

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

CHARLES D. WALCOTT, DIRECTOR

RESULTS

OF

PRIMARY TRIANGULATION AND PRIMARY TRAVERSE

FISCAL YEAR 1901-02

BY

H. M. WILSON, J. H. RENSHAW, E. M. DOUGLAS, AND R. U. GOODE



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ILLUSTRATION.

PLATE I. Map showing condition of astronomic location and primary control

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
Washington, D. C., June 18, 1902.

SIR: We have the honor to transmit herewith, in form for publication, the results of the primary triangulation and primary traverse executed by the United States Geological Survey during the fiscal year 1901-2.

The results were computed by Messrs. A. H. Thompson, George T. Hawkins, C. F. Urquhart, R. H. Chapman, Frank Tweedy, Charles E. Cooke, W. H. Griffin, Sledge Tatum, and E. L. McNair, under the direction of Mr. S. S. Gannett, who likewise compiled them for publication.

Very respectfully,

H. M. WILSON,

Geographer in charge of Atlantic section.

J. H. RENSHAW,

Geographer in charge of Central section.

E. M. DOUGLAS,

Geographer in charge of Rocky Mountain section.

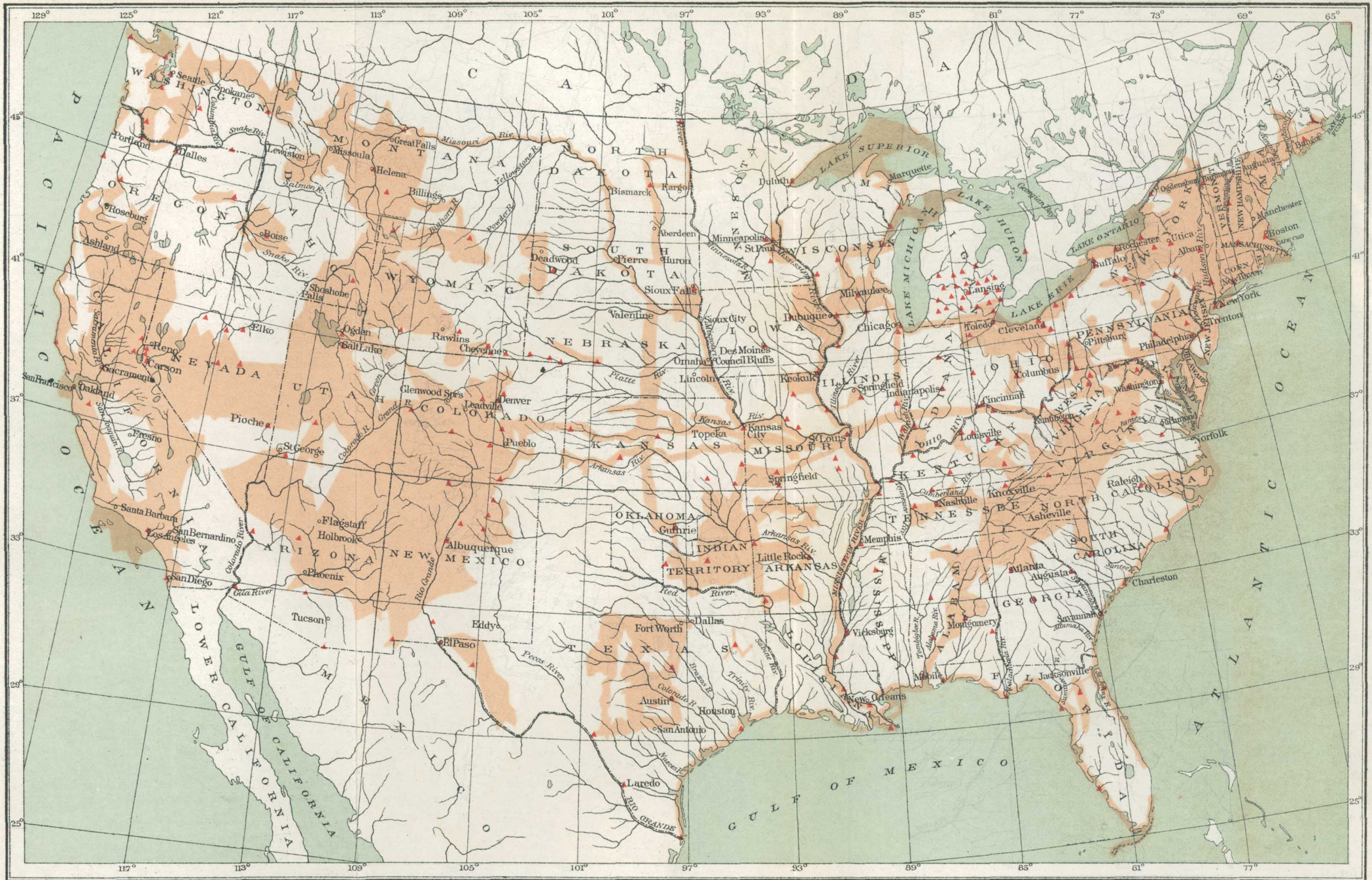
R. U. GOODE,

Geographer in charge of Pacific section.

Hon. CHARLES D. WALCOTT,

Director United States Geological Survey.





JULIUS BIEN & CO. LITH. N.Y.

MAP SHOWING CONDITION OF ASTRONOMIC LOCATION AND PRIMARY CONTROL

to April 30, 1902.

Areas tinted are controlled by triangulation or traverse
Astronomic station.

100 0 100 200 300 400 500 600 MILES

RESULTS OF PRIMARY TRIANGULATION AND PRIMARY TRAVERSE, FISCAL YEAR 1901-2.

By H. M. WILSON, J. H. RENSHAW, E. M. DOUGLAS, and R. U. GOODE.

SUMMARY.

Summary of published results, 1901-2: Triangulation, primary traverse, meridian marks, and base lines.

Locality.	Triangulation stations.	Traverse stations.	Meridian marks.	Base lines.
ATLANTIC SECTION.				
New York.....	35		1	
Pennsylvania.....	21			
Maryland.....		47		
North Carolina.....		136		
Ohio.....		86		
CENTRAL SECTION.				
Ohio.....		703		
Alabama.....		61		
Indiana-Illinois.....		55		
Michigan.....		65		
Wisconsin.....		14		
Missouri.....		45		
Iowa.....		23		
Arkansas.....		14		
Nebraska.....		52		
ROCKY MOUNTAIN SECTION.				
Arizona-New Mexico.....	29			
Montana.....	64			2
Wyoming.....	12		1	1
Wyoming-Colorado.....	28			1
PACIFIC SECTION.				
California.....	33	62		
Total.....	222	1,363	2	4

ATLANTIC SECTION OF TOPOGRAPHY.

NEW YORK.

TRIANGULATION STATIONS.

Mr. E. L. McNair, topographer, was engaged during the first half of the field season in extending triangulation over the southern portion of the Adirondacks and during the remainder of the season over the northwestern part of the same region. He established and marked the positions of 35 stations, which control 9 15-minute quadrangles, covering portions of Fulton, Hamilton, St. Lawrence, Franklin, Saratoga, and Warren counties. He also established a meridian line at Johnstown.

DESAW, FRANKLIN COUNTY.

Situated about 2 miles east of Dickinson Center, on a large rock in field owned by Fred Desaw.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $44^{\circ} 43' 12.69''$. Longitude $74^{\circ} 30' 53.14''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Niery	55 51 07.54	235 40 10.66	4.3963093
White Hill	56 57 42.16	236 46 41.90	4.3929324
Norwood	97 43 33.65	277 24 10.29	4.5644263
Azure	356 54 38.76	176 55 12.93	4.2993577

IRON, FRANKLIN COUNTY.

A secondary station situated on the eastern side and 150 feet below summit of a high timbered mountain in Altamont Township, about 3 miles, air line, south of Derrick station on New York and Ottawa Railroad.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: The spruce signal tree; true azimuth to same, $283^{\circ} 50'$; distance, 7.15 feet.

[Latitude $44^{\circ} 19' 14.2''$. Longitude $74^{\circ} 28' 56.3''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
St. Regis	231 03 17	51 09 40	4.19284
Morris	358 17 47	178 18 04	4.25234

KILDARE, FRANKLIN COUNTY.

A secondary station, situated at the western end of a high timbered mountain in Altamont Township, about 3 miles south of Derrick station, on the New York and Ottawa Railroad.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: Spruce signal tree; true azimuth, $160^{\circ} 35'$; distance, 22 feet.

[Latitude $44^{\circ} 19' 09.9''$. Longitude $74^{\circ} 29' 26.1''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Little Blue	98 36 44	278 22 57	4.42298
Panther	119 15 47	299 04 36	4.38590
Azure	178 01 48	358 01 22	4.39190

PINNACLE, FULTON COUNTY.

Situated on a round timbered knob, partly cleared, in northern part of town of Bleecker.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $43^{\circ} 13' 04.16''$. Longitude $74^{\circ} 23' 20.69''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Blue Ridge	169 12 05.03	349 11 27.46	3.8195692
Cathead	228 00 57.24	48 05 03.62	4.0376901
Sacandaga	266 31 33.43	86 38 18.76	4.1265109

SACANDAGA, FULTON COUNTY.

Situated on a partially cleared mountain about 2 miles west of Northville.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $43^{\circ} 13' 30.01''$. Longitude $74^{\circ} 13' 28.84''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pinnacle	86 38 18.76	266 31 33.43	4.1265109
Blue Ridge	111 21 13.89	291 13 50.76	4.1947207
Cathead	141 07 12.81	321 04 33.64	3.9213483
Buck	208 18 19.47	28 21 41.08	4.1452430

STRATFORD, FULTON COUNTY.

A secondary station, situated on a low, bare knoll about one-fourth mile northeast of town of Stratford.

Station mark: A lone poplar tree 9 inches in diameter and 12 feet high.

Reference mark: A boulder 3 by 3 by 3 feet, distant $55\frac{1}{2}$ feet from station mark; true azimuth from mark $127^{\circ} 50'$.

[Latitude $43^{\circ} 11' 06.2''$. Longitude $74^{\circ} 41' 29.9''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Barto	69 30 56	249 22 48	4.23658
Oak Hill	127 50 22	307 48 57	3.54610
West Creek No. 2	180 40 23	0 40 28	4.09602
Tomany	221 15 05	41 19 56	4.16090

BLUE RIDGE, HAMILTON COUNTY.

Situated on a partly cleared, timbered ridge in town of Benson, about 5 miles west of Benson Center.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $43^{\circ} 16' 34.25''$. Longitude $74^{\circ} 24' 15.54''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Tomany	93 12 48.07	273 05 49.33	4.1396657
West Creek No. 1	96 13 18.13	276 01 29.29	4.3699741
Twin Lake No. 2	142 30 55.00	322 23 31.00	4.37794
Twin Lake No. 1	144 02 51.76	323 55 50.84	4.3706853
Hamilton	191 26 40.71	11 28 13.64	4.1861832
Buck	252 35 27.24	72 46 12.52	4.3465601
Cathead	265 01 18.09	85 06 02.20	3.9721603
Sacandaga	291 13 50.76	111 21 13.89	4.1947207
Pinnacle	349 11 27.46	169 12 05.03	3.8195692

BUCK, HAMILTON COUNTY.

Situated on a cleared mountain about 4 miles northeast of Hope Falls, Hamilton County, and near the Saratoga-Hamilton County line.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude 43° 20' 08.51". Longitude 74° 08' 34.75".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sacandaga	28 21 41.08	208 18 19.47	4.1452430
Cathead	63 58 35.96	243 52 34.91	4.1207917
Blue Ridge	72 46 12.52	252 35 27.24	4.3465601
Hamilton	115 01 25.72	294 52 12.62	4.3009785
Mill Creek	200 27 17.27	20 31 15.56	4.3478133
Bald Head	221 34 28.11	41 41 42.84	4.3309793
Wells	251 41 36.93	71 48 41.35	4.1661306

CATHEAD, HAMILTON COUNTY.

Situated in town of Benson, about 1 mile north of Benson post-office, on a burnt rocky hill.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: A dead tree used as signal; distant 33.3 feet, true azimuth, 89° 09' from mark.

[Latitude 43° 17' 04.42". Longitude 74° 17' 21.12".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pinnacle	48 05 03.62	228 00 57.24	4.0376901
Blue Ridge	85 06 02.20	265 01 18.09	3.9721603
Hamilton	156 12 45.49	336 09 33.96	4.1921313
Speculator	168 06 57	348 04 51	4.30218
Buck	243 52 34.91	63 58 35.96	4.1207917
Sacandaga	321 04 33.64	141 07 12.81	3.9213483

FISH, HAMILTON COUNTY.

(Not occupied.)

A secondary point situated on a bare hill, about 2 miles west of Lake Pleasant. Probably a station of the Colvin Survey.

[Latitude 43° 28' 18.1". Longitude 74° 27' 36.3".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Tomany	23 48 26	203 43 45	4.35993
West Creek No. 1	44 22 14	224 12 42	4.42900
Twin Lake No. 1	73 38 08	253 33 23	3.98512
Hamilton	311 24 58	131 28 50	4.00363

HAMILTON, HAMILTON COUNTY.

A United States Coast and Geodetic Survey triangulation station, situated on a high cleared mountain about 3 miles south of Lake Pleasant.

Station mark: A copper bolt set in solid rock and marked "U. S. G. S. 465 N. Y.," near which is a United States Coast and Geodetic Survey copper bolt, not marked.

[Latitude $43^{\circ} 24' 41.82''$. Longitude $74^{\circ} 22' 00.14''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Blue Ridge	11 28 13.64	191 26 40.71	4.1861832
Tomany	49 42 09.98	229 33 37.78	4.3435825
West Canada	113 22 30.27	293 07 42.24	4.4994236
Little Moose	150 10 42.30	330 02 15.89	4.5200577
Snowy	177 03 15.52	357 02 24.76	4.5065186
Big Range	206 09 35.82	26 14 31.60	4.3397301
Gore	221 33 38.32	41 46 44.82	4.5860772
Mill Creek	244 14 46.95	64 27 59.47	4.4582536
Crane	245 28 19.04	65 44 59.34	4.5547813
Prospect	268 28 38.73	88 53 20.26	4.6858085
Wells	276 42 21.77	96 58 39.81	4.5087915
Buck	294 52 12.62	115 01 25.72	4.3009785
Cathead	336 09 33.96	156 12 45.49	4.1921313

SPECULATOR, HAMILTON COUNTY.

(Not occupied.)

A secondary point situated on a partly timbered mountain about 3 miles south of Speculator. Probably a station of the Colvin Survey.

[Latitude $43^{\circ} 27' 36.2''$. Longitude $74^{\circ} 20' 24.8$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Hamilton	21 43 39	201 42 34	3.76294
Twin Lake No. 1	85 45 06	265 35 26	4.27932
Cathead	348 04 51	168 06 57	4.30218

TOMANY, HAMILTON COUNTY.

Situated in town of Arietta about 4 miles northwest of Arietta, on a timbered mountain about $1\frac{1}{2}$ miles west of highway leading to Piseco

Lake. Summit of mountain has been cleared. Theodolite was supported on a beech tree sawed off 25 feet above ground, around which was built a tower and platform.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: The beech signal tree 20 feet distant; true azimuth $156^{\circ} 26'$ from mark.

[Latitude $43^{\circ} 16' 58.85''$. Longitude $74^{\circ} 34' 26.84''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Stratford	41 19 55	221 15 05	4.16090
Oak Hill	54 46 05	234 39 50	4.17918
Barto	56 43 04	236 30 05	4.48817
West Creek No. 2	99 38 32.33	279 33 46.34	3.9793818
West Creek No. 1	100 23 16.70	280 18 26.65	3.9864913
Twin Lake No. 2	177 29 49	357 29 25	4.25977
Twin Lake No. 1	179 50 28.83	359 50 27.80	4.2608692
Fish	203 43 45	23 48 26	4.35993
Hamilton	229 33 37.78	49 42 09.98	4.3435825
Blue Ridge	273 05 49.33	93 12 48.07	4.1396657

TWIN LAKE NO. 1, HAMILTON COUNTY.

Situated in Arietta Township about 4 miles west of Piseco Lake on the east edge of a timbered mountain.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $43^{\circ} 26' 49.68''$. Longitude $74^{\circ} 34' 28.58''$.]

To station—	Azimuth.	Back azimuth.	Log. distance,
	° ' "	° ' "	Meters.
West Creek No. 2	29 20 23.69	209 15 38.81	4.2806716
West Creek No. 1	29 54 43.63	209 49 54.68	4.2791890
Fish	253 33 23	73 38 08	3.98512
Speculator	265 35 26	85 45 06	4.27932
Hamilton	283 07 12.71	103 15 47.23	4.2378111
Blue Ridge	323 55 50.84	144 02 51.76	4.3706853
Tomany	359 50 27.30	179 50 28.83	4.2608692

TWIN LAKE NO. 2, HAMILTON COUNTY.

A secondary point situated in Arietta Township, about 4 miles west of Piseco Lake, on west end of a timbered mountain.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude 43° 26' 47.6". Longitude 74° 35' 01.7".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Blue Ridge	322 23 31	142 30 55	4.37794
Tomany	357 29 25	177 29 49	4.25977

WEST CREEK NO. 1, HAMILTON COUNTY.

Situated on the northwest end of a narrow ridge about one-fourth mile long in the southern part of Hamilton County, about 3 miles west of the Powley place, on road from Stratford to Piseco Lake.

Station mark: A copper bolt set in solid rock and marked "U. S. G. S. N. Y. 486."

Reference mark: The spruce signal tree 27 feet distant from station mark; true azimuth, 328° 40'.

[Latitude 43° 17' 55.27". Longitude 74° 41' 29.34".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Schuyler	66 25 45.00	246 08 31.00	4.57643
Cold Brook	80 00 51.00	259 48 45.00	4.41872
Pen	101 13 36.00	280 50 11.00	4.67191
Twin Lake No. 1	209 49 54.68	29 54 43.63	4.2791890
Fish	224 12 42.00	44 22 14.00	4.42900
Hamilton	244 24 39.65	64 38 02.33	4.4648879
Blue Ridge	276 01 29.29	96 13 18.13	4.3699741
Tomany	280 18 26.65	100 23 16.70	3.9864913

WEST CREEK NO. 2, HAMILTON COUNTY.

Situated on the southeast end of a narrow ridge about one-fourth mile long in the southern part of the county, about 3 miles west of the Powley place, on road from Stratford to Piseco Lake.

Station mark: A bronze triangulation tablet set in solid rock.

Reference mark: The spruce signal tree 13.65 feet distant from station mark; true azimuth, 350° 46'.

[Latitude 43° 17' 50.40". Longitude 74° 41' 23.42".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Stratford	0 40 28.00	180 40 23.00	4.09602
Twin Lake No 1	209 15 38.81	29 20 23.69	4.2806716
Hamilton	244 01 54.16	64 15 12.76	4.4640717
Tomany	279 33 46.34	99 38 32.33	3.9793818

OAK HILL, HERKIMER COUNTY.

A secondary station situated on the eastern side of a timbered mountain, about 2 miles northwest of Stratford.

Station mark: An ash tree 14 inches in diameter.

[Latitude $43^{\circ} 12' 16.1''$. Longitude $74^{\circ} 43' 32.9''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Tomany	234 39 50	54 46 05	4.17918
Stratford	307 48 57	127 50 22	3.54610

ARAB, ST. LAWRENCE COUNTY.

A secondary station situated on a partly cleared mountain about $1\frac{1}{2}$ miles east of Childwold station, on New York Central Railroad.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $44^{\circ} 12' 16.8''$. Longitude $74^{\circ} 35' 20.5''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wheeler	73 01 01	252 58 32	3.69594
Moosehead	144 02 04	323 58 00	4.11987
Morris	298 46 37	118 51 21	4.01481

BEECH PLAINS CHURCH, ST. LAWRENCE COUNTY

(Not occupied.)

Secondary point situated in town of Pierrepont.

Station mark: Tower of church.

[Latitude $44^{\circ} 30' 45.4''$. Longitude $75^{\circ} 04' 23.0''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McCarthy	254 56 52	75 05 19	4.21820
Stark	307 22 34	127 27 07	4.03564

CANTON WATER TOWER, ST. LAWRENCE COUNTY.

(Secondary point. Not occupied.)

Station mark: Center of water tower.

[Latitude 44° 35' 41.4". Longitude 75° 09' 47.3".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
White Hill	269 04 32	89 20 51	4.48811
McCarthy	281 47 02	101 59 17	4.37320
Fike	295 20 25	115 34 54	4.48160
Stark	314 51 05	134 59 26	4.34790

FIKE, ST. LAWRENCE COUNTY.

Situated on a high, bare knob in southwest corner of town of Parishville, on land owned by Benjamin Fike, who lives about 50 rods north of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude 44° 28' 39.21". Longitude 74° 49' 07.84".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Little Blue	0 03 09.92	180 03 09.52	4.1354408
Stark	76 56 55.90	256 50 48.11	4.0761604
McCarthy	153 33 33.08	332 31 18.37	3.9639417
White Hill	194 17 03.42	14 18 52.38	4.1425627
Nierny	195 15 38.27	15 17 30.62	4.1278494
Azure	254 15 12.54	74 28 34.05	4.4187160
Panther	319 15 13.24	139 17 49.21	3.8778808
Moosehead	331 39 39.01	151 45 13.51	4.3488909

LITTLE BLUE, ST. LAWRENCE COUNTY.

Situated on a rocky knob (nearly cleared) in southeast corner of town of Granshur, at the headwaters of the middle fork of the Grasse River. Best reached from the camp of the "Hollywood Club," on Clear Pond, 2 miles distant.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude 44° 21' 16.67". Longitude 74° 49' 08.41".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Stark	133 24 22.24	313 18 15.25	4.2030889
McCarthy	169 02 09.28	348 59 55.15	4.3470034
Fike	180 03 09.52	360 03 09.92	4.1354408
Panther	211 53 07.12	31 55 43.33	3.9708924
Azure	230 33 17.90	50 46 38.93	4.5145711
Moosehead	299 27 32.55	119 33 07.08	4.0859436
Morris	308 10 34.15	128 24 56.78	4.5432946

M'CARTHY, ST. LAWRENCE COUNTY.

Situated on a partly cleared hill about 3 miles east of Colton, in town of Colton, on land owned by Mr. McCarthy, who lives about one-half mile west of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $44^{\circ} 33' 03.78''$. Longitude $74^{\circ} 52' 19.98''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Stark	34 07 11.76	214 03 18.41	4.1180159
Norwood	161 11 43.05	341 07 25.93	4.3972766
Nierny	238 22 01.19	58 26 08.45	3.9603360
Azure	272 00 13.36	92 15 50.18	4.4698326
Fike	332 31 18.37	152 33 33.08	3.9639417
Little Blue	348 59 55.15	169 02 09.28	4.2030889

MOOSEHEAD, ST. LAWRENCE COUNTY.

Situated on a cleared mountain in Jamestown township, on south side of Raquette River, about $1\frac{1}{2}$ miles northeast of Sevey post-office.

A signal of New York State land survey is on same mountain, about 500 feet distant.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $44^{\circ} 18' 02.19''$. Longitude $74^{\circ} 41' 09.67''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Little Blue	119 33 07.08	299 27 32.55	4.0859436
Fike	151 45 13.51	331 39 39.01	4.3488909
Panther	157 56 32.83	337 53 34.22	4.1773993
Azure	208 46 02.30	28 53 47.86	4.4844836
St. Regis	246 56 14.88	67 11 10.66	4.4887547
Morris	312 52 57.88	133 01 46.12	4.3610592

NIERNY, ST. LAWRENCE COUNTY.

Situated on a bare knoll about 3 miles southeast of Parishville, on land owned by Mr. Nierny, who lives about 200 yards south of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude 44° 35' 38.71". Longitude 74° 46' 27.66".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Fike	15 17 30.62	195 15 38.27	4.1278494
Stark	44 06 11.35	223 58 10.86	4.3378501
McCarthy	58 26 08.45	238 22 01.19	3.9603360
Norwood	140 03 24.73	319 54 59.79	4.3909593
Desaw	235 40 10.66	55 51 07.54	4.3963093
Azure	285 04 14.54	105 15 44.47	4.3517520

NORWOOD, ST. LAWRENCE COUNTY.

Situated on a low, sandy knoll about 1 mile north of Norwood.

Station mark: A flat stone about 30 inches square and 8 inches thick, in the top of which is cemented a bronze triangulation tablet.

[Latitude 44° 45' 49.12". Longitude 74° 58' 25.85".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Desaw	277 24 10.29	97 43 33.65	4.5644263
Azure	303 14 16.51	123 34 12.20	4.6523077
White Hill	319 20 20.50	139 28 42.10	4.3828385
Nierny	319 54 59.79	140 03 24.73	4.3909593
McCarthy	341 07 25.93	161 11 43.05	4.3972766
Stark	358 47 24.30	178 47 47.41	4.5378178

PANTHER, ST. LAWRENCE COUNTY.

Situated on a cleared mountain, locally known as Catamount Mountain, on the west side of the Raquette River, about 3 miles southeast of Stark post-office, and about twenty minutes walk from the main highway.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: New York State land survey signal and station mark distant 3.05 feet; true azimuth, 308° 04' from station.

[Latitude 44° 25' 33.86". Longitude 74° 45' 25.09".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Little Blue	31 55 43.33	211 53 07.12	3.9708924
Stark	100 25 11.81	280 16 28.25	4.2255977
Fike	139 17 49.21	319 15 13.24	3.8778808
Azure	237 45 17.54	57 46 02.60	4.3807413
St. Regis	273 06 10.88	93 24 06.43	4.5321590
Morris	322 42 42.45	142 54 29.66	4.5698926
Moosehead	337 53 34.22	157 56 32.83	4.1773993

POTSDAM. PRESBYTERIAN CHURCH, ST. LAWRENCE COUNTY.

(Not occupied.)

Secondary point situated in town of Potsdam.

Station mark: Center of church tower.

[Latitude 44° 40' 12.5". Longitude 74° 58' 52.9".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
White Hill	295 53 22	116 02 02	4.25889
McCarthy	326 45 07	146 49 43	4.19915
Stark	356 51 02	176 51 44	4.38271
Nierny	297 09 19	117 18 03	4.26655

ROGERS, ST. LAWRENCE COUNTY.

(Not occupied.)

Secondary point situated on a low, bare hill in town of Norfolk, about one-half mile southwest of Plum Brook station, on Rome, Watertown and Ogdensburg division of New York Central and Hudson River Railroad. The land is owned by W. H. Rogers, who lives about 50 rods northeast of station.

Station mark: The elm signal tree, about 15 inches in diameter.

[Latitude 44° 49' 41.6". Longitude 74° 55' 54.8".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Norwood	24 51 09	204 49 23	3.89793
Nierny	334 18 43	154 25 22	4.46025
McCarthy	351 14 53	171 17 24	4.49360

STARK, ST. LAWRENCE COUNTY.

Situated on a timbered ridge in northeast corner of the town of Clare, on the west side of the North Branch of the Grasse River, on land owned by Irving Stark.

Theodolite elevated 52 feet on a tower built around trunk of a beech tree.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference marks. Center of signal tower and tree 46.3 feet distant. True azimuth $238^{\circ} 12'$. Nail in top of stump of beech tree distant 75.4 feet. True azimuth $355^{\circ} 16'$ from station.

[Latitude $44^{\circ} 27' 11.69''$. Longitude $74^{\circ} 57' 52.90''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Norwood.....	178 47 47.41	358 47 24.30	4.5378178
McCarthy.....	214 03 18.41	34 07 11.76	4.1180159
White Hill.....	222 51 17.55	42 59 14.67	4.3436695
Nierny.....	223 58 10.86	44 06 11.35	4.3378501
Fike.....	256 50 48.11	76 56 55.90	4.0761604
Panther.....	280 16 28.25	100 25 11.81	4.2255977
Little Blue.....	313 18 15.25	133 24 22.24	4.2030889

WHEELER, ST. LAWRENCE COUNTY.

(Not occupied.)

Secondary point situated on a low mountain partly burned over, 3 miles, air line, southwest of Arab Mountain. Timber on north side of mountain.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $44^{\circ} 11' 29.7''$. Longitude $74^{\circ} 38' 54.3''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Arab.....	252 58 32	73 01 01	3.69594
Morris.....	284 17 31	104 24 44	4.15417

WHITE HILL, ST. LAWRENCE COUNTY.

Situated on a bare knoll about 3 miles southeast of Parishville, on land owned by Welch Brothers, who live about 40 rods southeast of station.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude 44° 35' 55.12". Longitude 74° 46' 32.50".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pike	14 18 52.38	194 17 03.42	4.1425627
Stark	42 59 14.67	222 51 17.55	4.3436695
Norwood	139 28 42.10	319 20 20.50	4.3828385
Desaw	236 46 41.90	56 57 42.16	4.3929324
Azure	286 14 01.09	106 25 34.44	4.3563551

ROADS, SULLIVAN COUNTY.

In Manakating Township, on a high brushy ridge 3 miles west of Westbrookville, a station on the Port Jervis, Monticello and New York Railroad.

Station mark: A bronze triangulation tablet set in boulder 30 by 18 by 18 inches, above which was built a mound of stone 3 feet high with 4 feet base.

Reference marks: Arrow cut in flat rock 4 by 3 feet and 1 foot above ground; azimuth, 91°; distance, 32.86 feet. Arrow cut in boulder 4 by 3 feet and 2 feet above ground; azimuth, 347°; distance, 25.57 feet.

[Latitude 41° 32' 09.44". Longitude 74° 37' 27.97".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
High Point	7 29 02.6	187 27 33.4	4.3817799
Wolf	205 53 43.1	25 55 18.2	3.8809053
Sams Point	235 59 37.5	56 10 16.9	4.4292886
Vernon	285 38 24.0	105 42 44.9	3.9765996
Writer	338 27 00.6	158 28 59.5	4.0548316

MILL CREEK, WARREN COUNTY.

On the west side of Mill Creek Pond, in lot 16, in town of Thurman, on a high burned-over mountain having numerous dead trees still standing. The land belongs to the State.

Station mark: A 1-inch hole drilled 2½ inches deep in highest part of solid rock.

Reference mark: A dead spruce tree used as signal; distance, 18 feet 4 inches; true azimuth, 32° 28' from mark.

[Latitude 43° 31' 24.63". Longitude 74° 02' 48.13".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Buck	20 31 15.55	200 27 17.27	4.3478133
Hamilton	64 27 59.47	244 14 46.95	4.4582536
Crane	250 35 57.01	70 39 24.86	3.8562727
Bald Head	307 00 56.45	127 04 13.38	3.9059145
Wells	339 24 18.46	159 27 25.25	4.2401419

MERIDIAN MARKS.

JOHNSTOWN, FULTON COUNTY.

Location of station: On line of outer race track-fence, east of main entrance to track. On the grounds of the Fulton County Agricultural Society.

Station mark: A marble post 36 by 6 by 6 inches, set 35 inches in the ground, in the center of top of which is cemented a bronze meridian tablet.

Distant mark: North of station 448 feet and 3 feet outside of outer race-track fence. A marble post 38 by 6 by 6 inches, set 36 inches in the ground, in the center of top of which is cemented a bronze meridian tablet.

Local referee: John F. Campbell, city engineer's office.

PENNSYLVANIA.

TRIANGULATION STATIONS.

Triangulation in the central portion of the State was extended from stations Wopsononock and Tunnel Hill, established in 1900, so as to control seven quadrangles in Cambria and Clearfield counties. Twenty-two stations were occupied and four secondary points were located by Mr. S. S. Gannett, geographer, during July, August, September, and October, 1901. Connection was made with the work of 1899, in Indiana County, at stations Palmer, McCoy, and Nolo, a circuit 370 miles in length thus being completed.

CHICORY, CAMBRIA COUNTY.

On a cleared knob in the central part of Jackson Township, 10 miles by road westward from Ebensburg, 300 yards south of the Chicory Hill schoolhouse.

Station mark: A marble post 34 by 6 by 6 inches, set 32 inches in the ground, in the center of top of which is countersunk and cemented a bronze triangulation tablet.

[Latitude 40° 26' 38.97". Longitude 78° 52' 48.29".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Ebensburg	251 24 48.82	71 30 51.47	4.1425539
Wess	292 00 35.81	112 04 41.23	3.9833693
Fye	318 31 18.78	138 37 47.50	4.8303852

EBENSBURG, CAMBRIA COUNTY.

Station is center of cupola of court-house in Ebensburg.

Station mark: Center of cupola.

[Latitude 40° 29' 02.07". Longitude 78° 43' 29.50".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Thomas	156 58 25.25	336 57 06.21	3.8644894
Carrolltown	185 49 38.40	5 50 15.62	4.1222362
Wopsononock	248 52 46.94	69 03 52.34	4.4120176
Tunnel Hill	270 56 22.25	91 03 22.64	4.1833793
Sherbine	0 52 21.75	180 52 15.82	4.1515885
Wess	27 55 04.38	207 53 07.38	3.9581867
Chicory	71 30 51.47	251 24 48.82	4.1425539

FYE, CAMBRIA COUNTY.

[Not occupied.]

A cleared ridge known as the "Fye Place," owned by the Mountain Coal Company, in Adams Township, 6 miles south of Summerhill and 7 miles southeast of South Fork.

Station mark: A marble post 36 by 6 by 6 inches, set 32 inches in the ground, in the center of top of which is countersunk and cemented a bronze triangulation tablet.

Reference mark: The lone locust signal tree 4 feet north of station mark.

[Latitude 40° 17' 58.79". Longitude 78° 42' 48.19".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Chicory	138 37 47.50	318 31 18.78	4.8303852
Wess	157 12 06.81	337 09 43.27	4.1299536
Sherbine	169 16 09.98	349 15 37.33	3.8058254

SHERBINE, CAMBRIA COUNTY.

On a small hill, having scattering locust trees on its summit, in Croyle Township, about $\frac{1}{4}$ mile west of the Summerhill township line, 2 miles southwest of Wilmore, 2 miles southeast of Summerhill post-office, on land of Aaron Sherbine. Theodolite elevated 28 feet.

Station mark: A marble post 36 by 6 by 6 inches, set 32 inches in the ground, in the center of top of which is countersunk and cemented a bronze triangulation tablet.

[Latitude $40^{\circ} 21' 22.50''$. Longitude $78^{\circ} 43' 38.65''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wess	146 43 20.03	326 41 29.11	3.8666773
Ebensburg	180 52 15.82	0 52 21.75	4.1515885
Tunnel Hill	228 00 07.85	48 07 13.50	4.3183273
Fye	349 15 37.33	169 16 09.98	3.8058254

SWOPE, CAMBRIA COUNTY.

On a flat ridge in the central portion of Chest Township, 3 miles by road northnortheast of Patton, in corner of lane 200 yards northwest of residence of Miss Lizzie Swope. Theodolite elevated 25 feet.

Station mark: A sandstone post 36 by 6 by 6 inches, set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

[Latitude $40^{\circ} 40' 47.99''$. Longitude $78^{\circ} 39' 04.20''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Thomas	31 12 16.66	211 08 04.77	4.2449177
McCoy	94 48 52.15	274 36 26.89	^a 4.4302943
Palmer	115 01 19.41	294 48 37.39	^a 4.4801794
Beck	154 43 22.37	334 39 53.74	4.2440372
Patterson	189 00 38.52	9 02 00.04	4.2712711
Spangle	235 14 55.19	55 20 18.75	4.1511289
Wopsononock	304 58 39.08	125 06 53.08	4.3381111

^a Mean.

THOMAS, CAMBRIA COUNTY.

Situated about 5 miles northwest of Ebensburg on a bare ridge known as Thomas Ridge.

Station mark: A marble post 36 by 6 by 6 inches set 32 inches in the ground on fence line between property of John Thomas and

Augustus Bash. In center of top of post is cemented a bronze triangulation tablet.

Reference mark: A lone cherry tree on fence line where it crosses summit of ridge; azimuth from station mark, 111° ; distance, 4.5 feet.

[Latitude $40^{\circ} 32' 40.45''$. Longitude $78^{\circ} 45' 31.17''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Tunnel Hill	291 04 07.15	111 12 26.84	4.2881485
Ebensburg	336 57 06.21	156 58 25.25	3.8644894
Wess	5 21 15.32	185 20 37.23	4.1710473
Nolo			4.2420542
Beck	182 55 29.61	2 56 13.52	4.4904668
Swope	211 08 04.77	31 12 16.66	4.2449177
Wopsononock	264 32 02.92	84 44 27.84	4.4325554

WESS, CAMBRIA COUNTY.

In the northern portion of Croyle Township, 8 miles southwest of Ebensburg, 1 mile west of New Germany, in a pasture owned by Leo Wess. Theodolite elevated 35 feet.

Station mark: A marble post 36 by 6 by 6 inches, set 32 inches in the ground, in the center of the top of which is countersunk and cemented a bronze triangulation tablet.

Reference mark: Line fence due north 44 feet distant. Center of big dead tree, N. 65° W. (magnetic), 31 feet distant.

[Latitude $40^{\circ} 24' 41.86''$. Longitude $78^{\circ} 46' 29.85''$.]

To station—	Azimuth.	Back azimuth,	Log. distance.
	° ' "	° ' "	Meters.
Chicory	112 04 41.22	292 00 35.81	3.9833693
Thomas	185 20 37.23	5 21 15.32	4.1710473
Ebensburg	207 53 07.38	27 55 04.38	3.9581867
Sherbine	326 41 29.11	146 43 20.03	3.8666773
Fye	337 09 43.27	157 12 06.81	4.1299536

BECK, CLEARFIELD COUNTY.

On a cultivated knob in Burnside Township, 2 miles west of New Washington, $5\frac{1}{2}$ miles south of Mahaffey, on land owned by Mr. Beck, who lives on southwest side of knob. View cut off by a fringe of timber on north side of hill; fine view in other directions.

Station mark: A sandstone post 32 by 6 by 6 inches, set 30 inches

in the ground, in the center of top of which is cemented a bronze triangulation tablet.

[Latitude $40^{\circ} 49' 22.06''$. Longitude $78^{\circ} 44' 23.81''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Thomas	2 56 13.52	182 55 29.61	4.4904668
Palmer	81 07 47.50	260 58 33.24	^a 4.3037143
Bowser	145 43 17.82	325 40 06.05	4.0855574
Walls	165 35 47.75	345 34 28.28	4.0578282
Patterson	256 00 42.07	76 05 32.70	4.0306219
Swope	334 39 53.74	154 43 22.37	4.2440372

^a Mean.

DAVIS, CLEARFIELD COUNTY.

A round knob with a clump of timber on its summit in Penn Township, 2 miles southwest of Grampian station, on the southern side of and 15 feet lower than summit, giving a view in all directions excepting northward. E. M. Davis, owner, lives one-fourth mile south.

Station mark: A marble post 36 by 6 by 6 inches, set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

Reference mark: Oak signal tree; azimuth $17^{\circ} 09'$, distant from station mark 7 feet.

[Latitude $40^{\circ} 57' 38.51''$. Longitude $78^{\circ} 38' 05.40''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Walls	70 04 30.56	249 59 03.01	4.0948567
Neeper	241 28 13.00	61 31 41.88	3.9280619
Kyler	269 56 10.89	90 08 07.96	4.4078921
Kephart	289 29 06.67	109 40 29.30	4.4129932
Spangle	336 03 31.50	156 08 17.51	4.4027012
Patterson	353 04 01.09	173 04 44.35	4.1079136

GIRARD, CLEARFIELD COUNTY.

A high knob, locally known as "Big Knob," in Girard Township, 7 miles by road north of Shawsville, 12 miles northwest of Frenchville; on south side of knob, about 100 feet lower than summit, at upper edge of field, and has an unobstructed view east, south, and west. On land owned by Peter Brown, but near the property line of the widow Krise.

Station mark: A marble post 36 by 6 by 6 inches, set 34 inches in the ground, having a bronze triangulation tablet cemented in its top.

[Latitude $41^{\circ} 08' 49.76''$. Longitude $78^{\circ} 20' 05.57''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Neeper	46 54 57.36	226 46 37.18	4.3867337
Pardee	323 56 18.24	144 02 33.44	4.3556921
McDowell	349 17 10.17	169 18 13.96	4.0861395
Kyler	359 05 41.70	179 05 50.89	4.3165002

KEPHART, CLEARFIELD COUNTY.

On a cultivated ridge in Decatur Township, 5 miles north of Houtzdale, 6 miles northeast of Osceola, on property of G. W. Kephart, 100 yards east of the main road.

Station mark: A marble post 36 by 6 by 6 inches, set 26 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

[Latitude $40^{\circ} 52' 57.335''$. Longitude $78^{\circ} 20' 43.265''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Spangle	44 32 17.97	224 25 42.57	4.3060350
Patterson	80 01 58.69	259 51 20.07	4.3657805
Davis	109 40 29.30	289 29 06.67	4.4129932
Neeper	126 58 54.43	306 51 00.80	4.3257634
Kyler	187 56 52.64	7 57 26.54	3.9415908
Pardee	232 11 13.41	52 17 52.85	4.2556682
Morrisdale	234 39 37.03	54 44 23.17	4.0976134

KEPHART TREE, CLEARFIELD COUNTY.

(Not occupied.)

A lone chestnut tree on a cultivated ridge, one-fourth mile southeast of and about 12 feet higher than Kephart triangulation station. A good view can be obtained in all directions excepting toward Kyler station.

Station mark: The chestnut signal tree.

[Latitude $40^{\circ} 52' 48.65''$. Longitude $78^{\circ} 20' 24.78''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Patterson	80 51 32.4	260 40 41.7	4.372874
Kephart Δ	121 46 14.1	301 46 02.0	2.706700

KYLER, CLEARFIELD COUNTY.

On a cleared ridge in Boggs Township, 3 miles west of Wallaceton, 9 miles southeast of Clearfield, owned by Mr. Kyler, who lives on south-east side of ridge. View toward the southeast is partly obstructed by a timbered ridge 1 mile distant, and toward the west is obstructed to a small extent by scattering trees on a ridge one-half mile distant; an extended view can be had in other directions.

Station mark: A marble post 24 by 6 by 6 inches, set in a bed of concrete resting on solid rock; in center of top of post is cemented a bronze triangulation tablet.

[Latitude $40^{\circ} 57' 37.99''$. Longitude $78^{\circ} 19' 51.575''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kephart	7 57 26.54	187 56 52.64	3.9415908
Patterson	62 14 27.84	242 03 14.88	4.4346841
Davis	90 08 07.96	269 56 10.89	4.4078921
Neeper	102 41 37.88	282 33 09.45	4.2689259
Girard	179 05 50.89	359 05 41.70	4.3165002
Pardee	259 37 11.67	79 43 16.98	4.1219412

M'DOWELL, CLEARFIELD COUNTY.

(Not occupied.)

On a comparatively low cleared hill in Bradford Township, 10 miles east-northeast of Clearfield, on land owned by R. L. McDowell. A good view can be had in all directions excepting southward.

Station mark: A marble post 38 by 6 by 6 inches, set 30 inches in the ground, 1 foot south of fence. In the center of top of post is cemented a bronze triangulation tablet.

Reference mark: A big lone chestnut tree; azimuth from station mark, $256^{\circ} 47'$; distance, 7.4 feet.

[Latitude $41^{\circ} 02' 21.35''$. Longitude $78^{\circ} 18' 28.52''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Neeper	76 56 18.75	256 46 55.41	4.3137579
Girard	169 18 13.96	349 17 10.17	4.0861395

MORRISDALE, CLEARFIELD COUNTY.

(Not occupied.)

The tower of the large brick school building at Morrisdale, 4 miles north of Philipsburg.

Station mark: Center of tower.

[Latitude 40° 56' 51.88". Longitude 78° 13' 26.61".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kephart.....	54 44 23.17	234 39 37.03	4.0976134
Kyler.....	99 00 50.19	278 56 37.86	3.9597614
Pardee.....	226 39 50.74	46 41 43.62	3.7430580

NEEPER, CLEARFIELD COUNTY.

On a cultivated flat ridge in Pike Township, 2 miles northwest of Curwensville, owned by R. R. Neeper, who lives on southeast side of ridge. A fine view can be had in all directions excepting northwest.

Station mark: A marble post 36 by 6 by 6 inches, set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

Reference mark: The chestnut signal tree; azimuth 74° 54'; distant from station mark 8.5 feet.

[Latitude 40° 59' 49.58". Longitude 78° 32' 46.88".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Patterson.....	19 25 37.98	199 22 52.62	4.2499421
Davis.....	61 31 41.88	241 28 13.00	3.9280619
Girard.....	226 46 37.18	46 54 57.36	4.3867337
McDowell.....	256 46 55.41	76 56 18.75	4.3137579
Kyler.....	282 33 09.45	102 41 37.88	4.2689259
Kephart.....	306 51 00.30	126 58 54.43	4.3257634

PARDEE, CLEARFIELD COUNTY.

In Morris Township, 1 mile south of Kylertown, 2 miles north of Munson, on property of the Pardee Coal Company, 20 feet east of road at a point 150 yards south of forks of road.

Station mark: An oak tree trimmed up, 10 feet east of north and south fence and 2 feet south of east and west fence.

[Latitude 40° 58' 54.96". Longitude 78° 10' 34.43".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Morrisdale	46 41 43.62	226 39 50.74	3.7430580
Kephart	52 17 52.35	232 11 13.41	4.2556682
Kyler	79 43 16.98	259 37 11.67	4.1219412
Girard	144 02 33.44	323 56 18.24	4.3556921

PATTERSON, CLEARFIELD COUNTY.

On a cultivated round hill owned by Lyman Patterson, 3 miles east of Lajose, one-half mile south of Marron, and on line between Ferguson and Jordan townships. Station is on fence line where it crosses summit of hill.

Station mark: A sandstone post 38 by 6 by 6 inches, set 34 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

[Latitude 40° 50' 45.92". Longitude 78° 36' 59.335".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Swope	9 02 00.04	189 00 38.52	4.2712711
Beck	76 05 32.70	256 00 42.07	4.0306219
Walls	122 39 55.61	302 33 45.19	4.1967302
Davis	173 04 44.35	353 04 01.09	4.1079136
Neeper	199 22 52.62	19 25 37.98	4.2499421
Kyler	242 03 14.88	62 14 27.84	4.4346841
Kephart	259 51 20.07	80 01 58.69	4.3657805
Spangle	319 59 51.10	140 03 53.63	4.1317818

SPANGLE, CLEARFIELD COUNTY.

On the northern end of a cultivated ridge in Beccaria Township, 1½ miles northeast of Coalport, on land owned by Levi Spangle, and about 300 yards east of his residence. View is unobstructed from southwest round by west to the northeast; timber cuts off eastward view.

Station mark: A sandstone post 36 by 6 by 6 inches, set 26 inches in the ground, and on the fence line. In the center of top of post is cemented a bronze triangulation tablet.

[Latitude 40° 45' 09.40". Longitude 78° 30' 48.17".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Swope	55 20 18.75	235 14 55.19	4.1511289
Patterson	140 03 53.63	319 59 51.10	4.1317818
Davis	156 08 17.51	336 03 31.50	4.4027012
Kephart	224 25 42.57	44 32 17.97	4.3060350

WALLS, CLEARFIELD COUNTY.

In a cleared field owned by Andrew Walls, in Bell Township, one-half mile northwest of Newtonburg and 5 miles northwest of Mahaffey, 300 yards northwest of Mr. Walls's house. The view is unobstructed east and south, but is cut off toward the west by a flat timbered ridge.

Station mark: A marble post 36 by 6 by 6 inches, set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

[Latitude 40° 55' 20.76". Longitude 78° 46' 25.26".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Davis	249 59 03.01	70 04 30.56	4.0948567
Patterson	302 33 45.19	122 39 55.61	4.1967302
Beck	345 34 28.28	165 35 47.75	4.0578282

BOWSER, JEFFERSON COUNTY.

On a cultivated ridge in the extreme southeastern corner of Gaskill Township, 6 miles northwest of Mahaffey, on land owned by Peter Bowser. Station is near the northeastern end of ridge, 4 or 5 feet lower than the summit, and on the fence line.

Station mark: A sandstone post 34 by 6 by 6 inches, set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

[Latitude 40° 54' 48.17". Longitude 78° 49' 16.89".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Beck	325 40 06.05	145 43 17.82	4.0855574
Swope	330 56 55.20	151 03 35.51	4.4717489

MARYLAND.

PRIMARY TRAVERSE.

The Ellicott and Westminster quadrangles were controlled by 80 miles of primary traverse which, beginning near the southwest corner of Baltimore City, follows the electric railway to Ellicott City, thence along highways to Glenelg post-office, thence northward approximately on the seventy-seventh meridian to the Maryland-Pennsylvania boundary line, thence eastward along this line to the Western Maryland Railroad crossing, where it was connected with line run by Mr. Hall in 1899. A line was also run along the Western Maryland Railroad from Westminster to Glyndon. This work was executed by Mr. E. L. McNair, topographer, in April, 1902.

Geographic positions along the electric road, Baltimore to Ellicott City, thence westward along highways to Glenelg post-office, thence northward to Westminster.

Station.	Latitude.	Longitude.
Baltimore, intersection of Yale avenue and Frederick pike.....	39 16 54.53	76 41 09.45
Catonsville, opposite First National Bank	39 16 19.8	76 43 53.9
Rolling road and electric railway crossing	39 16 25.9	76 45 24.1
Road and electric railway crossing.....	39 16 25.6	76 46 42.9
Ellicott City, opposite Howard House, at junction Clarksville and Frederick pikes.....	39 16 03.2	76 47 53.4
Road east, telephone line	39 15 21.1	76 49 12.7
Columbia post-office, road, four corners	39 14 23.5	76 50 15.9
Road north	39 14 08.4	76 52 07.2
Forks of road, west and northwest.....	39 14 01.5	76 53 48.5
Patuxent River, middle branch	39 14 39.7	76 54 36.4
Road crossing, telephone line.....	39 14 59.2	76 55 56.4
Triadelphia pike on north	39 15 52.7	76 58 52.9
Glenelg, Providence M. E. Church, bronze tablet in southeast corner	39 15 37.2	77 00 37.1
Glenwood post-office and store.....	39 17 14.0	77 01 43.0
Frederick pike, crossing.....	39 19 14.5	77 01 11.5
Baltimore and Ohio Railroad crossing	39 21 10.6	77 00 57.4
Road west	39 23 09.5	77 01 10.2
Berrett post-office, four corners.....	39 24 26.4	77 00 59.8
Liberty pike crossing	39 25 46.2	77 00 30.8
Road east	39 27 25.7	77 00 14.9
Morgan Run crossing	39 28 49.8	77 00 14.5
Road intersection	39 29 37.7	76 59 55.2
Fenby post-office and tollgate.....	39 32 13.9	76 59 41.0

Geographic positions along the Western Maryland Railroad between Westminster and Glyndon.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Westminster, road crossing, 1 mile northeast of.....	39 35 02.9	76 58 25.8
Tannery, road crossing	39 34 18.8	76 57 00.4
Carrollton, road crossing at station	39 33 23.6	76 55 10.2
Patapsco, road crossing at station	39 32 19.6	76 53 42.3
Road crossing	39 31 46.6	76 52 58.1
Finksburg, road crossing at station	39 29 59.7	76 52 50.4
Glen Falls, road crossing at station	39 29 38.2	76 52 07.5
Glen Morris, road crossing at station	39 28 59.6	76 49 42.5
Glyndon, road crossing 150 feet north of station ...	39 28 30.4	76 49 12.8

Geographic positions along highways between Westminster and Maryland-Pennsylvania boundary line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Westminster, Western Maryland Railroad crossing.....	39 34 30.42	76 59 45.68
Westminster, tollgate, 1 mile north of	39 35 31.0	76 59 57.4
Mount Pleasant Hotel, road west	39 38 15.8	77 00 22.4
Road east	39 39 45.6	77 00 49.6
Road east	39 41 15.6	77 00 41.1

Geographic positions along Maryland-Pennsylvania boundary line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road west, on State line	39 43 13.0	77 00 20.4
Boundary post	39 43 13.0	76 59 42.3
Boundary post	39 43 13.2	76 58 34.7
Boundary post in wheat field	39 43 13.5	76 57 26.9
Boundary post in wheat field	39 43 13.6	76 56 19.6
Boundary post at roadside	39 43 13.8	76 55 11.4
Boundary post	39 43 14.0	76 54 03.3
Boundary post	39 43 14.2	76 52 55.7
Boundary post in wheat field	39 43 14.3	76 51 47.9
Western Maryland Railroad crossing (junction with Hall's line of 1899)	39 43 14.55	76 50 43.64
Boundary post 240 feet east of Western Maryland Railroad crossing	39 43 14.45	76 50 40.48

NORTH CAROLINA.

PRIMARY TRAVERSE.

The following positions for the control of ten 15-minute quadrangles in the east-central portion of the State were obtained from primary traverse in March and April, 1902, by Mr. Sledge Tatum, topographer.

The line begins at the main line crossing, South Rockymount, located by Mr. Oscar Jones in 1900, and runs westward along the Atlantic Coast Line Railroad to Nashville; thence along highways to Forestville; thence along the Seaboard Air Line Railway to Raleigh; thence along the Southern Railway to Goldsboro and connected with the south meridian stone. A spur line follows the Atlantic Coast Line Railroad from Goldsboro southward to Dudley. A line approximately on the parallel of $35^{\circ} 30'$ follows the highways between Princeton and Ayden, and another line follows the highways from Conetoe via Wilson to Raleigh.

Geographic positions along the Atlantic Coast Line Railroad from Rockymount to Nashville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
South Rockymount, main line junction	35 55 51.7	77 48 02.5
Road crossing	35 57 03.5	77 50 00.3
Road crossing	35 57 30.0	77 52 21.3
Road crossing	35 57 47.7	77 53 55.8
Road crossing	35 57 52.1	77 55 09.1
Road crossing	35 58 03.7	77 57 12.0
Nashville station	35 58 06.3	77 58 18.4

Geographic positions along highways between Nashville and Wake Forest.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road left	35 58 25.1	78 00 42.3
Road right	35 59 37.6	78 02 17.5
Road left	35 59 28.2	78 03 12.8
Road left	35 59 02.6	78 03 43.4
Hunts Cross Roads	35 59 30.0	78 07 32.3
Creek left	35 58 49.3	78 08 10.5
Road left	35 57 43.7	78 09 06.8
Road left	35 56 53.6	78 10 20.7
Tar River, center of	35 56 27.3	78 12 10.5
Road left	35 56 58.6	78 14 08.0
Road right	35 57 23.6	78 14 56.3
Halls Cross Roads	35 58 55.9	78 15 52.4
Road left	35 58 09.3	78 17 14.0

Geographic positions along highways between Nashville and Wake Forest—Cont'd.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road left	35 57 42.0	78 17 27.4
Bakers, road crossing at	35 56 52.5	78 18 46.4
Road crossing	35 58 34.6	78 21 00.6
Road crossing	35 58 54.8	78 22 55.9
Road crossing	35 59 48.0	78 25 00.0
Mays Cross Roads	36 00 54.2	78 26 27.0
Road crossing	36 00 20.7	78 28 42.6
Road crossing	35 59 03.8	78 30 20.6

Geographic positions along the Seaboard Air Line Railway from Wake Forest to Raleigh.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Forestville station	35 57 42.4	78 30 57.7
Road crossing	35 56 35.3	78 31 33.5
Wyatt station	35 55 48.6	78 32 18.6
Flat River	35 54 34.7	78 33 26.0
Neuse station	35 53 49.2	78 34 07.0
Road crossing	35 53 01.8	78 34 35.8
Road crossing	35 51 45.1	78 35 44.5
Millbrook station	35 51 00.7	78 36 10.3
Road crossing	35 50 02.3	78 36 19.5
Road crossing	35 48 15.0	78 37 25.3
Raleigh, Union station	35 46 37.7	78 38 39.7
Raleigh, capitol dome	35 46 48.4	78 38 18.0

Geographic positions along the Southern Railway from Raleigh to Goldsboro.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Creek left	35 45 23.2	78 38 00.9
Road crossing	35 42 59.6	78 37 26.9
Garner station	35 42 22.6	78 36 11.0
Auburn station	35 41 38.0	78 33 19.8
Road crossing	35 40 49.1	78 31 19.7
Road crossing	35 39 55.8	78 28 23.5
Road crossing	35 38 22.1	78 26 45.4
Road crossing	35 36 59.7	78 24 32.4
Wilson Mills station	35 35 00.2	78 21 18.4
Neuse River	35 33 31.3	78 19 13.3

Geographic positions along the Southern Railway from Raleigh to Goldsboro—
Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road crossing	35 32 45.5	78 18 14.8
Selma, crossing Atlantic Coast Line R. R.	35 31 56.2	78 16 45.6
Pinelevel station	35 30 45.3	78 14 37.1
Road crossing	35 29 28.6	78 12 18.5
Road crossing	35 28 51.7	78 11 11.8
Road crossing	35 27 53.7	78 09 27.2
Whitneys crossing	35 26 26.7	78 06 50.3
Rose station	35 25 00.1	78 04 14.5
Road crossing	35 24 07.0	78 02 55.0
Weils station	35 22 47.0	78 01 07.4

Geographic positions along the Atlantic Coast Line Railroad between Goldsboro and Dudley.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Genoa station	35 19 37.7	78 01 49.6
Dudley station	35 15 58.2	78 02 13.0

Geographic positions along highways between Princeton, Pikeville, and Ayden.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Princeton crossing	35 27 57.7	78 09 34.4
Little River, bridge over	35 28 55.0	78 08 36.9
Road right	35 29 02.9	78 06 07.4
Road right	35 29 12.2	78 04 17.8
Crossroads	35 29 47.4	78 01 58.8
Road left	35 29 28.1	78 00 22.2
Pikeville station, Atlantic Coast Line R. R. crossing, 310 feet south of	35 29 49.5	77 58 57.7
Road right	35 30 00.4	77 57 44.3
Crossroads	35 30 04.5	77 56 38.8
Crossroads	35 29 47.2	77 55 40.1
Aycocks Mill, road right	35 30 06.6	77 53 52.8
Road left	35 31 50.0	77 54 02.3
Eureka crossroads	35 32 32.9	77 52 32.0
Faro post-office	35 30 47.3	77 50 45.2
Road right	35 29 58.4	77 49 28.0
Bullhead post-office	35 29 18.3	77 47 48.1
Crossroads	35 28 39.2	77 43 59.2

Geographic positions along highways between Princeton, Pikeville, and Ayden—
Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road right	35 27 25.9	77 42 04.2
Crossroads	35 27 00.3	77 40 52.1
Road left	35 28 44.7	77 38 50.5
Road left	35 28 47.9	77 37 46.1
Snowhill, Greene County court-house	35 27 17.7	77 40 12.7
Road left	35 28 53.0	77 38 14.9
Dixonville post-office	35 28 14.8	77 36 35.4
Road right	35 28 22.3	77 35 17.8
Road left	35 29 04.5	77 35 05.8
Ormondsville crossroads	35 28 14.3	77 32 45.6
Road right	35 27 53.2	77 31 01.2
Ridge Spring post-office	35 27 22.9	77 29 19.4
Road left	35 28 04.5	77 28 53.9
Road left	35 28 27.8	77 27 58.3
Tramway crossing	35 28 33.4	77 26 31.5

Geographic positions along highways between Conetoe and Wilson

Station.	Latitude.	Longitude.
	° ' "	° ' "
Conetoe station	35 48 56.5	77 27 19.7
Road right	35 48 16.1	77 30 04.4
Road left	35 47 44.4	77 32 06.4
Old Sparta post-office	35 47 21.6	77 33 18.3
Pitt-Edgecombe county line	35 44 52.7	77 32 33.7
Road left	35 44 16.0	77 32 29.1
Creek left	35 44 08.9	77 33 38.2
Crossroads	35 43 55.2	77 35 29.9
Crisp post-office, crossroads at	35 45 03.9	77 37 33.2
Road right	35 44 31.6	77 39 08.6
East Carolina Railway crossing	35 44 14.8	77 40 07.8
Road left	35 43 54.5	77 42 08.2
Road left	35 43 36.2	77 43 16.5
Road left	35 42 14.2	77 44 55.9
Crossroads	35 42 22.6	77 46 57.0
Crossroads	35 41 46.3	77 49 02.5
Road right	35 41 47.3	77 50 49.3
Road left	35 42 09.5	77 52 23.3
Wilson, railroad crossing	35 43 20.6	77 54 25.5
Wilson station, Atlantic Coast Line R. R.	35 43 21.9	77 54 24.5

Geographic positions along highways between Wilson and Raleigh.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road left	35 43 10.0	77 57 04.7
Crossroads	35 43 29.8	77 59 44.9
Crossroads	35 43 50.1	78 01 47.5
Road left	35 44 25.3	78 03 41.5
Talbot post-office	35 44 12.2	78 05 37.5
Road left	35 44 31.4	78 07 29.9
Connor post-office	35 44 28.1	78 09 03.4
Road left	35 44 16.2	78 10 39.8
Road left	35 4 15.4	78 11 51.7
Road right	35 46 26.7	78 13 34.5
Road left	35 46 39.4	78 16 04.4
Crossroads	35 46 49.6	78 17 18.5
Road right	35 47 12.0	78 18 15.3
Road right	35 46 56.8	78 19 32.6
Road left	35 46 55.3	78 21 41.8
Road right	35 48 06.2	78 24 02.5
Eagle Rock post-office	35 48 14.7	78 25 21.5
Road left	35 47 59.7	78 28 16.1
Crossroads	35 47 52.8	78 29 12.0
Road right	35 48 00.3	78 32 11.1
Road left	35 47 52.7	78 33 35.2
Road left	35 47 12.2	78 35 25.7

OHIO.**PRIMARY TRAVERSE.**

During the month of October, 1901, Mr. Sledge Tatum, topographer, controlled, by means of 140 miles of primary traverse, four quadrangles in the north-central portion of the State, in Lorain, Huron, Medina, Richland, Ashland, and Wayne counties.

The traverse is based upon Camden and Townsend triangulation stations of the United States lake survey and on points near Millbrook and Burbank, established in 1900 from primary traverse by Mr. E. L. McNair.

Geographic positions along Baltimore and Ohio Railroad (Lodi and Wooster branch) from Erie Railroad crossing to Lodi.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Erie and Baltimore and Ohio R. R. crossing	40 59 19.4	82 01 33.7
Burbank, 2 miles west of, road crossing	41 00 04.6	82 01 09.0

Geographic positions along Baltimore and Ohio Railroad (main line) from Lodi to Greenwich.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Lodi, junction main line and branch, point 70 feet west of tool house	41 01 39.3	82 01 04.6
Road crossing	41 00 51.8	82 02 48.0
Road crossing	41 00 51.6	82 03 17.7
Road crossing	41 00 49.5	82 04 41.5
Road crossing	41 01 05.0	82 05 50.6
Homer station, road crossing 770 feet east of	41 01 03.6	82 07 16.4
Road crossing	41 01 32.4	82 08 44.1
Road crossing	41 01 50.2	82 09 49.6
Road crossing	41 01 54.2	82 12 06.0
Sullivan station, road crossing west of	41 01 55.0	82 13 20.4
Road crossing	41 01 56.3	82 15 36.6
Road crossing	41 01 57.0	82 16 50.3
Road crossing	41 01 57.9	82 18 18.3
Road crossing	41 02 33.7	82 20 46.1
Road crossing	41 03 19.4	82 22 32.7
Hereford station	41 03 34.3	82 23 37.9
Rumley station	41 03 03.7	82 26 08.7
Road crossing	41 02 17.3	82 29 09.3
Road crossing	41 02 05.9	82 30 01.0
Greenwich station, street crossing 100 feet east of ..	41 02 04.7	82 30 40.1

Geographic positions along highways from Greenwich to Mansfield.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road west	41 00 40.6	82 30 36.0
United Brethren Church	40 59 35.0	82 30 28.0
Crossroads	40 59 34.1	82 29 13.2
Crossroads	40 58 31.7	82 29 32.8
Road east	40 57 11.9	82 29 42.3
Crossroads	40 56 19.0	82 29 41.6
Road east	40 55 25.3	82 29 51.4
Shenandoah, crossroads at	40 54 42.6	82 29 58.0
Road west	40 53 41.0	82 30 16.6
Road west	40 53 07.5	82 30 47.3
Road east	40 52 21.4	82 30 50.4
Crossroads	40 50 53.7	82 30 49.0
Road west	40 49 19.8	82 30 47.9
Road east	40 47 55.5	82 30 48.5
Mansfield, flagstaff of State reformatory	40 46 57.6	82 30 11.1

Geographic positions along highways from Mansfield to Millbrook via Hayesville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road crossing	40 45 28.1	82 29 39.9
Road crossing	40 45 37.7	82 28 28.8
Road south	40 45 56.7	82 27 19.6
Road south	40 45 56.6	82 26 16.4
Brick schoolhouse	40 45 57.5	82 25 40.3
Road crossing	40 46 02.2	82 23 51.9
Petersburg, road crossing at	40 46 25.1	82 21 50.0
Road crossing	40 46 22.5	82 20 22.7
Road south	40 46 19.3	82 18 58.2
Road south	40 46 19.6	82 17 15.9
Hayesville, street crossing at	40 46 21.6	82 16 02.7
Road north	40 46 18.8	82 13 52.3
Road south	40 46 18.1	82 12 46.6
Road crossing	40 46 14.0	82 11 04.4
Road north	40 45 41.6	82 09 23.3
Lakefork, forks of road at	40 44 54.8	82 08 26.5
Road crossing	40 45 13.7	82 06 50.8
Blachleyville, street crossing at	40 45 51.0	82 04 54.7
Road crossing	40 44 43.3	82 02 52.8
Road north	40 43 51.4	82 00 26.9
Pittsburg, Fort Wayne and Chicago Rwy. bridge No. 121, near Millbrook; copper bolt in bridge abutment at northwest corner of	40 43 51.9	81 51 24.6

Geographic positions along highways from a point about $\frac{1}{4}$ miles east of Hayesville northward, via Polk, Sullivan, and Wellington, to Camden triangulation station of United States Lake Survey.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Ashland and Wooster Rwy., crossing of	40 47 57.9	82 11 37.8
Crossroads	40 49 39.8	82 12 37.3
Crossroads	40 52 15.7	82 12 42.6
Crossroads	40 54 03.7	82 12 48.3
Polk, Erie R. R. crossing	40 57 00.7	82 12 53.9
Crossroads	40 58 25.9	82 12 55.2
Crossroads	40 59 31.7	82 13 23.6
Sullivan, bronze tablet in public school building	41 01 47.3	82 13 07.6
Sullivan, Baltimore and Ohio R. R. crossing	41 01 55.0	82 13 20.4
Crossroads	41 03 27.8	82 13 16.3
Crossroads	41 05 04.8	82 13 16.2

Geographic positions along highways from a point about $4\frac{1}{2}$ miles east of Hayesville northward, via Polk, Sullivan, and Wellington, to Camden triangulation station of United States Lake Survey—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road east	41 06 58.5	82 13 12.2
Crossroads	41 08 52.3	82 13 06.0
Wellington station, Wheeling and Lake Erie R. R. .	41 09 48.2	82 13 29.9
Wheeling and Lake Erie R. R., crossing of	41 10 10.1	82 16 31.0
Brighton, crossroads at	41 10 15.8	82 18 34.1
Road west	41 12 55.1	82 18 22.6
Lake Shore and Michigan Southern Rwy., cross- ing of	41 16 04.3	82 18 08.7
Camden triangulation station, United States Lake Survey	41 16 26.0	82 17 46.7

Geographic positions along highways from Townsend triangulation station of the United States Lake Survey south to Greenwich.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Townsend triangulation station, United States Lake Survey	41 15 43.5	82 29 00.6
Lake Shore and Michigan Southern Rwy., cross- ing of	41 15 29.0	82 29 31.0
Road east	41 13 19.0	82 29 29.9
Crossroads	41 10 31.0	82 29 25.6
Road west	41 08 40.1	82 30 51.2
Road west	41 07 49.0	82 31 13.2
Crossroads	41 06 08.6	82 30 49.6
Road east	41 03 53.4	82 30 44.8
Greenwich, bronze tablet in base of standpipe at city waterworks	41 01 37.3	82 31 13.5

CENTRAL SECTION OF TOPOGRAPHY.

OHIO.

PRIMARY TRAVERSE.

Thirty 15-minute quadrangles, covering portions of 18 counties in the northwestern portion of the State, were controlled by 160 miles of primary traverse along railways by Mr. George T. Hawkins, topographer, supplemented by 700 miles of traverse run by Mr. J. R. Ellis along highways, following meridians and parallels as closely as practicable.

The following geographic positions were determined from primary traverse in 1901 by Mr. George T. Hawkins, topographer.

The line starts from a point in the western part of the city of Toledo and follows the Lake Shore Railway to Edgerton, thence southwest via highways to the Indiana-Ohio State line, thence south along the State line to the Findlay, Fort Wayne and Western Railway, thence along that railway to Findlay, where it was connected with a line run in 1900.

Geographic positions along Lake Shore and Michigan Southern Railway, between Toledo and Edgerton.

Station.	Latitude.	Longitude.
Toledo, crossing of Michigan Central and Toledo, St. Louis and Western railroads	° ' " 41 37 33.5	° ' " 83 34 23.2
Mileposts 4 and 5, north and south road crossing between	41 38 01.4	83 36 23.6
Mileposts 5 and 6, north and south road crossing between	41 37 50.4	83 37 32.6
Mileposts 6 and 7, north and south road crossing between	41 37 39.3	83 38 42.4
Mileposts 7 and 8, north and south road crossing between	41 37 28.2	83 39 52.0
Milepost 8, $\frac{1}{4}$ mile east of, east and west road crossing	41 37 24.7	83 40 13.4
Mileposts 8 and 9, north and south road crossing between	41 37 17.0	83 41 01.8
Holland, north and south road crossing east of	41 37 05.9	83 42 11.3
Holland station	41 37 00.8	83 42 43.2
Holland, road crossing west of	41 37 00.2	83 42 47.1
Mileposts 11 and 12, north and south road crossing between	41 36 46.3	83 44 14.0
Milepost 12, east and west road crossing west of	41 36 35.3	83 45 22.6
Mileposts 12 and 13, north and south road crossing between	41 36 32.4	83 45 40.3
Mileposts 13 and 14, east and west road crossing between	41 36 24.2	83 46 31.4
Mileposts 14 and 15, east and west road crossing between	41 36 11.7	83 47 49.6

Geographic positions along Lake Shore and Michigan Southern Railway, between Toledo and Edgerton—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Mileposts 16 and 17, north and south road crossing between.....	41 35 55.9	83 49 27.6
Mileposts 17 and 18, north and south road crossing between.....	41 35 44.4	83 50 39.1
Mileposts 18 and 19, north and south road crossing between.....	41 35 33.3	83 51 47.7
Mileposts 18 and 19, north and south road crossing between.....	41 35 22.3	83 52 55.9
Swanton station.....	41 35 18.1	83 53 22.0
Swanton, main street crossing.....	41 35 17.5	83 53 25.9
Mileposts 20 and 21, north and south road crossing between.....	41 35 11.0	83 54 05.6
Mileposts 20 and 21, north and south road crossing between.....	41 35 03.3	83 54 53.5
Mileposts 21 and 22, north and south road crossing between.....	41 34 59.7	83 55 15.6
Mileposts 22 and 23, north and south road crossing between.....	41 34 48.2	83 56 26.9
Mileposts 23 and 24, north and south road crossing between.....	41 34 31.3	83 58 11.0
Mileposts 24 and 25, east and west road crossing between.....	41 34 25.2	83 58 48.3
Delta station.....	41 34 14.8	83 59 52.9
Delta, road crossing west of.....	41 34 14.5	83 59 54.8
Delta, road crossing west of.....	41 34 13.4	84 00 01.7
Delta, road crossing west of.....	41 34 11.7	84 00 11.9
Road crossing, northeast and southwest.....	41 34 01.8	84 01 13.0
Mileposts 27 and 28, north and south road crossing between.....	41 33 51.8	84 02 14.4
Mileposts 28 and 29, north and south road crossing between.....	41 33 40.6	84 03 23.5
Mileposts 29 and 30, north and south road crossing between.....	41 33 29.2	84 04 33.6
Mileposts 31 and 32, north and south road crossing between.....	41 33 06.6	84 06 52.6
Mileposts 32 and 33, north and south road crossing between.....	41 32 55.1	84 08 02.9
Wauseon, main street crossing.....	41 32 51.1	84 08 27.3
Wauseon station.....	41 32 49.7	84 08 35.9
Wauseon, crossing Lake Shore and Detroit Southern railroads.....	41 32 47.2	84 08 51.7
Wauseon Cemetery, north and south road crossing at.....	41 32 44.0	84 09 11.2
Milepost 34, east and west road crossing at.....	41 32 37.5	84 09 50.9
Mileposts 34 and 35, north and south road crossing between.....	41 32 32.7	84 10 20.5
Mileposts 35 and 36, north and south road crossing between.....	41 32 21.4	84 11 29.9

*Geographic positions along Lake Shore and Michigan Southern Railway,
between Toledo and Edgerton—Continued.*

Station.	Latitude.	Longitude.
Mileposts 36 and 37, north and south road crossing between.....	° ' " 41 32 10.0	° ' " 84 12 39.4
Mileposts 37 and 38, north and south road crossing between.....	41 31 59.3	84 13 44.7
Mileposts 38 and 39, north and south road crossing between.....	41 31 48.0	84 14 53.7
Mileposts 38 and 39, east and west road crossing between.....	41 31 42.7	84 15 26.3
Mileposts 39 and 40, north and south road crossing between.....	41 31 36.7	84 16 02.7
Mileposts 40 and 41, north and south road crossing between.....	41 31 25.3	84 17 12.0
Archbold station.....	41 31 15.3	84 18 12.7
Archbold, main street crossing.....	41 31 13.8	84 18 21.7
Mileposts 42 and 43, north and south road crossing between.....	41 31 02.4	84 19 31.1
Mileposts 43 and 44, north and south road crossing between.....	41 30 52.7	84 20 30.2
Milepost 45, north and south road crossing near....	41 30 35.5	84 22 14.4
Mileposts 45 and 46, north and south road crossing between.....	41 30 27.2	84 23 04.7
Mileposts 46 and 47, north and south road crossing between.....	41 30 18.3	84 23 58.8
Stryker, main street crossing.....	41 30 09.8	84 24 50.5
Stryker station.....	41 30 08.4	84 24 58.8
Milepost 48, north and south road crossing near....	41 30 02.7	84 25 33.1
Mileposts 48 and 49, north and south road crossing between.....	41 29 57.5	84 26 04.8
Milepost 49, north and south road crossing near....	41 29 49.8	84 26 51.5
Mileposts 49 and 50, north and south road crossing between.....	41 29 43.2	84 27 31.2
Milepost 50 and 51, north and south road crossing between.....	41 29 32.1	84 28 38.3
Mileposts 51 and 52, north and south road crossing between.....	41 29 20.6	84 29 47.9
Milepost 52, road crossing near.....	41 29 14.1	84 30 26.6
Milepost 53, road crossing near.....	41 29 06.3	84 31 14.2
Road crossing, northeast and southwest.....	41 29 01.2	84 31 44.6
Mileposts 53 and 54, north and south road crossing between.....	41 28 57.1	84 32 09.7
Lake Shore and Cincinnati Northern Railroad cross- ing.....	41 28 53.5	84 32 31.5
Bryan, road crossing at.....	41 28 49.2	84 32 57.4
Bryan, road crossing at.....	41 28 48.4	84 33 01.9
Bryan station.....	41 28 48.0	84 33 04.3
Road crossing over railroad.....	41 28 35.3	84 34 21.0

*Geographic positions along Lake Shore and Michigan Southern Railway,
between Toledo and Edgerton—Continued.*

Station.	Latitude.	Longitude.
	° ' "	° ' "
Mileposts 56 and 57, north and south road crossing between	41 28 23.0	84 35 35.2
Road crossing over railroad	41 28 11.3	84 36 45.4
Milepost 59, north and south road crossing near ...	41 27 59.9	84 37 54.5
Mulberry station	41 27 48.9	84 39 00.7
Milepost 60, north and south road crossing near ...	41 27 48.6	84 39 02.6
Road crossing over railroad	41 27 36.6	84 40 14.4
Milepost 62, north and south road crossing near ...	41 27 24.7	84 41 26.5
Mileposts 62 and 63, north and south road crossing between	41 27 20.6	84 41 51.5
Milepost 63, north and south road crossing near ...	41 27 13.0	84 42 37.2
Milepost 64, north and south road crossing near ...	41 27 01.8	84 43 45.3
Edgerton, road crossing at	41 26 53.9	84 44 32.7
Edgerton station	41 26 52.4	84 44 42.1
Edgerton, main street crossing	41 26 50.8	84 44 51.5

Geographic positions along highways between Edgerton and Ohio-Indiana State line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 5 N., R. 1 E., corner secs. 3 and 4, on township line	41 25 23.8	84 44 54.7
T. 5 N., R. 1 E., corner secs. 3, 4, 9, and 10	41 24 40.7	84 44 54.2
T. 5 N., R. 1 E., corner secs. 9, 10, 15, and 16	41 23 48.7	84 44 53.3
T. 5 N., R. 1 E., corner secs. 15, 16, 21, and 22	41 22 56.4	84 44 52.5
T. 5 N., R. 1 E., corner secs. 21, 22, 27, and 28	41 22 04.2	84 44 51.6
T. 5 N., R. 1 E., corner secs. 28, 29, 32, and 33	41 21 12.1	84 45 59.2
T. 5 N., R. 1 E., corner secs. 29, 30, 31, and 32	41 21 11.8	84 47 08.8

Geographic positions along Ohio-Indiana State line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 5 N., R. 1 E., corner on State line between secs. 30 and 31	41 21 12.0	84 48 12.5
T. 4 N., R. 1 E., corner secs. 6 and 7	41 19 28.7	84 48 12.3
Road west	41 18 51.2	84 48 12.1
Baltimore & Ohio Railroad crossing	41 18 13.6	84 48 11.7
Roads west and southeast	41 17 59.0	84 48 11.7
Road west	41 17 06.4	84 48 11.3
Road northeast and southwest	41 16 14.6	84 48 10.9
Road west	41 15 22.0	84 48 10.8

Geographic positions along Ohio-Indiana State line—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Ts. 3 and 4 N., R. 1 E., township corner	41 15 08.2	84 48 10.8
Road west	41 14 29.5	84 48 10.7
Road west	41 13 37.0	84 48 10.8
T. 3 N., R. 1 E., corner secs. 7 and 18	41 13 20.2	84 48 10.9
Road west	41 13 11.1	84 48 11.0
T. 3 N., R. 1 E., corner secs. 18 and 19	41 12 27.8	84 48 10.9
Road east and west	41 11 52.5	84 48 10.9
Road west	41 11 05.2	84 48 10.6
Road east	41 11 02.1	84 48 10.6
Road east	41 09 26.4	84 48 11.1
Wabash Railroad crossing	41 08 53.8	84 48 11.0
Road east	41 08 11.7	84 48 11.3
Road west	41 07 35.6	84 48 11.3
Road east	41 07 19.2	84 48 11.3
Road east	41 06 26.8	84 48 11.1
Road east	41 06 00.5	84 48 11.1
Road west	41 05 50.8	84 48 11.1
Ts. 1 and 2 N., R. 1 E., township corner	41 04 41.7	84 48 11.1
Road east and west	41 04 41.1	84 48 11.1
Road west	41 04 06.1	84 48 11.0
T. 1 N., R. 1 E., corner secs. 6 and 7	41 03 46.7	84 48 10.9
Road west	41 03 13.3	84 48 10.8
T. 1 N., R. 1 E., corner secs. 7 and 18	41 02 54.4	84 48 10.6
Road northeast	41 02 22.7	84 48 10.8
Road east	41 02 01.6	84 48 10.7
Road west	41 01 41.8	84 48 10.8
T. 1 N., R. 1 E., corner secs. 19 and 30	41 01 09.2	84 48 11.0

Geographic positions along Findlay, Fort Wayne and Western Railway, between Baldwin and Findlay.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Baldwin station	41 01 05.9	84 48 09.5
Road crossing, north and south	41 01 06.0	84 47 01.4
Road crossing, north and south	41 01 06.0	85 46 27.1
McGill station	41 01 06.0	84 46 26.2
Road crossing, north and south	41 01 06.1	84 45 35.8
Batson station	41 01 06.3	84 44 44.7
Road crossing, north and south	41 01 06.4	84 43 35.3
Road crossing, north and south	41 01 06.6	84 42 26.0

Geographic positions along Findlay, Fort Wayne and Western Railway, etc.—
Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 1 N., Rs. 1 and 2 E., corner secs. 19, 30, 24, and 25.	41 01 09.2	84 41 16.2
Tipton, road crossing at	41 01 07.1	84 40 08.7
Road crossing, north and south	41 01 07.3	84 38 58.4
Road crossing, north and south	41 01 07.5	84 37 49.5
Road crossing, north and south	41 01 07.7	84 36 40.6
Road crossing, north and south	41 01 07.8	84 36 05.9
Road crossing, north and south	41 01 07.9	84 35 31.1
Haviland, railroad crossing at	41 01 08.0	84 34 56.0
T. 1 N., Rs. 2 and 3 E., corner secs. 19, 30, 24, and 25.	41 01 10.0	84 34 21.6
Road crossing, north and south	41 01 08.2	84 33 12.1
Road crossing, north and south	41 01 08.4	84 32 02.9
Road crossing, north and south	41 01 08.6	84 30 53.4
Road crossing, north and south	41 01 08.9	84 29 44.4
Groverhill station	41 01 09.2	84 28 39.0
Groverhill, main street crossing	41 01 09.2	84 28 35.1
T. 1 N., Rs. 3 and 4 E., corner secs. 19, 30, 24, and 25.	41 01 10.7	84 27 26.0
Road crossing, north and south	41 01 10.1	84 25 42.5
Roselmo station	41 01 10.3	84 25 07.4
Road crossing, north and south	41 01 10.7	84 24 58.9
Road crossing, north and south	41 01 10.9	84 23 24.6
Road south	41 01 11.1	84 22 50.1
Erie Canal crossing	41 01 11.6	84 21 31.5
T. 1 N., Rs. 4 and 5 E., corner secs. 19, 30, 24, and 25.	41 01 12.7	84 20 31.7
Road crossing, north and south	41 01 12.4	84 19 22.0
Road crossing, north and south	41 01 12.6	84 18 47.0
Cloverleaf Railroad crossing	41 01 12.9	84 18 12.7
Road crossing, north and south	41 01 13.1	84 17 38.3
Road crossing, northwest and southeast	41 01 13.2	84 17 24.6
Road crossing, under railway	41 01 13.2	84 17 15.1
Road crossing, north and south	41 01 13.7	84 15 54.6
Road crossing, north and south	41 01 13.9	84 15 20.0
Road crossing, north and south	41 01 14.1	84 14 45.4
Rs. 5 and 6 E., road crossing between	41 01 14.5	84 13 36.3
Detroit and Lima Northern Railway crossing	41 01 14.7	84 12 59.0
Criswell station	41 01 15.0	84 11 58.1
Road crossing, north and south	41 01 15.0	84 11 52.7
Road crossing, north and south	41 01 15.4	84 10 18.0
Avis, road crossing at	41 01 15.4	84 10 09.7
Road crossing, north and south	41 01 15.7	84 08 59.7
Road crossing, north and south	41 01 15.8	84 08 25.8
Road crossing, north and south	41 01 15.8	84 08 07.9

Geographic positions along Findlay, Fort Wayne and Western Railway, etc.—
Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Rs. 6 and 7 E., road crossing between	41	01	16.4	84	06	41.2
Road crossing, north and south	41	01	16.8	84	05	32.3
Road crossing, north and south	41	01	17.0	84	04	57.5
Road crossing, north and south	41	01	17.1	84	04	42.1
Glandorf, road crossing at	41	01	17.2	84	04	23.4
Glandorf, road crossing $\frac{1}{2}$ mile east of	41	01	17.4	84	03	48.0
Ottawa, Cincinnati, Hamilton and Dayton Railway crossing	41	01	17.7	84	02	51.0
Ottawa station (Findlay, Fort Wayne and Western Railway)	41	01	17.7	84	02	49.0
Road crossing, north and south	41	01	17.8	84	02	39.4
Detroit Southern Railroad crossing	41	01	17.9	84	02	04.4
Rs. 7 and 8 E., road crossing between	41	01	18.2	83	59	45.3
Pike road crossing	41	01	18.2	83	58	47.0
Road crossing, north and south	41	01	18.8	83	57	27.1
Road crossing	41	01	19.1	83	55	26.1
Gilboa station	41	01	19.1	83	55	19.6
Road crossing, north and south	41	01	19.1	83	55	19.2
Road crossing, north and south	41	01	19.1	83	55	08.9
Road crossing, north and south	41	01	19.2	83	54	16.6
Road crossing, north and south	41	01	19.3	83	53	59.4
Pike road crossing, northeast and southwest	41	01	19.4	83	53	11.0
Road, north and south	41	01	19.5	83	52	50.5
Road crossing, north and south	41	01	19.7	83	51	41.4
Moffits, road crossing at	41	01	19.8	83	50	49.2
Road crossing, north and south	41	01	20.2	83	48	49.2
Benton Ridge, road crossing at	41	01	20.4	83	47	57.0
Benton Ridge, road crossing $\frac{1}{4}$ mile east of	41	01	20.5	83	47	08.0
Rs. 9 and 10 E., road crossing between	41	01	20.7	83	45	55.7
Road, north and south	41	01	20.8	83	45	04.8
Pike road crossing, northeast and southwest	41	01	20.8	83	44	19.6
Road crossing, north and south	41	01	20.7	83	44	13.1
Road crossing, north and south	41	01	20.7	83	43	39.1
Road crossing, north and south	41	01	20.5	83	42	46.5
Road crossing, north and south	41	01	20.4	83	41	54.3
Lake Erie and Western Railroad crossing	41	01	20.4	83	41	00.2
Road crossing, north and south	41	01	20.4	83	40	45.2
Road crossing, northeast and southwest	41	01	20.5	83	40	05.4
Findlay, Main street crossing	41	01	20.5	83	39	01.6
Findlay station	41	01	20.5	83	38	59.5

The following geographic positions were determined from primary traverse run in 1901 by Mr. J. R. Ellis, field assistant:

Geographic positions along highways from Mount Sterling to McCutchenville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Mount Sterling, Baltimore and Ohio Railroad and main street crossing	39 43 17.6	83 16 03.7
Roads, north, east, and south	39 45 11.9	83 15 11.1
Loubbert Creek, bridge over	39 47 09.3	83 14 53.1
Wrightsville and Kiousville Pike, 300 feet east of W. McNeff's house	39 48 58.2	83 16 26.2
Wrightsville, cross roads at	39 51 39.3	83 14 52.2
Lilly Chapel and Georgesville, and road north	39 53 13.0	83 15 06.1
Lilly Chapel, Georgesville and West Jefferson cross roads	39 55 51.3	83 16 54.4
National Pike, cross roads on	39 56 45.4	83 15 14.0
Road east	39 58 24.9	83 15 36.0
School house, road southwest at	39 59 53.5	83 15 50.9
Worthington store, road east at	40 02 30.5	83 15 49.9
Road east	40 04 08.1	83 15 05.6
Road east, north, and south	40 05 27.3	83 15 23.4
Pittsburg, Cincinnati, Chicago and St. Louis Railway, crossing of	40 05 43.2	83 14 54.0
Madison and Union counties, stone monument between	40 06 29.8	83 14 01.3
Fork of road northwest	40 09 50.2	83 13 44.1
Schoolhouse No. 9, road west near	40 11 26.2	83 14 32.3
Watkins, cross road in east part of	40 12 45.5	83 14 41.0
Road east, west, and north	40 13 53.0	83 14 46.1
Road north, south, east, and west	40 15 02.0	83 14 54.5
Road north, south, east, and west	40 16 56.0	83 15 02.0
Road north, west, and south	40 18 00.7	83 15 07.2
Delaware and Union counties, stone monument between	40 20 01.0	83 14 59.6
Roads east, west, and north	40 21 02.9	83 14 19.2
Roads east, west, and north, near schoolhouse	40 21 53.5	83 13 51.0
Road north, east, and south	40 22 54.5	83 14 58.9
State road, northeast and southwest	40 23 46.7	83 16 07.9
Hoskins and State road crossing	40 25 08.6	83 14 57.0
Richwood and Prospect pike	40 26 10.7	83 15 32.1
East and west pike	40 27 47.0	83 15 04.0
Woodland, 570 feet southwest of, crossing Big Four Railway	40 28 45.3	83 15 27.4
Pike crossing, east and west	40 29 37.0	83 15 35.6
Road crossing, east and west	40 30 46.4	83 15 22.2
Road east, north and south	40 31 47.2	83 15 56.0
Do	40 33 04.0	83 16 07.6

Geographic positions along highways from Mount Sterling to McCutchenville—
Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road, northwest and southeast.....	40 33 20.3	83 15 20.0
Gurley, 1 mile east of, Big Four Railway crossing.....	40 35 09.5	83 15 21.2
Espyville, road crossing southeast and west at.....	40 35 52.5	83 15 20.4
T. 5 S., R. 14 E., $\frac{1}{2}$ corner between secs. 15 and 16....	40 36 28.8	83 14 47.0
T. 5 S., R. 14 E., corner secs. 3, 4, 9, and 10.....	40 37 47.1	83 14 46.1
Ts. 4 and 5 S., R. 14 E., $\frac{1}{2}$ corner between secs. 3 and 34.....	40 38 39.3	83 14 11.1
Pike road crossing, northeast and southwest.....	40 38 54.7	83 13 13.4
School house, road crossing east and west, near.....	40 40 23.9	83 13 55.7
Crossing, east and west road with Harpster and Marion road.....	40 42 08.4	83 14 53.1
Roads, northeast and southwest.....	40 46 28.5	83 14 28.6
Quarter corner sections (no number).....	40 47 21.6	83 13 03.3
T. 3 S., R. 14 E., corner secs. 2, 3, 10, and 11.....	40 48 13.8	83 13 38.9
Ts. 2 and 3 S., R. 14 E., corner secs. 3, 4, 32, 33....	40 49 06.2	83 14 47.2
T. 2 S., R. 14 E., $\frac{1}{4}$ corner between secs. 28 and 33..	40 49 58.4	83 15 22.5
T. 2 S., R. 14 E., $\frac{1}{4}$ corner between secs. 16 and 21..	40 51 42.9	83 15 23.2
Roads east, west, north, and south.....	40 52 35.4	83 15 04.2
Roads east, west, and northeast.....	40 54 02.0	83 14 47.4
Roads north, west, and south.....	40 54 32.3	83 15 24.6
Sandusky River, bridge over.....	40 55 41.8	83 14 44.7
T. 1 S., R. 14 E., corner secs. 15, 16, 21, and 22....	40 56 57.9	83 14 49.5
T. 1 S., R. 14 E., corner secs. 9, 10, 15, and 16....	40 57 49.9	83 14 49.8
McCutchenville, crossing main street and Perrys- burg road.....	40 59 26.6	83 15 36.6
McCutchenville, north part of, Ohio Central Rail- way crossing.....	41 00 08.0	83 15 43.1

*Geographic positions along highways from near Bettsville to latitude 41° 00',
thence west to longitude 83° 45', thence north to Maumee River, thence east to
Dowling, Ohio.*

Station.	Latitude.	Longitude.
	° ' "	° ' "
Station 50 on Oak Harbor line.....	41 16 02.6	83 14 06.8
Bettsville crossing, Pennsylvania Railroad at.....	41 14 41.3	83 14 13.2
Crossroads at section corner.....	41 13 58.9	83 14 42.4
T. 3 N., R. 14 E., corner secs. 15, 16, 21, and 22....	41 12 36.7	83 14 41.0
T. 3 N., R. 14 E., corner secs. 27, 28, 33, and 34....	41 10 51.7	83 14 46.2
Ts. 2 and 3 N., R. 14 E., corner secs. 3, 4, 33, and 34.....	41 09 59.6	83 14 49.4
T. 2 N., R. 14 E., corner secs. 9, 10, 15, and 16.....	41 08 17.0	83 14 50.6
T. 2 N., R. 14 E., corner secs. 15, 16, 21, and 22....	41 07 24.4	83 14 50.4

Geographic positions along highways from near Bettsville, etc.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 2 N., R. 14 E., corner secs. 27, 28, 33, and 34.....	41 05 39.5	83 14 51.6
Ts. 1 and 2 N., R. 14 E., corner secs. 3, 4, 33, and 34.....	41 04 47.5	83 14 51.6
Roads north, south, east, and west.....	41 02 36.8	83 14 51.0
T. 1 N., R. 14 E., $\frac{1}{4}$ corner between secs. 16 and 21.....	41 01 44.6	83 15 43.3
T. 1 N., R. 14 E., $\frac{1}{4}$ corner between secs. 28 and 33.....	41 00 26.3	83 15 43.5
T. 1 N., Rs. 13 and 14 E., $\frac{1}{4}$ corner between secs. 31 and 36.....	40 59 59.8	83 18 18.6
T. 1 N. and 1 S., R. 13 E., corner secs. 3, 4, 33, and 34.....	40 59 32.3	83 21 47.1
T. 1 N. and 1 S., Rs. 12 and 13 E., corner secs. 1, 6, 31, and 36.....	40 59 30.9	83 25 13.9
Road northeast and southwest.....	40 59 28.1	83 27 29.1
Vanlue, crossing Big Four Railway, in northwest part of.....	40 58 32.6	83 29 03.4
Schoolhouse, crossroads at.....	40 58 31.8	83 30 46.2
Roads east, west, and north.....	40 58 53.9	83 33 53.2
Roads northeast and southwest.....	40 58 57.4	83 36 47.1
Ts. 1 N. and 1 S., Rs. 10 and 11 E., corner between.....	40 59 35.5	83 39 02.2
Ts. 1 N. and 1 S., R. 10 E., corner secs. 1, 2, 35, and 36.....	40 59 35.7	83 40 11.1
Ts. 1 N. and 1 S., R. 10 E., $\frac{1}{4}$ corner between secs. 3 and 34.....	40 59 36.0	83 41 54.6
Lake Erie and Western Railroad crossing.....	41 00 45.2	83 41 54.5
T. 1 N., R. 10 E., $\frac{1}{4}$ corner between secs. 15 and 16.....	41 02 38.5	83 42 29.2
T. 1 N., R. 10 E., $\frac{1}{4}$ corner between secs. 9 and 10.....	41 03 30.9	83 42 29.4
Cincinnati, Hamilton and Dayton Railway crossing.....	41 04 59.2	83 43 36.9
T. 2 N., R. 10 E., corner secs. 28, 29, 32, and 33.....	41 05 42.6	83 43 37.1
T. 2 N., R. 10 E., corner secs. 16, 17, 20, and 21.....	41 07 26.8	83 43 37.9
Road northeast and southwest.....	41 09 34.5	83 43 38.3
T. 3 N., R. 10 E., corner secs. 28, 29, 32, and 33.....	41 10 58.1	83 43 36.9
T. 3 N., R. 10 E., corner secs. 20, 21, 28, and 29.....	41 11 50.1	83 43 37.8
T. 3 N., R. 10 E., corner secs. 16, 17, 20, and 21.....	41 12 42.2	83 43 38.1
T. 3 N., R. 10 E., corner secs. 4, 5, 8, and 9.....	41 14 26.6	83 43 38.5
T. 4 N., R. 10 E., corner secs. 28, 29, 32, and 33.....	41 16 09.8	83 43 40.0
T. 4 N., R. 10 E., corner secs. 20, 21, 28, and 29.....	41 17 02.0	83 43 40.3
T. 4 N., R. 10 E., corner secs. 4, 5, 8, and 9.....	41 19 38.8	83 43 41.4
Ts. 4 and 5 N., R. 10 E., corner secs 4, 5, 32, and 33.....	41 20 34.4	83 43 42.3
T. 5 N., R. 10 E., corner secs. 20, 21, 28, and 29.....	41 22 18.9	83 43 41.8
T. 5 N., R. 10 E., $\frac{1}{4}$ corner between secs. 8 and 17.....	41 24 03.8	83 44 16.7
Ts. 5 and 6 N., R. 10 E., $\frac{1}{4}$ corner between secs. 5 and 32.....	41 25 48.2	83 44 16.9
T. 6 N., R. 10 E., $\frac{1}{4}$ corner between secs. 29 and 32.....	41 26 40.1	83 44 17.8

Geographic positions along highways from near Bettsville, etc.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 6 N., R. 10 E., $\frac{1}{4}$ corner between secs. 17 and 20.	41 28 25.2	83 44 17.9
T. 6 N., R. 10 E., corner secs. 14, 15, 26, and 27.	41 28 24.0	83 41 23.3
T. 6 N., R. 10 E., corner secs. 13, 14, 23, and 24.	41 28 23.9	83 40 13.8

Geographic positions along highways from Vanlue to Pfeiffer, thence west to 83° 45', thence north to southwest corner of Findlay quadrangle.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Vanlue, Big Four Railway crossing in northwest part of	40 58 32.6	83 29 03.5
T. 1 S., R. 12 E., $\frac{1}{4}$ corner between secs. 16 and 21.	40 56 53.5	83 29 10.5
T. 1 S., R. 12 E., $\frac{1}{4}$ corner between secs. 28 and 33.	40 55 09.2	83 29 10.3
T. 2 S., R. 12 E., $\frac{1}{4}$ corner between secs. 4 and 9.	40 53 24.7	83 29 10.7
Roads northeast and southwest	40 51 51.5	83 29 30.6
$\frac{1}{4}$ corner secs.	40 50 49.0	83 30 23.2
Big Four Railway crossing near milepost 70.	40 49 06.4	83 30 08.1
Road crossing northeast and southwest.	40 47 09.0	83 29 49.4
T. 3 S., R. 12 E., corner secs. 28, 29, 32, and 33.	40 44 41.7	83 29 48.7
T. 4 S., R. 12 E., corner secs. 8, 9, 16, and 17.	40 42 04.8	83 29 45.7
T. 4 S., R. 12 E., corner secs. 20, 21, 28, and 29.	40 40 19.4	83 29 45.1
Ts. 4 and 5 S., R. 12 E., corner secs. 4, 5, 32, and 33.	40 38 34.0	83 29 46.3
Roads north, east, and west.	40 37 24.1	83 30 57.4
Henpeck schoolhouse, road crossing at	40 38 04.5	83 33 09.0
Corner secs.	40 38 39.2	83 34 34.0
Kenton, 1.5 miles west of, crossing of Big Four Railway.	40 38 48.3	83 38 20.6
Kenton, 4.5 miles west of, crossing of Big Four Railway.	40 39 30.7	83 40 30.2
Big Four Railway and north and south road crossing.	40 40 09.6	83 42 28.9
T. 3 S., R. 10 E., corner secs. 5, 6, 31, and 32.	40 43 57.2	83 44 52.6
T. 3 S., R. 10 E., corner secs. 19, 20, 29, and 30.	40 45 42.4	83 44 52.2
T. 3 S., R. 10 E., corner secs. 7, 8, 17, and 18.	40 47 26.6	83 44 51.7
Ts. 2 and 3 S., R. 10 E., $\frac{1}{4}$ corner between secs. 5 and 32.	40 49 08.9	83 44 16.5
T. 2 S., R. 10 E., corner secs. 19, 20, 29, and 30.	40 50 53.5	83 44 48.9
T. 2 S., R. 10 E., corner secs. 7, 8, 17, and 18.	40 52 38.5	83 44 48.2
Ts. 1 and 2 S., R. 10 E., corner secs. 5, 6, 31, and 32.	40 54 25.5	83 44 47.7
T. 1 S., R. 10 E., corner secs. 19, 20, 29, and 30.	40 56 10.3	83 44 47.6
T. 1 S., R. 10 E., corner secs. 7, 8, 17, and 18.	40 57 55.2	83 44 48.4
T. 1 S., R. 10 E., corner secs. 5, 6, 7, and 8.	40 58 47.7	83 44 48.0

Geographic positions along highways from a position near southwest corner of the Findlay quadrangle west to meridian $84^{\circ} 00'$, thence north to Ohio-Michigan boundary line, thence west to longitude $84^{\circ} 15'$, thence south to Erie Railroad, thence southeast along railroad to Foraker.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Findlay, about 5 miles southwest of, Lake Erie and Western Railroad crossing	40 58 54.1	83 44 47.9
Ts. 1 N. and 1 S., Rs. 9 and 10 E., corner secs. 1, 6, 31, and 36	40 59 36.5	83 45 56.3
Ts. 1 N. and 1 S., R. 9 E., corner secs. 3, 4, 33, and 34	40 59 35.9	83 49 23.1
Ts. 1 N. and 1 S., R. 9 E., corner secs. 5, 6, 31, and 32	40 59 35.4	83 51 41.3
Ts. 1 N. and 1 S., R. 8 E., corner secs. 1, 2, 35, and 36	40 59 35.1	83 53 59.1
Ts. 1 N. and 1 S., R. 8 E., corner secs. 3, 4, 33, and 34	40 59 34.7	83 56 17.5
Ts. 1 N. and 1 S., R. 8 E., corner secs. 5, 6, 31, and 32	40 59 34.0	83 58 36.2
T. 1 N., Rs. 7 and 8 E., corner secs. 7, 18, 13, and 12	41 03 02.2	83 59 45.5
T. 2 N., Rs. 7 and 8 E., corner secs. 25, 30, 31, and 36	41 05 40.1	83 59 46.5
T. 2 N., Rs. 7 and 8 E., corner secs. 18, 19, 24, and 13	41 07 24.8	83 59 47.5
T. 2 N., Rs. 7 and 8 E., corner secs. 1, 6, 7, and 12	41 09 09.5	83 59 48.0
T. 3 N., Rs. 7 and 8 E., corner secs. 25, 30, 31, and 36	41 10 53.0	83 59 49.0
T. 3 N., Rs. 7 and 8 E., corner secs. 18, 19, 24, and 13	41 12 37.6	83 59 50.2
T. 3 N., Rs. 7 and 8 E., corner secs. 1, 6, 7, and 12	41 14 22.2	83 59 51.2
Ts. 3 and 4 N., Rs. 7 and 8 E., corner secs. 1, 6, 31, and 36	41 15 15.1	83 59 52.1
T. 4 N., Rs. 7 and 8 E., corner secs. 19, 30, 24, and 25	41 16 59.4	83 59 54.0
T. 4 N., R. 7 E., corner secs. 7, 18, 13, and 12	41 18 44.4	83 59 56.0
Ts. 4 and 5 N., R. 7 E., corner secs. 1, 6, 31, and 36	41 20 30.1	83 59 58.2
T. 5 N., Rs. 7 and 8 E., corner secs. 19, 30, 24, and 25	41 22 14.9	83 59 57.7
T. 5 N., R. 7 E., corner secs. 7, 18, 13, and 12	41 23 59.3	83 59 57.0
Iron bridge over creek southeast, center of	41 25 59.1	83 59 56.0
T. 6 N., Rs. 7 and 8 E., corner secs. 19, 30, 24, and 25	41 27 26.9	83 59 55.6
T. 6 N., R. 7 E., corner secs. 7, 18, 13, and 12	41 29 11.3	83 59 55.2
Ts. 6 and 7 N., R. 7 E., $\frac{1}{2}$ corner between secs. 1 and 36	41 30 55.6	84 00 30.1
Ts. 7 and 8 N., Rs. 7 and 8 E., corner secs. 1, 6, 31, and 36	41 36 10.1	83 59 54.1
Ts. 9 and 10 S., Rs. 3 and 4 E., corner secs. 1, 6, 31, and 36	41 38 30.9	83 59 45.2
T. 9 S., Rs. 3 and 4 E., corner secs. 24, 19, 30, and 25	41 40 13.8	83 59 48.6
T. 9 S., R. 3 E., corner secs. 7, 18, 13, and 12	41 41 57.2	83 59 52.5
T. 9 S., R. 3 E., corner secs. 1, 6, 7, and 12	41 42 49.8	83 59 54.0
T. 9 S., R. 3 E., corner secs. 2, 3, 10, and 11	41 42 50.3	84 02 13.2
T. 9 S., R. 3 E., corner secs. 5, 6, 7, and 8	41 42 47.3	84 05 43.1
Ohio-Michigan State line	41 42 46.4	84 07 10.1

Geographic positions along highways from a position near southwest corner of the Findlay quadrangle, etc.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Schoolhouse, road crossing at	41 42 14.7	84 08 37.0
T. 9 S., R. 2 E., corner secs. 3, 4, 9, and 10, on State line	41 42 30.3	84 10 21.9
T. 9 S., R. 2 E., corner secs. 8, 9, 16, and 17	41 41 48.4	84 11 30.4
T. 9 S., Rs. 1 and 2 E., corner secs. 7, 18, 13, and 12	41 41 47.2	84 13 48.7
T. 9 S., R. 1 E., corner secs. 13, 14, 23, and 24	41 40 54.3	84 14 55.6
T. 9 S., R. 1 E., corner secs. 25, 26, 35, and 36	41 39 08.9	84 14 54.3
T. 10 S., R. 1 E., corner secs. 1, 2, 11, and 12	41 37 24.0	84 14 52.0
T. 7 N., R. 5 E., corner secs. 1, 2, 11, and 12	41 35 12.2	84 14 56.0
T. 7 N., R. 5 E., corner secs. 13, 14, 23, and 24	41 33 27.7	84 14 55.5
T. 6 N., R. 5 E., corner secs. 1, 2, 11, and 12	41 30 00.5	84 14 53.6
T. 6 N., R. 5 E., corner secs. 13, 14, 23, and 24	41 28 16.1	84 14 52.8
Ridgeville corners, crossroads at	41 26 15.8	84 15 26.0
T. 5 N., R. 5 E., corner secs. 1, 2, 11, and 12	41 24 46.9	84 14 50.7
T. 5 N., R. 5 E., corner secs. 13, 14, 23, and 24	41 23 02.3	84 14 49.3
T. 5 N., R. 5 E., corner secs. 25, 26, 35, and 36	41 21 17.6	84 14 48.0
T. 4 N., R. 5 E., corner secs. 1, 2, 11, and 12	41 19 32.5	84 14 48.0
T. 4 N., R. 5 E., corner secs. 13, 14, 23, and 24	41 17 48.2	84 14 48.0
T. 4 N., R. 5 E., corner secs. 25, 26, 35, and 36	41 16 03.8	84 14 47.9
Ts. 3 and 4 N., R. 5 E., corner secs. 1, 2, 35, and 36	41 15 11.5	84 14 47.8
T. 3 N., R. 5 E., corner secs. 11, 12, 13, and 14	41 13 26.1	84 14 48.6
T. 3 N., R. 5 E., corner secs. 23, 24, 25, and 26	41 11 41.7	84 14 49.8
Ts. 2 and 3 N., R. 5 E., corner secs. 1, 2, 35, and 36	41 09 57.3	84 14 50.2
T. 2 N., R. 5 E., corner secs. 11, 12, 13, and 14	41 08 13.0	84 14 49.7
T. 2 N., R. 5 E., corner secs. 23, 24, 25, and 26	41 06 28.1	84 14 48.4
Ts. 1 and 2 N., R. 5 E., corner secs. 1, 2, 35, and 36	41 04 43.4	84 14 47.2
T. 1 N., Rs. 5 and 6 E., corner secs. 1, 6, 7, and 12	41 03 52.0	84 13 37.7
T. 1 N., Rs. 5 and 6 E., corner secs. 25, 30, 31, and 36	41 00 22.3	84 13 35.9
T. 1 S., Rs. 5 and 6 E., corner secs. 1, 6, 7, and 12	40 58 37.0	84 13 34.3
T. 1 S., R. 5 E., corner secs. 11, 12, 13, and 14	40 57 42.6	84 14 39.7
T. 1 S., R. 5 E., corner secs. 23, 24, 25, and 26	40 55 58.8	84 14 39.5
Ts. 1 and 2 S., R. 5 E., corner secs. 1, 2, 35, and 36	40 54 14.5	84 14 38.1
T. 2 S., R. 5 E., corner secs. 13, 14, 23, and 24	40 51 35.6	84 14 37.5
T. 2 S., R. 5 E., corner secs. 25, 26, 35, and 36	40 49 51.9	84 14 37.2
T. 3 S., R. 5 E., corner secs. 1, 2, 11, and 12	40 48 07.8	84 14 36.3
T. 3 S., R. 5 E., corner secs. 13, 14, 23, and 24	40 46 23.6	84 14 35.0
T. 3 S., R. 5 E., corner secs. 25, 26, 35, 36	40 44 38.5	84 14 33.3
Ts. 3 and 4 S., R. 5 E., corner secs. 1, 2, 35, and 36	40 43 46.1	84 14 32.8

Geographic positions along Erie Railroad from Kemp to Foraker.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Kemp station (Kempton post-office)	40 43 25.6	84 13 27.6
Road crossing, northeast and southwest	40 43 33.9	84 09 19.0
Lima station	40 43 26.4	84 06 21.9
Ohio Southern Railroad crossing	40 43 26.5	84 05 10.5
T. 4 S., R. 7 E., corner secs. 3, 4, 9, and 10	40 43 00.7	84 03 06.3
T. 4 S., Rs. 7 and 8 E., corner secs. 1, 6, 7, and 12 ..	40 42 59.7	83 59 38.7
Westminster station	40 42 57.2	83 59 35.3
Harrod station	40 42 33.9	83 55 15.9
Algers station	40 42 19.1	83 50 37.6
T. 4 S., R. 9 E., corner secs. 8, 7, 16, and 17	40 42 14.1	83 50 31.5
McGuffey station	40 41 40.1	83 47 05.3
Foraker station	40 40 46.6	83 44 21.8

Geographic positions for control of Westerville quadrangle.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Columbus, Mock road crossing	40 00 54.0	82 59 47.9
Road northeast and southwest (electric railway) ..	40 00 49.5	82 58 03.2
Cleveland, Akron and Columbus Railway crossing (azimuth of railway 194° 09')	40 00 49.1	82 57 54.3
Road north and south	40 00 47.7	82 57 24.1
Alum Creek, south end of bridge	40 00 34.7	82 56 06.5
Road north and south	40 01 13.3	82 54 41.5
Road north and south	40 01 08.7	82 53 03.1
Gehanna, center of bridge over Big Walnut River ..	40 01 08.3	82 52 48.7
T. 1, Rs. 16 and 17, secs. 1, 2, 3, 4, corner of road north and south	40 01 06.2	82 52 00.1
District No. 11, schoolhouse	40 01 02.9	82 50 39.4
T. 1, R. 16, corner secs. 2, 1, 4, 3	40 00 57.6	82 49 08.0
Havens Corners, crossroads	40 01 10.4	82 48 54.3
Road north and south, at schoolhouse	40 01 09.6	82 47 23.4
Franklin-Licking county line, road north	40 01 06.0	82 46 13.4
Squire Swishers, road north and south	40 00 56.6	82 45 00.6
Road east and west	40 02 33.8	82 44 51.9
Road east and west	40 03 07.4	82 44 51.1
Intersection, road north and road east and west, south of schoolhouse	40 03 02.0	82 45 20.8
Bridge	40 03 40.2	82 45 18.0
Beech, crossroads	40 04 46.2	82 45 13.3
Road east and west	40 05 50.6	82 45 14.6

Geographic positions for control of Westerville quadrangle—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Bridge over branch running west	40 06 34.0	82 45 11.6
Intersection of road north and Johnstown road northeast and southwest	40 07 27.6	82 45 07.5
Licking, Franklin, and Delaware counties, corner of; also corner Ts. 2 and 3, Rs. 15 and 16, secs. 2, 3, 4, 1	40 07 33.8	82 45 43.0
Road west at schoolhouse	40 08 19.9	82 45 39.6
Road east and west and southeast	40 09 22.6	82 45 34.8
Road east	40 10 17.9	82 45 30.8
Road north near Clem Blamer's house	40 10 14.4	82 44 18.6
Road northwest and southeast	40 10 45.2	82 44 16.2
Road east and west	40 12 27.1	82 44 24.4
Wm. Feasels, crossroads	40 13 56.8	82 44 17.7
Delaware-Licking county line, road north and south	40 13 59.0	82 45 15.3
Road north	40 13 57.7	82 47 24.1
South Condit, crossroads	40 14 52.9	82 47 20.4
Road north	40 14 44.8	82 49 48.5
Cleveland, Akron and Columbus crossing (azimuth of railway 253° 00')	40 14 47.4	82 50 42.3
Big Walnut Creek, center of bridge	40 14 48.6	82 50 59.3
Sunbury, Harrison street and Mount Vernon road, at Dr. Vankirk's	40 14 42.3	82 51 14.5
Road northwest and southeast	40 14 44.4	82 51 53.6
Road west to Rome	40 15 01.5	82 52 18.6
T. 4, R. 17, secs. 1, 2, 3, 4, corner of	40 14 46.2	82 53 40.0
Rome, intersection of roads at guidepost	40 14 48.1	82 54 38.7
Johnny Cake schoolhouse, road north and south	40 14 17.0	82 56 22.7
Cheshire, road north	40 14 19.9	82 57 41.0
Cheshire, Whitman's store	40 14 20.1	82 57 45.3
Cheshire, 1 mile west of, station on Green Spring and Columbus line	40 14 22.4	82 58 45.8
District No. 7, schoolhouse, road south	40 14 24.9	83 00 22.7
Big Four Railway crossing (azimuth 176° 56')	40 14 26.0	83 00 46.2
Columbus-Delaware road	40 14 31.9	83 03 05.7
Intersection of roads north and south and west (about 800 feet below bridge over Olentangy River)	40 15 10.4	83 03 46.7
T. 4, R. 19, secs. 1, 2, 3, 4, corner of, road north and south	40 15 12.1	83 04 56.4
Hocking Valley Railway road crossing, 340 feet south of milepost 103	40 15 12.6	83 05 08.5

Geographic positions for control of Mount Sterling quadrangle.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Mount Sterling, Main street crossing Baltimore and Ohio Railroad (Hawkins traverse, 1900)	39 43 17.6	83 16 03.7
Mount Sterling, road southwest to Washington Court-House	39 42 59.3	83 16 06.2
Fayette-Madison county line	39 41 47.3	83 16 16.4
Jones schoolhouse No. 5, center of road	39 40 51.0	83 16 16.6
Old Yankeetown, east and west road	39 39 41.1	83 16 05.8
Schoolhouse No. 2, road	39 38 50.6	83 16 16.3
Waterloo, in front of Methodist Church	39 37 24.7	83 15 55.5
Fayette-Pickaway county line, stone monument	39 37 01.4	83 15 31.0
Road north and south	39 36 09.4	83 16 04.9
Bridge near Chauncey Dicks	39 35 29.9	83 15 56.0
Pike, northwest and southeast	39 34 08.0	83 16 13.5
Pickaway and Fayette counties, road on line of	39 33 32.8	83 15 46.9
New Holland, Main street crossing Cincinnati and Muskingum Valley Railroad	39 33 15.8	83 15 26.2
Road southwest	39 31 31.2	83 14 43.9
Ross-Pickaway county line	39 30 55.6	83 14 56.7
Schoolhouse No. 9, intersection of roads	39 30 15.2	83 15 03.4
Brick schoolhouse, District No. 10, crossroads	39 28 53.5	83 14 45.9
Plano post-office	39 29 27.2	83 17 07.2
Fairview, road crossing Cincinnati, Hamilton and Dayton Railway (azimuth 282° 58')	39 28 48.5	83 18 15.6
Fairview church, road north	39 28 42.1	83 19 19.8
Road north and south	39 28 49.6	83 20 14.1
Pleasant Grove, southwest corner schoolhouse yard, road north	39 30 02.2	83 21 36.6
Blacksmith shop, road north and south	39 30 32.8	83 22 39.8
Bridge over drain south	39 30 50.6	83 23 57.1
Washington Court-House, north end of bridge over Middle Fork Paint Creek, 1 mile south of	39 31 04.4	83 25 01.5
Ohio Southern Railway crossing near trestle, 480 feet southeast of milepost 102	39 30 55.1	83 25 06.5
Washington Court-House, crossroads on Greenfield pike, 2 miles south of	39 30 34.2	83 26 28.8
Leesburg pike, north and south	39 30 16.3	83 28 22.3
Snow Hill pike, Ingles schoolhouse, 20 feet north	39 30 19.6	83 29 43.1
Jasper Mills, Baltimore and Ohio Railroad crossing, $\frac{1}{4}$ mile east of (azimuth 253° 36')	39 31 19.1	83 30 27.0
Sugar Creek church, intersection of Palmer pike, east and west and road north, about 300 feet west of	39 32 54.1	83 30 27.5
Johnstown schoolhouse	39 33 59.5	83 30 19.6
Township line, stone post	39 34 26.5	83 30 46.4

Geographic positions for control of Mount Sterling quadrangle—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Luray siding Cincinnati, Hamilton and Dayton Railway, east switch block	39 34 36.3	83 30 51.6
Hagler, Ohio Southern Railroad crossing	39 35 16.8	83 30 55.7
Washington-Jefferson pike, northwest and south- east	39 35 41.1	83 30 46.2
Blackoak schoolhouse, platform in front of	39 36 08.6	83 30 29.8
Paint Creek, west end of bridge over	39 37 10.1	83 29 17.2
McDill's blacksmith shop, road east and west	39 38 58.3	83 30 01.1
Paint Creek, center of bridge over	39 39 35.3	83 30 16.7
Paint Creek, south end of iron bridge over	39 39 49.9	83 30 17.2
Pike, west, at small bridge	39 40 31.3	83 30 15.7
Maple Grove schoolhouse	39 41 47.6	83 30 15.2
Fayette-Madison County, stone monument	39 42 29.9	83 30 10.1
Hayes schoolhouse, road east and west	39 42 51.4	83 29 52.4
Sedalia, Ohio Southern Railroad crossing, $\frac{1}{4}$ mile southwest of	39 43 28.7	83 29 17.4
Sedalia, South Solon pike, east and west	39 44 01.4	83 29 06.5
Sedalia, intersection Main street and road east and west	39 44 00.5	83 28 36.7
Bridge over creek northeast	39 43 55.9	83 25 45.2
Range, London pike northwest	39 43 55.5	83 25 31.7
Bethel, M. E. Church, crossroads at	39 43 48.8	83 23 37.4
Bridge over branch south	39 43 52.0	83 22 16.6
Chenowith, road north	39 43 51.6	83 21 25.1
Sugar Run bridge	39 43 49.7	83 19 53.9
Road south at schoolhouse	39 43 48.8	83 19 11.5
Mount Sterling, London pike, $\frac{1}{4}$ mile north of	39 43 48.7	83 16 17.2
Stokes-Range township monument	39 44 02.8	83 30 07.8
Sedalia, 2 miles west of, center of South Solon pike, in front of Jim Chapman's gate	39 43 59.8	83 31 02.3

Geographic positions between Green Spring and Columbus, along or near the eighty-third meridian.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 3 N., R. 16 E., corner secs. 3, 2, 11, and 10	41 14 29.4	82 59 40.2
T. 3 N., R. 16 E., coner secs. 10, 11, 14, and 15, road east and west	41 13 37.0	82 59 40.6
T. 3 N., R. 16 E., corner secs. 15, 14, 23, and 22, road east and west	41 12 44.7	82 59 41.4
T. 3 N., R. 16 E., corner secs. 22, 23, 26, and 27, road east and west, schoolhouse	41 11 51.4	82 59 42.2

Geographic positions between Green Spring and Columbus, etc.—Continued.

Station.	Latitude.	Longitude.
T. 3 N., R. 16 E., corner secs. 27, 26, 35, and 34, road east and west	° ' " 41 10 59.4	° ' " 82 59 43.4
Ts. 2 and 3 N., R. 16 E., corner secs. 34, 35, 2, and 3, road east and west (jogs east 50 feet, then turns south)	41 10 08.1	82 59 46.4
T. 2 N., R. 16 E., corner secs. 3, 2, 11, and 10	41 09 12.8	82 59 44.9
T. 2 N., R. 16 E., corner secs. 10, 11, 14, and 15	41 08 20.4	82 59 45.5
T. 2 N., R. 16 E., corner secs. 15, 14, 23, and 22, road east and west	41 07 28.2	82 59 45.6
T. 2 N., R. 16 E., corner secs. 27, 26, 35, and 34, road east and west	41 05 43.5	82 59 45.6
Ts. 1 and 2 N., R. 16 E., corner secs. 34, 35, 2, and 3, road east and west	41 04 51.3	82 59 45.6
T. 1 N., R. 16 E., corner secs. 3, 2, 11, and 10, road east	41 03 57.9	82 59 45.9
T. 1 N., R. 16 E., corner secs. 10, 11, 14, and 15, pike east	41 03 05.5	82 59 46.5
Bloomville, Pennsylvania Railroad crossing, 290 feet east of switch block (azimuth of railway 308° 55')	41 02 40.8	82 59 56.6
T. 1 N., R. 16 E., corner secs. 15, 14, 23, and 22, roads east and west and northwest	41 02 13.3	82 59 46.8
T. 1 N., R. 16 E., corner secs. 22, 23, 26, and 27, road east and west	41 01 21.1	82 59 48.2
T. 1 N., R. 16 E., corner secs. 27, 26, 35, and 34, road east and west	41 00 28.9	82 59 47.8
Ts. 1 N. and 1 S., R. 16 E., corner secs. 34, 35, 2, and 3, road east and west	40 59 36.2	82 59 49.6
T. 1 S., R. 16 E., corner secs. 3, 2, 11, and 10, road east and west	40 58 45.3	82 59 49.7
T. 1 S., R. 16 E., corner secs. 10, 11, 14, and 15, road east and west	40 57 52.9	82 59 49.7
Northern Ohio Railway and road crossing (azimuth west 89° 50')	40 57 26.5	82 59 49.9
T. 1 S., R. 16 E., corner secs. 14, 15, 23, and 22, road east and west	40 57 00.2	82 59 49.9
T. 1 S., R. 16 E., corner secs. 22, 23, 26, and 27, road east and west	40 56 07.9	82 59 50.0
T. 1 S., R. 16 E., corner secs. 27, 26, 35, and 34, road east and west	40 55 15.5	82 59 50.4
Ts. 1 and 2 S., R. 16 E., corner secs. 34, 35, 2, and 3, road east and west	40 54 23.4	82 59 50.8
Broken Sword, cross roads at Ts. 1 and 2 S., R. 16 E., corner secs. 33, 34, 3, 4	40 54 23.3	83 00 59.4
T. 2 S., R. 16 E., corner secs. 3, 4, 10, and 9, road east and west	40 53 30.4	83 00 59.9
T. 2 S., R. 16 E., corner secs. 9, 10, 15, and 16, road east and west	40 52 38.2	83 00 59.9

Geographic positions between Green Spring and Columbus, etc.—Continued.

Station.	Latitude.	Longitude.
T. 2 S., R. 16 E., corner secs. 16, 15, 22, and 21, road east and west, schoolhouse	° ' " 40 51 46.1	° ' " 83 00 59.8
Ohio Central Railway, at road crossing (azimuth 126° 32')	40 50 49.8	83 00 59.5
Ts. 2 and 3 S., R. 16 E., corner secs. 33, 34, 3, and 4	40 49 08.5	83 00 59.4
Bucyrus; Pennsylvania Railroad crossing, 2 miles west of (azimuth 273° 52')	40 48 41.4	83 01 03.2
T. 3 S., R. 16 E., corner secs. 4, 3, 10, and 9, road east and west	40 48 16.3	83 01 02.5
Northeast and southwest pike road and road south	40 47 38.8	82 59 53.4
Marion City, road northeast and southwest	40 46 38.5	82 59 52.7
Columbus, Sandusky & Hocking Railroad crossing (azimuth 34° 22')	40 46 31.7	82 59 14.9
Road east and west	40 44 47.4	82 59 29.9
Ts. 3 and 4 S., R. 16 E., corner secs. 34, 35, 2, and 3, road west	40 43 55.0	82 59 42.5
Road east and west	40 43 03.9	82 59 59.4
Crawford and Marion county line, road east and west	40 42 11.1	83 00 15.6
Kirkpatrick, road east and west	40 41 18.9	83 00 30.7
T. 4 S., R. 16 E., corner secs. 21, 22, 28, and 27, road east and west	40 40 26.3	83 00 53.0
Road east and west	40 39 07.4	83 01 08.7
Erie Railroad crossing (azimuth 248° 04')	40 37 05.3	83 01 44.8
T. 5 S., R. 16 E., $\frac{1}{4}$ corner between secs. 15 and 10	40 36 56.8	83 00 18.4
T. 5 S., R. 16 E., corner secs. 15, 14, 23, and 22	40 36 04.6	82 59 44.1
T. 5 S., R. 16 E., corner secs. 22, 23, 26, and 27, road northeast, due east of	40 35 12.2	82 59 48.5
Road east and west	40 33 43.1	82 59 44.9
T. 6 S., R. 16 E., corner secs. 3, 2, 11, and 10	40 32 34.0	82 59 44.1
T. 6 S., R. 16 E., corner secs. 10, 11, 14, and 15, road east and west	40 31 42.0	82 59 44.2
T. 6 S., R. 16 E., corner secs. 15, 14, 23, and 22, road east and west	49 30 48.9	82 59 43.8
T. 6 S., R. 16 E., corner secs. 22, 23, 26, and 27, road east and west (church)	40 29 56.0	82 59 44.2
Road east and west	40 29 29.7	82 59 44.6
Marion Morrow, county line	40 29 08.1	83 00 25.9
Corner lots 15, 14, 20, and 21, road east and west	40 28 20.1	83 00 27.9
T. 7 N., R. 18 W., corner lots 21, 22, 20, and 19, crossroads	40 27 21.6	83 00 32.0
T. 7 N., R. 18 W., corner lots 12, 9, 8, and 13, road north and south	40 27 18.2	82 59 21.7
Westfield, $\frac{1}{4}$ mile west of, center of bridge over Whetstone River	40 25 56.8	82 59 13.2

Geographic positions between Green Spring and Columbus, etc.—Continued.

Station.	Latitude.	Longitude.
T. 6 N., R. 18 W., corner lots 13, 8, 7, and 14, pike east and west, schoolhouse	° ' " 40 24 43.0	° ' " 83 00 04.2
Crossroads corner lots 15 (turn east)	40 23 49.9	83 00 10.6
Schoolhouse (turn south)	40 23 48.8	82 59 40.7
Leonardsburg, 840 feet northeast of Big Four station	40 21 34.5	82 59 14.5
Leonardsburg, 1 mile southwest of, road crossing ..	40 20 39.4	82 59 50.3
Road northeast and southwest	40 19 58.3	82 59 53.5
Corner lots 19, 12, 11, and 20	40 19 53.7	82 59 53.5
Big Four Railway crossing	40 19 53.6	83 00 33.0
T. 5 N., R. 18 W., sec. 3, lots 22 and 23, (Edin-Delaware Pike northeast and southwest)	40 18 32.7	83 00 37.8
Pike east and west, where old railroad crosses	40 17 46.6	83 00 59.2
On pike running southeast and northwest, road south	40 17 17.7	83 00 57.2
Road east and west	40 16 08.1	83 00 02.2
Road west to Berlin station	40 15 16.6	82 59 35.1
T. 4 N., R. 18 W., secs. 2, 1, 4, 3	40 14 58.2	82 59 11.9
Cheshire, 1 mile west of, State road north and south ..	40 14 22.4	82 58 45.9
Road east and west	40 12 59.2	82 59 04.8
Road east and west	40 11 54.2	82 59 24.0
T. 3 N., R. 18 W., corner secs 2, 1, 4, 3	40 10 26.2	82 59 31.8
Road east and west	40 09 26.0	82 59 42.3
Road east	40 08 44.7	82 59 58.4
Delaware-Franklin county line, road east	40 08 10.2	83 00 16.4
Crossing under Big Four Railway, turn south on railway	40 08 07.6	83 00 19.0
Flint, road crossing 210 feet north of station	40 07 38.3	83 00 16.9
Road crossing	40 06 33.3	83 00 12.3
Worthington, $\frac{3}{4}$ mile south of, junction Columbus, Sandusky and Hocking Valley and Big Four railways	40 05 10.9	83 00 06.4
Road crossing	40 03 42.0	83 00 00.0
Road crossing	40 01 58.6	82 59 52.6
Mock road crossing, east and west	40 00 54.1	82 59 47.9
Columbus, intersection North Fourth street and Wyandotte avenue	40 00 36.3	82 59 53.4
Columbus, intersection North High street and West Lane avenue	40 00 21.9	83 00 33.8

Geographic positions along highways from Oak Harbor west to about meridian 83° 15', thence south following near said meridian to about parallel 41° 15' thence east following near said parallel to a point nearly south of the United States Lake Survey triangulation station Townsend.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Oak Harbor station, 700 feet east of, crossing north and south.....	41 31 11.8	83 08 44.4
T. 6 N., R. 14 E., corner secs. 15, 16, 21, and 22, road east and west.....	21 00 00.0 41 28 21.1	83 14 28.4
Road east and west.....	41 27 54.9	
Road east.....	41 26 37.0	83 14 26.5
Lake Shore Railway (azimuth 314° 41' 20'')	41 25 58.1	83 14 25.8
T. 5 N., R. 14 E., corner secs. 3, 4, 9, and 10, road east.....	41 24 49.5	83 14 26.4
Hessville, crossing electric railway in southeast part.....	41 24 03.5	83 14 32.6
Road east and west.....	41 22 13.4	83 13 23.8
T. 5 N., R. 14 E., corner secs. 26, 27, 34, and 35, road east and west.....	41 21 21.2	83 13 25.7
Ts. 4 and 5 N., R. 14 E., corner secs. 2, 3, 34, and 35.....	40 20 29.1	83 13 27.9
Corner secs. 2, 3, 10, and 11, road east and west....	41 19 33.0	83 13 32.7
Road east and west.....	41 16 55.3	83 14 07.6
Lake Erie and Western Railroad (azimuth 48° 50')	41 16 37.3	83 14 07.3
Roads north, east, south, and west.....	41 16 02.6	83 14 06.8
Road southwest.....	41 16 05.6	83 12 21.8
Road northeast.....	41 16 17.2	83 12 08.6
Road north, south, east, and west.....	41 15 43.4	83 11 16.4
Road north and south.....	41 15 45.1	83 10 04.8
T. 4 N., R. 15 E., center section 33.....	41 15 47.7	83 08 26.4
T. 4 N., R. 15 E., $\frac{1}{4}$ corner between secs. 33 and 34.....	41 15 48.7	83 07 52.5
Ts. 3 and 4 N., R. 15 E., corner secs. 3, 4, 33, and 34.....	41 15 22.1	83 07 53.9
Ts. 3 and 4 N., R. 15 E., corner secs. 2, 3, 34, and 35, road north.....	41 15 22.9	83 06 44.3
Ts. 3 and 4 N., R. 15 E., corner secs. 1, 2, 35, and 36, road north and south.....	41 15 23.5	83 05 31.4
Ts. 3 and 4 N., Rs. 15 and 16 E., corner secs. 1, 6, 31, and 36, road north.....	41 15 23.7	83 04 21.9
Ts. 3 and 4 N., R. 16 E., corner secs. 5, 6, 31, and 32.....	41 15 23.3	83 03 15.6
Green Spring, crossing main street.....	41 15 23.2	83 03 07.4
Big Four Railway crossing (azimuth 227° 28')	41 15 22.8	83 02 52.5
Ts. 3 and 4 N., R. 16 E., corner secs. 3, 4, 33, and 34.....	41 15 20.2	83 00 49.1
New York, Chicago and St. Louis Railroad crossing.....	41 15 20.1	83 00 46.8
Ts. 3 and 4 N., R. 16 E., corner secs. 2, 3, 34, and 35, road south.....	41 15 20.2	82 59 39.5

Geographic positions along highways from Oak Harbor, etc.—Continued.

Station.	Latitude.	Longitude.
Ts. 3 and 4 N., R. 16 E., corner secs. 1, 2, 35, and 36, road north and south	° ' " 41 15 20.4	° ' " 82 58 30.6
Ts. 3 and 4 N., Rs. 16 and 17 E., corner secs. 1, 6, 31, and 36, road north and south	41 15 20.2	82 57 21.1
Ts. 3 and 4 N., R. 17 E., corner secs. 5, 6, 31, and 32, road north and south	41 15 20.0	82 56 11.4
Ts. 3 and 4 N., R. 17 E., corner secs. 4, 5, 32, and 34, road north and south	41 15 19.6	82 55 02.1
Ts. 3 and 4 N., R. 17 E., corner secs. 3, 4, 33, and 34, road north and south	41 15 19.2	82 52 52.2
Road northeast and southwest	41 15 18.7	82 52 19.1
Road north and south	41 15 18.5	82 51 32.5
Hocking Valley Railway (azimuth 207° 25')	41 15 18.3	82 50 48.6
Road north and south	41 14 49.8	82 48 09.2
Lake Shore Railway (azimuth 307° 31')	41 15 34.5	82 46 58.4
Road north and south	41 15 34.6	82 45 50.9
Road northwest	41 15 21.8	82 44 43.4
Monroeville, north part of, Baltimore and Ohio Railroad crossing	41 15 02.5	82 41 52.2
Road northeast and southwest	41 15 00.8	82 41 04.0
Road north and south	41 14 59.5	82 39 55.2
Norwalk, corner Whittsey and Washington streets	41 14 58.7	82 37 12.6
Norwalk, junction Lake Erie and Lake Shore railways	41 14 52.4	82 36 09.6
T. 3 N., R. 22 E., corner secs. 1, 2, 3, and 4	41 14 58.9	82 35 25.8
Road north and south	41 14 58.0	82 33 57.6
Road north and south	41 14 56.7	82 31 58.0
Road north and south	41 14 53.5	82 29 30.8
Townsend, United States Lake Survey triangulation station	41 15 43.5	82 29 00.6

Geographic positions from Townsend triangulation station eastward along or near parallel $41^{\circ} 15'$ to meridian $82^{\circ} 15'$, thence northward to Brownhelm triangulation station of the United States Lake Survey.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road north and south	41 14 51.6	82 28 01.8
T. 4 N., Rs. 20 and 21 W., corner secs. 1, 2, 3, and 4	41 14 50.7	82 26 32.6
Wakeman, road north through center of	41 14 51.0	82 24 08.4
T. 4 N., R. 20 W., corner secs. 1, 2, 3, and 4	41 14 51.5	82 23 31.1
Road north and south	41 14 16.8	82 21 40.8
Road north	41 14 16.5	82 20 50.5
Road north	41 14 15.7	82 19 56.3
T. 4, R. 19, lots 29, 28, 4, and 5, corner between sub-districts 3 and 4	41 14 15.3	82 18 16.2
Road north and south	41 14 15.3	82 17 22.8
T. 4 N., Rs. 18 and 19, corner between subdistricts 3 and 4	41 14 14.7	82 16 06.9
Road north and south	41 14 14.1	82 15 23.1
T. 4, R. 18, T. lots 75, 76, 85, and 86, Center Pittsfield	41 14 13.4	82 13 07.1
Crossing electric railway, run north on railway	41 14 13.4	82 13 06.8
Road east and west	41 15 55.6	82 13 03.0
Crossing Lake Shore Railway	41 16 53.1	82 14 12.6
Road east and west	41 17 40.6	82 14 19.0
T. 5, R. 18, corner lots 53, 54, 63, and 64, road east ..	41 18 32.3	82 14 17.1
South Amherst, cross roads at	41 21 27.2	82 14 26.0
Crossing Lake Shore at stone quarry No. 6	41 22 09.7	82 15 11.0
Crossing Lake Shore at stone quarry No. 6	41 22 14.1	82 15 10.9
Cross roads	41 22 42.8	82 15 10.6
Shore Rice, in front of machine shop	41 22 46.3	82 15 26.9
T. 6, R. 19, corner lots 38, 39, 42, and 43, Brownhelm post-office	41 23 20.9	82 16 58.1
Brownhelm, United States Lake Survey triangulation station	41 23 18.5	82 18 28.8

ALABAMA.

PRIMARY TRAVERSE.

The following geographic positions were determined from primary traverse in 1901 by Mr. George T. Hawkins, topographer. The line starts from United States Coast and Geodetic Survey triangulation station Kahatchee and follows the Central of Georgia Railway to Opelika, thence by the Western Railway of Alabama to Montgomery and connected with the capitol dome.

Geographic positions along Central of Georgia Railway.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Zuber, road crossing at	33 13 55.8	86 18 02.0
Sylacauga, crossing of Louisville and Nashville Railroad	33 10 25.0	86 15 01.9
Trammels, road crossing at	33 07 23.7	86 12 05.4
Hollins station	33 07 03.2	86 09 05.3
Parkdale, road crossing at	33 05 52.5	86 06 42.0
Goodwater station	33 03 51.8	86 03 06.0
Milepost 85, road crossing 900 feet north of	33 02 17.7	86 02 06.4
Milepost 84, road crossing 1,400 feet north of	33 01 32.6	86 01 56.8
Milepost 84, road crossing 550 feet south of	33 01 14.2	86 02 03.7
Siding, road crossing 500 feet south of	33 00 32.9	86 02 00.3
Mileposts 82 and 83, road crossing between	33 00 00.2	86 01 58.6
Kellyton station	32 58 48.6	86 01 55.9
Kellyton, road crossing $\frac{1}{2}$ mile southeast of	32 58 29.0	86 01 33.8
Kellyton, road crossing at county line southeast of	32 58 04.3	86 00 13.2
Milepost 78, road crossing 400 feet north of	32 57 31.1	85 59 32.6
Alexander, main street crossing at	32 56 42.1	85 57 12.0
Milepost 71, road crossing $\frac{1}{2}$ mile south of	32 55 12.0	85 54 16.2
Tallapoosa bridge, northeast end of ironwork	32 54 51.6	85 52 48.9
Tallapoosa bridge, southeast end of ironwork	32 54 46.0	85 52 42.9
Sturdevant station	32 54 32.2	85 52 33.3
Jacksons Gap, road crossing at	32 53 13.7	85 48 40.9
Milepost 63, road crossing south of	32 53 07.4	85 47 10.4
Section line, east and west, road crossing on	32 52 41.7	85 46 39.5
Mileposts 61 and 62, road crossing between	32 52 28.9	85 46 26.1
Dadeville, main street crossing	32 50 06.3	85 45 24.3
Siding, road crossing at	32 49 21.2	85 41 39.7
Campbell, road crossing at	32 48 01.6	85 39 10.4
Campbell station	32 47 59.1	85 39 10.6
Ross, road crossing $\frac{1}{2}$ mile southeast of	32 46 35.4	85 38 00.6
Milepost 46, road crossing at	32 45 32.3	85 36 25.3
County line, north and south road crossing at	32 45 32.2	85 35 35.8
Waverly, road crossing at	32 44 08.0	85 34 34.1
Waverly station	32 44 07.8	85 34 33.3
Milepost 41, road crossing near	32 44 00.6	85 32 33.3
Goldhill station	32 43 25.8	85 30 29.2
Milepost 37, road crossing $\frac{1}{2}$ mile southeast of	32 42 22.4	85 28 39.8
Aubrey, road crossing at	32 40 02.4	85 27 14.5

Geographic positions along Western Railway of Alabama.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Opelika, point on Western Railway of Alabama 15 feet east of water tank.....	32 38 25.5	85 23 23.7
Auburn, road crossing east of.....	32 36 37.1	85 28 48.0
Auburn station.....	32 36 36.3	85 28 51.6
Milepost 55, road crossing $\frac{1}{4}$ mile west of.....	32 35 58.5	85 32 54.7
Loachapoka station.....	32 36 14.4	85 35 54.6
Mileposts 51 and 52, road crossing between.....	32 36 15.1	85 36 06.0
Milepost 49, road crossing $\frac{1}{4}$ mile west of.....	32 35 26.5	85 38 30.6
Notasulga station.....	32 33 41.9	85 40 11.1
Milepost 41, road crossing 550 feet southwest of.....	32 29 34.6	85 41 47.0
Chehaw station.....	32 28 52.8	85 42 50.9
Clough, road crossing at.....	32 28 53.4	85 45 48.9
Franklin, road crossing at.....	32 28 42.9	85 47 58.6
Franklin station.....	32 28 41.3	85 48 10.9
Cowles station.....	32 27 52.4	85 51 56.6
Cowles, crossing at.....	32 27 50.1	85 51 59.2
Milstead station.....	32 26 34.1	85 53 50.5
Milepost 27, crossing near.....	32 26 26.0	85 54 33.2
Shorter station.....	32 24 55.0	85 58 00.6
Clietts station.....	32 24 07.0	85 59 52.0
Mount Meigs station.....	32 23 55.4	86 06 28.6
Milepost 9, road crossing $\frac{1}{4}$ mile east of.....	32 25 01.3	86 11 17.9
Sevenmile siding, north and south road crossing near west end of.....	33 25 32.9	86 13 29.4
Mileposts 3 and 4, gravel road crossing between.....	32 35 23.1	86 17 03.2
Montgomery, capitol dome at.....	32 22 39.9	86 18 01.8

INDIANA-ILLINOIS.

PRIMARY TRAVERSE.

The following geographic positions were determined by primary traverse by Mr. George T. Hawkins, topographer, in August, 1901.

The line starts from an adjusted position established by primary traverse in 1899 near Evansville, and follows the Evansville and Terre Haute Railroad to Vincennes, where it was tied to the Coast and Geodetic Survey astronomic pier. From a point on this line at Princeton, Ind., a line was run along the Air Line Railroad to Mount Carmel, Ill., thence by Louisville and Nashville Railroad to Evansville, Ind., and tied to original point.

Geographic positions along the Evansville and Terre Haute Railroad, from Evansville to Vincennes.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Junction point (1899).....	37 58 56.0	87 32 14.5
T. 6, R. 10, $\frac{1}{4}$ corner secs. 16 and 21.....	37 59 35.7	87 32 14.1
Church, $\frac{1}{2}$ mile northwest of, section corner at road.....	38 03 06.0	87 32 41.2
Inglefield, road crossing at.....	38 06 33.7	87 33 30.7
Inglefield station.....	38 06 36.6	87 33 31.0
T. 5, R. 10 W., corner secs. 5 and 6.....	38 07 27.1	87 33 49.5
Stagers, road crossing at.....	38 08 58.4	87 33 43.3
St. James, road crossing at.....	38 10 57.4	87 34 13.8
Haubstadt station.....	38 12 18.5	87 34 24.1
Fort Branch, corner secs. 13 and 18.....	38 14 47.2	87 34 32.7
Fort Branch station.....	38 14 56.1	87 34 43.7
King, road crossing at.....	38 18 17.5	87 34 31.3
Princeton station.....	38 21 22.3	87 34 24.8
Patoka station.....	38 24 15.4	87 35 11.9
North and south road crossing, telephone line.....	38 26 12.2	87 34 18.7
Hazelton station.....	38 29 20.4	87 32 33.4
Decker station.....	38 31 10.7	87 31 36.3
Siding, road crossing at.....	38 35 39.2	87 31 14.4
Road crossing, telephone line.....	38 37 58.2	87 30 46.0
Vincennes court-house, center of cupola (United States standard).....	38 40 35.2	87 31 37.3
Vincennes, astronomic latitude and longitude station (United States standard).....	38 40 35.7	87 31 35.0

Geographic positions along the Air Line Railroad from Princeton, Ind., to Mount Carmel, Ill.

Station	Latitude.	Longitude.
	° ' "	° ' "
INDIANA.		
Princeton, 4 miles west of, north and south road crossing.....	38 22 17.3	87 39 13.2
North and south road crossing, telephone line.....	38 22 50.0	87 41 10.1
T. 1 S., R. 12 W., corner secs. 27, 28, 33, and 34.....	38 23 36.1	87 44 12.8
ILLINOIS.		
Mount Carmel station, Air Line Railroad.....	38 24 16.2	87 45 25.7

Geographic positions along Big Four Railway from Mount Carmel to Carmi, Ill.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Air Line and Big Four Railway Junction, point 300 feet southwest of, on Big Four Railway	38 24 34.2	87 46 27.8
T. 1 S., R. 12 W., center sec. 30	38 24 06.2	87 47 13.9
Schrodt's, road crossing at	38 22 59.6	87 49 21.3
Keen station	38 21 08.8	87 52 02.6
T. 2 S., R. 13 W., $\frac{1}{4}$ corner between secs. 18 and 19	38 20 04.8	87 54 00.0
Cowling station	38 18 41.2	87 56 13.1
Grayville station, Big Four Railway	38 15 36.9	87 59 29.4
Grayville, crossing at ferry	38 15 27.7	87 59 27.7
Calvin, $\frac{1}{4}$ mile northeast of, corner on township line	38 12 59.6	88 00 38.8
Calvin station	38 12 36.0	88 01 01.7
T. 4. S., Rs. 10 and 11 W., corner secs. 7, 12, 13, and 18	38 11 02.3	88 02 23.5
Crossville station	38 09 50.2	88 03 49.4
Road crossing, north and south	38 08 05.2	88 05 43.7
Carmi, junction of Big Four and Louisville and Nashville Railroads	38 05 47.4	88 09 20.4

*Geographic positions along Louisville and Nashville Railroad from Carmi, Ill., to
Evansville, Ind.*

Station.	Latitude.	Longitude.
	° ' "	° ' "
ILLINOIS.		
Epworth, road crossing at	38 04 17.7	88 06 20.2
T. 5 S., R. 10 W., corner secs. 21, 22, 27, and 28	38 04 05.9	88 05 46.9
Maumee, road crossing at	38 02 10.5	88 02 45.9
INDIANA.		
T. 6 S., R. 14 W., corner secs. 8, 9, 16, and 17	38 00 42.7	87 59 13.8
Section line north and south, road crossing on	37 59 50.4	87 59 13.1
Upton, road crossing at	37 57 49.9	87 57 37.3
Mt. Vernon station	37 56 24.2	87 53 48.3
T. 7 S., R. 13 W., center sec. 3	37 56 40.9	87 51 32.0
Ts. 6 and 7 S., R. 13 W., corner secs. 1, 2, 35, and 36	37 57 05.8	87 49 51.2
Caborus, road crossing at	37 58 19.2	87 47 26.1
T. 6 S., R. 12 W., corner secs. 21, 22, 27, and 28	37 58 46.5	87 45 11.7
St. Phillips, road crossing at	37 58 56.2	87 42 56.9
North Howell, crossing Louisville and Nashville Railroad and street-car line	37 58 21.3	87 36 32.0

Geographic positions along Belt Railway, Evansville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Evansville, crossing Belt Railway and Howell street-car line	37 58 54.9	87 35 24.7
Evansville, crossing Belt and I. C. Railroads	37 59 36.3	87 35 01.8
T. 6, R. 10, corner secs. 16, 17, 20, and 21	37 59 36.5	87 32 47.0

MICHIGAN.

PRIMARY TRAVERSE.

The following geographic positions were determined by primary traverse in 1901 by Mr. George T. Hawkins, topographer.

The line starts from the Presbyterian Church spire at Tecumseh, located by the United States Lake Survey, and follows the Lake Shore and Michigan Southern Railway to Ann Arbor, thence along Ann Arbor Railroad to New Hudson, thence along wagon road to Novi, thence along Pere Marquette Railroad to Detroit, and connected with the United States Lake Survey triangulation station, St. Paul's Church spire.

Geographic positions between Tecumseh and Chelsea.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Tecumseh, Presbyterian Church spire	42 00 15.0	83 56 54.6
T. 5 S., R. 4 E., $\frac{1}{4}$ corner between secs. 8 and 9	42 03 36.3	83 58 01.0
Clinton station, Lake Shore and Michigan Southern Railway	42 04 06.4	83 58 24.1
Ts. 4 and 5 S., township line between	42 04 42.6	83 58 33.0
T. 4 S., R. 4 E., $\frac{1}{4}$ corner between secs. 20 and 29	42 06 27.7	83 58 44.5
River Raisin, crossing at	42 07 19.4	83 58 57.8
T. 3 S., R. 3 E., corner secs. 25, 26, 35, and 36	42 10 35.8	84 01 55.7
T. 3 S., R. 3 E., corner secs. 13, 14, 25, and 26	42 11 29.4	84 01 57.5
Forks of three roads near house	42 14 22.8	84 02 14.7
T. 2 S., R. 3 E., corner secs. 25, 26, 35, and 36	42 15 29.2	84 02 03.2
Forks of road at cemetery	42 16 48.2	84 01 54.3

Geographic positions along Michigan Central Railroad, Chelsea to Ann Arbor.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Chelsea station	42 19 09.7	84 01 10.8
T. 2 S., R. 4 E., corner secs. 3, 4, 9, and 10	42 19 31.1	83 57 32.9
Dexter, crossing under railroad west of	42 20 22.5	83 53 32.8
Dexter station	42 20 25.7	83 53 03.1
Scio, road crossing at	42 19 27.9	83 50 20.2
Delhi station	42 19 49.5	83 48 37.1
Ann Arbor and Michigan Central Railroad crossing	42 17 24.9	83 44 45.3

Geographic positions along or near Ann Arbor Railroad from Ann Arbor to Hamburg.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Ann Arbor, main street crossing	42 17 31.5	83 44 13.7
Ann Arbor, observatory dome	42 16 54.6	83 43 52.9
T. 2 S., R. 6 E., corner secs. 9, 10, 15, and 16	42 18 59.1	83 43 18.9
T. 2 S., R. 6 E., $\frac{1}{4}$ corner north side sec. 4 (?)	42 20 36.6	83 43 58.5
T. 2 S., R. 6 E., $\frac{1}{4}$ corner north side sec. 4 (?)	42 21 28.4	83 44 00.8
T. 1 S., R. 6 E., corner secs. 8, 9, 16, and 17	42 24 04.4	83 44 35.9
Whitmore station	42 25 21.7	83 45 56.9
Ts. 1 S. and 1 N., R. 6 E., corner on base line, 120 feet east of railroad	42 25 43.3	83 46 27.9

Geographic positions along Grand Trunk Railway, Hamburg to Anderson and Anderson to New Hudson.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Hamburg station	42 26 50.2	83 48 02.7
T. 1 N., R. 5 E., $\frac{1}{4}$ corner between secs. 21 and 22 ..	42 27 46.7	83 50 16.9
Grand Trunk and Ann Arbor Railroad crossing ..	42 27 44.6	83 50 30.1
Ann Arbor Railroad, crossing over	42 27 54.1	83 52 03.4
T. 1 N., R. 4 E., $\frac{1}{4}$ corner between secs. 23 and 24 ..	42 27 39.9	83 55 38.0
Pinckney station	42 27 38.2	83 56 31.4
Road crossing, northwest and southeast	42 27 38.3	83 57 45.2
Section road, north and south	42 27 38.3	83 57 57.9
T. 1 N., R. 4 E., corner secs. 17, 18, 19, and 20 ..	42 28 02.7	84 00 21.2
Anderson station	42 28 02.7	84 00 39.4
T. 1 N., R. 6 E., $\frac{1}{4}$ corner between secs. 30 and 31 ..	42 26 29.7	83 46 37.9
Whitmore, road crossing at	42 26 20.5	83 44 43.0
Rushton, road crossing at	42 27 06.7	83 41 45.5
T. 1 N., Rs. 6 and 7 E., $\frac{1}{4}$ corner between secs. 25 and 30 ..	42 27 10.5	83 39 58.2
Grand Trunk and Pere Marquette Railroad crossing ..	42 27 39.0	83 38 46.9
South Lynn station	42 27 39.8	83 38 46.9
T. 1 N., R. 7 E., corner secs 3, 4, 9, and 10	42 30 18.5	83 36 54.8
New Hudson station	42 30 31.4	83 36 43.4

Geographic positions along highways, New Hudson to Novi.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 1 N., R. 7 E., corner secs. 2, 3, 10, and 11	42 30 21.6	83 35 44.6
Road south	42 30 13.7	83 34 49.6
Road north	42 30 09.8	83 34 31.4
Road south	42 29 54.1	83 33 19.8
Road north and south	42 29 38.4	83 32 09.5
Road north and south	42 29 22.2	83 30 55.9
Road north and south	42 29 06.2	83 29 44.3

Geographic positions along the Pere Marquette Railroad, Novi to Detroit.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Novi, road crossing west of	42 28 55.5	83 28 55.9
Novi, road crossing south of	42 28 32.9	83 28 31.3
T. 1 N., R. 8 E., corner secs. 22, 23, 26, and 27	42 27 59.1	83 28 29.3
T. 1 N., R. 8 E., corner secs. 26, 27, 34, and 35	42 27 06.9	83 28 26.7
Road crossing, northwest and southeast	42 23 45.9	83 28 08.0
Plymouth station	42 22 50.0	83 27 42.3
Stark station	42 22 30.7	83 22 51.4
T. 1 S., R. 9 E., $\frac{1}{4}$ corner between secs. 27 and 28 ..	42 22 31.3	83 22 21.6
Elm station	42 22 34.9	83 19 58.1
T. 1 S., Rs. 9 and 10 E., $\frac{1}{4}$ corner between secs. 25 and 30	42 22 37.4	83 18 50.4
Beech station	42 22 40.2	83 17 47.9
Oak junction	42 22 44.5	83 14 16.9
T. 1 S., Rs. 10 and 11 E., $\frac{1}{4}$ corner between secs. 25 and 30	42 22 47.1	83 11 52.7
West Detroit, Michigan avenue crossing	42 19 52.3	83 07 02.2

WISCONSIN.

PRIMARY TRAVERSE.

The following geographic positions were determined by primary traverse by George T. Hawkins, topographer, in 1901. The line starts from the court-house in Milwaukee and follows the Chicago and Northwestern Railway to the north line of Ozaukee County.

Geographic positions along the Chicago and Northwestern Railway, from Milwaukee northward.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Milwaukee court-house dome	43 02 31.8	87 54 18.4
Lakeshore Junction station	43 05 16.9	87 53 40.5
Whitefish Bay station	43 07 04.4	87 54 09.9
Fox Point station	43 09 29.4	87 54 03.3
T. 8, R. 22, corner secs. 4, 5, 8, and 9	43 10 36.1	87 54 18.4
Douges Grove station	43 12 21.8	87 55 06.1
Mequon	43 13 14.9	87 55 09.7
Stone schoolhouse, section corner at	43 17 41.1	87 55 28.9
Ulao station, east and west crossing	43 19 13.5	87 54 58.4
Cedarsburg and Port Washington road, intersection on township line with east and west road ..	43 22 06.7	87 54 02.3
Port Washington station	43 23 14.2	87 52 56.7
Ts. 11 and 12, R. 22, corner of township line between ..	43 27 20.8	87 52 14.1
Belgium station	43 29 55.2	87 51 18.7
Ts. 12 and 13, R. 22, corner of secs. 2, 3, 34, and 35 ..	43 32 34.6	87 50 27.7

MISSOURI.

PRIMARY TRAVERSE.

The following geographic positions were determined by primary traverse in 1901 by Mr. George T. Hawkins, topographer. The line starts from an adjusted position at Kirksville, determined by primary traverse in 1900, and follows the Wabash Railroad to Jacksonville; thence from Macon, along Hannibal and St. Joe Railroad, to Monroe; thence along Missouri, Kansas and Texas Railway to Hartman; thence along Hannibal and St. Joe Railroad to Hannibal, and connected with the United States Mississippi River Commission triangulation station Hannibal.

Geographic positions along Wabash Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Kirksville, Omaha, Kansas City and Eastern Railroad crossing	40 12 05.0	92 35 10.5
T. 62 N., R. 15 W., corner secs. 28, 29, 32, and 33 ..	40 08 22.0	92 35 26.9
Millard station	40 06 26.1	92 32 47.2
T. 61 N., R. 15 W., corner secs. 11, 12, 13, and 14 ..	40 05 44.6	92 32 00.9
T. 61 N., R. 15 W., corner on township line, south side secs. 31 and 32	40 02 14.3	92 29 46.9
Laplata station	40 01 27.2	92 29 23.5
T. 60 N., R. 14 W., corner secs. 17, 18, 19, and 20 ..	39 59 57.9	92 29 37.6

Geographic positions along Wabash Railroad—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 59 N., R. 14 W., $\frac{1}{4}$ corner between secs. 5 and 8.	39 56 26.8	92 29 11.4
Atlanta station	39 53 58.7	92 28 50.6
T. 59 N., R. 14 W., corner on township line, south side secs. 32 and 33	39 52 06.5	92 28 37.9
T. 58 N., R. 14 W., corner secs. 8, 9, 16, and 17	39 50 21.8	92 28 41.1
Ts. 57 and 58 N., township line between	39 46 49.9	92 28 37.8
Macon station, Wabash Railroad	39 44 18.1	92 28 36.5
Hannibal and St. Joe Railroad crossing	39 44 16.4	92 28 36.8
T. 57 N., R. 14 W., $\frac{1}{4}$ corner between secs. 27 and 28.	39 42 58.8	92 27 51.9
Road crossing, east and west	39 40 48.1	92 28 33.7
Excello station	39 38 11.8	92 28 30.0
Ts. 55 and 56 N., corner secs. 3, 4, 33, and 34	39 36 28.6	92 28 09.9
Jacksonville station	39 35 17.4	92 28 15.0

Geographic positions along Hannibal and St. Joe Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Anabel station	39 44 45.1	92 20 04.4
T. 57 N., R. 13 W., corner secs. 10, 11, 14, and 15.	39 45 01.1	92 19 53.7
Rs. 12 and 13 W., line between	39 44 38.8	92 17 40.5
Clarence station	39 44 33.5	92 15 40.4
Milepost 56, north and south road crossing near	39 43 53.2	92 12 08.4
Lentner station	39 43 07.3	92 08 51.3
T. 57 N., R. 11 W., corner secs. 20, 21, 28, and 29	39 43 14.8	92 08 50.7
T. 57 N., Rs. 10 and 11 W., corner secs. 30, 31, 36, and 25	39 42 16.0	92 04 20.1
Shelbina station	39 41 37.6	92 02 26.9
T. 56 N., R. 9 W., $\frac{1}{4}$ corner between secs. 6 and 7	39 40 27.0	91 57 00.9
Hunnewell station	39 40 00.1	91 51 39.0
Rs. 8 and 9 W., line between	39 39 52.1	91 50 48.9
T. 56 N., R. 8 W., corner secs. 8, 9, 16, and 17	39 39 30.8	91 48 34.9
Monroe station	39 39 08.8	91 44 15.3

Geographic positions along Missouri, Kansas and Texas Railway.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Monroe, 2 miles east of, section corner	39 39 26.8	91 41 49.3
Monroe, 3 miles east of, section corner	39 39 26.2	91 40 41.8
T. 56 N., Rs. 6 and 7 W., $\frac{1}{4}$ corner between secs. 7 and 8	39 39 49.6	91 37 19.7
Huntington, road crossing at	39 39 40.6	91 35 56.1
T. 56 N., R. 6 W., $\frac{1}{4}$ corner between secs. 3 and 10 ..	39 40 14.7	91 33 25.1
Rensselaer station	39 40 22.9	91 33 15.7
Rs. 5 and 6 W., line between	39 40 47.9	91 31 44.6

Geographic positions along Hannibal and St. Joe Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Paris and Hannibal gravel road crossing	39 41 07.1	91 26 07.9
New London and Hannibal gravel road crossing	39 40 58.5	91 24 10.9
Ts. 56 and 57 N., Rs. 4 and 5 W., corner between ..	39 41 06.7	91 23 53.1
New London and Hannibal dirt road crossing	39 41 54.1	91 22 28.1
Hannibal, Main street crossing	39 42 26.6	91 21 15.2

IOWA.

PRIMARY TRAVERSE.

The following geographic positions were determined by primary traverse in 1901 by Mr. George T. Hawkins, topographer. The line starts from Postville station (established by primary traverse in 1899-1900 from triangulation by Mississippi River Commission) and follows the Chicago, Milwaukee and St. Paul Railway to county line 2 miles east of Cresco, thence north on highways to the Iowa-Minnesota State line, thence east to a church. A spur line starts from Calmar and follows the Dakota Division of same railway to Jackson Junction.

Geographic positions along Chicago, Milwaukee and St. Paul Railway.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Postville station.....	43 05 14.8	91 34 17.0
Castalia station.....	43 06 35.6	91 40 30.0
T. 96 N., R. 7 W., $\frac{1}{4}$ corner secs. 21 and 28.....	43 06 39.7	91 40 32.5
Ossian station.....	43 08 43.1	91 45 42.2
T. 96 N., R. 8 W., $\frac{1}{4}$ corner secs. 10 and 11.....	43 08 49.7	91 45 53.5
T. 97 N., R. 8 W., $\frac{1}{4}$ corner secs. 31 and 32.....	43 10 34.9	91 49 28.9
Calmar station.....	43 11 01.6	91 51 54.9
Conover station.....	43 13 01.1	91 53 52.2
T. 97 N., R. 9 W., northwest corner sec. 5.....	43 15 19.1	91 56 19.0
T. 98 N., R. 10 W., $\frac{1}{4}$ corner secs. 23 and 24.....	43 17 29.9	91 58 58.7
Ridgeway station.....	43 17 50.9	91 59 23.7
T. 98 N., R. 10 W., $\frac{1}{4}$ corner secs. 4 and 9.....	43 19 41.8	92 01 55.5

Geographic positions along highway.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 99 N., Rs. 10 and 11 W., corner secs. 19, 30, 24, and 25.....	43 22 16.6	92 04 50.0
T. 99 N., Rs. 10 and 11 W., corner secs. 7, 18, 13, and 12.....	43 24 01.6	92 04 49.8
Ts. 99 and 100 N., Rs. 10 and 11 W., corner between.....	43 25 44.6	92 04 48.9
T. 100 N., Rs. 10 and 11 W., corner secs. 7, 18, 13, and 12.....	43 29 13.9	92 04 48.3

Geographic positions along Iowa-Minnesota State line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Iowa-Minnesota State line.....	43 30 03.6	92 04 31.1
Road south at church.....	43 30 03.0	92 00 38.6
Road north at church.....	43 30 03.1	92 00 34.7

Geographic positions along Dakota Division of Chicago, Milwaukee and St. Paul Railway.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 97 N., R. 9 W., $\frac{1}{4}$ corner between secs. 26 and 27.....	43 11 26.2	91 52 55.5
Fort Atkinson station.....	43 08 44.5	91 56 03.0
T. 96 N., R. 10 W., $\frac{1}{4}$ corner between secs. 13 and 14.....	43 08 00.7	91 59 00.1
Jackson Junction station.....	43 06 53.3	92 02 01.8

ARKANSAS.

PRIMARY TRAVERSE.

The following geographic positions were determined from primary traverse in 1901 by Mr. George T. Hawkins, topographer. The line starts from Gurdon station and follows the Iron Mountain Railway to Delight, thence via highways to the western edge of the Murfreesboro quadrangle.

Geographic positions along Iron Mountain Railway.

Station.	Latitude.	Longitude.
	° / "	° / "
Gurdon station	33 55 08.0	93 09 12.1
Okolona station	33 59 43.6	93 20 21.7
Antoine station	34 01 59.8	93 25 13.2
Delight station	34 01 46.4	93 30 12.4

Geographic positions along highways from Delight westward.

Station.	Latitude.	Longitude.
	° / "	° / "
Snellton, road south at	34 02 51.6	93 33 02.8
Brocktown post-office	34 04 09.0	93 36 26.0
Murfreesboro court-house	34 03 41.4	93 41 24.0
Sign board, Harris Ferry and Dallas	34 02 39.3	93 47 31.6
Church, road crossing 200 feet south of	34 02 35.7	93 49 16.8
Church, road crossing 200 feet west of	34 02 18.9	93 52 15.6
T. 8 S., R. 27 W., corner secs. 20, 21, 28, 29	34 02 21.8	93 53 36.3
Centerpoint, crossroads 1 mile east of	34 01 49.5	93 55 41.2
Centerpoint, crossroads 1 mile west of	34 01 16.4	93 57 48.0
T. 8 S., R. 28 W., $\frac{1}{4}$ corner between secs. 8 and 17 ..	33 59 06.8	94 00 27.7

NEBRASKA.

PRIMARY TRAVERSE.

The following positions in Nebraska were determined by Mr. George T. Hawkins, topographer, in 1901. Starting from the United States Missouri River Commission triangulation station Otoe, the line follows the Burlington and Missouri River Railroad west to the Missouri Pacific Railway, thence along the latter railway to Hickman, thence along the Burlington and Missouri River Railroad to Union Pacific Railroad, via Lincoln and Ashland, to Plattsmouth, where line

was tied to United States Missouri River Commission triangulation station Plattsmouth:

Geographic positions along Burlington and Missouri River Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
United States Missouri River Commission triangulation station Otoe.....	40 39 26.96	95 49 02.86
Nebraska City, road crossing under railroad.....	40 40 29.1	95 50 35.6
Nebraska City, crossing Missouri Pacific Railway under Burlington and Missouri River Railroad..	40 40 25.4	95 50 46.9
T. 8 N., R. 13 E., corner secs. 14, 15, 22, and 23....	40 39 19.4	95 55 58.5
T. 8 N., R. 13 E., corner secs. 17, 18, 19, and 20....	40 39 17.6	95 59 23.4
T. 8 N., Rs. 12 and 13 E., corner secs. 13, 18, 19, and 24.....	40 39 20.7	96 00 33.1

Geographic positions along Missouri Pacific Railway.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Lorton station.....	40 35 56.1	96 01 11.4
T. 7 N., R. 12 E., corner secs. 13, 14, 23, and 24....	40 34 07.6	96 01 38.4
T. 7 N., Rs. 11 and 12 E., corner on township line between secs. 31 and 36.....	40 32 24.3	96 06 29.5
T. 6 N., R. 11 E., corner secs. 1, 2, 11, and 12.....	40 31 32.1	96 07 14.8
T. 6 N., R. 11 E., corner secs. 2, 3, 10, and 11.....	40 30 39.1	96 09 31.8
Cook station.....	40 30 36.0	96 09 38.6
Rs. 10 and 11 E., crossing of line between.....	40 31 16.6	96 14 04.3
T. 7 N., R. 10 E., $\frac{1}{4}$ corner between secs. 33 and 34..	40 31 57.0	96 17 29.5
Burr station.....	40 32 15.2	96 17 58.9
T. 7 N., R. 9 E., corner secs. 11, 12, 13, and 14.....	40 35 00.2	96 22 00.2
Douglas station.....	40 35 30.4	96 22 59.1
T. 7 N., R. 9 E., corner secs. 5, 6, 7, and 8.....	40 35 47.3	96 26 34.7
Rs. 8 and 9 E., crossing of line between.....	40 36 17.1	96 27 42.3
Panama, $\frac{3}{4}$ mile southeast of, crossroads.....	40 35 52.7	96 29 58.2
Panama station.....	40 36 03.3	96 30 28.2
Ts. 7 and 8 N., R. 8 E., corner secs. 5, 6, 31, and 32..	40 36 47.9	96 33 26.3
T. 7 N., Rs. 7 and 8 E., corner secs. 2, 3, 34, and 35..	40 36 47.7	96 36 29.9
Hickman station, Missouri Pacific Railway.....	40 37 11.5	96 37 40.6

Geographic positions on Burlington and Missouri River Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Hickman station	40 37 20.9	96 37 57.1
Missouri Pacific and Burlington and Missouri River Railroad crossing	40 38 01.2	96 38 42.4
T. 8 N., R. 7 E., $\frac{1}{4}$ corner between secs. 20 and 29 ..	40 38 30.7	96 39 20.7

Geographic positions along Union Pacific Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 8 N., Rs. 6 and 7 E., corner on township line between secs. 1 and 6	40 41 59.6	96 41 00.6
Jamaica station	40 42 00.2	96 41 10.8
Union Pacific and Chicago, Rock Island and Pacific Railroad crossing	40 44 46.9	96 42 37.2
T. 9 N., R. 6 E., corner secs. 2, 3, 10, and 11	40 46 21.6	96 42 50.8
Lincoln, Union Pacific and Burlington and Missouri River Railroad crossing	40 48 42.2	96 42 49.5

Geographic positions along Burlington and Missouri River Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Lincoln station	40 49 04.0	96 42 34.2
Fremont, Elkhorn and Missouri Valley and Burlington and Missouri River Railroad crossing ..	40 50 18.3	96 40 48.8
Havelock station	40 51 37.1	96 38 18.6
Havelock station, section corner 1 mile northeast of ..	40 52 05.2	96 37 21.2
T. 11 N., R. 7 E., corner secs. 25, 26, 35, and 36 ..	40 53 15.2	96 35 03.6
Waverly station	40 55 11.2	96 31 29.8
T. 11 N., R. 8 E., corner secs. 10, 11, 14, and 15 ..	40 55 52.9	96 29 58.6
Greenwood station	40 57 52.6	96 26 24.4
T. 12 N., R. 9 E., $\frac{1}{4}$ corner between secs. 21 and 28 ..	40 59 20.5	96 24 52.9
T. 12 N., R. 9 E., corner secs. 10, 11, 14, and 15 ..	41 01 03.8	96 23 09.0
Ashland station	41 02 22.8	96 21 32.0
Southbend station	41 00 24.4	96 14 36.9
T. 12 N., R. 10 E., $\frac{1}{4}$ corner between secs. 13 and 24 ..	41 00 14.5	96 14 36.9
Chicago, Rock Island and Pacific and Burlington and Missouri River Railroad crossing	40 59 59.8	96 14 06.1
Louisville station	41 00 18.8	96 09 42.8
Missouri Pacific and Burlington and Missouri River Railroad crossing	41 00 22.7	96 09 31.1
T. 12 N., R. 11 E., corner secs. 14, 15, 22, and 23 ..	41 00 12.3	96 09 28.6
Cedar Creek station	41 02 21.0	96 06 03.3
Cullom, road crossing north and south	41 03 26.7	96 01 18.6
Omaha Junction, blockhouse at	41 02 59.8	95 55 11.5

ROCKY MOUNTAIN SECTION OF TOPOGRAPHY.

WYOMING-COLORADO.

TRIANGULATION STATIONS.

Wyoming.

This work depends on a base line 4.6 miles in length, measured westward along the railroad tangent, beginning $2\frac{1}{2}$ miles west of Fort Steele. The line was prepared in the usual manner by nailing boards and zinc strips to the cross-ties. Three complete measurements were made with standard 300-foot tape No. 1, temperatures being taken by two Standard thermometers at each tape length.

The length of base reduced to sea level is 24,181.420 feet.

Logarithm of length in meters=3.8674977.

Positions depend upon the latitude and longitude pier of the Wheeler survey, established in 1872, corrected for the revised longitude of Salt Lake, from which it was originally determined. The astronomic point was occupied as an azimuth station on two nights, and a check azimuth was observed near milepost 145 on the Colorado-Wyoming State line. During the progress of this work 12 primary and 4 secondary stations were occupied, and numerous high peaks were located by intersections, controlling three 30-minute quadrangles in Wyoming and one in Colorado.

Angles were measured and azimuths were observed with an 8-inch micrometer theodolite by Mr. Frank Tweedy, topographer, who also prepared and measured the base line.

AZIMUTH MARK, CARBON COUNTY.

Situated one-half mile west of Fort Steele, on end of spur just south of Fort Steele-Rawlins wagon road.

Station mark: A stone post, 24 by 10 by 6 inches, in center of top of which is cemented a bronze tablet.

[Latitude $41^{\circ} 46' 39.02''$. Longitude $106^{\circ} 57' 30.53''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Greenville	63 27 32.85	243 22 34.11	4.0640571
East base	97 03 40.20	277 02 01.27	3.5384929
Mount Steele	154 41 30.14	334 39 55.60	3.8839366
St. Marys	257 18 45.01	77 23 25.44	3.9982118
Astronomic station	267 28 15.63	87 28 40.30	2.9324543

BATTLE, CARBON COUNTY.

(Not occupied.)

The highest point of a high, isolated, volcanic, flat-topped butte on north side of Snake River, about 6 miles west of Honnold post-office.

[Latitude $41^{\circ} 02' 01.7''$. Longitude $107^{\circ} 16' 56.1''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Bridger	230 37 45	50 47 37	4.43369
Hahn	305 09 57	125 23 48	4.56034

BRIDGER, CARBON COUNTY.

Situated about $3\frac{1}{2}$ miles northwest of Battle post-office, on the Continental Divide, on highest peak in the Grand Encampment country, locally known as Bridger Peak, and called the Grand Encampment Peak by the King survey.

Station mark: A bronze tablet cemented in solid rock, over which is built a cairn.

[Latitude $41^{\circ} 11' 18.86''$. Longitude $107^{\circ} 01' 55.61''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sage	177 24 12.03	357 23 06.03	4.7072903
Platte	202 02 02.02	22 10 10.03	4.6589063
Needle	245 23 13.02	65 35 34.45	4.4591310
Riverside	260 04 54.00	80 14 59.00	4.3371700
Pelham	300 08 45.04	120 22 27.61	4.5288192
Zirkel	324 04 46.00	144 18 09.00	4.6791300
Hahn	347 17 16.00	167 21 17.00	4.5925200

EAST BASE, CARBON COUNTY.

Situated about 3 miles west of Fort Steele, 575 feet south of Union Pacific Railway track at east end of a $4\frac{1}{2}$ -mile tangent and near end of a low ridge running parallel with track.

Station mark: A stone post, 36 by 10 by 6 inches, set 32 inches in the ground, in the center of top of which is cemented a bronze tablet.

Reference marks: An iron bench-mark post set 20.01 feet north and at right angles to base line. An iron bench-mark post set 20.14 feet south and at right angles to base line. An iron bench-mark post set 20.24 feet east and on prolongation to base line.

[Latitude 41° 46' 52.76". Longitude 106° 59' 59.02".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Greenville	51 03 02.68	280 59 42.81	3.9503037
West base.....	88 33 43.25	268 30 10.67	3.8674977
Mount Steele.....	181 21 18.96	1 21 23.40	3.8127309
Azimuth mark	277 02 01.27	97 03 40.20	3.5384929

FORT STEELE, ASTRONOMIC STATION, CARBON COUNTY.

Situated about 700 feet southeast of railroad station at Fort Steele, across a small gulch 6 feet deep and about 500 feet southwest of the Fort Steele Hotel.

Station mark: An iron bench-mark post projecting 6 inches above ground.

The station is described in Wheeler's report of 1872, and was originally marked by a pine post 3 feet in diameter and 2½ feet high above ground, but was sawed off and sides chopped away until in 1901 it stood but 1 foot above the ground. It was entirely decayed beneath the surface of ground and was dug up and replaced by the iron post noted above.

[Latitude 41° 46' 40.24". Longitude 106° 56' 53.50".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Azimuth station.....	87 28 40.30	267 28 15.63	2.9324543
Mount Steele.....	149 03 17.53	329 01 18.30	3.9044541

GRENNVILLE, CARBON COUNTY.

Situated about 3 miles south of Grennville station on the Union Pacific Railway, on a small rise on east and west ridge, about one-half mile west of old road graded across ridge.

Station mark: An iron bench-mark post.

[Latitude 41° 43' 50.92". Longitude 107° 04' 59.14".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Rawlins.....			4.24470
West base.....	175 23 17.22	355 23 04.61	3.7355056
Mount Steele.....	210 18 27.78	31 21 52.20	4.1469299
East base.....	230 59 42.81	51 03 02.68	3.9503037
Azimuth mark	243 22 34.11	63 27 32.85	4.0640571
St. Mary	249 46 34.31	69 56 13.40	4.3302481
Sage	348 14 11.45	168 15 07.15	3.9780430

HONNOLD, CARBON COUNTY.

(Walsh Hill of King survey.)

A sharp mountain about 2 miles northwest of Honnold post-office, Colorado, and 1 mile north of Snake River. The Colorado-Wyoming line crosses south slope of mountain.

Station mark: A bronze tablet set in bed rock on highest knob, over which a cairn is built.

[Latitude $41^{\circ} 00' 42.3''$. Longitude $107^{\circ} 11' 11.5''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Bridger	213 23 55	33 30 00	4.37173
Hahn	310 32 47	130 42.52	4.45439

MEDICINE BOW, NEAR ALBANY-CARBON COUNTY LINE.

(Not occupied.)

The highest point of Medicine Bow or Snowy Mountains, between the valleys of the Platte and Laramie rivers. It is a massive, round-topped mountain, locally known as Medicine Bow Peak, and is the highest peak of southern Wyoming, reaching an elevation of about 12,000 feet.

[Latitude $41^{\circ} 21' 44.6''$. Longitude $106^{\circ} 19' 03.7''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pelham			4.67777
Needle			4.53721
Sage			4.84246
St. Mary			4.81332

MOUNT STEELE, CARBON COUNTY.

Situated about 6 miles northwest of Fort Steele, on a high, sharp, rocky point on long ridge northeast of Platte River.

Station mark: A cairn $5\frac{1}{2}$ feet high with a 2 by 4 inch scantling in center.

Reference mark: A bronze tablet set in rock, 8 by 8 by $1\frac{1}{2}$ feet, $5\frac{1}{2}$ feet southeast of center of monument.

[Latitude 41° 50' 23.30". Longitude 106° 59' 52.36".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
East Base	1 21 23.40	181 21 18.96	3.8127309
Sage	13 33 08.62	193 30 40.12	4.3429037
Grennville	30 21 52.20	210 18 27.78	4.1469299
West base	48 23 30.91	228 19 53.77	4.0026039
St. Mary	289 59 43.19	110 05 58.35	4.1406194
Astronomic station	329 01 18.30	149 03 17.53	3.9044541
Platte	334 38 42.02	154 45 31.16	4.5221187
Azimuth mark	334 39 55.60	154 41 30.14	3.8839366

NEEDLE, CARBON COUNTY.

Situated on the highest point of a square-topped granite butte at junction of Grand Encampment Creek and North Platte River. Station on south side of creek.

Station mark: A bronze tablet cemented in solid rock, over which is built a cairn.

[Latitude 41° 17' 45.92". Longitude 106° 43' 10.92".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Bridger	65 35 34.45	245 23 13.02	4.4591310
Sage	144 01 11.25	323 47 40.35	4.6833258
Platte	163 32 31.31	343 28 15.59	4.4997329
St. Mary	169 41 00.82	349 36 09.80	4.7525844
Pelham	354 11 03.96	174 12 27.10	4.4641739

PELHAM, CARBON COUNTY.

Situated on a high peak $2\frac{1}{2}$ miles north of divide between Grand Encampment Creek and waters of Big Creek where crossed by Columbine road. It is $2\frac{1}{2}$ miles north of Colorado-Wyoming State line, is locally known as "Rocky," and is the point called Pelham of the King survey.

Station mark: A bronze tablet cemented in solid rock under a cairn 5 feet high.

[Latitude $41^{\circ} 02' 06.84''$. Longitude $106^{\circ} 41' 04.61''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Hahn	44 25 12.00	224 15 33.00	4.4708300
Three Point	74 56 19.00	254 51 31.00	4.0256800
Bridger	120 22 27.61	300 08 45.04	4.5288192
Sage	155 18 55.41	335 04 03.17	4.8741960
Platte	168 40 04.50	348 34 26.07	4.7814746
Needle	174 12 27.10	354 11 03.96	4.4641739

PLATTE, CARBON COUNTY.

Situated about 7 miles north of Saratoga, on ridge, $1\frac{1}{2}$ miles east of Platte River and one-third mile east of main road from Fort Steele to Saratoga.

Station mark: An iron bench-mark post.

[Latitude $41^{\circ} 34' 08.19''$. Longitude $106^{\circ} 49' 37.36''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Bridger	22 10 10.03	202 02 02.02	4.6589063
Sage	114 09 15.77	293 59 59.30	4.3274390
St. Mary	177 16 11.17	357 15 36.36	4.4043905
Needle	343 8 15.59	163 32 31.31	4.4997329
Pelham	348 34 26.07	168 40 04.50	4.7814746

RAWLINS, CARBON COUNTY.

(Not occupied.)

A round-topped point about 1 mile northwest of Rawlins monument.

[Latitude $41^{\circ} 48' 23.4''$. Longitude $107^{\circ} 16' 07.0''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Mount Steele	4.35783
West base	4.18404
Grennville	4.24470

RIVERSIDE, CARBON COUNTY.

(Secondary point.)

In eastern edge of town of Riverside, at junction of Encampment-Santiago road and Encampment-Collins road. Station is at the north-west corner of township 14 north, range 83 west.

[Latitude 41° 13' 19.2". Longitude 106° 46' 36.4".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Bridger	80 14 59.00	260 04 54.00	4.33717
Needle	210 09 14.00	30 11 29.00	3.97853

SAGE, CARBON COUNTY.

Situated about 9 miles southwest of Fort Steele, on south edge of mesa overlooking Sage Creek drainage.

Station mark: A rock monument 9 feet high.

Reference mark: A bronze table cemented in solid rock, 5.15 feet northeast of monument.

[Latitude 41° 38' 49.24". Longitude 107° 03' 35.38".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Grennville	168 15 07.15	348 14 11.45	3.9780430
Mount Steele	193 30 40.12	13 33 08.62	4.3429037
St. Mary	227 22 13.37	47 30 56.25	4.3918929
Platte	293 59 59.30	114 09 15.77	4.3274390
Needles	323 47 40.35	144 01 11.25	4.6833258
Pelham	335 04 03.17	155 18 55.41	4.8741960
Bridger	357 23 06.03	177 24 12.03	4.7072903

ST. MARY, CARBON COUNTY.

Situated 2½ miles north of Wolcott station on Union Pacific Railway, on a high bare point.

Station mark: A bronze triangulation tablet set in a rock, 10 by 5 by 2 feet, over which is built a cairn 6 feet high.

[Latitude 41° 47' 49.70". Longitude 106° 50' 29.71".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sage	47 30 56.25	227 22 13.37	4.3918929
Grennville	69 56 13.40	249 46 34.31	4.3302481
Azimuth mark	77 23 25.44	257 18 45.01	3.9982118
Mount Steele	110 05 58.35	289 59 43.19	4.1406194
Platte	357 15 36.36	177 16 11.17	4.4043905

SARATOGA, CARBON COUNTY.

(Not occupied.)

Station mark: The cupola on the high school at Saratoga.

[Latitude $41^{\circ} 27' 32.1''$. Longitude $106^{\circ} 48' 54.0''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Sage	-----	-----	4. 46565
Platte	-----	-----	4. 08854

SHARP, CARBON COUNTY.

(Not occupied.)

An isolated, rocky, and partially timbered hill, about 7 miles north of Bridger Peak.

[Latitude $41^{\circ} 17' 01.1''$. Longitude $107^{\circ} 00' 49.6''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Needle	-----	-----	4. 39224
Bridger	-----	-----	4. 02808

THREE POINT, CARBON COUNTY.

(Secondary point.)

On rocky hill covered with burnt timber, about 1 mile north of Columbine road crossing of Grand Encampment River.

Station mark: A bedrock granite boulder, 4 by 3 by 2 feet, in top of which is drilled a 1-inch hole.

[Latitude $41^{\circ} 00' 37.2''$. Longitude $106^{\circ} 48' 23.0''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Pelham	254 51 31	74 56 19	4. 02563

WEST BASE, CARBON COUNTY.

Situated one-third mile east of Grennville station, 275 feet south of Union Pacific Railway track, $7\frac{1}{2}$ miles west of Fort Steele.

Station mark: A stone post, 30 by 12 by 8 inches, in center of top of which is cemented a bronze tablet.

Reference marks: An iron bench-mark post set 19.99 feet north and at right angles to base line. An iron bench-mark post set 20 feet south and at right angles to base line. An iron bench-mark post set 20 feet east and on base line.

[Latitude $41^{\circ} 46' 46.64''$. Longitude $107^{\circ} 05' 18.07''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Mount Steele.....	228 19 53.77	48 23 30.91	4.0026039
East base	268 30 10.67	88 33 43.25	3.8674977
Grennville	355 23 04.61	175 23 17.22	3.7355056

Colorado.

ANITA, ROUTT COUNTY.

(Not occupied.)

The western of two high knobs on mountain ridge at head of Slater Creek, about 16 miles southwest of Honnold post-office, locally known as "Bears Ears."

Station mark: Highest point of knob.

[Latitude $40^{\circ} 46' 46.5''$. Longitude $107^{\circ} 14' 58.9''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Bridger	201 53 04	22 01 38	4.68995
Hahn	254 51 50	75 04 22	4.44605

AZIMUTH STATION, ROUTT COUNTY.

(Secondary point.)

Situated in meadow at crossing of Grand Encampment River by Columbine road.

Station mark: A post 6 inches in diameter set 2 feet in the ground.

[Latitude $41^{\circ} 00' 10.9''$. Longitude $106^{\circ} 48' 51.1''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Three Point	218 59 51	39 00 10	3.01856

HAHN, ROUTT COUNTY.

(A secondary point.)

Situated about 2 miles east of Columbine post-office, on high peak; can be reached by road and mine trails from Columbine.

Station mark: A bronze tablet cemented in rock, over which is built a cairn 5 feet high.

[Latitude $40^{\circ} 50' 41.3''$. Longitude $106^{\circ} 55' 48.0''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Whitehead	45 20 08	225 15 33	4.14266
Anita	75 04 22	254 51 50	4.44605
Battle	125 23 48	305 09 57	4.56034
Honnold	130 42 52	310 32 47	4.45439
Bridger	167 21 17	347 17 16	4.59252
Pelham	224 15 33	44 25 12	4.47083
Zirkel	274 05 45	94 15 05	4.30352

HIGH SHARP, ROUTT COUNTY.

(Not occupied.)

A sharp, lone peak, 7 miles south of Dixon post-office, on Snake River. Probably Navesink Peak of the King survey.

[Latitude $40^{\circ} 55' 13.3''$. Longitude $107^{\circ} 27' 23.8''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Bridger	230 00 38	50 17 22	4.66731
Pelham	258 38 20	79 08 43	4.82097

WHITEHEAD, ROUTT COUNTY.

(Not occupied.)

A high mountain peak about 8 miles southwest of Columbine post-office, locally known as Sand Mountain or Whitehead Mountain.

Station mark: A dead tree on highest point.

[Latitude $40^{\circ} 45' 24.6''$. Longitude $107^{\circ} 02' 49.1''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Bridger	181 29 26	1 30 01	4.68090
Hahn	225 15 33	45 20 08	4.14266

ZIRKEL, ROUTT COUNTY.

(Not occupied.)

A sharp, ragged, rocky peak on Continental Divide, about 14 miles east of Columbine post-office. The highest pinnacle of a rock comb was sighted. Mount Zirkel is probably about 4 miles southeast of this point.

[Latitude 40° 49' 53.8". Longitude 106° 41' 31.7".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Hahn	94 15 05	274 05 45	4.30352
Bridger	144 18 09	324 04 46	4.68913

MILEPOST 145, COLORADO-WYOMING STATE LINE.

(Not occupied.)

In swamp between Columbine road and Grand Encampment River, about 500 feet west of river crossing.

Station mark: A pine post 6 by 6 inches by 5 feet high.

[Latitude 41° 00' 17.8". Longitude 106° 48' 57.8".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Three Point	333 31 39	53 32 02	3.00454

MILEPOST 163, COLORADO-WYOMING STATE LINE.

On a flat one-half mile west of Honnold post-office.

Station mark: A cut stone monument 60 by 18 by 18 inches.

[Latitude 41° 00' 18.9". Longitude 107° 09' 24.1".]

WYOMING.

TRIANGULATION STATIONS.

Two 30-minute quadrangles in Sheridan and Johnson counties, Wyo., were controlled by triangulation based upon Beckton and Soldier creeks, established by W. S. Post in 1896. Eleven stations were occupied and a check azimuth was observed near Buffalo by Mr. Frank Tweedy, topographer, during the field season of 1900.

AZIMUTH STATION, JOHNSON COUNTY.

Situated one-fourth mile west of Main street, Buffalo, on top of a rise of 50 feet above Clear Creek south of ice house and dry ice pond.

Station mark: A stone post 36 inches long, 12 inches square at base and 8 inches square at top, set 32 inches in the ground, in top of which is cemented a bronze meridian tablet. Station is the same as the south meridian mark.

[Latitude $44^{\circ} 20' 37.06''$. Longitude $106^{\circ} 42' 02.34''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McKinney	68 50 56.48	248 47 25.29	3.8561753
Buffalo	185 04 05.30	5 04 27.74	3.9049104

BUFFALO, JOHNSON COUNTY.

Situated on a grassy point on east and west ridge, about 4 miles north of Buffalo and 3 miles south of Lake De Smet. It is $2\frac{1}{2}$ miles east of Sheridan-Buffalo stage road.

Station mark: A standard iron bench-mark post.

[Latitude $44^{\circ} 24' 56.31''$. Longitude $106^{\circ} 41' 30.26''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Azimuth station	5 04 27.74	185 04 05.30	3.9049104
McKinney	34 58 02.87	214 54 09.10	4.1114584
Ten Sleep	61 46 22.30	241 29 00.70	4.5743590
Cloud Peak	84 45 13.80	264 25 02.95	4.5851407
Shell	123 47 10.45	303 41 39.91	4.0987021
Banner	137 58 13.68	317 48 15.32	4.4489394
Prairie Dog	166 21 40.71	346 18 59.87	4.3315864
Cross H	354 21 26.45	174 22 17.18	4.2141446

CONE, JOHNSON COUNTY.

(Not occupied.)

Situated on sharp cone on broken mesa ridge between French and Sand creeks, about 2 miles west of road between Buffalo and Upper Rock Creek.

[Latitude $44^{\circ} 22' 39.4''$. Longitude $106^{\circ} 47' 03.7''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Shell	164 42 45	344 41 08	4.06487
Buffalo	240 09 34	60 13 27	3.92973

CROSS H, JOHNSON COUNTY.

Situated 1 mile south of Cross H ranch and three-fourths mile east of Buffalo-Casper stage road, on the northwest corner of mesa.

Station mark: A standard iron bench-mark post.

[Latitude $44^{\circ} 16' 08.40''$. Longitude $106^{\circ} 40' 17.67''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Ten Sleep	87 36 37.40	267 18 26.50	4.5404024
Cloud Peak	107 45 40.40	287 24 40.40	4.6223708
McKinney	122 19 06.93	302 14 22.78	4.0281333
Buffalo	174 22 17.18	354 21 26.45	4.2141446

DE SMET, JOHNSON COUNTY.

(Not occupied).

Situated on a high, sharp, reddish point, $1\frac{1}{2}$ miles east of north end of Lake De Smet and 3 miles south of Piney Creek.

Station mark: A cairn.

[Latitude $44^{\circ} 29' 59.8''$. Longitude $106^{\circ} 43' 36.1''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Shell	72 38 32	252 34 29	3.90394
Buffalo	343 26 43	163 28 11	3.98996

M'KINNEY, JOHNSON COUNTY.

Situated on east slope of mountain ridge, three-fourths mile south of mouth of Clear Creek Canyon and 3 miles east of Fort McKinney.

Signal: A large pine tree at point where ridge breaks down abruptly to the plain at head of steep gulch.

Station mark: A bronze triangulation tablet cemented in large granite boulder at west foot of tree. Distance to center of tree, 3 feet.

[Latitude $44^{\circ} 19' 13.00''$. Longitude $106^{\circ} 47' 04.55''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Banner	160 00 02.73	339 53 59.02	4.5248164
Shell	170 10 14.59	350 08 38.23	4.2511675
Prairie Dog	184 12 20.47	4 13 33.92	4.4987622
Buffalo	214 54 09.10	34 58 02.87	4.1114584
Azimuth station	248 47 25.29	68 50 56.48	3.8561753
Cross H	302 14 22.78	122 19 06.93	4.0281333

SHELL, JOHNSON COUNTY.

Situated on grassy butte between North and South forks of Shell Creek, about $2\frac{1}{2}$ miles west of Sheridan-Buffalo stage road and 1 mile south of Buell's ranch on North Fork of Shell Creek.

Station mark: A standard iron bench-mark post.

[Latitude $44^{\circ} 28' 42.17''$. Longitude $106^{\circ} 49' 22.29''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Buffalo	303 41 39.91	123 47 10.45	4.0987021
McKinney	350 08 38.23	170 10 14.59	4.2511675

BANNER, SHERIDAN COUNTY.

Situated on east end of mountain ridge sloping north to Big Horn and east to Banner post-office, about 4 miles east of Banner. Reached by old road from Banner.

Signal: A tall pine tree, the last high tree on east end of ridge, slightly down on south side of ridge. It is conspicuous from the north and south.

Station mark: A bronze triangulation tablet cemented in solid rock; azimuth to signal tree, $7^{\circ} 13'$; distance, 40.7 feet.

[Latitude $44^{\circ} 36' 12''.00$. Longitude $106^{\circ} 55' 43.81''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Beckton	149 30 03.39	329 25 06.37	4.2627415
McCormick	190 49 10.61	10 50 13.75	4.0227657
Prairie Dog	269 57 47.37	90 05 05.62	4.1387356
Buffalo	317 48 15.32	137 58 13.68	4.4489394
McKinney	339 53 59.02	160 00 02.73	4.5248164

GEORGE, SHERIDAN COUNTY.

Situated on a peaked butte on ridge on east side of main Prairie Dog Creek and about 3 miles east of Sheridan.

Station mark: A standard iron bench-mark post.

[Latitude $44^{\circ} 46' 23.52''$. Longitude $106^{\circ} 52' 47.28''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McCormick	12 37 07.26	192 36 06.25	3.9413366
Beckton	76 47 56.20	256 40 54.44	4.1314607
Soldier	118 39 22.38	298 31 44.91	4.2107574
Prairie Dog	332 23 31.18	152 28 45.96	4.3283742

M'CORMICK, SHERIDAN COUNTY.

Situated about 6 miles east of Big Horn, on a grassy hill between Prairie Dog and McCormick creeks.

Station mark: A standard iron bench-mark post.

[Latitude 44° 41' 47.32". Longitude 106° 54' 13.96".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Banner.....	10 50 13.75	190 49 10.61	4.0227657
Beckton.....	115 43 44.50	295 37 44.01	4.0972845
Soldier.....	142 51 56.14	322 45 20.00	4.3109496
George.....	192 36 06.26	12 37 07.26	3.9413366
Prairie Dog.....	311 17 06.05	131 23 21.52	4.1953394

PRAIRIE DOG, SHERIDAN COUNTY.

Situated on south end of high point on divide between Prairie Dog and Piney creeks, at head of Murphy Gulch. A road from Prairie Dog to Bigred post-office crosses ridge one-half mile north of station.

Station mark: A bronze triangulation tablet, cemented in solid rock.

[Latitude 44° 36' 11.82". Longitude 106° 45' 19.69".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McKinney.....	4 13 33.92	184 12 20.47	4.4987622
Banner.....	90 05 05.62	269 57 47.37	4.1387356
Beckton.....	124 29 27.56	304 17 11.73	4.4461406
McCormick.....	131 23 21.52	311 17 06.05	4.1953394
George.....	152 28 45.96	332 23 31.18	4.3283742
Buffalo.....	346 18 59.87	166 21 40.71	4.3315864

MERIDIAN MARKS.

BUFFALO, JOHNSON COUNTY.

Location of station: On rise of ground 50 feet above Clear Creek and 1,400 feet south of fence surrounding Buffalo high school. It is one-fourth mile east of the main street of Buffalo. It is above (south of) ice house and ice pond.

Station mark: A limestone post, 36 inches long, cut 8 inches square at top, set 32 inches in the ground, and in center of top is cemented a bronze meridian tablet.

Distant mark: North of station 1,400 feet, at base of fence surrounding Buffalo high school; a limestone post 36 inches long and cut 8 inches square at top, set 32 inches in the ground, in the center of top of which is cemented a bronze meridian tablet; true azimuth, $179^{\circ} 58' 01.15''$; north mark is set 9.69 inches too far west.

MONTANA.

TRIANGULATION STATIONS.

Positions in northwestern Montana, published herewith, result from the field work of Messrs. S. S. Gannett, A. H. Thompson, H. L. Baldwin, jr., and R. H. Chapman, in the years 1897 to 1901, inclusive. They are based upon a geodetic latitude and longitude found by taking the mean of the astronomic positions, as determined at Hamilton and Helena stations, which were connected through a series of quadrilaterals.

Seven positions of stations in the expansion of the Hamilton base, published in the nineteenth annual report, are now republished with corrected values.

The Helena astronomic station is a primary astronomic station of the United States Coast and Geodetic Survey, situated near the United States assay office at Helena, and connected by measurements with the court-house spire.

The observed latitude of the pier is $46^{\circ} 35' 18.3''$.

The observed longitude of the pier is $112^{\circ} 02' 11.84''$.

The corresponding position of the court-house spire is, latitude $46^{\circ} 35' 17.5''$; longitude $112^{\circ} 02' 06.94''$.

To obtain the geodetic positions adopted, subtract from above $1.57''$ for latitude, and $2.13''$ for longitude.

The Helena base (Lewis and Clarke County) was measured twice at night with the 300-foot standard steel tape, along the roadbed of the Northern Pacific Railroad near Helena, by Mr. R. H. Chapman, topographer, in 1897. The resulting length, when reduced to sea level and corrected for temperature and inclination, is 6,511.77 meters.

The Hamilton astronomic station is situated on the eastern side of the railroad right of way, 50 feet east of the eastern rail of track, 80 feet northeast of the station at Hamilton, Ravalli County. The quarter corner between secs. 25 and 30, Rs. 20 and 21 W., T. 6 N., is distant 339 feet, true bearing N. $39^{\circ} 13' W$.

Observations for time were made on three nights in July, 1897. Telegraphic comparisons of time were made with the Washington Observatory, St. Louis, on the same nights. Prof. H. S. Pritchett was the observer at the Washington Observatory and Mr. S. S. Gannett at the Hamilton station.

The resulting observed longitude for the Hamilton station is $114^{\circ} 09' 09.40'' \pm 0.11''$.

The observed latitude from 56 sets of observations is $46^{\circ} 14' 53.91'' \pm 0.11''$.

To obtain the geodetic positions adopted, add to the above $1.57''$ for latitude and $2.13''$ for longitude.

A meridian mark was set 2,377 feet south of pier on the section line, 213.4 feet east of corner between secs. 31, 36, 25, and 30, T. 6 N., R. 20 W.

The Bitterroot Base was measured with 300-foot steel tape along the Hamilton branch of the Northern Pacific Railway.

The resulting length, when reduced to sea level and corrected for temperature and inclination, is 8,582.835 meters.

Connection was made with post No. 373 on the international boundary and with a station of the Missouri River Commission (see Hilger station below).

Azimuths were obtained by observations on Polaris near elongation at following stations: Hamilton (astronomic station), Helena West Base, Monture, Carey, and Durham.

MONTURE, DEER LODGE COUNTY.

A high, sharp peak on southern end of an approximately north-and-south ridge between two streams flowing into South Fork of Flathead River. The westernmost branch of Monture Creek heads immediately south of station. Peak is about 12 miles north from Woodworth post-office and 20 miles northwest of Ovando post-office. The best approach is from Woodworth via trail up East Fork of Shanley (or Cottonwood) Creek, across east-and-west ridge to headwaters of Monture Creek, through pass southeast of station. Animals were taken to summit. Good camps at lakes on high shelf east of station.

Station mark: An aluminum bolt set in a boulder weighing several tons.

[Latitude $47^{\circ} 14' 23.41''$. Longitude $113^{\circ} 17' 37.23''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kamas	26 40 08.07	206 25 57.27	4.7399916
McLeod	71 46 10.73	251 18 33.13	4.7006137
McDonald	109 01 24.01	288 33 51.54	4.6979308
Holland	146 46 33.27	326 33 51.64	4.5966669
Gordon	191 21 35.48	11 23 59.42	4.3187096
Scapegoat	257 05 13.29	77 25 45.73	4.5581578
Stonewall	287 33 59.67	107 58 28.19	4.6461419

NEVADA, DEER LODGE COUNTY.

On summit of a round-topped, heavily timbered mountain on continental divide, about 12 miles north of west from Marysville and 5 miles northwest of point where Marysville-Blackfoot City wagon road crosses the continental divide. Mountain is very steep on north slope. Waters to north, to west, and to south flow to Nevada Creek; those to east flow to the Little Prickly Pear. Two and one-half miles a little east of south from station is a similar mountain, heavily timbered, and about same elevation.

Station mark: A bronze tablet cemented in a stone post, 30 by 9 by 12 inches, set level with surface of ground.

Reference marks: Copper nail in top of blazed stump; true azimuth, $243^{\circ} 54'$; distance, 10.3 feet east. Copper nail in root of blazed stump; true azimuth, $329^{\circ} 39'$; distance, 25.2 feet southeast. Copper nail in blaze on stump marked "1892 J. Fell—J. D.;" true azimuth, $72^{\circ} 45'$; distance, 47.4 feet southwest.

[Latitude $46^{\circ} 46' 22.48''$. Longitude $112^{\circ} 32' 36.74''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Stonewall	159 02 04.84	338 53 34.65	4.6142244
Dearborn	179 01 55.27	359 01 21.40	4.7603365
Mitchell	220 48 24.96	40 59 57.79	4.4870990
Hilger	269 54 59.04	90 21 45.41	4.6700058
Lenox	301 07 07.16	121 29 50.10	4.6686244
Red Mountain	324 21 42.82	144 35 44.25	4.6273402

SILVERTIP, DEER LODGE COUNTY.

A high rocky peak on divide between the waters of the South Fork and Middle Fork of Flathead River, about 25 miles (air line) from Warm Springs on North Fork of Sun River. The longest axis of the mountain is northwesterly-southeasterly. The peak is very steep on every side, but may be easily ascended up spur almost due east of station. The nearest camp (water and grass) is about 3 miles south of peak immediately at foot of sharp ridge extending south from peak.

Station mark: A copper bolt set in rock in place and stamped "U.S.G.S. Δ ."

Reference mark: A cairn 6 feet high, 8.7 feet southeast of station mark.

[Latitude 47° 47' 10.12". Longitude 113° 14' 59.44".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Holland	42 01 38.15	221 46 56.48	4.5712744
Swan	76 14 46.05	255 57 25.72	4.4793510
Gildart	101 31 51.59	281 13 25.03	4.5009454
Baptiste	143 18 08.99	323 01 05.26	4.6785024
Pentagon	210 45 44.39	30 51 22.22	4.2669682
Rocky	264 35 41.52	84 55 43.91	4.5304282
Whiteridge	303 07 39.14	123 18 41.25	4.3480500
Cliff	327 06 24.40	147 11 49.77	4.2277913

STONEWALL, DEERLODGE COUNTY.

On the highest point of Stonewall Mountain, about 10 miles north of Lincoln and from 12 to 15 miles southwest of the Continental Divide. It lies between the headwaters of Copper Creek, which is a westerly branch of the Center Fork of the Big Blackfoot River, and those of "Eight Mile" Creek, which flows to the Big Blackfoot River near Ovando (to west of mountain), about 2 miles north of "copper mines" near head of Copper Creek. The only good camping place is at toe of heavily timbered ridge about 6 miles southeast of station, at forks of Copper Creek. Feed for stock is scarce and thin.

Station mark: A small cairn covering a flat stone set level with surface, upon which is roughly chiseled "U.S.G.S.+", the cross being at center of station.

Reference mark: A cairn 10 feet high, 8.3 feet northeast of station mark.

[Latitude 47° 07' 05.81". Longitude 112° 44' 14.95".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kamas	62 16 54.23	241 38 22.85	4.8797950
Monture	107 58 28.19	287 33 59.67	4.6461419
Gordon	131 58 08.34	311 36 01.52	4.7069408
Scapegoat	162 24 11.37	342 20 13.22	4.3530624
Dearborn	215 30 12.74	35 38 11.10	4.3726424
Mitchell	293 26 03.02	113 46 08.85	4.5791777
Nevada	338 53 34.65	159 02 04.84	4.6142244

ÆNEAS, FLATHEAD COUNTY.

A high, bare, rocky peak on Swan Range, about 1 mile south of Æneas Pass trail, 10 miles north of foot of Swan Lake, 5 miles east of south end of Echo Lake. Easiest reached from the west by Æneas Pass, thence south along ridge. Good camp at small lake one-half mile south and 500 feet below station, at foot of Æneas trail.

Station mark: An aluminum tablet cemented in rock in place, above which a cairn 7 feet high was erected.

[Latitude 48° 09' 00.18". Longitude 113° 55' 05.28".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Moss	4 17 54.69	184 15 36.68	4.7138082
G. N.	206 51 28.55	26 57 50.35	4.3679315
Baptiste	276 02 37.98	96 15 23.15	4.3296589
Gildart	330 57 57.43	151 09 15.48	4.5920903

BAPTISTE, FLATHEAD COUNTY.

A high, bare, sandstone peak, light in color, and highest in vicinity, on range east of South Fork of Flathead River, about 10 miles southwest from Java Station on Great Northern Railway. It was ascended by traveling about 4 miles on foot along ridge from the south. There is a good camp in basin at head of gulch flowing to South Fork, about 1 mile southwest of station, from which the climb to station is not difficult.

Station mark: An aluminum tablet cemented in rock in place, over which a cairn 6 feet high was erected.

[Latitude 48° 07' 46.08". Longitude 113° 37' 57.90".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Swan	0 42 26.09	180 42 06.12	4.6572513
Gildart	4 16 52.85	184 15 27.46	4.5052975
Moss	27 11 38.65	206 56 38.27	4.7432742
Æneas	96 15 23.15	276 02 37.98	4.3296589
G. N.	155 19 00.86	335 12 36.32	4.4052811
Stimpson	182 20 13.96	2 21 17.88	4.6335816
Observation	211 26 50.30	31 40 33.62	4.6377352
Elk	235 00 57.26	55 15 59.88	4.4837563
Half Dome	248 41 47.27	69 06 34.17	4.6448796
Pentagon	300 12 30.27	120 35 13.88	4.6439957
Silvertip	323 01 05.26	143 18 08.99	4.6785024

COALBANK, FLATHEAD COUNTY.

About 20 miles almost due north of Columbia Falls, on highest point of ridge, 1 mile east of North Fork of Flathead River, 3 miles south of mouth of Camas Creek, and 5 miles southeast and across river from mouth of Coal Creek. Easily ascended from north, where good camp may be found about 4 miles northeast of station. From Camas Creek keep southwesterly through timber and windfall to a long, timbered ridge, a north spur from which peak is visible.

Station mark: An aluminum tablet cemented in block of limestone 36 by 18 by 16 inches resting on surface, with small cairn 2 feet high over it.

Reference mark: A cairn 6 feet high, around which is tripod 15 feet high, 4.7 feet west of center.

[Latitude $48^{\circ} 36' 08.06''$. Longitude $114^{\circ} 07' 58.98''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Vulture	197 06 43.77	17 11 42.70	4.4403850
Heavens	239 33 31.95	59 46 03.41	4.3753830

GILDART, FLATHEAD COUNTY.

A high, rocky, shale point on summit of Swan Range, about 10 miles northwest of Swan Peak, about 12 miles southwest of south end of Swan Lake, 10 miles northeast of Squaw Flat. Good camping place at a small lake one-fourth mile south and 500 feet below station.

Station mark: An aluminum bolt set in shale rock, over which a cairn 6 feet high was erected.

[Latitude $47^{\circ} 50' 32.54''$. Longitude $113^{\circ} 39' 52.83''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Moss	52 52 45.61	232 39 12.36	4.4583161
Æneas	151 09 15.48	330 57 57.43	4.5720903
Baptiste	184 15 27.46	4 16 52.85	4.5052975
Pentagon	256 25 17.57	76 49 23.37	4.6193167
Silvertip	281 13 25.03	101 31 51.59	4.5009454

G. N., FLATHEAD COUNTY.

On the highest and most northwesterly of group of high, bare, rocky peaks of a brilliant yellow color in sunlight, between Great Northern Railway and South Fork of Flathead River, about 15 miles south

of west from Paola, about 15 miles due south from Nyack. The south slope is a cliff and the north and northeast slopes are covered by a glacier. Ascent was made from camps at two small lakes southeast of station.

Station mark: A copper nail in mound of cement and rock chips, over which a cairn 6 feet high was erected.

[Latitude $48^{\circ} 20' 13.74''$. Longitude $113^{\circ} 46' 33.47''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Eneas	26 57 50.35	206 51 28.55	4.3679315
Stimpson	211 47 53.12	31 55 22.82	4.3693805
Half Dome	277 40 01.70	98 11 16.00	4.7178889
Baptiste	335 12 36.32	155 19 00.86	4.4052811

HEAVENS, FLATHEAD COUNTY.

The highest sharp peak on ridge between McDonald Creek and Camas Creek, having a glacier on north and heavy snow field on east, about 5 miles north of northern end of McDonald Lake. It may be ascended from McDonald Creek by a long, hard climb, but the easiest route is from Camas Creek west of station by trail up Camas Creek to point about halfway between marshy meadow and first lake above Trout Lake, thence east up small stream heading in basin directly west of station, thence up spur north of basin to summit. Rock wall climbing for 2,000 feet.

Station mark: A bronze triangulation tablet cemented in solid rock on edge of cliff.

Reference mark: A cairn 6 feet high 3 feet southwest of station mark.

[Latitude $48^{\circ} 42' 36.15''$. Longitude $113^{\circ} 51' 18.05''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Coal bank	59 46 03.41	239 33 31.95	4.3753830
Vulture	139 25 55.88	319 18 22.24	4.2767308
Cleveland	181 27 22.63	1 27 45.27	4.3820563
Chief	215 53 50.41	36 04 59.30	4.4892290
Siyeh	261 27 08.56	81 36 27.41	4.1866002

MOSS, FLATHEAD COUNTY.

On a high, rocky peak on Mission Range, 4,500 feet above Flathead Lake, about 4 miles east of Phil. Moss's house. Small timber on top of

mountain was practically cleared off. Easily ascended by trail turning east up ridge, about a mile north of Moss's house. Good camp near foot of cliff to east and 1,000 feet below station; if no water there, find small meadow and pond $1\frac{1}{2}$ miles northeast, or lake $1\frac{1}{2}$ miles southeast.

Station mark: An aluminum tablet cemented in limestone ledge.

[Latitude $47^{\circ} 41' 09.71''$. Longitude $113^{\circ} 58' 11.22''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Æneas	184 15 36.68	4 17 54.69	4.7138082
Baptiste	206 56 38.27	27 11 38.65	4.7432742
Gildart	232 39 12.36	52 52 45.61	4.4583161
Swan	260 56 43.68	81 11 21.24	4.3986100
Holland	299 27 42.68	119 44 55.97	4.5264132
McDonald	353 22 19.41	173 24 36.47	4.5284824

STIMPSON, FLATHEAD COUNTY.

The highest prominent mountain about 10 miles, air line, north-east of Nyack station, Great Northern Railway, 6 miles southwest of Cut Bank Pass.

Station mark: A bronze triangulation tablet cemented in solid rock, above which a cairn 6 feet high was erected.

o [Latitude $48^{\circ} 30' 57.41''$. Longitude $113^{\circ} 36' 32.43''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Baptiste	2 21 17.88	182 20 13.96	4.6335816
Siyeh	173 02 48.84	353 01 46.16	4.3805672
Divide	222 29 55.14	42 40 04.16	4.3582004
Observation	285 51 16.29	106 03 58.03	4.3369737
Elk	317 43 41.50	137 57 42.89	4.5376220

SWAN, FLATHEAD COUNTY.

The highest sharp peak of the Swan Range lying between the Swan Valley and the valley of the South Fork of Flathead River. The peak is easily ascended by following the northeast ridge from camp at foot of cliff due east from station.

Station mark: A bronze triangulation tablet cemented in solid rock, above which a cairn 7 feet high was erected.

[Latitude $47^{\circ} 43' 15.595''$. Longitude $113^{\circ} 38' 24.80''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McDonald	29 18 20.25	209 06 01.90	4.6322527
Moss	81 11 21.24	260 56 43.68	4.3986100
Baptiste	180 42 06.12	0 42 26.09	4.6572513
Silvertip	255 57 25.72	76 14 46.05	4.4793510
Holland	347 45 20.68	167 47 57.74	4.3214981

VULTURE, FLATHEAD COUNTY.

A high, ragged peak with glacier remnants on east, on ridge dividing waters of Little Kootenai Creek and the North Fork of Flathead River. It is between the head of Quartz Creek on north and Logging Creek on south. Most easily ascended from near the head of Little Kootenai Creek via trail to summit of ridge one-half mile north of large cairn on prominent peak, thence southwesterly around head of Quartz Creek across bench due east of peak, thence over snow field and through gap just south of station, thence north across snow field to top of ridge, thence along crest to station.

Station mark: A bronze triangulation tablet under center of cairn 8 feet high.

[Latitude $48^{\circ} 50' 20.78''$. Longitude $114^{\circ} 01' 21.20''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Coal bank	17 11 42.70	197 06 43.77	4.4403850
Cleveland	232 52 39.49	53 00 36.56	4.2086134
Siyeh	293 35 42.22	113 52 35.32	4.4776027
Heavens	319 18 22.24	139 25 55.88	4.2767308

QUIGG, GRANITE COUNTY.

A high, rocky peak, about 20 miles south of Quigley and about 3 miles east of Rock Creek at point where trail to Stevensville, via Burnt Fork, leaves main Quigley-Phillipsburg trail. Peak is about 4,100 feet above river, and the slopes are covered with small scattering trees. About 2 miles east of station is a similar peak, bare, and perhaps higher.

Station mark: An aluminum tablet cemented in ledge, close to edge of precipice north of station.

Reference marks: Copper nail in notch on west side of pine tree, blazed on northeast and west sides (S); true azimuth, $352^{\circ} 48'$; distance, 53.4 feet south. Copper nail in top of pine stub blazed on

north, south, east, and west sides; true azimuth, $128^{\circ} 21'$; distance, 27.2 feet west. Copper nail in turn of pine stub blazed on side toward station; true azimuth, $267^{\circ} 55'$; distance 24 feet east.

[Latitude $46^{\circ} 29' 01.36''$. Longitude $113^{\circ} 43' 04.32''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Willow	41 12 36.54	221 03 41.08	4.3803840
St. Mary	94 50 59.47	274 28 07.87	4.6069916
Miller	157 16 02.01	337 08 42.48	4.5212790
McLeod	167 13 20.58	347 04 26.19	4.8445761
Kamas	192 28 26.79	12 32 51.52	4.5532809

CAREY, LEWIS AND CLARKE COUNTY.

Station is in NW. $\frac{1}{4}$ of sec. 11, T. 20 N., R. 7 W., on north end of flat, grassy ridge running northeasterly and southwesterly, about 5 miles northwest of town of Augusta. It is about one-half mile south of road from Augusta to Sun River Canyon (North Fork), and about 4 miles southeast of "China" Clark's ranch on Willow Creek. Azimuth station.

Station mark: Copper bolt set in rock in place, marked "U. S. G. S. Δ ."

[Latitude $47^{\circ} 30' 24.76''$. Longitude $112^{\circ} 27' 14.31''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Dearborn	17 53 06.65	197 48 35.17	4.4019801
Scapegoat	52 32 36.20	232 16 05.76	4.5513954
Fairview	83 37 46.40	263 24 42.84	4.3500521
Rocky	142 55 47.19	322 40 29.10	4.6321238

CLIFF, ON LINE BETWEEN LEWIS AND CLARKE AND DEER LODGE COUNTIES.

On Continental Divide, on edge of cliff, about 15 miles north of west of Warm Springs on North Fork of Sun River, at head of West Fork of South Fork of North Fork of Sun River, and about $6\frac{1}{2}$ miles nearly west of "Whiteridge." There is a break in cliff wall about 2 miles north of station and a goat trail over break. Best route to foot of cliff is via North Fork of Sun River and up the first canyon north of Whiteridge station.

Station mark: A copper bolt set in solid rock.

Reference mark: A cairn 6 feet high, 7.5 feet north of station mark.

[Latitude $47^{\circ} 39' 30.51''$. Longitude $113^{\circ} 07' 39.69''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Silvertip	147 11 49.77	327 06 24.40	4.2277913
Pentagon	180 37 39.31	0 37 51.06	4.4782543
Rocky	234 50 07.95	55 04 43.69	4.4787721
Whiteridge	258 08 36.32	78 14 12.69	3.9867018
Scapegoat	329 30 27.07	149 43 43.23	4.6504064

DEARBORN, LEWIS AND CLARKE COUNTY.

The highest point of eastern end of a long ridge dividing the waters of the North Fork of Dearborn River (to south) from the South Fork of Sun River (to north). The mountain has high cliffs of white limestone on east, south, and north, but the southwest slope is comparatively gradual. About 4 miles south of west of Sheep Mountain.

Best ascended from camp on Dearborn River, southwest of peak. Pack animals can be taken to station.

Station mark: A copper bolt marked "U. S. G. S. \triangle " set in rock in place, about 10 feet from edge of cliff.

[Latitude $47^{\circ} 17' 27.01''$. Longitude $112^{\circ} 33' 23.12''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Stonewall	35 38 11.10	215 30 12.74	4.3726424
Scapegoat	96 30 25.26	276 18 27.59	4.3147674
Fairview	145 57 39.49	325 49 08.70	4.4142805
Carey	197 48 35.17	17 53 06.65	4.4019801
Mitchell	328 30 21.50	148 42 31.19	4.6050259
Nevada	359 01 21.40	179 01 55.27	4.7603365

EAST BASE, LEWIS AND CLARKE COUNTY.

On top of bank north of Northern Pacific Railway track, at first cut, about 1 mile west of East Helena station.

Station mark: A bronze bench-mark tablet set in a dressed granite block, 27.5 feet north of the north rail of track and about 12 feet above it.

[Latitude 46° 35' 32.01". Longitude 111° 56' 24.35".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Lenox	56 56 18.10	236 52 41.29	3.8801481
Court-House	86 06 51.67	266 02 44.33	3.8612164
Mount Helena	88 17 23.38	268 11 59.17	3.9779385
West base	101 05 27.93	281 01 49.78	3.8136990
Scratchgravel	131 08 54.47	311 02 39.88	4.1626492
Gamer	164 51 38.90	344 49 56.69	4.0583098
Hilger	181 57 34.93	1 57 58.36	4.3006694

WEST BASE, LEWIS AND CLARKE COUNTY.

About 570 feet west of switch stand near western end of tangent of Northern Pacific Railway track and 1,900 feet west of the depot at Helena. It is 27.5 feet north of the line of the north rail of main track projected from end of tangent, and is south of track. Center is 67.5 feet from switch stand, on north side of track, to northeast and 70.35 feet from switch stand, on south side of track to northwest.

Station mark: A bronze bench-mark tablet set in a dressed granite block.

[Latitude 46° 36' 12.47". Longitude 112° 01' 24.60".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Court-house spire	26 07 08.51	206 06 39.30	3.2887750
Mount Helena	63 39 09.67	243 37 23.58	3.5402121
Scratchgravel	151 11 59.58	331 09 23.26	3.9770434
Gamer	199 06 45.92	19 08 42.03	4.0154497
East base	281 01 49.78	101 05 27.93	3.8136990
Lenox	359 36 53.99	179 36 55.22	3.7317875

FAIRVIEW, LEWIS AND CLARKE COUNTY.

About 16 miles a little south of west of town of Augusta, on the highest point of high ridge just west of a head of a North Fork of Willow Creek (which flows to the North Fork of Sun River), and about 1 mile north of the main branch of Willow Creek. It is about 2 miles west of "Red" McCarty's ranch house. The Augusta-Warm Springs road, via Willow Creek, passes east of station, and wood roads lead to foot of cliff beneath it.

Station mark: A copper bolt set in rock in place, 7.6 feet west of cairn.

Reference mark: A cairn 8 feet high, erected 5 feet from edge of cliff.

[Latitude $47^{\circ} 29' 02.95''$. Longitude $112^{\circ} 44' 57.17''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Scapegoat	17 10 48.39	197 07 20.51	4.3028101
Whiteridge	138 30 03.82	318 18 53.87	4.4558891
Rocky	174 11 44.97	354 09 32.49	4.5665888
Carey	263 24 42.84	83 37 46.40	4.3500521
Dearborn	325 49 08.70	145 57 39.49	4.4142805

GAMER, LEWIS AND CLARKE COUNTY.

The station is just south of the middle of an east-west road running on second section line north of south line of T. 11 N., R. 3 W., about one-fourth mile east of Fred Gamer's ranch house, about 8 miles north and east of Helena, and 443 feet west of stone in swamp, marking corner common to secs. 21, 22, 27, and 28, T. 11 N., R. 3 W.

Station mark: A copper bolt stamped "U.S.G.S. \triangle ", set in a granite post about 12 by 10 by 6 inches and level with surface of ground, having a mound of earth about 12 inches high heaped over the center.

[Latitude $46^{\circ} 41' 29.52''$. Longitude $111^{\circ} 58' 44.98''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
West base	19 08 42.03	199 06 45.92	4.0154497
Scratchgravel	79 30 32.88	259 26 00.29	3.9084088
Hilger	202 18 38.59	22 20 44.40	3.9848157
SE. cor. secs. 21, 22, 27, and 28, T. 11 N., R. 3 W.			2.1308116
East base	344 49 56.69	164 51 38.90	4.0583098

HILGER, LEWIS AND CLARKE COUNTY.

A station of the Missouri River Commission Survey, on the eastern end of a flat-topped mountain about $2\frac{1}{2}$ miles west of Missouri River, 15 miles northwest of Helena, and 22 miles northwest of Canyon Ferry on Missouri River.

Station mark: A $\frac{1}{4}$ -inch copper bolt, leaded into rock in place, set by Missouri River Commission.

[Latitude 46° 46' 18.78". Longitude 111° 55' 52.15".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
East base.....	1 57 58.36	181 57 43.93	4.3006695
Lenox.....	16 17 22.88	196 13 22.30	4.4000026
Gamer.....	22 20 44.40	202 18 38.59	3.9848157
Red.....	33 02 05.53	212 49 24.67	4.6125363
Scratchgravel.....	48 12 22.20	228 05 43.65	4.1933062
Nevada.....	90 21 45.41	269 54 59.04	4.6700058
Mitchell.....	131 22 47.89	311 07 31.60	4.5485050

Position for this station, as published by the Missouri River Commission in Appendix AAA, Report for 1891 of Chief of Engineers, War Department:

Latitude, 46° 46' 10.07". Longitude, 111° 55' 48.43".

LENOX, LEWIS AND CLARKE COUNTY.

The station is on a high, grassy ridge, 2.4 miles south of the courthouse at Helena, and 2.25 miles west of south of the Lenox addition to the city of Helena.

Station mark: A bronze bench-mark tablet cemented in rock in place.

[Latitude 46° 33' 17.83". Longitude 112° 01' 22.90".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Red.....	56 07 20.15	235 58 40.62	4.2649438
Nevada.....	121 29 50.10	301 07 07.16	4.6686244
Helena.....	140 46 34.00	320 44 46.71	3.6966486
West base.....	179 36 55.22	359 36 53.99	3.7317875
Hilger.....	196 13 22.30	16 17 22.88	4.4000026
East base.....	236 52 41.29	56 56 18.10	3.8801431

MITCHELL, LEWIS AND CLARKE COUNTY.

On north peak of a high, grassy ridge, bare on north and west slopes, with scattering timber on the south and dense forest on east slope; about 10 miles northwest of Mitchell station on Montana Central Railway and immediately west of Lyon Gulch. It is between the waters of Lyon Gulch and Canyon Creek, and about 2½ miles east of the Continental Divide.

Station mark: A copper bolt marked U. S. G. S. Δ set in rock in place.

[Latitude $46^{\circ} 58' 53.82''$. Longitude $112^{\circ} 16' 47.53''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Nevada	40 59 57.79	220 48 24.96	4.4870990
Stonewall	113 46 08.85	293 26 03.02	4.5791777
Scapegoat	131 38 20.00	311 14 35.51	4.7436966
Dearborn	148 42 31.19	328 30 21.50	4.6050259
Hilger	311 07 31.60	131 22 47.89	4.5485050
Scratchgravel	335 56 46.55	156 05 22.86	4.5671950

MOUNT HELENA, LEWIS AND CLARKE COUNTY.

Station is on summit of high peak a mile west of the city of Helena.

Station mark: A bronze bench-mark tablet cemented in rock in place, stamped 5458 feet.

[Latitude $46^{\circ} 35' 22.58''$. Longitude $112^{\circ} 03' 50.63''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
West Base	243 37 23.58	63 39 09.67	3.5402121
East Base	268 11 59.17	88 17 23.38	3.9779385
Lenox	320 44 46.71	140 46 34.00	3.6966486

PENTAGON, ON LINE BETWEEN LEWIS AND CLARKE AND DEER LODGE COUNTIES.

A high peak on Continental Divide, approximately 25 miles (air line) southwest of Raymond post-office. The drainage on the north, west, and south is to the Middle Fork of Flathead River; that to the southeast is to North Fork of Sun River. The base of the peak has somewhat the shape of a pentagon, whence the name. Southeast of peak is a small lake and feed where good camp is afforded. From here the ascent is comparatively easy, a climb of about 2,000 feet.

Station mark: A copper bolt set in solid rock.

Reference mark: A cairn 7 feet high, 12.3 feet north of station mark.

[Latitude $47^{\circ} 55' 44.33''$. Longitude $113^{\circ} 07' 23.82''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Cliff	0 37 51.06	180 37 39.31	4.4782543
Silvertip	30 51 22.22	210 45 44.39	4.2669682
Gildart	76 49 23.37	256 25 17.58	4.6193167
Baptiste	120 35 13.88	300 12 30.27	4.6439957
Elk	162 04 08.01	341 56 23.93	4.6206030
Half Dome	184 57 09.25	4 59 08.68	4.5834950
Rocky	297 40 04.06	117 54 29.90	4.4381328

SCAPEGOAT, ON LINE BETWEEN LEWIS AND CLARKE AND DEER
LODGE COUNTIES.

Highest point of ragged limestone peak on Continental Divide, at head of a West Branch of the North Fork of Dearborn River. The drainage to southwest is to Blackfoot River; to northwest is to Flathead River. The point has low cliff on southwest. It rises from a plateau which is surrounded by a cliff with vertical wall of 500 feet and total height of about 1,000 feet. Ascended from east, from a West Branch of the North Fork of Dearborn River. Cliff may be scaled by ascent of snow in reentrant angle, about $1\frac{1}{2}$ miles southwest of point, or over tongue of ridge 2 miles southwest of point.

Station mark: A copper bolt 10.5 feet east of cairn and about 3 feet below it, marked "U. S. G. S. Δ ."

Reference mark: A cairn 6 feet high on highest point.

[Latitude $47^{\circ} 18' 41.60''$. Longitude $112^{\circ} 49' 39.58''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Gordon	111 58 02.36	291 39 52.11	4.5249427
Fairview	197 07 20.51	17 10 48.39	4.3028101
Carey	232 16 05.76	52 32 36.20	4.5513954
Dearborn	276 18 27.59	96 30 25.26	4.3147674
Mitchell	311 14 35.51	131 38 20.00	4.7436966
Stonewall	342 19 51.98	162 23 50.24	4.3530878

SCRATCHGRAVEL, LEWIS AND CLARKE COUNTY.

Station is on highest point of a rocky knoll about 8 miles a little west of north from the city of Helena. Summit is thickly timbered, but some cutting was done near station.

Station mark: A copper rivet set in lead in rock in place.

Reference mark: A nail at bottom of blaze on south side of pine tree northeast of station; true azimuth to nail, $236^{\circ} 21'$; distance, 12.25 feet.

[Latitude $46^{\circ} 40' 41.59''$. Longitude $112^{\circ} 04' 59.60''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Mitchell	156 05 22.86	335 56 46.55	4.5671950
Hilger	228 05 43.65	48 12 22.20	4.1933062
Gamer	259 26 00.27	79 30 32.88	3.9084088
East Base	311 02 39.88	131 08 54.47	4.1626492
West Base	331 09 23.26	151 11 59.58	3.9770434

WHITERIDGE, LEWIS AND CLARKE COUNTY.

The highest peak on White Ridge, lying approximately northeast and southwest, about 10 miles northwest of the Warm Springs on the North Fork of Sun River. It is easily ascended via the northeast spur.

Station mark: A copper bolt marked "U.S.G.S. Δ " set in hard stone, extending 6 inches above surface and 18 inches below it.

Reference mark: A cairn 9 feet high 7.5 feet east of center.

[Latitude $47^{\circ} 40' 34.78''$. Longitude $113^{\circ} 00' 04.67''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Cliff	78 14 12.69	258 08 36.32	3.9867018
Silvertip	123 18 41.25	303 07 39.14	4.3480500
Rocky	224 40 21.14	44 49 20.21	4.3334810
Fairview	318 18 53.87	138 30 03.82	4.4558891
Scapegoat	342 03 17.29	162 10 58.11	4.6295499

GORDON, ON LINE BETWEEN MISSOULA AND POWELL COUNTIES.

On the bare rocky summit of a comparatively low mountain 5 miles southwest of junction of South Fork of Flathead River and Willow Creek. The top is light-colored limestone dipping northeast, at northern end of a long timbered ridge.

Station mark: An aluminum tablet cemented in a flat rock.

Reference marks: + cut in rock north of station, 21.8 feet distant.

+ cut in rock west of station, 28.7 feet distant.

[Latitude $47^{\circ} 25' 24.63''$. Longitude $113^{\circ} 14' 21.48''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Monture	11 23 59.42	191 21 35.48	4.3187096
Holland	116 09 36.42	295 54 29.38	4.4575503
Scapegoat	291 39 52.11	111 58 02.36	4.5249680
Stonewall	311 36 01.52	131 58 08.34	4.7069408

HOLLAND, MISSOULA COUNTY.

A very high, sharp, bare peak on Swan Range, about 8 miles northeast of Holland ranch, in Swan Valley, and 6 miles west of north from Gordon Pass. May be approached with animals from Gordon Pass by keeping on high shelf, swinging around amphitheaters east of crest, crossing crest in pass, thence following game trail about 2 miles south

of station, and then traveling along ridge to station. Water, wood, and grass in flat west of crest and about 2 miles from station.

Station mark: A bronze triangulation tablet cemented under center of cairn 8 feet high.

[Latitude 47° 32' 12.17". Longitude 113° 34' 52.13".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McLeod	27 53 02.63	207 88 01.81	4.7424174
McDonald	56 26 16.18	236 11 22.28	4.4848600
Moss	119 44 55.97	299 27 42.68	4.5264132
Swan	167 47 57.74	347 45 20.68	4.3214980
Silvertip	221 46 56.48	42 01 38.15	4.5712744
Gordon	295 54 29.38	116 09 36.42	4.4575503
Monture	326 33 51.64	146 46 33.27	4.5966669

KAMAS, MISSOULA COUNTY.

On highest point and at east end of a high, timbered ridge on divide between waters of Big Blackfoot and Hellgate rivers. About 7 miles due south of Potomac post-office, Kamas Prairie, and about 6 miles east of Clinton, station of Northern Pacific Railway. It is about 2 miles southeast from point where road from Clinton to Potomac crosses divide.

Station mark: An aluminum tablet cemented in a stone buried even with surface of ground.

Reference marks: Copper nail in notch on pine tree 24 inches diameter, 50.75 feet west; copper nail in top of fir stump 10 inches diameter, 21 feet north; copper nail in top of pine stump, blazed, 13.2 feet northeast.

[Latitude 46° 47' 51.64". Longitude 113° 37' 00.20".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Quigg	12 32 51.52	192 28 26.79	4.5532809
St. Mary	56 49 45.87	236 22 25.90	4.7591661
McLeod	145 12 31.92	324 59 10.07	4.6081045
Monture	206 25 57.27	26 40 08.07	4.7399916
Stonewall	241 38 22.85	62 16 54.23	4.8798203

M'DONALD, MISSOULA COUNTY.

The highest peak of the Mission Range, about 15 miles north of east from St. Ignatius Mission and 20 miles north of Flathead Agency.

Top of mountain has two summits of equal elevation about half a mile apart with drop of perhaps 100 feet between. Station is on western peak. The mountain is more easily approached from the Flathead Valley than from Swan Valley and is most easily ascended from southwest. There is little feed for stock, but wood and water are plentiful on McDonald Creek at east foot of peak.

Station mark: An aluminum bolt cemented in spit rock under center of a cairn 9 feet high.

[Latitude $47^{\circ} 23' 03.64''$. Longitude $113^{\circ} 55' 05.42''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McLeod	00 27 46.86	180 27 37.90	4.5046578
Moss	173 24 36.48	353 22 19.41	4.5284824
Swan	209 06 01.90	29 18 20.25	4.6322527
Holland	236 11 22.28	56 26 16.18	4.4848600
Monture	288 33 51.54	109 01 24.01	4.6979308

M'LEOD, MISSOULA COUNTY.

The highest peak of group of mountains lying south of Jocko River and north of Missoula, on a southern extension of the Mission Range. It is plainly visible from Jocko post-office and Jocko Valley. Summit is round and barren, broken rock, having a deep amphitheater on northeast. Peak is easily ascended on foot, from pass on north, 800 feet below summit, but animals may be taken to the station by approaching the peak from the southern slope.

Station mark: An aluminum tablet, cemented in rock in place, over which is a cairn 9 feet high.

[Latitude $47^{\circ} 05' 48.80''$. Longitude $113^{\circ} 55' 17.53''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
St. Mary	20 50 35.53	200 36 31.51	4.8411536
McDonald	180 27 37.90	0 27 37.60	4.5046578
Holland	207 38 01.81	27 53 02.63	4.7424174
Monture	251 18 33.13	71 46 10.73	4.7006137
Kamas	324 59 10.07	145 12 31.92	4.6081045
Quigg	347 04 26.19	167 13 20.58	4.8445761
Miller	355 50 47.28	175 52 21.13	4.5757137

MILLER (MILLER CREEK PEAK), MISSOULA COUNTY.

On a high, round-topped knob, about 10 miles (air line) southeast of Missoula. Knob is timbered on top, on north, east, and west

slopes; is grassy and open on south. It is between Little Park Creek, a branch of Miller Creek, and main Miller Creek; about 2 miles north-east of Hayes's sawmill and 2 miles southeast of mouth of Little Park Creek. Good camp on Miller Creek.

Station mark: An aluminum tablet cemented in solid rock.

[Latitude 46° 45' 32.90". Longitude 113° 53' 09.05".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Willow	3 23 06.95	183 21 29.21	4.6882822
St. Mary	45 09 31.93	224 53 56.85	4.5873858
McLeod	175 52 21.13	255 50 47.28	4.5757137
Quigg	337 08 42.48	157 16 02.01	4.5212790

DALY, RAVALLI COUNTY.

A station used only in the expansion of the base, situated 6 miles east of Hamilton, on land owned by Marcus Daly estate. It is on a rounded bald knob about 1,000 feet above the valley, and would be of no use in extending triangulation eastward, as much higher points are back of it.

Station mark: A bronze tablet set in shale rock.

[Latitude 46° 14' 02.78". Longitude 114° 01' 14.16".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
South base	68 44 55.92	248 39 27.36	4.0199315
Ward (2)	71 02 12.83	250 50 47.11	4.3334344
Ward (1)	71 23 34.32	251 12 13.86	4.3291730
North base	114 19 16.11	294 13 21.18	4.0623393
St. Mary	151 11 32.72	331 01 52.82	4.5495169
Willow	217 47 48.75	37 52 02.00	4.0875631

EL CAPITAN, RAVALLI COUNTY.

The station is on the central chimney of the main peak. It can be reached by going up the main fork of Rock Creek about 12 miles from Lake Como, to a point where a creek comes in from the south over a series of falls about 200 feet high. Proceed upstream about 200 yards above this point to a point where a blazed trail comes in from the south, crossing Rock Creek about 200 yards above the falls. A trail was cut and blazed up the South Fork of Rock Creek to an elevation of over 6,000 feet.

Station mark: A copper bolt in solid rock.

[Latitude 46° 00' 32.91". Longitude 114° 23' 44.55".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
St. Mary	191 48 04.3	11 54 41.1	4.757832
Ward (2)	205 32 19.6	25 37 08.0	4.299310
Willow	226 17 46.1	46 38 13.0	4.701860

NORTH BASE, RAVALLI COUNTY.

Two miles north of Hamilton, on prolongation of the railroad tangent, opposite the sawmill at Riverside and 19.5 feet south of a fence running east and west.

Station mark: A bronze tablet cemented in a rock set flush with surface of ground.

Reference marks: Crosses cut on rocks set respectively 10 feet north, east, and west of the station.

[Latitude 46° 16' 36.46". Longitude 114° 09' 25.46".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Ward (1)	39 54 25.84	219 48 59.87	4.1788528
St. Mary	165 53 52.84	345 50 08.51	4.4330820
Willow	254 38 55.30	74 49 03.84	4.2712508
Daly	294 13 21.18	114 19 16.11	4.0623393
South base	354 48 43.70	174 49 09.85	3.9336308
Astronomic pier	354 32 02.44	174 32 12.50	3.4958579

ST. MARY, RAVALLI COUNTY.

Eight miles west of Stevensville. To reach the station, go to Curlew extension, north end of Curlew mine, and follow the ridge nearly to the top, then turn off on right-hand ridge and follow it to main dividing ridge, along which a trail is plainly blazed to the lake, which is about $1\frac{1}{2}$ miles north of station and 8 miles northwest of Curlew.

Station mark: A copper bolt in solid rock, above which a cairn 8 feet in diameter and 10 feet high was erected.

[Latitude 46° 30' 47.79". Longitude 114° 14' 35.27".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Ward (1)	4 35 14.87	184 33 32.40	4.5797243
Ward (2)	4 47 49.15	184 46 01.41	4.5820774
El Capitan	11 54 41.10	191 48 04.30	4.7578320
Willow	310 52 19.34	131 06 13.50	4.5129510
Daly	331 01 52.82	151 11 32.72	4.5495169
North base	345 50 08.51	165 53 52.84	4.4330820
South base	347 58 33.55	168 02 43.96	4.5515850

SOUTH BASE, RAVALLI COUNTY.

One-third of a mile south of the railroad station at Grantsdale, on prolongation of railroad tangent and about 500 feet south of its extremity. The station is on slightly elevated ground just west of an irrigation ditch.

Station mark: A copper bolt 1 inch in diameter sunk $3\frac{1}{2}$ inches in a rock 8 inches square on top, set 3 feet in the ground.

Reference mark: A cross cut in the top of a rock 10 feet westward and at right angles to the base line.

[Latitude 46° 11' 59.62". Longitude 114° 08' 49.25".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Ward (1)	73 50 35.38	253 44 43.50	4.0370748
St. Mary	168 02 43.96	347 58 33.55	4.5515850
North base	174 49 09.85	354 48 43.70	3.9336308
Willow	231 56 56.56	52 06 38.56	4.3401538
Daly	248 39 27.36	68 44 55.92	4.0199315

WARD (1), RAVALLI COUNTY.

Six miles, air line, southwest of Grantsdale. The station is on the northern end, but about 100 feet lower than the highest point, of the high mountain just north of Roaring Lion Creek. The summit extends northeast and southwest about one-fourth mile.

Station mark: A copper bolt in the solid rock, above which a cairn 5 feet in diameter at base and 10 feet in height was erected.

[Latitude $46^{\circ} 10' 21.18''$. Longitude $114^{\circ} 16' 56.91''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
St. Mary	184 33 32.40	4 35 14.87	4.5797243
North base	219 48 59.87	39 54 25.84	4.1788524
Willow	239 05 10.47	59 20 44.57	4.5084996
Daly	251 12 13.86	71 23 34.32	4.3291720
South base	253 44 43.50	73 50 35.38	4.0370748

WARD (2), RAVALLI COUNTY.

A second station to be used in the main scheme of triangulation was established on the extreme summit, about 800 feet southwest of Ward (1). A long ridge of easy slope leads to the station from the southeastern side.

Station mark: A copper bolt in the solid rock, above which is a cairn 5 feet in diameter at base and 8 feet in height.

[Latitude $46^{\circ} 10' 14.89''$. Longitude $114^{\circ} 17' 04.18''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
El Capitan	25 37 08.00	205 32 19.60	4.2993100
St. Mary	184 46 01.41	4 47 49.15	4.5820774
Willow	238 55 53.90	59 11 33.24	4.5116335
Daly	250 50 47.11	71 02 12.83	4.3334344

WILLOW, RAVALLI COUNTY.

A station in the base expansion, situated 15 miles northeast of Hamilton, on a bald summit of the range on the eastern side of the Bitterroot Valley and about 4,000 feet above it. It can be reached by following up Willow Creek from Corvallis to a half-finished log cabin; thence up a leading spur to the station, the latter part of the way being through lodge-pole pines and difficult to travel. This station can be used in the extension of triangulation in any direction excepting eastward.

Station mark: A lone tree, trimmed.

[Latitude 46° 19' 15.72". Longitude 113° 55' 23.70".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Daly	37 52 02.00	217 47 48.75	4.0875630
El Capitan	46 38 13.00	226 17 46.10	4.7018600
South base	52 06 38.56	231 56 56.56	4.3401538
Ward (2)	59 11 33.24	238 55 53.90	4.5116330
Ward (1)	59 20 44.57	239 05 10.47	4.5084996
Astronomic pier	65 41 35.41	245 31 37.08	4.2891104
North base	74 49 03.84	254 38 55.30	4.2712508
St. Mary	131 06 13.50	310 52 19.34	4.5129510

ALIAS, TETON COUNTY.

On highest butte, about 10 miles north of Cook's ranch, on Cutbank Creek.

Station mark: An iron bench-mark post set 3 feet in ground.

[Latitude 48° 47' 08.07". Longitude 112° 44' 04.96".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Cutbank	72 16 38.65	252 00 11.85	4.4498243
Lincoln	123 43 09.50	303 29 32.88	4.4239834
Milk River	196 26 39.15	16 30 22.76	4.3289271
Landslide	205 59 54.50	26 04 08.53	4.1951016
Baker	233 01 47.08	53 09 24.16	4.1900240
Connie	350 37 29.81	170 40 27.45	4.4743217

BAKER, TETON COUNTY.

On a low, rounded hill, 5 miles southeast of Landslide butte.

Station mark: An aluminum tablet set in a sandstone rock placed flush with ground.

[Latitude 48° 52' 09.18". Longitude 112° 33' 57.73".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Connie	11 06 56.51	191 02 18.10	4.5960195
Alias	53 09 24.16	233 01 47.08	4 1900240
Lincoln	99 04 05.56	278 42 50.89	4.5425517
Landslide	131 02 03.24	310 58 39.93	3.8624070

BOUNDARY 373, TETON COUNTY.

Situated on the international boundary line between the Dominion of Canada and the United States, about 4 miles east of St. Marys River and on the ridge north of the valley known as Galbreath Basin. The station is 9.7 feet west of the post and stone monument on the international boundary (forty-ninth parallel).

The post is about 5 inches square in a monument of loose rock about 6 feet in diameter and 3 feet high, and is marked "IXXV, IXXIV, Long. $113^{\circ} 12' 23''$, 1881." An iron pipe $1\frac{1}{4}$ inches in diameter is set in the ground at north corner of monument. On Cartee's map the post is given as No. 373.

Station mark: An aluminum bolt stamped "U. S. G. S.," set in a flat rock sunk in ground.

[Latitude $48^{\circ} 59' 59.90''$. Longitude $113^{\circ} 12' 21.32''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Galbreath.....	26 50 33.70	206 48 11.50	3.9293058
Robertson.....	64 00 07.24	243 44 02.56	4.4623648

CHIEF MOUNTAIN, TETON COUNTY.

A prominent and well-known mountain 4 miles south of the international boundary and on the line between the Blackfeet Indian Reservation and the Flathead Forest Reserve. It can be ascended from camp on Kennedy Creek, 2 miles (air line) southeast of peak, by going around south side and up the ridge near the western end of mountain.

Station mark: An aluminum tablet stamped "9056," cemented in solid rock.

Reference mark: A boundary monument 6 feet high, 3 feet south-east of station mark.

[Latitude $48^{\circ} 56' 04.16''$. Longitude $113^{\circ} 36' 29.36''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Siyeh.....	7 26 28.22	187 24 39.03	4.3596134
Heavens.....	36 04 59.30	215 53 50.41	4.4892290
Cleveland.....	87 15 17.32	267 04 30.01	4.2429799
Galbreath.....	270 32 28.26	90 48 17.87	4.4088709
Divide.....	332 40 44.32	152 50 08.95	4.5244456

CLEVELAND, TETON COUNTY.

Highest peak on ridge dividing waters of Little Kootenai Creek (to north) and Belly River (to east). Has cliff about 4,000 feet high on north and east. About the only way to ascend peak is from a point where trail down Little Kootenai Creek crosses a branch from east, about $2\frac{1}{2}$ miles south of Waterton Lake, follow a blazed trail through timber and cross ledges and brush in southeasterly direction, keeping about one-half mile north of creek. Good camp in amphitheater southeast of peak. Ascend wall by spur which reaches top of ridge about one-half mile south of station, about 4,000 or 4,500 feet climb on foot.

Station mark: An aluminum tablet cemented in a flat rock buried in ground under center of a cairn 8 feet high.

[Latitude $48^{\circ} 55' 36.14''$. Longitude $113^{\circ} 50' 47.96''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Heavens	1 27 45.27	181 27 22.63	4.3820563
Vulture	53 00 36.56	232 52 39.49	4.2086134
Intersection	136 14 22.68	316 10 38.07	3.9422535
Chief Mountain	267 04 30.01	87 15 17.32	4.2429799
Siyehe	326 14 10.44	146 23 07.56	4.4189162

CONNIE, TETON COUNTY.

On a high bluff north of Two Medicine Creek, about $1\frac{1}{2}$ miles east of Schoot's ranch and about 4 miles east of Old Mission.

Station mark: An iron bench-mark post set 3 feet in ground.

[Latitude $48^{\circ} 31' 15.94''$. Longitude $112^{\circ} 40' 08.34''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Cutbank	123 22 09.97	303 02 47.64	4.5789289
Alias	170 40 27.45	350 37 29.81	4.4743217
Baker	191 02 18.10	11 06 56.51	4.5960195

CUTBANK, TETON COUNTY.

On a salient in the southern escarpment of the high ridge between Cutbank Creek and the South Fork of Milk River, about one-half mile east of the Blackfoot-St. Marys road and about 16 miles from Blackfoot.

Station mark: An aluminum bolt set in a large rock and buried about 3 inches under surface of ground.

Underground mark: A small bottle about 2 feet under surface.

[Latitude 48° 42' 28.87". Longitude 113° 05' 57.54".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Divide.....	78 30 23.05	258 16 50.78	4.3537211
Robertson			4.5938421
Galbreath	154 56 19.85	334 49 09.11	4.4393359
Lincoln.....	191 15 25.39	11 18 17.07	4.3764294
Alias	252 00 11.85	72 16 38.65	4.4498243
Connie	303 02 47.64	123 22 09.97	4.5789289
Durham	349 01 49.31	169 04 21.35	4.3395795

DIVIDE, TETON COUNTY.

On a high, almost isolated peak, about 20 miles northwest from Browning, on western boundary line of the Blackfeet Indian Reservation. It is best reached by going up the South Fork of Milk River to Fox Creek, then up the divide between Fox Creek and the South Fork. This divide is an open prairie; follow up prairie for about 6 miles from mouth of Fox Creek to its end in forest. From this point a blazed trail leads through forest to the foot of the bare peak of the mountain. Go around the north side of the mountain to the west side, then climb slide rock to top.

Station mark: An iron bolt set in solid ledge, above which a rock monument about 5 feet square and 12 feet high was erected. The monument was erected by survey party locating boundary of Blackfeet Reservation, and marks an angle in the boundary line.

Reference mark: A bronze tablet 6 inches below surface and 3 feet 3 inches directly west of center of monument.

[Latitude 48° 40' 01.30". Longitude 113° 23' 58.95".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Stimpson	42 40 04.16	222 29 55.14	4.3582004
Siyeh.....	111 08 31.11	290 57 18.40	4.2926991
Chief Mountain.....	152 50 08.95	332 40 44.32	4.5244456
Robertson	153 58 13.26	333 50 55.74	4.4314489
Galbreath	199 23 02.88	19 29 25.94	4.4944507
Cutbank.....	258 16 50.78	78 30 23.05	4.3537211
Durham	302 36 06.04	122 52 09.10	4.4952861
Observation.....	346 36 47.00	166 40 04.77	4.3693647

DURHAM, TETON COUNTY.

A high point on the ridge three-fourths of a mile south of Durham Station on Great Northern Railway.

Station mark: An aluminum bolt set on a rock 2 feet long buried even with surface of ground.

[Latitude 48° 30' 53.68". Longitude 113° 02' 34.88".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Half Dome	5 36 24.55	185 34 48.53	4.4330247
Elk	36 29 36.39	216 18 14.18	4.5000046
Observation	74 28 54.88	254 16 10.92	4.3375263
Divide	122 52 09.10	302 36 06.04	4.4952861
Cutbank	169 04 21.35	249 01 49.31	4.3395795
Alias	216 55 45.97	37 09 39.24	4.5764569

ELK, TETON COUNTY.

About 6 miles south of Summit Station on Great Northern Railway, on the Continental Divide, between the headwaters of the South Fork of Two Medicine Creek and the south branch of Summit Creek. It is the highest point in the immediate vicinity. It is best reached by going up as far as the prairie extends on the South Fork of Two Medicine and then taking an old trail on the south side of creek, following the creek for about 2 miles, crossing it, and thence on a blazed and cut-out trail for 4 miles to crest of the mountain. It is a difficult trail to travel on account of thick and fallen timber and soft ground.

Station mark: An aluminum bolt set in loose rock under center of cairn 6 feet high.

[Latitude 48° 17' 09.76". Longitude 113° 17' 47.25".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Baptiste	55 15 59.88	235 00 57.26	4.4837563
Stimpson	137 57 42.89	317 43 41.50	4.5376220
Observation	173 32 39.96	353 31 19.30	4.2948174
Durham	216 18 14.18	36 29 36.39	4.5000046
Half Dome	275 17 37.84	95 27 22.93	4.2104101
Pentagon	341 56 23.93	162 04 08.01	4.6206030

FLATTOP, TETON COUNTY.

A secondary station on the southern and highest end of Flattop Mountain, just west of Lower St. Marys Lake.

Station mark: An aluminum bolt set in solid rock, over which is a monument of loose stone 7 feet high and 3 feet in diameter.

[Latitude $48^{\circ} 44' 26.30''$. Longitude $113^{\circ} 31' 09.33''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Galbreath.....	221 55 50.52	42 07 37.80	4.4566111
Divide.....	312 53 03.63	132 58 26.98	4.0798410

GALBREATH, TETON COUNTY.

On eastern end of ridge dividing Galbreath Basin from North Fork of Milk River, about half a mile west of the low divide between Milk River and Galbreath Basin.

Station mark: An aluminum bolt in a stone set 2 feet in ground.

[Latitude $48^{\circ} 55' 54.41''$. Longitude $113^{\circ} 15' 29.84''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Divide.....	19 29 25.94	199 23 02.88	4.4944507
Robertson.....	76 58 00.69	256 44 18.59	4.3581326
Chief Mountain.....	90 48 17.87	270 32 28.26	4.4088709
Boundary post 373.....	206 48 11.50	26 50 33.70	3.9293058
Lincoln.....	275 24 31.66	95 34 35.06	4.2140284
Cutbank.....	334 49 09.11	154 56 19.85	4.4393359

HALF DOME, TETON COUNTY.

On the highest mountain of the "False" Range north of the canyon of Badger Creek. It is a rounded summit with almost vertical face to north, called "Half Dome," from the resemblance to that feature when seen from the northwest, but appearing as a rounded summit from other directions.

Station mark: A copper bolt set in solid rock under a cairn 7 feet high.

[Latitude $48^{\circ} 16' 20.53''$. Longitude $113^{\circ} 04' 43.37''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pentagon.....	4 59 08.68	184 57 09.25	4.5834950
Baptiste.....	69 06 34.17	248 41 47.27	4.6448796
Elk.....	95 27 22.93	275 17 37.84	4.2104101
Observation.....	139 05 14.01	318 54 07.47	4.4467669
Durham.....	185 34 48.53	5 36 24.55	4.4330247

LANDSLIDE, TETON COUNTY.

On a prominent butte of that name 5 miles south of international boundary.

Station mark: An iron bench-mark post set 3 feet in ground.

[Latitude 48° 54' 43.91". Longitude 112° 38' 27.59".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Alias	26 04 08.53	205 59 54.50	4.1951016
Lincoln	91 21 28.54	271 03 36.86	4.4617384
Milk River	172 37 36.20	352 37 05.64	3.8077582
Baker	310 58 39.93	131 02 03.24	3.8624070

LINCOLN, TETON COUNTY.

On a prominent butte, one-half mile west of "Emigrant Pass" wagon road and 5 miles south of the international boundary.

Station mark: An iron bench-mark post set 3 feet in ground.

[Latitude 48° 55' 03.69". Longitude 113° 02' 09.42".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Cutbank	11 18 17.07	191 15 25.39	4.3764294
Galbreath	95 34 35.06	275 24 31.66	4.2140284
Milk River	258 16 34.54	78 33 56.13	4.4577635
Landslide	271 03 36.86	91 21 28.54	4.4617384
Baker	278 42 50.89	99 04 05.56	4.5425517
Alias	303 29 32.88	123 43 09.50	4.4239834

MILK RIVER, TETON COUNTY.

On a high butte on east or west bank of Milk River, 1 mile south of the international boundary.

Station mark: An iron bench-mark post sunk 3 feet in ground.

[Latitude 48° 58' 10.12". Longitude 112° 39' 08.12".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Alias	16 30 22.76	196 26 39.15	4.3289271
Lincoln	78 33 56.13	258 16 34.54	4.4577635
Landslide	352 37 05.64	172 37 36.20	3.8077582

OBSERVATION, TETON COUNTY.

About 6 miles northwest of Midvale station on Great Northern Railway, 4 miles a little south of west of Lower Two Medicine Lake, and 6 miles east of the Continental Divide. It is best reached by taking the trail from the wagon-road bridge over Two Medicine Creek near the upper bull corral of the Indian agency. This trail leads to the station on a shoulder about 1 mile east of highest point, which is an inaccessible crag.

Station mark: Center of drill hole in a rock set in ground under center of cairn 7 feet in height.

[Latitude $48^{\circ} 27' 44.00''$. Longitude $113^{\circ} 19' 35.15''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Baptiste	31 40 33.62	211 26 50.30	4.6377352
Stimpson	106 03 58.03	285 51 16.29	4.3369737
Divide	166 40 04.77	346 36 47.00	4.3693647
Durham	254 16 10.92	74 28 54.88	4.3375263
Half Dome	318 54 07.47	139 05 14.01	4.4467669
Elk	353 31 19.30	173 32 39.96	4.2948174

ROBERTSON, TETON COUNTY.

On the eastern end of Robertson Mountain, being the second peak on the "comb" counting from the east. Only apparent way of reaching it is to climb the rock slide on north side of east end of mountain, passing over the "comb" until station is reached. It is a difficult and somewhat dangerous climb on account of loose rock.

Station mark: An aluminum bolt, stamped "U. S. G. S.," set in solid ledge, over which is a monument of loose rock 9 feet high.

[Latitude $48^{\circ} 53' 06.45''$. Longitude $113^{\circ} 33' 40.65''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Galbreath	256 44 18.59	76 58 00.69	4.3581326
Divide	333 50 55.74	153 58 13.26	4.4314489

ROCKY, TETON COUNTY.

Highest peak of range to east of the North Fork of Sun River, about 6 miles west of "Ear" (or "Elephants Ear") Butte, and 4 miles southwest of Friar's sawmill, on South Fork of Teton River, about 6 miles east of North Fork of Sun River. It is on divide between waters of

the South Fork of Teton River and waters of the North Fork of Sun River. Best route of ascent is from the south.

Station mark: A copper bolt marked "U. S. G. S. Δ " set in a stone buried flush with surface.

Reference mark: A cairn 8 feet high, 11.5 feet east of station mark.

[Latitude $47^{\circ} 48' 50.38''$. Longitude $112^{\circ} 47' 56.36''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Scapegoat	2 13 21.57	182 12 05.39	4.7474380
Whiteridge	44 49 20.21	224 40 21.14	4.3334810
Cliff	55 04 43.60	234 50 07.95	4.4787721
Silvertip	84 55 43.91	264 35 41.52	4.5304282
Pentagon	117 54 29.90	297 40 04.06	4.4381328
Carey	322 40 29.10	142 55 47.19	4.6321238
Fairview	354 09 32.49	174 11 44.97	4.5665888

SIYEH, TETON COUNTY.

About 5 miles south of Altyn post-office and just south of the Crack-erjack copper mine. Go up creek from Altyn 2 miles south, thence over a winding trail up east side of mountain to the canyon from east, which ascend south then east up the creek entering at head of amphitheater. At top of ridge go on foot over the crest of peaks for about 3 miles; this is a long and difficult climb. Peak slopes 45° south and falls off nearly perpendicular 4,500 feet on the north.

Station mark: A bronze tablet wedged into a drill hole in a large rock 2 feet lower than base of reference mark.

Reference mark: A stone monument 4 feet high, erected 5 feet northwest of station mark, on the highest part and close to the precipice.

[Latitude $48^{\circ} 43' 49.43''$. Longitude $113^{\circ} 38' 54.41''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Heavens	81 36 27.41	261 27 08.56	4.1866002
Vulture	113 52 35.32	293 35 42.22	4.4776027
Cleveland	146 23 07.56	326 14 10.44	4.4189162
Chief Mountain	187 24 39.03	7 26 28.22	4.3596134
Divide	290 57 18.40	111 08 31.11	4.2926991
Stimpson	353 01 46.16	173 02 48.84	4.3805672

ARIZONA-NEW MEXICO.

TRIANGULATION STATIONS.

Arizona.

Triangulation in south-central Arizona was extended eastward from stations Black Hawk, Blair, and Coal by Thomas Winsor and Jeremiah Ahern during the season of 1900, and extended still farther eastward into New Mexico by R. H. Chapman, topographer, during November and December, 1901. Three 30-minute quadrangles in Arizona and two in New Mexico were controlled by fifteen stations. A check azimuth was observed near Morenci.

Geographic location of points in vicinity of Globe, Ariz.

Name of mine.	Point located.	Latitude.	Longitude.
	MINE LOCATIONS.	° ' "	° ' "
Hoosier	Hoisting rope	33 24 54.22	110 46 53.59
Old Dominion shaft	Hoisting rope	33 24 37.54	110 47 23.44
Gray Hoist	Hoisting rope	33 25 04.62	110 46 41.99
Gray Incline	Hoisting rope	33 25 07.86	110 46 38.88
Copper Hill	Hoisting rope	33 25 21.81	110 46 29.61
Cuprite mine	Hoisting rope	33 25 11.86	110 46 34.99
Globe Public School	Flag pole in yard of public school.	33 23 47.30	110 47 27.92

CENTER STATION, GILA COUNTY.

About 200 feet southwest of summit of ridge extending in a north-east direction from the Buffalo mine, about 1,800 feet from Buffalo mine and about 1,900 feet from the Gray mine.

Station mark: A bronze tablet cemented in rock in place.

Latitude $33^{\circ} 25' 14.60''$. Longitude $110^{\circ} 47' 00.94''$.

NORTH EAST STATION, GILA COUNTY.

Summit of highest hill, about nine-tenths mile southeast of Black Hawk triangulation station.

Station mark: A bronze tablet cemented in rock in place.

Latitude $33^{\circ} 25' 30.09''$. Longitude $110^{\circ} 45' 29.39''$.

NATANES, GILA COUNTY.

Situated on summit of cone-shaped butte of same name about 40 miles northeast of San Carlos, one-third mile west of trail to Fort Apache, 4 miles south of Black River, and 4 miles northeast of horse camp and corral of Chiricahua Cattle Company.

Station mark: A bronze triangulation tablet cemented in point of

solid rock in about center of top of butte, over which is built a monument of rocks and brush.

[Latitude $33^{\circ} 33' 36.00''$. Longitude $110^{\circ} 07' 46.67''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Turnbull	12 50 31.76	192 46 10.88	4.7437771
Triplets	40 26 35.12	220 19 17.19	4.5006441
Gila	337 57 16.68	158 03 07.34	4.6433704

ASH PEAK, GRAHAM COUNTY.

(Not occupied.)

A sharp conical peak on range east of Gila River; about 12 miles northwest of Duncan and 7 miles west of river. Is close to public road from Duncan to Solomonsville.

[Latitude $32^{\circ} 45' 00.7''$. Longitude $109^{\circ} 15' 45.4''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Guthrie	161 57 34	341 55 52	4.19903
Line	245 50 31	65 59 08	4.43456

AZIMUTH (2), GRAHAM COUNTY.

Situated on summit of small knoll on divide, three-tenths mile south of Morenci, 260 yards southeast of two water tanks.

Station mark: A large stone post, in center of top of which is cemented a bronze tablet.

[Latitude $33^{\circ} 04' 17.00''$. Longitude $109^{\circ} 22' 00.69''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sunset	246 57 47	67 02 20	4.149184
Guthrie	346 43 02	166 44 44	4.325316

BRYCE, GRAHAM COUNTY.

Situated on summit of highest peak in Gila Range, about 15 miles northeast of town of Pima and about 3 miles east of wagon road from Bryce to Ash Flat.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: A large cairn, 14 feet distant from station mark; azimuth of mark from station, $148^{\circ} 37'$.

[Latitude 33° 01' 06.62". Longitude 109° 40' 22.94".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Graham.....	27 52 18.37	207 45 49.73	4.6010908
Turnbull.....	96 23 20.23	276 04 04.88	4.7427259
Gila.....	126 31 02.72	306 21 53.10	4.5110005
Sunset.....	254 34 42.17	74 49 16.71	4.6344900
Guthrie.....	293 38 02.07	113 49 43.31	4.5632224

GILA, GRAHAM COUNTY.

Situated on summit of Gila Peak, about 12 miles northeast of Geronimo and one-half mile west of the Hooker trail from Geronimo to Ash Flat.

Station mark: A bronze triangulation tablet cemented in solid rock, over which is built a cairn.

[Latitude 33° 11' 32.00". Longitude 109° 57' 09.23".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Turnbull.....	65 22 46.27	245 12 38.24	4.5016173
Triplets.....	114 19 19.76	294 06 14.30	4.6088877
Natanes.....	158 03 07.34	337 57 16.68	4.6433704
Bryce.....	306 21 53.10	126 31 02.72	4.5110005
Graham.....	352 07 05.84	172 09 43.55	4.7410079

GRAHAM, GRAHAM COUNTY.

On easternmost peak of a high, timbered mountain, about 20 miles south of the town of Pima. Wagon road via Cluff's ranch from Pima to summit of main ridge near Cluff's sawmill, which is about 4 miles west of station. Good trail along ridge to station. Theodolite elevated 35 feet.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude 32° 42' 00.75". Longitude 109° 52' 19.25".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Turnbull.....	138 40 17.18	318 27 35.69	4.7410352
Gila.....	172 09 43.55	352 07 05.84	4.7410079
Bryce.....	207 45 49.73	27 52 18.37	4.6010908
Guthrie.....	248 19 42.27	68 37 48.46	4.7489196
Secho.....	284 14 41.16	104 43 43.49	4.9399787

GUTHRIE, GRAHAM COUNTY.

Situated on the highest point between Green & Sons' toll road from Solomonsville to Coronado and the Gila River. Station is 2 miles northwest of summit of above road.

Station mark: A $\frac{1}{2}$ -inch iron bolt wedged with nails in a hole drilled in solid rock, over which is built a cairn 8 feet in diameter and 8 feet high.

[Latitude 32° 53' 08.75". Longitude 109° 18' 53.75".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Graham	68 37 48.46	248 19 42.27	4.7489196
Bryce	113 49 43.31	293 38 02.07	4.5632224
Morenci	164 00 19.10	343 58 00.50	4.3795070
Sunset	197 17 57.00	17 20 47.78	4.4367053
Line	277 27 30.68	97 37 50.86	4.4766777
Secho	322 50 47.82	143 01 51.29	4.7250061

MORENCI, GRAHAM COUNTY.

A three-point station, situated on a peak about 2 miles northwest of town of Morenci. A good trail from Morenci on south slope of peak reaches top of ridge about one-half mile west of station, at which point leave trail and travel along ridge to station.

Station mark: A bronze triangulation tablet cemented in solid rock.

Reference mark: A cairn 4 feet in diameter and 5 feet high, 4 feet north of station mark.

[Latitude 33° 05' 36.40". Longitude 109° 23' 08.35".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sunset	258 12 33	78 17 48	4.177416
Line	306 30 43	126 43 23	4.655230
Guthrie	343 58 00	164 00 19	4.379507

PIMA CHURCH, GRAHAM COUNTY.

(Not occupied.)

Station mark: Spire on Mormon church at Pima.

[Latitude 32° 53' 26.97". Longitude 109° 49' 34.35".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Graham	11 29 09	191 27 '40	4.333842
Bryce	225 17 05	45 22 05	4.304064

SHANNON, GRAHAM COUNTY.

Summit of Shannon Mountain, one-half mile northeast of town of Metcalf, 150 yards east of the office of the Shannon Mining Company.

Station mark: A bronze bench-mark tablet set in rock, over which a small cairn was built.

[Latitude $33^{\circ} 07' 02.50''$. Longitude $109^{\circ} 21' 35.89''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Guthrie	350 40 48	170 42 16	4.41543
Azimuth (2)	367 11 27	187 11 14	3.71082

SUNSET, GRAHAM COUNTY.

Situated 6 miles northeast of town of Clifton, on mountain locally known as Sunset Mountain. Wagon road from Clifton to old slaughter corral on Limestone wash about 2 miles above its mouth, thence by good trail taking left hand (to N.) to gap east of station, thence dim trail to station.

Station mark: A bronze triangulation tablet cemented in solid rock, over which is built a cairn 6 feet in diameter and 7 feet high.

[Latitude $33^{\circ} 07' 15.81''$. Longitude $109^{\circ} 13' 40.22''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Guthrie	17 20 47.78	197 17 57.00	4.4367053
Bryce	74 49 16.71	254 34 42.17	4.6344900
Morenci	78 17 48.4	258 12 38.10	4.1774160
Pleasant	233 35 23.45	53 44 52.30	4.5235914
Mogollon	254 12 01.18	74 32 48.81	4.7873988
Canyon	276 51 41.38	97 16 44.58	4.8571778
Line	324 17 52.14	144 25 23.59	4.5676142
Secho	340 45 48.18	160 54 03.87	4.8602010

TRIPLETS, GRAHAM COUNTY.

Situated on summit of highest of three peaks known as The Triplets, about 12 miles northeast of San Carlos and 2 miles northwest of Hackberry Springs on old San Carlos and Fort Apache road.

Station mark: A bronze triangulation tablet cemented in solid rock, over which is built a cairn.

[Latitude 33° 20' 32.95". Longitude 110° 21' 01.12".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Coal	37 18 55.33	217 11 30.46	4.5408219
Black Hawk	105 03 56.49	284 50 10.38	4.6037580
Natanes	220 19 17.19	40 26 35.12	4.5006441
Gila	294 06 14.30	114 19 19.76	4.6088877
Turnbull	344 31 27.14	164 34 23.10	4.4921118

TURNBULL, GRAHAM COUNTY.

Situated on summit of sharp, rocky, isolated peak known as Mount Turnbull, about 15 miles southeast of San Carlos and 15 miles west of Geronimo.

Station mark: A bronze triangulation tablet cemented in solid rock, over which is built a cairn.

[Latitude 33° 04' 21.37". Longitude 110° 15' 41.67".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Coal	94 31 40.94	274 21 23.30	4.4688635
Black Hawk	130 40 04.24	310 23 25.91	4.7924053
Triplets	164 34 22.10	344 31 27.14	4.4921118
Natanes	192 46 10.88	12 50 31.76	4.7437771
Gila	245 12 38.24	65 22 46.27	4.5016173
Bryce	276 04 04.88	96 23 20.23	4.7427259
Graham	318 27 35.69	138 40 17.18	4.7410352

New Mexico.

BULLARD, GRANT COUNTY.

Situated on a rocky cone (200 by 50 feet on top) about 20 miles southeast of Cliff post-office. A good wagon road from Cliff via Mango Springs, "H W" ranch, and Saddle Rock Canyon to foot of peak, 1 mile from station.

Station mark: A bronze triangulation tablet cemented in solid rock, over which is built a cairn 9 feet high and 4 feet in diameter.

[Latitude $32^{\circ} 42' 26.95''$. Longitude $108^{\circ} 32' 18.36''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' ''	° ' ''	Meters.
Secho	61 10 38.66	240 56 34.21	4.6692474
Line	110 20 16.09	290 05 21.36	4.6611612
Pleasant	150 23 41.25	330 10 35.08	4.8784318
Canyon	190 48 06.90	10 50 34.58	4.5760629

CANYON, GRANT COUNTY.

Situated about 6 miles northeast of Cliff post-office, on a sharp, brushy hill, on rocky ridge south and east of Gila River. Easily ascended from Gila River west of station up level grassy ridge, thence to first gap south of hill, thence north on ridge to station.

Station mark: A bronze triangulation tablet cemented in solid rock.

[Latitude $33^{\circ} 02' 28.22''$. Longitude $108^{\circ} 27' 46.24''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' ''	° ' ''	Meters.
Bullard	10 50 34.58	190 48 06.90	4.5760629
Line	67 11 46.73	246 54 19.96	4.7347506
Sunset	97 16 44.58	276 51 41.38	4.8571778
Pleasant	122 55 39.16	302 40 00.62	4.7232391
Mogollon	154 08 38.08	334 04 18.19	4.4502461

CLIFF, GRANT COUNTY.

A secondary station situated 100 yards north of Heather's store (Cliff post-office), 25 yards east of stage road to Mogollon, and about 20 feet southwest of northeast corner of northeast quarter of northeast quarter of sec. 32, T. 15 S., R. 17 W.

Station mark: Center of windmill.

[Latitude $32^{\circ} 57' 39.35''$. Longitude $108^{\circ} 36' 44.80''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' ''	° ' ''	Meters.
Mogollon	182 44 23	2 44 58	4.53539
Canyon	237 28 54	57 33 48	4.21939

LINE, GRANT COUNTY.

Situated about 15 miles in a northerly direction from Duncan, Ariz., being on the highest point visible from that place. A road from Dun-

can to a cow camp about 2 miles south of station. Water at cow camp, also on road about 3 miles from same. Station is best reached from Steeplerock, a mining camp about $1\frac{1}{2}$ miles northeast of station.

Station mark: A bronze triangulation tablet cemented in solid rock, above which a cairn 6 feet high was erected.

[Latitude $32^{\circ} 51' 01.02''$. Longitude $108^{\circ} 59' 50.99''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Guthrie	97 37 50.86	277 27 30.68	4.4766777
Sunset	144 25 23.59	324 17 52.14	4.5676142
Mogollon	218 49 45.46	39 02 56.22	4.7769400
Canyon	246 54 19.96	67 11 46.73	4.7347506
Bullard	290 05 21.36	110 20 16.09	4.6611612
Secho	356 40 32.01	176 41 18.18	4.5853982

SECHO, GRANT COUNTY.

Situated on highest of low isolated hills about 3 miles east of Arizona and New Mexico Railway and about 4 miles northeast of section house at Summit station, about halfway between Lordsburg, N. Mex., and Duncan, Ariz.

Station mark: A hole drilled in solid rock, over which a cairn 7 feet in diameter and $7\frac{1}{2}$ feet high was erected.

[Latitude $32^{\circ} 30' 13.46''$. Longitude $108^{\circ} 58' 25.47''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Graham	104 43 43.49	284 14 41.16	4.9399787
Guthrie	143 01 51.29	322 50 47.82	4.7250061
Sunset	160 54 03.87	340 45 48.18	4.8602010
Line	176 41 18.18	356 40 32.01	4.5853982
Bullard	240 56 34.21	61 10 38.66	4.6692474

MOGOLLON, SOCORRO COUNTY.

Situated on the highest peak of the Mogollon range, locally known as "Baldy," about 10 miles north of Farquar's ranch on Mogollon Creek. Bare on south and southwest slopes; east and north slopes timbered.

Station mark: A bronze triangulation tablet cemented in triangular stone about 18 by 14 by 14 inches, set 10 inches in the ground. Underneath stone on center a ".30-caliber Government" cartridge shell is driven in ground. A cairn 4 feet high was built over mark.

[Latitude $33^{\circ} 16' 11.72''$. Longitude $108^{\circ} 35' 41.44''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Line	39 02 56.22	218 49 45.46	4.7769400
Sunset	74 32 48.81	254 12 01.18	4.7873988
Canyon	334 04 18.19	154 08 38.08	4.4502461

PLEASANT, SOCORRO COUNTY.

Situated on highest point of brushy mountain about 3 miles due west from Pleasanton. Brush and timber cleared from summit in 1901. Easily ascended from "Frisco" River at Pleasanton via lane to west side of river and then by cattle trail to top of ridge, thence northward to station.

Station mark: A bronze triangulation tablet cemented in bowlder in place.

[Latitude $33^{\circ} 17' 57.90''$. Longitude $108^{\circ} 56' 21.62''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sunset	53 44 52.30	233 35 23.45	4.5235914
Canyon	302 40 00.62	122 55 39.16	4.7232391
Bullard	330 10 35.08	150 23 41.25	4.8784318

PACIFIC SECTION OF TOPOGRAPHY.

CALIFORNIA.

TRIANGULATION STATIONS.

Central California.

Control for the three fifteen-minute quadrangles south and east of Mount Diablo is based upon Mocho and Diablo stations of the Coast and Geodetic Survey. In addition to these, seven other stations were occupied, and three secondary points were located by Mr. C. F. Urquhart, topographer, in November and December, 1901. Positions are given on the "United States standard datum."

BROWN, ALAMEDA COUNTY.

Situated on a high prairie point in pasture land owned by Mr. Brown. It is best reached from Livermore via road up Mocho Creek to summit of ridge, thence a road turns northwest and passes very near station.

Station mark: A small pile of rock around signal tree.

[Latitude 37° 36' 22.98". Longitude 121° 37' 10.84''].]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Trenouth	61 53 05.56	241 43 55.02	4.4006441
Sunol	93 25 59.84	273 14 56.27	4.4266916
Wiedeman	114 04 36.83	293 50 52.92	4.5581580
Brushy	157 51 19.54	337 48 17.29	4.2868343
Byron	172 32 14.88	352 30 27.36	4.5189234
Bridge	195 00 51.94	15 03 31.56	4.3915751

BRUSHY, ALAMEDA COUNTY.

Situated about 8 miles by road from Livermore on a mountain locally known as "Brushy Peak." It is best reached from Livermore by road to Joseph Laughlin's residence, 6½ miles, thence up mountain. Mountain is covered with live-oak trees, all of which were cut from summit. No other timbered mountain near.

Station mark: A hole drilled in rock and filled with lead, above which is erected a rock monument with small tree in center.

[Latitude 37° 46' 04.42". Longitude 121° 42' 08.96''].]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Trenouth	26 30 49.72	206 24 40.21	4.5224301
Sunol	49 48 47.05	229 40 44.55	4.4036711
Wiedeman	82 54 01.66	262 43 18.78	4.4134343
Diablo	124 22 25.82	304 14 40.12	4.3518752
Byron	191 24 54.45	11 26 09.60	4.1796710
Bridge	246 44 12.87	66 49 55.48	4.1727068
Brown	337 48 17.29	157 51 19.54	4.2868343
Mocho	337 58 21.85	158 03 45.51	4.5407469

LEAL, ALAMEDA COUNTY.

(Not occupied.)

Situated on a high knoll, cleared of timber, about 1 mile east from Mr. Leal's cabin. To reach station take road east from Sunol to within three-fourths mile of Appleton's ranch, thence take left-hand road up creek and ridge to Leal's ranch. Signal can be seen from several points on a road along ridge.

Station mark: A rock monument 6 feet high with tree in center.

[Latitude $37^{\circ} 40' 41.48''$, Longitude $121^{\circ} 43' 26.39''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Trenouth.....			4.11502
Sunol	124 44 25	304 37 11	4.32713
Wiedeman			4.54040
Brushy.....	183 48 38	3 49 25	4.45511
Mocho			4.18723

LIVERMORE, ALAMEDA COUNTY.

(Not occupied.)

Station is the Catholic Church in the town of Livermore.

Station mark: Center of church spire.

[Latitude $37^{\circ} 41' 05.23''$. Longitude $121^{\circ} 45' 55.37''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Trenouth.....			4.35381
Sunol	62 39 54	242 34 10	4.19126
Wiedeman	106 35 12	286 26 48	4.32308
Brushy.....			4.03192
Brown			4.19110

LONE PINE, ALAMEDA COUNTY.

(Not occupied.)

Situating about 2 miles northeast of Leal station, on line between Leal and Brown, on summit of knoll covered with scattering oak trees.

Station mark: A lone pine tree near summit, standing much higher than other trees.

[Latitude $37^{\circ} 31' 40.94''$. Longitude $121^{\circ} 42' 20.26''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Trenouth.....			4.17398
Sunol	118 18 23	298 10 29	4.33576
Brown	221 06 17	41 09 26	4.06236
Mocho			4.15909

SUNOL, ALAMEDA COUNTY.

Situated on the highest point of a prairie ridge running about northwest from Sunol. Take road up Sinbar Creek for about 3 miles, or until the second bridge is passed, thence up ridge on west side of creek about 1 mile to signal.

Station mark: A rock with hole drilled in it and filled with lead, above which was built a rock monument with tree in center about 9 feet high.

[Latitude $37^{\circ} 37' 13.48''$. Longitude $121^{\circ} 55' 18.08''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wiedeman	154 03 20.18	334 00 40.71	4.1643781
Diablo	181 25 58.89	1 26 17.08	4.4631686
Brushy	229 40 44.55	49 48 47.05	4.4036711
Livermore	242 34 10	62 39 54	4.19126
Brown	273 14 56.27	93 25 59.84	4.4266916
Lone Pine	298 10 29	118 18 23	4.33576
Leal	304 37 11	124 44 25	4.32713
Trenouth	341 25 00.88	161 26 53.02	4.1516486

TRENOUTH, ALAMEDA COUNTY.

Situated on mountain locally known as Trenouth Mountain, being the highest point of ridge between Alameda Creek and the Santa Clara Valley, and about $1\frac{1}{2}$ miles southeast from Mission Mountain. A road from Mission San Jose (a small town) goes up mountain to Mr. Trenouth's residence, which is about one-half mile northeast of station.

Station mark: A rock 18 by 6 by 6 inches set 18 inches in the ground, in top of which a hole was drilled and filled with lead, above which was erected a rock monument with small tree in center.

[Latitude $37^{\circ} 29' 57.49''$. Longitude $121^{\circ} 52' 14.13''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wiedeman	157 42 48.20	337 38 16.65	4.4581934
Sunol	161 26 53.02	341 25 00.88	4.1516486
Livermore			4.35381
Brushy	206 24 40.21	26 30 49.72	4.5224301
Brown	241 43 55.02	61 53 05.56	4.4006441
Lone Pine			4.17398
Leal			4.11502

BRIDGE, CONTRA COSTA COUNTY.

Situated about 4 miles southeast of Byron and 2 miles northeast of the Southern Pacific Railroad. The station is the most northeastern of four high towers built to carry electric-power wires from Stockton to San Jose over the San Joaquin River.

Station mark: Center of tower.

[Latitude $37^{\circ} 49' 14.72''$. Longitude $121^{\circ} 32' 49.89''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Brown	15 03 31.56	195 00 51.94	4.3915751
Brushy	66 49 55.48	246 44 12.87	4.1727068
Byron	130 02 51.46	309 58 23.53	4.1440237

BYRON, CONTRA COSTA COUNTY.

Situated on railroad right of way, about one-fourth mile northwest from Byron and Brentwood county road. It is on south side of railroad about 40 feet from track, on a hill through which the railroad passes in an open cut. Mr. Henry McCabe's residence is about one-fourth mile southeast of station.

Station mark: A telegraph pole.

Reference mark: A rock with small hole drilled in it and "U. S." cut on it, 3.6 feet northwest of telegraph pole.

[Latitude $37^{\circ} 54' 05.25''$. Longitude $121^{\circ} 40' 06.44''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	<i>Meters.</i>
Brushy	11 26 09.60	191 24 54.45	4.1796710
Diablo	84 22 28.90	264 13 27.25	4.3355799
Bridge	309 58 23.53	130 02 51.46	4.1440237
Brown	352 30 27.36	172 32 14.88	4.5189234

DIABLO, CONTRA COSTA COUNTY.

A station of the Coast and Geodetic Survey on summit of well-known mountain of that name.

Station mark: A copper bolt cemented in solid rock, above which was erected a brick pier.

[Latitude 37° 52' 55.48". Longitude 121° 54' 48.36".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sunol	1 26 17.08	181 25 58.89	4.4631686
Wiedeman	24 05 36.49	204 02 38.33	4.2413220
Byron	264 13 27.25	84 22 28.90	4.3355799
Brushy	304 14 40.12	124 22 25.82	4.3518752
Brown	319 40 30	139 51 16	4.60295
Mocho	324 44 31.77	144 57 40.03	4.7394918
Trenouth	354 54 16	174 55 52	4.62994

WIEDEMAN, CONTRA COSTA COUNTY.

Situated on highest point of a prairie ridge about 3 miles southwest of San Ramon. It can be reached by road from San Ramon to Mr. Christopher Wiedeman's house, thence by trail three-fourths mile up hill.

Station mark: A hole drilled in rock and filled with lead, above which was erected a rock monument with tree in center.

[Latitude 37° 44' 19.26". Longitude 121° 59' 38.97".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Diablo	204 02 38.33	24 05 36.49	4.2413220
Brushy	262 43 18.78	82 54 01.66	4.4134343
Livermore	286 26 48	106 35 12	4.32308
Brown	293 50 52.92	114 04 36.83	4.5581580
Mocho	306 38 18.69	126 54 23.02	4.6847231
Leal	316 30 21	136 40 13	4.54040
Sunol	334 00 40.71	154 03 20.18	4.1643781
Trenouth	337 38 16.65	157 42 48.20	4.4581934

MOCHO, SANTA CLARA COUNTY.

A Coast and Geodetic Survey station, situated on highest point of mountain locally known as Eylar Mountain. It can be reached by a good mountain road from Livermore up Mocho Creek to cabin at foot of Eylar Mountain, 18 miles from Livermore, thence a good trail to station, which is about 1½ miles up the ridge from old cabin at Banta Springs.

Station mark: A stone pier 4 feet high.

Reference mark: A rock monument with tree 14 feet high in center used as signal, 3.5 feet east of station mark.

[Latitude, $37^{\circ} 28' 39.696''$. Longitude, $121^{\circ} 33' 18.781''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Leal			4.18725
Lone Pine			4.15909
Wiedeman	126 54 23.02	306 38 18.69	4.6847231
Diablo	144 57 40.03	324 44 31.77	4.7394918
Brushy	158 03 45.51	337 58 21.85	4.5407469
Brown			4.18684

Randsburg Mining District.

Four 3-point stations for the control of the Randsburg mining district were occupied by Mr. R. U. Goode, geographer, during the latter part of September, 1900, with an 8-inch theodolite reading by verniers to 10 seconds. Positions were computed from the following stations of the Wheeler survey, which were connected with the trans-continental triangulation of the United States Coast and Geodetic Survey in 1901, and recomputed on United States standard datum.

	Latitude.	Longitude.
	° ' "	° ' "
Telescope	36 10 12.8	117 05 20.0
Olancha	36 15 55.5	118 07 03.0
Maturango	36 07 13.3	117 29 41.7
Owens	35 44 18.6	117 59 47.0

GOVERNMENT, KERN COUNTY.

On the point locally known as Government Peak, $1\frac{1}{2}$ miles southwest from Randsburg and above the Yellow Aster mine.

Station mark: A cairn 5 feet in height.

[Latitude $35^{\circ} 21' 08.29''$. Longitude $117^{\circ} 40' 24.35''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
El Paso	131 45 30.87	311 39 38.03	4.3134470
Olancha	158 30 59.96	338 15 24.58	5.0373238
Laurel	176 04 47.05	356 04 24.63	4.1543844
Telescope	210 03 09.50	30 23 39.29	5.0212863
Johannesburg	237 11 29.13	57 12 47.25	3.6079340
Red	272 23 39.14	92 26 44.85	3.9091392

LAUREL, KERN COUNTY.

On a peak locally known as Laurel Mountain, about 4 miles a little south of west from Gorden station (Searles post-office), being the first high point in that direction.

Station mark: A cairn 6 feet in height.

[Latitude 35° 28' 50.20". Longitude 117° 41' 03.05'.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
El Paso	87 53 09.80	267 47 38.86	4.1579419
Dome	290 27 11.38	110 33 03.17	4.2129570
Red	328 04 05.53	148 07 33.95	4.2348120
Government	356 04 24.63	176 04 47.05	4.1543844

DOME, SAN BERNARDINO COUNTY.

On a high rocky point about 8 miles northeast from Johannesburg, in sec. 7, T. 29 S., R. 42 E.

Station mark: A cairn 6 feet high.

[Latitude 35° 25' 44.63". Longitude 117° 30' 56.55'.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Red	35 08 02.03	215 05 39.10	4.0346145
Laurel	110 33 03.17	290 27 11.38	4.2129570

EL PASO, SAN BERNARDINO COUNTY.

A station of the Wheeler survey.

[Latitude 35° 28' 32.61". Longitude 117° 50' 33.28'.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Laurel	267 47 38.86	87 53 09.80	4.1579419
Government	311 39 38.03	131 45 30.87	4.3134470

JOHANNESBURG, SAN BERNARDINO COUNTY.

South end of the station gable.

[Latitude 35° 22' 19.55". Longitude 117° 38' 09.36'.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Red	298 22 57.23	118 24 44.86	3.7273887
Government	57 12 47.25	237 11 29.13	3.6079340

RED, SAN BERNARDINO.

About 3 miles southeast of Johannesburg, on the highest point of Red Mountain.

Station mark: A cairn 5 feet high.

[Latitude $35^{\circ} 20' 57.17''$. Longitude $117^{\circ} 35' 03.37''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Government	92 26 44.85	272 23 39.14	3.9091392
Johannesburg	118 24 44.86	298 22 57.23	3.7273887
Laurel	148 07 33.95	328 04 05.53	4.2348120
Telescope	206 02 44.48	26 20 06.65	5.0065190
Dome	215 05 39.10	35 08 02.03	4.0346145

Sierra Forest Reserve.

Mr. E. T. Perkins, jr., topographer, continued the belt of triangulation of the previous year southward along the high Sierras to Tehachapi Pass. Besides reoccupying 2 stations, he built and occupied 11 new stations, some of which were formerly located by the Wheeler survey.

This work was further extended and connected with that in southern California by Mr. Urquhart in December, 1901.

The work furnishes control for six 30-minute quadrangles in Tulare and Kern counties.

Positions were computed from the south from the line Frazier-Liebre on Yolo standard datum, but a correction of $+6.53''$ in latitude and $-3.60''$ in longitude was applied to reduce the positions published herewith to the "U. S. Standard" of the Coast and Geodetic Survey.

BRECKINRIDGE, KERN COUNTY.

The station is at the eastern end of Breckinridge Mountain, a heavily timbered plateau south of the Kern River, 6 miles west of Havilah. It can be ascended from Rankins Ranch in Walker Basin by following the main ridge.

Station mark: A bronze triangulation tablet cemented in the top of a ledge which projects 10 or 12 feet above surface of ground, surmounted by a cairn 5 feet high.

[Latitude $35^{\circ} 27' 03.86''$. Longitude $118^{\circ} 34' 58.89''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sunday	179 49 37.92	359 49 35.35	4.5655670
Big Meadows	203 16 37.60	23 25 23.77	4.7575669
Pah Ute	269 52 04.54	89 58 45.66	4.2415837
Cache	309 51 59.73	130 03 33.88	4.5971175
Old Town	351 04 52.21	171 06 46.54	4.5091169

CACHE, KERN COUNTY.

A peak at the head of Cache Creek, about 10 miles northeast of Cameron station on Southern Pacific Railroad. The name of creek and peak was taken from Wheeler map. Water was found at an old Indian camp at west foot of peak.

Station mark: A bronze triangulation tablet cemented in solid rock, above which a cairn 9 feet high was erected.

[Latitude $35^{\circ} 13' 19.63''$. Longitude $118^{\circ} 14' 58.66''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pajuela	19 49 57.53	199 48 25.51	4.0763916
Double	45 34 00.61	225 25 53.94	4.4775061
Old Town	75 41 49.28	255 32 11.59	4.4179828
Breckinridge	130 03 33.88	309 51 59.73	4.5971175
Pah Ute	153 14 10.77	333 09 16.60	4.4546164
Soledad	348 04 51.10	168 06 58.16	4.4335946

DOUBLE, KERN COUNTY.

A partly timbered double peak about 6 miles southwest of Tehachapi, at the head of Oak Creek. It can be ascended from camp at old sawmill 3 miles up the creek from Piffords.

Station mark: A bronze triangulation tablet cemented in solid rock, above which a cairn 9 feet high was erected.

[Latitude $35^{\circ} 01' 56.68''$. Longitude $118^{\circ} 29' 04.49''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Liebre	12 15 32.28	192 12 23.37	4.5980058
Frazier	57 21 04.14	237 04 26.93	4.7212601
Old Town	164 45 32.38	344 44 02.36	4.1782222
Pah Ute	190 22 09.83	10 25 24.40	4.6743668
Cache	225 25 53.94	45 34 00.61	4.4775061
Pajuela	240 27 27.11	60 34 01.36	4.3003508
Soledad	281 25 36.86	101 35 48.84	4.4410062

OLD TOWN, KERN COUNTY.

A low peak at the northern edge of Tehachapi Pass, about 2 miles north of the old settlement of Tehachapi.

Station mark: A bronze triangulation tablet cemented in solid rock, surmounted by a cairn 6 feet high.

[Latitude 35° 09' 48.59". Longitude 118° 31' 41.06'']

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Breckinridge	171 06 46.54	351 04 52.21	4.5091169
Pah Ute	201 18 06.13	21 22 51.50	4.5350191
Cache	255 32 11.59	75 41 49.28	4.4179828
Pajuela	282 23 32.31	102 31 37.32	4.3393768
Double	344 44 02.36	164 45 32.38	4.1782222

OWENS, KERN COUNTY.

(Not occupied.)

A high peak 20 miles east of Kernville, on the waters of the South Fork of Kern River.

Station mark: A cairn probably erected by the Wheeler Survey.

[Latitude 35° 44' 18.60". Longitude 117° 59' 46.99.'']

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pah Ute	48 24 22.08	228 10 35.43	4.6802818
Sunday	95 25 22.55	275 04 45.81	4.7274706
Big Meadows	124 18 30.89	304 06 42.62	4.5649336

PAH UTE, KERN COUNTY.

The highest peak on the range south of Kernville and about 8 miles east of Havilah. It can be ascended from camp at Rankins in Walker Basin in three hours, from Nick Williams in three hours, or from Cienega in two hours. Water directly under peak one-half mile to southeast, reached by wagon road; then good road to summit.

Station mark: A bronze triangulation tablet cemented in solid rock, above which a cairn 5 feet high was erected.

[Latitude 35° 27' 04.62". Longitude 118° 23' 27.29'']

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Double	10 25 24.40	190 22 09.83	4.6743668
Old Town	21 22 51.50	201 18 06.13	4.5350191
Breckinridge	89 58 45.66	269 52 04.54	4.2415837
Sunday	154 34 23.72	334 27 38.40	4.6097404
Big Meadows	185 44 06.62	5 46 09.34	4.7224576
Cache	333 09 16.60	153 14 10.77	4.4546164

PAJUELA, KERN COUNTY.

On the first low peak 3 miles east of Cameron station on Southern Pacific Railroad.

Station mark: A bronze triangulation tablet buried in ground, above which was erected a cairn 6 feet high.

[Latitude $35^{\circ} 07' 15.64''$. Longitude $118^{\circ} 17' 38.41''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Double	60 34 01.36	240 27 27.11	4.3003508
Old Town	102 31 37.32	282 23 32.31	4.3393768
Cache	199 48 25.51	19 49 57.53	4.0763916
Soledad	327 47 50.69	147 51 29.34	4.2581887

SOLEDAD, KERN COUNTY.

A butte 7 miles southeast of Mohave, around the eastern end of which the Southern Pacific Railroad passes. It can be best reached by road to the "Grey Eagle" mine and then by trail to summit.

Station mark: A bronze triangulation tablet cemented in solid rock, above which a cairn 10 feet high was erected.

[Latitude $34^{\circ} 58' 57.89''$. Longitude $118^{\circ} 11' 17.68''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Odell	4 57 13.63	184 55 39.21	4.6893126
Liebre	47 01 04.14	226 47 46.03	4.6868484
Frazier	72 21 45.60	251 54 58.97	4.8748714
Double	101 35 48.84	281 25 36.86	4.4410062
Pajuela	147 51 29.34	327 47 50.69	4.2581887
Cache	168 06 58.16	348 04 51.10	4.4335946

SUNDAY, KERN COUNTY.

The highest peak in Greenhorn Mountains, on the west side of the Kern River, at head of Cedar Creek, about 18 miles northwest of Kernville. Camp at Meadow, 800 feet below summit, on the south-east side.

Station mark: A bronze triangulation tablet cemented in granite ledge, over which was erected a cairn 5 feet high.

[Latitude 35° 46' 57.15". Longitude 118° 35' 03.31".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Moses	171 05 10.17	351 01 46.57	4.7462795
Florence	182 31 19.39	2 32 31.46	4.8406527
Big Meadows	235 12 24.95	55 21 15.81	4.4420184
Pah Ute	334 27 38.40	154 34 23.72	4.6097404
Breckinridge	359 49 35.35	179 49 37.92	4.5655670

ODELL, LOS ANGELES COUNTY.

On the western end of a long, flat ridge, 6 miles north-northwest of Acton and one-fifth mile north-northwest of Mr. Odell's house. The ridge is nearly free from brush, and can be easily ascended on horseback.

Station mark: A copper bolt sunk in the solid, outcropping ledge, above which a cairn 8 feet high and 8 feet in diameter was erected.

[Latitude, 34° 32' 36.87". Longitude, 118° 14' 03.28".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Frazier	111 07 16.02	290 42 12.40	4.8577810
Liebre	116 22 54.38	296 11 14.73	4.5440811
Soledad	184 55 39.21	4 57 13.63	4.6893126

OLANCHA, INYO AND TULARE COUNTIES.

(Not occupied.)

The highest peak on range southwest of Owen Lake.

Station mark: A cairn, probably erected by the Wheeler survey.

[Latitude, 36° 15' 55.53". Longitude 118° 07' 03.05".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Big Meadows	27 10 16.18	207 02 40.29	4.6282473
Sunday	38 16 38.85	218 00 10.70	4.8332895
Florence	112 03 17.94	291 47 54.89	4.6220458

WHITNEY, INYO AND TULARE COUNTIES.

The highest peak in the United States proper, at head of Kern River, about 20 miles southwest of Independence.

Station mark: A cairn, probably erected by the Wheeler survey.

[Latitude 36° 34' 43.57". Longitude 118° 17' 29.57".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Big Meadows	2 54 47.92	182 53 20.79	4.8614282
Sunday	16 40 53.82	196 30 33.52	4.9646686
Florence	50 32 52.02	230 23 38.13	4.4779257
Wauguyhe	248 55 26.49	69 38 02.11	5.0540514

BIG MEADOWS, TULARE COUNTY.

The highest point on range between Kern River and South Fork of Kern River, about 25 miles northeast of Kernville along the Mount Whitney trail.

Station mark: A bronze triangulation tablet cemented in a large boulder, over which is erected a cairn 6 feet high.

[Latitude 35° 55' 28.50". Longitude 118° 19' 56.92".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pah Ute	5 46 09.34	185 44 06.62	4.7224576
Breckinridge	23 25 23.77	203 16 37.60	4.7575669
Sunday	55 21 15.81	235 12 24.95	4.4420184
Moses	141 33 04.62	321 20 46.63	4.7013414
Florence	159 55 59.28	339 48 16.62	4.7554015

FLORENCE, TULARE COUNTY.

Mount Florence is the highest point east of Farewell Gap, about 6 miles southeast of "Mineral King," at headwaters of Middle Fork of Kawesh and Little Kern rivers.

Station mark: A bronze triangulation tablet cemented in solid rock, surmounted by a cairn 6 feet high.

[Latitude, 36° 24' 22.96". Longitude, 118° 33' 00.95".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sunday	2 32 31.46	182 31 19.39	4.8406527
Moses	39 35 55.38	219 31 17.76	4.2635024
Big Baldy	134 54 42.41	314 42 51.70	4.6217913
Silliman	153 37 10.01	333 31 56.75	4.4687506
Big Meadows	339 48 16.62	159 55 59.28	4.7554015

MOSES, TULARE COUNTY.

A high rocky point between headwaters of North Fork and Middle Fork of Tulare River, about 3 miles northeast of Frazier's mill. Ascended from camp at south end of Long Meadows in two hours—one hour on foot.

Station mark: A bronze triangulation tablet cemented in solid rock, surmounted by a cairn 6 feet high.

[Latitude, $36^{\circ} 16' 44.12''$. Longitude, $118^{\circ} 40' 49.45''$.]

To station—	Azimuth.	Back azimuth.	Lóg. distance.
	° ' "	° ' "	Meters.
Big Baldy	157 35 04.44	337 27 53.29	4.6742414
Silliman	177 58 02.20	357 57 27.82	4.6076826
Florence	219 31 17.76	39 35 55.38	4.2635024
Big Meadows	321 20 46.63	141 33 04.62	4.7013414
Sunday	351 01 46.57	171 05 10.17	4.7462795

PRIMARY TRAVERSE.

Primary traverse for the control of the Sacramento fifteen-minute quadrangle, based upon the position of the dome of the State capitol, (United States standard datum), was run by Mr. Charles F. Urquhart, topographer, in three circuits, as follows:

From Sacramento, eastward along Central Pacific Railway to Fair-oaks; thence northward via highways to Roseville; thence returning to Sacramento via Central Pacific Railway.

From near Salisbury on Central Pacific Railway, south to about parallel $38^{\circ} 30'$; thence westward via highways to about meridian $121^{\circ} 30'$; thence northward to Sacramento.

From a point about $1\frac{3}{4}$ miles northeast of State capitol, westward via highways to Sacramento-Sutter county line; thence eastward to Roseville.

Geographic positions along Central Pacific Railway from Sacramento to Fair Oaks.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Sacramento, State capitol dome	38 34 37.4	121 29 34.3
Sacramento, Y street, 47 feet north from north meridian monument	38 33 35.2	121 28 59.3
Sacramento, corner Thirty-first and R streets, cross- ing of Thirty-first street	38 33 51.6	121 28 05.9
Homestead, road crossing at	38 33 47.6	121 27 51.4
Brighton station	38 33 07.0	121 25 23.4
Perkins station	38 32 49.5	121 23 57.1
Mahew, opposite railroad building	38 33 54.0	121 21 03.1
Mahew, road crossing at	38 33 55.9	121 20 59.2
Mills station	38 35 10.9	121 18 28.5
Mills station, road crossing at	38 35 11.7	121 18 26.8
Fairoaks, junction of spur line to	38 36 28.0	121 15 52.7
Soudan, road crossing at	38 36 09.5	121 16 46.6
Fairoaks station	38 38 01.6	121 15 43.0

Geographic positions along highways from Fair Oaks to Roseville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Fairoaks colony	38 38 39.7	121 16 13.3
Fairoaks and Roseville road, intersection of road from Mr. Cunningham's house with west bound- ary of colony	38 39 11.2	121 17 28.9
Three Corners, road east to Orangevale and north to Roseville	38 40 43.1	121 17 22.1
Auburn road, crossing of	38 41 42.1	121 17 22.3
Schoolhouse, point opposite	38 41 47.6	121 17 22.4
County-line monument, Sacramento and Placer counties	38 43 19.1	121 17 22.9
Road west	38 43 20.8	121 17 22.9
County-line monument, Sacramento and Placer counties	38 43 21.3	121 17 56.0
Road east, near railroad	38 44 12.9	121 17 55.8

Geographic positions along Central Pacific Railroad from Roseville to Sacramento.

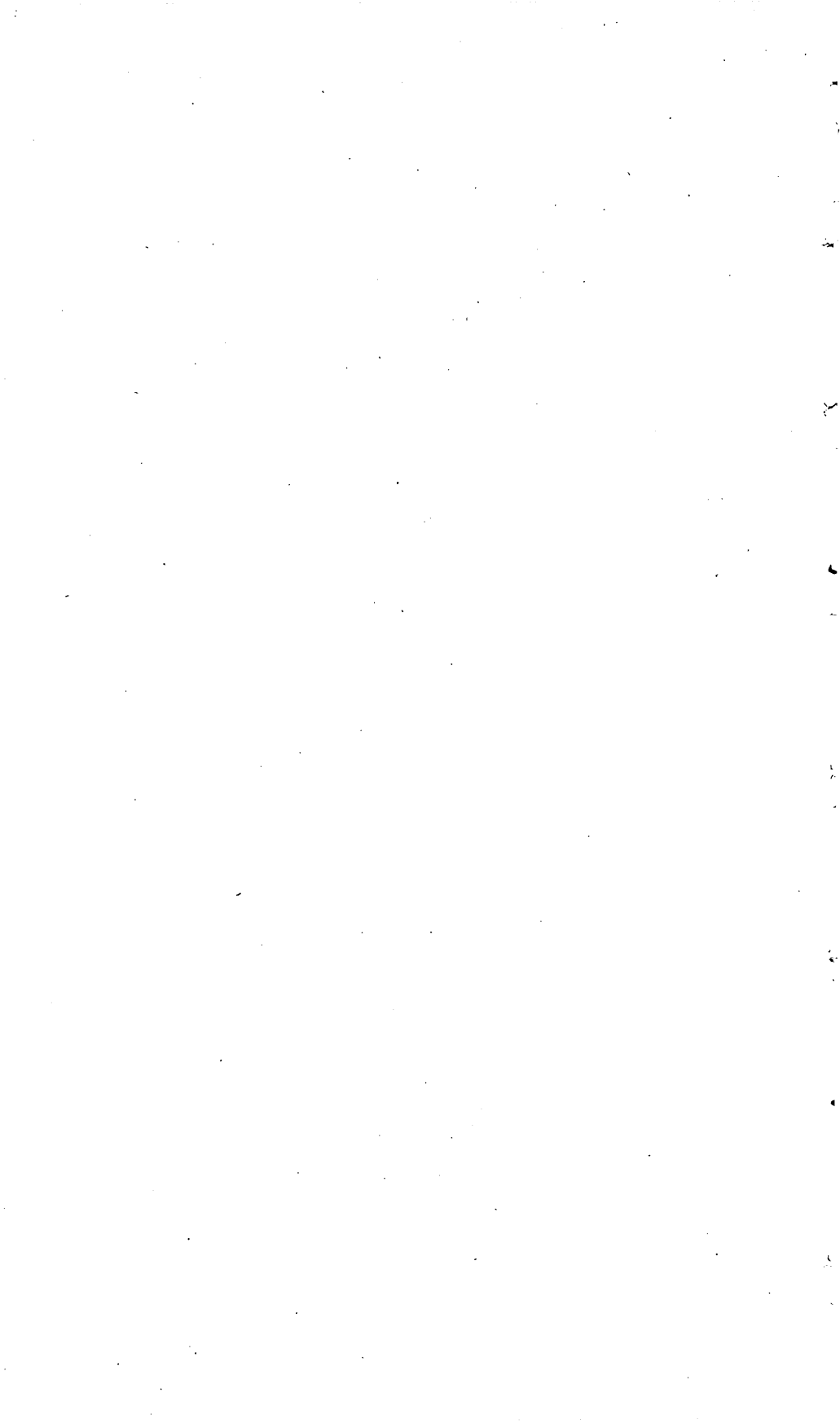
Station.	Latitude.	Longitude.
	° ' "	° ' "
Crossing of road to Ezra Dudley's residence	38 44 17.0	121 17 56.4
County-line monument, Sacramento and Placer counties	38 43 25.0	121 18 46.1
Antelope, road crossing at	38 42 32.2	121 19 43.3
Road crossing	38 40 38.5	121 21 46.7
Ben Ali, first road crossing northeast of	38 37 20.4	121 25 21.6
Ben Ali (box car)	38 37 17.6	121 25 24.6
Roseville and Sacramento road, crossing of	38 36 41.4	121 26 03.8
Roseville, Marysville, and Sacramento roads, junction of	38 36 41.6	121 26 54.9
Long bridge over overflow, northeast end of	38 36 10.2	121 27 57.5
Sacramento, Twelfth street crossing, north side Central Pacific Rwy. tracks	38 35 20.5	121 29 10.3
Sacramento, corner Thirteenth and N streets	38 34 30.6	121 29 25.3

Geographic positions along highways south from point near Salisbury to about parallel 38° 30', thence westward along highways to about meridian 121° 30', thence northward to Sacramento.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Intersection of Mills and Whiterock road with road from Salisbury	38 35 28.0	121 15 17.9
Three Corners	38 33 35.9	121 15 30.4
Crossing on old Jackson road	38 31 42.4	121 15 37.4
Crossing new Jackson road	38 30 36.9	121 15 36.9
Road corner, leave new Jackson road	38 30 51.4	121 16 42.8
Road crossing at schoolhouse	38 30 40.3	121 17 49.7
Road crossing to Walsh	38 30 40.4	121 20 03.0
Road crossing	38 30 40.2	121 21 42.9
Central Pacific Rwy. crossing	38 30 39.5	121 24 04.9
Upper Stockton road crossing (Dadin's blacksmith shop)	38 30 39.2	121 26 05.9
Lower Stockton road crossing	38 30 38.8	121 27 58.2
Road crossing (thence north)	38 30 38.5	121 28 56.2
Road crossing	38 32 24.7	121 28 57.2

Geographic positions along highways from northeast end of long bridge over overflow, north to county line, thence east to Roseville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Three Corners, river road turns west	38 36 22.2	121 28 29.6
Road northeast	38 37 51.9	121 28 28.8
Road west (near Mr. Schieber's house)	38 39 25.0	121 28 28.6
Opposite Six-mile house	38 39 50.6	121 28 59.7
Opposite Mr. Cippa's barnyard	38 40 32.3	121 29 00.1
Road at saloon	38 42 01.2	121 29 00.8
County line monument, Sacramento and Sutter counties	38 44 05.7	121 29 00.7
Three Corners, on Marysville and Roseville road ...	38 45 06.2	121 29 01.2
County line crossing Sutter and Placer counties ...	38 45 06.8	121 28 08.3
Road south	38 45 06.7	121 26 17.9
Lane south	38 45 07.1	121 23 30.8
Road south, telephone line	38 45 07.1	121 21 51.3
Top of small hill, opposite old house	38 45 07.6	121 19 19.5
Roseville station, semaphore post at	38 45 06.0	121 16 57.3



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