75	48.0	24.0	37 00 59.8	0 00	+6.4	06.2
	ε Bootis	-15.88	39.0	34.0				
	4903 B.A.C.	-14.87	44.0	28.5	37 00 28.6	+0 33.1	+4.3	06.0

Latitude. +37°01'06.8"

Probable error final result . ±0.41"

Remarks,- This station at Colorado River was at a bend in the river as far south as possible without crossing to the south side.

The upper section of iron stand was used and rested on soft sandstone, was filled in with earth and tamped as at other stations.

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ASTRONOMICAL NOTES.
STATION NO. 5.

Date 1901	Star	Microm. Reading R	Level N. d	Level S. d	Half-sum of Declination	Corrections Microm.	Corrections Level	Latitude 37°00'
June 10	ε Bootis	-9.07	50.0	12.0				
	4903 B.A.C.	-9.73	31.0	32.0	37°00'35.6"	-0'21.9"	+7.8"	21.5"
	4953 B.A.C.	+1.08	41.0	22.0				
	4980 B.A.C.	-6.71	23.0	41.0	36 57 57.6	+2 24.4	+0.2	22.2
	5075 B.A.C.	-7.44	33.0	31.0				
	5157 B.A.C.	+4.44	45.0	30.0	37 04 15.7	-3 51.8	+3.6	27.5
	5523 B.A.C.	-8.36	67.0					
	ζ Herculis	+5.13	30.0	35.0	36 56 29.6	+3 43.8	+13.2	26.6
	π Hurculis	-1.72	35.0	32.0				
	5847 B.A.C.	+8.37	37.0	29.0	37 09 30.5	-9 10.9	+2.4	22.0
	ι Hurculis	-6.52	31.0	36.0				
	μ "	+6.02	33.0	35.0	36 55 09.4	+5 14.5	-1.5	22.4
June 11	4384 B.A.C.	+4.23	10.0	46.0				
	4479 B.A.C.	-6.73	37.0	21.0	36 56 20.5	+4 08.3	-4.2	24.6
	4600 B.A.C.	-6.52	32.0	22.0				
	4632 B.A.C.	-8.77	35.0	20.0	36 59 10.2	+1 13.0	+5.8	29.0
	ε Bootis	-9.73	17.0	39.0				
	4903 B.A.C.	-9.75	21.5	37.0	37 00 35.8	-0 00.7	-8.0	27.1
	4953 B.A.C.	+1.74	27.5	31.0				
	4980 B.A.C.	-7.14	23.0	36.0	36 57 58.4	+2 32.3	-3.5	27.2
June 12	π Hurculis	(re) -4.29	37.0	17.0				
	5847 B.A.C.	+11.17	32.0	23.5	37 09 31.1	-9 18.9	+6.0	18.2
	ι Hurculis	-4.22	26.0	33.5				
	μ "	+3.62	37.0	22.5	36 55 10.0	+5 11.2	+1.6	22. 8
	o Draconis	+4.33	26.0	31.5				
	ε Aquilae	-3.99	29.8	38.5	37 06 05.8	-5 42.3	-3.0	20.5
	ϑ Lyrae	+5.27	33.5	35.0				
	6651 B.A.C.	-5.28	33.0	37.0	37 05 56.5	-5 31.1	-1.4	24.0

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ASTRONOMICAL NOTES.

STATION NO. 5.

Date 1901	Star	Microm. Reading R	Level N. d	Level S. d	Half-sum of Declination	Corrections Microm.	Corrections Level	Latitude. 37°00'
June 13	4649 B.A.C.	-6.20	22.8	44.0				
	α Bootis	+2.01	26.5	39.5	36°57'22.8"	+3'12.0"	-7.3"	27.5"
	4953 B.A.C.	+1.02	38.0	32.5				
	4980 B.A.C.	-7.24	66.0	4.0	36 57 58.9	+2 05.2	+14.4	18.5
	5523 B.A.C.	-5.90	33.5	36.0				
	ζ Herculis	+2.88	43.5	29.0	36 56 30.6	+3 51.1	+2.5	24.2
	π "	(20') -9.16	34.0	36.5				
	5847 B.A.C.	+5.82	39.0	34.0	37 09 31.5	-9 11.6	+0.5	20.4
	ι Herculis	-4.84	28.5	44.5				
	μ "	+4.47	40.0	36.0	36 55 10.3	+5 17.6	-2.6	25. 3

Latitude. +37°00'23.8"

Probable error final result. ±0.49"

Remarks,- This station was in a south west branch of Copper Cañon with sides almost impassable. The cañon was narrow and the lights were frequently extinguished by down currents of air. Weather cloudy more than one half of the time.

ASTRONOMICAL NOTES.

STATION NO. 6.

Date 1901	Star	Microm. Reading R	Level N. d	Level S. d	Half-sum of Declination	Corrections Microm.	Corrections Level	Latitude 37°00'
June 22	4797 B.A.C.	-9.06	54.0	28.0				
	4816 B.A.C.	-9.70	45.0	37.5	37°01'08.6"	-0'21.2"	+7.1"	54.5"
	ε Bootis	+0.37	46.0	39.0				
	4903 B.A.C.	-9.65	28.5	56.5	37 00 38.0	+0 23.8	-4.4	57.4
	ι Herculis	-6.11	27.5	29.5				
	μ "	+6.57	25.0	32.5	36 55 12.9	+5 46.3	-2.0	57.2
June 23	4797 B.A.C.	-7.35	40.0	28.0				
	4816 B.A.C.	-7.85	36.0	32.0	37 01 08.8	-0 16.6	+3.4	55.6
	ε Bootis	+0.14	34.0	35.0				
	4903 B.A.C.	-9.24	13.0	55.0	37 00 38.1	+0 29.8	-9.2	58.7
	4953 B.A.C.	-0.89	32.0	38.0				
	4980 B.A.C.	-5.41	26.0	43.5	36 58 00.6	+3 01.4	-5.0	57.0
	5075 B.A.C.	-5.47	26.5	27.5				
	5157 B.A.C.	+1.81	35.0	19.0	37 04 18.5	-3 29.9	+3.2	51.8
	5523 B.A.C.	-5.16	23.0	35.5				
	ζ Herculis	+3.12	35.5	27.0	36 56 33.0	+4 23.6	-0.2	56.4
	π "	(20) -7.66	44.0	20.0				
	5847 B.A.C.	+3.54	30.0	33.0	37 09 34.4	-8 45.8	+4.4	53.0
	ι Herculis	-4.26	29.5	35.0				
	μ "	+4.62	28.5	36.0	36 55 13.2	+5 43.0	-2.7	53.5
June 24	4797 B.A.C.	-7.46	39.0	29.5				
	4816 B.A.C.	-8.20	46.0	23.5	37 01 09.0	-0 24.5	+6.8	51.3
	ε Bootis	-8.55	40.5	29.0				
	4903 B.A.C.	-8.23	35.0	35.0	37 00 38.3	+0 10.6	+2.5	51.4

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ASTRONOMICAL NOTES.

STATION NO. 6.

Date 1901	Star	Microm. Reading R	Level N. d	Level S. d	Half-sum of Declination	Corrections Microm.	Corrections Level	Latitude 37°00'
June 24	4953 B.A.C.	+2.56	44.0	26.5				
	4980 B.A.C.	-7.61	40.0	30.5	36°58'00.8"	+2'44.2"	+5.8"	50.8"
	5075 B.A.C.	-6.61	29.0	42.0				
	5157 B.A.C.	+2.59	29.0	41.5	37 04 18.7	-3 18.0	-5.4	55.3
	5523 B.A.C.	-4.86	33.0	39.5				
	ζ Herculis	+2.77	39.0	35.0	36 56 33.4	+4 22.2	-0.5	55.1
	π "	-9.45 (20)	53.5	57.0				
	5847 B.A.C.	+5.33	46.0	45.5	37 09 34.6	-8 45.8	+3.6	52.4
	ι Herculis	-4.71	28.5	31.0				
	μ "	+5.15	26.5	35.0	36 55 13.5	+5 45.7	-2.4	56.8

Latitude. +37°00'54.6"

Probable error final result ±0.41"

Remarks,- The two hundred and fiftieth mile was in a sand desert with sand storms all of thetime. The station was put further north on the east side of a ridge formed by a trap dyke, this afforded some protection from the sand, even then the circles and levels had to be brushed off every fifteen minutes, so they could be read.

This was the case more or less at all stations except No. 3 near the ninety fourth mile.

(Signed) Augustus MacConnel,

Assistant Astronomer.

REPORT.

The country through which this boundary line runs, lies at an average elevation above the sea of about 5000 ft. The lowest point being 2200 feet at the Beaver Dam Wash at the 3rd mile from the initial point and the highest at the 175th mile on the south slope of the Navajo Mountain, 8000 feet. The climate is dry and healthful. The nights are cool, and in winter, frosty, with occasional hard freezing weather. The Colorado River at Lees' Ferry about ten miles south of the line has been known to freeze over, the ice being of sufficient thickness to allow of pedestrians crossing. The days are usually warm and in summer, hot, 105° in the shade at Kanab is not unusual. While at the low altitude of of St. George, the climate is semi-tropical, but little ice forms at any time. Cotton is raised and the pomegranate and almond grow beside the apple and the pear. The soil is very sandy, ranging from pure sand to gumbo and red clay, sometimes combined with alkali or gypsum. Nearly all kinds of crops can be raised where water can be obtained for irrigation but as all the water in Santa Clara Creek and the springs near St. George and nearly all the water of the Virgin River is utilized, the irrigated area cannot be much increased.

The country generally is sparsely covered with grass and sage, though there are wide areas of gypsum or alkali lands on which there is no vegetation but a little stunted greasewood. There are also large areas of bare sandstone on which there is no vegetation. The high mesas or table lands are generally covered with a scrubby growth of cedar and piñon, this is short bodied, not usually over fifteen feet in height. The branches are very numerous and start out near the ground making it difficult to find a space on the knotty bodies of sufficient size to place the required marks for bearing trees. The timber is chiefly valuable for firewood and fencing. There is some fairly good yellow pine timber on Moquitch Mountain near Kanab and on Navajo Mountain east of the Colorado River. South of the line on the Buckskin Plateau there is a large forest of good timber. Many varieties of cactii abound along the whole line. Willow, mesquite and mescrew are found along the Virgin and Colorado Rivers. A little scrub live-oak on Moquitch Mountain and yucca

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Dragonis or spanish boyonet in the vicinity of the initial corner. The basic rock all along the line except on the Beaver Dam Range and the Buckskin Plateau is sandstone varying in color from a pale yellow, nearly gray, to a very dark brown. This in the vicinity of St. George and some other points has been capped with black lava. There are many limestone croppings in the Beaver Dam and Buckskin Ranges.

There are several copper mines producing ore in the Beaver Dam Range a few miles north of the boundary line. There are many copper prospects on the Buckskin plateau, about ten miles south of the line where a smelter and also a leaching process plant has recently been erected. There are said to be some copper prospects in the vicinity of Copper Cañon east of Navajo Mountains. The Colorado River for many miles each side of where it is crossed by the boundary line has been located as placer claims and a company using a steam dredger is working it for gold. There are also some parties working claims for gold along the San Juan River.

The surface is broken. There are low rolling sand hills, mesa, or table lands at different elevations that terminate in walls and cliffs, varying in height from 300 to 1800 feet. There are many deep cañons beside those of the Rio Virgin and the Colorado from 500 to 2000 feet deep.

There are very few settlements along or near the line and there is no part of it that runs through cultivated lands. St. George, 7 1/2 miles north of the 26th mile corner, has a population of about 1800. Price City about 2 miles north of the 28th mile corner has about 50 people. Canaan Springs about 4 miles north of the 59th mile corner has one family. Pipe Springs about 9 miles south of the 74th mile corner has one family. Kanab about 3 1/4 miles north of the 84th mile corner has about 600 people. Fredonia about 4 miles south of the same point has about 150. Johnson Creek about 6 miles north of the 92nd mile corner has about 50 people.

There is a small settlement on the Paria River about 15 miles north of the 118th mile corner. Lees' Ferry about 11 miles south of the 137th mile corner has one family. There are a few Pah Ute and Navajo Indians settled in Pah Ute Cañon about 6 miles south of the line. Small bands of Navajo Indians with herds of sheep and goats are scattered about over the country from the Navajo Mountains to the eastward. Bluff City on the San Juan River about 20 miles north of 252nd mile corner has a population of about 200.

The astronomical observations were made by Prof. Augustus MacConnel of Elmira, N. Y. using a Würdemann Zenith Telescope loaned me by the Department of the Interior. This, when in use was placed on a frustum of a cone 5 feet long made of sheet iron in sections and bolted together, with a heavy iron ring bolted on top. This was set about 3 feet in the ground and filled with sand, firmly tamped. A trench was left around the outside about 8 inches wide and a foot deep to cut off the surface vibration, a piece of canvass 8 feet wide was used as a wind break, stretched around four posts and so arranged that it could be raised or lowered to suit the convenience of the observer. It was entirely open at the top and there was no apparent difference in temperature between the outside atmosphere and that within the observatory (See photo. on page 301)

The line between astronomical stations was run by the tangent method, the tangents being projected by double back and fore sights, reversing the instrument each time to eliminate errors of collimation. The transit used for this work was made by Heller and Brightly of Philadelphia, Pa. and was provided with a six inch horizontal limb graduated to 20' of arc and reading by two double verniers placed opposite to each other, to 30" of arc. A five inch vertical limb similarly graduated and reading by vernier to 30" of arc. The telescope was 14 inches long and of very high power, it was provided with stadia wires placed at the ratio of 1 to 100 . This instrument was new and was made by the above mentioned firm especially for this work. The stadia wires were so placed that either one of them could be used in conjunction with the horizontal cross wire of the instrument so that 2600 feet distance could be measured with a 13 foot rod.

The rod was held truly vertical at all times to insure which, a rod level was used and the horizontal distances were calculated on inclined sights by multiplying by a constant for the angle at each sight and a small constant called C. amounting to 1.15 feet when the telescope was level and proportional according to the angle, was added for the true distance.

Stadia measurements were used only across cañons or over very rough ground, over comparatively level and rolling land two sets of chainmen were employed acting independently of each other and using steel tapes 66 feet or 1 chain in length and the mean of such measurements taken. All angles were turned at least four times with the instrument reversed at each sight and the mean of these sights was used. All turning points were marked on a wooden plug or hub driven in the ground or on a smooth firm rock.

The chainmen were the best that could be procured, two of them had been employed as chainmen on government subdivision of the public lands for several years.

An Aneroid Barometer 2 3/4 inches diameter with attached thermometer was used for ascertaining the elevations for use in making the profile and the altitude in feet above the sea level is shown in the field notes.

A number of photographs of points on or near the line were taken, some of which are shown in this volume. Many valuable plates were ruined by the horse, on which the camera was packed, getting down in the quicksands of the San Juan River, notably those showing the 6th Astronomical Monument at the 250th mile corner and objects in that vicinity.

A sidereal chronometer Hyatt No. 1051 was used for sidereal time at the astronomical stations and this was checked for local mean time by a Barraud chonometer No. 333 , both belonging to Mr. MacConnel, this was used in connection with several stars observed for local mean time. The sidereal chronometer was packed in cotton, face up, and carried in a grip. Mr. MacConnel carried this grip in his hand along the whole line, he walking

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all the way as he was unwilling to subject it to the jar incident to riding on horseback, or any other mode of conveyance.

We used for transportation of supplies and camp equipage along the line, a pack train composed of horses and burros, used wagons for hauling freight and water: from the initial corner as far east as the Colorado River. From the river eastward, wagons could not be used and we had to rely upon the pack train except that we managed to get a wagon and a load of supplies from Bluff City on the San Juan River, to come out and meet us at Monument Pass.

The iron mile posts were made in St. Louis, Mo. and shipped to Modena, Utah by rail, thence transported by freight teams and pack animals. For carrying water for camp along the easterly portion of the line, I used a number of five gallon kegs.

Many of the stone corners were set on bare rock with a monument of stone built around them and a witness monument of stone of the regulation size raised east of the corner. This was unavoidable owing to such large tracts of country being denuded of soil. Where the rock was hard and smooth enough to admit of it, a cross was made at the exact point for the corner and the bed rock properly marked on each side of the cross and a witness monument raised east of it,but in many places this plan was found to be impracticable owing to the friable and partly decomposed nature of the surface of the bed rock.

Offsets were unavoidable at the Paria Cañon and over some of the denuded and very much broken country just east of the Colorado River and also at the Navajo Mountain.

The Navajo Indians caused us no trouble and rendered good service as guides to tanks, springs and water pockets.

Feed for the animals was very scarce along the line and in the rough climbing east of the river the horses soon gave out and I had to procure others from the Indians and replace them again in a few days with fresh ones from the same source. The burros however, stood the trip well and by keeping them shod, they were able to get over some exceedingly rough trails and carry a good load.

My thanks are due to Augustus MacConnel of Elmira, N. Y. who did the astronomical work, for his great care and accuracy in his

department, for his untiring energy and unfailing cheerfulness in most disagreeable situations under the most trying circumstances. The privation and hardshps incident to, and unavoidin a trip through a desert region, though a man over sixty years of age, he withstood the rigors of camp, walked the whole 277 miles and carried the sideral chronometer in his hand so solicitous was he for the accurate performance of his part of the work.

I wish to acknowledge the services of J. Frank Warner of Cheyenne, Wyo. transit man, for his great care and indomitable energy in projecting the line over a country abounding in difficulties.

I also wish to thank Oscar McClellan of Red Bank, Wyo. who had charge of the transportation and supplies. Much is owing to his good judgment, great energy and untiring zeal and courage that we were enabled to penetrate such a region and carry the work through to a successful termination.

R. G. Schnitger and E. P. Blanchard of Cheyenne, Wyo. chainmen of over five years experience on the public land surveys, took great interest in their work.

Mormon A. Shumway of Kanab, Utah had charge of the corner gang and took great pains in his work.

Each and every man did his duty faithfully and stood by the work and one another and took the hardship, lack of water and inconveniences incident to an expedition through a country so nearly approaching a desert, in a manner worthy of praise, and for which I wish to express my greatest appreciation.

The party was disbanded in the desert many miles from any town. The members departing for their homes in different states and travelling in different directions. No officer authorized to administer oaths, other than myself being available without great inconvenience, delay and expense, I administered the required final oaths under the provisions of the Manual, page 64.

Howard B Carpenter
U.S Surveyor and Astronomer

BOUNDARY LINE BETWEEN THE STATE OF UTAH AND THE TERRITORY OF ARIZONA.

FINAL OATHS.

Oaths for survey of the Boundary Line between the State of Utah and the Territory of Arizona.

We hereby certify that we assisted H. Howard B. Carpenter United States Surveyor and Astronomer in surveying all those parts and portions of the Boundary Line between the State of Utah and the Territory of Arizona which is represented in the foregoing field notes as having been surveyed by him and under his direction and that said survey has been in all respects to the best of our knowledge and belief well and faithfully surveyed and the corner monuments established according to the instructions furnished by the Hon. Commissioner of the General Land Office.

(Signed)

Augustus MacConnel.	Asst. Astronomer.
J. Frank Warner.	Transitman.
Rex G. Schnitger.	Chainman.
Ed. P. Blanchard.	Chainman.
H. W. Gilbert.	Chainman.
Karl A. Snyder.	Chainman.
A. J. Smoots.	Axeman.
M. A. Shumway.	Moundman.
Bert Johanson.	Moundman.
I. V. Warner.	Rodman.
Murray H. Gilcrest.	Flagman.
A. L. Lemmon.	Flagman.

Subscribed and sworn to before me this first day of July A. D. 1901.

(Signed) Howard B. Carpenter.

U. S. Surveyor. & Astronomer.

FINAL OATHS.

I, Augustus MacConnel, do hereby certify that I assisted Howard B. Carpenter U. S. Surveyor and Astronomer in the establishment of the 37th Parallel of North Latitude. Between the 32nd, and 37th Meridians West from Washington, the same being the boundary line between the State of Utah and the Territory of Arizona, done under his contract with the Acting Commissioner of the General Land Office, dated October 13th, 1900. That I made the astronomical observations for latitude and that the said boundary line was established in strict conformity to the instructions furnished by the said Commissioner to the best of my knowledge and belief; and I do solemnly swear that the foregoing are the true field notes of said astronomical observations made by me.

(Signed) Augustus MacConnel.
Assistant Astronomer.

Sworn to and subscribed before me by Augustus MacConnel on this 18th day of February, A. D. 1902.

(Signed) J. M. Alexander.
County Clerk.
Childress County, Texas.

(Seal)

FINAL OATH OF U. S. SURVEYOR AND ASTRONOMER.

I, Howard B. Carpenter United States Surveyor and Astronomer, dosolemnly swear that in pursuance of a contract with Hon. W. A. Richards, Acting Commissioner of the General Land Office bearing date of October 13th, 1900. And in strict conformity to the laws of the United S tates and the instructions furnished me by the said Commissioner, I have well, faithfully and truly in my own proper person, surveyed, marked and established the Boundary Line between the State of Utah and the Territory of Arizona, the same being that portion of the 37th parallel of latitude north of the Equator included between the 32nd and the 37th meridian west from Washington and I do further solemnly swear that all the corners of said survey have been established and perpetuated in strict accordance with the Manual of Surveying Instructions and the special written instructions of the said Hon. Acting Commissioner and in the specific manner described in the field notes and that the foregoing are the true field notes and astronomical notes of such survey, and should any fraud be detected I will suffer the penalty of perjury under the provisions of an Act of Congress approved August 8th 1846.

Howard B. Carpenter.
United States Surveyor and Astronomer.

Subscribed and sworn to before me this Fifth day of March A. D. 1902.

L Mc Kirk
Clerk US Circuit Court
District of Wyoming

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Triplicate

Approval

General Land Office April 19th 1902

The fore-going field notes of the survey of the Boundary Line between the Territory of Arizona and the State of Utah, being the 37° Parallel of North Latitude, between the 32° and 37° Longitude, West from Washington, executed by Howard. B. Carpenter U.S. Surveyor and Astronomer, under his contract dated October 13th 1900 having been critically examined and the necessary corrections and explanations made, the said field notes, and the surveys they discribe, are hereby approved—

Binger Hermann

Commissioner

I certify that the foregoing transcript of the field notes of the of the above-discribed survey of the boundary line between Arizona and Utah has been correctly copied from the original notes on file in this office

Binger Hermann

Commissioner

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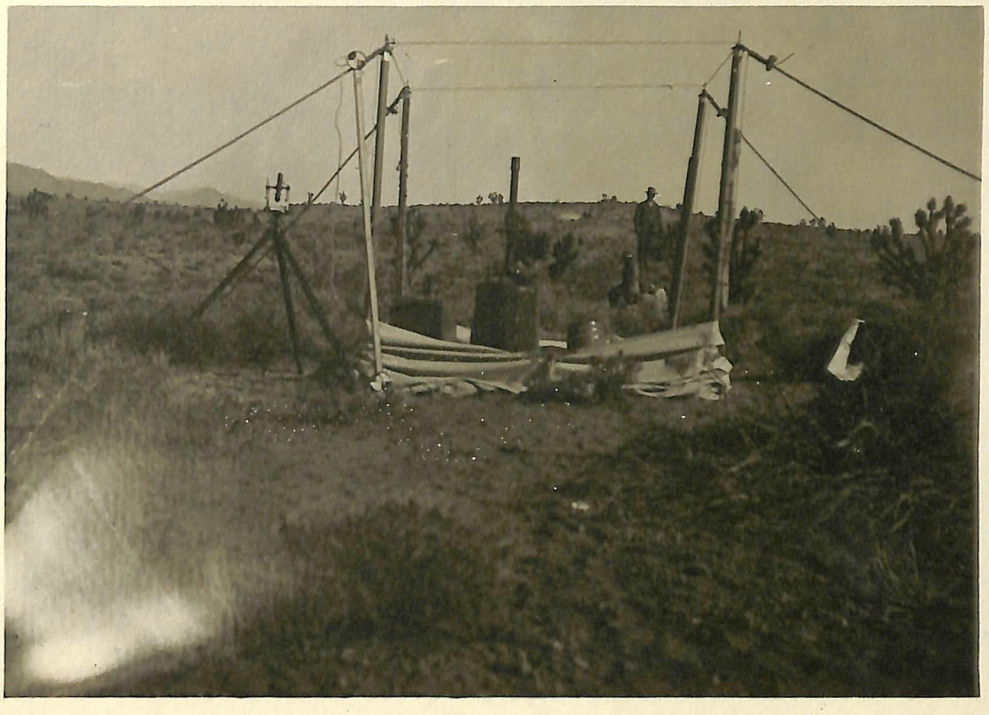

FIRST ASTRONOMICAL STATION, NEAR THE OLD JAMES MONUMENT.

View to the north.

THE OLD, JAMES MONUMENT.

View to the west. Now destroyed.

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THE INITIAL CORNER.

On the east line of Nevada. View to the N. W.

View to the west from the 13th mile corner.

Beaver Dam Mountains

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YUCCA DRAGONIS OR SPANISH BAYONET.

KEG CACTUS.

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CAMP IN RED CAÑON.

North of the 15th mile.

EAST WALL OF RED CAÑON.

Near 15th mile corner. View to the N. E.

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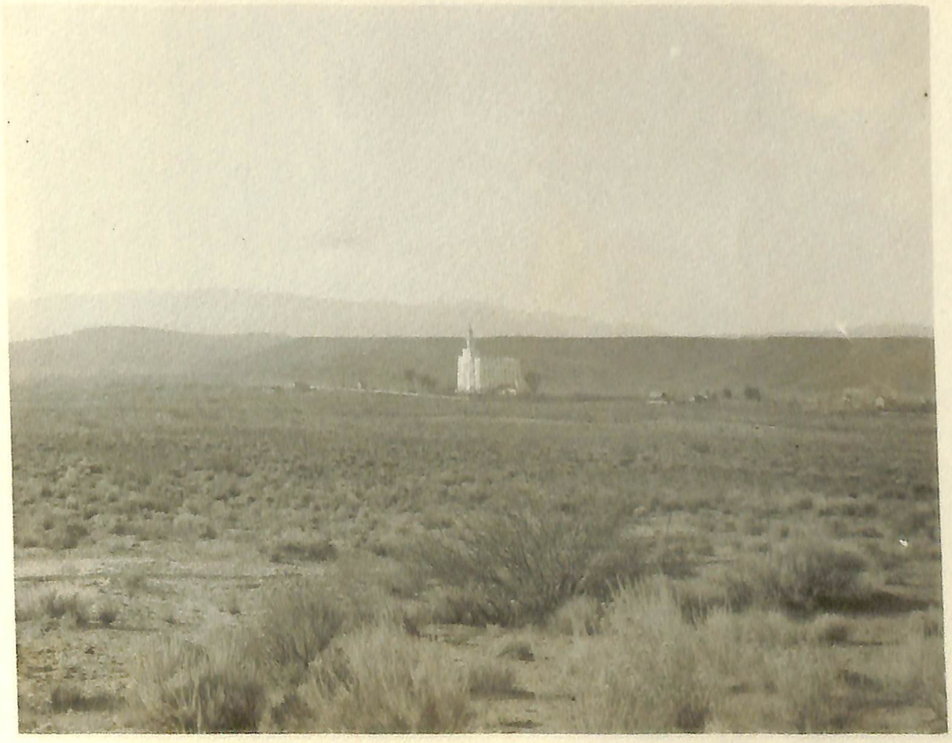
ST. GEORGE, UTAH.

North half of town. View to the west.



ST. GEORGE,, UTAH.

South half of town showing Mormon Temple. View to the S.W.

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CAMP IN HERD HOUSE CORRAL.

Near 32nd mile corner.

BURRO PACK ANIMALS.

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SECOND ASTRONOMICAL MONUMENT.

At the 51st mile corner. View to the S. W.

From 51st Mile Corner.

View to the N. E. toward Canaan Springs.

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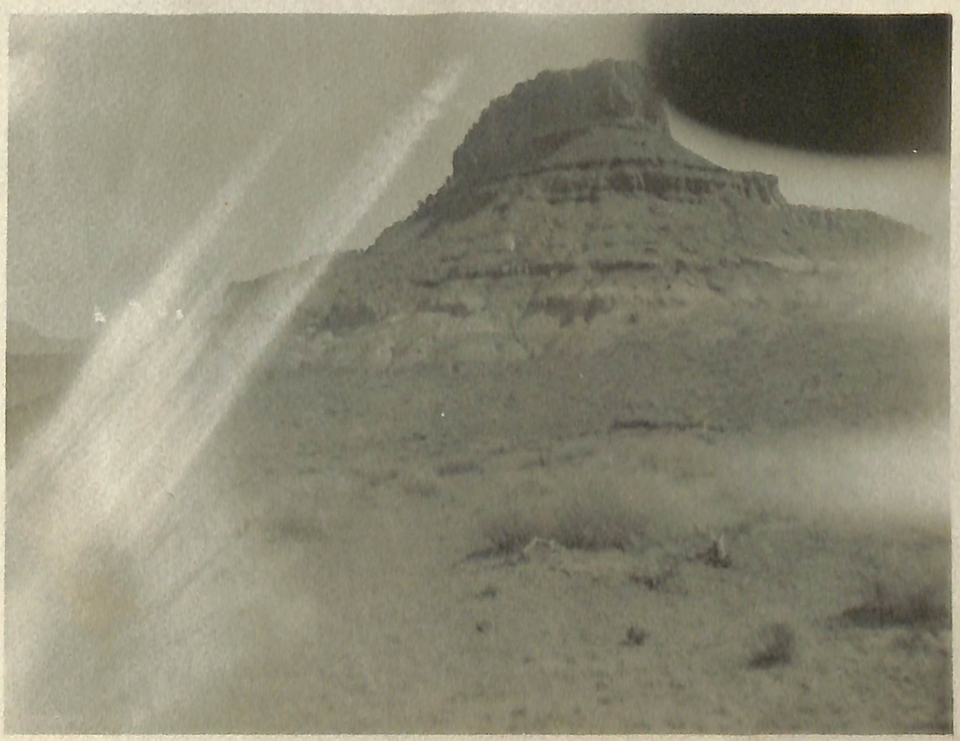
AT SHORT CREEK.

South of 60th mile corner. View to the N. E.



POINT OF CLIFF.

South of 53rd mile corner.

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THIRD ASTRONOMICAL MONUMENT.

At the 94th mile corner. View to the N. W.

CASTLE ROCK.

View to the north from the 143rd mile corner.

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THE COLORADO RIVER CAÑON.

From a point on the line at the mouth of warm Creek.

View to the N. E.

THE RIVER CAÑON.

From the same point. View to the south.

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Horse Swimming the Colorado River behind the Boat.

Towing the boat up stream in order to make landing in patch of willows on opposite bank.

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CHIMNEY ROCK.

On west side of the Colorado River, near the Ute Crossing.

STATE LINE BUTTE.

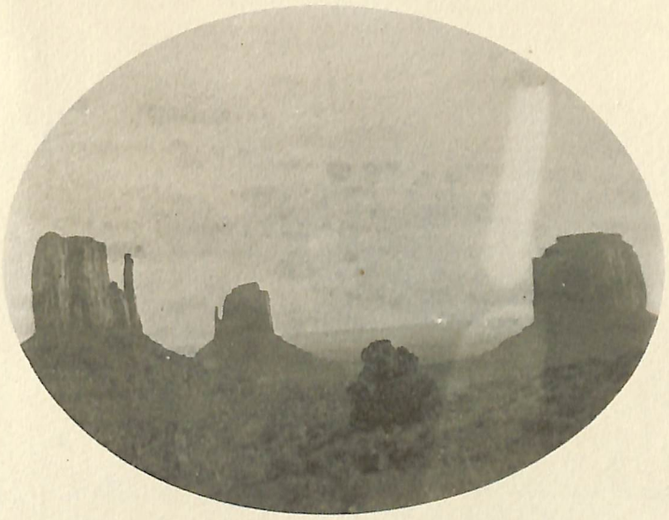
On the 153rd mile. The line passes over the apex.

BOOK 2628

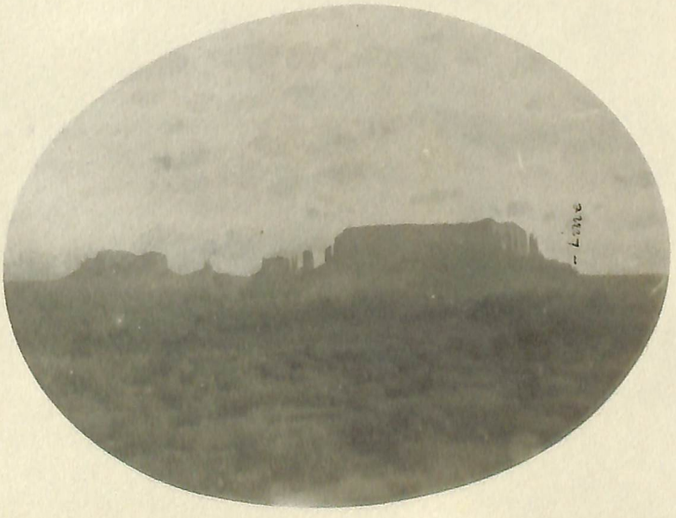
Near water pockets in denuded sandstone region south of 165th mile corner.

A difficult Navajo trail about 6 miles south of the 160th mile corner.
Bare sandstone.

BOOK 2628 314



MONUMENT PASS.
South of the 218th mile corner.
The monument on the left is Ragged Top.



MONUMENT PASS.
216th mile. View to the N. E. The line passes over the foot of the long butte, at south edge.

BOOK 2628

MONUMENT PASS.
View to the N. W. from a point 5 miles south of the line.

NEEDLES
About 5 miles south of the line, near Monument Pass.

SENTINEL ROCK.

North of the 138th mile corner.

COPPER CAÑON.

North of the line. View to the south.

BOOK 2628

The Tower 1300 ft. high.
South of the 151st mile corner.

The Obelisk 700 ft high.
See field notes of the 200th mile

318

125.00 chs.

UTAH

125.00 chs.

Lat 37° N

State Bdy. Robinson

S. 54

330 M. on Bdy. mon.

31 32 33 34 35 36

6 5 4 3 2 1

14 W

6 W

5

BOOK 2628

Ind. Bdy

244

245

Corner

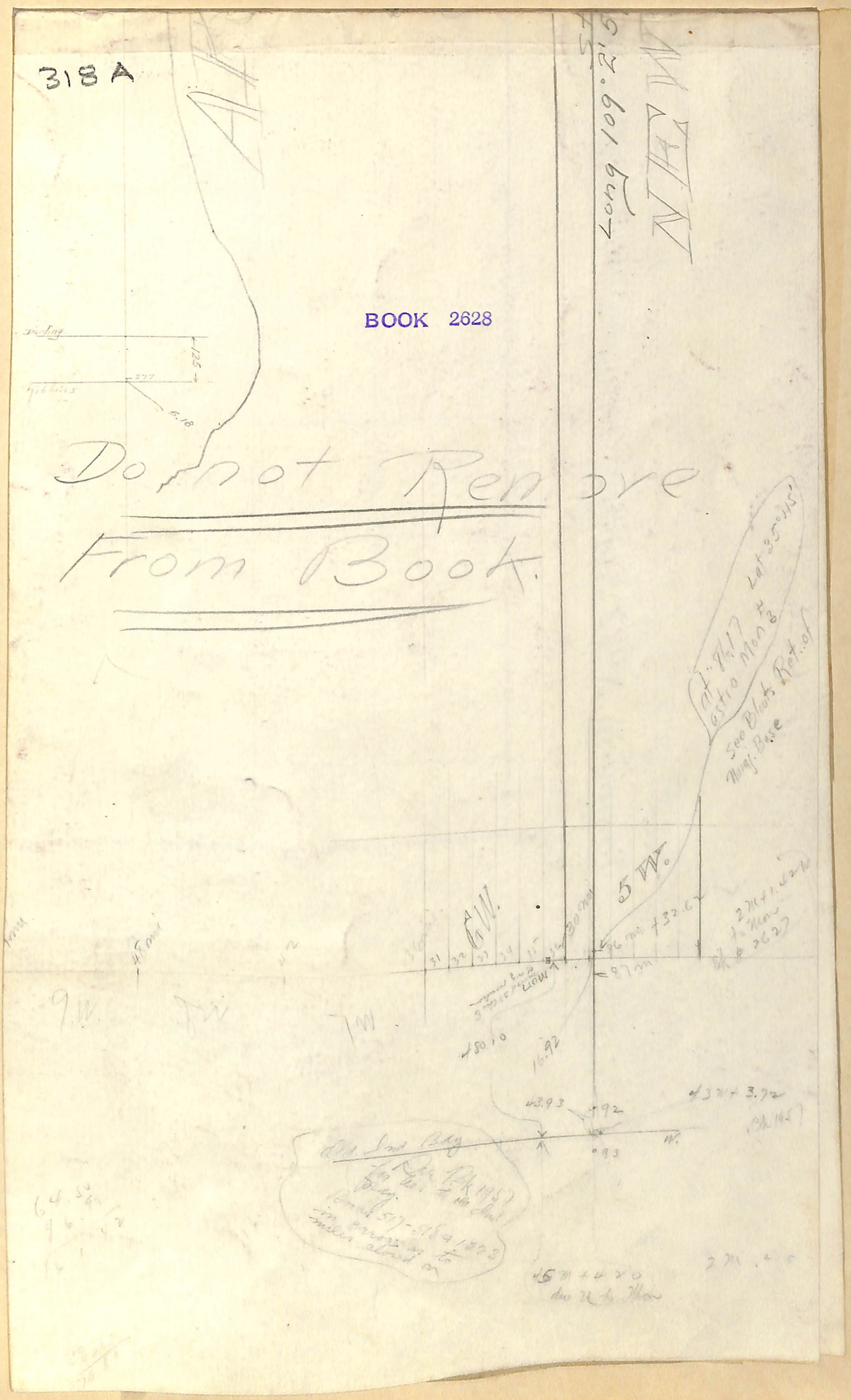
Utah

Arizona

63

NEW MEXICO

318 A

BOOK 2628

Do not Remove
From Book.