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**UNITED STATES GEOLOGICAL SURVEY**  
**GEORGE OTIS SMITH, Director**

**Bulletin 644**

# **TRIANGULATION AND PRIMARY TRAVERSE**

**1913-1915**

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**R. B. MARSHALL, CHIEF GEOGRAPHER**



**WASHINGTON**  
**GOVERNMENT PRINTING OFFICE**  
**1916**

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MAP OF THE UNITED STATES SHOWING CONDITION OF ASTRONOMIC LOCATION AND PRIMARY CONTROL  
to January 1, 1916

# TRIANGULATION AND PRIMARY TRAVERSE, 1913-1915.

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R. B. MARSHALL, Chief Geographer.

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## INTRODUCTION.

### PERSONNEL.

*Field work.*—The field work of primary control, the computed results of which are given in the following pages, was carried on from 1913 to 1915, inclusive, under R. B. Marshall, chief geographer, with Frank Sutton, W. H. Herron, Sledge Tatum, George R. Davis, and T. G. Gerdine, geographers, in charge, respectively, of the Atlantic, Central, Rocky Mountain, Pacific, and Northwestern divisions.

Credit is given to the various topographers, assistant topographers, and aids directly in charge under the headings of the several lists.

*Computation.*—The office computations were under the supervision of E. M. Douglas, geographer. The results were computed by the following members of the topographic branch, detailed from time to time to this work: D. H. Baldwin, T. M. Bannon, L. F. Biggs, D. S. Birkett, R. H. Chapman, C. E. Cooke, J. R. Ellis, J. I. Gayetty, G. T. Hawkins, Oscar Jones, C. B. Kendall, J. F. McBeth, Fred McLaughlin, F. J. McMaugh, E. L. McNair, C. L. Nelson, A. C. Roberts, H. S. Senseney, C. F. Urquhart, and J. H. Wilson. Mr. Biggs and Mr. Urquhart did all their computing in the Sacramento office. The data were compiled for publication by S. S. Gannett, geographer.

### DATUM.

Wherever practicable, and unless otherwise stated, positions have been computed on North American datum.

### STATION MARKS.

Permanent marks are placed at all occupied triangulation stations and at certain of the primary traverse stations, from 3 to 8 miles apart.

These marks are of the form adopted for leveling bench marks, and in many places the elevation as well as the latitude and longitude has been determined. The marks are of two forms. The first form is a circular bronze or aluminum tablet (*C* and *E*, Pl. II),  $3\frac{1}{2}$  inches in diameter and one-fourth inch thick, having a 3-inch stem, which is cemented in a drill hole in solid rock in the wall of some public build-

ing, bridge, abutment, or other substantial masonry structure. The second form (*F*, Pl. II), set in the ground where no masonry or rock is available, consists of a hollow wrought-iron post 3½ inches in outside diameter and 4 feet long. The bottom is spread out to a width of 10 inches in order to give a firm bearing on the earth. A bronze or aluminum-bronze cap is riveted over the top of the post. The tablets, as well as the caps on the iron posts, are appropriately lettered, and where States have cooperated in the work the fact of such cooperation is indicated by the addition of the State name (*G*, Pl. II).

#### SUMMARY.

*Summary of triangulation and primary traverse, 1913-1915.*

Locality.	Triangulation stations.	Traverse stations.
Alabama.....		143
Arizona-New Mexico.....	15	.....
California.....	183	.....
Colorado.....	98	.....
Colorado-Utah.....	27	.....
Idaho.....	47	.....
Idaho-Montana.....	176	.....
Illinois.....		873
Illinois-Wisconsin.....		137
Indiana.....		45
Iowa.....		165
Kansas-Nebraska.....		181
Kentucky.....	12	106
Louisiana.....		127
Maine.....		17
Maryland.....		197
Michigan.....		732
Michigan-Indiana.....		88
Minnesota.....		338
Minnesota-North Dakota-South Dakota.....		200
Mississippi.....		109
Missouri.....		1,019
Nevada.....	70	.....
New Jersey-New York-Pennsylvania.....	11	34
New Mexico.....	36	.....
New York.....	16	206
North Carolina.....		178
Oklahoma.....		225
Oregon.....	22	531
Tennessee-Arkansas.....		105
Texas.....	35	1,045
Utah.....	70	.....
Utah-Idaho.....	25	.....
Vermont.....	14	.....
Virginia-West Virginia.....		119
Washington.....	16	110
West Virginia.....	50	.....
Wisconsin.....		237
Wisconsin-Minnesota.....		89
Wyoming.....	7	.....
	930	7,356



#### GEOLOGICAL SURVEY STATION MARKS.

- A, Tablet used in cooperating States. The State name is inserted at G.  
 B and D, Copper temporary bench mark, consisting of a nail and copper washer.  
 A, C, and E, Tablets for stone or concrete structures.  
 F, Iron post used where there is no rock.

## ALABAMA.

### PRIMARY TRAVERSE.

**Childersburg, Cooks Springs, Leeds, McFall, and Oneonta quadrangles.**

#### ST. CLAIR COUNTY.

The following geographic positions were determined by primary traverse and are based upon positions previously determined by primary traverse (described in Bulletins 245 and 276) upon North American datum.

The work was done by J. R. Ellis in April, 1914.

#### CHILDERSBURG QUADRANGLE.

##### *Along highways near north border of quadrangle.*

Station.	Latitude.	Longitude.	Distance between stations.
Vandiver, at southwest corner of Whitefield & Boasher's store, iron post stamped "Prim. Trav. Sta. No. 1077".....	33° 28' 13.7"	86° 30' 50.2"	.....
T road north, center of.....	33° 28' 50.1"	86° 29' 58.8"	5,701
T road south at northwest corner of fence (road south is dim).....	33° 29' 02.0"	86° 28' 47.4"	6,165
Mail box in forks of road.....	33° 29' 18.6"	86° 27' 30.7"	6,717
Pigah Church, forks of road at Goode Bros.' store, 15 feet north to mail box.....	33° 29' 44.9"	86° 19' 49.6"	.....

Magnetic declination for north border of quadrangle,  $2^{\circ} 30' E.$

#### COOKS SPRINGS QUADRANGLE.

##### *Along railroad through center of quadrangle.*

Station.	Latitude.	Longitude.	Distance between stations.
Road crossing.....	33° 33' 36.2"	86° 29' 59.2"	.....
Quarter corner between secs. 6 and 7.....	33° 34' 29.3"	86° 28' 23.3"	9,729
Brampton, in concrete coping in front of railroad depot; bronze tablet stamped "Prim. Trav. Sta. No. 1, 1914".....	33° 34' 32.7"	86° 28' 20.7"	409
Brampton, 0.90 mile east of, under high trestle, public highway crossing.....	33° 34' 30.6"	86° 27' 25.2"	4,700
Milepost 791, road crossing at.....	33° 34' 26.9"	86° 27' 01.2"	2,070
Cooks Springs, about 2.80 miles west of, second-class road crossing.....	33° 35' 21.8"	86° 25' 40.0"	8,839
Cooks Springs, at west end of siding, switch block.....	33° 35' 30.1"	86° 24' 35.5"	5,518
Cooks Springs, 20 feet north of wagon road on south side of trestle, in top of old brick culvert; bronze tablet stamped "Prim. Trav. Sta. No. 2, 1914".....	33° 35' 31.8"	86° 23' 53.7"	3,541
Cooks Springs, road crossing at.....	33° 35' 32.6"	86° 23' 47.8"	499
Tunnel, east end of.....	33° 35' 04.9"	86° 23' 12.2"	4,117
Road crossing, 530 feet west of spur.....	33° 35' 08.6"	86° 22' 03.0"	5,870
Road crossing.....	33° 35' 05.6"	86° 21' 20.3"	3,622
Milepost 783, road crossing at.....	33° 35' 25.5"	86° 19' 54.3"	7,551
Eden station, 210 feet west of, road crossing.....	33° 35' 14.3"	86° 18' 48.2"	5,707
T. 18 S., R. 3 E., quarter corner between secs. 2 and 3.....	33° 35' 01.6"	86° 18' 28.7"	2,090
Pell City station, 2,200 feet west of, road crossing.....	33° 34' 56.3"	86° 17' 35.9"	4,498
Pell City station, railroad crossing at.....	33° 35' 07.7"	86° 17' 03.3"	2,989
Milepost 779, track opposite.....	33° 35' 25.9"	86° 16' 11.4"	4,750
Milepost 779, about 0.80 mile east of, north and south road crossing.....	33° 35' 24.1"	86° 15' 20.8"	4,290

## COOKS SPRINGS QUADRANGLE—Continued.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°, ′, ″	°, ′, ″	Feet.
T road east, center of.....	33 36 06.5	86 15 02.4	.....
Pell City, about 2 miles north and 2 miles east of, 400 feet north of intersection of the Pell City-Coal City pike and road south to Seddon, in ledge; bronze tablet stamped "Prim. Trav. Sta. No. 5, 1914, elev. 580".....	33 37 05.0	86 15 10.2	5,949
Pike at road north.....	33 37 12.7	86 15 10.7	785
Junction of pikes, 15 feet north and 20 feet east to elevation 504 on telephone pole.....	33 39 17.4	86 15 35.9	12,790
Coal City Baptist Church, in north part of Old Broken Arrow Village, at southwest corner, in ledge; bronze tablet stamped "Prim. Trav. Sta. No. 6, 1914, Elev. 575".....	33 39 57.8	86 15 59.1	4,525
Seaboard Air Line R. R. crossing.....	33 40 53.5	86 16 30.2	6,213
Concrete culvert under high trestle.....	33 40 56.9	86 16 21.6	804
Milepost R. 696, 460 feet south of, east-west road crossing and Seaboard Air Line R. R. ....	33 41 33.8	86 15 46.8	4,754
Switch block at spur.....	33 42 11.8	86 15 02.9	5,336

## Along highway near north border of quadrangle.

Coal station, road crossing west of; line leaves railroad at this point and follows wagon road.....	33 40 58.9	86 17 13.5	.....
T. 16 S., R. 3 E., quarter corner between secs. 35 and 36.....	33 41 00.3	86 17 23.3	1,337
Pump house, just west of, on south side of road at T road south; stump.....	33 41 13.7	86 18 07.0	3,715
Forks of road, junction of Fox Creek and Broken Arrow Creek roads; south corner of old shop.....	33 41 34.4	86 18 34.4	3,117
Top of hill, elevation 812, at negro house, cross roads.....	33 42 00.0	86 19 02.4	3,509
Old sawmill site, elevation 729 feet, painted on tree.....	33 42 27.6	86 19 39.9	4,217
Shoal Creek, center of bridge over.....	33 42 37.7	86 20 26.6	4,077
Shoal Creek, west side of, 0.3 mile north of Negro Baptist Church, on west side of north and south road, at west end of small bridge, in stone; bronze tablet stamped "Prim. Trav. Sta. No. 8, 1914, Elev. 746".....	33 43 01.6	86 20 30.8	2,446
Beaver Valley pike, at T road southeast, 15 feet west to C gate.....	33 43 44.5	86 20 40.4	4,413
Beaver Valley pike at T road west, 5 feet north and 10 feet east to end of log.....	33 44 18.4	86 20 23.1	3,718
Large frame church, road opposite.....	33 44 54.0	86 20 44.7	4,040

## Along highway near northwest corner of quadrangle.

Milepost 118, private road crossing at.....	33 44 14.30	86 29 45.6	.....
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## Along highways near south border of quadrangle.

T. 18 S., R. 2 E., corner secs. 4, 5, 32, and 33.....	33 30 08.0	86 26 50.8	.....
Dykes Mill, south end of bridge over Kelley Creek.....	33 30 16.4	86 26 49.5	857
Crossroads, center of.....	33 30 24.5	86 25 58.6	4,390
Crossroads, north and south road (second class).....	33 31 09.0	86 24 50.6	7,312
Pleasant Grove schoolhouse, 50 feet south of southwest corner, T road north.....	33 31 27.0	86 24 11.4	8,788
T. 17 S., R. 2 E., center of sec. 26.....	33 31 27.0	86 24 12.3	74
Forks of road, 350 feet south of, opposite brick chimney of residence, center of north and south road.....	33 31 10.4	86 23 39.8	3,223
Crossroads, north and south road dim.....	33 30 46.2	86 23 10.5	3,480
Wolf Creek, about 2 miles south and 1 mile east of, 250 feet north of G. W. Johnson's residence, just north of forks, in ledge; bronze tablet stamped "Prim. Trav. Sta. No. 3, 1914".....	33 30 35.0	86 22 10.8	5,186
London, 2 miles north of, center of crossroads.....	33 30 12.7	86 21 43.2	3,247
Crossroads, at old shop, center of.....	33 30 03.5	86 21 03.5	3,482
Tps. 18 and 19 S., R. 3 E., corner secs. 2, 3, 34, and 35.....	33 30 10.7	86 19 32.4	.....
Forks of road, center of box culvert at.....	33 30 02.3	86 18 46.1	4,009
Easonville, center of crossroads at, 10 feet west to center of bridge, Valley pike, at east and west section line .....	33 31 22.6	86 17 16.1	11,140
	33 31 33.5	86 17 04.6	1,470

## COOKS SPRINGS QUADRANGLE—Continued.

Spur line to point near southeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Forks of road, center of Old Hardwick farmhouse, 300 feet southeast of, at north side of T road north, on south side of large square post, nail in blaze.....	• ' "	• ' "	
Cropwell, at northwest corner of Robinson & Sons' building; bronze tablet stamped "Prim. Trav. Sta. No. 4, Elev. 478, 1914".....	33 31 12.5	86 15 23.6	4,048
Cropwell, in north part of, T road east.....	33 33 09.3	86 16 06.7	7,998
Intersection of Cropwell-Seddon road and Birmingham & Atlantic R. R.....	33 33 19.1	86 16 04.0	1,015
	33 33 32.7	86 15 32.1	3,030

Magnetic declination for north border of quadrangle,  $2^{\circ} 52' E.$ ; for south border,  $2^{\circ} 30' E.$ ; for east border,  $2^{\circ} 16' E.$ .

## LEEDS QUADRANGLE.

Along railroad from Leeds to Seddon.

Station.	Latitude.	Longitude.	Distance between stations.
Leeds, 0.6 mile west of, 615 feet west of trestle over East Cahaba River, in limestone 35 feet north of Southern Ry. track; bronze tablet stamped "Prim. Trav. Sta. No. 9, elev. 627 feet"....Road crossing.....	• ' "	• ' "	
Mile post C 120, at road crossing 2,020 feet south of, bronze tablet No. 10, cemented in concrete 18 inches below surface of rail in center of track of Alabama Great Southern R. R.; signboard bears S. $76^{\circ} \frac{1}{2}$ W., distant 15.5 feet.....	33 32 53.2 33 32 33.9	86 32 56.6 86 31 32.0	7,422
	33 42 25.2	86 30 57.2	.....

## McFALL QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Seddon, about 0.75 mile west of, center of road crossing, northwest and southeast.....	• ' "	• ' "	
Milepost R. 694, about 700 feet south of, 35 feet north of road crossing, on northeast corner of concrete culvert; cross and "U. S. G. S." cut.....	33 35 21.3	86 14 43.0	.....
Seddon, about 1 mile south of, center of forks of road.....	33 42 29.1	86 14 15.4	.....
T. 18 S., R. 4 E., corner secs. 4, 5, 8, and 9.....	33 34 17.7 33 34 38.2	86 14 17.3 86 14 17.4	2,081

Magnetic declination for west border of quadrangle,  $2^{\circ} 16' E.$ .

## ONEONTA QUADRANGLE.

Along highways and railroad near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
St. Clair Springs, about 3 miles east of T road south, 10 feet north to telephone pole.....	33 45 37.4	86 21 20.4	
Little Indian Creek, center of middle truss of bridge over.....	33 45 47.1	86 22 40.8	6,863
Tops, 10 and 11, 1st, 2nd and 3rd E., corner sec. 1, 2, 3, and 4.....	33 45 52.9	86 22 55.4	747
St. Clair Springs, about 1 mile east of intersection of pikes, 5 feet south and 17 feet east of T road.....	33 45 44.7	86 23 14.6	3,403
St. Clair Springs, T road south, center of, 10 feet south to telephone pole.....	33 45 46.9	86 24 10.0	4,688
St. Clair Springs, about 1.25 miles west of, 45 feet east to telephone pole N. of, 10 feet east.....	33 46 09.5	86 25 24.8	6,713
Springside, about 2 miles northeast of, north-south pike crossing A.M. and Great Southern R.R.....	33 46 54.6	86 25 36.2	4,657
Springville, about 0.75 mile northeast of, road crossing.....	33 46 46.9	86 27 18.6	8,671
Springville, 10 feet east of intersection of roads.....	33 46 26.3	86 27 56.9	3,744
Springville station, 2 miles southwest of, east and west road crossing.....	33 46 08.3	86 29 10.1	10,180

Magnetic declination for south border of quadrangle,  $2^{\circ} 52' E.$ 

## Goodwater and Weogufka quadrangles.

## COOSA, TALLADEGA, AND WEOGUFKA COUNTIES.

The following geographic positions on North American datum were determined by primary traverse in 1914 by J. R. Ellis. They are based on positions described in Bulletins 201 and 276.

## WEOGUFKA QUADRANGLE.

From Kahatchee triangulation station of the United States Coast and Geodetic Survey along public highways west to tie at Wilsonville.

Stations.	Latitude.	Longitude.	Distance between stations.
Kahatchee triangulation station, 4 miles south of Childersburg, on highest point of range of hills, a bottle under a large boulder.....	33 13 38.27	86 21 38.53	
Forks of road, 0.8 mile northwest of triangulation station.....	33 14 12.5	86 22 05.3	4,255
J. S. Bryant's mail box at T road east.....	33 13 44.3	86 23 34.5	8,072
Lee Henderson plantation, at forks of road, at south end of negro cabin, in brick chimney; bronze tablet stamped "Prim. Trav. Sta. No. 9, 1914".	33 13 25.4	86 24 22.4	4,497
Corner sections (no numbers) north and south road at hedge fence west.....	33 13 31.6	86 24 21.6	640
Wilsonville, center of covered bridge over Kahatchee Creek, 3.5 miles east of.....	33 14 20.5	86 24 54.6	5,688
Mountain Grove Church, center of T road south at.....	33 14 13.8	86 25 54.9	5,162
McGowan Ferry, T road south, 0.5 mile east of, 30 feet south and 10 feet east to black oak tree.....	33 14 15.0	86 27 12.6	6,610
Wilsonville, east and west road crossing Southern Ry., 0.8 mile northeast of.....	33 14 15.6	86 28 20.4	5,700
Wilsonville, "Prim. Trav. Sta. No. 794".	33 14 04.10	86 29 02.90	

From McGowan Ferry south along highways to Fayetteville station, thence along Louisville & Nashville Railroad to tie at Sylacauga.

McGowan Ferry, west end of small bridge at forks of road 1.2 miles south and 0.5 mile east of.....	33 13 06.7	86 27 02.7	
Haye Spring Branch, at north and south road crossing.....	33 11 33.5	86 26 59.7	9,431
Shady Grove Church, center of crossroads just southeast of.....	33 10 51.2	86 25 45.6	7,618
Cemetery, crossroads 0.2 mile southeast of.....	33 10 12.1	86 25 00.6	5,508
Fayetteville, center of T road north at.....	33 09 19.3	86 24 24.1	6,189
Fayetteville station, corner sections at.....	33 08 46.4	86 24 23.1	3,333

**WEOGUFKA QUADRANGLE—Continued.**  
**Along Louisville & Nashville Railroad.**

Station.	Latitude.	Longitude.	Distance between stations.
Fayetteville station, north and south road crossing Louisville & Nashville R. R., about 300 feet east of.....	33 08 46.7	86 24 19.0	354
Fayetteville station, private road crossing, 0.8 mile east of.....	33 09 01.5	86 23 33.2	4,170
Milepost 94A, private road crossing, 0.5 mile east of.....	33 09 23.8	86 22 23.5	6,339
Fayetteville station, 2.5 miles east of, in marble outcrop on north side of Louisville & Nashville R. R., 1,000 feet east of road crossing, 25 feet south and 10 feet west to east end of culvert No. 41; bronze tablet stamped "Prim. Trav. Sta. No. 10, 1914".....	33 09 33.2	86 21 55.4	2,568
Milepost 92A, east and west road crossing at.....	33 09 51.0	86 20 53.2	5,394
Milepost 91A, east and west road crossing, 1.300 feet east of.....	33 09 45.1	86 19 36.9	6,310
Milepost 90A, road crossing, 300 feet southwest of.....	33 09 54.0	86 18 56.2	3,777
Gant Junction, road crossing, 30 feet west of semaphore.....	33 10 04.7	86 17 53.9	5,408
Milepost 88A, private road crossing, 210 feet west of.....	33 10 05.5	86 16 53.2	5,161
Milepost 87A, north and south road crossing at.....	33 10 06.3	86 15 49.4	5,432
Sylacauga, crossing of Louisville & Nashville R. R. and Central of Georgia R. R. at.....	33 10 25.0	86 15 01.9	4,455

**From Sylacauga south along highways to point near southeast corner of quadrangle, thence west along south border to Marble Valley and north to Talladega Springs, thence along Louisville & Nashville Railroad to tie at Fayetteville station.**

Sylacauga, crossing of Louisville & Nashville R. R. and Central of Georgia R. R. ....	33 10 25.0	86 15 01.9	.....
T. 23 S., R. 18 E., corner sections at Sylacauga; iron hub.....	33 10 02.7	86 15 03.4	2,253
Sylacauga, center of T road north, 1 mile south of, 15 feet east and 10 feet south to mail box.....	33 09 18.9	86 15 09.1	4,457
Sylacauga, center of T road west, 24 miles south of.....	33 08 09.0	86 15 17.4	7,090
Sylacauga, 3 miles south of, in ledge of stone on north side of Stewartsville-Sylacauga road, 0.2 mile south of Tanyard branch, 18 feet from center of road; bronze tablet stamped "Prim. Trav. Sta. No. 11, 1914".....	33 07 31.4	86 15 15.0	3,803
Stewartsville, northeast corner of store, at forks of road, 2 miles north and 0.5 mile west of.....	33 06 26.5	86 15 33.0	6,742
Shelton Creek, center of bridge over.....	33 05 01.4	86 15 13.5	8,758
T. 24 S., R. 18 E., corner secs. 14, 15, 22, and 23.....	33 03 36.8	86 15 05.7	.....
Mail box No. 39, at T road north.....	33 01 47.1	86 15 35.2	.....
New Side Baptist Church, well house at forks of road just south of Weogufka, center of crossroads, on top of hill, 1.3 miles east of.....	33 01 23.4	86 16 13.9	4,072
Weogufka, bridge at middle of Weogufka Creek, 0.5 mile east of.....	33 01 04.6	86 17 21.4	6,054
Weogufka, bridge at middle of Weogufka Creek, 0.5 mile east of.....	33 01 07.3	86 18 00.6	3,345
Weogufka, center of crossroads at.....	33 01 00.1	86 18 42.8	3,070
Tps. 24 and 25 S., Rs. 17 and 18 E., corner of, 20 feet south to black oak tree.....	33 00 58.0	86 19 11.4	2,438
Weogufka, center of crossroads, 1.5 miles west and 0.5 mile south of.....	33 00 33.0	86 20 12.6	5,791
Weogufka, 3 miles west of and 0.8 mile south of, in east chimney of W. T. Lesley's residence at Unity Church; bronze tablet stamped "Prim. Trav. Sta. No. 13, 1914".....	33 00 20.0	86 21 35.4	7,173
Frog poolee crossroads, center of.....	33 00 23.3	86 21 47.8	1,110
Weogufka, center of crossroads, 5 miles due west of.....	33 00 48.7	86 23 24.6	8,629
Forks of road at top of hill, dim road to southwest.....	33 01 04.0	86 24 20.3	4,992
Paint Creek, center of crossroad, 0.5 mile east of.....	33 02 07.6	86 25 08.0	7,643
Marble Valley, center of bridge over Paint Creek, 1.5 miles east and 0.5 mile south of.....	33 02 14.0	86 25 33.3	2,182
Marble Valley, in brick chimney of J. W. Morris's residence at; bronze tablet stamped "Prim. Trav. Sta. No. 14, 1914".....	33 02 40.2	86 27 01.8	7,991
Marble Valley, center of T road east, 1.5 miles north of and 0.5 mile east of.....	33 04 01.2	86 26 34.9	8,199
Guide board, "Marble Valley 2 miles," forks of road at, 30 feet south to guide board.....	33 04 39.2	86 26 18.1	4,103
Looney Mill, center of T road east at.....	33 05 21.9	86 26 13.0	4,643
Pickerwood Creek, center of bridge over.....	33 05 35.1	86 26 43.8	2,816
Talladega-Coosa county line, center of north-south road on.....	33 06 11.5	86 26 46.0	3,085
Talladega Springs, in concrete coping at spring house; bronze tablet stamped "Prim. Trav. Sta. No. 15, 1914".....	33 06 56.6	86 26 34.4	4,674
Talladega Springs station, 1 mile northeast of, northeast and southwest road crossing Louisville & Nashville R. R. ....	33 07 57.3	86 26 06.2	6,586
Fayetteville station, road crossing east and west, Louisville & Nashville R. R., 0.75 mile southwest of.....	33 08 30.0	86 25 10.8	5,751
Station 171, tie point.....	33 08 46.56	86 24 19.08	4,709

Magnetic declination for west half of north border of quadrangle,  $2^{\circ} 24' E.$ ; for north half of west border of quadrangle,  $2^{\circ} 31' E.$ ; for south half of west border of quadrangle,  $2^{\circ} 30' E.$ ; for south half of east border of quadrangle,  $2^{\circ} 57' E.$ ; for east half of south border of quadrangle,  $3^{\circ} 07' E.$ ; for west half of south border of quadrangle,  $2^{\circ} 34' E.$ .

## GOOD WATER QUADRANGLE.

Near Stewartsville.

Stations.	Latitude.	Longitude.	Distance between stations.
			Feet.
Stewartsville, forks of road at, 25 feet south to center of small bridge.....	* ' "	* ' "	
	33 04 40.3	86 14 50.6	
Stewartsville, center of forks of road, 1 mile south of.....	33 03 51.6	86 14 52.2	4,918
Stewartsville, 3 miles south and 1 mile east of, on west edge of Stewartsville-Hanover road, about 800 feet northeast of forks of road, 17 feet west to blaze on east face of black gum tree, in ledge of stone; bronze tablet stamped "Prim. Trav. Sta. No. 12, 1914".....	33 02 29.6	86 13 41.3	

## NORTH CAROLINA.

### PRIMARY TRAVERSE.

**Belhaven, Bunyon, Jamesville, and Plymouth quadrangles.**

**BEAUFORT, MARTIN, AND WASHINGTON COUNTIES.**

The following geographic positions on North American datum were determined in 1913 by George T. Hawkins. The line starts from Coast Survey triangulation station Cedar Grove and follows Norfolk Southern Railroad to triangulation station Range South. Circuits are looped from the main line and follow railroads and highways as indicated in the tabulated lists:

#### BELHAVEN QUADRANGLE.

**Along Norfolk Southern Railroad.**

Station.	Latitude.	Longitude.	Distance between stations.
Milepost 15, railroad track opposite.....	35 44 54.4	76 38 01.7	
Wenona blind siding, head block.....	35 43 51.2	76 38 33.6	6,900
Old Plymouth, road crossing near water tank.....	35 43 05.0	76 38 56.9	5,050
Pike Road station, railroad track opposite.....	35 41 43.8	76 39 32.4	8,718
Old log railroad, crossing of.....	35 40 15.4	76 39 52.2	9,090
Milepost 8, second-class road crossing 2,550 feet south of.....	35 38 41.4	76 40 13.2	9,860
Milepost 7, Norfolk Southern R. R. crossing, drainage ditch 1,150 feet south of.....	35 38 03.5	76 40 21.7	3,900
Bishop, 10 feet east of railroad and 15 feet south of wagon road, 110 feet north of railroad station and 60 feet west of old store, iron post stamped "Prim. Trav. Sta. No. 3, 1913".....	35 36 39.0	76 40 40.4	8,680
Wilkins station, road crossing 300 feet east of.....	35 36 27.3	76 42 01.3	6,780
Second-class road crossing, 70 feet southeast to gate.....	35 36 21.8	76 42 57.1	4,640
County road crossing, 50 feet northwest to crossing sign.....	35 36 13.5	76 44 22.0	7,061
Pantego station, road crossing 400 feet southeast of.....	35 35 28.9	76 39 40.3	8,650
Milepost 2, road crossing 1,800 feet southeast of, 15 feet south to crossing sign.....	35 34 14.2	76 38 43.7	8,886
Belhaven, road crossing 1 mile west of.....	35 33 07.6	76 38 16.4	7,110
Belhaven, in northwest corner of railway reservation northeast of station, U. S. drainage bench mark iron post .....	35 32 24.1	76 37 25.4	6,090

#### Along highways.

Belhaven crossing, Main and Haslin streets.....	35 32 24.5	76 37 24.2	110
Second-class crossroad, 20 feet northwest to 2 mail boxes.....	35 32 59.4	76 38 14.5	6,756
Three corners, 50 feet southwest to negro cabin, 260 feet southeast to old store.....	35 33 36.4	76 38 39.6	8,690
T road south, 10 feet north to N. W. Sadler's mail box.....	35 33 35.4	76 33 58.0	3,440
T road south, 40 feet southwest to old store.....	35 33 26.8	76 33 09.0	4,144
Leechville, 1½ miles west of, at T road north, 14 feet west to J. R. Green's mail box, 45 feet southeast to northwest corner of cabin, 15 feet north to east and west road; iron post stamped "Prim. Trav. Sta. No. 5, 1913".....	35 33 53.7	76 32 04.9	5,946
Small wooden bridge, three corners at.....	35 34 29.1	76 32 04.7	3,580
14-inch pine, blazed on east and west; nail in each blaze.....	35 35 48.3	76 33 53.0	12,010
Forks of road, 20 feet east to sign, "Pungo 8 miles, Leechville 5 miles".....	35 35 47.8	76 34 02.7	800
Mr. Swindell's residence, well in front of.....	35 36 12.1	76 34 40.5	3,971
Gate, road opposite.....	35 36 38.4	76 35 19.0	4,144
Forks of road, dim road northeast.....	35 37 39.3	76 36 17.7	7,836
Forks of road, dim road southeast.....	35 37 57.0	76 36 35.4	2,305
Forks of road, 120 feet south to sign, "Pantico 4 miles, Pilkewood 7 miles".....	35 38 01.0	76 36 44.5	853

\* Distance from station at Bishop.

## BELHAVEN QUADRANGLE—Continued.

## Along highways—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
County road crossing drainage ditch.....	* * *	* * *	
Forks, second-class road west, 40 feet north to mail box, 150 feet southeast to 2-story frame house.....	35 38 57.3	76 36 36.4	5,733
Forks, second-class road at white race church.....	35 39 14.0	76 36 48.5	1,955
Pungo post office, road opposite.....	35 39 54.3	76 36 34.0	4,255
T road north at white race schoolhouse.....	35 40 35.8	76 37 13.7	5,322
T road west, 150 feet northwest to 2-story house.....	35 40 57.6	76 37 43.7	3,316
County road crossing drainage ditch.....	35 41 58.0	76 38 07.1	6,400
Wenona, 300 feet east of Norfolk Southern Ry. on north side of old Plymouth road, stamped "Prim. Trav. Sta. No. 6, 1913," 10 feet north of center of road and 3 feet south of ditch.....	35 42 40.9	76 38 33.2	4,840
Old Plymouth road crossing Norfolk Southern R. R. ....	35 43 02.8	76 38 54.6	2,830
Three corners at church.....	35 43 05.0	76 38 56.9	300
T road west at store.....	35 43 05.8	76 40 10.3	
Second-class road fork northwest.....	35 44 24.6	76 41 20.5	7,137
T road southeast, 50 feet south to 2-story house.....	35 44 59.9	76 41 49.7	3,467
T road southeast, 20 feet north to sign, "Washington 23 miles, Paniglo 5 miles".....	35 45 32.6	76 42 17.3	8,142
T road northwest, at old store.....	35 46 25.1	76 42 31.5	2,118
Yeatesville, three corners at, 40 feet north to store.....	35 46 30.9	76 43 36.5	5,904
Yeatesville, on north side east and west road, 600 feet west of 3 corners, 60 feet northwest of Mr. Woolard's house, 40 feet northeast of small house; iron post stamped "Prim. Trav. Sta. No. 7, 1913".....	35 47 42.2	76 44 26.0	4,502
	35 31 42.3	76 44 33.7	636

## BUNYON QUADRANGLE.

## Along Norfolk Southern Railroad.

Station.	Latitude.	Longitude.	Distance between stations.
Cedar Grove, on sandy point on north side of Pamlico River 1 mile southeast of Washington; it is the next point above Austin Point and 1 mile distant; 1½-inch iron pipe driven in the ground; the station is now about 10 feet from the shore line, in water near 3 feet deep; reference mark, cypress stump, 19.6 feet from station, at water's edge.....	* * *	* * *	
River Road station, road crossing.....	35 31 52.58	77 02 10.99	
Bunyon station, road crossing 500 feet south of.....	35 32 07.2	76 59 10.4	14,500
Hall Swamp station, road crossing.....	35 32 13.1	76 58 31.2	3,786
Alligoods station, road crossing.....	35 33 00.8	76 57 09.2	8,320
Slatestone station, road crossing.....	35 33 29.6	76 56 19.6	5,030
Milepost 117, railroad track opposite.....	35 34 17.3	76 54 57.0	8,350
Walla Walla station, north-south road crossing at.....	35 34 34.0	76 54 10.6	4,193
Milepost 114, road crossing northeast and southwest, 250 feet south of.....	35 35 09.4	76 52 26.9	9,280
Pinetown, 54 feet northwest of the northwest corner of station, 30 feet north of northeast corner of frame house, 11 feet west of west rail of main line Norfolk Southern R. R. and 16 feet north of railway crossing; iron post stamped "Prim. Trav. Sta. No. 1, 1913".....	35 35 59.2	76 51 58.0	5,575
Mileposts 110 and 111, well-traveled road crossing between.....	35 36 37.2	76 51 52.3	3,870
Milepost 109, railway track opposite.....	35 38 54.4	76 51 31.6	13,970
Mizell station, road crossing at.....	35 40 19.2	76 51 11.6	8,737
Mizell station, road crossing 1 mile northeast of.....	35 41 37.5	76 50 28.0	8,690
Hoke station, road crossing at.....	35 42 15.9	76 49 47.8	5,100
Milepost 103, railway track opposite.....	35 43 57.5	76 48 48.0	11,400
Terracina station, road crossing at.....	35 44 52.3	76 48 11.4	6,300
Stevens station, road crossing drainage ditch at.....	35 36 04.3	76 45 55.4	
Log Spur, head block.....	35 35 58.1	76 46 58.3	5,231
Acrestation, road crossing at east end of.....	35 35 50.4	76 48 17.0	6,550
Second-class road crossing, 150 feet south to white house, 30 feet north to county road.....	35 36 14.1	76 50 46.3	7,288
Prim. Trav. Sta. No. 1 (described above).....	35 36 37.2	76 51 52.3	5,953

## BUNYON QUADRANGLE—Continued.

Along highways.

Station.	Latitude.	Longitude.	Distance between stations.
T road south, signpost 20 feet southeast reads "Bath 5½ miles".....	35 31 42.0	76 45 08.8	
T road north at old store, 100 feet northwest to two-story house.....	35 31 46.2	76 46 34.7	7,112
Three corners, on east bank of drainage ditch.....	35 31 37.4	76 47 21.4	3,956
Crossroads, 200 feet southwest to large house 60 feet northeast to small house.....	35 31 28.8	76 48 00.3	3,334
Hunter's bridge, four corners.....	35 31 19.0	76 48 35.3	3,053
Crossroads, 400 feet south to white schoolhouse, 20 feet southeast to signpost.....	35 31 23.8	76 50 33.4	9,770
Crossing of county road and narrow-gage railroad.....	35 31 32.0	76 51 49.2	6,320
On north side of east and west road, 60 feet west of T road north, 15 feet southeast to mail box, 68 feet west to mail box, 300 feet north to two-story house; iron post stamped "Prim. Trav. Sta. No. 8, 1913".....	35 31 32.0	76 52 21.8	2,700
Three corners, 20 feet northwest to signpost "Plymouth road 3½ miles".....	35 31 28.1	76 53 04.1	3,512
Three corners, 100 feet north to 200 feet southeast to house.....	35 30 42.5	76 54 01.0	6,584
Second-class crossroad.....	35 31 06.0	76 55 27.5	7,535
County road crossing narrow-gage road.....	35 31 31.9	76 56 32.6	5,984
T road southwest, 30 feet south to old store.....	35 31 53.8	76 57 55.0	7,155
Bunyon station, road crossing 500 feet south of.....	35 32 13.1	76 58 31.2	3,577

## JAMESVILLE QUADRANGLE.

Along Norfolk Southern Railroad, Hinson to Plymouth.

Station.	Latitude.	Longitude.	Distance between stations.
Hinson, 12 feet west of west rail main line Norfolk Southern R. R., 20 feet south of station, 21 feet southwest of southwest corner of station, and 10 feet northeast of pine tree; iron post stamped "Prim. Trav. Sta. No. 2, 1913".....	35 45 47.6	76 47 34.4	
Milepost 101, railroad track opposite.....	35 46 15.0	76 46 58.6	4,045
Milepost 100, railroad track opposite.....	35 46 44.5	76 46 05.8	5,285
Reno station, railroad track opposite.....	35 48 14.0	76 45 52.1	9,120
Mileposts 96 and 97, county road crossing between.....	35 49 24.2	76 45 29.3	7,347
Milepost 95, county road crossing, 700 feet northwest of.....	35 50 53.4	76 45 36.0	9,030
Plymouth, U. S. C. S. north meridian stone.....	35 51 40.2	76 45 14.1	5,070
Jones's value for north meridian stone (not adjusted to this value).....	35 51 41.9	76 45 14.1	

## PLYMOUTH QUADRANGLE.

Along Norfolk Southern Railroad.

Station.	Latitude.	Longitude.	Distance between stations.
Milepost 91, road crossing, 1,400 feet southwest of.....	35 51 56.8	76 43 37.6	
Waters station, second-class road crossing.....	35 53 14.9	76 43 03.2	11,080
Westover station, railway track opposite.....	35 54 02.9	76 40 42.3	8,234
County road crossing.....	35 54 28.9	76 39 26.7	6,750
County road crossing, 200 feet southeast to church.....	35 55 09.8	76 37 46.7	9,205
Main line Norfolk Southern R. R., on projected line of tangent from south on Belhaven branch.....	35 55 42.6	76 36 58.9	5,146
Range South, U. S. C. S. triangulation station at the south end of the Albemarle Sound bridge, Norfolk Southern R. R., between 2 tracks and 575 feet southwest of the end of the bridge; station mark, a small brass bolt in center of top of large block of cement 1 foot square on top, buried flush with ground.....	35 56 19.20	76 36 14.05	
Mileposts 26 and 27, Belhaven branch Norfolk Southern R. R.....	35 53 54.6	76 37 27.0	11,160
Roper, main street crossing railway.....	35 52 40.0	76 36 55.5	7,983
Mileposts 23 and 24, second-class road crossing between, 300 feet east to negro cabin.....	35 51 43.2	76 36 17.8	6,522
Milepost 22, railroad track opposite.....	35 50 36.1	76 35 45.6	7,290
Milepost 21, railroad track opposite.....	35 49 45.0	76 35 36.6	5,213
Milepost 20, railroad track opposite.....	35 48 56.3	76 35 59.2	5,264
Milepost 19, railroad track opposite.....	35 48 08.2	76 36 23.6	5,240
Milepost 18, railroad track opposite.....	35 47 19.7	76 36 48.2	5,311
Milepost 17, railroad track opposite.....	35 46 31.4	76 37 12.6	5,280
Railroad siding, head block at south end of.....	35 45 35.0	76 37 40.9	6,110

a Distance from main line.

## Belhaven, Buxton, and Plymouth quadrangles.

## BEAUFORT AND WASHINGTON COUNTIES.

Positions on approximate North American datum determined from notes of John L. Roper Lumber Co., Land Reclamation Department, which have common points with U. S. Geological Survey primary traverse line. Line follows highways from points on traverse line at Plymouth described in Bulletin 151 and is tied to traverse line at Acre. Line was run in 1913 and computed in 1915.

## PLYMOUTH QUADRANGLE.

Along highways near southwest border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Plymouth, milepost 92.....	35 51 41.9	76 44 21.1	
Plymouth, $\frac{1}{2}$ mile south of forks of road at cemetery.....	35 51 21.6	76 44 39.6	2,553
Plymouth, $\frac{1}{2}$ mile south of, bench mark in 15-inch water oak.....	35 50 57.4	76 44 45.3	2,500
Plymouth, 1½ miles south of, bench mark in 3-inch pine tree.....	35 50 31.6	76 44 24.7	3,110
Plymouth, $\frac{3}{4}$ miles south of, bench mark in 6-inch gum tree.....	35 49 49.2	76 44 12.2	4,414
Plymouth, 3 miles south of, bench mark in 6-inch oak tree.....	35 49 23.6	76 44 06.9	2,623
Plymouth, 4 miles south of, bench mark in 15-inch gum tree, near schoolhouse.....	35 48 41.0	76 44 04.1	4,320
Plymouth, $\frac{1}{2}$ miles south of, bench mark in 6-inch pine tree near Mr. Bateman's house.....	35 47 57.9	76 43 23.9	5,472
D. G. Darden's house, crossroads near.....	35 47 42.3	76 43 25.6	1,580
D. G. Darden's house, $\frac{1}{2}$ mile south of, bench mark in 6-inch gum tree.....	35 47 27.0	76 43 27.3	1,554
D. G. Darden's house, road southwest, 1 mile southwest of.....	35 46 49.7	76 43 47.6	4,120
Bench mark in 24-inch oak tree near house.....	35 46 19.4	76 44 02.0	3,200
County road crossing drainage ditch.....	35 46 06.0	76 44 10.8	1,536
Near where road crosses drainage ditch; bench mark in 15-inch pine tree.....	35 45 47.6	76 44 13.5	1,874
Schoolhouse, 650 feet north of; bench mark No. 404, in 24-inch oak tree.....	35 45 33.5	76 44 17.4	1,460

## BELHAVEN QUADRANGLE.

Near northwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Plymouth, road crossing Hollis road; bench mark in 12-inch pine near.....	35 44 46.3	76 44 30.9	
Plymouth, road crossing drainage ditch at edge of woods.....	35 44 23.1	76 44 27.9	2,360
U. S. B. M. "F 33," at edge of swamp.....	35 44 05.7	76 44 36.3	1,890
U. S. B. M. "F 32," 500 feet northeast of L. G. Nance's house.....	35 43 43.6	76 44 53.0	2,625

## BUNYON QUADRANGLE.

Along highways in east part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Acre, county road crossing railway.....	35 35 44.1	76 49 26.3	
Acre, 1 mile north of three corners.....	35 36 30.2	76 49 07.5	4,917
Acre, 2.5 miles northeast of; bench mark in 10-inch pine tree.....	35 37 44.7	76 48 28.0	8,205
D. L. Harris's house, U. S. B. M. 600 feet north of.....	35 38 11.2	76 48 18.6	2,795
B. T. Bowen's house, four corners, 100 feet southwest of.....	35 38 15.0	76 47 45.3	7,014
Milepost "To Plymouth 15 miles," 1,500 feet north of H. A. Bowen's house.....	35 40 11.2	76 47 17.7	6,120
J. T. Bowes's house, U. S. B. M. 600 feet northeast of.....	35 40 30.6	76 47 04.1	2,265
Milepost, "To Plymouth 14 miles".....	35 40 58.0	76 46 47.4	3,090
U. S. Harris's house, U. S. B. M. near.....	35 41 00.0	76 46 41.0	965
Acre Chapel, U. S. B. M. near.....	35 41 43.0	76 46 18.9	4,165
Acre Chapel, 50-inch oak 1.25 miles northeast of.....	35 42 23.8	76 45 45.7	4,950
G. L. Bowen, U. S. B. M. "F 31" near.....	35 42 55.5	76 45 22.8	3,720

\* Uncertain location.

**Ayden and Kinston quadrangles.****GREENE AND LENOIR COUNTIES.**

The following geographic positions on approximate North American datum were determined in 1913 by George T. Hawkins. The positions are based on the corrected value of Grainger station, published on page 146, Bulletin 181.

A circuit was completed by using the traverse line run by Oscar Jones in 1900 from Grainger station along Atlantic Coast Line Railroad to Kinston, thence along Norfolk Southern Railroad to road crossing 280 feet east of milepost 78, thence north along highways to Snow Hill by Hawkins in 1913, thence east along highways from Snow Hill to Ridge Springs by Sledge Tatum in 1902, thence south along highways to Grainger by Hawkins in 1913, the closure error of the circuit being 1.74" in latitude and 1.12" in longitude.

The positions of points along Jones line from Grainger to milepost 78 as published on pages 144-146, Bulletin 181, are changed but slightly.

The latitudes of points along Tatum's line from Snow Hill to Ridge Springs (p. 41, Bulletin 201) are increased 4.3" at Snow Hill and 2.8" at Ormondsville; the longitudes are changed but a few tenths of a second.

**KINSTON QUADRANGLE.****Along railroads from Grainger to milepost 78.**

Station.	Latitude.	Longitude.	Distance between stations.
Grainger, railway opposite telegraph window.....	35 19 10.8	77 30 32.0	Feet.....
Grainger, 6 feet south of post office, 27 feet east of center of highway, 126 feet east of north rail of Atlantic Coast Line R. R.; iron post stamped "77 Raleigh, Prim. Trav. Sta. No. 11, 1913".	35 19 09.6	77 30 30.8	148
Kinston, crossing of Atlantic Coast Line and Norfolk Southern railroads.....	35 15 31.3	77 34 27.2	29,530
Kinston, railway opposite telegraph window of Norfolk Southern R. R. station.....	35 15 51.2	77 34 53.8	2,990
Kinston, road crossing 3 miles west of.....	35 16 15.7	77 38 12.6	16,670
Falling Creek, railway opposite station.....	35 16 34.8	77 41 23.4	15,940
Milepost 78, road crossing 280 feet east of.....	35 17 08.6	77 44 06.4	13,940
Milepost 78, road crossing 280 feet east of, 15 feet northeast of, 13 feet of north rail and 2 feet northeast of crossing signpost; iron post stamped "Prim. Trav. Sta. No. 12, 1913".	35 17 08.7	77 44 06.3	15

**Along highways.**

Three Corners, in front of large white house 60 feet north to artemesian well, 30 feet north to hydraulic valve.....	35 18 54.0	77 43 48.2	10,780
Three Corners, 40 feet south to post oak between two roads.....	35 19 30.7	77 42 46.0	6,350
Crossroads, 30 feet northeast to corner of wire fence.....	35 20 36.5	77 42 33.1	6,750
Institute, 7 road west in south part of.....	35 21 14.6	77 42 46.2	4,010
Institute, 1/2 mile north of, 30 feet southwest to crossroads, 110 feet northeast to southwest corner of two-story house, 20 feet east of north and south road and 15 feet north of east and west road; iron post stamped "Prim. Trav. Sta. No. 13, 1913".	35 21 59.4	77 42 59.2	4,665
Three Corners, 30 feet southeast to mail box, 150 feet northeast to new house.....	35 23 04.3	77 42 43.9	6,690
Crossroads, 20 feet north to corner of wire fence, first-class roads north, south, and west, second-class road east.....	35 23 24.9	77 42 23.5	2,687
Arbor, T road west at, 30 feet northeast to store, 70 feet southwest to church.....	35 24 04.3	77 42 08.0	4,194

## KINSTON QUADRANGLE—Continued.

## Along highways—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Crossroads, 20 feet northeast to signpost "To Log mill road 2 miles".	* * *	* * *	Feet.
	35 25 42.8	77 41 28.3	10,495
Crossroads, 40 feet south to signpost "To Snow Hill 1 mile".	35 26 51.9	77 41 22.0	7,012
Snow Hill, courthouse dome.	35 27 21.9	77 40 13.0	6,460
Snow Hill in wall at north side of entrance to county courthouse; aluminum tablet stamped "64 RALEIGH, Prim. Trav. Sta. No. 14, 1913".	35 27 22.0	77 40 13.1	12
Snow Hill, country road opposite entrance to courthouse.	35 27 22.1	77 40 13.4	30
Snow Hill, 1.5 miles northeast of road left.	35 28 48.9	77 38 51.1	11,110
Snow Hill, 2 miles northeast of road left.	35 28 56.9	77 38 15.4	3,063
Snow Hill, 2.5 miles northeast of road left.	35 28 31.6	77 37 46.4	2,456
Dixonville, post office.	35 28 18.3	77 36 35.6	6,780
Dixonville, 1 mile east of road right.	35 28 25.6	77 35 17.9	6,470
Dixonville, 2 miles northeast of road left.	35 29 07.6	77 35 05.7	4,370
Road left.	35 29 02.9	77 34 22.0	3,658
Ormonville, crossroads at.	35 28 17.1	77 32 45.3	9,232
Ridge Springs, road right, 2 miles northwest of.	35 27 55.8	77 31 00.8	8,913
Crossroads, near white church, 20 feet southwest to large oak.	35 24 35.9	77 30 01.5	-----
Second-class road, fork to east.	35 23 51.8	77 30 01.0	4,447
Grainger, 5 miles north of, 20 feet northeast of T road north, 18 feet east of north and south road, 20 feet north of east and west road, 6 feet east to Pine, 15 feet southeast to Pine; iron post stamped "Prim. Trav. Sta. No. 9, 1913".	35 23 08.6	77 30 13.1	4,975
Three Corners, 20 feet south to mail box No. 48.	35 22 00.2	77 30 42.3	6,840
T road east, 10 feet northeast to mail box No. 94.	35 21 19.4	77 30 14.6	4,710
Old Church, three corners near, 60 feet north to southwest corner of graveyard.	35 20 14.1	77 30 13.9	5,583
Grainger station.	35 19 10.8	77 30 32.0	7,550

Magnetic declination on east border of quadrangle,  $3^{\circ} 15' W.$ ; on west border,  $3^{\circ} 00' W.$

## AYDEN QUADRANGLE.

## Near Ridge Springs.

Station.	Latitude.	Longitude.	Distance between stations.
Ridge Springs, post office.	* * *	* * *	Feet.
Ridge Springs, post office, 45 feet south and 32 feet east of entrance; iron post stamped "Prim. Trav. Sta. No. 10, 1913".	35 27 25.3	77 29 18.9	-----
Ridge Springs, 2 miles south of; T road west, 20 feet northwest to 2 mail boxes, 150 feet northwest to large bell.	35 27 24.8	77 29 18.5	55
	35 25 40.8	77 29 44.7	10,730

## ARIZONA AND NEW MEXICO.

### TRIANGULATION STATIONS.

#### Mogollon, Nutrioso, and Reserve quadrangles.

#### APACHE AND GREENLEE COUNTIES, ARIZ.; SOCORRO COUNTY, N. MEX.

In the winter of 1913-14 C. B. Kendall extended triangulation control for the Reserve quadrangle, N. Mex., from stations Mogollon, Sunset, and Pleasant, described in Bulletins 201 and 551. He occupied five new stations and located five points by intersections all based on North American datum. Additional control work was done in the Patterson quadrangle in 1915 by Mr. Kendall, but final computations have not yet been made.

#### ESCADILLO, APACHE COUNTY, ARIZ.

On the highest point of the Escadillo Mountain, about 10 miles northwest of Luna and about 8 miles east of Nutrioso. Station can be easily found, as a Forest Service lookout tower, 40 feet high and very solid, was used to observe from. Can be best reached from the west by trail from Nutrioso, from south by Forest Service trail from Bush Valley, and from east by trail from the "E. L. C." ranch. The mountain is heavily timbered, but the tower affords a good view in all directions, except a small segment to the north. The station is on the west side of the mountain and on the second hill from the north end. A ranger's cabin is on the east slope in saddle between the two hills and about 0.5 mile northeast of station.

Signal: Center of tower over which was erected a flag.

Station mark: A bronze triangulation tablet in large boulder set in ground directly under center pole of tower.

[Latitude 33° 56' 50.81". Longitude 109° 07' 16.99".]

To station —	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Sunset.....	6 09 03.88	186 06 33.56	4.9638596	57.175
Fox.....	249 16 18.98	69 30 17.81	4.6139437	25.544
Apache.....	269 39 40	89 56 26	4.66524	28.747
Tularosa.....	300 35 52.42	120 54 03.64	4.765282	36.465
Box.....	300 57 06.05	121 07 18.99	4.5183765	20.499
Turner Peak.....	312 10 13	132 12 48	3.98333	5.984
Brushy Mountain.....	343 04 07	163 08 08	4.58510	23.903
Whiterocks.....	351 37 30.81	171 40 06.81	4.6971698	30.941

#### SUNSET, GREENLEE COUNTY, ARIZ.

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 good trail taking left hand (to north) 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.

## 14 TRIANGULATION AND PRIMARY TRAVERSE, 1913-1915.

[Maricopa datum: Latitude  $33^{\circ} 07' 15.81''$ ; longitude  $109^{\circ} 13' 40.22''$ . United States standard datum: Latitude  $33^{\circ} 07' 21.16''$ ; longitude  $109^{\circ} 13' 37.30''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Guthrie a.....	17 20 47.78	197 17 57.00	4.4367053	
Guthrie b.....	17 20 20.55	197 17 29.86	4.4366440	16.982
Bryce a.....	74 49 16.71	264 34 42.17	4.6344900	
Bryce b.....	74 48 52.49	264 34 18.03	4.6344384	26.778
Morenci a.....	78 17 48.4	258 12 38.10	4.1774160	
Pleasant a.....	233 35 23.45	53 44 52.30	4.5235914	
Pleasant b.....	233 35 03.06	53 44 31.87	4.5235652	20.745
Mogollon a.....	254 12 01.18	74 32 48.81	4.7873988	
Mogollon b.....	254 11 32.77	74 32 20.25	4.7873376	38.079
Canyon a.....	276 51 41.38	97 16 44.58	4.8571778	
Canyon b.....	276 51 14.01	97 16 17.43	4.8571186	44.717
Line a.....	324 17 52.14	144 25 23.58	4.5676142	
Line b.....	324 17 24.91	144 24 56.41	4.5675529	22.956
Secho a.....	340 45 48.18	160 54 03.87	4.8602010	
Secho b.....	340 45 20.95	160 53 36.79	4.8601397	45.029
Escadillo b.....	188 05 33.56	6 09 03.68	4.9638596	57.175
Whiterocks b.....	202 00 09.62	22 06 12.80	4.6585718	28.309
Tularosa b.....	224 21 35.98	44 43 04.81	4.9358163	53.601
Pleasant b.....	233 35 03.06	53 44 31.87	4.5235652	20.745
Grouse b.....	244 11 34	64 28 14	4.72275	32.818
Mogollon b.....	254 11 32.77	74 32 20.25	4.7873376	38.079

a Maricopa datum.

b United States standard datum.

**APACHE, SOCORRO COUNTY, N. MEX. (Not occupied; sighted from five stations.)**

In T. 4 S., R. 17 W., near corner secs. 21, 22, 27, and 28, approximate. On the west end of the Apache Mountain, about 3 miles southeast of the Jewett ranger station and 7 miles northwest of the village of Aragon. Can be easily reached from the Jewett ranger station.

Station mark and signal: An oak tree 15 feet high carrying flag and around tree was built a quodripod of poles.

[Latitude  $33^{\circ} 56' 55.88''$ . Longitude  $108^{\circ} 37' 15.57''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Whiterocks.....	38 30 16	218 16 12	4.79960	39.170
Box.....	46 29 14	226 22 43	4.39613	15.470
Escadillo.....	89 56 26	269 39 40	4.66524	28.747
Fox.....	151 36 39	331 33 50	4.21161	10.115
Tularosa.....	352 14 35	172 16 04	4.48336	18.911

**BEARWALLOW, SOCORRO COUNTY, N. MEX. (Not occupied; sighted from four stations.)**

On Bearallow Mountain of the Mogollon Range, about  $8\frac{1}{2}$  miles northeast of the town of Mogollon, at the head of Copper Creek on the west and Gilita Creek on the east.

Signal and station mark: Center of United States Forest Service lookout tower, about 40 feet high.

[Latitude  $33^{\circ} 26' 58.60''$ . Longitude  $108^{\circ} 40' 06.18''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Pleasant.....	56 48 38	236 39 44	4.47816	18.696
Whiterocks.....	99 48 10	279 35 45	4.54934	21.963
Tularosa.....	198 37 06	18 40 08	4.42536	16.547
Mogollon.....	340 36 52	160 39 20	4.31965	12.972

## BOX, SOCORRO COUNTY, N. MEX.

On the east end of the San Francisco Range, locally known as the South Mountain. About 8 miles north and 3 miles west of Reserve. It is in the northwest part of T. 6 S., R. 19 W., about 3 miles southeast of the junction of Rio San Francisco and the S. A. Creek, and 1 mile northeast along ridge from a point where trail from the S. A. ranch to Reserve crosses summit. Station is about 2 miles southwest of a point where the Rio San Francisco goes into a canyon locally known as "The Box," from which station derives its name.

Signal: Flag in top of pine tree, 11.4 feet distant, true azimuth from station mark  $156^{\circ} 54'$ .

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

[Latitude  $33^{\circ} 47' 38.75''$ . Longitude  $108^{\circ} 48' 57.20''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Whiterocks.....	33 15 11.08	213 07 37.37	4.5859557	23.980
Escadillo.....	121 07 18.99	300 57 06.05	4.5183765	20.499
Apache.....	228 22 43	46 29 14	4.39613	15.470
Tularosa.....	300 18 50.28	120 26 48.54	4.4088781	15.987

## BRUSHY MOUNTAIN, SOCORRO COUNTY, N. MEX. (Not occupied; sighted from four stations.)

In the southwest part of T. 8 S., R. 21 W., on the west side of the Pueblo Creek, about 7 miles north and 2 miles east of Whiterocks Mountain.

Signal and station mark: Highest point of mountain.

[Latitude  $33^{\circ} 36' 56.21''$ . Longitude  $109^{\circ} 00' 02.51''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Whiterocks.....	17 39 26	197 38 03	4.11618	8.120
Escadillo.....	163 08 08	343 04 07	4.58510	23.903
Tularosa.....	260 04 26	80 18 32	4.60118	24.804
Pleasant.....	350 34 56	170 30 59	4.54866	21.979

## FOX, SOCORRO COUNTY, N. MEX.

In sec. 4 (approximate), T. 3 S., R. 18 W., on the highest point of the "Fox" Mountain and is a high round bare peak overlooking the country for miles in every direction. Several canyons head against the peak, viz, Perry Lawson southeast, American northwest, and Des Meter northeast. It is about 3 miles west of the Jewett Gap and 10 miles northwest of the Jewett ranger station and N. H. ranch. It is an excellent natural triangulation station, as it overlooks the American, Salt Lake, and Agua Fria valleys and the Johnson Basin. It is easily ascended by following Forest Service trail from Jewett Gap.

Signal: Rock cairn 4 feet high around which was built a quodripod of poles. A bushy pine was set over center.

Station mark: A bronze triangulation tablet set in 6 by 8 by 24 inch stone buried in ground over which was built a rock cairn 4 feet high.

[Latitude  $34^{\circ} 04' 40.51''$ . Longitude  $108^{\circ} 42' 17.41''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Whiterocks.....	26 17 06.92	206 05 49.17	Log. meters.	Miles.
Turner Peak.....	56 21 22	236 09 59	4.8514387	44.135
Escadillo.....	69 30 17.81	249 16 18.98	4.57648	23.434
Apache.....	331 33 50	151 36 39	4.6139437	25.544
Tularosa.....	345 02 13.01	165 06 30.19	4.21161	10.115
			4.6630428	28.602

**GROUSE, SOCORRO COUNTY, N. MEX.** (Not occupied; sighted from four stations.)

On the highest point of Grouse Mountain of the Mogollon Range, in T. 11 S., R. 18 W., near line between secs. 20 and 21, approximate. Station is a quarter of a mile north of trail leading from the Tennessee Cabin to Apache Spring at a point 3 miles east of the Tennessee Cabin.

Station mark and signal: A 35-foot pine tree trimmed and carrying flags and targets. Space around tree was cleared.

NOTE.—This station was built to be occupied later and a triangulation tablet was set in an 8 by 8 by 30 inch stone over which a small rock cairn was built, but as snow prevented occupying it, no angles or distance was taken from it to the signal tree. The tablet is about 30 feet northeast of tree.

[Latitude  $33^{\circ} 19' 43.68''$ . Longitude  $108^{\circ} 42' 59.01''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Sunset.....	64 28 14	244 11 34	Log. meters.	Miles.
Pleasant.....	81 33 38	261 26 19	4.72275	32.818
Whiterocks.....	122 33 29	302 22 41	4.32053	12.998
Mogollon.....	299 08 57	119 12 59	4.55660	22.385
			4.11535	8.104

**MOGOLLON, SOCORRO COUNTY, N. MEX.**

Situated on 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.

[Maricopa datum: Latitude  $33^{\circ} 16' 11.72''$ ; longitude  $108^{\circ} 35' 41.44''$ . U. S. standard datum: Latitude  $33^{\circ} 16' 17.27''$ ; longitude  $108^{\circ} 35' 38.88''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Cliff a.....	2 44 28.60	182 43 54.08	Log. meters.	Miles.
Line b.....	39 02 56.22	218 49 45.46	4.5353289	21.315
Line a.....	39 02 28.27	218 49 17.70	4.7768400	37.173
Sunset b.....	74 32 48.81	254 12 01.18	4.7873985	.....
Sunset a.....	74 32 20.25	254 11 32.77	4.7873376	38.079
Jordan a.....	250 49 43.88	70 61 50.16	4.5584409	22.480
Chalk a.....	203 14 02.62	113 21 15.92	4.3480791	13.849
Copperus a.....	295 42 26.24	115 55 19.16	4.0088055	25.244
Black a.....	314 44 05.77	134 58 15.11	4.7551806	35.361
Canyon b.....	334 04 18.19	154 08 38.08	4.4502461	.....
Canyon a.....	334 03 49.29	154 08 09.24	4.4501926	17.520
Grouse a.....	119 12 59	299 08 57	4.11535	8.104
Whiterocks a.....	121 43 12.63	301 28 22.73	4.6908202	30.491
Bearwallow a.....	160 39 20	340 36 52	4.31065	12.972
Tularosa a.....	182 03 42.39	2 04 17.05	4.6532044	27.961

a U. S. standard datum.

b Maricopa datum.

## PLEASANT, SOCORRO COUNTY, N. MEX.

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 San Francisco River at Pleasanton via lane to west side of river and thence by cattle trail to top of ridge, thence northward to station.

Station mark: A bronze triangulation tablet cemented in boulder.

[Maricopa datum: Latitude  $33^{\circ} 17' 57.90''$ ; longitude  $108^{\circ} 56' 21.62''$ . U. S. standard datum: Latitude  $33^{\circ} 18' 03.30''$ ; longitude  $108^{\circ} 56' 18.82''$ .]

To station—	Azimuth.	Back azimuth.	Distance	
			Log. meters.	Miles.
Sunset a	• • "	• • "	4.5235914	
Sunset b	53 44 52.30	233 35 23.45	4.5235652	20.745
Canyon a	53 44 31.87	233 35 03.06	4.7232391	
Canyon b	302 40 00.62	122 55 39.16	4.7231782	32.850
Cliff b	302 39 34.51	122 55 13.05	4.6845221	30.052
Bullard a	320 48 18.53	140 59 01.76	4.8784318	
Bullard b	330 10 35.08	150 23 41.25	4.8783710	46.959
Whiterocks a	330 10 09.78	150 23 16.03	4.3886081	15.204
Brushy Mountain a	156 33 10.29	336 29 42.64	4.54866	21.979
Tularosa a	170 36 59	350 34 56	4.7289620	33.200
Bearwallow a	218 47 07.16	38 58 06.02	4.47816	18.686
Grouse a	236 39 44	56 48 38	4.32053	12.998
	261 26 19	81 33 38		

a Maricopa datum.

b U. S. standard datum.

## TULAROSA (EAGLE PEAK), SOCORRO COUNTY, N. MEX.

Station is on the highest peak of the Tularosa Mountains, locally known as Eagle Peak, under which name it was occupied by the Wheeler Survey. It is in T. 7 S., R. 17 W., sec. 22, approximate, and is at the head of Long Canyon on the north and Cox Canyon on the south. They both head in a saddle about one-fourth mile west of the station. The Forest Service trail from Tularosa ranger station across mountains to the Nigrito ranger station crosses through the saddle. There is a ranger cabin in saddle from which a trail and telephone line leads east up hill to station. Station is about 11 miles east of Reserve and 15 miles south and 4 miles west of Aragon on the Magdalena public road.

Signal: A pole set over tablet and carrying flags; around the pole was erected a quadripod with white cloth around top, and between this and the flag were placed pine boughs. Three targets of red cloth were placed on the sides of quadripod north, south, and west.

Station mark: A bronze triangulation tablet in a 6 by 8 by 24 inch stone set in ground over which is erected a rock cairn 5 feet high.

[Latitude  $33^{\circ} 40' 36.94''$ . Longitude  $108^{\circ} 34' 36.04''$ .]

To station —	Azimuth.	Back azimuth.	Distance	
			Log. meters.	Miles.
Mogollon	• • "	• • "	4.6532044	27.961
Bearwallow	2 04 17.05	182 03 42.39	4.42536	16.547
Pleasant	18 40 08	198 37 06	4.7289620	33.200
Sunset	38 59 06.02	218 47 07.16	4.9358163	5.601
Whiterocks	44 43 04.81	224 21 35.98	4.6758515	29.458
Brushy Mountain	66 09 32.71	245 54 03.26	4.60118	24.804
Box	80 18 32	260 04 26	4.4098781	15.967
Escadillo	120 26 48.54	300 18 50.28	4.7685262	36.465
Fox	120 54 03.64	300 35 52.42	4.6330428	28.602
Apache	165 06 30.19	345 02 13.01	4.48336	18.911
	172 16 04	352 14 35		

**TURNER PEAK, SOCORRO COUNTY, N. MEX. (Not occupied; sighted from three stations.)**

Near the northwest corner of T. 5 S., R. 21 W., about 9 miles northwest of the town of Luna, and about 6 miles southeast of the Forest Service lookout tower on Escadillo Mountain.

Signal and station mark: The highest point of a sharp peak locally known as Turner Peak.

[Latitude 33° 53' 20.83". Longitude 109° 02' 39.36".]

To station —	Azimuth.	Back azimuth.	Distance.	
Escadillo.....	• ' "	• ' "	Log. meters.	Miles.
Fox.....	132 12 48	312 10 13	3.98263	5.984
Whiterocks.....	236 09 59	56 21 22	4.57648	23.434
	359 53 05	179 53 07	4.63140	26.593

**WHITEROCKS, SOCORRO COUNTY, N. MEX.**

On the highest and most southerly of the three peaks of Whiterocks Mountain, which rises abruptly from the mesa west of the junction of Pueblo Creek with the Rio San Francisco and is about 9 miles northwest of same and 12 miles northwest of Alma. The peak is timbered, but was cleared on the east slope and affords an excellent view for about 90° both sides of due east. Station can be reached by climbing the mountain from almost any direction. Water can be found at the Grey Bull Spring in the next canyon north of the white rocks on the east slope of the third peak north and is about 1½ miles northeast of station. An old rock cairn was found, and on tearing it down to place tablet a tin box was found in which was a paper upon which was written in pencil the following: "Explorations west of the 100th meridian, triangulation station XXX. Occupied Oct. 24th, 1873, Gilbert Thompson, Topographer."

Signal: Flag and targets on oak tree 15 feet high, distance 9 feet, true azimuth 59° 15' from station mark; tree was braced by a pole quadripod.

Arizona-New Mexico State line crosses the mountain less than 0.25 mile west of station.

[Latitude 33° 30' 11.79". Longitude 109° 02' 36.02".]

To station —	Azimuth.	Back azimuth.	Distance.	
Sunset.....	• ' "	• ' "	Log. meters.	Miles.
Escadillo.....	22 06 12.80	202 00 09.62	4.6585718	28.309
Turner Peak.....	171 40 06.81	351 37 30.81	4.6971698	30.941
Brushy Mountain.....	179 53 07	359 53 05	4.63140	26.593
Fox.....	197 38 03	17 39 26	4.11618	8.120
Box.....	206 05 49.17	26 17 06.92	4.8514387	44.135
Apache.....	213 07 37.37	33 15 11.08	4.5859557	23.950
Tularosa.....	218 16 12	38 30 16	4.79960	39.170
Bearwallow.....	245 54 03.26	66 09 32.71	4.6758515	29.458
Mogollon.....	279 35 45	99 48 10	4.54834	21.963
Grouse.....	301 28 22.73	121 43 12.63	4.6908202	30.491
Pleasant.....	302 22 41	122 33 29	4.55660	22.385
	336 29 42.64	156 33 10.29	4.3886081	15.204

## NEW MEXICO.

### TRIANGULATION STATIONS.

**Koehler, Mount Laughlin, and Ute Creek quadrangles.**

#### COLFAX COUNTY.

In 1914 J. R. Ellis extended triangulation west from stations Eagletail and Mount Laughlin, described in Bulletin 551. Eight new stations were occupied and five points were located by intersections; all on approximate North American datum. Azimuth observations were made at Maxwell station; the observed azimuth was used in computations of positions west of the line French-Koehler.

#### BARTLETT, COLFAX COUNTY, N. MEX.

Situated in northwest part of Colfax County on a small peak about 2 miles northeast of Vermejo Park post office on land owned by Wm. H. Bartlett. The signal is visible from the above post office.

Signal: A small topped pine tree centered over the tablet with a quadripod built around it and covered with white cloth.

Station mark: A bronze tablet cemented in solid rock.

[Latitude  $36^{\circ} 54' 30.55''$ . Longitude  $104^{\circ} 57' 52.20''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Sharp peak to southwest.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Sharp peak to west.....	35 42 46	215 33 53	4.57897	23.568
Ridge.....	70 12 22	250 03 05	4.38845	15.198
Rock.....	250 44 07	70 47 40	3.96815	5.774
Koehler.....	275 18 37.41	95 21 58.37	3.9201820	5.170
Colfax.....	303 49 04.02	123 58 32.57	4.4519159	17.590
Dawson.....	324 03 18	144 12 12	4.57639	23.428
	348 48 28.90	168 51 17.58	4.3660890	14.436

#### CHASE, COLFAX COUNTY, N. MEX.

On partly bare knoll at east end of ridge on Mrs. Mary Springer's land and about 3 miles southwest of Chase ranch.

Signal: A pine tree 15 inches in diameter stripped to within 10 feet of top. Signal is 2.4 feet northwest of station mark.

Station mark: A bronze tablet set in solid rock at foot of pine tree.

[Latitude  $36^{\circ} 32' 22.79''$ . Longitude  $104^{\circ} 58' 11.10''$ .]

To station —	Azimuth.	Back azimuth.	Distance.	
Knob.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Dawson.....	18 33 02	198 31 40	4.03112	6.675
Koehler.....	195 19 46.21	15 21 45.69	4.2742944	11.685
Colfax.....	223 37 03.12	43 46 40.49	4.5412396	21.607
French.....	245 16 48	65 25 50	4.39588	15.461
	279 14 27.53	99 22 44.47	4.3232646	13.080

**COLFAX, COLFAX COUNTY, N. MEX. (Not occupied.)**

On the south end of a prominent bluff about 3 miles northeast of Maxwell station.  
Signal and station mark: A 6-foot rock cairn centered over a bronze tablet set in solid rock.

[Latitude  $36^{\circ} 37' 59.39''$ . Longitude  $104^{\circ} 43' 01.37''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Chase.....	65 25 50	245 16 48	4.39588	15.461
Dawson.....	113 49 50	293 42 46	4.28445	11.962
Bartlett.....	144 12 12	324 03 18	4.57639	23.428
Eagletail.....	.....	78 47 51	4.44043	17.131
Maxwell.....	.....	118 31 10	4.32204	13.043

**DAWSON, COLFAX COUNTY, N. MEX.**

On the southwest end of a wooded ridge on the divide between Von Bremer Creek and Cerososo Arroyo, about 6 miles west and 2 miles north of Dawson village. The ridge is in the shape of a horseshoe and the station stands on the southwest part of ridge.

Signal: A 12-inch pine tree trimmed to within about 10 feet of the top, which stands 2.7 feet southwest of the station mark.

Station mark: A bronze tablet set in sandstone 20 by 20 by 5 inches, which projects 3 inches above surface of ground.

[Latitude  $36^{\circ} 42' 11.14''$ . Longitude  $104^{\circ} 54' 50.80''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Chase.....	15 21 45.69	195 19 46.21	4.2742044	11.685
Knob.....	16 32 01	196 28 41	4.47039	18.354
Sharp Peak southwest.....	73 18 28	253 07 47	4.44434	17.286
Bartlett.....	168 51 17.58	348 49 28.90	4.3660890	14.436
Rock.....	189 46 37.68	9 48 09.49	4.3491612	13.884
Koehler.....	249 43 29.33	69 51 08.01	4.3069900	12.599
Colfax.....	293 42 46	113 49 50	4.28445	11.962
French.....	323 44 09.97	143 50 19.43	4.2624875	16.590

**EAGLETAIL, COLFAX COUNTY, N. MEX.**

Station is situated 16 miles a little south of east from Raton, on the highest point of Eagletail Mountain—a very prominent position. It is on the farther south of the two small peaks on the summit. Considerable timber was cut around this station.

Station mark: An aluminum tablet set in solid rock over which was erected a tripod of poles 12 feet high.

[Latitude  $36^{\circ} 40' 54.49''$ . Longitude  $104^{\circ} 24' 52.66''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Goat Hill.....	173 50 12	.....	4.39522	15.437
Yankee.....	196 42 52.72	16 45 58.20	4.4257508	16.562
Bellisle.....	216 19 28.73	36 27 35.26	4.5305900	21.063
Thomson.....	238 58 36.16	59 07 05.77	4.3917615	15.315
Laughlin.....	286 54 22.69	107 02 35.48	4.3311658	13.370
Maxwell.....	29 12 53.99	209 09 27.53	4.2465241	10.962
French.....	56 32 43.57	236 21 09.96	4.5403411	21.562
Colfax.....	78 47 51	.....	4.44043	17.131
Koehler.....	110 11 33.24	290 01 16.67	4.4355593	16.931
Red River.....	150 43 39.38	330 40 33.26	4.1978934	9.800
Highest peak of group.....	340 19 32	180 21 33	4.17414	9.279

## NEW MEXICO.

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## FRENCH, COLFAX COUNTY, N. MEX.

On the east point of a flat-topped butte, the northernmost of a group of three, on land owned by Capt. French, and is about 7 miles due south of Colfax station.

Signal: A small (topped) piñon tree centered over tablet and supported by four poles. White cloth was tacked to the four faces.

Station mark: A bronze tablet in top of sandstone 5 by 12 by 26 inches, which projects 5 inches above surface of ground 15 feet east of point of butte.

[Latitude 36° 30' 32.30". Longitude 104° 44' 16.13".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Knob.....	74 25 48	254 16 10	4.40025	15.618
Chase.....	99 22 44.47	279 14 27.53	4.3232646	13.080
Dawson.....	143 50 19.43	323 44 00.97	4.4264875	16.590
Koehler.....	186 33 31.83	6 34 50.80	4.4584027	17.855
Koehler, observed azimuth.....	186 33 10.62	6 34 29.52	.....	.....
Red River.....	212 39 44.73	32 48 13.61	4.5927348	24.327
Eagletail.....	236 21 09.96	56 32 43.57	4.5403411	21.562
Maxwell.....	259 24 32.14	79 32 38.58	4.3155726	12.851

## HIGHEST PEAK IN GROUP EAST OF MAXWELL, COLFAX COUNTY, N. MEX. (Not occupied.)

The highest point of the highest peak of a group of peaks situated about 9 miles due east of Maxwell City.

Station mark: A rock or small tree on the highest part of peak.

[Latitude 36° 33' 18.28". Longitude 104° 21' 30.50".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Maxwell.....	84 26 20	264 20 54	4.13682	8.514
Eagletail.....	160 21 33	340 19 32	4.17414	9.279
Laughlin.....	243 13 07	63 19 16	4.23930	10.780

## KNOB, COLFAX COUNTY, N. MEX. (Not occupied.)

Station mark: A large sharp-topped rock projecting from a spur of the Snow Range Mountains.

[Latitude 36° 26' 52.34". Longitude 105° 00' 28.33".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Dawson.....	196 28 41	16 32 01	4.47039	18.354
Chase.....	198 31 40	18 33 02	4.03112	6.675
French.....	254 16 10	74 25 48	4.40025	15.618

## KOEHLER, COLFAX COUNTY, N. MEX.

About 6 miles northwest of Koehler village, at the highest point of the intersection of three ridges, which forms a T with the stem pointing north. The hill is timbered, but lines were opened from the station to the surrounding stations.

Signal: A 40-foot pole carrying cross arms to which black cloth targets were attached. The pole is wired and nailed to a stripped tree. Signal is 9.5 feet northwest of station mark.

Station mark: A bronze tablet set in top of sandstone 26 by 10 by 5 inches projecting 4 inches above surface of ground.

[Latitude 36° 45' 58.38". Longitude 104° 42' 03.91".]

To station—	Azimuth.	Back azimuth.	Distance.	
French.....	• ' "	• ' "	Log. meters.	Miles.
French, observed azimuth.....	6 34 50.80	186 33 31.83	4.4584027	17.855
Chase.....	6 34 29.52	186 33 10.62		
Dawson.....	43 46 40.49	223 37 03.12	4.5412396	21.607
Bartlett.....	69 51 08.01	249 43 29.23	4.3069900	12.599
Rock.....	123 58 32.57	303 49 04.02	4.4519159	17.590
Red River.....	134 41 12.16	314 35 04.29	4.3297740	13.278
Eagletail.....	256 07 58.91	76 15 10.08	4.2644453	11.423
	290 01 10.67	110 11 33.24	4.4353393	16.931

**LAUGHLIN, COLFAX COUNTY, N. MEX.**

A bare, grassy mountain about 18 miles east of Maxwell, at the head of Tinaja Creek, in T. 28 N., R. 26 E. The station is on highest point of the mountain and about 2 miles east of Gus Brackett's ranch. This mountain is known by some as Laughlins Peak, but by more as Old Baldy.

Station mark: An aluminum tablet in loose stone 1 foot underground, over which is a stone with drill hone 4 inches underground. A pile of stone above ground marks the site.

[Latitude 36° 37' 31.45". Longitude 104° 11' 07.18".]

To station—	Azimuth.	Back azimuth.	Distance.	
Eagletail.....	• ' "	• ' "	Log. meters.	Miles.
Goat Hill.....	107 02 35.48	286 54 22.69	4.3311658	13.320
Yankee.....	143 18 08	338 01 54.36	4.58717	24.017
Thomson.....	158 07 03.13	1 59 18.84	4.5647908	21.288
Highest peak of group.....	181 59 03.02	243 13 07	4.2775297	11.773
Maxwell.....	63 19 16	252 28 35.68	4.23930	10.780
Red River Peak.....	72 40 13.99	305 15 39.95	4.4877057	18.970
	125 26 59.46		4.5389034	21.491

**MAXWELL, COLFAX COUNTY, N. MEX.**

On the highest part of a low hill 1.5 miles due east of the town of Maxwell. The Maxwell-Chico wagon road runs south of the station, about 0.25 mile distant. Azimuth observations were made on Polaris October 13, 1914.

Signal: A 12-foot sawed lumber tripod covered with white cloth on the upper portion of the 3 sides. Centered over station mark.

Station mark: A bronze tablet set in the top of a concrete post 7 by 9 by 40 inches, which projects 6 inches above surface of ground.

[Latitude 36° 32' 34.84". Longitude 104° 30' 38.83".]

To station—	Azimuth.	Back azimuth.	Distance.	
French.....	• ' "	• ' "	Log. meters.	Miles.
Colfax.....	79 32 38.58	259 24 32.14	4.3155726	12.851
Red River.....	118 31 10	...	4.32204	13.043
Eagletail.....	131 42 26.83	1 42 47.77	4.4649220	18.125
Laughlin.....	209 09 27.53	29 12 53.99	4.2465241	10.962
Highest peak of group.....	252 28 35.68	72 40 13.99	4.4847057	18.970
	264 20 54	84 26 20	4.13682	8.514

**RED RIVER PEAK, COLFAX COUNTY, N. MEX. (Not occupied.)**

Station is on peak about 10 miles southwest of Raton and 3 miles southwest of Otero, on the Atchison, Topeka & Santa Fe Railway.

Station mark: An aluminum tablet set in stone placed in ground, over which was erected a tripod of poles 6 feet high.

[Latitude 36° 48' 20.71". Longitude 104° 30' 03.77".]

To station—	Azimuth.*	Back azimuth.	Distance.	
	* ° ' "	* ° ' "	Log. meters.	Miles.
Berela.....	43 00 16	4.50719	19.977	
Yankee.....	52 37 20	4.28701	12.033	
Thomson.....	92 14 25	4.46019	17.928	
Maxwell.....	1 42 47.77	181 42 26.83	4.4649220	18.125
French.....	32 48 13.61	212 39 44.73	4.5027348	24.327
Koehler.....	76 15 10.08	256 07 58.91	4.2644453	11.423
Laughlin.....	305 15 39.95	125 26 59.46	4.5380034	21.491
Eagilstail.....	330 40 33.26	150 43 39.38	4.1978934	9.800

**RIDGE, COLFAX COUNTY, N. MEX.** (Not occupied; sighted from two stations only; no check on this position.)

[Latitude 36° 56' 09.86". Longitude 104° 51' 57.70".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ' "	* ° ' "	Log. meters.	Miles.
Rock.....	7 17 47	187 17 35	3.58737	2.403
Bartlett.....	70 47 40	250 44 07	3.98015	5.774

#### ROCK, COLFAX COUNTY, N. MEX.

On the highest part of ridge, about 8 miles east of Vermejo Park post office. It is near the divide between Red River and Rio Vermejo. Road Canyon heads about 3 miles north of the station. A wagon road leaves the Rio Vermejo valley about 3 miles southeast of Vermejo Park post office and follows up Road Canyon and over the divide to Bartlett's horse ranch, thence down Longs Canyon.

Signal: A 12-foot tripod covered with white cloth, centered over tablet.

Station mark: A bronze tablet cemented in solid rock on small knoll at highest point of ridge.

[Latitude 36° 54' 05.44". Longitude 104° 52' 17.54".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ' "	* ° ' "	Log. meters.	Miles.
Dawson.....	9 48 09.49	189 46 37.68	4.3491612	13.884
Sharp peak to southwest.....	45 26 05	225 13 49	4.63020	26.519
Sharp peak to west.....	76 33 31	236 20 53	4.50771	20.001
Bartlett.....	95 21 58.37	275 18 37.41	3.9201820	5.170
Ridge.....	187 17 35	7 17 47	3.58737	2.403
Koehler.....	314 35 04.29	134 41 12.16	4.3297740	13.278

#### SHARP PEAK TO SOUTHWEST, COLFAX COUNTY, N. MEX. (Not occupied.)

A sharp peak in the Snow Range, about 22 miles west of Dawson village. From French and Maxwell triangulation stations a cairn was visible, and was sighted.

Station mark: A cairn.

[Latitude 36° 37' 50.57". Longitude 105° 12' 43.31".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ' "	* ° ' "	Log. meters.	Miles.
Bartlett.....	215 33 53	35 42 46	4.57897	23.568
Rock.....	225 13 49	45 26 05	4.63020	26.519
Dawson.....	253 07 47	73 18 28	4.44434	17.286

## 24 TRIANGULATION AND PRIMARY TRAVERSE, 1913-1915.

**SHARP PEAK TO WEST, COLFAX COUNTY, N. MEX.** (Not occupied; sighted from only two stations; no check on this position.)

A high summit in the Snow Range, probably Castilla Peak.  
Station mark: A cairn.

[Latitude  $36^{\circ} 50' 00.54''$ . Longitude  $105^{\circ} 13' 20.96''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Bartlett.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Rock.....	250 03 05 256 20 53	70 12 22 76 33 31	4.3845 4.5071	15.198 20.001

## CALIFORNIA.

### TRIANGULATION STATIONS.

**Argus Peak, Bagdad, Berry, Elizabeth Lake, Freeman, Hinkley, Kramer, Johannesburg, Pilot Knob, 17, Tecopa, and Telescope Peak 30' quadrangles.**

#### INYO, KERN, LOS ANGELES, AND SAN BERNARDINO COUNTIES.

During the seasons of 1911, 1912, and 1913 Messrs. C. F. Urquhart, W. R. Chenoweth, and Charles Hartman extended triangulation over the above-named quadrangles.

Positions are on approximate North American datum as derived from United States Geological Survey stations Odell and Soledad, described in Bulletin 201. Connections were also made with stations El Paso, Grey, Kelso, Kingston, Oro Grande, Owens Peak, and Telescope, previously located and described in Bulletin 310. Sixteen stations were occupied and 14 points were located by intersections.

#### ARGUS, SAN BERNARDINO COUNTY, CAL.

An exceptionally rocky mountain, 10 miles northeast of "Borax Flat" headquarters. It can be reached on horseback from "Borax Flat" by going to Joe Peterson's ranch (7 miles), thence by trail which starts on south side of ranch to summit of mountains.

Station mark: A large boulder, 18 feet high, with a bronze triangulation tablet set in top.

[Latitude 35° 51' 09.20". Longitude 117° 26' 45.23".]

To station—	Azimuth.	Back azimuth.	Distance.	
Red.	• ' "	• ' "		
El Paso.	12 36 54.14	192 32 05.90	4.7577497	35.571
Owens.	40 42 11.52	220 28 20.43	4.7412037	34.242
Volcano.	75 54 15.61	255 34 56.51	4.7104814	31.903
Telescope.	108 26 39.58	288 13 06.72	4.5636742	22.752
Needle.	222 19 44.31	42 32 20.67	4.6789270	29.667
Brown.	264 08 54.17	84 23 35.73	4.5790223	23.571
Pilot.	295 11 26.86	115 26 31.71	4.6336203	26.728
	338 22 17.12	158 29 58.87	4.7345946	33.725

#### AVAWATZ, SAN BERNARDINO COUNTY, CAL. (Not occupied.)

Signal was built and marked, but was not occupied, and there is no available description.

[Latitude 35° 30' 46.83". Longitude 116° 19' 51.10".]

To station—	Azimuth.	Back azimuth.	Distance.	
Tie Fort.	• ' "	• ' "		
Calico.	38 43 50.36	218 36 01.83	4.5141646	20.301
Pilot.	38 56 38.19	218 39 04.75	4.8670768	45.754
Brown.	81 18 13.04	260 47 04.40	4.9150675	51.100
Kingston.	107 27 07.20	287 03 11.61	4.8129266	40.390
Kelso.	237 39 34.78	57 54 06.89	4.6487748	27.677
Cave.	309 11 00.35	129 32 03.02	4.8535638	44.352
	359 08 32.33	179 08 49.07	4.6904511	30.465

## BALD, KERN COUNTY, CAL.

A bald granite mountain about 15 miles north of Mojave and 4.5 miles southwest of Cinco. It is easily ascended on horseback from Cinco by keeping along the base of foothills and following up a ridge on the north side of a prominent canyon 1,200 feet wide and 2 miles south of Cinco.

Station mark: A 7-foot rock cairn over a bronze triangulation tablet.

[Latitude 35° 18' 21.92". Longitude 118° 05' 40.54".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Soledad.....	14 53 09.44	194 49 55.45	4.5222702	20.683
Owens.....	180 45 14.16	9 48 39.52	4.7197137	32.588
El Paso.....	225 32 30.00	45 41 16.72	4.5070022	19.969
Red.....	259 32 41.17	79 50 24.81	4.6743912	29.359
Rich.....	313 36 32.25	133 50 52.26	4.7193548	32.561
Desert.....	325 30 45.90	145 36 09.73	4.4004708	15.625

## BROWN, SAN BERNARDINO COUNTY, CAL.

A prominent double-topped mountain in southern part of the Panamint Range and just south of Wingate Pass. It is about 6 miles due east across the valley from Lone Willow Spring, which is situated on the Ballarat and Granite Wells Spring. The mountain can be easily climbed from any direction. The signal is on the eastern-most part of mountain.

Station mark: A cairn 9 feet high and 7 feet at base.

Reference mark: A bronze triangulation tablet cemented in a prominent rock about 3.5 feet west of signal.

[Latitude 35° 41' 12.37". Longitude 117° 00' 57.22".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Opal.....	20 57 06.80	200 50 44.75	4.6674440	28.893
Pilot.....	30 43 49.48	210 36 30.44	4.5716914	23.176
Red.....	54 06 37.58	233 46 50.60	4.8040016	39.569
El Paso.....	72 50 43.12	252 21 52.98	4.8846108	48.749
Argus.....	115 26 31.71	295 11 26.86	4.6336203	26.728
Telescope.....	173 03 02.48	353 00 29.00	4.7326507	33.574
Needle.....	177 11 03.35	357 10 37.92	4.3465047	13.799
Kingston.....	267 06 37.30	87 45 10.63	4.9988570	61.974
Avawatz.....	287 03 11.61	107 27 07.20	4.8129266	40.390
Tie Fort.....	316 51 34.36	137 07 36.39	4.7870874	38.057
Calico.....	348 01 29.73	168 07 40.57	4.8940800	48.689

## CALICO, SAN BERNARDINO COUNTY, CAL.

Highest point upon what is known as the Calico Mountains, lying about 7 miles a little west of north of the town of Otis, on the San Pedro, Los Angeles & Salt Lake Railroad, and about 10 miles north of the town of Daggett. Animals can be ridden nearly to summit of mountain from the south by following the trail up first main canyon east of the site of the old town of Calico.

Signal and station mark: A cairn 7 feet high and 8 feet at base.

Reference mark: A bronze triangulation tablet cemented in rock 11 feet north of signal.

## CALIFORNIA.

27

[Latitude 34° 59' 44.63". Longitude 116° 50' 16.14".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Sharp.....	38 27 04.91	218 17 17.36	4.6241388	26.151
General.....	80 13 32.84	260 03 31.03	4.4314649	16.781
Rich.....	86 09 16.38	265 40 20.21	4.8866935	47.868
Red.....	120 11 45.91	209 45 59.68	4.8944157	48.727
Pilot.....	141 43 20.19	321 29 55.35	4.754916	35.345
Brown.....	168 07 40.57	348 01 29.73	4.8940800	48.689
Avawatz.....	218 39 04.75	38 56 38.19	4.8670768	45.754
Tie Fort.....	218 49 17.15	38 59 02.03	4.6123915	25.453
Kingston.....	225 41 11.35	46 13 14.23	5.0670688	72.514
Cave.....	259 45 36.32	80 03 20.63	4.6788306	29.661
Kelso.....	262 52 40.58	83 31 03.33	5.0100266	63.588
Tit.....	333 48 19.49	153 55 30.92	4.6394214	27.068

## CAVE, SAN BERNARDINO COUNTY, CAL.

No description furnished.

Station mark: A triangulation tablet under a rock monument.

[Latitude 35° 04' 16.07". Longitude 116° 19' 22.13".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Tit.....	30 31 05.40	210 20 37.60	4.7410748	34.231
Calico.....	80 03 20.63	259 45 36.32	4.6788306	29.661
Pilot.....	114 02 35.71	283 31 20.47	4.9533513	55.809
Tie Fort.....	138 01 40.95	317 53 38.26	4.5005084	19.672
Avawatz.....	179 08 49.07	359 08 32.33	4.6904511	30.465
Kingston.....	206 52 03.67	27 06 14.31	4.9120250	50.743
Kelso.....	265 53 32.01	86 14 11.13	4.7382534	34.010
Old Dad a.....	298 00 42.61	118 22 17.58	4.8137179	40.464

a Not adjusted.

## DESERT, KERN COUNTY, CAL.

A small bald hill about 14 miles east of Mojave, a town at the junction of the Southern Pacific &amp; Santa Fe railroads.

Signal and station mark: A cairn about 6 feet high over a triangulation tablet.

[Latitude 35° 05' 08.98". Longitude 117° 56' 18.47".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Soledad.....	63 25 40.99	243 17 04.79	4.4065554	15.845
Bald.....	145 36 09.73	325 30 45.90	4.4004706	15.625
Red.....	227 48 44.91	48 01 01.96	4.6390395	27.064
Fremont.....	254 35 15.21	74 51 59.12	4.6605822	28.440
Rich.....	303 07 46.39	123 16 41.88	4.4514375	17.571
Muroc.....	342 47 50.82	162 49 56.96	4.2757725	11.725

## EL PASO, KERN COUNTY, CAL.

This point is a Wheeler Survey station, on the highest point of range of mountains, about 12 miles northwest of Johannesburg, and can be reached on horseback.

Station mark: A cairn 7 feet high over a bronze triangulation tablet.

• 62510°—Bull. 644—17 — 3

[Urquhart, 1913: Latitude  $35^{\circ} 28' 31.33''$ ; longitude  $117^{\circ} 50' 30.70''$ . Goode, 1900: Latitude  $35^{\circ} 28' 32.61''$ ; longitude  $117^{\circ} 50' 33.28''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Soledad.....	• ' "	• ' "	<i>Log. meters.</i>	
30 05 02.10	209 53 02.77	4.800005	Miles.	
45 41 16.72	225 32 30.00	4.5070022	39.207	
154 25 54.70	334 20 30.84	4.5103725	19.969	
Owens.....	1 03 55.15	4.7273318	20.124	
Volcano.....	1 03 55.15	4.7273318	33.165	
Argus.....	220 28 20.43	40 42 11.52	4.7412037	34.242
Needle.....	237 59 22.60	58 27 51.60	4.937501	53.852
Brown.....	252 21 52.96	72 50 43.12	4.8946108	48.749
Pilot.....	278 35 11.78	98 56 37.89	4.7528974	35.176
Red.....	300 46 59.26	120 55 58.34	4.4368487	16.990
Fremont.....	311 21 04.41	131 34 32.01	4.6726467	29.241
Rich.....	315 47 32.32	165 53 20.88	4.7820496	37.618
Laurela.....	267 47 38.86	87 53 09.80	4.1579419	-----
Governmenta.....	311 39 38.03	131 45 30.87	4.3134470	-----

a Goode, 1900.

#### FREMONT PEAK, SAN BERNARDINO COUNTY, CAL. (Not occupied.)

The highest point of a mountain well known as Fremont Peak. It is about 12 miles southeast of Johannesburg.

[Latitude  $35^{\circ} 11' 40.23''$ . Longitude  $117^{\circ} 27' 14.31''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Rich.....	• ' "	• ' "	<i>Log. meters.</i>	
36 47 16.03	216 39 30.98	4.5360744	Miles.	
Soledad.....	70 52 41.10	250 27 21.56	4.8510179	21.351
Desert.....	74 51 59.12	254 35 15.21	4.6005822	44.093
El Paso.....	131 34 32.01	311 21 04.41	4.6726467	28.440
Red.....	145 31 52.10	325 27 22.97	4.3179348	29.241
Pilot.....	222 35 39.57	42 43 34.41	4.4863110	12.921
General.....	311 54 35.89	132 05 47.77	4.6005743	19.040

#### GENERAL, SAN BERNARDINO COUNTY, CAL.

On highest point of a prominent mountain about 3 miles east of Hinkley, a station on the Atchison, Topeka & Santa Fe Railway.

Signal and station mark: A cairn 8 feet high.

Reference mark: A bronze triangulation tablet, set 3 feet northwest of cairn.

[Latitude  $34^{\circ} 57' 14.60''$ . Longitude  $117^{\circ} 07' 45.09''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Oro Grande.....	• ' "	• ' "	<i>Log. meters.</i>	
20 57 14.19	200 51 47.82	4.6102313	Miles.	
42 58 57.97	222 55 23.93	4.1441013	25.327	
89 10 10.61	268 51 16.25	4.7011500	8.659	
Rich.....	132 05 47.77	311 54 35.89	4.6005743	31.225
Fremont.....	136 45 25.15	316 29 43.64	4.780131	24.770
Red.....	200 03 31.63	80 13 32.84	4.314649	37.451
Calico.....	338 56 19.91	178 56 31.68	4.4529785	16.781
Sharp.....				

#### GREY BUTTE, LOS ANGELES COUNTY, CAL.

A small butte in the Mojave Desert, northeast of mouth of canyon, and 25 miles west of Hesperia. Station can be reached by driving from Hesperia to "Alec the Frenchman's," distance about 25 miles, which is a ranch at the head of Wescal Canyon, where one can get hay and water. The point is about 12 miles northwest of this ranch and in plain sight. Take road leading to Rock Creek until it joins main Hesperia road, thence directly across desert to Butte (do not take Canagine-Diggetts

road). There are several ranches to the southwest of the Rock Creek settlement which appear much nearer than "Aleck the Frenchman's." The road leading to Aleck's from the Hesperia road is marked by large granite rock with several small ones placed on it.

**Station mark:** Aluminum tablet set in gravel and cement

**Signal:** Rock cairn 6 feet high over station mark.

[Latitude  $34^{\circ} 33' 25.02''$ . Longitude  $117^{\circ} 43' 20.79''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
West Baldy a.....	• ' "	• ' "	<i>Log. meters.</i>	
Little Rock a.....	9 51 13.32	189 49 48.74	4.3487810	.....
Morley a.....	42 47 58.40	223 41 39.14	4.4012929	.....
Pacific a.....	52 57 08.28	232 53 18.33	4.1130401	.....
Almondale Schoolhouse a.....	56 00 55.62	235 50 20.82	4.5385670	.....
Emma.....	73 19 22.25	253 12 37.00	4.2796344	.....
Palmer a.....	73 36 53.76	253 25 42.11	4.4987313	.....
Odell.....	81 27 45.96	261 20 37.31	4.2899405	.....
Soidedad.....	88 20 09.80	268 02 44.87	4.6720994	29.205
Rich.....	138 03 29.17	317 47 32.86	4.8036980	30.541
Oro Grande.....	185 13 19.06	5 14 47.72	4.6371514	26.946
Oro Grande a.....	261 20 52.85	81 35 40.36	4.6052554	25.038
Cleghorn a.....	261 20 14.92	81 35 02.26	4.6052096	.....
San Antonio a.....	315 29 31.03	135 40 03.19	4.6106263	.....
	346 36 53.48	166 39 29.57	4.4843982	.....

a Yolo datum.

#### IRON, SAN BERNARDINO COUNTY, CAL. (Not occupied.)

A prominent low mountain covered with black rock about 5 miles south of Hinkley, a station on the Santa Fe Railroad.

**Station mark and signal:** A cairn 7 feet high over a bronze triangulation tablet.

[Latitude  $34^{\circ} 51' 43.63''$ . Longitude  $117^{\circ} 13' 59.11''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Oro Grande.....	• ' "	• ' "	<i>Log. meters.</i>	
Red.....	10 15 45.76	190 13 52.89	4.4522241	17.602
General.....	149 29 58.77	329 17 53.43	4.7976055	38.990
	222 55 23.93	42 58 57.97	4.1441013	8.659

#### KELSO, SAN BERNARDINO COUNTY, CAL.

On highest point of low range of mountains about 8 miles northeast of Kelso, a small town on the San Pedro, Los Angeles & Salt Lake R. R. There is no road to the station.

**Signal and station mark:** Cairn 6 feet high.

**Reference mark:** Triangulation tablet 1.3 meters north of signal.

[Urquhart, 1913: Latitude  $35^{\circ} 06' 17.97''$ ; longitude  $115^{\circ} 43' 26.51''$ . Urquhart, 1909: Latitude  $35^{\circ} 06' 16.57''$ ; longitude  $115^{\circ} 43' 27.83''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Calico.....	• ' "	• ' "	<i>Log. meters.</i>	
Cave.....	83 31 03.33	262 52 40.58	5.0100266	63.588
The Fort.....	86 14 11.13	265 53 32.01	4.7382334	34.010
Awawatz.....	104 51 39.54	284 22 54.25	4.8935610	48.631
Kingston.....	129 32 03.02	309 11 00.35	4.8535338	44.352
Kingston a.....	165 57 14.88	345 50 36.66	4.8522307	44.216
Kingston b.....	165 57 05.76	315 50 27.38	4.8523483	.....
Rocky a.....	170 48 25.96	350 47 01.12	4.3667854	.....
Clark a.....	194 47 57.35	14 52 40.49	4.0840579	.....
McCullough a.....	221 42 12.68	42 01 07.95	4.8705980	.....
New York a.....	245 10 16.30	65 24 31.15	4.6161919	.....
Old Dad b.....	355 32 27.97	175 33 28.63	4.5394017	21.516

a Urquhart, 1909.

b Not adjusted.

**KINGSTON, SAN BERNARDINO COUNTY, CAL. (Not occupied.)**

On the highest point of Kingston Range. It is about 20 miles west-southwest of Sandy post office. The nearest known water is at Horse Spring, on northeast side of mountain.

Signal: A rock cairn 6 feet high with tree in center.

Station mark: A triangulation tablet under center of cairn.

[Latitude  $35^{\circ} 43' 36.58''$  (Urquhart, 1909). Longitude  $115^{\circ} 54' 55.30''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Nopah.....	•   '   "	•   '   "		
154 23 33.23	334 17 45.05		4,531,994	
Olcott.....	234 34 49.68	54 49 23.12	4,661,4279	
Ivanpah.....	274 18 06.35	94 34 17.15	4,622,5419	
McCollough.....	281 26 27.24	101 52 12.00	4,832,7703	
Clark.....	306 54 53.01	127 06 18.76	4,569,3575	
New York.....	313 13 46.85	133 34 47.43	4,876,9283	
Kelso.....	345 50 27.38	165 57 05.76	4,852,3483	41.228
Rocky.....	343 29 26.85	163 34 40.75	4,681,5349	

**KINGSTON, SAN BERNARDINO COUNTY, CAL. (Not occupied.)**

On the highest point of Kingston Range. It is about 20 miles west-southwest of Sandy post office. The nearest known water is at Horse Spring, on northeast side of mountain.

Signal: A rock cairn 6 feet high with tree in center.

Station mark: A triangulation tablet under center of cairn.

[Latitude  $35^{\circ} 43' 37.40''$  (Urquhart, 1913). Longitude  $115^{\circ} 54' 53.67''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Cave.....	•   '   "	•   '   "		
27 06 14.31	206 52 03.67		4,912,0250	50.743
Calico.....	46 13 14.23	225 41 11.35	5,067,0688	72.514
Tie Fort.....	49 54 19.71	229 32 00.26	4,881,8844	47.341
Avawatz.....	57 54 06.89	237 39 34.78	4,645,7748	27.677
Brown.....	87 45 10.63	207 06 37.30	4,998,8570	61.974
Kelso.....	345 50 36.66	165 57 14.88	4,852,2307	44.216

**KINGSTON, SAN BERNARDINO COUNTY, CAL. (Not occupied.)**

On the highest point of Kingston Range. It is about 20 miles west-southwest of Sandy post office. The nearest known water is at Horse Spring, on northeast side of mountain.

Signal: A rock cairn 6 feet high with tree in center.

Station mark: A triangulation tablet under center of cairn.

[Latitude  $35^{\circ} 43' 36.40''$  (Blackburn, 1907; Moor, 1907). Longitude  $115^{\circ} 54' 55.04''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Furnace.....	•   '   "	•   '   "		
139 50 31	319 25 55		4,986,312	
Nopah.....	154 24 04	334 18 10	4,531,15	
Charleston.....	198 06 52	18 14 39	4,803,81	
Olcott.....	234 34 34	54 49 00	4,661,41	

<sup>1</sup> See p. 37.

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**MUROC, KERN COUNTY, CAL. (Not occupied.)**

Station mark: Center of water tank at Muroc station on Santa Fe Railway, between Mojave and Barstow.

[Latitude 34° 55' 23.98". Longitude 117° 52' 38.60".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Soledad.....	103 09 32.71	282 58 51.58	4.4646310	18.113
Desert.....	162 49 56.96	342 47 50.82	4.2757725	11.725
Red.....	209 29 02.32	29 39 11.35	4.7347212	33.734
Rich.....	261 56 57.78	82 03 46.27	4.2620078	11.359

**NEEDLE, INYO COUNTY, CAL. (Not occupied.)**

The highest point on a prominent peak which was not occupied.

[Latitude 35° 53' 12.07". Longitude 117° 01' 40.72".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Pilot.....	18 19 17.11	198 12 22.34	4.7366160	35.506
El Paso.....	58 27 51.60	237 59 22.60	4.9378501	53.852
Argus.....	84 23 35.73	264 08 54.17	4.5790223	23.571
Brown.....	357 10 37.92	177 11 03.35	4.3465047	13.799

**ODELL, LOS ANGELES COUNTY, CAL.**

On the western end of a long flat ridge, 6 miles north-northwest of Acton and 0.2 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.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Fernando.....	40 12 54.37	220 06 17.92	4.4431714	.....
Frazier.....	111 07 16.02	290 42 12.40	4.8577810	.....
Libre.....	116 22 54.38	296 11 14.73	4.5440811	.....
Soledad.....	184 55 39.21	4 57 13.63	4.6893126	30.385
Rich.....	228 31 47.11	48 50 45.84	4.8303542	42.044
Grey.....	268 02 44.87	88 20 09.80	4.6720994	29.205
San Gabriel.....	339 20 32.83	159 25 09.77	4.5510244	.....
Gleason.....	344 10 08.58	164 12 05.70	4.2843385	.....

**OLD DAD, SAN BERNARDINO COUNTY, CAL. (Not occupied.)**

No description furnished.

[Latitude 34° 47' 37.71". Longitude 115° 41' 40.62".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Tit.....	79 11 33.64	258 39 39.98	4.9401265	54.135
Cave.....	118 22 17.58	298 00 42.61	4.8137179	40.464
Kelso.....	175 33 28.63	355 32 27.97	4.5394017	21.516

**OPAL, SAN BERNARDINO COUNTY, CAL. (Not occupied.)**

A prominent mountain not very high, about 7 miles south-southeast of Pilot Knob.  
Station mark: A small cairn on highest point.

[Latitude  $35^{\circ} 17' 42.84''$ . Longitude  $117^{\circ} 11' 55.29''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Red.....	•   '   "	•   '   "		
99 46 48.64	279 33 27.82	4.5501007	22.052	
Pilot.....	167 48 46.19	347 47 49.95	4.0652366	7.221
Brown.....	200 50 44.75	20 57 06.80	4.6674440	28.893

**ORO GRANDE, SAN BERNARDINO COUNTY, CAL.**

A rocky mountain, 6 miles northwest of Victorville, a station on the Santa Fe Rail-way. The summit can be reached on horseback, but it is very rough.

Station mark: A copper triangulation bolt under a cairn 9 feet high.

[Latitude  $34^{\circ} 36' 38.97''$ . Longitude  $117^{\circ} 17' 17.20''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Cleghorn a.....	•   '   "	•   '   "		
17 57 42.60	197 53 30.81	4.5671803	-----	
San Antonio a.....	42 45 28.44	222 33 20.31	4.6856852	-----
Lone Pine a.....	44 51 30.96	224 39 26.64	4.6645360	-----
Grey Butte a.....	81 35 02.26	261 20 14.92	4.6032096	-----
Grey Butte.....	81 35 40.36	261 20 52.85	4.6052584	25.038
Rich.....	136 12 57.05	315 50 33.89	4.7129535	32.085
Red.....	161 51 24.21	341 41 14.69	4.9355717	53.570
Ivan.....	190 13 52.89	10 15 45.76	4.4522241	17.602
General.....	200 51 47.82	20 57 14.19	4.6102313	25.327
Sharp.....	237 13 11.93	57 18 48.99	4.2539194	11.150
Antelope a.....	301 56 01.30	122 03 07.61	4.3539870	-----
San Gorgonio a.....	322 54 57.27	143 10 39.59	4.8511948	-----

a Yolo datum.

**OWENS, KERN COUNTY, CAL. (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.

[Urquhart, 1913: Latitude  $35^{\circ} 44' 18.94''$ ; longitude  $117^{\circ} 50' 46.95''$ . Perkins, 1901: Latitude  $35^{\circ} 44' 18.60''$ ; longitude  $117^{\circ} 59' 46.99''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Bald.....	•   '   "	•   '   "		
9 48 39.52	189 45 14.16	4.7197137	32.588	
Pah Ute a.....	48 24 22.08	228 10 35.43	4.6802818	-----
Sunday a.....	95 25 22.55	275 04 45.81	4.7274706	-----
Big Meadows a.....	124 18 30.89	304 06 42.62	4.5649336	-----
Volcano.....	211 41 37.05	31 47 26.46	4.4534702	17.653
Argus.....	255 34 56.51	75 54 15.61	4.7104814	31.903
El Paso.....	334 20 30.84	154 25 54.70	4.5103725	20.124

a Perkins, 1901.

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## PILOT, SAN BERNARDINO COUNTY, CAL.

A Wheeler Survey station, about 25 miles east of Johannesburg and 2 miles east of Granite Springs. Can be ascended on horseback from the south side.

Signal and station mark: A cairn 9 feet high.

Reference mark: A bronze triangulation tablet 2 feet southwest of cairn.

[Latitude  $35^{\circ} 23' 51.41''$ . Longitude  $117^{\circ} 13' 32.50''$ .]

To station—	Azimuth.	Back azimuth.	Distance.					
	*	'	"	Log. meters.	Miles.			
Rich.....	39	39	24.34	219	23	43.82	4.8123792	40.339
Fremont.....	42	43	34.41	222	35	39.57	4.4863110	19.040
Soledad.....	62	34	41.94	242	01	24.95	4.9956979	61.525
Red.....	80	40	34.07	260	28	08.52	4.5179146	20.477
El Paso.....	98	56	37.89	278	35	11.78	4.7528974	35.178
Volcano.....	138	42	12.91	318	21	02.16	4.9176920	51.409
Argus.....	158	29	58.87	338	22	17.12	4.7345946	33.725
Telescope.....	188	11	27.37	8	16	16.06	4.9375493	53.814
Needle.....	198	12	22.34	18	19	17.11	4.7569460	35.506
Brown.....	210	36	30.44	30	43	49.48	4.5716914	23.176
Avawatz.....	260	47	04.40	81	18	13.04	4.9150675	51.100
Tie Fort.....	281	35	16.24	101	58	31.73	4.7940311	38.671
Cave.....	293	31	20.47	114	02	35.71	4.9333513	55.809
Calico.....	321	29	55.35	141	43	20.19	4.7549816	35.345
Tit.....	326	44	18.41	147	04	53.36	4.9996874	62.092
Opal.....	347	47	49.95	167	48	46.19	4.0652366	7.221
Sharp.....	353	06	52.24	173	10	23.61	4.8928770	48.554

## RED, SAN BERNARDINO COUNTY, CAL.

The highest point on a prominent mountain about 3 miles southeast of Johannesburg. It can be reached on horseback.

Signal and station mark: An 8-foot rock cairn.

Reference mark: Bronze tablet set 2 feet southwest of cairn.

[Latitude  $35^{\circ} 20' 56.26''$ . Longitude  $117^{\circ} 35' 00.38''$ .]

To station—	Azimuth.	Back azimuth.	Distance.					
	*	'	"	Log. meters.	Miles.			
Rich.....	11	05	00.57	191	01	42.03	4.6582249	28.286
Muroc.....	29	39	11.35	209	29	02.32	4.7347212	33.734
Desert.....	48	01	01.96	227	48	44.91	4.6390395	27.064
Soledad.....	53	46	19.02	233	25	25.01	4.8354356	42.539
Bald.....	79	50	24.81	259	32	41.17	4.6743912	29.359
El Paso.....	120	55	58.34	300	46	59.26	4.4368487	16.990
Volcano.....	161	40	33.58	341	31	54.26	4.8513739	44.129
Argus.....	192	32	05.90	12	36	54.14	4.7577497	35.571
Telescope.....	206	01	01.74	26	18	22.89	5.0065117	63.076
Brown.....	233	46	50.60	54	06	37.58	4.8040016	39.569
Pilot.....	260	28	08.52	80	40	34.07	4.5179146	20.477
Opal.....	279	33	27.82	99	46	48.64	4.5501007	22.052
Calico.....	299	45	59.68	120	11	45.91	4.8944157	48.727
General.....	316	29	43.64	136	45	25.15	4.7801131	37.451
Fremont.....	325	27	22.97	145	31	52.10	4.3179348	12.921
Iron.....	329	17	53.43	149	29	58.77	4.7976055	38.990
Oro Grande.....	341	41	14.69	161	51	24.21	4.9355717	53.570

## RICH, KERN COUNTY, CAL.

On the highest point of ridge about 4 miles south of Rich station on Santa Fe Railway. It can be easily reached on horseback.

Signal and station mark: A cairn 7 feet high.

Reference mark: A bronze bolt set in rock, 3 feet northeast of cairn.

[Latitude  $34^{\circ} 56' 46.48''$ . Longitude  $117^{\circ} 40' 45.25''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Grey.....	° ' "	° ' "	Log. meters.	Miles.
5 14 47.72	185 13 19.06	4.6371514	26.946	
Odell.....	48 50 45.84	228 31 47.11	4.830542	42.044
Muroc.....	82 03 46.27	261 56 57.78	4.2620078	11.359
Soledad.....	95 07 27.73	274 49 57.62	4.6689750	28.995
Desert.....	123 16 41.88	303 07 46.39	4.4514375	17.571
Bald.....	133 50 52.26	313 36 32.25	4.7193548	32.561
El Paso.....	165 53 20.88	345 47 43.32	4.7820496	37.618
Red.....	191 01 42.03	11 05 00.57	4.6582249	28.286
Fremont.....	218 39 30.98	36 47 16.93	4.5360744	21.351
Pilot.....	219 23 43.82	39 39 24.34	4.8123792	40.339
Calico.....	265 40 20.21	86 09 16.38	4.8866935	47.868
General.....	268 51 16.25	89 10 10.61	4.7011500	31.225
Sharp.....	298 15 10.97	118 34 13.50	4.7620027	35.921
Oro Grande.....	315 59 33.89	136 12 57.05	4.7120535	32.085

**SHARP, SAN BERNARDINO COUNTY, CAL. (Not occupied.)**

A very prominent cone-shaped peak on east side of Mojave River about 15 miles south-southwest of Barstow.

[Latitude  $34^{\circ} 41' 53.84''$ . Longitude  $117^{\circ} 07' 24.43''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Oro Grande.....	° ' "	° ' "	Log. meters.	Miles.
57 18 48.99	237 13 11.93	4.2539194	11.150	
Rich.....	118 34 13.50	298 15 10.97	4.7620027	35.921
Pilot.....	173 10 23.61	353 08 52.24	4.8928770	48.554
General.....	178 56 31.68	358 56 19.91	4.4529785	17.633
Calico.....	218 17 17.36	38 27 04.91	4.6241388	26.151
Tit.....	277 33 30.47	97 50 25.24	4.6611459	28.477

**SOLEDAD, KERN COUNTY, CAL.**

A butte 7 miles southeast of Mojave, 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.	Distance.	
Odell.....	° ' "	° ' "	Log. meters.	Miles.
4 57 13.63	184 55 39.21	4.6893126	30.385	
Liebre.....	47 01 04.14	226 47 46.03	4.6864384	.....
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	4.4333946	.....
Bald.....	194 49 55.45	14 53 09.44	4.5222702	20.683
El Paso.....	209 53 02.77	30 05 02.10	4.8000085	39.207
Red.....	233 25 25.01	53 46 19.02	4.8354356	42.539
Pilot.....	242 01 24.95	62 34 41.94	4.9956979	61.525
Desert.....	243 17 04.79	63 25 40.99	4.4063554	15.845
Fremont.....	250 27 21.56	70 52 41.10	4.8510179	44.093
Rich.....	274 49 57.62	95 07 27.73	4.6689780	28.995
Muroc.....	282 58 51.58	103 09 32.71	4.3646310	18.113
Grey.....	317 47 32.86	138 03 29.17	4.8036980	39.541

**TELESCOPE PEAK, INYO COUNTY, CAL. (Not occupied.)**

The highest point of Panamint or Telescope Range. It is about 11 miles northeast of the town of Ballarat, and 23 miles southwest of Furnace Creek ranch in Death Valley. It is best reached from west side, following wagon road up Tuber Canyon. From end of road follow trail northeast to summit of "Baldy" Mountain, thence southward about 3 miles following a good trail along summit range. Animals may be taken to station when there is little or no snow. Station of Wheeler Survey, 1873 (?).

Station mark: Aluminum tablet cemented in slate stone 12 by 10 by 4 inches under cairn 4 feet base and 5 feet high. This is on site of small monument which was destroyed. No record of Wheeler station found.

[Urquhart, 1913: Latitude 36° 10' 12.52"; longitude 117° 05' 18.80". Blackburn, 1907: Latitude 36° 10' 12.88"; longitude 117° 05' 20.24".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Pilot a.....	8 16 16.06	188 11 27.37	4.9375483	58. 814
Red a.....	26 18 22.89	206 01 01.74	5.0065117	63. 076
Argus a.....	42 32 20.67	222 19 44.31	4.6789270	29. 667
Maturango.....	81 32 11.00	261 17 48.00	4.5681200	.....
Tin.....	157 41 10.00	337 26 44.00	4.9349500	.....
Death.....	174 17 17.00	354 15 50.00	4.5658200	.....
Grape.....	176 31 04.00	356 27 46.00	4.9467000	.....
Furnace.....	239 59 44.00	60 16 41.00	4.6941900	.....
Charleston.....	264 26 55.00	85 18 11.00	5.0996500	.....
Funeral.....	279 54 31.00	100 10 59.00	4.6286800	.....
Nopah.....	281 00 42.00	101 36 01.00	4.9668300	.....
Brown a.....	353 00 29.00	173 03 02.48	4.7326307	33. 574

a Urquhart, 1913.

**TIE FORT, SAN BERNARDINO COUNTY, CAL. (Not occupied.)**

Signal was built, but as station was not occupied there is no available description.  
Station mark: A cairn.

[Latitude 35° 16' 59.07". Longitude 116° 33' 19.97".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Tit.....	5 20 22.46	185 17 53.12	4.8532216	44. 317
Calico.....	38 59 02.03	218 49 17.15	4.6123915	25. 453
Pilot.....	101 58 31.73	281 35 16.24	4.7940311	38. 671
Brown.....	137 07 36.39	316 51 34.36	4.7870874	38. 057
Avawatz.....	218 36 01.83	38 43 50.36	4.5141646	20. 301
Kingston.....	229 32 00.26	49 54 19.71	4.8818844	47. 341
Kelso.....	284 22 54.25	104 51 39.54	4.8935640	48. 631
Cave.....	317 53 38.26	138 01 40.95	4.5005084	19. 672

**TIT, SAN BERNARDINO COUNTY, CAL.**

No description available

[Latitude 34° 38' 34.58". Longitude 116° 37' 40.57".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Sharp.....	97 50 25.24	277 33 30.47	4.6611459	28. 474
Pilot.....	147 04 53.36	326 44 18.41	4.9996874	62. 092
Calico.....	153 55 30.92	333 48 19.49	4.6394214	27. 088
Tie Fort.....	185 17 53.12	5 20 22.46	4.8532216	44. 317
Cave.....	210 20 37.60	30 31 05.40	4.7410748	34. 231
Old Dad a.....	258 39 39.98	79 11 33.64	4.9401265	54. 135

a Not adjusted.

## VOLCANO, INYO COUNTY, CAL.

A round-top mountain, 4 miles east of Little Lake station on the Southern Pacific Railroad (Mojave and Owens Valley branch). From Little Lake on Owens Valley road 2 miles, thence east after crossing railroad until a dry lake about 1 mile from railroad is reached, thence across a sandy wash southeast until a well-defined drain is reached, up this drain to within a short distance of summit. Animals can be taken to summit.

Station mark: An 8-foot rock cairn.

Reference mark: Bronze triangulation tablet set 5 feet east of cairn.

[Latitude  $35^{\circ} 57' 22.86''$ . Longitude  $117^{\circ} 49' 51.34''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
El Paso.....	•     "	•     "	4.7273318	33.165
Owens.....	1 03 55.15	181 03 32.17	4.4534702	17.653
Argus.....	31 47 26.46	211 41 37.65	4.5636742	22.752
Pilot.....	288 13 06.72	108 26 39.58	4.9176920	51.409
Red.....	318 21 02.16	138 42 12.91	4.8513739	44.129
	341 31 54.26	161 40 33.58		

## Ivanpah quadrangle.

## SAN BERNARDINO COUNTY.

The positions in the following list were determined by L. F. Biggs in September and October, 1915, by extending triangulation from stations Clark, Olcott, and Kingston, on approximate North American datum. This base is weak and positions can not be accurately computed until connection has been made with well-determined points.

For stations in this scheme in Nevada, see Bulletin 644-M.

## CLARK, SAN BERNARDINO COUNTY, CAL.

Described as follows in Bulletin 496, page 35:

Highest and most western peak on Clark Mountain, a well-known point about 25 miles northwest of Leastalk, a station on the San Pedro, Los Angeles & Salt Lake Railroad. The nearest water is at Benson's mine at foot of mountain on east side. There is a road from Leastalk to mine.

Signal: Cairn 6 feet high.

Station mark: Triangulation tablet set in rock 1 meter west of signal.

[Latitude  $35^{\circ} 31' 31.98''$ . Longitude  $115^{\circ} 35' 18.04''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Kingston.....	•     "	•     "	4.5093575	23.052
Green Monster.....	127 06 18.76	306 54 53.01	4.6218156	26.012
Ripley.....	174 59 42.76	354 58 17.75	4.4810177	18.809
Olcott.....	177 45 02.95	357 44 35.38	4.6942983	30.736
Shenandoah.....	189 09 32.54	9 12 36.11	4.5050049	22.822
Diablo Grande.....	191 13 51.51	11 16 37.81	4.3554467	14.086
	212 36 11.41	32 40 54.31		

KINGSTON, SAN BERNARDINO COUNTY, CAL.

Described in Bulletin 496, pages 35 et seq., as follows:

On the highest point of Kingston Range. It is about 20 miles west-southwest of Sandy post office. The nearest known water is at Horse Spring, on the northeast side of the mountain.

Signal: Cairn 6 feet high, with tree in center.

Station mark: Triangulation tablet under center of cairn.

[Latitude  $35^{\circ} 43' 36.58''$ . Longitude  $115^{\circ} 54' 55.30''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mesa.....	221 42 52.89	41 54 59.92	4.6689748	28.995
Green Monster.....	233 07 25.91	53 17 29.58	4.5097518	20.096
Olcott.....	234 34 49.68	54 49 23.12	4.6614279	28.496
Shemandoah.....	249 26 07.91	69 40 23.08	4.5832003	24.353
Diablo Grande.....	274 18 01.28	94 34 12.06	4.6225326	26.055
Clark.....	306 54 53.01	127 06 18.76	4.5693757	23.052

KNIGHTS WELL, SAN BERNARDINO COUNTY, CAL.

Station is west one of two pumps at Knights Well on the State Line road, 9 miles southeast of Ripley.

[Latitude  $35^{\circ} 41' 42.42''$ . Longitude  $115^{\circ} 31' 53.35''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Green Monster.....	159 00 20.84	338 56 55.93	4.3895211	15.236
Shemandoah.....	186 41 07.23	6 41 54.22	4.2387279	10.767
Diablo Grande.....	267 44 32.44	87 47 16.50	3.8490820	4.396

CORNER SECS. 1, 2, 35, AND 36, T. 18 N., R. 13 E., SAN BERNARDINO COUNTY, CAL.

Station is iron pipe on township line, west edge of State Line road, 7 miles southwest of Ripley.

Station mark: A regulation United States Land Office iron township-line post.

[Latitude  $35^{\circ} 43' 17.71''$ . Longitude  $115^{\circ} 32' 18.43''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Green Monster.....	157 46 10.68	337 43 00.38	4.3335927	13.395
Shemandoah.....	190 30 19.51	10 31 21.18	4.1618474	9.020
Diablo Grande.....	289 02 35.21	109 05 33.96	3.9109050	5.061

Santa Rosa and Sebastopol quadrangles.NAPA AND SONOMA COUNTIES.

In the spring of 1914 C. F. Urquhart extended triangulation from Coast and Geodetic Survey stations Ross and Mount Helena so as to control all of Santa Rosa and part of Sebastopol 15' quadrangles. Seven stations were occupied and four points were located by intersections, all based on North American datum.

<sup>1</sup> See p. 30.

**BENNETT, SONOMA COUNTY, CAL. (Not occupied.)**

A tree on highest point of Bennett Mountain, 6 miles east-southeast of Santa Rosa.  
Station mark: Center of signal tree.

[Latitude  $38^{\circ} 24' 49.47''$ . Longitude  $122^{\circ} 37' 27.29''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Cotati.....	26 33 36	206 30 52	4.15944	8.970
Taylor.....	72 05 42	252 03 51	3.65975	2.338
Hood.....	230 22 54	50 25 40	3.90045	5.040
Black.....	332 12 56	152 14 37	3.92712	5.254

**BLACK, SONOMA COUNTY, CAL.**

On highest point of Sonoma Mountain, near fence, between pasture and grain field, owned by Mrs. M. A. Black. It is about 0.75 mile north of the public road and about 8 miles north of Petaluma. The station can be reached with buckboard, the last 1.2 miles being over a private road which turns off at the Anderson place.

Station mark: Laurel sapling in cairn 5 feet in diameter.

Reference mark: An aluminum tablet set in a rock 6.7 feet west of signal.

[Latitude  $38^{\circ} 20' 46.84''$ . Longitude  $122^{\circ} 34' 44.99''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Cotati.....	62 26 30.19	242 22 04.83	4.0692896	7.289
West Hill.....	89 54 02.00	269 43 33.00	4.3891400	15.223
School.....	108 03 19.00	257 57 14.00	4.1725800	9.215
Ross.....	110 43 46.31	290 23 37.97	4.7021686	31.298
Taylor.....	126 16 22.28	306 12 50.32	4.0118158	6.386
Bennett.....	132 14 37.00	312 12 56.00	3.9271200	5.254
Mount Helena.....	172 36 04.38	352 34 04.34	4.5587256	22.494
Hood.....	190 21 43.71	10 22 42.98	4.1092648	7.991
Peak.....	168 03 56	348 02 00.00	4.3407700	13.618

**COTATI, SONOMA COUNTY, CAL.**

On highest point of a bald hill, in the Meacham pasture, about 2 miles west of Penn Grove, a station on the Northwestern Pacific Railroad, between Santa Rosa and Petaluma, and can be easily reached.

Station mark: The signal.

Reference mark: Tablet set in solid rock. Azimuth from signal to mark  $124^{\circ} 47'$ , distance 2.3 feet.

[Latitude  $38^{\circ} 17' 50.62''$ . Longitude  $122^{\circ} 41' 52.94''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
West.....	110 49 34.00	290 43 34.00	4.1787600	9.378
Ross.....	122 16 48.26	302 01 06.39	4.6380503	27.002
School.....	159 27 08.00	339 25 32.00	4.0299900	6.658
Santa Rosa.....	175 05 03.00	355 04 28.00	4.2018500	9.890
Taylor.....	190 20 09.74	10 21 03.42	4.0681581	7.270
Bennett.....	206 30 52.00	26 33 36.00	4.1591400	8.970
Black.....	242 22 04.83	63 26 30.19	4.0692896	7.289

**MOUNT HELENA, NAPA COUNTY, CAL.**

A station of the United States Coast and Geodetic Survey on the summit of Mount Helena, about 12 miles to the northward of Calistoga. The station was originally marked by a fine drill hole and cross in the top of a one-half-inch copper bolt

5 inches long, which was cemented in a drill hole in bedrock, and by a brick pier 3 bricks square and 43 inches high, built over the bolt. When visited in 1908 it was found that the pier had been dynamited. Other instrument piers are at the following distances and directions from the station: Collimator pier, 2 bricks square and 61 inches high, 2.27 meters northwest; transit pier, 2 by 3 bricks and 39 inches high, 17.04 meters southwest; latitude pier, 2 by  $\frac{1}{2}$  bricks and 36 inches high, 17.74 meters southwest of the station and 1.68 meters east of the transit pier; vertical angle pier, 2 bricks square and 44 inches high, 33.31 meters southwest of the station and 16.92 meters a little south of east of the latitude pier. A boundary mark between Lake and Napa counties, a large drill hole in a basaltic rock, is 2.18 meters northwest of the station.

The brick pier spoken of in description has about all fallen down or been pulled down. Copper bolt was found. There is a good trail from Mount Helena down to summit of peak. The rim is on road from Calistoga to Middletown and 7 miles from former.

[Latitude  $38^{\circ} 40' 11.080''$ . Longitude  $122^{\circ} 37' 57.817''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Taylor.....	6 53 39.44	186 52 06.84	4.47789110	18.666
West Hill.....	28 51 43.00	208 43 19.00	4.61336000	25.510
Mount Lola.....	245 56 18.019	67 22 03.416	5.33015644	.....
Round Top.....	269 20 15.615	90 58 57.2'3	5.36002670	.....
Mount Diablo.....	324 01 34.822	144 28 18.913	5.03233246	.....
Hood.....	343 15 59.73	163 18 59.42	4.38512020	15.082
Black.....	352 34 04.34	172 36 04.38	4.55872500	22.494
Peak.....	359 27 11	179 27 12	4.16010000	8.984

#### HOOD, SONOMA COUNTY, CAL.

On Hood Mountain, 12 miles by road and trail east of Santa Rosa.

Signal and station mark: A small sapling in center of a cairn 5 feet in diameter, on highest point of mountain.

Reference mark: A tablet set in rock, 2 feet east of cairn.

[Latitude  $38^{\circ} 27' 37.12''$ . Longitude  $122^{\circ} 33' 09.58''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Black.....	10 22 42.98	190 21 43.71	4.1092648	7.991
Bennett.....	50 25 40.00	230 22 54.00	3.9000500	5.040
Taylor.....	58 13 01.52	238 08 29.99	4.0958674	7.748
Santa Rosa.....	81 02 50.00	260 56 49.00	4.1531800	8.812
Ross.....	95 59 51.24	275 38 42.01	4.6962906	30.877
Mount Helena.....	163 18 59.42	343 15 59.73	4.3851202	15.082

#### PEAK, SONOMA COUNTY, CAL. (Not occupied.)

A lone tree on north side of a round peak northeast of mark West Springs which is probably the nearest stopping place.

Station mark: Center of lone tree used for signal.

[Latitude  $38^{\circ} 32' 22.18''$ . Longitude  $122^{\circ} 37' 52.10''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Taylor.....	13 42 02	193 40 26	4.19900	9.825
Mount Helena.....	179 27 12	359 27 11	4.16010	8.984
Black.....	348 02 00	168 03 56	4.34077	13.618

## ROSS MOUNTAIN, SONOMA COUNTY, CAL.

A station of the United States Coast and Geodetic Survey on the mountain locally known as Pole Mountain, on land belonging to Baker & Sons. It may be reached from Cazadero by a wagon road for about 3 miles to the ranch of W. H. Knowles and then about 2 miles by a good trail to the station. A good camping place with a fine spring of water is about one-fourth mile southeast and about 250 feet below the station.

Station mark: Copper bolt in the top of a concrete pier.

Reference marks: Three stones, each with a half-inch drill hole in the top, placed level with the surface of the ground and 6 feet from the station, one nearly in line to Tomales Bay, one toward Mount Helena, and the third toward Walalla. A charred oak stump with a wrought-iron nail in the top was 20 feet 4 inches N.  $54^{\circ} 01' W.$  (true) from station.

Signal: A tree 49.9 feet distant trimmed up. All other timber higher than this was cut from summit of peak.

[Latitude  $38^{\circ} 30' 20.583''$ . Longitude  $123^{\circ} 07' 09.221''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	'	"	Miles.
Mount Helena <sup>a</sup> .....	246	36	09.171	4.6640160
Hood.....	275	38	42.010	4.6962906
Taylor.....	286	30	03.900	4.6081249
Black.....	200	23	37.970	4.7021686
Cotati.....	302	01	06.390	4.6380503
Mount Diablo <sup>a</sup> .....	302	51	49.822	5.1013702
Mount Tamalpais <sup>a</sup> .....	324	27	22.348	4.8984717

<sup>a</sup> Coast Survey.

## SANTA ROSA, SONOMA COUNTY, CAL. (Not occupied.)

Station mark: Center of gilded cupola on Santa Rosa Bank, side of street west of courthouse. (Not Santa Rosa National Bank.)

[Latitude  $38^{\circ} 28' 24.91''$ . Longitude  $122^{\circ} 42' 49.16''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	'	"	Miles.
Hood.....	260	56	49	4.15318
Taylor.....	321	27	28	3.74498
Cotati.....	355	04	28	4.20185

## TAYLOR, SONOMA COUNTY, CAL.

On highest bald point of Taylor Mountain, a well-known mountain 3 miles south-southeast of Santa Rosa.

Signal and station mark: A tree in center of cairn.

Reference mark: A tablet in solid rock, true azimuth  $23^{\circ} 53'$ , distance 6.8 feet from signal.

[Latitude  $38^{\circ} 24' 03.88''$ . Longitude  $122^{\circ} 40' 26.43''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	'	"	Miles.
Cotati.....	10	21	03.42	4.0681581
West Hill.....	69	15	06.00	4.2388200
School.....	75	52	21.00	3.7812300
Ross.....	106	46	40.64	4.6081249
Santa Rosa.....	141	28	57.00	3.7449800
Mount Helena.....	186	52	06.84	4.4776911
Peak.....	193	40	26.00	4.1990000
Hood.....	238	08	29.99	4.0958674
Bennett.....	252	03	51.00	3.6597500
Black.....	306	12	50.32	4.0118458

## TODD SCHOOL, SONOMA COUNTY, CAL.

The small one-story frame schoolhouse 4.5 miles south-southwest of Santa Rosa.  
 Station mark: Center of cupola.

[Latitude 38° 23' 15.98". Longitude 122° 44' 27.88".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Taylor.....	255 49 51	75 52 21	3.78123	3.755
Black.....	287 57 12	108 03 15	4.17258	9.245
Cotati.....	339 25 32	159 27 08	4.02999	6.658

## WEST HILL, SONOMA COUNTY, CAL. (Not occupied.)

A very high tree in grove on high point on ridge 5 or 6 miles west-southwest of Sebastopol.

Station mark: Center of tree.

[Latitude 38° 20' 44.24". Longitude 122° 51' 33.84".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mount Helena.....	208 43 19	28 51 43	4.61336	25.510
Taylor.....	249 08 12	69 15 06	4.23882	10.770
Black.....	269 43 33	89 54 02	4.38914	15.223
Cotati.....	290 43 34	110 49 34	4.17876	9.378

Banta, Butlers, Ceres, Cooperstown, Crows Landing, Denair, Dickinson, Empire, Hospital Creek, Lone Tree Creek, Modesto, Montpelier, Newman, Oakdale, Orestimba Creek, Patterson, Reservoir, Tracy, Waterford, Westley, and Westport 7½' quadrangles; Bonanza, Capitola, Copperopolis, Gilroy, Hot Springs, Grevison Peak, Hollister, Morgan Hill, Mount Boardman, Mount Hamilton, and Pajaro 15' quadrangles.

## ALAMEDA, MERCED, MONTEREY, SAN BENITO, SAN JOAQUIN, SANTA CLARA, SANTA CRUZ, AND STANISLAUS COUNTIES.

The field work was done by C. F. Urquhart, topographic engineer, assisted by Roy B. Kilgore, jr., topographer, in October, November, and December, 1912, and January, February, May, and June, 1913. Sixty-three stations were occupied, four of which were stations of the Coast and Geodetic Survey, and 27 points were located by intersections. The control of twenty-one 7½' quadrangles and ten 15' quadrangles was completed, on North American datum. For points previously located, see Bulletin 551.

The work was done in cooperation with the State of California.

## BAREILLAS, MERCED COUNTY, CAL.

On a bald peak, the lowest and most eastern of three peaks on land owned by J. C. Barreillas. It is about 3 miles a little east of south of the San Luis ranch, which is on the road between Los Banos and Hollister, about 15 miles from the former. The signal can be seen from this ranch.

Signal and station mark: A cairn 7 feet high.

Reference mark: A tablet set in rock, 1.72 meters south of signal.

[Latitude  $37^{\circ} 01' 33.570''$ . Longitude  $121^{\circ} 02' 19.456''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Santa Ana.....	•   •   "	•   •   "		
Pacheco.....	52 17 14.01	232 10 14.11	4.3304995	13.578
Howard.....	84 55 47.40	264 46 49.16	4.3461620	13.788
Christian.....	133 51 38.01	313 45 06.23	4.3468888	13.811
	165 13 30.43	345 11 30.55	4.2836434	11.940

**BARTLETT, SANTA CRUZ COUNTY, CAL.**

Station is on a sagebrush sand hill about half a mile northwest of Watsonville landing on the ocean. It is situated about 4 miles southwest of the town of Watsonville and can be reached in buggy.

Signal: A 4 by 4 inch redwood pole, 14 feet high, set  $4\frac{1}{2}$  feet in ground, with two targets at right angles to each other on pole.

Station mark: A tablet set in rock under center of signal.

[Latitude  $36^{\circ} 53' 14.996''$ . Longitude  $121^{\circ} 49' 48.109''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lillian.....	•   •   "	•   •   "		
Loma Prieta.....	167 14 50.16	347 13 55.96	4.0046368	6.280
Church.....	177 15 03.64	357 14 34.56	4.3957141	15.455
Watsonville.....	232 54 24.75	52 57 37.10	3.9971654	6.173
Lux.....	243 51 39.96	63 54 09.97	3.8381432	4.280
School.....	267 24 37.45	87 35 08.75	4.4160516	16.196
Pajaro.....	249 42 56.77	69 47 37.62	4.0913279	7.668
Gavilan.....	277 35 00.16	97 37 45.61	3.8380452	4.280
	297 44 29.16	117 55 38.46	4.4955250	19.448

**BATCHER, SANTA CLARA COUNTY, CAL.**

This station is on a high ridge with scattering oak trees on it. It is on the highest point of ridge and about 3 miles southeast of Gilroy Hot Springs, a health resort, 14 miles from the town of Gilroy. The land is owned by Mr. Batcher, a San Francisco capitalist.

Station mark and signal: A laurel tree placed in ground and braced by four laurel poles.

Reference mark: A triangulation tablet set in rock and placed in ground 4.4 feet southwest of signal.

Instrument placed over tablet. True azimuth from station to reference mark,  $22^{\circ} 11'$ .

[Latitude  $37^{\circ} 05' 44.077''$ . Longitude  $121^{\circ} 26' 04.231''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Gavilan.....	•   •   "	•   •   "		
Lux.....	11 25 24.44	191 22 19.95	4.5850532	23.900
Thompson.....	22 46 36.68	202 42 52.69	4.3766676	14.792
Loma Prieta.....	51 33 25.41	231 26 52.85	4.3134420	12.788
Corral.....	92 52 57.61	272 38 09.52	4.5610335	22.614
Lick.....	107 10 21.70	287 07 28.41	3.8705606	4.612
Madrone.....	146 00 42.20	325 53 09.81	4.5176506	20.465
Mocho.....	152 02 08.73	331 59 16.73	4.1753466	9.302
Gerber.....	165 59 12.58	345 47 49.34	4.6408546	27.177
Orestimba.....	185 21 58.69	5 22 56.86	4.4033932	15.731
Castle.....	216 11 39.40	36 19 15.29	4.4973537	19.530
Howard.....	224 12 51.29	44 18 05.20	4.2642706	11.419
Pacheco.....	248 06 28.73	68 14 16.67	4.3141378	12.808
Santa Ana.....	306 28 41.90	126 34 01.70	4.2126976	10.140
	319 32 23.27	139 39 40.49	4.4427328	17.222

## BELL, SAN JOAQUIN COUNTY, CAL.

A windmill situated near a flat-topped red tank, on land owned by Mr. W. E. Moore, about 6 miles west of Tipon, a station of the Southern Pacific Railroad.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 44' 42.351''$ . Longitude  $121^{\circ} 13' 55.813''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Vernalis.....	18 45 27.11	198 43 35.73	4.1427815	8.632
Moy.....	44 06 24.85	224 01 00.34	4.2719258	11.622
Tipon.....	273 47 54.43	93 51 53.45	3.9814538	5.954
Mill.....	305 43 09.28	125 44 37.02	3.6359280	2.687
Kern.....	359 20 14.90	179 20 22.88	4.4434398	17.250

## BLACK GULCH, STANISLAUS COUNTY, CAL.

On highest point of mountain, 6 miles west of Patterson, which can be reached by following road which leads due west from Patterson 3 miles, then to the southwest up Black Gulch about one-fourth mile beyond deserted cabin where dim road turns to the right to lone deserted cabin up gulch. From this point follow up ridge to right to signal.

Signal and station mark: A cairn 7 feet high.

Reference mark: A bronze triangulation tablet set in rock, 6.1 feet east of center of signal.

True azimuth, station to reference mark,  $277^{\circ} 00'$ .

[Latitude  $37^{\circ} 27' 02.070''$ . Longitude  $121^{\circ} 13' 28.246''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Orestimba.....	0 12 48.64	180 12 47.35	4.1477756	8.732
Gerber.....	48 53 20.91	228 46 40.27	4.3336888	13.398
Red.....	78 06 36.20	257 57 01.93	4.3276709	13.214
Oso.....	115 45 06.50	295 39 40.03	4.1652690	9.091
Vernalis.....	165 14 54.87	345 12 47.07	4.3053402	12.551
Kern.....	175 52 00.32	358 51 51.50	3.6638497	3.070
Westley.....	192 12 04.43	12 13 00.52	4.0295501	6.651
Grayson.....	197 54 02.07	17 55 42.38	4.1190908	8.174
School (Haight).....	218 23 47.29	38 25 33.08	3.8373690	4.273
Modesto.....	224 01 54.73	44 10 28.63	4.4734037	18.482
Van Ormer.....	230 58 48.22	51 01 35.47	3.8390751	5.400
Westport.....	236 41 50.42	56 48 56.84	4.3132812	12.783
Patterson.....	253 49 08.71	73 52 30.56	3.9289646	5.276
Jovan.....	257 11 12.75	77 19 40.86	4.3230684	13.074
Turlock.....	261 28 27.24	81 42 29.84	4.5365767	21.376
Crows Landing.....	295 51 45.92	115 57 18.84	4.1727906	9.250
Newman.....	310 19 24.09	130 26 41.98	4.3872457	14.474
Crow.....	326 28 58.19	146 31 47.61	4.0944841	7.724
Cleveland.....	337 31 47.10	157 35 11.81	4.3373999	13.513

## BLOODSOE, MERCED COUNTY, CAL.

A lumber tripod on pasture hill on G. W. Bloodsoe's ranch. The nearest stopping place is Hickman, 6 miles southeast of Montpelier, on the Santa Fe Railway.

Station mark: An iron bench-mark post set under center of tripod.

[Latitude  $37^{\circ} 30' 47.722''$ . Longitude  $120^{\circ} 35' 58.085''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Dallas.....	80 42 32.53	260 37 20.87	4.1052710	7.918
Montpelier.....	112 53 39.21	292 49 43.77	4.0127644	6.399
School (Dickinson).....	190 32 07.44	10 32 27.15	3.6375436	2.697
Pillsbury.....	201 48 35.94	21 49 55.12	3.9334675	5.331
Holmes.....	223 33 10.67	43 36 56.00	4.1210219	8.211
Thomson.....	256 58 57.48	77 02 28.17	3.9403839	5.417

## BROWN, ALAMEDA COUNTY, CAL.

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 and over a tablet.

[1901: Latitude  $37^{\circ} 36' 22.98''$ ; longitude  $121^{\circ} 37' 10.84''$ . 1913: Latitude  $37^{\circ} 36' 22.978''$ ; longitude  $121^{\circ} 37' 10.775''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Trenouth.....	61 53 05.56	241 43 55.02	4.400441	
Sunol.....	93 25 59.84	273 14 56.27	4.4266916	
Wiedeman.....	114 04 36.83	293 50 52.92	4.5581590	
Brushy.....	157 51 19.54	337 45 17.29	4.2968343	
Byron.....	172 32 14.88	352 30 27.36	4.5189234	
Bridge.....	195 00 51.94	15 08 31.56	4.3915751	
Tracy.....	230 32 57.01	50 40 23.58	4.3649212	14.397
Oso.....	236 38 36.81	116 47 36.87	4.3864221	15.128
Mocho.....	338 14 25.24	158 16 46.61	4.1868513	9.554

## BUTLERS, STANISLAUS COUNTY, CAL.

A line windmill, situated on the south side of the road, 7 miles due west of Modesto, on land owned by Mrs. Butler. The windmill tower has been wrapped with white cloth.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 38' 17.540''$ . Longitude  $121^{\circ} 07' 04.155''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Kern.....	31 38 28.36	211 34 25.35	4.2710137	11.597
Vernalis.....	84 58 45.18	264 52 42.58	4.1648865	9.083
Patrick.....	123 00 06.47	303 02 14.68	3.7285138	3.326
Theobald.....	206 23 21.34	86 24 59.53	3.5965564	2.454
Modesto.....	267 14 28.77	87 19 09.20	4.0519460	7.003
Young.....	321 26 56.94	141 27 59.09	3.6027343	2.489

## CASHMAN, STANISLAUS COUNTY, CAL.

A timber tripod on summit of small sharp butte, about 8 miles east of Oakdale, on land owned by Mr. T. J. Cashman.

Station mark: A bench-mark post set under center of tripod.

[Latitude  $37^{\circ} 46' 02.394''$ . Longitude  $120^{\circ} 41' 31.459''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Walters.....	22 40 22.24	202 39 35.26	3.6880395	3.030
Levison.....	51 52 47.23	231 47 45.15	4.1888793	9.555
Windmill.....	64 29 50.20	244 27 10.84	3.8488699	4.388
Crane.....	79 48 22.76	259 41 28.21	4.2264375	10.466
Riverbank.....	80 13 53.03	260 04 53.32	4.3405264	13.611
Oakdale Church.....	89 12 06.09	269 06 18.83	4.1423994	8.625
Oakdale.....	102 08 21.47	282 02 20.13	4.1691066	9.172
Wolfing.....	301 00 51.30	121 03 27.86	3.8636908	4.540
No. 1.....	327 53 45.51	147 56 52.65	4.1494960	8.767
Hagen.....	358 50 45.45	178 50 53.43	4.2009964	9.871

## CASTLE, STANISLAUS COUNTY, CAL. (Not occupied.)

Highest point of prominent mountain 5 miles northwest of Howard triangulation station.

[Latitude 37° 12' 51.025". Longitude 121° 17' 24.493".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Batcher.....	44 18 05.20	224 12 51.29	4.2642706	11.419
Madrone.....	90 14 41.74	270 06 35.17	4.2974719	12.326
Gerber.....	139 07 24.10	319 03 07.61	4.2023768	9.902
Orestimba.....	205 19 00.35	25 21 22.13	4.1296784	8.376
Howard.....	311 04 59.38	131 07 33.80	3.9223223	5.196
Pacheco.....	350 19 05.49	179 19 12.14	4.3593694	14.214

## CERES, STANISLAUS COUNTY, CAL.

Red tank in town of Ceres on the Southern Pacific Railroad.

Station mark: Center of tank.

[Latitude 37° 35' 24.871". Longitude 120° 57' 10.546".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Joven.....	17 52 05.76	197 50 38.94	4.0572643	7.089
Westport.....	58 11 32.38	238 08 43.34	3.9034910	4.976
Courtney.....	88 22 57.37	268 19 55.10	3.8653274	4.557
Modesto.....	150 38 31.37	330 37 09.32	3.8275030	4.177
Hughson.....	264 09 13.06	84 12 26.12	3.8922953	4.849
Turlock.....	316 17 10.62	136 21 18.80	4.1600864	8.996
Keyes.....	318 20 07.71	138 21 43.00	3.7611671	3.585

## CHRISTIAN, MERCED COUNTY, CAL.

On highest summit of bald, round hill, locally known as Christian Hill, on land owned by Simon Newman Co., about 7 miles southwest of town of Gustine, a station on the Southern Pacific Railroad, and half a mile west of ranch owned by J. F. Schnyder. Can be reached from Schnyder's ranch on horseback.

Station mark: A 4 by 4 inch redwood pole, 14 feet high, with three cross targets, and is sunk in the ground a depth of 3 feet.

Reference mark: A bronze triangulation tablet, set in rock 4.6 feet northwest of signal and station mark.

True azimuth, station to reference mark: 163° 56'.

[Latitude 37° 11' 36.236". Longitude 121° 05' 38.142".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Howard.....	74 01 28.25	253 56 55.78	4.0633837	7.190
Orestimba.....	141 16 09.99	321 11 24.08	4.2691191	11.547
Cleveland.....	158 49 17.23	338 47 56.90	3.9568293	5.626
Crow.....	165 29 11.90	345 27 16.10	4.2736010	11.667
Newman.....	204 41 18.77	24 43 50.78	4.1704023	9.199
Gustine.....	230 36 21.94	50 39 43.78	4.0289475	6.611
Stack.....	260 34 00.83	80 38 10.83	4.0143355	6.422
Barreillas.....	345 11 30.55	165 13 30.43	4.2836434	11.940

## CHURCH, SANTA CRUZ COUNTY, CAL. (Not occupied.)

A church 2 miles northeast of Watsonville, Cal.

[Latitude  $36^{\circ} 56' 29.254''$ . Longitude  $121^{\circ} 44' 27.855''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Pajaro.....	• / " 9 05 29.07	• / " 189 05 02.29	Log. meters.   Miles. 3.8443243   4.342
Bartlett.....	52 57 37.10	232 54 24.75	3.9971654   6.173
Gavilan.....	316 10 02.62	136 18 00.26	4.4552729   17.726

## CLAUS, STANISLAUS COUNTY, CAL.

A red water tank in Claus, belonging to the Santa Fe Railway. It can be occupied. Station mark: Center of tank.

[Latitude  $37^{\circ} 41' 12.238''$ . Longitude  $120^{\circ} 55' 05.734''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Modesto.....	• / " 52 39 33.91	• / " 232 36 55.50	Log. meters.   Miles. 3.9027590   4.967
Stack.....	121 19 54.51	301 17 25.26	3.8449099   4.318
Riverbank.....	162 25 13.61	342 24 32.45	3.7368915   3.390
Empire.....	344 29 23.22	164 29 59.00	3.7298971   3.336

## CLEVELAND, STANISLAUS COUNTY, CAL.

On a low cultivated hill on land owned by Mrs. John Miller, and a quarter mile north of her ranch house. About three-fourths mile north of Cleveland District School and 8 miles west of Gustine, a station on the Southern Pacific Railroad.

Signal: A 4 by 4 inch redwood pole, 14 feet long, with 3 feet cross targets and placed in the ground a depth of 3 feet.

Station mark: Center of 4 by 4 inch pole.

[Latitude  $37^{\circ} 16' 10.069''$ . Longitude  $121^{\circ} 07' 50.897''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Howard.....	• / " 34 00 54.30	• / " 213 57 41.89	Log. meters.   Miles. 4.147047   8.718
Orestimba.....	125 54 13.50	305 50 47.80	4.0136237   6.412
Black Gulch.....	157 35 11.81	337 31 47.10	4.3373899   13.513
Crow.....	171 35 42.08	351 35 06.66	3.9929778   6.114
Newman.....	242 03 43.93	62 07 36.52	4.0293702   6.648
Gustine.....	278 20 24.12	98 25 06.52	4.0650988   7.219
Stack.....	296 35 36.71	116 41 07.26	4.1779102   9.360
Christian.....	338 47 56.90	158 49 17.23	3.9568293   5.626

## CORRAL, SANTA CLARA COUNTY, CAL.

Station is on highest point of ridge about 3 or 4 miles west of Gilroy Hot Springs, a health resort, 14 miles from the town of Gilroy, a station on the Southern Pacific Railroad. Land is owned by Mr. Hyde, or has been sold to Mr. Batcher. The "Diamond Fields" trail from Gilroy Hot Springs goes to Summit of ridge, thence west along ridge to a corral. Signal is about a quarter mile north of corral.

Signal: An oak tree 40 or 50 feet high, with all limbs except the top cut off. A triangle is cut in the east side of tree with U. S. printed in nails on it.

As the Santa Clara Valley can not be seen from this point, a line was measured 618.4 feet west to summit of hill overlooking the valley; at this point a United States Geo-

logical Survey triangulation tablet was set in rock and placed in ground. Triangles were blazed on two trees north and northwest of triangulation tablet, distant about 30 feet each from tablet.

[Latitude  $37^{\circ} 06' 55.073''$ ; longitude  $121^{\circ} 30' 51.479''$ . Tablet on hill west: Latitude  $37^{\circ} 06' 55.539''$ ; longitude  $121^{\circ} 30' 58.400''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	,	"	
Lux.....	4	58	50.16	184 57 59.01
Thompson.....	31	00	48.97	210 57 09.38
Madonna.....	58	01	05.73	235 54 15.52
Loma Prieta.....	89	14	39.97	269 02 45.00
Murphy.....	92	36	38.28	272 30 54.59
Lick.....	155	41	29.67	335 36 50.95
Madrone.....	180	18	55.27	00 18 56.76
Batcher.....	287	07	28.41	107 10 21.70
Pacheco.....	300	25	26.87	120 33 39.86

#### COURTNEY, STANISLAUS COUNTY, CAL.

A windmill on Mr. Courtney's ranch,  $4\frac{1}{2}$  miles west of Ceres.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 35' 18.050''$ . Longitude  $121^{\circ} 02' 09.346''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	,	"	
Kern.....	58	43	43.43	238 36 40.92
Modesto.....	213	34	59.53	33 36 39.86
Ceres.....	268	19	55.10	88 22 57.37
Westport.....	352	28	57.79	172 29 10.94

#### CRANE, STANISLAUS COUNTY, CAL.

A tall wooden windmill, 3 miles east of Riverbank, a town on the Santa Fe Railway, on J. W. Crane's place. It can be occupied for some sights.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 44' 25.166''$ . Longitude  $120^{\circ} 52' 48.539''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	,	"	
Modesto.....	42	00	05.95	221 56 03.58
Riverbank.....	81	31	50.43	261 29 45.28
Oakdale.....	199	19	16.46	19 20 09.91
Cashman.....	259	41	28.21	79 48 22.76
Windmill.....	270	13	02.71	90 17 17.82
Walters.....	275	46	52.64	95 53 00.04
Levison.....	325	21	19.88	145 23 12.06

#### CROW, STANISLAUS COUNTY, CAL.

On highest point of round foothill 5 miles southwest of Crows Landing, just south of Crow Creek, on land owned by George Crow and  $1\frac{1}{2}$  miles north of his ranch house. Can drive to foot of hill from almost any direction.

Station mark and signal: A 4 by 4 inch redwood pole, 10 feet long with 3 feet cross targets and set 3 feet in the ground.

Reference mark: A bronze triangulation tablet set in rock 3.9 feet south of signal.

True azimuth, station to reference mark  $355^{\circ} 11'$ .

[Latitude 37° 21' 25.814". Longitude 121° 08' 49.339".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Orestimba.....	61 58 06.31	241 55 14.85	3.892543	4.871
Black Gulch.....	146 31 47.61	326 28 58.19	4.0944841	7.724
Kern.....	154 46 22.64	334 43 24.32	4.2281635	10.508
Patterson.....	185 50 14.90	5 50 46.97	4.1070391	7.950
Crows Landing.....	239 24 05.94	59 26 47.20	3.8803463	4.717
Newman.....	293 25 33.12	113 30 01.38	4.0744560	7.376
Christian.....	345 27 16.10	165 29 11.90	4.2736010	11.667
Cleveland.....	351 35 06.66	171 35 42.08	3.9929778	6.114

**CROWS LANDING, STANISLAUS COUNTY, CAL. (Not occupied.)**

The most southern church in Crows Landing.

Station mark: Center of church spire.

[Latitude 37° 23' 31.062". Longitude 121° 04' 23.685".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Crow.....	59 26 47.20	239 24 05.94	3.8803463	4.717
Black Gulch.....	115 57 16.84	295 51 45.92	4.1727906	9.250
Kern.....	129 48 19.60	309 42 39.70	4.2522857	11.108

**DALLAS, STANISLAUS AND MERCED COUNTIES, CAL.**

A lumber tripod on Mrs. Hickman's land, about 5½ miles due east of Turlock and 500 feet north of county road running from Turlock to Snelling.

Station mark: A triangulation tablet set in rock under center of tripod.

[Latitude 37° 29' 40.680". Longitude 120° 44' 30.025".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Turlock.....	90 57 36.79	270 54 01.77	3.9384440	5.393
Denair.....	130 01 28.82	309 59 36.85	3.7706831	3.664
Hughson.....	136 19 31.09	316 15 00.47	4.1979657	9.802
Waterford.....	174 35 51.39	354 35 12.58	4.2193571	10.297
Hickman.....	177 34 41.00	357 34 26.03	4.1537439	8.853
Hall.....	185 50 35.07	5 51 00.47	4.0021038	6.244
Hagen.....	198 05 21.48	18. 07 18.28	4.1799298	9.403
Pillsbury.....	237 27 50.42	57 34 21.51	4.2713761	11.607
School (Dickinson).....	244 35 45.38	64 41 16.89	4.1699578	9.190
Bloodsoe.....	260 37 20.87	80 42 32.53	4.1052710	7.918

**DENAIR, STANISLAUS COUNTY, CAL. (Not occupied.)**

Station mark: Cupola on school in Denair, a station on the Santa Fe Railway.

[Latitude 37° 31' 43.642". Longitude 120° 47' 33.916".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Turlock.....	48 44 43.35	228 43 00.23	3.7430046	3.438
Hughson.....	140 01 42.92	319 59 04.31	3.9971780	6.173
Hall.....	221 43 20.14	41 45 37.54	3.9194441	5.168
Dallas.....	309 59 36.85	130 01 28.83	3.7706831	3.664

## DICKINSON SCHOOL, MERCEDE COUNTY, CAL. (Not occupied.)

Station Mark: Center of cupola on Dickinson School, 6 miles east of Montpelier, on the Santa Fe Railway.

[Latitude 37° 33' 08.140". Longitude 120° 35' 25.752".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Bloodsoe.....	10 32 27.15	100 32 07.44	3.6375436	2.697
Dallas.....	64 41 16.89	244 35 45.38	4.1699678	9.190
Hagen.....	132 57 49.01	312 54 13.90	4.0725356	7.343
No. 1.....	173 01 27.47	353 00 50.99	4.0815762	7.493
Pillsbury.....	212 55 19.36	32 56 18.86	3.6139801	2.737
Thomsen.....	286 39 47.29	106 42 58.36	3.9050916	4.994

## EMPIRE, STANISLAUS COUNTY, CAL. (Not occupied.)

A church spire in Empire, a station on the Santa Fe Railroad. Station mark: Center of spire.

[Latitude 37° 38' 24.426". Longitude 120° 54' 07.174".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Modesto.....	92 23 49.57	272 20 35.48	3.8919838	4.845
Riverbank.....	163 27 24.33	343 26 07.39	4.0343524	6.725
Claus.....	164 29 59.00	344 29 23.22	3.7294971	3.336
Levison.....	234 15 33.63	54 18 13.69	3.8981694	4.915
Hughson.....	325 27 50.44	145 29 11.67	3.7603148	3.578

## GAVILAN, MONTEREY COUNTY, CAL.

A station of the Coast and Geodetic Survey on the crest of the mountain separating Pajaro Valley from the Valley of Salinas and about 4 miles to the southward of the Mission of San Juan. The crest is composed of a line of sharp peaks from 2,800 to 3,000 feet high, and the station is on the western extremity, on a small platform of level land just where the ground commences to fall rapidly. The station was marked by a stone block, with a drill hole in the top, filled with lead, set 2½ feet below the surface of the ground. Three lead bolts in fixed rocks are as follows: One 13 feet 2 inches south by west (approximately), one 13 feet 9 inches southeast (approximately), and one 5 feet 9 inches north by east (approximately), from the center.

[Latitude 36° 45' 20.910". Longitude 121° 31' 11.350".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Bartlett.....	117 55 38.46	297 44 29.16	4.4955250	19.418
Pajaro.....	123 23 12.42	303 14 48.39	4.3970080	15.501
Watsonville.....	129 28 26.40	309 19 46.67	4.4440520	17.274
Church.....	136 18 00.26	316 10 02.62	4.4552729	17.728
School.....	139 38 05.18	319 31 36.00	4.3945269	15.413
Loma Prieta.....	143 56 25.47	323 44 45.39	4.6890356	30.366
Thompson.....	161 06 14.56	351 02 47.79	4.4202423	16.353
Lick.....	170 31 19.45	350 26 53.84	4.8188815	40.918
Lux.....	174 09 25.88	354 08 46.82	4.1995939	9.839
Batcher.....	191 22 19.95	11 25 24.44	4.5850534	23.900
Pacheco.....	216 28 36.92	36 38 59.77	4.5121347	21.651
Santa Ana.....	236 58 11.66	57 08 31.24	4.4846064	18.965

## GERBER, SANTA CLARA AND STANISLAUS COUNTIES, CAL.

Station is on highest point of a high brushy mountain on east side of San Antonio Valley, and near the source of San Antonio Creek. It is about 4 miles from Mr. Gerber's ranch in San Antonio Valley. This valley can be reached by wagon road from Mount Hamilton and from Livermore. The best road is via Livermore and there is a very good trail from Gerber's ranch to signal.

Station mark and signal: A juniper tree set 3½ feet in ground.

Reference mark: A triangulation tablet cemented in rock placed in ground 3.2 feet from signal. Instrument was placed over center of tablet.

True azimuth, station to reference mark 18° 07'.

[Latitude 37° 19' 21.678". Longitude 121° 24' 28.069".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Batcher.....	5 22 56.86	185 21 58.69	4.4033942	15.731
Madrone.....	38 06 22.19	218 02 31.51	4.182226	9.457
Loma Prieta.....	58 53 42.45	238 37 53.85	4.6553767	28.101
Lick.....	95 47 41.42	275 39 09.52	4.3198304	12.977
Mocho.....	142 51 14.33	322 45 51.99	4.3343450	13.418
Red.....	154 54 11.81	334 52 18.76	4.0334548	6.711
Oso.....	188 23 09.54	8 24 24.45	4.3172692	12.901
Black Gulch.....	226 46 40.27	48 53 20.91	4.3356888	13.398
Orestimba.....	269 26 56.51	89 33 35.28	4.2093470	10.062
Howard.....	316 17 12.91	136 24 03.87	4.3846073	15.065
Castle.....	319 03 07.61	139 07 24.10	4.2023768	9.902
Pacheco.....	342 53 33.88	162 57 56.42	4.5626024	22.696

## GILROY, SANTA CLARA COUNTY, CAL. (Not occupied.)

Catholic Church in Gilroy.

Station mark: Center of spire.

[Latitude 37° 01' 00.304". Longitude 121° 34' 22.514".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Thompson.....	43 03 13.40	223 01 41.06	3.7449825	3.454
Loma Prieta.....	113 39 26.77	293 29 39.81	4.4191614	16.312
Murphy.....	112 35 17.03	322 31 40.94	4.1633691	9.051
Lux.....	346 42 06.63	166 43 22.42	4.1325515	8.431

## GRAYSON, STANISLAUS COUNTY, CAL. (Not occupied.)

Church in old town of Grayson on west side of San Joaquin River, near town of Westley.

Station mark: Center of church spire.

[Latitude 37° 33' 48.090". Longitude 121° 10' 43.495".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Black Gulch.....	17 55 42.38	197 54 02.07	4.1190908	8.174
Kern.....	30 07 40.30	210 05 51.11	3.9431290	5.451
Oso.....	70 20 29.37	250 13 22.11	4.2622189	11.365

## GUSTINE, MERCED COUNTY, CAL. (Not occupied.)

Station mark: Center of steeple on church in town of Gustine on Southern Pacific Railroad.

## CALIFORNIA.

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[Latitude 37° 15' 15.154". Longitude 121° 00' 04.475".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Christian.....	50 39 43.78	230 36 21.94	4.0269475	6.611
Howard.....	62 52 09.21	242 44 14.78	4.3374811	13.515
Cleveland.....	98 25 06.52	278 20 24.12	4.0650988	7.219
Orestimba.....	111 22 06.63	291 13 58.38	4.3285122	13.239

## HAGEN, STANISLAUS COUNTY, CAL.

A 6 by 6 inch post with cross targets, on north edge of Martin Hagen's ranch. Located just east of high power line pole and on fence line, 3½ miles due east of Hickman.

Station mark: An iron bench-mark post set at foot of wood post.

[Latitude 37° 37' 27.244". Longitude 120° 41' 18.412".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Montpelier.....	11 02 58.60	191 02 18.25	3.9280379	5.265
Dallas.....	18 07 18.28	198 05 21.48	4.1799298	9.403
Hall.....	39 58 48.31	219 57 16.83	3.7577625	3.557
Turlock.....	43 14 28.32	223 08 56.18	4.2908557	12.140
Hughson.....	79 13 40.95	256 07 13.01	4.2006798	9.863
Hickman.....	88 24 32.34	264 22 20.38	3.7245243	3.295
Modesto.....	94 34 04.27	274 23 00.81	4.4268888	16.605
Waterford.....	108 40 58.32	288 38 22.45	3.8199323	4.105
Levison.....	117 13 50.24	297 08 40.68	4.1450398	8.677
Walters.....	169 03 59.99	349 03 05.11	4.0642228	7.204
Cashman.....	178 50 53.43	358 50 45.45	4.200964	9.871
Wolfing.....	206 07 22.24	266 09 50.57	4.1302031	8.388
No. 1.....	241 17 56.02	61 20 54.88	3.9129691	5.085
Pillsbury.....	291 28 11.62	111 32 46.36	4.0744735	7.378
School (Dickinson).....	312 54 13.90	132 57 49.01	4.0725356	7.343

## HAIGHT SCHOOL, STANISLAUS COUNTY, CAL.

Haight School, about 2 miles west of Vanormer, on the Southern Pacific Railroad.  
Station mark: Center of belfry.

[Latitude 37° 29' 56.850". Longitude 121° 10' 34.370".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Black Gulch.....	38 25 33.08	218 23 47.29	3.8373690	4.273
Kern.....	84 20 32.03	264 18 37.36	3.6674577	2.889

## HALL, STANISLAUS COUNTY, CAL.

A round observatory on Mrs. Hall's home, a white house 3 miles southeast of Hickman, a station on the Santa Fe Railway.

Station mark: Center of observatory.

[Latitude 37° 35' 04.927". Longitude 120° 43' 48.331".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Dallas.....	5 51 00.47	185 50 35.07	4.0021038	6.244
Denair.....	41 45 37.64	221 43 20.14	3.9199441	5.168
Turlock.....	44 33 56.05	224 29 55.41	4.1406707	8.591
Hughson.....	96 46 12.63	276 41 16.31	4.0791821	7.456
Levison.....	140 50 08.69	320 52 30.80	4.1422234	8.621
Hickman (2).....	159 01 49.26	339 01 08.84	3.6570022	2.821
Waterford.....	158 20 15.83	338 19 11.54	3.8488338	4.347
Hagen.....	219 57 16.83	89 58 48.31	3.7577625	3.557
Montpelier.....	332 22 17.53	152 23 08.60	3.6467811	2.755

## HICKMAN, STANISLAUS COUNTY, CAL.

A church spire in town of Hickman.

Station mark: Center of spire.

[Latitude 37° 37' 22.413". Longitude 120° 44' 54.577".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Turlock.....	•   '   "	•   '   "	4. 2105739	10.091
Hughson.....	29 48 51.82	209 45 31.46	4. 0282561	6.632
Hagen.....	74 38 38.96	254 34 22.84	3. 7245243	3.295
Hall.....	268 22 20.28	88 24 32.34	3. 6570022	2.821
Dallas.....	339 01 08.84	159 01 49.26	4. 1537439	8.853

## HOLMES, STANISLAUS COUNTY, CAL. (Not occupied.)

A dismantled wooden windmill near old deserted house on hill about 6 miles south west of La Grange, known as the old "Jim Holmes" place.

Station mark: Center of windmill tower.

[Latitude 37° 35' 58.186". Longitude 120° 29' 46.936".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Thomsen.....	•   '   "	•   '   "	3. 8829431	4.746
Bloodsoe.....	4 39 10.64	184 38 55.26	4. 1210219	8.211
Pillsbury.....	43 36 56.90	223 33 10.67	3. 7876220	3.810
No. 1.....	74 49 58.29	254 47 31.13	4. 0731554	7.354
Kussian.....	124 21 19.39	304 17 16.02	3. 9784706	5.913
	152 27 10.24	333 25 20.57		

## HOWARD, SANTA CLARA COUNTY, CAL.

On high point of ridge with scattering oak trees, on divide between Quinto and Romero creeks. The highest point of ridge is round brushy hill with lone tree on southwest side, 1 mile west of station. Can be reached from Howard Cattle Co.'s ranch, 10 miles west of Gustine, by following up Quinto Creek about 5 miles to cabin, thence by trail on up creek about 2 miles to sulphur spring to south end of trail. Follow up ridge here about 1½ miles southwest to station.

Signal and station mark: An oak tree 13 feet high, placed 3 feet in the ground.

Reference mark: A bronze triangulation tablet set in rock 4.3 feet northwest of signal.

True azimuth, station to reference mark, 110° 21'.

[Latitude 37° 09' 52.689". Longitude 121° 13' 09.023".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Santa Ana.....	•   '   "	•   '   "	4. 4593361	17.893
Pacheco.....	2 24 01.10	182 23 31.76	4. 2647058	11.430
Batcher.....	19 10 52.12	199 08 24.71	4. 3141378	12.808
Madrone.....	68 14 16.67	248 06 28.73	4. 4269767	16.609
Castle.....	102 05 34.46	281 54 53.74	3. 9223223	5.196
Gerber.....	131 07 33.80	311 04 59.38	4. 3846073	15.065
Orestimba.....	136 24 03.87	316 17 12.91	4. 2476912	10.991
Cleveland.....	178 17 49.68	358 17 36.76	4. 1470847	8.718
Gustine.....	213 57 41.89	34 00 54.30	4. 3374611	13.515
Christian.....	242 44 14.78	62 52 09.21	4. 0633837	7.190
Barellas.....	253 56 55.78	74 01 28.25	4. 3468888	13.811
	313 45 06.23	133 51 38.01		

## HUGHSON, STANISLAUS COUNTY, CAL.

Flagpole on flat-roofed hotel in Hughson, a town on the Santa Fe Railway.

Station mark: Center of flagpole.

## CALIFORNIA.

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[Latitude 37° 35' 50.536". Longitude 120° 51' 54.092".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Keyes.....	37 37 26.18	217 35 48.50	3.8089621	4.002
Ceres.....	84 12 26.12	264 09 13.06	3.8922953	4.849
Modesto.....	114 39 26.48	294 34 51.25	4.0850366	7.558
Empire.....	145 29 11.67	325 27 50.44	3.7603148	3.578
Levison.....	198 38 43.46	18 40 02.18	3.9918177	6.140
Waterford.....	241 19 38.04	61 23 30.26	4.0265109	6.605
Hickman.....	254 34 22.84	74 38 38.86	4.0282561	6.632
Hagan.....	259 07 13.01	79 13 40.95	4.2006798	9.863
Hall.....	278 41 18.31	96 46 12.63	4.0791821	7.456
Montpelier.....	290 50 38.36	110 56 25.64	4.1749079	9.295
Dallas.....	316 15 00.47	136 19 31.09	4.1979657	9.802
Denair.....	319 59 04.31	140 01 42.92	3.9971780	6.173
Turlock.....	348 47 37.58	168 48 32.91	4.0599436	7.133

## JACKSON, STANISLAUS COUNTY, CAL.

Cupola on Jackson School, 3 miles southwest of Salida, a station on the Southern Pacific Railroad.

Station mark: Center of cupola.

[Latitude 37° 41' 19.378". Longitude 121° 07' 53.941".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Kern.....	21 43 51.83	201 40 19.05	4.3644007	14.380
Patrick.....	50 33 06.38	230 31 44.96	3.6261328	2.627
Salida.....	240 06 26.11	60 08 09.08	3.6773654	2.956

## JOVEN, STANISLAUS COUNTY, CAL.

A wooden windmill just east of flat-roofed tank house, which may be occupied, 9 miles west of Turlock, on Mr. Young's place.

Station mark: Center of windmill tower.

[Latitude 37° 29' 32.613". Longitude 120° 59' 33.051".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Orestimba.....	47 50 13.43	227 41 44.76	4.442303	17.282
Black Gulch.....	77 19 40.86	257 11 12.75	4.3230684	13.074
Kern.....	90 51 39.27	270 43 02.08	4.3196253	12.971
Westport.....	153 30 57.60	333 29 35.53	3.8701367	4.608
Modesto.....	180 40 44.22	0 40 49.16	4.2232140	10.389
Ceres.....	197 50 38.94	17 52 05.76	4.0572643	7.089
Keyes.....	228 13 21.81	48 16 23.77	3.9927314	6.111
Turlock.....	268 18 03.75	88 23 38.38	4.1306910	8.395

## KEYES, STANISLAUS COUNTY, CAL. (Not occupied.)

Cupola on school in Keyes, on the Southern Pacific Railroad.

Station mark: Center of cupola.

[Latitude 37° 33' 05.027". Longitude 120° 54' 34.285".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Joven.....	48 16 23.77	228 13 21.81	3.9927314	6.111
Ceres.....	138 21 43.00	318 20 07.71	3.7611671	3.585
Hughson.....	217 35 48.50	37 37 26.18	3.8089621	4.002
Turlock.....	314 57 21.56	134 59 54.45	3.9401931	5.414

## LEVIN STANISLAUS COUNTY CAL.

On land owned by Mr. L. C. Claus. It can be reached by following road west from Patterson, or by going to Fairmount, Lodi, or Modesto, where road to station is about 4 miles to south of town.

Station mark: A wooden post 4 by 4 inches square, 14 feet high, with cross targets and pyramid at the ground line.

Distance marks: A wooden triangle set in a rock 4 feet in front of post.

The station mark is also a bench-mark, 3117.47.

[Latitude 37° 40' 54.208". Longitude 120° 49' 45.165".]

To station	Azimuth	Back azimuth	Distance.
Clovis	18 40 02.18	198 38 43.46	Log. meters Miles.
Patterson	54 18 13.69	234 15 33.63	3.9948177 6.140
Modesto	73 13 54.16	253 07 59.91	3.9816068 4.915
Riverbank	121 14 44.39	301 10 47.17	4.1716075 9.225
Crone	145 23 12.05	325 21 19.88	4.0466056 6.903
Windmill	221 29 42.22	41 32 04.99	3.8978509 4.911
Cahill	231 47 45.15	51 52 47.23	3.9357975 5.300
Watson	243 52 15.77	63 56 30.78	4.055776 7.067
Hagan	297 08 40.68	117 13 50.24	4.1450398 8.677
Watford	301 40 12.44	124 42 40.12	3.8748880 4.658
Hall	320 52 30.80	140 56 08.69	4.1422234 8.621

## LEVISON, STANISLAUS COUNTY, CAL.

A 6 by 5 inch redwood post, with cross targets, on north-south fence line, 300 feet south of county road which runs east from Claus. On land owned by Mr. Levison, which is rented to Mr. G. W. Litt.

Station mark: An iron bench-mark post set at foot of wood post.

[Latitude 37° 40' 54.208". Longitude 120° 49' 45.165".]

To station	Azimuth.	Back azimuth.	Distance.
Hughson	18 40 02.18	198 38 43.46	Log. meters Miles.
Patterson	54 18 13.69	234 15 33.63	3.9948177 6.140
Modesto	73 13 54.16	253 07 59.91	4.1716075 9.225
Riverbank	121 14 44.39	301 10 47.17	4.0466056 6.903
Crone	145 23 12.05	325 21 19.88	3.8978509 4.911
Windmill	221 29 42.22	41 32 04.99	3.9357975 5.300
Cahill	231 47 45.15	51 52 47.23	4.1868793 9.555
Watson	243 52 15.77	63 56 30.78	4.055776 7.067
Hagan	297 08 40.68	117 13 50.24	4.1450398 8.677
Watford	301 40 12.44	124 42 40.12	3.8748880 4.658
Hall	320 52 30.80	140 56 08.69	4.1422234 8.621

## CALIFORNIA.

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## LICK, SANTA CLARA COUNTY, CAL.

Station mark is center of the large observatory on Mount Hamilton. Not the observatory located by the United States Coast and Geodetic Survey.

[Latitude  $37^{\circ} 20' 29.242''$ . Longitude  $121^{\circ} 38' 32.191''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Murphy.....	6 15 54.10	180 14 48.25	4.3912199	15.296
Loma Prieta.....	35 01 18.61	214 54 00.48	4.4935714	19.361
Mocho.....	206 59 03.95	27 02 14.35	4.2297124	10.545
Gerber.....	275 39 09.52	95 47 41.42	4.3198304	12.977
Madrone.....	320 54 29.82	140 59 10.36	4.2579461	11.254
Santa Ana.....	322 55 43.55	143 10 33.43	4.7821472	37.627
Batcher.....	325 53 09.81	146 00 42.20	4.5176506	20.465
Corral.....	335 36 50.95	155 41 29.67	4.4401055	17.118
Gavilan.....	350 26 53.84	170 31 19.45	4.8188815	40.946
Thompson.....	356 36 10.30	176 37 08.40	4.6038834	24.959

## LILLIAN, SANTA CRUZ COUNTY, CAL. (Not occupied.)

Station mark: A flag on hill about 7 miles northwest of Watsonville, Cal.

[Latitude  $36^{\circ} 58' 34.782''$ . Longitude  $121^{\circ} 51' 18.315''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Pajaro.....	319 54 40.39	139 58 20.21	4.1483064	8.743
Bartlett.....	347 13 55.96	157 14 50.16	4.0046368	6.280

## LOMA PRIETA, SANTA CLARA AND SANTA CRUZ COUNTIES, CAL.

This station of the Coast and Geodetic Survey was formerly known as Mount Bache, and is on the highest peak of the range of mountains forming the boundary line between the counties of Santa Clara and Santa Cruz. It may be reached from Wrights on the Southern Pacific by a wagon road for about 4 miles to D. H. Montgomery's ranch, and then by a fair trail for about 6 or 7 miles to the top of the mountain. The underground mark was a 2 by 3 inch brown stone with a copper bolt in the center, 3 feet 2 inches below the surface. A rock with drill hole filled with lead, having cross lines on the top, was placed 24 $\frac{1}{2}$  inches below the surface and three-eighths inch west of the copper bolt in the brown stone. A concrete foundation 3 $\frac{1}{4}$  feet square and 9 inches deep was laid around this stone, and upon it was built a hexagonal pier 30 inches in diameter at the base and 26 inches at the top. An 8 by  $\frac{1}{2}$  inch copper bolt in top of pier marked the center.

[Latitude  $37^{\circ} 06' 40.912''$ . Longitude  $121^{\circ} 50' 36.423''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mocho.....	212 04 03.95	32 14 32.67	4.6814337	29.839
Lick.....	214 54 00.48	35 01 18.61	4.4935714	19.361
Gerber.....	238 37 53.85	58 53 42.45	4.6553767	28.101
Madrone.....	248 31 05.58	68 43 02.86	4.4977960	19.550
Murphy.....	265 56 07.85	86 02 19.19	4.1827286	9.464
Corral.....	269 02 45.00	89 14 39.97	4.4662553	18.180
Batcher.....	272 38 09.52	92 52 57.61	4.5610335	22.614
Pacheco.....	282 52 32.40	103 12 39.46	4.7058346	32.299
Santa Ana.....	292 37 25.88	112 59 29.33	4.7706278	36.642
Gilroy.....	293 29 39.81	113 39 26.77	4.4191614	16.312
Thompson.....	305 37 10.10	125 45 24.37	4.3972921	15.511
Madonna.....	311 11 35.22	131 16 39.15	4.2192995	10.296
Lux.....	310 59 06.23	131 10 08.26	4.5610335	22.614
Gavilan.....	323 44 45.39	143 56 25.47	4.6890356	30.366
Pajaro.....	342 41 38.92	162 44 53.88	4.4309190	16.760
Bartlett.....	357 14 34.56	177 15 03.64	4.3957141	15.455

## LUX, SANTA CLARA COUNTY, CAL.

On western knob of bald hill,  $1\frac{1}{2}$  miles southwest of Sargent, a station on the Southern Pacific (Coast Line) Railroad. Station may be reached on horseback from any direction.

Station mark and signal: An oak tree 11 feet high, placed in the ground a depth of 3 feet.

Reference mark: A bronze triangulation tablet set in rock, 4 feet northwest of signal and station mark.

True azimuth, station to reference mark,  $126^{\circ} 27'$ .

[Latitude  $36^{\circ} 53' 51.907''$ . Longitude  $121^{\circ} 32' 16.454''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Bartlett.....	87 35 08.75	267 24 37.45	4.4160516	16.196
Watsonville.....	95 31 10.30	275 23 08.83	4.2997344	12.390
Loma Prieta.....	131 10 08.26	310 59 06.23	4.5610335	22.614
Thompson.....	142 55 01.60	322 52 13.63	4.0593523	7.124
Gilroy.....	166 43 22.42	346 42 06.63	4.1325515	8.431
Corral.....	184 57 59.01	4 58 50.16	4.3844156	15.058
Batcher.....	202 42 52.69	22 46 36.68	4.3766676	14.792
Pacheco.....	241 12 15.89	61 21 18.72	4.4061085	15.829
Santa Ana.....	268 07 33.07	88 18 32.78	4.4340901	16.911
Gavilan.....	354 08 46.82	174 09 25.86	4.1995939	9.539

## MADONNA, SANTA CLARA COUNTY, CAL. (Not occupied.)

Station mark: A very prominent tree on Madonna Hill, about 7 miles west of Gilroy.

[Latitude  $37^{\circ} 00' 46.622''$ . Longitude  $121^{\circ} 42' 12.086''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Loma Prieta.....	131 16 39.15	311 11 35.22	4.2192995	10.296
Murphy.....	192 53 04.54	12 54 11.49	4.0898192	7.641
Corral.....	235 54 15.52	56 01 05.73	4.3073100	12.608
Thompson.....	294 56 54.69	115 00 04.93	3.9356804	5.358

## MADRONE, SANTA CLARA COUNTY, CAL.

Station is on highest point of a ridge known as the Blue Ridge, lying between the main fork and the east fork of Coyote Creek. It is about 5 miles northeast of Madrone Springs, a small summer resort on Soda Springs Creek, a tributary of Coyote Creek from the west. It can be reached on horseback from almost any direction, but probably best from Madrone Springs.

Signal and station mark: A pine tree trimmed up with the top left on it.

Reference mark: Bronze triangulation tablet set in rock on summit of hill, the signal is 223.9 feet north-northwest of tablet. Highest point has scattering trees on it.

## CALIFORNIA.

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[Latitude  $37^{\circ} 12' 53.015''$ ; longitude  $121^{\circ} 30' 49.015''$ . Tablet on summit: Latitude  $37^{\circ} 12' 51.088$ ; longitude  $121^{\circ} 30' 47.654''$ .]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	'	"	Log. meters.	Miles.	
Corral.....	00	18	56.78	180 18 55.27	4.0427551	6.857
Thompson.....	19	13	18.82	199 09 37.48	4.4403645	17.128
Loma Prieta.....	68	43	02.86	248 31 05.58	4.4977960	19.550
Lick.....	140	59	10.30	320 54 29.82	4.2579461	11.254
Mocho.....	172	48	49.52	352 47 18.67	4.4685892	18.278
Red.....	192	24	21.71	12 26 19.71	4.3479766	13.846
Gerber.....	218	02	31.51	38 06 22.19	4.1824226	9.457
Orestimba.....	244	34	00.80	64 44 29.85	4.4520375	17.595
Castle.....	270	06	35.17	90 14 41.74	4.2974719	12.326
Howard.....	281	54	53.74	102 05 34.46	4.4269767	16.609
Pacheco.....	318	39	02.78	138 47 14.84	4.4845820	18.964
Batcher.....	331	59	16.73	152 02 08.73	4.1753466	9.305

## MILL, SAN JOAQUIN COUNTY, CAL.

A wooden windmill with 14-foot wheel, on ranch owned by W. C. Miller, about 4 miles southwest of Ripon, on the Southern Pacific Railroad.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 43' 20.438''$ . Longitude  $121^{\circ} 11' 32.452''$ .]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	'	"	Log. meters.	Miles.	
Kern.....	7	13	44.02	187 12 24.50	4.4054421	15.805
Vernals.....	36	54	50.91	216 51 31.94	4.1235570	8.239
Moy.....	56	36	29.35	236 29 37.30	4.2967110	12.304
Bell.....	125	44	37.02	305 43 09.28	3.6359280	2.687
Ripon.....	252	40	35.90	72 43 07.12	3.8019704	3.938

## MOCHO, ALAMEDA OR SANTA CLARA COUNTY, CAL.

A station of the Coast and Geodetic Survey.

On the summit of the highest peak of the group of mountains lying to the eastward of Santa Clara Valley, on the eastern flank of the Mount Diablo Range and overlooking the San Joaquin Valley; about  $11\frac{1}{2}$  miles northeast from the Lick Observatory on Mount Hamilton and about 30 miles southeast of the town of Livermore. The station was marked in 1879 by a copper bolt sunk in the rock, over which, in 1887, was built a concrete pier 45 inches high by 24 inches square, enlarged to the top to 26 inches, to receive the theodolite.

Since the above description was written another concrete pier has been built about 5 feet east of the station and a small house built over the two piers. The crooked tree at this station was sighted from stations "Red" and "Gerber," but from all other stations a signal over center was sighted.

[Latitude  $37^{\circ} 28' 39.696''$ . Longitude  $121^{\circ} 33' 18.781''$ .]

To Station—	Azimuth.	Back azimuth.	Distance.			
	*	'	"	Log. meters.	Miles.	
Lick.....	27	02	14.35	206 59 03.95	4.2207124	10.545
Loma Prieta.....	32	14	32.67	212 04 03.95	4.6814337	29.839
Brown.....	158	16	46.61	338 14 25.24	4.1808513	9.554
Oso.....	258	12	43.76	78 19 21.82	4.2150722	10.196
Orestimba.....	300	10	23.93	120 22 27.75	4.5295001	21.031
Red.....	311	12	47.99	131 16 17.40	4.0513329	6.997
Gerber.....	322	45	51.99	142 51 14.33	4.3343459	13.418
Pacheco.....	335	22	57.78	155 32 41.97	4.7581030	35.600
Santa Ana.....	335	38	02.09	155 49 43.91	4.8430541	43.292
Batcher.....	345	47	49.34	165 52 12.58	4.6408546	27.177
Madrone.....	352	47	18.67	172 48 49.52	4.4685892	18.278

## MODESTO, STANISLAUS COUNTY, CAL.

High city water tank in Modesto.

Station mark: Center of water tank.

[Latitude 37° 38' 34.886". Longitude 120° 59' 24.970".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Joven.....	0 40 49.15	180 40 44.22	4.2232140	10.389
Westport.....	19 10 25.15	199 08 58.02	4.0282731	6.632
Orestimba.....	30 27 52.41	210 19 17.95	4.6133547	25.510
Courtney.....	33 36 39.86	213 34 59.53	3.8624533	4.527
Black Gulch.....	44 10 28.63	224 01 54.73	4.4734037	18.482
Kern.....	52 05 57.93	231 57 14.93	4.4265677	16.593
Oso.....	66 12 16.86	245 58 15.44	4.5086249	23.014
Young.....	67 19 03.96	247 15 25.78	3.9777505	5.903
Moy (2).....	86 36 12.94	266 21 57.06	4.5369794	21.396
Vernalis (1).....	86 02 30.84	265 51 47.33	4.4130241	16.083
Butler.....	87 19 09.20	267 14 28.77	4.0519460	7.003
Theobald.....	87 46 43.81	267 43 41.58	3.8846070	4.549
Patrick.....	98 40 01.64	278 33 29.34	4.2019739	9.893
Salida.....	131 44 53.28	311 41 25.11	4.0485074	6.948
Stack.....	182 30 44.10	2 30 53.39	3.9291913	5.279
Riverbank.....	205 03 22.06	25 05 19.41	4.0452347	12.818
Oakdale.....	215 00 24.57	35 05 20.49	4.3144711	9.025
Crane.....	221 56 03.58	42 00 05.95	4.1620075	7.555
Claus.....	232 36 55.50	52 39 33.91	3.9027590	4.967
Walters.....	249 04 27.35	69 14 36.69	4.4171911	16.238
Levison.....	293 07 59.91	73 13 54.16	4.1716075	9.225
Empire.....	272 20 35.48	92 23 49.57	3.8919538	4.845
Hagen.....	274 23 00.81	94 34 04.27	4.4268888	16.605
Hughson.....	294 34 51.25	114 39 26.48	4.0850366	7.555
Turlock.....	320 48 12.87	140 53 43.16	4.3233657	13.083
Ceres.....	330 37 09.32	150 38 31.37	3.8275030	4.177

## MONTPELIER, STANISLAUS COUNTY, CAL. (Not occupied.)

A windmill located by the public school in Montpelier, a station on the Santa Fe Railway. It can not be seen from Dallas.

Station mark: Center of windmill tower.

[Latitude 37° 32' 57.489". Longitude 120° 42' 24.568".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Turlock.....	63 16 59.24	243 12 07.68	4.1194054	8.180
Hughson.....	110 56 25.64	290 50 38.36	4.1749079	9.295
Hall.....	152 23 08.60	332 22 17.53	3.6467811	2.755
Hagen.....	191 02 18.25	11 02 58.60	3.9240379	5.265
Pillsbury.....	252 35 14.75	72 40 29.59	4.1231511	8.251
Bloodsee.....	292 49 43.77	112 53 39.21	4.0127644	0.399

## MOY, SAN JOAQUIN COUNTY, CAL.

On fence line on top of small hill 7.5 miles south of Banta. It is about 300 feet west of road, on land owned by Peter Moy.

Station mark: Iron bench-mark post.

## CALIFORNIA.

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[Latitude  $37^{\circ} 37' 26.404''$ . Longitude  $121^{\circ} 22' 46.659''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Black Butte.....	110 32 26.50	290 28 50.91	3.9657369	5.742
Western Pacific tank.....	160 23 23.00	340 22 02.00	3.9295800	5.284
Banta .....	181 59 08.00	1 59 45.00	4.1534900	8.848
Red barn.....	195 15 32.00	15 17 02.00	4.1391300	8.560
Fitzsimmons.....	201 49 56.79	21 51 46.62	4.0611109	7.153
Manteca.....	216 19 24.16	36 25 26.60	4.3886554	15.206
Hinkle.....	232 37 01.00	52 39 31.00	3.8809600	4.724
Tracy.....	163 37 38.51	345 36 16.95	4.1192620	8.177
Bell.....	234 01 00.34	44 06 24.85	4.2719258	11.622
Mill.....	236 29 37.30	56 36 29.35	4.2967110	12.304
Ripon.....	240 22 11.34	60 31 34.53	4.4141724	16.126
Selma.....	249 44 26.80	69 55 15.01	4.4425550	17.215
Patrick.....	256 21 43.77	76 29 27.64	4.2822830	11.902
Modesto.....	266 21 57.06	96 36 12.94	4.5369794	21.396
Vernalis.....	268 03 55.97	88 07 28.82	3.9322097	5.316
Windmill.....	280 58 00.57	101 03 09.38	4.1018339	7.856
Westport.....	284 21 46.00	104 34 33.88	4.5037500	19.820
Kern.....	316 57 38.81	137 03 10.37	4.3917429	12.164
Oso.....	357 36 55.94	177 37 09.27	4.1110144	8.024

## MURPHY, SANTA CLARA COUNTY, CAL.

On the highest point of a high hill about 1 mile west of Morgan Hill, a small town on the Southern Pacific Co.'s Coast Line. Animals can be ridden to summit.

Station mark and signal: A small tree left standing; other trees and brush were cut from the summit.

Reference mark: A bronze triangulation tablet set on large rock.

At this station, signal and mark are on same azimuth from position of instrument, the signal being 5.7 feet from instrument and mark 15 feet from instrument. True azimuth, station to reference mark,  $247^{\circ} 17'$ .

[Latitude  $37^{\circ} 07' 15.489''$ . Longitude  $121^{\circ} 40' 21.006''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Madonna.....	12 54 11.49	192 53 04.54	4.0881912	7.641
Loma Prieta.....	86 02 10.19	265 56 07.85	4.1827286	9.464
Lick.....	186 14 48.25	6 15 54.10	4.3912199	15.296
Corral.....	272 30 54.59	92 36 38.28	4.1484306	8.745
Pacheco.....	289 57 46.35	110 11 42.64	4.5622606	22.678
Gilroy.....	322 31 40.94	142 35 17.03	4.1633691	9.051
Thompson.....	342 01 11.94	162 03 15.49	4.2156193	10.209

## MOUNT OSO, STANISLAUS COUNTY, CAL.

On summit of Mount Oso, 17 miles south of Tracy and 10 miles southwest of Westley. Can be reached from Westley by following due west road, 1 miles north of town about 4 miles, where road turns due south past Mr. G. W. Hamilton's ranch house, to mouth of Ingram Creek Canyon. Road can be followed up canyon about 6 miles from Hamilton's. At forks of creek, at sheep camp, take the right-hand road up a grade. The road stops at an old lone chimney. Ridge south of creek can be followed on horseback about 2 miles to summit.

It can also be reached from the west side by following road up Hospital Creek canyon, about 19 miles from Vernalis or 2 miles beyond Sperry's ranch, then climb to top.

Station mark and signal: Pine tree about 12 feet high, placed in the ground and braced with four poles.

Reference mark: A bronze triangulation tablet set in rock 5.7 feet southeast of signal.

True azimuth, station to reference mark,  $311^{\circ} 44'$ .

62510°—Bull. 644—17—5

[Latitude  $37^{\circ} 30' 27.925''$ . Longitude  $121^{\circ} 22' 24.785''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Gerber.....	8 24 24.45	188 23 09.54	4.3172692	12.901
Red.....	35 17 24.37	215 14 16.09	4.1198399	8.188
Mocho.....	78 19 21.82	258 12 43.76	4.2150722	10.196
Brown.....	116 47 36.87	296 38 36.81	4.3864221	15.128
Tracy.....	171 34 04.87	351 32 30.07	4.4138071	16.112
Moy.....	177 37 09.27	357 36 55.94	4.1110144	8.024
Vernals.....	211 16 52.58	31 20 11.82	4.1884572	9.580
Windmill.....	228 31 44.00	48 36 39.08	4.1999876	9.448
Modesto.....	245 58 15.44	66 12 16.86	4.5686429	23.014
Ranch.....	247 42 25.53	67 51 19.06	4.36357573	14.425
Grayson.....	250 13 22.11	70 20 29.37	4.2622189	11.365
Westley.....	255 01 06.76	75 07 29.71	4.2034832	9.927
Westport.....	260 40 23.66	80 52 57.21	4.4881356	19.120
Turlock.....	271 26 03.08	91 45 32.87	4.6740870	29.338
Kern.....	276 15 54.47	96 21 12.28	4.1106201	8.016
Patterson.....	280 30 16.72	100 39 05.24	4.3365104	13.485
Black Gulch.....	295 39 40.03	115 45 06.50	4.165390	9.091
Orestimba.....	327 09 52.67	147 15 17.38	4.3849974	15.078

## NEWMAN, STANISLAUS COUNTY, CAL. (Not occupied.)

Station mark: Center of a large black steel water tank in Newman, a town on the Southern Pacific Railroad.

[Latitude  $37^{\circ} 18' 52.506''$ . Longitude  $121^{\circ} 01' 27.013''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Christian.....	24 43 50.78	204 41 18.77	4.1704023	9.199
Cleveland.....	62 07 36.52	242 03 43.93	4.0293702	6.648
Orestimba.....	93 24 02.38	273 16 43.84	4.2514212	11.086
Crow.....	113 30 01.38	293 25 33.12	4.0744560	7.376
Black Gulch.....	130 26 41.98	310 19 24.09	4.3672457	14.474

## NO. 1, STANISLAUS COUNTY, CAL.

A lumber tripod on pasture hill north of road which runs from Waterford to La Grange. Signal can not be seen from road. Turn north across canal at white house on south side of road about 8 miles east of Waterford.

Station mark: An iron bench-mark post under center of tripod.

[Latitude  $37^{\circ} 39' 34.627''$ . Longitude  $120^{\circ} 36' 25.540''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Hagen.....	61 20 54.88	241 17 56.02	3.9129691	5.085
Walters.....	128 31 34.80	308 27 40.82	4.0784010	7.443
Cashman.....	147 56 52.65	327 53 45.51	4.1494960	8.767
Wolfing.....	171 27 44.54	351 27 13.84	3.9180228	5.145
Russian.....	251 47 36.34	71 49 50.17	3.7520325	3.511
Holmes.....	304 17 16.02	124 21 19.39	4.0731554	7.354
Pillsbury.....	334 59 41.74	155 01 17.81	3.9606918	5.678
School.....	353 00 50.99	173 01 27.47	4.0815762	7.498

## OAKDALE, STANISLAUS COUNTY, CAL.

A lumber tripod on top of hill 2 miles north of Oakdale and three-quarters of a mile northeast of Burnetts station.

Station mark: A bench-mark post under center of tripod.

[Latitude 37° 47' 42.664". Longitude 120° 51' 21.278".]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	'	"	Log. meters.	Miles.	
Crane.....	19	20	09.91	109 19 16.46	3.8097394	4.010
Modesto.....	35	05	20.49	215 00 24.57	4.3144711	12.818
Riverbank.....	46	16	25.69	226 13 30.01	3.9950055	6.143
Cashman.....	282	02	20.13	102 08 21.47	4.1691066	9.172
Walters.....	301	06	18.92	121 11 33.11	4.1665594	9.118
Oakdale Church.....	350	23	47.52	170 24 01.48	3.5241722	2.077

## OAKDALE CHURCH, STANISLAUS COUNTY, CAL. (Not occupied.)

Methodist Episcopal Church in Oakdale, a town on the Southern Pacific Railroad.  
Station mark: Center of spire.

[Latitude 37° 45' 55.743". Longitude 120° 50' 58.490".]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	'	"	Log. meters.	Miles.	
Riverbank.....	65	20	22.93	245 17 10.36	3.9281348	5.266
Oakdale.....	170	24	01.48	350 23 47.52	3.5241722	2.077
Cashman.....	269	06	18.83	89 12 06.09	4.1423894	8.625

## ORESTIMBA, STANISLAUS COUNTY, CAL.

On highest point of mountain 11 miles due west of Newman, and north of Orestimba Creek; it can be reached from Orestimba School, 6 miles west of Newman, by following road up creek 3 miles to gate where road turns due north uphill. Follow road 2 miles to Stonesifer's cabin, thence by trail up creek half a mile, then follow up ridge on the south to station, about 2 miles.

Station mark and signal: An oak tree 11 feet high placed in the ground 3 feet.

Reference mark: A bronze triangulation tablet set in rock 3.9 feet south of signal.  
True azimuth, station to reference mark, 348° 58'.

[Latitude 37° 10' 26.221". Longitude 121° 13' 30.373".]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	'	"	Log. meters.	Miles.	
Castle.....	25	21	22.13	205 19 00.35	4.1296786	8.376
Batcher.....	36	19	15.29	216 11 39.40	4.4973537	19.530
Madrone.....	64	44	29.85	244 34 00.89	4.4520375	17.595
Gerber.....	89	33	35.28	269 26 56.51	4.2093470	10.062
Red.....	114	58	14.86	294 49 42.62	4.3597532	14.227
Mocho.....	120	22	27.75	300 10 25.93	4.5295001	21.031
Oso.....	147	15	17.38	327 09 52.67	4.3849974	15.078
Black Gulch.....	180	12	47.35	0 12 48.64	4.1477756	8.732
Van Ormer.....	199	12	49.78	19 15 38.21	4.3154824	12.848
Patterson.....	206	33	27.39	26 36 50.23	4.2637837	11.406
Modesto.....	210	19	17.95	30 27 52.41	4.6133547	25.510
Westport.....	214	13	47.10	34 20 54.20	4.4865506	19.051
Joven.....	227	41	44.76	47 50 13.43	4.4442363	17.282
Turlock.....	240	39	32.06	60 53 34.74	4.5920418	24.288
Crow.....	241	55	14.85	61 58 05.31	3.8942543	4.871
Newman.....	273	16	43.84	93 24 02.38	4.2514212	11.086
Gustine.....	291	13	58.38	111 22 06.63	4.3285122	13.239
Stacks.....	300	19	10.25	120 28 06.57	4.4031347	15.721
Cleveland.....	305	50	47.80	125 54 13.50	4.0136237	6.412
Christian.....	321	11	24.08	141 16 09.99	4.2691191	11.547
Howard.....	338	17	36.76	178 17 49.68	4.2476912	10.991

## PACHECO, SANTA CLARA COUNTY, CAL.

Sharp rock, the highest point of rocky summit of mountain in Santa Clara County, known as Pacheco Peak. The summit has been cleared of laurel trees, but one was left standing about 30 feet northeast of rock used as signal. Peak is about 3 miles southeast of Bell station, a well-known stopping place on Pacheco Pass road, and is most easily reached from this place on horseback.

Signal: Sharp rock, the highest point of summit.

Station mark: A bronze triangulation tablet set in top of rock used as signal.

[Latitude 37° 00' 29.018". Longitude 121° 17' 13.483".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Gavilan.....	36 36 59.77	216 28 36.92	4.5421347	21.651
Lux.....	61 21 18.72	241 12 15.89	4.4061065	15.829
Thompson.....	84 03 00.87	263 51 09.33	4.4684031	18.271
Loma Prieta.....	103 12 39.46	283 52 32.40	4.7058346	32.299
Murphy.....	110 11 42.64	289 57 46.35	4.5622606	22.678
Corral.....	120 33 39.86	300 25 26.87	4.3702019	14.573
Batcher.....	126 34 01.70	306 28 41.90	4.2126976	10.140
Madrone.....	138 47 14.84	318 39 02.78	4.4845820	18.964
Mochon.....	155 32 41.97	335 22 57.78	4.7518030	35.600
Gerber.....	162 57 56.42	342 53 33.88	4.5626024	22.696
Castle.....	179 19 12.14	359 19 05.49	4.3593694	14.214
Howard.....	199 08 24.71	19 10 52.12	4.2647058	11.430
Barellas.....	264 46 49.16	84 55 47.40	4.3461620	13.788
Santa Ana.....	336 57 30.96	156 59 28.64	4.0927644	7.693

## PAJARO, SANTA CRUZ COUNTY, CAL.

Station is on a small hill one-fourth mile north of Pajaro and Castorville road and about a mile a little west of south of Pajaro Railroad station. It can be reached in a buggy.

Signal and station mark: An eucalyptus tree about 12 feet above ground and 4 feet or more in the ground.

Reference mark: A United States Geological Survey bronze triangulation tablet set in granite rock which was set in ground at base of tree.

[Latitude 36° 52' 45.422". Longitude 121° 45' 12.438".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Bartlett.....	97 37 45.61	277 35 00.16	3.8380452	4.280
Lillian.....	139 58 20.21	319 54 40.39	4.1483064	8.743
Loma Prieta.....	162 44 53.88	342 41 38.92	4.4309190	16.760
Watsonville.....	170 47 22.36	350 47 06.85	3.6016018	2.483
Church.....	189 05 02.29	9 05 29.07	3.8443243	4.342
School.....	222 30 58.03	42 32 53.32	3.9470803	4.369
Gavilan.....	303 14 48.30	123 23 12.42	4.3970060	15.501

## PATRICK, STANISLAUS COUNTY, CAL.

An old wooden windmill, near a cedar tree on Mr. Fitzpatrick's land, 6 or 7 miles southwest of Salida. The tower of the windmill has been wrapped with white cloth.

Station mark: Center of windmill tower.

[Latitude 37° 39' 52.222". Longitude 121° 10' 07.150".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Kern.....	15 43 20.91	195 41 09.43	4.2910197	12.144
Vernalis.....	67 20 41.04	247 16 30.11	4.0380988	6.783
Moy.....	76 29 27.64	256 21 43.77	4.2822830	11.902
Jackson.....	230 31 44.96	50 33 06.38	3.6261328	2.627
Salida.....	235 35 20.50	55 38 24.90	3.9520277	5.564
Modesto.....	278 33 29.34	98 40 01.64	4.2019739	9.893
Butler.....	303 02 14.68	123 04 06.47	3.7285138	3.326

## CALIFORNIA.

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## PATTERSON, STANISLAUS COUNTY, CAL. (Not occupied.)

Station mark: Center of a large steel water tank in town of Patterson, on the Southern Pacific Railroad.

[Latitude  $37^{\circ} 28' 18.094''$ . Longitude  $121^{\circ} 07' 56.380''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Crow.....	5 50 46.97	185 50 14.80	4. 1070391	7. 950
Orestimba.....	26 36 50.23	206 33 27.39	4. 2637737	11. 408
Black Gulch.....	73 52 30.56	253 49 08.71	3. 9289646	5. 726
Oso.....	100 39 05.24	280 30 16.72	4. 3365104	13. 485
Kern.....	106 48 40.19	286 45 09.42	3. 9488164	5. 523

## PILLSBURY, STANISLAUS COUNTY, CAL.

A lumber tripod on hill on H. D. Pillsbury's land, about 12 miles east of Hickman, and 1 or 2 miles southwest of Alfred Davis's place.

Station mark: An iron bench-mark post set under center of tripod.

[Latitude  $37^{\circ} 35' 06.076''$ . Longitude  $120^{\circ} 33' 48.167''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Bloodsoe.....	21 49 55.12	201 48 35.94	3. 9334675	5. 331
School (Dickinson).....	32 56 18.86	212 55 19.36	3. 6439801	2. 737
Dallas.....	37 34 21.51	237 27 50.42	4. 2713761	11. 607
Montpelier.....	72 40 29.59	252 35 14.75	4. 1231511	8. 251
Hagen.....	111 32 46.36	291 28 11.62	4. 0744735	7. 376
No. 1.....	155 01 17.81	334 59 41.74	3. 9606918	5. 678
Wolfing.....	162 50 54.25	312 48 47.43	4. 2361223	10. 710
Ruskian.....	188 33 10.51	8 33 48.14	4. 0067243	6. 311
Holmes.....	254 47 31.13	74 49 58.29	3. 7876239	3. 810
Thomsen.....	318 32 42.59	138 34 54.25	3. 9036801	4. 978

## RANCH, STANISLAUS COUNTY, CAL. (Not occupied.)

Station mark: Center of cupola on residence near the junction of San Joaquin and Tuolumne rivers.

[Latitude  $37^{\circ} 35' 12.675''$ . Longitude  $121^{\circ} 07' 49.301''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Kern.....	40 25 38.20	220 22 02.84	4. 1267364	8. 319
Oso.....	67 51 19.06	247 42 25.53	4. 3657673	14. 425

## RED MOUNTAIN, STANISLAUS COUNTY, CAL.

A well-known mountain at the north end of San Antonio Valley. It is on the second summit from the south end of mountain and about 1 mile northeast of magnesite mine, which is reached by good road from Livermore (30 or 40 miles). San Antonio Valley can also be reached by road from Lick Observatory, but the road is not very good for a heavy load. There is no road to the San Joaquin Valley. No forage can be obtained at the mine but there is good water. Can be reached on horseback from mine. Camp can be located for a reasonable time at Mr. Gerber's ranch, 4 miles south, but he has no hay to sell in large quantities.

Signal: A pine tree with lower limbs cut off, about 25 feet high.

Station mark: A triangulation tablet set in rock at foot of tree.

Position of instrument was changed to see Orestimba, as signal is not quite on highest point of mountain.

[Latitude  $37^{\circ} 24' 38.914''$ . Longitude  $121^{\circ} 27' 34.351''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Madrone.....	12 26 19.11	192 24 21.71	4.3479766	13.546
Mocho.....	131 16 17.40	311 12 47.99	4.0515329	6.997
Oso.....	215 14 16.09	35 17 24.37	4.119399	8.188
Black Gulch.....	257 57 01.93	78 05 36.20	4.3276709	13.214
Orestimba.....	294 49 42.62	114 58 14.86	4.3597532	14.227
Garber.....	334 52 18.76	154 54 11.81	4.0334548	6.711

**RIPON, SAN JOAQUIN COUNTY, CAL. (Not occupied.)**

A light-colored tank house with green roof, in town of Ripon, a station on the Southern Pacific Railroad.

[Latitude  $37^{\circ} 44' 21.582''$ . Longitude  $121^{\circ} 07' 25.326''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Kern.....	18 52 38.82	198 48 48.45	4.452040	17.805
Moy.....	60 31 34.53	240 22 11.34	4.4141724	16.126
Mill.....	72 43 07.12	252 40 35.90	3.8019704	3.938
Bell.....	93 51 53.45	273 47 54.43	3.9814538	5.954
Salida.....	313 28 54.44	133 30 19.96	3.6737816	2.932

**RIVERBANK, STANISLAUS AND SAN JOAQUIN COUNTIES, CAL.**

A high white tank in Riverbank, a town on the Santa Fe Railway. The tank belongs to the Riverbank Water Co.

Station mark, center of tank.

[Latitude  $37^{\circ} 44' 00.933''$ . Longitude  $120^{\circ} 56' 13.029''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Modesto.....	25 05 19.41	205 03 22.06	4.0452347	6.896
Stack.....	70 08 21.29	250 06 33.14	3.6629653	2.860
Salida.....	78 43 29.55	238 38 03.74	4.1236703	8.265
Oakdale.....	226 13 30.01	46 18 28.69	3.9950055	6.143
Oakdale Church.....	245 17 10.36	65 20 22.93	3.9281348	5.206
Cashman.....	260 04 53.32	80 13 55.03	4.3405264	13.611
Crane.....	261 29 45.28	81 31 50.43	3.7043614	3.146
Walters.....	272 07 25.81	92 15 38.32	4.2949653	12.255
Levison.....	301 10 47.17	121 14 44.39	4.0456656	6.903
Claus.....	342 24 32.45	162 25 13.61	3.7368615	3.390
Empire.....	343 26 07.39	163 27 24.33	4.0343524	6.725

**RUSSIAN, STANISLAUS COUNTY, CAL.**

A 6 by 6 inch post with cross targets, on pasture hill owned by Mr. Rushing, about 6 miles from La Grange, which is nearest stopping place. Cross iron bridge about 2 miles from town and take road that turns to right up hill by bridge. Follow on north side of canal and take road that turns to right.

Signal and station mark: The 6-inch post.

Reference mark: A triangulation tablet set in rock.

True azimuth, station to reference mark,  $72^{\circ} 45'$ , distance, 2.7 feet.

[Latitude  $37^{\circ} 40' 31.829''$ . Longitude  $120^{\circ} 32' 46.531''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Pillsbury.....	8 33 48.14	188 33 10.51	4.0067203	6.311
No. 1.....	71 49 50.17	251 47 36.34	3.7520325	5.511
Wolfling.....	134 16 28.39	314 13 43.74	3.9641017	5.721
Holmes.....	332 25 20.57	152 27 10.24	3.9784706	5.913

## SALIDA, STANISLAUS COUNTY, CAL.

A flagpole on the Salida Grain Co.'s warehouse at Salida, a station on the Southern Pacific Railroad. There is a platform at the base of the pole which can be occupied. Station mark: Center of flagpole.

[Latitude 37° 42' 36.249". Longitude 121° 05' 05.558".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Kern.....	28 01 54.79	207 56 39.21	4.4318997	16.798
Patrick.....	55 38 24.90	235 35 20.50	3.9520277	5.564
Jackson.....	60 08 09.08	240 06 26.11	3.6773654	2.956
Vernalis.....	62 06 02.43	241 58 47.06	4.2950553	12.283
Moy.....	69 55 15.01	249 44 26.60	4.4425550	17.215
Ripon.....	133 30 19.96	313 28 54.44	3.6737816	2.932
Riverbank.....	258 38 03.74	78 43 29.55	4.1238703	8.265
Stack.....	263 07 26.60	83 11 04.24	3.9433400	5.454
Modesto.....	311 41 25.11	131 44 53.28	4.0485074	6.948
Theobald.....	352 22 42.56	172 23 08.35	3.8019282	4.845

## SANTA ANA, SAN BENITO COUNTY, CAL.

A station of the Coast and Geodetic Survey.

On western summit of a double-topped peak, very rocky and covered with oaks, locally known as Henrietta Peak, about 2 miles from the one known as Santa Ana. The station is easily reached from the town of Hollister by going out the main street to the north, crossing the railroad track, and taking the first road to the right or east. Follow this road for about 2 miles to a road running north and south, turn to the north and proceed until a second road leading to the right is reached; take this and proceed easterly, following the main wagon road and crossing the creek at the mouth of the Dos Picachos Canyon. By following the grade which winds up the ridge on the north side of the Dos Picachos Canyon for about 6 or 8 miles a point is reached near the summit of the grade, about halfway between Herrington's ranch house and the Stayton mine, where the wagon road should be left and the backbone of the ridge followed in a southwesterly direction until the station is reached, about half a mile south of and 1,000 feet above Herrington's house.

Station was marked by an irregular-shaped rock with a copper bolt in the top, around which a concrete foundation 3 feet square and about 10 inches deep was laid, and upon this a concrete pier, hexagonal in shape, and 26 inches in diameter, was built. A copper bolt with cross cut upon it was set in top of pier to mark center of station, 5 feet 2½ inches above the subsurface mark. A concrete pier, occupied in 1885 for latitude observations, was 37 feet 6 inches from the triangulation station in azimuth 129° 07' 01".

Instrument was placed over center of mark.

[Latitude 36° 54' 19.368". Longitude 121° 13' 57.739".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Gavilan.....	57 08 31.24	236 58 11.66	4.4846064	18.965
Lux.....	88 18 32.78	268 07 33.07	4.4348091	16.911
Thompson.....	103 47 17.17	283 33 28.84	4.5452n22	21.809
Loma Prieta.....	112 59 29.33	292 37 25.88	4.7706278	36.642
Batcher.....	139 39 40.49	319 32 23.27	4.4427328	17.222
Lick.....	143 10 33.43	322 55 43.55	4.7821472	37.627
Mocho.....	155 49 43.91	335 38 02.09	4.8430541	43.292
Pacheco.....	156 59 28.64	336 57 30.96	4.0927644	7.693
Howard.....	182 23 31.76	2 24 01.10	4.4593361	17.893
Barellas.....	232 10 14.11	52 17 14.01	4.3394995	13.578

## WATSONVILLE SCHOOL, SANTA CRUZ COUNTY, CAL. (Not occupied.)

A school about  $3\frac{1}{2}$  miles a little north of east of Watsonville, Cal.

Station mark: Center of cupola.

[Latitude  $36^{\circ} 55' 33.524''$ . Longitude  $121^{\circ} 42' 00.429''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	•   '   "	•   '   "	Log. meters.	Miles.
Pajaro.....	42 32 53.32	222 30 58.03	3.8470803	4.369
Bartlett.....	69 47 37.62	249 42 56.77	4.0913279	7.668
Gavilan.....	319 31 36.00	139 38 05.18	4.3945289	15.413

## STACKS, MERCED COUNTY, CAL. (Not occupied.)

The northern of two stacks at oil station about 4 miles south-southeast of Gustine, a town on the Southern Pacific Railroad.

Station mark: Center of northern stack.

[Latitude  $37^{\circ} 12' 30.985''$ . Longitude  $120^{\circ} 58' 44.658''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	•   '   "	•   '   "	Log. meters.	Miles.
Christian.....	80 38 10.83	260 34 00.83	4.0143355	6.422
Cleveland.....	116 41 07.26	296 35 36.71	4.1779102	9.380
Orestimba.....	120 28 06.57	300 19 10.25	4.4031347	15.721

## STACK, STANISLAUS COUNTY, CAL.

Station mark: Center of stack on mill about 3 miles west of Riverbank and 6 miles north of Modesto.

[Latitude  $37^{\circ} 43' 10.182''$ . Longitude  $120^{\circ} 59' 09.765''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	•   '   "	•   '   "	Log. meters.	Miles.
Modesto.....	2 30 53.39	182 30 44.10	3.9291913	5.279
Salida.....	83 11 04.24	263 07 26.60	3.9433400	5.454
Riverbank.....	250 06 33.14	70 08 21.29	3.8629653	2.860
Claus.....	301 17 25.26	121 19 54.51	3.8449099	4.348

## THEOBALD, STANISLAUS COUNTY, CAL.

A high red wooden tank on Theobald's ranch (Mrs. Cassius Crow, owner), located  $4\frac{1}{2}$  miles west of Modesto on north side of road.

Station mark: Center of tank.

[Latitude  $37^{\circ} 38' 25.578''$ . Longitude  $121^{\circ} 04' 23.379''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	•   '   "	•   '   "	Log. meters.	Miles.
Young.....	23 09 52.92	203 09 16.91	3.5655681	2.285
Kern.....	40 25 23.43	220 19 42.38	4.3261494	13.167
Butler.....	86 24 59.53	266 23 21.34	3.5965564	2.454
Salida.....	172 23 08.35	352 22 42.56	3.8919282	4.845
Modesto.....	267 43 41.58	87 46 43.81	3.8548070	4.549

## THOMSEN, MERCED COUNTY, CAL.

A lumber tripod on Henry Thomsen's place, 6 miles west of Snelling. Follow railroad from Snelling to Hopetown, then turn due west and take first main north and south road. Signal is on a little butte about 2 miles north of house and about one-fourth mile west of road.

Station mark: An iron bench-mark post set under center of tripod.

[Latitude 37° 31' 51.272". Longitude 120° 30' 12.169."]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bloodsee.....	77 02 28.17	256 58 57.48	3.9403839	5.417
School.....	106 42 58.36	286 39 47.29	3.9050916	4.994
Pillsbury.....	138 34 54.25	318 32 42.59	3.9036801	4.978
Holmes.....	184 38 55.26	4 39 10.64	3.8829431	4.746

## THOMPSON, SANTA CLARA COUNTY, CAL.

Station is on highest point of bald mountain about 2 miles southeast of Gilroy, a town on the Southern Pacific Railroad (Coast Line). The land is owned by the Miller & Lux Co., and can be easily reached on horseback from the California Wine Association's headquarters at the foot of mountain.

Station mark and signal: An oak tree set in ground.

Reference mark: A bronze triangulation tablet cemented in rock 4.4 feet northwest of signal. Instrument placed over tablet.

True azimuth, station to reference mark, 122° 15'.

[Latitude 36° 58' 48.509". Longitude 121° 36' 55.953".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Madonna.....	115 00 04.93	294 56 54.69	3.9336804	5.358
Loma Prieta.....	125 45 24.37	305 37 10.10	4.3972921	15.511
Murphy.....	162 03 15.49	342 01 11.94	4.2156193	10.209
Lick.....	178 37 08.40	356 36 10.30	4.6038834	24.959
Madrone.....	199 09 37.48	19 13 18.82	4.4403645	17.128
Corral.....	210 57 09.38	31 00 48.97	4.2429236	10.871
Gilroy.....	223 01 41.06	43 03 13.40	3.7449825	3.454
Batcher.....	231 26 52.85	51 33 25.41	4.3134420	12.788
Pacheco.....	263 51 09.33	84 03 00.87	4.4684031	18.271
Santa Ana.....	283 33 28.84	103 47 17.17	4.5452822	21.809
Lux.....	322 52 13.63	142 55 01.60	4.0593523	7.124
Gavilan.....	341 02 47.79	161 06 14.56	4.4202423	16.353

## TRACY, SAN JOAQUIN COUNTY, CAL.

High red tank in town of Tracy, Cal.

Station mark: Center of tank.

[Latitude 37° 44' 19.886". Longitude 121° 25' 00.077".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Brown.....	50 40 23.58	230 32 57.01	4.3649212	14.397
Kern.....	328 24 15.23	148 31 08.66	4.5018199	19.732
Moy.....	345 36 16.95	165 37 38.51	4.1192620	8.177
Oso.....	351 32 30.07	171 34 04.87	4.4138071	16.112

## TURLOCK, STANISLAUS COUNTY, CAL.

An iron city tank in Turlock. It is east and north of twin tank in same town.  
 Station mark: Center of tank.

[Latitude 37° 29' 45.251". Longitude 120° 50' 23.269".]

To station—	Azimuth.	Back azimuth.	Distance.
Orestimba.....	•   '   "	•   '   "	<i>Log. meters.</i> <i>Miles.</i>
Black Gulch.....	60 53 34.74	240 39 32.06	4.5920418 24.288
Joven.....	81 42 29.84	261 28 27.24	4.5365767 21.376
Kern.....	88 23 38.38	268 18 03.75	4.1306910 8.395
Oso.....	89 56 53.05	269 42 41.20	4.5362790 21.361
Westport.....	91 45 32.87	271 26 03.06	4.6740870 29.338
Keyes.....	110 26 45.66	290 19 48.76	4.2536186 11.142
Ceres.....	134 59 54.45	314 57 21.56	3.9401931 5.414
Modesto.....	136 21 18.90	316 17 10.62	4.1606864 8.996
Hughson.....	140 53 43.16	320 48 12.87	4.3233657 13.063
Waterford.....	163 48 32.91	348 47 37.56	4.0599436 7.133
Hickman.....	203 27 38.03	23 30 34.60	4.2512474 11.081
Hagen.....	209 45 31.46	29 48 51.82	4.2105739 10.091
Hall.....	223 06 56.18	43 14 28.32	4.2908557 12.140
Danair.....	224 29 55.41	44 33 56.05	4.1406707 8.591
Montpelier.....	228 43 00.23	48 44 43.35	3.7430046 3.438
Dallas.....	243 12 07.68	63 16 59.24	4.1194054 8.180
	270 54 01.77	90 57 36.79	3.9384440 5.393

## VAN ORMER, STANISLAUS COUNTY, CAL. (Not occupied.)

Station mark: Center of the most western stack at oil pumping station at Van Ormer, on the Southern Pacific Railroad.

[Latitude 37° 29' 50.472". Longitude 121° 08' 53.350".]

To station—	Azimuth.	Back azimuth.	Distance.
Orestimba.....	•   '   "	•   '   "	<i>Log. meters.</i> <i>Miles.</i>
Black Gulch.....	19 15 38.21	199 12 49.78	4.3154824 12.848
Kern.....	51 01 35.47	230 58 48.22	3.9390751 5.400
	85 40 33.25	265 37 37.09	3.8530434 4.430

## VERNALIS, SAN JOAQUIN COUNTY, CAL.

Station mark: Center of smokestack at Vernalis pumping station on Southern Pacific Railroad, 12 miles southeast of Tracy, Cal.

[Latitude 37° 37' 35.628". Longitude 121° 16' 57.991".]

To station—	Azimuth.	Back azimuth.	Distance.
Oso.....	•   '   "	•   '   "	<i>Log. meters.</i> <i>Miles.</i>
Moy.....	31 20 11.82	211 16 52.58	4.1884572 9.500
Bell.....	88 07 28.82	268 03 55.97	3.9322097 5.316
Mill.....	198 43 35.73	18 45 27.11	4.1427815 8.632
Salida.....	216 51 31.94	36 54 50.91	4.1235570 8.259
Patrick.....	241 58 47.06	62 06 02.43	4.2958533 12.283
Butler.....	247 16 30.11	67 20 41.04	4.0380988 6.783
Modesto.....	264 52 42.58	84 58 45.18	4.1648865 9.083
Kern.....	265 51 47.83	86 02 30.84	4.4130241 16.083
Black Gulch.....	341 49 00.54	161 50 59.57	4.1866632 9.550
	345 12 47.07	165 14 54.87	4.3053402 12.551

## VERNALIS WINDMILL, STANISLAUS COUNTY, CAL. (Not occupied.)

A lone windmill about 3½ miles southeast of Vernalis, a station on the Southern Pacific Railroad.

Station mark: Center of windmill tower.

## CALIFORNIA.

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[Latitude  $37^{\circ} 38' 08.090''$ . Longitude  $121^{\circ} 14' 20.674''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Oso.....	48 36 39.08	228 31 44.00	4.1990876	9.848
Moy.....	101 03 09.38	280 58 00.57	4.1018339	7.866
Kern.....	355 31 29.44	175 31 52.56	4.0770460	7.420

## WALTERS, STANISLAUS COUNTY, CAL.

A lumber tripod on butte about a mile south of county road from Oakdale to Coopers-town, about 9 miles southeast of Oakdale on Mr. G. C. Walter's place.

Station mark: An iron bench-mark post, under center of tripod.

[Latitude  $37^{\circ} 43' 36.462''$ . Longitude  $120^{\circ} 42' 48.206''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Waterford.....	23 38 14.41	203 36 33.27	4.0050559	6.286
Levison.....	63 56 30.78	243 52 15.77	4.0558776	7.067
Modesto.....	69 14 36.69	249 04 27.35	4.4171911	16.234
Riverbank.....	92 15 38.32	272 07 25.81	4.2949652	12.255
Crane.....	95 53 00.04	275 46 52.64	4.1695734	9.182
Windmill.....	107 58 19.08	287 56 26.76	3.0743535	2.936
Oakdale.....	121 11 33.11	301 06 18.92	4.1665594	9.118
Cashman.....	202 39 35.26	22 40 22.24	3.6880395	3.030
Wolfing.....	264 49 56.10	84 53 19.55	3.9124446	5.079
No. 1.....	308 27 40.82	128 31 34.80	4.0784010	7.443
Hagen.....	349 03 06.11	169 03 59.99	4.0642228	7.204

## WATERFORD, STANISLAUS COUNTY, CAL. (Not occupied.)

A church spire, with red roof, in town of Waterford, a station on the Santa Fe Railway.

Station mark: Center of spire.

[Latitude  $37^{\circ} 38' 35.805''$ . Longitude  $120^{\circ} 45' 33.664''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Turlock.....	23 30 54.60	203 27 38.03	4.2512474	11.081
Hughson.....	61 23 30.26	241 19 38.04	4.0265409	6.605
Levison.....	124 42 46.12	304 40 12.44	3.8748880	4.658
Walters.....	203 36 33.27	23 38 14.41	4.0050559	6.286
Hagen.....	288 38 22.45	108 40 58.32	3.8199323	4.105
Hall.....	338 19 11.54	158 20 15.83	3.8448338	4.347
Dallas.....	354 35 12.58	174 35 51.39	4.2193571	10.297

## WATSONVILLE, SANTA CRUZ COUNTY, CAL. (Not occupied.)

Station mark: Center of spire on a church in Watsonville.

[Latitude  $36^{\circ} 54' 53.375''$ . Longitude  $121^{\circ} 45' 38.276''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Bartlett.....	63 54 09.97	243 51 39.96	3.8381432	4.280
Lux.....	95 31 10.30	275 23 08.83	4.2997344	12.390
Gavilan.....	309 19 46.67	129 28 26.40	4.4440520	17.274
Pajaro.....	350 47 06.35	170 47 22.36	3.6016018	2.483

**WESTLEY, STANISLAUS COUNTY, CAL. (Not occupied.)**

Station mark center of water tank at school on west side of town of Westley on the Southern Pacific Railroad.

[Latitude 37° 32' 41.426". Longitude 121° 11' 56.091".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	'	"	
Black Gulch.....	12	13	00.52	192 12 04.43
Kern.....	25	20	16.06	205 19 11.11
Oso.....	75	07	29.71	255 01 06.76

**WESTPORT, STANISLAUS COUNTY, CAL.**

Station mark center of steeple on Westport Methodist Episcopal Church.

[Latitude 37° 33' 07.882". Longitude 121° 01' 47.773".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	'	"	
Orestimba.....	34	40	54.20	214 13 47.10
Black Gulch.....	56	48	56.84	236 41 50.42
Kern.....	70	10	42.66	250 03 27.19
Oso.....	80	52	57.21	260 40 23.66
Moy.....	104	35	33.88	284 21 46.00
Courtney.....	172	29	10.94	353 28 57.79
Modesto.....	199	08	58.02	19 10 25.15
Ceres.....	238	08	43.34	58 11 32.38
Turlock.....	290	19	48.76	110 26 45.69
Joven.....	333	29	35.53	153 30 57.60

**WINDMILL, STANISLAUS COUNTY, CAL. (Not occupied.)**

A steel windmill near old barn and deserted shack on south side of Oakdale and Cooperstown road, 7 miles southeast of Oakdale.

Station mark center of windmill tower.

[Latitude 37° 44' 23.705". Longitude 120° 45' 51.749".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	'	"	
Levison.....	41	32	04.99	221 29 42.22
Crane.....	90	17	17.82	270 13 02.71
Cushman.....	244	27	10.84	64 29 50.20
Walters.....	287	56	26.70	107 58 19.08

**YOUNG, STANISLAUS COUNTY, CAL.**

A high wooden windmill on Mr. William Young's place, about 6 miles southwest of Modesto. The windmill is north of the white tank house and dwelling on the north side of the road.

Station mark: Center of windmill tower.

[Latitude 37° 36' 35.902". Longitude 121° 05' 22.362".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	'	"	
Kern.....	43	56	41.34	223 51 36.36
Butler.....	141	27	59.09	321 26 56.94
Theobald.....	203	09	16.91	23 09 52.92
Modesto.....	247	15	25.78	67 19 03.96

**Arena, Atwater, Cressy, Gustine, Merced, Mitchell School, Stevenson, Turlock, and Winton 7½' quadrangles, and Edendale 15' quadrangle.**

**MERCED AND STANISLAUS COUNTIES.**

During the season of 1914 C. L. Nelson extended triangulation over the above-named quadrangles. The work was based on stations Bloodsoe, Dallas, Joven, Thomsen, and Turlock, previously located in this area, on North American datum. Twenty-seven new stations were occupied and 17 points were located by intersection.

**AMSTERDAM, MERCED COUNTY, CAL.**

A lumber tripod on hill about 1 mile southwest of Amsterdam.

Station mark: Iron post under center of tripod.

[Latitude 37° 25' 38.816". Longitude 120° 33' 07.606".]

To station—	Azimuth.	Back azimuth.	Distance.	
R. R. Red.....	*   '	"   "		
Winton.....	10 56	38.38	190 56 01.69	3. 89338515
Cressy.....	49 51	05.64	229 48 54.14	3. 8430305
Dallas.....	85 34	29.97	265 29 17.70	4. 1029013
Dry Creek.....	114 01	34.55	293 54 43.51	4. 2637301
Bloodsoe.....	138 38	56.82	319 37 02.88	3. 8519179
Thomsen.....	156 16	12.62	336 14 28.91	4. 0171954
Wassom.....	200 33	40.76	20 35 27.51	4. 0886622
Super.....	250 44	21.65	70 47 00.81	3. 8336014
Blacksmith.....	269 07	10.50	89 11 44.09	4. 0441140
Lighthouse.....	278 29	30.80	98 35 36.48	4. 1750801
Nairn.....	291 10	12.23	111 11 05.65	3. 3651171
Merced.....	335 21	47.35	155 23 01.72	3. 8590502
	335 30	18.05	155 32 48.29	4. 1674108
				9. 136

**BLACKSMITH, MERCED COUNTY, CAL.**

A lumber signal on top of pasture hill about 2 miles northeast of Merced reservoir.  
Station mark: An iron post under a cairn.

[Latitude 37° 24' 26.708". Longitude 120° 23' 05.779".]

To station—	Azimuth.	Back azimuth.	Distance.	
Merced.....	*	"		
Lakeside School.....	38 01	52.87	217 58 17.90	4. 1511041
Nairn.....	38 26	17.53	218 24 34.38	3. 8277024
Lighthouse.....	69 48	02.42	249 43 11.34	4. 0692809
Amsterdam.....	96 18	00.51	276 12 48.26	4. 1042753
Wassom.....	98 35	36.48	278 29 30.80	4. 1750801
Super.....	118 09	29.67	298 06 03.03	3. 9767853
Hurricane.....	122 37	10.43	302 35 38.27	3. 8461410
South Point.....	321 23	46.90	141 25 40.76	3. 8690886
Monument.....	337 23	40.96	157 25 55.17	4. 1515650
	357 06	20.74	177 06 36.17	4. 0937836
				7. 711

## BLOODSOE, MERCED COUNTY, CAL.

Lumber tripod on pasture hill of Mr. G. W. Bloodsoe's ranch. Nearest stopping place is Hickman, 6 miles southwest of Montpelier on the Santa Fe Railroad.

Station mark: An iron post set under center of tripod.

[Latitude  $37^{\circ} 30' 47.722''$ . Longitude  $120^{\circ} 35' 58.085''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Winton.....	4 36 53.25	184 36 25.28	4.1480588	8.738
Dry Creek.....	5 46 28.07	185 46 17.78	3.6155633	2.564
Roadmill.....	63 13 16.00	243 11 19.16	3.7227303	3.282
Dallas.....	80 42 32.53	260 37 20.87	4.1032710	7.918
Thomson.....	256 58 57.48	77 02 28.16	3.9403839	5.417
Tank.....	276 47 18.26	96 52 57.07	4.1387903	8.553
Super.....	301 29 16.60	121 35 34.17	4.2527132	11.119
Wassom.....	304 22 46.12	124 27 09.18	4.1097493	8.000
Lighthouse.....	328 28 32.32	148 31 09.49	4.0846315	7.551
Amsterdam.....	338 14 28.91	156 16 12.82	4.0171954	6.465

## BRIDGE, MERCED COUNTY, CAL.

A lumber tripod about 150 yards northeast of State highway and Southern Pacific Railroad, about 300 yards north of Merced River.

Station mark: An iron post under center of tripod.

[Latitude  $37^{\circ} 24' 13.379''$ . Longitude  $120^{\circ} 44' 36.961''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Leedom.....	133 16 25.43	313 14 35.83	3.7845550	3.784
Turlock.....	140 16 10.55	320 12 30.99	4.1241505	8.270
Dallas.....	180 58 02.59	0 58 06.81	4.0039668	6.271
Winton.....	279 02 38.12	99 07 25.31	4.0711270	7.319
Livingston.....	315 57 59.11	135 58 47.95	3.4542817	1.769
Swansen.....	338 56 32.61	158 57 55.30	3.9701677	5.801
Curtner.....	354 35 43.61	174 35 56.70	3.7508378	3.501

## CURTNER, MERCED COUNTY, CAL.

A lumber tripod on top of low sand hill on Curtner ranch, about 3 miles southwest of Livingston and about one-half mile south of east-west oiled road and about one-half mile west of north-south oiled road.

Station mark: Iron bench-mark post set under center of tripod.

[Latitude  $37^{\circ} 21' 11.429''$ . Longitude  $120^{\circ} 44' 15.399''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Stilt.....	18 26 58.02	198 25 39.09	4.0060185	6.300
Tarweed.....	31 38 45.33	211 37 43.76	3.6780040	2.960
Tree Mill.....	92 42 59.33	272 40 01.23	3.8592457	4.494
Bridge.....	174 35 56.70	354 35 43.61	3.7508378	3.501
Livingston.....	202 07 01.80	22 07 37.52	3.5849892	2.390
Winton.....	251 18 19.26	71 22 53.19	4.0689655	7.283
W. C.....	279 14 11.53	99 17 47.81	3.9489693	5.525
Swansen.....	317 42 15.41	137 43 24.97	3.6228253	2.607

## CRESSEY, MERCED COUNTY, CAL.

On summit of hill 1 mile west of town of Cressey, on the Santa Fe Railway, about 100 feet south of road and about 200 yards southeast of Merced River.

Signal: A lumber tripod.

Station mark: An iron post.

[Latitude 37° 25' 06.788". Longitude 120° 41' 41.470".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Turlock.....	123 50 33.30	303 45 15.97	4.1884452	9.500
Dallas.....	153 52 51.22	333 51 08.71	3.9733707	5.844
Amsterdam.....	265 29 17.70	85 34 29.97	4.1029013	7.875
Winton.....	295 35 10.52	115 38 11.16	3.9090948	5.040

## DALLAS, STANISLAUS OR MERCED COUNTY, CAL.

A lumber tripod on Mrs. Hickman's land, located about  $5\frac{1}{4}$  miles due east of Turlock and 500 feet north of county road running from Turlock to Snelling.

Station mark: Triangulation tablet set in rock under center of tripod.

[Latitude 37° 29' 40.680". Longitude 120° 44' 30.025".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Bridge.....	0 58 06.81	180 58 02.59	4.0039658	6.271
Leedom.....	37 53 22.72	217 51 28.79	3.8748583	4.658
Turlock.....	90 57 36.79	270 54 01.77	3.9384440	5.393
Bloodsoe.....	260 37 20.87	80 42 32.53	4.1052710	7.918
Road Mill.....	272 15 35.01	92 18 49.78	3.8958438	4.889
Dry Creek.....	279 28 23.83	99 33 25.09	4.0910301	7.663
Amsterdam.....	293 54 43.51	114 01 38.55	4.2637301	11.405
Winton.....	316 10 27.13	136 15 10.40	4.2188775	10.286
Cressey.....	333 51 08.71	153 52 51.22	3.9733707	5.844

## DRY CREEK, MERCED COUNTY, CAL.

On summit of hill about 100 yards northeast of road and 200 yards northwest of Dry Creek.

Station mark: A bottle buried in the ground under center of tripod and under an iron post.

[Latitude 37° 28' 34.555". Longitude 120° 38' 14.981".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Winton.....	4 07 49.47	184 07 31.77	3.9972663	6.175
Dallas.....	99 33 25.09	279 28 23.83	4.0910301	7.663
Road Mill.....	111 52 07.52	291 50 21.02	3.6658718	2.879
Bloodsoe.....	185 46 17.78	5 46 28.07	3.6155633	2.564
Thomsen.....	235 43 56.50	55 47 37.38	4.0325899	6.698
Tank.....	260 01 02.81	80 06 51.76	4.1553506	8.886
Wasson.....	285 59 28.96	106 04 02.18	4.0601601	7.137
Lighthouse.....	312 43 41.72	132 46 29.10	3.9644879	5.726
Amsterdam.....	319 37 02.88	139 38 56.82	3.8519179	4.418

## EAST END, MERCED COUNTY, CAL. (Not occupied.)

[Latitude 37° 09' 04.701". Longitude 120° 41' 38.253".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lizard.....	180 06 27.61	0 06 28.24	4.1346065	8.471
Lost.....	208 44 40.75	28 46 18.86	3.9202851	5.172

## EYRAUD (1), MERCED COUNTY, CAL.

High cement silo on the Eyrraud ranch, about 7 miles southeast of Atwater.

[Latitude 37° 13' 39.437". Longitude 120° 33' 12.037".]

To station—	Azimuth.	Back azimuth.	Distance.	
Merced.....	* / " 215 11 50.41	* / " 35 14 22.90	Log. meters.	Miles.
Hurricane.....	233 59 53.82	54 07 54.76	4.0320386	6.680
Monument.....	244 02 35.39	64 06 57.85	4.3828852	15.005
South Point.....	251 19 24.08	71 27 45.04	4.2381532	10.732
			4.3327504	13.380

## EYRAUD (2), MERCED COUNTY, CAL.

High cement silo on the Eyrraud ranch, about 7 miles southeast of Atwater.

Station mark: Center of silo.

[Latitude 37° 13' 39.353". Longitude 120° 33' 12.146".]

To station—	Azimuth.	Back azimuth.	Distance.	
Red chimney.....	* / " 38 27 31.29	* / " 218 26 31.97	Log. meters.	Miles.
Poplar A.....	49 28 44.79	229 26 41.03	3.5898351	2.416
Poplar C.....	49 52 43.79	229 50 07.29	3.8221991	4.126
Lost.....	82 10 01.39	262 06 33.44	3.9216519	5.188
Horse.....	115 11 47.45	295 08 56.54	3.9322484	5.316
			3.8859770	4.779

## HORSE, MERCED COUNTY, CAL.

A lumber tripod 6 miles south of Atwater, 40 yards east of tributary to Black Rascal Creek, and 20 feet east of unfenced road to white ranch buildings that lie about 0.8 mile to the south.

Station mark: Iron bench-mark post.

[Latitude 37° 15' 25.469". Longitude 120° 37' 54.549".]

To station—	Azimuth.	Back azimuth.	Distance.	
Lost.....	* / " 18 48 38.61	* / " 198 48 01.48	Log. meters.	Miles.
Lizard.....	109 04 36.54	289 02 21.72	3.6713635	2.916
W. C.....	176 17 24.54	356 17 09.80	3.7637639	3.607
Eyrraud (2).....	295 08 56.54	115 11 47.45	3.9662765	5.749
Poplar A.....	345 49 11.54	165 49 58.57	3.8859770	4.779
Poplar C.....	356 09 10.31	176 09 24.57	3.8935345	4.863
			3.9381907	5.389

## HURRICANE, MERCED COUNTY, CAL.

Low signal with cloth frames and wound with barbed wire on prominent round hill about 1½ miles northeast of deserted cattle-ranch building.

Station mark: Iron bench-mark post.

[Latitude 37° 21' 19.143". Longitude 120° 19' 58.235".]

To station—	Azimuth.	Back azimuth.	Distance.	
Monument.....	* / " 31 07 40.84	* / " 211 06 02.55	Log. metres.	Miles.
Eyrraud (1).....	54 07 54.76	233 59 53.82	3.8878027	4.799
Merced.....	68 05 31.15	248 00 02.58	4.3828852	15.005
Lakeside School.....	93 22 18.27	273 18 41.38	4.1578133	8.936
Lighthouse.....	112 36 59.49	292 29 53.55	3.9450425	5.475
Blacksmith.....	141 25 40.76	321 23 46.90	4.2715066	11.611
South Point.....	353 31 22.38	173 31 42.80	3.8690868	4.597
			3.8665005	4.569

## JOVEN, STANISLAUS COUNTY, CAL.

A wooden windmill just east of flat-roofed tank house, which may be occupied, 9 miles west of Turlock on Mr. Young's place.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 29' 32.613''$ . Longitude  $120^{\circ} 50' 33.051''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Taylor.....	29 36 00.35	209 34 52.01	3.7474348	3.474
North Mill.....	86 14 20.40	266 12 59.94	3.5124963	2.022
Turlock.....	268 18 03.75	88 23 38.38	4.1306910	8.395
West End.....	299 36 46.86	119 39 00.99	3.7945667	3.872
Flagstaff.....	304 08 54.50	124 10 51.52	3.7559769	3.543
New Tower.....	332 58 31.51	153 00 44.70	4.0740378	7.369
Lone Mill.....	343 31 47.70	163 32 35.67	3.8349871	4.250

## LAKESIDE SCHOOL, MERCED COUNTY, CAL. (Not occupied.)

Station mark: Cupola of Lakeside School, southwest of Merced reservoir.

[Latitude  $37^{\circ} 21' 35.803''$ . Longitude  $120^{\circ} 25' 55.669''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Merced.....	37 38 05.17	217 36 13.34	3.8713685	4.621
Nahrn.....	96 55 09.99	276 52 02.17	3.8848483	4.766
Lighthouse.....	128 12 24.45	308 08 55.53	4.0320428	6.690
Super.....	183 20 58.75	3 21 09.81	3.8846584	4.784
Blacksmith.....	218 24 34.38	38 26 17.53	3.8277024	4.179
Hurricane.....	273 18 41.38	93 22 18.27	3.9450425	5.475

## LEEDOM, MERCED COUNTY, CAL.

Station is mill on tank tower which forms part of dwelling house on Leedom's ranch, 1 mile west of Delhi, on the Southern Pacific Railroad. The owner of the house lives about 200 yards east of tank house. Station is about 100 feet south of road.

Observation platform was built on top of tank roof and occupied.

Station mark: Center of windmill.

[Latitude  $37^{\circ} 26' 28.734''$ . Longitude  $120^{\circ} 47' 37.310''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Turlock.....	146 04 03.58	336 02 22.64	3.8635084	4.538
Dallas.....	217 51 28.79	37 53 22.72	3.8748583	4.658
Bridge.....	313 14 35.83	133 16 25.43	3.7845550	3.784

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## LIGHTHOUSE, MERCED COUNTY, CAL.

Willow tree set in top of Lighthouse Hill, about three-quarters of a mile south of Amsterdam, about one-quarter mile west of road and railroad.

Station mark: Center of willow signal tree.

[Latitude 37° 25' 11.653". Longitude 120° 31' 39.699".]

To station—	Azimuth.	Back azimuth.	Distance.	
R. R. Red.....	28 02 53.19	208 01 23.12	Log. meters.	Miles.
Winton.....	63 59 40.64	243 56 25.75	3,890205	4.824
Amsterdam.....	111 11 05.65	291 10 12.23	3,9207112	5.177
Dry Creek.....	132 46 29.10	312 43 41.72	3,3651171	1.440
Bloodsoe.....	148 31 09.49	328 28 32.32	3,9644879	5.726
Thomsen.....	189 53 42.81	9 54 36.07	4,0846315	7.551
Wassom.....	234 11 06.33	54 12 52.04	3,7219397	3.276
Super.....	263 33 45.75	83 37 25.89	3,9524544	5.569
Blacksmith.....	276 12 48.26	96 18 00.51	4,1042753	7.900
Hurricane.....	292 29 53.55	112 36 59.49	4,2715056	11.611
Lakeside School.....	308 08 55.53	128 12 24.45	4,0320428	6.600
Merced.....	342 35 55.06	162 37 31.95	4,1187726	8.168
Nairn.....	351 33 53.35	171 34 14.33	3,7631514	3.602

## LIVINGSTON, MERCED COUNTY, CAL. (Not occupied.)

White tower on church just east of Hotel Idanha in Livingston. Tower can be occupied.

Station mark: Center of tower.

[Latitude 37° 23' 06.995". Longitude 120° 43' 16.540".]

To station—	Azimuth.	Back azimuth.	Distance.	
Curtner.....	22 07 37.52	202 07 01.80	Log. meters.	Miles.
Bridge.....	135 58 47.95	315 57 59.11	3,5849892	2.390
			3,4542817	1.760

## LIZARD, MERCED COUNTY, CAL.

A lumber tripod signal on high sand dune about 4 miles south of Swansen.

Station mark: Iron bench-mark post set under center of tripod.

[Latitude 37° 16' 26.951". Longitude 120° 41' 37.213".]

To station—	Azimuth.	Back azimuth.	Distance.	
East End.....	0 06 28.24	180 06 27.61	Log. meters.	Miles.
Tree J.....	52 57 00.47	232 53 47.31	4,1346065	8.471
Stilt.....	83 12 36.17	263 09 41.51	3,9938074	6.126
Tarweed.....	126 24 29.44	306 21 52.07	3,8547100	4.447
Swansen.....	169 17 47.36	349 17 21.00	3,9001301	4.937
W. C.....	213 37 55.09	33 39 55.30	3,7608871	3.583
Horse.....	289 02 21.72	109 04 36.54	3,9452260	5.477
Lost.....	327 53 03.24	147 54 40.86	3,667	3.8739444

## LONE MILL, STANISLAUS COUNTY, CAL.

Iron mill near watering trough in large field. A galvanized-iron tank, about 4 feet off the ground, lies about 10 feet to the northwest.

Station mark: Center of mill.

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[Latitude 37° 25' 59.873". Longitude 120° 58' 14.185".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Taylor.....	109 52 17.09	289 50 20.85	3.6987425	3.105
Joven.....	163 32 35.67	343 31 47.70	3.8349871	4.250
West End.....	225 00 19.88	45 01 45.96	3.6919416	3.057
Turlock.....	238 58 47.85	59 03 34.29	4.1302786	8.387
New Tower.....	319 16 49.76	139 18 14.94	3.7231345	3.285

## LOST, MERCED COUNTY, CAL.

A lumber tripod 7 miles southwest of Atwater, on low levee, about one-half mile south of junction of two sloughs.

Station mark: An iron post.

[Latitude 37° 13' 01.391". Longitude 120° 38' 55.911".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
East End.....	28 46 18.86	208 44 40.75	3.9202851	5.172
Lizard.....	147 54 40.86	327 53 03.24	3.8739444	4.648
Horse.....	198 48 01.48	18 48 38.61	3.6713635	2.915
Eyraud.....	262 06 33.44	82 10 01.39	3.9322484	5.316
Red Chimney.....	287 10 46.94	107 13 15.51	3.8022145	3.941
Poplar A.....	312 30 35.24	132 31 59.35	3.6678604	2.892
Poplar C.....	333 33 07.14	153 33 58.49	3.6725273	2.923

## MERCED, MERCED COUNTY, CAL.

Center of cupola of courthouse in Merced.

[Latitude 37° 18' 24.733". Longitude 120° 29' 00.061".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Eyraud.....	35 14 22.99	215 11 50.41	4.0320386	6.689
Winton.....	127 55 52.07	307 51 10.57	4.1605318	8.993
Amsterdam.....	155 32 48.29	335 30 18.05	4.1674108	9.136
Nairn.....	155 41 02.32	335 39 46.45	3.8735923	4.645
Lighthouse.....	162 37 31.95	342 35 55.06	4.1187726	8.168
Wassom.....	181 17 09.35	1 17 18.02	4.1940220	9.713
Super.....	200 11 26.66	20 13 29.63	4.1592636	8.968
Lakeside School.....	217 36 13.34	37 38 05.17	3.8713685	4.621
Blacksmith.....	217 58 17.90	38 01 52.87	4.1511041	8.800
Hurricane.....	248 00 02.58	68 05 31.15	4.1578133	8.936
Monument.....	277 29 37.49	97 33 27.60	3.9746578	5.861
South Point.....	277 42 18.29	97 48 08.02	4.1554871	8.889

## MILL, MERCED COUNTY, CAL. (Not occupied.)

Lone windmill on wooden mill tower, with bunch of low willows against tower on the south side.

[Latitude 37° 17' 49.162". Longitude 120° 49' 35.400".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Tarweed.....	247 55 57.15	67 58 09.56	3.7638013	3.607
Stilt.....	305 52 47.32	125 54 42.27	3.7612400	3.586

**MITCHELL SCHOOL (FLAGSTAFF), STANISLAUS COUNTY, CAL. (Not occupied.)**

Station mark: White staff, west of yellow building with red roof. Appears from a distance as though it might be a school.

[Latitude  $37^{\circ} 27' 48.758''$ . Longitude  $120^{\circ} 56' 21.064''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Taylor.....	* ' "	* ' "	<i>Log. meters.</i>	<i>Miles.</i>
Joven.....	77 31 00.35 124 10 51.32	257 27 55.27 304 08 54.50	3.8843254 3.7559769	4.761 3.543

**MONUMENT, MERCED COUNTY, CAL. (Not occupied.)**

Station mark: Tall white shaft about 5 miles east of Merced near Santa Fe Railway.

[Latitude  $37^{\circ} 17' 44.657''$ . Longitude  $120^{\circ} 22' 40.337''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Eyraud.....	* ' "	* ' "	<i>Log. meters.</i>	<i>Miles.</i>
Merced.....	64 08 57.85 97 33 27.60	244 02 35.39 277 29 37.49	4.2381552 3.9746578	10.752 5.861
Super.....	163 35 07.18	343 33 19.70	4.1877880	9.575
Blacksmith.....	177 06 36.17	357 06 36.17	4.0937836	7.711
Hurricane.....	211 06 02.55	31 07 40.84	3.8878027	4.799

**NAIRN, MERCED COUNTY, CAL.**

Lone mill, with watering trough, 1 mile southwest of Nairn, on Oakdale Merced branch of Southern Pacific Railroad.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 22' 05.668''$ . Longitude  $120^{\circ} 31' 05.145''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Winton.....	* ' "	* ' "	<i>Log. meters.</i>	<i>Miles.</i>
Amsterdam.....	104 01 03.11 155 23 01.72	283 57 37.36 335 22 47.34	3.9341807 3.8590502	5.340 4.492
Lighthouse.....	171 34 14.33	351 33 53.35	3.7631514	3.602
Super.....	230 05 44.41	50 09 03.44	4.0213085	6.526
Blacksmith.....	249 43 11.34	69 48 02.42	4.0992809	7.810
Lakeside School.....	276 52 02.17	96 55 09.99	3.8848483	4.766
Merced.....	335 39 46.45	155 41 02.32	3.8735923	4.645

**NEW TOWER, MERCED COUNTY, CAL. (Not occupied.)**

New yellow tank tower building that shows prominently from the north and west with an afternoon sun. Viewed from Lone Mill, only the upper part is visible and is partly concealed by the tops of two poplars. The triangulator has not been at the station and can give no better description. Tower has the usual pyramid-shaped roof with not much pitch.

[Latitude  $37^{\circ} 23' 49.893''$ . Longitude  $120^{\circ} 55' 53.988''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Taylor.....	* ' "	* ' "	<i>Log. meters.</i>	<i>Miles.</i>
Lone Mill.....	125 01 18.26 139 18 14.94	304 57 56.87 319 16 49.76	3.9976891 3.7231345	6.181 3.285
Joven.....	153 00 44.70	332 58 31.51	4.0740378	7.369

**NORTH MILL, STANISLAUS COUNTY, CAL. (Not occupied.)**

Lone mill on tank on open timber structure about 2 miles north of Taylor and 2 miles west of Joven.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 29' 25.668''$ . Longitude  $121^{\circ} 01' 45.247''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Joven.....	266 12 59.94	86 14 20.40	3.5124963	2.022
Taylor.....	354 00 14.13	174 00 26.21	3.6695605	2.903

**POPLAR A, MERCED COUNTY, CAL. (Not occupied.)**

[Latitude  $37^{\circ} 11' 19.348''$ . Longitude  $120^{\circ} 36' 36.805''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lost.....	132 31 59.35	312 30 35.24	3.6678604	2.892
Horse.....	165 49 58.57	345 49 11.54	3.8935345	4.863
Eyraud.....	229 26 41.03	49 28 44.79	3.8221991	4.126

**POPLAR C, MERCED COUNTY, CAL. (Not occupied.)**

[Latitude  $37^{\circ} 10' 44.743''$ . Longitude  $120^{\circ} 37' 30.967''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lost.....	153 33 58.49	333 33 07.14	3.6725273	2.923
Horse.....	176 09 24.57	356 09 10.31	3.9381907	5.389
Eyraud.....	229 50 07.29	49 52 43.79	3.9216519	5.188

**RED CHIMNEY, MERCED COUNTY, CAL.**

[Latitude  $37^{\circ} 12' 00.557''$ . Longitude  $120^{\circ} 34' 50.226''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lost.....	107 13 15.51	287 10 46.94	3.8022145	3.941
Eyraud.....	218 26 31.97	38 27 31.29	3.5898351	2.416

**ROAD MILL, MERCED COUNTY, CAL. (Not occupied.)**

Station is mill near tank on low structure about one-quarter mile southwest of school and about 100 feet south of road between Turlock and Snelling. The mill is on line of that section of road between itself and Dallas.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 29' 30.497''$ . Longitude  $120^{\circ} 39' 10.008''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Dallas.....	92 18 49.78	272 15 35.01	3.8958438	4.889
Bloodsos.....	243 11 19.16	63 13 16.00	3.7227303	3.282
Dry Creek.....	291 50 21.02	111 52 07.52	3.6658718	2.879

**R. E. RED, MERCED COUNTY, CAL. (Not occupied.)**

Red tank on timber structure among group of red railroad buildings on Santa Fe Railway about 3 miles southeast of Winton.

Station mark: Center of tank.

[Latitude  $37^{\circ} 21' 29.394''$ . Longitude  $120^{\circ} 34' 08.023''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Winton.....	°   '   "	°   '   "	<i>Log. meters.</i>	<i>Miles.</i>
Amsterdam.....	129 46 57.91	309 45 23.19	3.6935837	3.104
Lighthouse.....	190 56 01.69	10 56 38.38	3.8935515	4.866

**SOUTH POINT, MERCED COUNTY, CAL. (Not occupied.)**

Tall green water tank on high open timber structure on Santa Fe Railroad about 8 miles east of Merced.

Station mark: Center of tank.

[Latitude  $37^{\circ} 17' 22.128''$ . Longitude  $120^{\circ} 19' 24.538''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Eyraud.....	°   '   "	°   '   "	<i>Log. meters.</i>	<i>Miles.</i>
Merced.....	71 27 45.04	251 19 24.08	4.3327504	13.369
Super.....	97 48 08.02	277 42 19.29	4.1554871	8.889
Blacksmith.....	149 21 48.64	329 18 02.37	4.2550564	11.179
Hurricane.....	157 25 55.17	337 23 40.96	4.1515650	8.809
	173 31 42.80	353 31 22.38	3.8605005	4.569

**STILT, MERCED COUNTY, CAL.**

A lumber tripod on sand dune one-half mile north of trees skirting slough and about 3 miles south of Bloss ranch buildings.

Station mark: An iron bench-mark post under center of tripod.

[Latitude  $37^{\circ} 15' 59.407''$ . Longitude  $120^{\circ} 46' 25.630''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Tree J.....	°   '   "	°   '   "	<i>Log. meters.</i>	<i>Miles.</i>
Mill.....	8 27 21.51	188 27 02.92	3.7118323	3.200
Tarweed.....	125 54 42.27	305 52 47.32	3.7612400	3.586
Curtner.....	187 14 35.67	7 14 53.06	3.7487691	3.484
Swansen.....	198 25 39.09	18 26 58.02	4.0060185	6.300
Lizard.....	222 46 36.92	42 49 05.33	3.9483550	5.517
	263 09 41.31	83 12 36.17	3.8547100	4.447

**SUPER, MERCED COUNTY, CAL.**

A lumber tripod with target signal on plateau about 2 miles north of Merced municipal reservoir.

Station mark: An iron bench-mark post.

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[Latitude  $37^{\circ} 25' 44.005''$ . Longitude  $120^{\circ} 25' 37.447''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lakeside School.....	3 21 09.81	183 20 58.75	3.8846584	4.764
Merced.....	20 13 29.63	200 11 26.66	4.1593636	8.968
Nairn.....	50 09 03.44	230 05 44.41	4.0213085	6.526
Winton.....	74 12 02.61	254 05 17.64	4.2315483	10.590
Lighthouse.....	83 37 25.89	263 33 45.75	3.9524544	5.569
Amsterdam.....	89 11 44.00	269 07 10.50	4.0441140	6.878
Wasom.....	114 14 36.15	294 12 41.67	3.7056314	3.155
Bloodsoe.....	121 35 34.17	301 29 16.60	4.2527132	11.119
Thomsen.....	149 12 56.96	329 10 09.80	4.1198947	8.189
Blacksmith.....	302 35 38.27	122 37 10.43	3.6461410	2.751
South Point.....	329 18 02.37	149 21 48.64	4.2550564	11.179
Monument.....	343 33 19.70	163 35 07.18	4.1877880	9.575

## SWANSEN, MERCED COUNTY, CAL.

Mill on red tank house on Ed. Swansen's ranch about 5 miles south of Livingston. There is a lumber observing platform built on the top of tank house which the topographer is requested to remove when he no longer needs it.

Station mark: Center of windmill tower.

[Latitude  $37^{\circ} 19' 30.738''$ . Longitude  $120^{\circ} 42' 20.711''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Stilt.....	42 49 05.33	222 46 36.92	3.9483550	5.517
Tarweed.....	79 52 37.10	259 50 26.02	3.7330266	3.360
Curtner.....	137 43 24.97	317 42 15.41	3.6228253	2.607
Bridge.....	158 57 55.30	338 56 32.61	3.9701677	5.901
Winton.....	230 22 18.87	50 25 43.13	4.0314934	6.681
W. C.....	254 17 23.16	74 19 49.82	3.7912704	3.843
Lizard.....	349 17 21.00	169 17 47.36	3.7608871	3.583

## TANK, MERCED COUNTY, CAL. (Not occupied.)

Red-roofed tank house, northeast of house. The tank house appears to have small balustrade around top. The buildings are white with red tops.

Station is south of Merced River between the river bottom and foothills in open country.

Station mark: Center of tank house.

[Latitude  $37^{\circ} 29' 54.579''$ . Longitude  $120^{\circ} 26' 41.617''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Wasom.....	28 25 45.53	208 24 29.98	3.8096400	3.974
Dry Creek.....	80 06 51.76	260 01 02.81	4.1553506	8.886
Bloodsoe.....	96 52 57.07	276 47 18.26	4.1387903	8.553
Thomsen.....	124 50 44.42	304 48 36.20	3.7992856	3.914

## TARWEED, MERCED COUNTY, CAL.

A lumber tripod on top of small hill about 1 mile northeast of Bloss ranch buildings and about 5 miles southwest of Livingston.

Station mark: An iron bench-mark post set under center of tripod.

[Latitude  $37^{\circ} 18' 59.851''$ . Longitude  $120^{\circ} 45' 56.918''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Still.....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Mill.....	7 14 53.06	187 14 35.67	3.7487691	3.484
Tree Mill.....	67 58 09.56	247 55 57.15	3.7638013	3.607
Curtner.....	132 58 26.66	312 54 30.21	3.8098806	4.011
Swansen.....	211 37 43.76	31 38 45.33	3.6780440	2.960
Lizard.....	259 50 26.02	79 52 37.10	3.7330266	3.360
	306 21 52.07	126 24 29.44	3.9001301	4.937

## TAYLOR, STANISLAUS COUNTY, CAL.

Mill on red tank about 30 feet northwest of dwelling house on Taylor ranch, on edge of slough, about 10 miles southwest of Turlock.

Station mark: Center of mill.

[Latitude  $37^{\circ} 26' 54.930''$ . Longitude  $121^{\circ} 01' 25.390''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
North Mill.....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Jovan.....	174 00 26.21	354 00 14.13	3.6695605	2.903
Turlock.....	200 34 52.01	29 36 00.35	3.7474348	3.474
Flagstaff.....	252 03 26.97	72 10 09.77	4.2328988	10.623
West End.....	257 27 55.27	77 31 00.35	3.8843254	4.761
Lone Mill.....	257 41 28.42	77 44 50.80	3.9227433	5.201
New Tower.....	298 50 20.85	109 52 17.09	3.6987425	3.105
	304 57 56.87	125 01 18.26	3.9976891	6.181

## THOMSEN, MERCED COUNTY, CAL.

A lumber tripod on Henry Thomsen's place, 6 miles west of Snelling. Follow railroad from Snelling to Hopetown, then turn due west and take first main north and south road. Is about 2 miles north of house and about a quarter mile west of road.

Signal on a little butte but not marked.

[Latitude  $37^{\circ} 31' 51.272''$ . Longitude  $120^{\circ} 30' 12.169''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Lighthouse.....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Amsterdam.....	9 54 36.07	189 53 42.81	4.0971237	7.771
Winton.....	20 35 27.51	200 33 40.76	4.0886622	7.621
Dry Creek.....	31 07 06.31	211 03 07.96	4.2707936	11.502
Bloodsoe.....	55 47 37.38	235 43 56.50	4.0325899	6.698
Tank.....	77 02 28.16	256 58 57.48	3.9403839	5.417
Super.....	304 48 36.20	124 50 44.42	3.7992856	3.914
Wasom.....	329 10 09.80	149 12 56.96	4.1198947	8.189
	347 03 11.48	167 04 04.05	3.9766622	5.889

## TREE J, MERCED COUNTY, CAL. (Not occupied.)

[Latitude  $37^{\circ} 13' 14.154''$ . Longitude  $120^{\circ} 46' 56.349''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Still.....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Lizard.....	188 27 02.92	8 27 21.51	3.7118323	3.200
	232 53 47.31	52 57 00.47	3.9938074	6.126

## TREE MILL, MERCED COUNTY, CAL. (Not occupied.)

Lone windmill in disrepair; about 20 feet east of acacia or locust tree and about 1.5 miles south of wagon bridge over Merced River.

Station mark: Center of windmill.

[Latitude  $37^{\circ} 21' 22.446''$ . Longitude  $120^{\circ} 49' 08.922''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Curtner.	272 40 01.23	92 42 59.33	3.8592457	4.494
Tarweed.	312 54 30.21	132 56 26.66	3.8098806	4.011

**TURLOCK, STANISLAUS COUNTY, CAL.** (Not occupied by C. L. Nelson in 1914.)

An iron city tank in Turlock. It is east and north of twin tank in same town.  
Station mark: Center of tank.

[Latitude  $37^{\circ} 29' 45.251''$ . Longitude  $120^{\circ} 50' 23.269''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lone Mill.	59 03 34.29	238 58 47.85	4.1302796	8.387
Taylor.	72 10 09.77	252 03 26.97	4.2328983	10.623
Joven.	88 23 38.38	268 18 03.75	4.1306910	8.395
Dallas.	270 54 01.77	90 57 36.79	3.9384440	5.393
Cressy.	303 45 15.97	123 50 33.30	4.1884452	9.590
Bridge.	320 12 39.99	140 16 10.55	4.1241505	8.270
Leedom.	326 02 22.64	146 04 03.58	3.8635084	4.538

**WASSOM, MERCED COUNTY, CAL.**

A lumber tripod on hill on Mr. Wassom's ranch, about 3 miles northeast of town of Amsterdam.

Station mark: An iron bench-mark post set under center of tripod.

[Latitude  $37^{\circ} 26' 51.678''$ . Longitude  $120^{\circ} 28' 45.789''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Merced.	1 17 18.02	181 17 09.35	4.1940220	9.713
Lighthouse.	54 12 52.04	234 11 06.33	3.7219397	8.276
Winton.	60 13 30.09	240 08 39.46	4.1321170	8.423
Amsterdam.	70 47 00.81	250 44 21.65	3.8336014	4.236
Dry Creek.	106 04 02.18	285 59 28.96	4.0601601	7.137
Bloodsoe.	124 27 09.18	304 22 46.12	4.1097493	8.000
Thomsen.	167 04 04.05	347 03 11.48	3.9766622	5.889
Tank.	208 24 29.98	28 25 45.53	3.8069400	3.984
Super.	294 12 41.67	114 14 36.15	3.7056314	3.155
Blacksmith.	298 06 03.03	118 09 29.67	3.9767853	5.890

**W. C., MERCED COUNTY, CAL.**

A lumber tripod signal on top of hill, 1 mile south of Southern Pacific Railroad and 2 miles west of Atwater, about 300 yards west of public road, on land belonging to W. C. Dallas.

Station mark: An iron bench-mark post.

[Latitude  $37^{\circ} 20' 24.985''$ . Longitude  $120^{\circ} 38' 18.871''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Lizard.	33 39 55.30	213 37 55.09	3.9452260	5.477
Swanson.	74 19 49.82	254 17 23.16	3.7912704	3.843
Curtner.	99 17 47.81	279 14 11.53	3.9489693	5.525
Winton.	204 13 48.04	24 14 45.57	3.7545134	3.531
Horse.	356 17 09.80	176 17 24.54	3.9662765	5.749

## WEST END, STANISLAUS COUNTY, CAL. (Not occupied.)

Station mark: West end of very high barn, with what appears to be galvanized-iron roof, with three pitches on either side.

[Latitude  $37^{\circ} 27' 52.681''$ . Longitude  $120^{\circ} 55' 52.613''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Lone Mill.....	45 01 45.96	225 00 19.88	3.0919416	3.057
Taylor.....	77 44 50.80	257 41 28.42	3.9227433	5.201
Joven.....	119 39 00.90	290 36 46.86	3.7945667	3.872

## WINTON, MERCED COUNTY, CAL.

Station mark: Center of high tank in town of Winton, on the Santa Fe Railway.

[Latitude  $37^{\circ} 23' 13.054''$ . Longitude  $120^{\circ} 36' 44.077''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
W. C.....	24 14 45.57	204 13 48.04	3.7545134	3.531
Swanson.....	50 25 43.13	230 22 18.87	4.0314934	6.881
Curtner.....	71 22 53.19	251 18 19.26	4.0689655	7.283
Bridge.....	99 07 25.31	279 02 38.12	4.0711270	7.319
Creasy.....	115 38 11.16	295 35 10.52	3.9000948	5.040
Dallas.....	136 15 10.40	316 10 27.13	4.2188775	10.286
Dry Creek.....	184 07 31.77	4 07 49.47	3.9972663	6.175
Bloodsoe.....	184 36 25.28	4 36 53.25	4.1480588	8.738
Thomsen.....	211 03 07.98	31 07 06.31	4.2707938	11.562
Amsterdam.....	229 48 54.14	49 51 05.64	3.8430305	4.329
Wasom.....	240 08 39.46	60 13 30.09	4.1321170	8.423
Lighthouse.....	243 56 35.75	63 59 40.64	3.9207112	5.177
Super.....	254 05 17.64	74 12 02.61	4.2315483	10.590
Nalrn.....	283 57 37.36	104 01 03.11	3.9341807	5.340
Merced.....	307 51 10.57	127 55 52.07	4.1603318	8.993
R. R. Red.....	309 45 23.19	129 46 57.91	3.6685837	3.104

## COLORADO.

### TRIANGULATION STATIONS.

**Creede and Del Norte quadrangles.**

#### **MINERAL, RIO GRANDE, AND SAGUACHE COUNTIES.**

During the season of 1914 J. R. Ellis extended triangulation northeast from stations Bellevue and South River, described in Bulletin 440. Four stations were occupied and seven points were located by intersections, all on North American datum.

#### **BARN, RIO GRANDE COUNTY, COLO. (Not occupied.)**

South end of barn about 6 miles northwest of Del Norte.

[Latitude  $37^{\circ} 41' 54.48''$ . Longitude  $106^{\circ} 26' 06.20''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Del Norte.....		223 06 33	4.21825	10.271
East Butte.....	238 56 18	58 59 29	3.95097	5.550
Dog.....	322 48 10	142 51 26	4.11416	8.082

#### **BELLEVUE, RIO GRANDE COUNTY, COLO.**

Situated on east end of Bellevue Mountain, locally known as North Mountain, about 1 mile north of the nearly abandoned town of Summitville.

Station mark: A rock monument 7 feet base and 9 feet high, probably erected by the Wheeler Survey.

Reference mark: The point occupied by theodolite is a hole drilled in a large rock (cracked) in which is cemented a nail with the head projecting 0.25 inch and over which a rock monument 2 feet base and 3 feet high was erected. True bearing from station  $227^{\circ} 43'$ , distant 9.9 feet.

[Latitude  $37^{\circ} 27' 02.48''$ . Longitude  $106^{\circ} 36' 14.98''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Summit.....	36 23 20.74	216 19 59.08	4.1390418	.....
Pagosa.....	89 06 35.64	268 49 43.89	4.6118040	.....
South River.....	112 28 06.51	292 14 20.07	4.5567810	.....
Del Norte.....	193 15 16.41	13 16 46.77	4.2007172	9.864
Bennett.....	250 24 49.58	76 31 02.93	4.1906878	9.639

#### **BENNETT, RIO GRANDE COUNTY, COLO.**

Situated in the highest part of Bennett Peak and at the headwaters of San Francisco Creek.

Signal: A cairn 4.5 feet base by 6.5 feet in height.

Station mark: A bronze tablet set in rock under center of cairn.

[Latitude  $37^{\circ} 29' 06.24''$ . Longitude  $106^{\circ} 28' 01.25''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Belleview.....	* * *	* * *	Log. meters.	Miles.
South River.....	76 31 02.92	256 24 49.58	4.190675	9.539
Del Norte.....	121 53 42.71	281 35 42.09	4.694039	30.715
East Butte.....	136 06 56.46	315 56 06.92	4.215960	10.215
Observatory.....	134 51 25.54	14 54 33.55	4.498250	15.308
Chimney.....	157 28 28.30	.....	4.34010	13.597
Dog.....	209 19 46.00	.....	4.44964	17.498
Center.....	206 53 36.70	29 56 49.63	4.1926261	9.682
Hog Silo.....	224 05 53.00	.....	4.62204	26.025
White Silo.....	226 36 21.00	.....	4.45013	17.520
	211 07 06.00	.....	4.50736	24.587

## CENTER, SAGUACHE COUNTY, COLO. (Not occupied.)

West end of yellow elevator at Center.

[Latitude  $37^{\circ} 45' 14.10''$ . Longitude  $106^{\circ} 06' 10.73''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * *	* * *	Log. meters.	Miles.
Bennett.....	224 05 54	.....	4.62201	26.023
Dog.....	52 25 43	232 16 49	4.43239	16.806
East Butte.....	85 58 18	265 49 18	4.33541	13.451

## CHIMNEY, RIO GRANDE COUNTY, COLO. (Not occupied.)

Chimney on new house 5 or 6 miles northeast of Del Norte and 0.25 mile north of main irrigation ditch.

[Latitude  $37^{\circ} 42' 16.14''$ . Longitude  $106^{\circ} 16' 38.14''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * *	* * *	Log. meters.	Miles.
Dog.....	28 43 47	208 41 16	4.09962	7.816
Bennett.....	209 19 48	4.44964	17.498	
East Butte.....	122 17 57	302 15 21	3.86766	4.542

## DEL NORTE, RIO GRANDE COUNTY, COLO.

Situated on the highest point of Del Norte Peak and about 14 miles southwest of Del Norte town. A wagon road leads from Del Norte to Hogback Mesa, from which the station may be reached by horseback.

Signal: A cairn 5 feet base by 6 feet in height.

Station mark: A bronze tablet set in solid rock under center of cairn.

[Latitude  $37^{\circ} 35' 23.67''$ . Longitude  $106^{\circ} 33' 46.62''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * *	* * *	Log. meters.	Miles.
Belleview.....	13 16 46.77	193 15 16.41	4.2007172	9.864
South River.....	87 25 24.82	267 10 06.59	4.5679884	22.979
South end of barn.....	223 06 33	.....	4.21825	10.271
East Butte.....	228 39 04.67	48 46 57.57	4.4021214	15.685
Chimney.....	243 08 46	.....	4.45086	17.557
Observatory.....	243 13 48	63 21 16	4.30393	12.511
Center.....	245 41 54	.....	4.64816	27.638
Dog.....	264 54 57.23	85 02 54.33	4.2845837	11.908

**DEL NORTE OBSERVATORY, RIO GRANDE COUNTY, COLO. (Not occupied.)**

Center of dome of observatory on low hill on south edge of Del Norte.

[Latitude 37° 40' 17.18". Longitude 106° 21' 33.11".]

To station—	Azimuth.	Back azimuth.	Distance.	
Bennett.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Del Norte.....	17 31 12	197 28 28	4.34010	13.597
East Butte.....	63 21 16	243 13 48	4.30393	12.511
		7 25 27	3.88479	4.766

**DOG MOUNTAIN, RIO GRANDE COUNTY, COLO.**

Situated on the highest point of Dog Mountain, a sharp peak about 6 miles due south of Del Norte.

Signal: A cairn 5 feet base by 6 feet in height.

Station mark: A bronze tablet set in solid rock under center of cairn.

[Latitude 37° 36' 18.31". Longitude 106° 20' 44.64".]

To station—	Azimuth.	Back azimuth.	Distance.	
Bennett.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Del Norte.....	29 56 49.63	209 53 36.70	4.1926261	9.682
South end of barn.....	83 02 54.33	264 54 57.23	4.2845837	11.966
East Butte.....	142 51 26	322 48 10	4.11416	8.082
Chimney.....	179 14 42.70	359 14 37.77	4.1752526	9.303
White Silo.....	208 41 16	28 43 47	4.09662	7.816
Center.....	211 58 03	32 03 21	4.37998	14.905
Red Silo.....	232 16 49	52 25 43	4.43209	16.805
Monte Vista.....	245 07 32	65 12 48	4.14586	8.684
	279 06 49	99 15 17	4.31578	12.857

**EAST BUTTE, RIO GRANDE COUNTY, COLO.**

Situated on the highest part of the eastmost of two buttes about 3.5 miles north of Del Norte. A wagon road runs north and south between the two buttes.

Signal: A rock cairn 4.5 feet base by 6 feet in height.

Station mark: A bronze tablet set in solid rock under center of cairn.

[Latitude 37° 44' 23.86". Longitude 106° 20' 52.69".]

To station—	Azimuth.	Back azimuth.	Distance.	
Observatory.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Bennett.....	7 25 27	.....	3.88479	4.766
Del Norte.....	14 54 33.85	194 51 25.54	4.4692850	18.308
South end of barn.....	48 46 57.57	228 39 04.67	4.4021214	15.685
White Silo.....	58 59 29	238 56 18	3.95097	5.550
Center.....	247 21 20	67 26 43	4.14532	8.683
Chimney.....	265 49 18	85 58 18	4.33541	13.451
Red Silo.....	302 15 21	122 17 57	3.86766	4.542
Monte Vista.....	305 10 24	125 15 45	4.19784	9.779
Dog.....	311 29 42	131 38 16	4.43996	17.112
	359 14 37.77	179 14 42.70	4.1752526	9.303

**MONTE VISTA, RIO GRANDE COUNTY, COLO. (Not occupied.)**

Station mark: Center of chimney on sugar beet factory, 1 mile east of Monte Vista.

[Latitude 37° 34' 31.20". Longitude 106° 06' 52.08".]

To station—	Azimuth.	Back azimuth.	Distance.	
Del Norte.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Dog.....	99 15 17	272 12 13	4.59825	24.638
East Butte.....	131 38 16	279 06 49	4.31578	12.857
		311 29 42	4.43996	17.112

**RED SILO, RIO GRANDE COUNTY, COLO. (Not occupied.)**

About 7 miles northwest of Monte Vista.

[Latitude  $37^{\circ} 39' 28.88''$ . Longitude  $106^{\circ} 12' 06.77''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Bennett.....		226 30 21	4.45018	17.520
Dog.....	65 12 48	245 07 32	4.14386	8.694
Del Norte.....		256 32 53	4.51534	20.356
East Butte.....	125 15 45	305 10 24	4.19784	9.799

**SOUTH RIVER, MINERAL COUNTY, COLO.**

On the summit of South River Peak, situated at the head of Red Mountain Creek which enters the Rio Grande from the south at the bend in river about 12 miles southwest of creek, and is at the east side of the east branch of the creek. A road reaches the basin about 1 mile distant from the peak via Red Mountain Creek. From the terminus of this road a trail leads across the divide and to Pagosa Spring.

Station mark: A bronze tablet cemented in rock, over which a cairn  $3\frac{1}{2}$  feet in diameter and 6 feet high was erected.

[Latitude  $37^{\circ} 34' 27.08''$ . Longitude  $106^{\circ} 58' 52.17''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Pagosa.....	27 34 34.55	207 31 27.76	4.2119146	
Graham.....	76 22 58.54	256 08 33.20	4.5550681	
Pyramid.....	108 02 41.92	287 47 38.97	4.5811070	
Uncompahgre.....	142 41 50.92	322 24 10.27	4.8424016	
Bristol.....	165 05 40.79	345 02 58.99	4.4009795	
San Luis.....	185 30 42.19	5 32 33.17	4.6629397	
La Garita.....	197 54 21.81	17 59 30.83	4.6031924	
Ouray.....	214 58 56.69	35 26 54.26	5.0618017	
Del Norte.....	267 10 06.59	87 25 24.82	4.5679884	22.979
Bennett.....	281 35 42.09	101 55 42.71	4.6940039	30.715
Bellevue.....	292 14 20.07	112 28 06.51	4.5567810	
Summit.....	314 27 34.07	134 37 57.63	4.5484071	

**WHITE SILO, SAGUACHE COUNTY, COLO. (Not occupied.)**

Center of a white silo about 10 miles northeast of Del Norte.

[Latitude  $37^{\circ} 47' 18.04''$ . Longitude  $106^{\circ} 12' 05.62''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Bennett.....		211 07 06	4.59736	24.587
Dog.....	32 03 31	211 58 03	4.37908	14.905
Del Norte.....		235 14 42	4.58827	24.078
East Butte.....	67 26 43	247 21 20	4.14532	8.683

**Pagoda 30' quadrangle.****MOFFATT, RIO BLANCO, AND ROUTT COUNTIES.**

During the season of 1915 C. B. Kendall extended triangulation southeastward from stations Cedar and Williams. Five new primary stations were occupied, and eight secondary points were located by intersections. Positions are on approximate North American datum as derived from stations Morrison and Table Mound, Colo.,

through Wyoming triangulation. (See Bull. 551, pp. 79 to 88, inclusive.)

**A. ROUTT COUNTY, COLO. (Not occupied.)**

On same divide as Williams triangulation station and about 2.5 miles northwest of same. It can be best reached by following trail up the first canyon northwest of Pagoda post office on Williams Fork, near Mr. Hughes's residence and about 1 mile from the post office. Station is 0.5 mile northwest of point where this canyon heads. The greater part of the hill was cleared.

Signal: Pole quadripod with flags.

Station mark: Bench mark in 8 by 10 by 24 inch sandstone centered under signal.

[Latitude 40° 22' 32.6". Longitude 107° 24' 18.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
Sleepy Cat.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Natural.....	21 19 52	201 15 06	4.45945	.....
Cedar.....	128 52 18	308 49 40	3.46578	.....
Buck.....	142 28 04	322 20 11	4.44945	.....
Williams.....	149 31 51	329 30 01	3.90148	.....
	307 34 03	127 35 28	3.59638	.....

**BAIERL, ROUTT COUNTY, COLO.**

On divide between Dry Creek on the west and Sage Creek on the east. Station is about 1 mile southwest of the highest part on the divide known as Williams Fork Mountain and is about 1 mile west of point where the road leading from Hayden up Sage Creek crosses the divide between that creek and Willow Creek, about 3.5 miles northwest of Dunkley post office. Follow road from Hayden to Dunkley up Sage Creek until Mr. John Baierl's house is reached, which is the last house on Sage Creek, go through his fields and follow right-hand road to foot of hill, then by cow trails to the top. Station will be found on the highest point of hill due west of Mr. Baierl's house, about 1 mile.

Signal: A pole quadripod with flags.

Station mark: Standard bench mark tablet set in stone 8 by 8 by 24 inches under center of signal.

[Latitude 40° 21' 27.52". Longitude 107° 13' 24.90".]

To station—	Azimuth.	Back azimuth.	Distance.	
Sage Willow.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Williams.....	26 37 08	206 36 27	3.52503	.....
Buck.....	88 11 07.00	268 05 29.84	4.0896743	.....
Hayden.....	114 36 29.69	294 27 35.12	4.3300629	.....
Twenty Mile.....	161 15 00.05	341 12 10.37	4.2823334	.....
Pinnacle.....	234 20 52.26	54 25 58.26	4.1366669	.....
	315 58 43.90	136 04 49.14	4.2835827	.....

**BUCK, ROUTT COUNTY, COLO.**

On the highest part of the mountain locally known as Buck Mountain. It is on the divide between Yampa River and Williams Fork of White River and 8 miles southeast of the town of Craig. The road from Hayden south by way of Deals Gulch to Williams Fork passes 3.5 miles west of the station, but as the country is fenced it can be best reached by road from Craig to Breeze Valley settlement, where a second-class road branches off and passes about 1 mile northeast of station. Leave this road at any convenient point and follow cow trails to summit of ridge and along ridge to top.

Signal: A pole quadripod with flags.

Station mark: A standard bench mark tablet in solid rock under signal.

[Latitude 40° 26' 15.38". Longitude 107° 27' 00.74".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Geologist.....	6 29 52	186 20 04	4. 19195	.....
Sleepy Cat.....	10 46 44	190 43 49	4. 53544	.....
Natural.....	36 25 21	216 27 35	3. 44940	.....
Cabin.....	65 25 32	245 23 17	3. 73062	.....
Cedar.....	139 39 41	319 33 39	4. 30675	.....
Hayden.....	235 02 14.68	55 08 20.32	4. 2089395	.....
Fire House.....	248 19 25	68 27 09.15	4. 25119	.....
Baerl.....	294 27 35.12	114 36 29.69	4. 3300629	.....
Williams.....	322 15 53.73	142 19 10.84	4. 0692065	.....
A.....	329 30 01	149 31 51	3. 90148	.....
Spruce.....	341 19 31	161 22 44	4. 33920	.....

**CABIN, MOFFATT COUNTY, COLO. (Not occupied.)**

Flag in tree about 0.5 mile east of road from Craig to Deals Gulch and near the head of Deals Gulch.

Signal and station mark: Flag.

[Latitude 40° 25' 02.8". Longitude 107° 30' 37.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Buck.....	245 23 17	65 25 32	3. 73062	.....
Williams.....	300 12 37	120 18 08	4. 14522	.....
Cedar.....	155 00 56	334 57 08	4. 29005	.....

**CEDAR, MOFFATT COUNTY, COLO.**

On highest point of Cedar Mountain, a well-known hill about 7 miles northwest of Craig. Animals can be ridden to summit.

Signal: A cairn 7 feet high.

Station mark: A triangulation tablet under center of cairn.

[Latitude 40° 34' 35.71". Longitude 107° 36' 27.43".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Devils Hole (U).....	29 40 13.49	209 28 52.15	4. 7012426	31.232
Brush (U).....	34 00 36.95	213 48 36.74	4. 6718142	29.185
Juniper (U).....	68 28 35.29	248 12 10.27	4. 5844446	23.867
Baker (U).....	198 38 10.87	18 44 07.78	4. 6024983	24.880
Welba (U).....	222 04 07.88	42 13 42.22	4. 4890545	19.160
Bears Ears (U).....	233 33 32.06	53 47 34.48	4. 5760526	23.410
Hahn (U).....	242 30 38.17	62 57 11.84	4. 8097394	40.085
Pilot (U).....	258 50 47.41	78 16 34.58	4. 6400562	27.127
Williams (U).....	320 30 48.08	140 40 07.40	4. 5049183	19.873
Pagoda (U).....	334 12 03.74	154 22 44.51	4. 7300635	33.444
Peak (U).....	339 06 05.51	159 14 59.33	4. 7383091	34.014
Sleepy Cat (U).....	352 08 11.08	172 11 16.70	4. 6855362	30.824
Hayden (K).....	283 04 21.88	103 16 30.59	4. 4327879	.....
Baelrl (K).....	306 36 50.99	126 51 48.25	4. 6089923	.....
Williams (K).....	320 30 48.08	140 40 07.40	4. 5049183	.....
A (K).....	322 20 11	142 28 04	4. 44945	.....
Natural (K).....	327 01 45	147 07 00	4. 32398	.....
Cabin (K).....	334 57 08	155 00 56	4. 29005	.....

NOTE.—U = values obtained by C. F. Urquhart in 1910; K = values obtained by C. B. Kendall in 1915.

**HAYDEN FIRE HOUSE, ROUTT COUNTY, COLO. (Not occupied.)**

In the town of Hayden, on the south side of the Moffat railroad, about 1,000 feet east of station. City fire and waterworks pumping station.

Signal and station mark: Smokestack in center of building.

[Latitude  $40^{\circ} 29' 48.3''$ . Longitude  $107^{\circ} 15' 26.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Williams.....	30 45 49	210 41 30	4.20561	.....
Buck.....	68 27 09	248 19 25	4.25119	.....

**GEOLOGIST, MOFFATT COUNTY, COLO. (Not occupied.)**

A geologist's flag on sandy, partly bare hill, about 5 miles south of the mouth of Deals Gulch and 5.5 miles southwest of Pagoda post office, on the divide between Williams River and Badger Gulch.

Signal and station mark: Flag in tree.

[Latitude  $40^{\circ} 17' 54.2''$ . Longitude  $107^{\circ} 28' 24.3''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Buck.....	186 29 04	6 29 52.4	4.19125	.....
Williams.....	235 18 34	55 22 40	4.03620	.....

**GNAT, ROUTT COUNTY, COLO. (Not occupied.)**

On a low bare hill about 3 miles southeast of the Breeze Valley settlement, about 3 miles south of Yampa River, and 7 or 8 miles southwest of Hayden. The road from Breeze Valley to Hayden passes about three-quarters of a mile south of the station.

Signal and station mark: Cairn 6 feet high, in center of which was erected a flagpole.

[Latitude  $40^{\circ} 27' 08.8''$ . Longitude  $107^{\circ} 23' 27.7''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Williams.....	349 56 27	169 57 20	4.04512	.....
Buck.....	72 32 59	252 30 35	3.73928	.....
Hayden.....	226 30 58	46 34 40	4.04412	.....
Bearl.....	306 27 56	126 34 27	4.24705	.....

**HAYDEN, ROUTT COUNTY, COLO.**

On a ridge about 2 miles northwest of Hayden. The public road from Hayden north to the Elkhead country passes 0.8 mile east of the station; keep this road to top of ridge, where a gate will be found and a second-class road to the northeast; keep this road to point near top of small rise, then turn south and follow a wire fence. Station is about 200 yards southwest of point where this fence makes a sharp angle to the northwest.

Signal: A quadripod of sawed lumber with flags.

Station mark: An 8 by 8 by 24 inch sandstone block with a bench-mark tablet centered under signal.

[Latitude  $40^{\circ} 31' 15.56''$ . Longitude  $107^{\circ} 17' 46.50''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Williams.....	18 15 22.89	198 12 34.84	4.2004203	.....
Buck.....	55 08 20.32	235 02 14.68	4.2089395	.....
Cedar.....	103 16 30.59	293 04 21.88	4.4327879	.....
Twenty Mile.....	300 23 06.37	120 31 02.70	4.3021408	.....
Bearl.....	341 12 10.37	161 15 00.05	4.2823334	.....

**NATURAL, MOFFATT COUNTY, COLO. (Not occupied.)**

On a sharp rise in ridge between Deals Gulch and first canyon to the east and about 2 miles southwest of Buck triangulation station.

Signal and station mark: Flag in tree.

[Latitude 40° 25' 02.0". Longitude 107° 28' 20.7".]

To station—	Azimuth.	Back azimuth.	Distance.	
Cedar.....	• / " 147 07 00	• / " 327 01 45	Log. meters.	Miles.
Buck.....	216 27 35	36 28 21	4.32398	.....
A.....	308 49 40	128 52 18	3.44940	.....
			3.86578	.....

**PINNACLE, ROUTT COUNTY, COLO.**

On Pinnacle Mountain, on divide between Trout Creek on the north and Oak Creek on the south. Peak is well known, being very sharp and well defined. The road from Dunkley via Pinnacle to Yampa and Oak Creek passes around the mountain on the south. There are numerous ways of ascending the Pinnacle, but one had better inquire the way as the fences are constantly being changed and a gap or gate would be more convenient, or meadows are apt to be flooded and impassable. Pinnacle school house is on the road 0.8 mile southwest of station. Animals were ridden to the top by going along the north and east slopes.

Signal: A pole quadrupod with flags.

Station mark: Bench-mark tablet in solid rock centered under signal. Over mark was built a rock cairn 4 feet high.

[Latitude 40° 13' 59.22". Longitude 107° 04' 00.13".]

To station—	Azimuth.	Back azimuth.	Distance.	
Williams.....	• / " 117 44 27.61	• / " 297 32 45.64	Log. meters.	Miles.
Baeirl.....	136 04 49.14	315 58 43.90	4.4615160	.....
Twenty Mile.....	174 17 09.10	354 16 09.20	4.2835827	.....
			4.3406890	.....

**SAGE WILLOW, ROUTT COUNTY, COLO. (Not occupied.)**

No description available,

[Latitude 40° 19' 50.4". Longitude 107° 14' 28.4".]

To station—	Azimuth.	Back azimuth.	Distance.	
Williams.....	• / " 103 34 27	• / " 283 29 27	Log. meters.	Miles.
Baeirl.....	206 36 27	26 37 08	4.04525	.....
			3.52503	.....

**SPRUCE, ROUTT COUNTY, COLO. (Not occupied.)**

On or near the west end of east and west ridge on divide between the waters of Williams Fork and Willow Creek, about 7 miles southeast of Pagoda post office.

Signal and station mark: A tall very prominent spruce tree.

[Latitude 40° 15' 04.6". Longitude 107° 22' 13.9".]

To station—	Azimuth.	Back azimuth.	Distance.	
Buck.....	• / " 161 22 44	• / " 341 19 32	Log. meters.	Miles.
Williams.....	180 58 54	0 59 00	4.33920	.....
			4.05742	.....

## TWENTY MILE, ROUTT COUNTY, COLO.

On the highest point of divide between Grassy Creek on the west, Fish Creek on the southeast, and Yampa River on the north. Station overlooks the Twenty-mile Park and is about 4 miles southeast of Harris on the Moffat railroad. The road from Hayden and Harris up Grassy Creek passes about 3 miles west of the station; leave this road near the 10-mile post to Hayden and follow second-class road through what is locally known as the Forest Culture. Keep this road till an old deserted house is reached about 1.25 miles from main road. Follow woods roads leading from the house east up a canyon or continue south through pasture until a large canyon to east is reached. An old road leads up this canyon about 2 miles. Wagon was taken to a point about 1 mile north of station, thence the top was reached by saddle along cow trails.

Signal: Pole quadripod with flags.

Station mark: Bench-mark tablet in 8 by 10 by 24 inch sandstone block centered under signal.

[Latitude  $40^{\circ} 25' 46.10''$ . Longitude  $107^{\circ} 05' 32.69''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bearl.....	54 25 58.26	234 20 52.26	4.1360667	.....
Williams.....	70 24 34.93	250 13 51.52	4.3956787	.....
Hayden.....	120 31 02.70	300 23 06.37	4.3021408	.....
Pinnacle.....	354 16 09.20	174 17 09.10	4.3406890	.....

## WILLIAMS, ROUTT COUNTY, COLO.

On about highest point of divide between Bear River and Williams River, on a line between Hayden and Pagoda post office. It is about 4.5 miles northeast from Pagoda and 10 or 12 miles from Hayden. Animals can be ridden to station from either place and the signal can be seen from Hayden, but not from Pagoda.

Signal: A quaking asp tree securely supported by poles.

Station mark: A triangulation tablet set in rock at base of tree.

[Latitude  $40^{\circ} 21' 14.57''$ . Longitude  $107^{\circ} 22' 05.58''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Peak (U).....	1 54 40.73	181 54 16.65	4.4227248	16.447
Sleepy Cat (U).....	29 08 43.55	209 02 31.96	4.4465245	17.373
Devil's Hole (U).....	67 22 31.70	247 01 54.86	4.6905796	30.474
Brush (U).....	73 09 13.08	252 47 57.21	4.6878817	30.285
Juniper (U).....	100 51 07.55	280 25 26.18	4.7563393	35.456
Cedar (U).....	140 40 07.40	320 30 48.08	4.5049183	19.873
Welba (U).....	180 32 39.95	0 32 52.49	4.6773908	29.562
Bear's Ears (U).....	192 07 02.50	12 11 42.54	4.6822060	29.892
Pilot (U).....	214 24 37.96	34 35 02.69	4.6019532	24.849
Pagoda (U).....	352 45 29.34	172 46 51.82	4.3797352	14.897
Spruce (K).....	0 59 00	180 58 54	4.05747	.....
Geologist (K).....	120 18 08	300 12 37	4.14522	.....
Cabin (K).....	120 18 08	300 12 37	4.14522	.....
A (K).....	127 35 28	307 34 03	3.59638	.....
Cedar (K).....	140 40 07.40	320 30 48.08	4.5049183	19.873
Buck (K).....	142 19 10.84	322 15 53.73	4.0692085	.....
Hayden (K).....	198 12 34.84	18 15 22.89	4.2904203	.....
Fir House (K).....	210 41 34	30 45 49	4.26561	.....
Twenty Mile (K).....	250 13 51.52	70 24 34.93	4.3956787	.....
Bearl (K).....	268 05 29.84	88 11 07.00	4.0896743	.....
Sage Willow (K).....	283 29 27	103 34 27	4.04525	.....
Pinnacle (K).....	297 32 45.64	117 44 27.61	4.4615160	.....

NOTE.—U = values obtained by C. F. Urquhart in 1910; K = values obtained by C. B. Kendall in 1915.

## COLORADO AND UTAH.

### TRIANGULATION STATIONS.

**Cameo, Coventry, Delta, Gateway, Grand Junction, Lone Cone, Mount Peale, Mount Waas, and Naturita quadrangles.**

**DELTA, GARFIELD, HINSDALE, MESA, MONROSE, AND SAN MIGUEL COUNTIES, COLO.; GRAND AND SAN JUAN COUNTIES, UTAH.**

During the season of 1914 C. F. Urquhart extended triangulation east and south from Coast and Geodetic Survey primary stations Tavaputs and Mount Waas, and secondary stations Chiquita, Mesa, and Mams Peak. He occupied 15 new stations and located 7 points by intersections, the positions for which are on North American datum.

#### CHIQUITA, MESA COUNTY, COLO.

Described by United States Coast and Geodetic Survey in Special Publication 19. About 12 miles south-southwest from Grand Junction, on the northern rim or brow of Piñon Mesa. The station is marked by a low brick pier used in mounting the instrument.

[Latitude  $38^{\circ} 54' 38.264''$ . Longitude  $108^{\circ} 39' 06.632''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Glade.....	139 27 36.64	319 24 09.67	4.0859796	7.574
Pifion.....	154 19 42.96	334 16 06.20	4.2814780	11.880
Tavaputs.....	156 30 45.30	336 17 20.60	4.8822167	47.377
Indian.....	211 41 17.58	31 45 53.81	4.3030700	12.486
Ray.....	215 14 16.30	35 32 32.34	4.8568205	44.688
Grand.....	245 38 46.06	65 53 49.24	4.5786049	23.548
Mesa.....	271 26 06.85	91 43 56.10	4.6131895	25.500
Uncompahgre.....	311 30 37.28	132 15 04.29	5.1444994	86.668

#### COKE, MONROSE COUNTY, COLO.

Station is on a rather prominent hill covered with cedar and piñon trees about 3 miles southwest of the coke ovens on road between Naturita and Paradox. It is just above and on the north side of Basin Creek Canyon. Can be reached on horseback from the coke ovens or from the Wheeler & Lavender ranch, known as the Spectacle ranch. Better traveling from the latter, but about 6 miles farther.

Signal: A cairn 6 feet high on highest point of peak.

Station mark: A bronze tablet set in solid rock under center of cairn.

[Latitude 38° 11' 17.260''. Longitude 108° 40' 20.549''.]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Blue Mountain.....	61 05 52.13	240 36 41.28	4.8693385	49.339
Gypsum.....	72 19 35.21	252 13 37.64	4.1698860	9.188
Mount Peale.....	119 55 09.93	299 34 28.33	4.7484857	34.821
Mount Wasa.....	128 57 37.33	308 36 57.41	4.7939472	38.663
Pace.....	138 11 21.95	317 56 18.70	4.7231679	32.849
Skinout.....	142 58 46.23	322 48 38.46	4.5961040	24.516
Montpelier.....	182 57 25.65	2 58 22.82	4.6355230	26.846
Tree.....	208 27 34.02	28 33 53.35	4.4933578	19.351
Nucla.....	229 46 36.30	49 51 18.46	4.1618449	9.020
Uncompahgre.....	276 33 43.92	97 18 35.28	4.0291353	66.451
Lone Cone.....	312 08 09.61	132 23 35.53	4.6947394	30.767
Young.....	321 31 38.32	141 36 34.15	4.2736658	11.669
North Mountain.....	322 14 44.62	142 24 44.54	4.5892113	24.130
Lavender.....	329 29 48.92	149 36 30.98	4.4964885	19.491

## FIR, MESA COUNTY, COLO.

On about the highest point of a flat-topped peak in the Fruita Reserve, on the summit of Piñon Mesa. It is about 5 miles north of Mr. Silzell's ranch, in Unaweep Canyon, and can be reached from there by trail. The flat ridge east of peak can not be seen over and is probably a little higher, but can not be used for station on account of dense growth of timber. There is a road from Glade Park post office to foot of peak.

Signal and station mark: A spruce or fir tree about 50 feet high, trimmed up.

Reference mark: A triangulation tablet set in rock 81.5 feet from tree.

True azimuth tree to tablet: 238° 23'.

[Latitude 38° 49' 44.524''. Longitude 108° 48' 10.768''.]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Pace.....	36 53 34.28	216 43 18.57	4.5992107	24.692
Mount Wasa.....	45 04 18.25	228 48 23.50	4.6898989	30.426
Tavaputs.....	167 34 29.77	347 26 49.56	4.9076281	50.232
Piñon.....	20 40 25.25	10 22 50.72	4.4266468	16.604
Spruce.....	191 16 24.91	11 23 09.84	4.8938909	48.668
Ray.....	218 45 55.97	39 09 54.47	4.9397753	54.091
Mams or North Mam.....	323 20 17.97	52 55 46.53	4.0086546	63.388
Grand.....	242 31 43.43	62 52 27.81	4.7296484	33.343
Uncompahgre.....	305 15 14.16	126 05 17.16	5.1587892	89.565
Montpelier.....	334 03 47.58	154 09 39.18	4.4930338	19.337

## GLADE, MESA COUNTY, COLO. (Not occupied.)

Station mark and signal: Cupola on schoolhouse at Glade Park post office, on Piñon Mesa, 18 miles from Grand Junction.

[Latitude 38° 59' 38.534''. Longitude 108° 44' 35.849''.]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Piñon.....	177 21 21.17	357 21 11.53	3.9018469	4.957
Chiquita.....	319 24 09.67	139 27 36.64	4.0859796	7.574

## GRAND, MESA COUNTY, COLO.

Station is near northwest corner of Grand Mesa and built near rim rock. A very short distance can be seen in country between Ray and Mesa.

Station mark: A triangulation tablet set under center of cairn 9 feet high.

[Latitude 39° 03' 02.597". Longitude 108° 15' 10.867".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Lone Cone.....	0 04 34.35	180 04 30.00	5.1107742	80.191
Tree.....	17 40 09.55	197 30 47.70	4.8557728	44.578
Montpelier.....	33 06 11.40	212 54 22.87	4.7975940	38.989
Mount Waas.....	56 27 17.54	235 50 39.97	5.0082586	63.330
Fir.....	62 52 27.81	242 31 43.43	4.7296484	33.343
Chiquita.....	65 53 49.24	245 38 46.06	4.5786049	23.548
Pifion.....	92 23 52.46	272 05 10.68	4.6318248	26.618
Indian.....	93 45 44.97	273 35 16.94	4.3804724	14.922
Tavaputs.....	130 09 56.19	309 41 20.97	4.9275225	52.586
Spruce.....	148 31 53.36	328 17 45.60	4.7871970	38.067
Ray.....	189 26 08.89	9 29 10.24	4.6401779	27.135
Mesa.....	338 55 47.42	158 58 35.20	4.2523450	11.110

## GYPSUM, SAN MIGUEL COUNTY, COLO.

Near the San Miguel and Montrose county line, and near the west end of Dry Creek basin, 10 or 11 miles west of the Wheeler & Lavender "Spectacle ranch." The only available water is at this ranch. There is a wagon road through Dry Creek basin to foot of ridge on which station is located. Very easy to reach on horseback.

Signal: A pifion tree braced up by small cairn and poles.

Station mark: A triangulation tablet set in solid rock under center of signal.

[Latitude 38° 08' 51.270". Longitude 108° 49' 59.175".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Blue Mountain.....	58 27 29.46	238 04 15.60	4.8126661	40.366
Mount Peale.....	133 09 13.86	312 54 31.39	4.6752488	29.417
Pace.....	154 10 05.81	334 01 01.94	4.0877436	30.278
Skinout.....	164 51 58.94	344 47 50.14	4.5713203	23.156
Montpelier.....	198 45 35.46	18 55 31.72	4.7020262	31.288
Coke.....	232 13 37.64	72 19 35.21	4.1698860	9.188
Uncompahgre.....	273 34 39.57	94 25 26.82	5.0812755	74.925
Young.....	291 31 02.80	111 41 55.54	4.4428244	17.226
Lone Cone.....	299 23 16.11	119 44 37.99	4.7661750	36.268
North Mountain.....	304 35 43.36	124 51 39.48	4.6632763	28.617
Lavender.....	306 48 22.67	127 01 01.15	4.5743960	23.321

## INDIAN, MESA COUNTY, COLO.

Water tank at abandoned Indian school about 2 miles east of Grand Junction.

Station mark: A pipe extending into the ground under center of tank. A rock with triangulation tablet set in it was placed in ground 2.4 feet from pipe.

True azimuth pipe to tablet: 238° 11'.

[Latitude 39° 03' 52.516". Longitude 108° 31' 47.585".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Chiquita.....	31 45 53.81	211 41 17.58	4.3030700	12.486
Pifion.....	90 29 01.90	270 20 48.09	4.2750492	11.706
Tavaputs.....	142 18 07.10	322 00 02.96	4.8250258	41.531
Grand.....	273 35 10.94	93 45 44.97	4.3804724	14.922
Mesa.....	300 49 28.16	121 02 42.99	4.5496652	22.030

## LAVENDER, SAN MIGUEL COUNTY, COLO.

On north rim of steep bluff overlooking the Wheeler & Lavender ranch (Desert claim). There is a wagon road from Narutita or Norwood to this ranch. Animals can be ridden from ranch to station. Distance about 3 miles.

Signal: An aspen tree braced by poles.

Station mark: A triangulation tablet set in rock at center of signal.

NOTE.—This station should not be used for extending triangulation, as its position is not very accurate.

[Latitude  $37^{\circ} 56' 40.182''$ . Longitude  $108^{\circ} 29' 28.462''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Gypsum.....	° ' "	° ' "		
127 01 01.15	306 48 22.67		4.5743960	23.321
Coke.....	329 29 48.92		4.4964885	19.491
Young.....	341 06 07.99		4.1150605	8.099
North Mountain.....	295 11 46.10	115 15 03.56	3.9381745	5.380

## LEON, DELTA-MESA COUNTY LINE, COLO.

On summit of Leon Peak on the Delta-Mesa county line. A well-known peak at the head of Big Creek, about 11 miles south and 6 miles east of Collbron station, is in T. 11 S., R. 94 W., near east edge of sec. 24, and can be easily reached by wagon road from Collbron up Big Creek via Big Creek ranger station to sawmill, thence by ranger's trail to summit. Animals can be ridden to foot of peak about 0.25 mile northwest of summit. Good feed and water.

Signal: Center of cupola of Forest Service lookout house.

Station mark: A standard bronze tablet set in large boulder under center of cupola of Forest Service lookout house 10 feet square. House built of wood and tin and painted white.

[Latitude  $39^{\circ} 04' 46.864''$ . Longitude  $107^{\circ} 50' 37.173''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Montpelier.....	° ' "	° ' "		
51 34 42.85	231 04 30.03		4.9510016	55.508
Mount Waas.....	243 02 30.82		5.1281457	83.463
Tavaputs.....	296 39 16.54		5.0510402	69.886
Spruce.....	305 45 22.51		4.9206805	51.764
Ray.....	324 39 35.84		4.6884371	30.324
Mams.....	356 48 18.18		4.5332803	21.214

## LONE CONE, SAN MIGUEL-DOLORES COUNTY LINE, COLO. (Not occupied.)

Station and signal is a small cairn on summit of Lone Cone, a very prominent peak in southeastern part of San Miguel County.

[Latitude  $37^{\circ} 53' 17.156''$ . Longitude  $108^{\circ} 15' 17.892''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
North Mountain.....	° ' "	° ' "		
101 15 28.36	281 10 03.22		4.1200279	8.192
Gypsum.....	299 23 16.11		4.7661750	36.268
Young.....	306 34 15.62		4.4933102	19.349
Mount Waas.....	310 01 23.53		5.0480353	69.404
Coke.....	312 08 09.61		4.6947394	30.767
Pace.....	315 01 08.88	315 00 39.00	5.0096106	62.527
Nucla.....	329 02 10.73		4.6964660	30.990
Montpelier.....	335 42 34.89		4.9232069	52.066
Grand.....	0 04 34.35		5.1107742	80.191
Mesa.....	3 24 26.01		5.0514019	69.944

**MAMS PEAK OR NORTH MAM, GARFIELD COUNTY, COLO.**

On summit of the North Mam Peak, the highest point of the Battlement Mesa, about 10 miles south and 5 miles west of Rifle, from which point it can be easily reached by wagon road up Beaver Creek to Fondett's ranch and thence by trail till peak first shows on the right. The best way from this point is to turn nearly north and approach the peak from the northeast side. Animals can be ridden to foot of peak on northeast side about 0.25 mile from summit.

Signal: A cairn 6 feet high with 10-foot pine pole in center.

Station mark: A bronze tablet set in stone and placed in crevice of rock and over which was built a cairn 6 feet high.

[Latitude  $39^{\circ} 23' 12.259''$ . Longitude  $107^{\circ} 51' 56.336''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Mount Waas.....	51 52 12.76	231 00 50.17	5.1787597	93.780
Fir.....	52 55 46.53	232 20 17.97	5.008646	63.388
Tavaputs.....	100 12 10.38	279 28 42.67	4.9980190	61.854
Ray.....	102 31 10.88	282 19 35.52	4.4286119	16.671
Spruce.....	103 04 14.03	282 35 17.06	4.8262464	41.648
Leon.....	356 48 18.18	176 49 08.25	4.5332803	21.214

**MAMS PEAK, GARFIELD COUNTY, COLO.**

[Location from Pelham, Hahn, and Bridger: Latitude  $39^{\circ} 23' 11.71''$ ; longitude  $107^{\circ} 51' 55.98''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Lincoln.....	56 35 58.74	236 17 30.75	4.7021508	31.297
Meade.....	84 08 20.72	263 50 06.11	4.6184718	25.812
Ray.....	102 31 36.59	282 20 00.98	4.4287787	16.677
Cathedral.....	123 01 08.21	302 34 59.83	4.8447632	43.462
Colorow.....	163 13 42.67	343 01 42.27	4.9652048	57.353
Petrolite.....	167 58 25.44	347 53 01.05	4.7632344	36.023
Rio Blanco.....	173 20 40.76	354 18 45.36	4.5710313	23.141
Sleepy Cat.....	199 06 35.44	19 19 32.69	4.9439031	54.608

**MESA, DELTA COUNTY, COLO.**

Described by United States Coast and Geodetic Survey in Special Bulletin 19.

A short distance north of the most western point of that part of the Grand Mesa which is southeast of Connah Creek, within about 40 feet of the edge of the rim rock which limits the mesa.

Station mark: A copper bolt set in the solid lava rock. It is also marked about 10 inches above the ground by a drill hole in a brick embedded in the masonry which fills the space between the bases of the three small brick piers used to support the instrument.

[Latitude  $38^{\circ} 54' 01.482''$ . Longitude  $108^{\circ} 10' 44.122''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Lone Cone.....	3 24 26.01	183 21 35.98	5.0514019	69.944
Tree.....	28 40 17.42	204 28 09.82	4.7698873	36.580
Montpelier.....	48 42 07.69	225 24 33.68	4.7345514	33.721
Mount Waas.....	66 35 42.37	245 56 21.53	4.9982566	61.888
Chiquita.....	91 43 56.10	271 26 06.85	4.6131895	25.500
Pilon.....	110 37 05.64	290 15 37.86	4.7208265	32.672
Indian.....	121 09 42.99	309 49 28.16	4.5496652	22.030
Tavaputs.....	135 06 52.16	314 35 30.99	5.0029033	62.554
Grand.....	158 58 35.20	338 55 47.42	4.2523450	11.110
Uncompahgre.....	325 32 34.11	145 59 21.22	5.0463212	69.131

**MONTPELIER, MESA COUNTY, COLO.**

Station is on ridge known as Uncompahgre Plateau, which divides the waters of Dolores and Gunnison rivers, and south of the Unaweep Canyon. It can be reached by going from Whitewater, a station on the Denver & Rio Grande Railroad, on Gateway road, to source of East Creek, thence up Kelly's dugway to summit of ridge; thence on road to the U. C. C. cattle ranch at source of Mesa Creek. Signal can be seen about 2 miles south of this place. Station is on prominent mountain with aspen trees around the sides; trees cut from the summit. The mountain is sometimes called Uncompahgre Butte.

Signal: A rock cairn 7 feet high.

Station mark: A triangulation tablet under center of cairn.

[Latitude  $38^{\circ} 34' 36.583''$ . Longitude  $108^{\circ} 38' 48.473''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ' "	* ° ' "	Log. meters.	Miles.
Coke.....	2 58 22.82	182 57 25.65	4.6355230	26.248
Gypsum.....	18 55 31.72	198 48 35.46	4.7020262	31.268
Blue Mountain.....	41 21 55.73	220 51 40.31	5.0358104	67.473
Mount Peale.....	73 21 47.74	253 00 03.49	4.7244604	32.947
Pace.....	84 18 42.82	264 02 38.31	4.5758634	23.400
Mount Waas.....	85 28 23.76	265 06 41.15	4.7056158	31.548
Fir.....	154 09 39.18	334 03 47.58	4.4830338	19.337
Ray.....	203 12 07.95	23 30 08.63	5.0179456	64.738
Grand.....	212 54 22.87	33 09 11.40	4.7975940	38.989
Mesa.....	222 24 33.68	48 42 07.69	4.7345514	33.721
Leon.....	231 04 30.03	51 34 42.85	4.9510016	55.508
Uncompahgre.....	29 02 27.24	118 46 33.14	5.0712622	73.217
Tree.....	321 21 35.76	141 26 59.39	4.3051468	12.546
Lone Cone.....	335 42 34.89	155 57 07.85	4.9232099	52.066
North Mountain.....	343 44 56.88	163 54 02.41	4.8860936	47.802

**NORTH MOUNTAIN, SAN MIGUEL COUNTY, COLO.**

On high mountain, well known locally as North Mountain. It is about 7 or 8 miles southeast of the Wheeler & Lavender ranch known as the Desert claim, and 8 miles a little north of west from Lone Cone. It can be reached on horseback from almost any direction, but the best trail is probably from the above ranch.

Signal: An aspen tree left standing.

Reference mark: A tablet set in rock and placed in ground 3 feet from tree.

Azimuth tree to mark:  $17^{\circ} 16'$ .

[Latitude  $37^{\circ} 54' 40.303''$ . Longitude  $108^{\circ} 24' 07.194''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ' "	* ° ' "	Log. meters.	Miles.
Blue Mountain.....	85 27 48.32	264 48 45.29	4.9712991	58.163
Lavender.....	115 15 03.56	295 11 46.10	3.9381745	5.389
Gypsum.....	124 51 39.48	304 35 43.36	4.6632763	28.617
Mount Waas.....	134 13 31.95	313 42 53.52	5.0017961	62.395
Pace.....	140 04 25.37	319 39 22.56	4.9620982	56.944
Coke.....	142 24 44.54	322 14 44.62	4.5892113	24.130
Young.....	143 05 05.88	323 00 01.77	4.3022892	12.463
Nucha.....	162 35 32.60	342 30 13.41	4.6236614	26.122
Montpelier.....	163 54 02.41	343 44 56.88	4.8860936	47.802
Tree.....	171 25 13.23	351 21 29.83	4.7691298	36.516
Lone Cone.....	281 10 03.22	101 15 28.36	4.1200279	8.192

**NUCLA, MONTROSE COUNTY, COLO.**

Tall flagpole at reservoir in the town of Nucla.

Station mark: A triangulation tablet set in rock at foot of flagpole.

Mark is near road and was used as a bench mark by levelman.

[Latitude  $38^{\circ} 16' 21.046''$ . Longitude  $108^{\circ} 32' 44.591''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Coke.....	49 51 18.46	229 46 36.30	4.1618449	9.020
Mount Waas.....	116 39 25.78	296 14 01.45	4.8227769	41.317
Pace.....	123 01 48.28	302 42 00.92	4.7420021	34.305
Tree.....	191 51 55.92	11 53 32.67	4.2646589	11.429
Lone Cone.....	329 02 10.73	149 12 56.30	4.6964660	30.890
North Mountain.....	342 30 13.41	162 35 32.60	4.6236614	26.122

**PIFON, MESA COUNTY, COLO.**

Station is on a pifion and cedar ridge 5 miles north of Glade Park post office on Pifion Mesa. The post office is 18 miles from Grand Junction. The ridge is locally known as Black Ridge. Animals can be ridden to the point.

Signal and station mark: A pifion tree, 25 feet high, with lower limbs cut off.

Reference mark: A triangulation tablet set in solid rock, 6.95 feet from tree.

True azimuth, tree to tablet:  $261^{\circ} 31'$ .

[Latitude  $39^{\circ} 03' 56.944''$ . Longitude  $108^{\circ} 44' 51.156''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Fir.....	10 22 50.72	190 20 45.25	4.4268648	16.604
Mount Waas.....	35 38 26.38	215 20 24.09	4.8560394	44.606
Tavaputs.....	157 10 58.45	337 01 10.65	4.7569782	35.508
Spruce.....	191 47 19.51	11 51 59.06	4.7127074	32.067
Ray.....	230 06 58.67	50 28 54.51	4.8116412	40.271
Indian.....	270 20 48.09	90 29 01.90	4.2750492	11.706
Grand.....	272 05 10.68	92 23 52.46	4.6318248	26.618
Mesa.....	290 15 37.86	110 37 05.64	4.7208265	32.672
Chiquita.....	334 16 06.20	154 19 42.96	4.2814780	11.880
Glade.....	357 21 11.53	177 21 21.17	3.9018469	4.957

**RAY, GARFIELD COUNTY, COLO.**

Described in United States Geological Survey Bulletin 551.

On highest point of bald ridge, about 6 miles northeast (air line) from De Beque, a station on the Denver & Rio Grande Railroad. Station can be reached from De Beque by following road to C. H. Conwell's ranch (8 miles), thence by trail up Logan Gulch to its source, thence up mountain to its highest point. The distance from Conwell's to station is 10 miles.

Signal: A fir tree braced by poles.

Station mark: A triangulation tablet set in rock under center of signal.

[Latitude  $39^{\circ} 26' 19.417''$ . Longitude  $108^{\circ} 10' 11.566''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Grand.....	9 29 10.24	189 26 00.89	4.6401779	27.135
Montpelier.....	23 30 08.63	203 12 07.95	5.0179456	64.758
Chiquita.....	35 32 32.34	215 14 16.30	4.8568205	44.686
Fir.....	39 09 54.47	218 45 55.97	4.9397753	54.091
Pifion.....	50 28 54.51	230 06 58.67	4.8116412	40.271
Spruce.....	103 14 42.21	282 57 20.64	4.6042162	24.979
Mams or North Mam.....	282 19 35.52	102 31 10.88	4.4286119	16.671
Leon.....	324 39 35.84	144 51 59.03	4.6884371	30.324

[Located from Pelham, Hahn & Bridger: Latitude  $39^{\circ} 26' 19.05''$ ; longitude  $108^{\circ} 10' 11.60''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ° ′ ″	• ° ′ ″	Log. meters.	Miles.
Grand.....	9 29 39.93	189 26 30.38	4.6402621	27.140
Lincoln.....	25 05 36.57	204 58 41.72	4.5694090	23.055
Low.....	31 52 23.65	211 49 22.59	4.1119505	8.041
Meade.....	56 09 54.42	236 03 14.52	4.2592310	11.287
Cathedral.....	134 40 09.26	314 25 38.15	4.6606689	28.446
Petrolite.....	195 19 03.38	15 25 18.18	4.7226619	32.810
Rio Blanco.....	214 52 47.20	35 02 29.81	4.5807534	23.665
Mams Peak.....	282 20 00.98	102 31 36.59	4.4287787	16.677
Red.....	317 31 03.60	137 38 14.95	4.2406675	10.815

#### SKINOUT, MONTROSE COUNTY, COLO. (Not occupied.)

Station mark and signal: A cone-shaped tree on highest point of Skinout Mountain on east side of Sinbad Valley. This valley can be reached by wagon road from Gateway on Dolores River.

[Latitude  $38^{\circ} 28' 17.811''$ . Longitude  $108^{\circ} 56' 40.521''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ° ′ ″	• ° ′ ″	Log. meters.	Miles.
Mount Wasas.....	107 01 48.22	286 51 14.56	4.4112776	16.019
Pace.....	124 21 07.42	304 16 11.49	4.1443393	8.663
Coke.....	322 48 38.46	142 58 46.23	4.5961040	24.516
Gypsum.....	344 47 50.14	164 51 58.94	4.5713203	23.156

#### SPRUCE, GARFIELD COUNTY, COLO.

On ridge at the source of Salt Wash and near the tributaries of Roan Creek. There is a round hill one-quarter mile N.  $13^{\circ}$  W., a little higher and more prominent, but a lone spruce tree on ridge was sighted from Ray and used as signal. All prominent points can be seen from point used.

To reach point from De Beque, go up Roan Creek to Highmore post office, thence up same creek to Mr. Burk's ranch, from which place a trail leads up to summit of cliffs, thence along ridge to source of Salt Wash. Station can be reached from any direction after getting on ridge.

Signal and station mark: A spruce tree 20 feet high.

Reference mark: A triangulation tablet.

True azimuth tree to mark:  $218^{\circ} 36'$ .

[Latitude  $39^{\circ} 31' 14.865''$ . Longitude  $108^{\circ} 37' 29.752''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ° ′ ″	• ° ′ ″	Log. meters.	Miles.
Fir.....	11 23 09.84	191 16 24.91	4.8938909	48.668
Pilon.....	11 51 59.06	191 47 19.51	4.7127074	32.067
Tavaputs.....	93 50 53.62	273 36 22.02	4.5155310	20.365
Mams or North Mam.....	282 35 17.06	103 04 14.03	4.8262164	41.618
Ray.....	282 57 20.64	103 14 42.21	4.6042162	24.979
Leon.....	305 45 22.51	126 15 03.97	4.9206805	51.764
Grand.....	328 17 45.60	148 31 53.36	4.7871970	38.067

#### TAVAPUTS, GARFIELD COUNTY, COLO.

A United States Coast and Geodetic Survey station, described in Special Publication 19.

On the southern edge of the Book Mountains, which in this vicinity consist of low flat ridges sparsely covered with pine and aspen trees. The station is between West

Salt Wash, 3 miles to the southeast, and Bitter Creek, three-fourths mile to the west. Bitter Creek has its source in a fresh-water spring 1.25 miles distant to the north.

Station mark: Copper bolt in a drill hole in solid rock, under a brick in concrete.

Reference marks: At the following distances and azimuths from the station: 2.43 meters,  $74^{\circ} 41'$ ; 2.40 meters,  $196^{\circ} 31'$ ; and 2.43 meters,  $322^{\circ} 12'$ .

[Latitude  $39^{\circ} 32' 23.946''$ . Longitude  $109^{\circ} 00' 19.148''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Mount Waas.....	9 53 07.92	189 44 44.55	5.0520834	70.054
Spruce.....	273 36 22.02	93 50 53.62	4.5153340	20.365
North Mam or Mams.....	279 28 42.67	100 12 10.38	4.9980190	61.854
Leon.....	296 39 16.54	117 23 25.93	5.0510402	69.886
Grand.....	309 41 20.97	130 09 56.19	4.9275225	52.586
Mesa.....	314 35 30.99	135 06 52.16	5.0029033	62.554
Indian.....	322 00 02.96	142 18 07.10	4.8250258	41.531
Chiquita.....	336 17 20.59	156 30 45.30	4.8822171	47.377
Pihon.....	337 01 10.65	157 10 58.45	4.7569782	35.508
Fir.....	347 26 49.56	167 34 29.77	4.9076281	50.232

#### TREE, MONTEREY COUNTY, COLO. (Not occupied.)

Signal and station mark: A tree on prominent mountain on Uncompahgre Plateau 12.5 miles southeast of Montpelier station and 11.5 miles north-northeast of Nucla.

[Latitude  $38^{\circ} 26' 04.805''$ . Longitude  $108^{\circ} 30' 08.660''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Nucla.....	11 53 32.67	191 51 55.92	4.2646589	11.429
Coke.....	28 33 53.35	208 27 34.02	4.4933578	19.351
Mount Waas.....	100 37 48.25	280 10 44.16	4.8032458	39.957
Face.....	103 36 20.07	283 14 53.55	4.7118665	32.005
Montpelier.....	141 26 59.39	321 21 35.76	4.3051468	12.546
Grand.....	197 30 47.70	17 40 09.55	4.8557726	44.578
Mesa.....	208 28 09.82	28 40 17.42	4.7698873	36.580
North Mountain.....	351 21 29.83	171 25 13.23	4.7691298	36.516

#### UNCOMPAGRE, HINSDALE COUNTY, COLO.

Described in United States Coast and Geodetic Survey Special Publication 19.

On summit of Uncompahgre Peak on north side about 10 feet from edge of perpendicular cliff of which this side of mountain consists. The summit is inaccessible except from south side. Lake City, the terminus of a branch of the Denver & Rio Grande Railroad, leaving the main road at Sapinero, distant about 8 miles air line, southeast of peak, is nearest and most convenient railroad town.

Station mark: A crosscut in top of a half-inch copper bolt leaded into solid rock. The surface mark is a half-inch hole in a brick cemented into top of masonry foundation pier, for theodolite, built around and over station bolt. Top of brick is 4 inches above bolt. The usual circular stone ring wall, inner diameter 11 feet, concentric with station bolt, was left standing.

Reference marks: Consist of four drill holes in solid rock, filled with lead—one south  $89^{\circ} 58'$  west, distant 9.35 feet; one north  $0^{\circ} 11'$  west, distant 8.71 feet; one north  $89^{\circ} 56'$  west, distant 9.4 feet; and one south  $3^{\circ} 37'$  west, distant 8.12 feet, from the geodetic point. The brick latitude pier, bearing south  $54^{\circ} 05'$  east, distant 50.11 feet, and the stone pendulum house, bearing south  $28^{\circ} 26'$  east, distant 134.15 feet, were also left standing.

[Latitude  $38^{\circ} 04' 18.387''$ . Longitude  $107^{\circ} 27' 41.707''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Sneffels.....	75 32 46.6	255 20 34.1	4.4764217	74.925
Gypsum.....	94 25 26.82	273 34 39.57	5.081792	66.451
Coke.....	97 18 35.28	276 33 43.92	5.0291535	26.927
Horsefly.....	108 20 41.92	288 03 18.17	4.6368392	101.238
Mount Waas.....	109 07 06.12	288 01 25.77	5.2119946	101.238
Montpelier.....	118 46 33.14	298 02 27.24	5.0712622	73.217
Fir.....	126 05 17.16	305 15 14.16	5.1587892	80.565
Chiquita.....	132 15 04.29	311 30 37.28	5.1444994	86.666
Mesa.....	145 59 21.22	325 32 34.11	5.0463212	69.131
Castle Rock.....	150 27 16.65	330 20 45.12	4.4940878	19.384
Sapinero.....	192 30 48	12 35 11	4.67609	
Treasury Mountain.....	196 43 01.82	16 56 36.24	5.0387020	
Cebolla.....	206 29 35	26 38 28	4.67002	
Mount Ouray.....	249 49 54.38	70 35 52.02	5.0611148	
San Luis.....	281 16 05.02	101 35 42.15	4.6770430	
Lake.....	282 30 36.9	102 38 39.2	4.2813527	
La Garita.....	287 11 57.80	107 34 53.28	4.7568771	
Bristol.....	310 41 43.10	130 56 43.65	4.6746191	
South River.....	322 24 10.27	142 41 50.92	4.8424018	
Sherman.....	348 59 42.2	169 01 03.2	4.2261074	
Pyramid.....	351 57 49.33	172 00 23.20	4.6427600	
Agency.....			4.75408	

**YOUNG, SAN MIGUEL COUNTY, COLO.**

Windmill tower in C. B. Young's yard. Mr. Young's ranch is the only place of any consequence in Dry Creek basin and is about 13 miles south of Naturita.

Station mark: A triangulation tablet set in rock and placed 3 inches under the surface of the ground under the center of tower. (It is possible that another well may be bored and the tower moved a few feet.)

[Latitude  $38^{\circ} 03' 20.162''$ . Longitude  $108^{\circ} 32' 21.346''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Gypsum.....	111 41 55.54	291 31 02.80	4.4428244	17.226
Coke.....	141 36 34.15	321 31 38.32	4.2736658	11.669
Lone Cone.....	306 34 15.62	126 44 45.32	4.4933102	19.349
North Mountain.....	323 00 01.77	143 05 05.88	4.3022892	12.463
Lavender.....	341 06 07.99	161 07 54.43	4.1150605	8.099

**BLUE MOUNTAIN, SAN JUAN COUNTY, UTAH. (Not occupied.)**

This mountain is known as Blue Mountain, but called Abajo Peak on land office map. About the highest peak was located.

[Latitude  $37^{\circ} 50' 22.968''$ . Longitude  $109^{\circ} 27' 43.469''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Pace.....	203 17 26.62	23 31 44.60	4.9293889	52.813
Montpelier.....	220 51 40.31	41 21 55.73	5.0358104	67.478
Gypsum.....	238 04 15.60	58 27 29.46	4.8126661	40.366
Coke.....	240 36 41.28	61 05 52.13	4.8998385	49.339
North Mountain.....	264 48 45.29	85 27 48.32	4.9712991	58.163

## MOUNT PEALE, SAN JUAN COUNTY, UTAH. (Not occupied.)

Station and signal is a rock cairn on the highest point of Mount Peale, which is the highest peak of the La Sal Range. The peak is on the south side of the La Sal Range.

[Latitude  $38^{\circ} 26' 19.048''$ . Longitude  $109^{\circ} 13' 43.237''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Mount Waas.....	180 36 48.49	0 36 51.56	4.0482451	6.944
Pace.....	228 58 51.16	49 04 31.86	4.2447974	10.918
Montpelier.....	253 00 03.49	73 21 47.74	4.7244604	32.947
Coke.....	299 34 28.33	119 55 09.93	4.744857	34.821
Gypsum.....	312 54 31.39	133 09 13.86	4.6752488	29.417

## PACE, GRAND COUNTY, UTAH.

Station is on the east end of a timber-covered ridge just above and west of Sinbad Valley. There is a rough wagon road from Paradox to Castleton, Utah, passing the Buckeye reservoir, Geyser reservoir, Roberson's summer ranch, and the Taylor ranch. Station is 2 or 3 miles northeast of Taylor's ranch. Mr. Pace has a ranch on Rock Creek about 1 mile below Taylor's, which is south of station. There is another road (almost abandoned) passing to north of station, from the source of Rock Creek to Sinbad Valley and thence to Gateway, on Dolores River. Animals can be ridden to point from any direction.

Signal and station mark: A pine tree about 50 feet high with lower limbs cut off.

Reference mark: A triangulation tablet set in solid rock 10.7 feet from tree.

Azimuth tree to tablet:  $88^{\circ} 45'$ .

[Latitude  $38^{\circ} 32' 32.694''$ . Longitude  $109^{\circ} 04' 35.821''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Blue Mountain.....	23 31 44.60	203 17 26.62	4.9293889	52.813
Mount Peale.....	49 04 31.86	228 58 51.16	4.2447974	10.918
Mount Waas.....	88 32 05.16	268 26 27.16	4.1186746	8.166
Fir.....	216 43 18.57	36 53 34.28	4.5992107	24.692
Montpelier.....	264 02 38.31	84 18 42.82	4.5758634	23.400
Tree.....	283 14 53.55	103 36 20.07	4.7118665	32.006
Nucula.....	302 42 00.92	123 01 48.28	4.7420201	34.306
Skinout.....	304 16 11.49	124 21 07.42	4.1443393	8.663
Lone Cone.....	315 00 39.00	135 31 08.88	5.0096106	63.527
Coke.....	317 56 18.70	138 11 21.95	4.7231679	32.849
North.....	319 39 22.56	140 04 25.37	4.9620982	56.944
Gypsum.....	334 01 01.94	154 10 05.81	4.6877436	30.276

## MOUNT WAAS, GRAND COUNTY, UTAH.

Described in United States Coast and Geodetic Survey Special Publication 19.

On the highest point of Mount Waas, which is the third prominent peak from the north end of the La Sal Mountains.

Station mark: A cross in a copper bolt which is set in a drill hole in the rock between the bases of three small brick piers used for mounting the instrument. The station is surrounded by a ring wall of rocks 4 feet high with an inner diameter of 10 feet.

Reference marks: Four reference marks, each probably consisting of a drill hole in the rock, are just outside the wall at the following distances and azimuths from the station: 2.24 meters,  $3^{\circ} 58'$ ; 2.29 meters,  $104^{\circ} 19'$ ; 2.18 meters,  $186^{\circ} 37'$ ; and 2.21 meters  $275^{\circ} 45'$ . Mount Waas astronomic station, marked by a concrete pier, is 28.213 meters from the station in azimuth about  $329^{\circ}$ .

[Latitude  $38^{\circ} 32' 21.44''$ . Longitude  $109^{\circ} 13' 38.30''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
	°   '   "	°   '   "	
Mount Peale.....	0 36 51.56	180 36 48.49	4.0482451
Tavaputs.....	189 44 44.32	9 53 07.60	5.0520834
Pifion.....	215 20 24.09	35 38 26.38	4.8560394
Fir.....	228 48 23.50	49 04 18.25	4.6898898
Mams or North Mam.....	231 00 50.17	51 52 12.76	5.1787597
Grand.....	235 50 39.97	58 27 17.54	5.0082588
Leon.....	243 02 30.82	63 54 32.75	5.1281457
Mesa.....	245 56 21.53	66 35 42.37	4.9982566
Montpelier.....	263 06 41.15	85 28 23.76	4.7056158
Pace.....	268 26 27.16	88 32 05.16	4.1186746
Tree.....	280 10 44.16	100 37 48.25	4.8082458
Skinout.....	286 51 14.56	107 01 48.22	4.4112776
Uncompahgre.....	288 01 25.77	109 07 06.12	5.2119946
Nucla.....	296 14 01.45	116 39 25.78	4.8227769
Coke.....	308 36 57.41	128 57 37.33	4.7939472
Lone Cone.....	310 01 23.53	130 37 28.93	5.0480353
North Mountain.....	313 42 53.52	134 13 31.95	5.0017961
			Miles.

## UTAH.

### TRIANGULATION STATIONS.

#### Marsh Peak and Vernal quadrangles.

##### UINTA COUNTY.

During the season of 1913 Oscar Jones extended triangulation southward from Little Mountain and Marsh Peak, described in Bulletin 181, in order to control the Vernal quadrangle. Eleven stations were occupied and four points were located by intersection, on North American datum.

##### B. M., UNTIA COUNTY, UTAH. (Not occupied.)

Station on a high bluff south side of Green River, 6 miles northeast of Ouray.  
Station mark: A bench-mark tablet in boulder marked "B. M. 5071 V. A."

[Latitude  $40^{\circ} 10' 36.44''$ . Longitude  $109^{\circ} 36' 23.11''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Ouray.....	68 45 37.23	248 39 29.30	4.1611829	9.00
Halfway.....	152 47 58.25	332 44 48.84	4.3024880	12.47
White.....	359 05 54.93	179 05 58.63	3.9300875	5.36

##### CONE, UNTIA COUNTY, UTAH.

On a high, very sharp cone-shaped butte 7 miles west of Ouray.

Signal: Cairn over station.

Station mark: A flat sandstone boulder in which is drilled a 1-inch hole and marked "U. S.  $53^{\circ} 26'$  G. S."

[Latitude  $40^{\circ} 06' 05.59''$ . Longitude  $109^{\circ} 50' 13.15''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Randlett.....	194 21 01.61	14 22 47.29	4.1937095	9.70
Halfway.....	201 41 02.58	21 45 47.60	4.4502309	17.52
Vernal.....	218 30 09.70	38 41 22.87	4.5064331	24.53
Ouray.....	243 16 13.64	63 19 00.83	3.8374573	4.28
White.....	270 43 33.27	90 52 31.61	4.2966286	12.30
Nipple.....	282 10 17.18	102 20 36.02	4.3674429	14.48

##### DEEP CREEK, UNTIA COUNTY, UTAH. (Not occupied.)

On southwest end of high ridge 1 mile northeast of Taft post office, one-fourth mile west of Deep Creek.

Station mark: A large cairn.

[Latitude  $40^{\circ} 24' 42.85''$ . Longitude  $109^{\circ} 47' 17.90''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Vernal.....	• • "	• • "	<i>Log. meters.</i>	<i>Miles.</i>
Halfway.....	279 54 38 322 44 58	100 04 00 142 47 51	4.3171666 4.0161607	12.90 6.45

## HALFWAY, UNTA COUNTY, UTAH.

On a table-top butte, 14 miles southwest of Vernal, 2 miles northwest of crossing of Vernal and Fort Duchesne wagon road with Halfway Hollow.

Station mark: Tablet in boulder.

Signal and reference mark: Cairn, distance 3.5 feet, true azimuth  $67^{\circ} 11'$ .

[Latitude  $40^{\circ} 20' 14.91''$ . Longitude  $109^{\circ} 42' 51.74''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Ouray.....	• • "	• • "	<i>Log. meters.</i>	<i>Miles.</i>
Cone.....	10 33 44.79	190 31 47.27	4.3711066	14.60
Randlett.....	21 45 47.60	201 41 02.58	4.4502309	17.52
Roosevelt.....	30 41 05.55	210 38 06.34	4.1092074	7.99
Deep Creek.....	69 44 49.52	249 36 27.71	4.2889423	12.11
Taft.....	142 47 50.82	322 44 58.40	4.0161607	6.45
Vernal.....	146 23 29.13	326 20 16.21	4.1030978	7.88
B. M.....	251 43 52.27	71 50 21.23	4.1737941	9.27
Nipple.....	332 43 48.84	152 47 58.25	4.3024880	12.47
White.....	338 24 45.72	158 30 21.18	4.5248155	20.80
	340 33 37.23	160 37 51.86	4.4481970	17.44

## LITTLE MOUNTAIN, UNTA COUNTY, UTAH.

Station is on mountain shown on Hayden map as Obelisk Plateau, locally known as Little Mountain, and near highest point.

Station mark: Copper bolt cemented in sandstone rock and marked "S. G.

△  
U. S."

Reference point: A post on highest point of mountain, marking the point of U. S. M. R. ("O. M. R."), and supported by a pile of rocks, 9.55 feet distant, true azimuth of which is  $30^{\circ} 26'$ .

[Latitude  $40^{\circ} 32' 18.40''$ . Longitude  $109^{\circ} 41' 55.65''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Taft.....	• • "	• • "	<i>Log. meters.</i>	<i>Miles.</i>
Marsh.....	35 21 23.30	215 17 33.57	4.1587528	8.96
Trout Creek Peak.....	150 21 36.00	330 16 33.05	4.3440832	13.72
Lena.....	178 22 03.68	358 21 41.82	4.4410184	-----
Red.....	220 57 50.04	41 08 57.10	4.5636299	-----
Vernal Tabernacle.....	243 05 18.88	63 10 57.62	4.1375363	8.54
Vernal.....	304 28 44	124 35 03	4.2216261	10.35
	323 56 19.23	144 02 12.60	4.3389033	13.56

## MARSH PEAK, UNTA COUNTY, UTAH.

On peak of same name on east end of that portion of the Uinta Range which rises above timber line.

Station mark: Aluminum tablet cemented in large flat rock with rocks piled around and over it.

Reference point: Large rock monument, 15.75 feet distant, true azimuth of which is  $276^{\circ} 53'$ .

[Latitude 40° 42' 40.42". Longitude 109° 49' 40.94".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Gilbert Peak.....	106 18 00.22	285 57 57.66	4.6524536	.....
Phil Pico.....	164 57 33.64	344 53 55.73	4.4774312	.....
Leidy Peak.....	175 47 49.36	355 47 36.34	3.8050251	.....
Twin Buttes.....	191 16 48.14	11 21 39.70	4.724335	.....
Trout Creek Peak.....	230 15 37.15	50 20 18.97	4.1194058	.....
Richards Butte.....	232 26 46.63	52 47 20.28	4.7448761	.....
Lena.....	256 18 37.30	76 34 49.24	4.5554878	.....
Red.....	299 10 11.76	119 20 54.22	4.4241722	10.80
Little Mountain.....	330 16 33.05	150 21 36.00	4.3440832	13.72
Taft.....	355 08 52.21	175 10 04.69	4.4922556	19.30

**NIPPLE, UNTA COUNTY, UTAH. (Not occupied.)**

A very sharp cone (can not be occupied) 6 miles east of Ouray, 1 mile south of White River. Well known as "Mollie's Nipple."

[Latitude 40° 03' 25.17". Longitude 109° 34' 11.99".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Cone.....	102 20 36.02	282 10 17.18	4.3674429	14.48
Ouray.....	115 52 16.77	295 44 44.85	4.2668832	11.47
White.....	147 33 10.85	327 31 50.12	3.7431804	3.44
Halfway.....	158 30 21.18	338 24 45.72	4.5248155	20.80
Vernal.....	183 03 02.30	3 03 54.53	4.5545964	22.28

**OURAY, UNTA COUNTY, UTAH.**

On east edge of a flat mesa 4 miles northwest of Ouray, 1 mile west of Duchesne River.

Station mark: Tablet in boulder over which is a cairn for signal.

[Latitude 40° 07' 45.81". Longitude 109° 45' 53.70".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Cone.....	63 19 00.83	243 16 13.64	3.8374573	4.28
Roosevelt.....	139 26 20.81	319 19 58.52	4.3327866	13.37
Randlett.....	169 22 04.93	349 21 03.22	4.0882917	7.62
Halfway.....	190 31 47.27	10 33 44.79	4.3711066	14.60
Vernal.....	213 35 41.30	33 44 06.98	4.5232847	20.73
B. M. ....	248 39 29.30	68 45 37.23	4.1611829	9.00
White.....	283 48 34.30	103 54 45.63	4.1479058	8.74
Nipple.....	295 44 44.86	115 52 16.77	4.2663332	11.47

**RANDLETT, UNTA COUNTY, UTAH.**

On a very sharp rocky butte one-half mile east of Randlett.

Station mark: Tablet in large boulder.

Signal and reference mark: Small cairn on top of large boulder which is highest point of butte, distance from station 15.80 feet, true azimuth 13° 48'.

[Latitude 40° 14' 16.28". Longitude 109° 47' 29.34".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Cone.....	14 22 47.29	194 21 01.61	4.1937695	9.70
Roosevelt.....	110 07 35.28	290 02 14.38	4.0967381	7.77
Taft.....	178 44 29.56	358 44 16.52	4.3349208	13.44
Halfway.....	210 38 06.34	30 41 05.85	4.1002074	7.99
Vernal.....	232 44 59.20	52 44 27.34	4.4154198	16.17
White.....	314 02 41.84	134 09 55.28	4.3452465	13.76
Ouray.....	349 21 03.22	169 22 04.93	4.0882917	7.62

## RED, UNTA COUNTY, UTAH.

On summit of Red Mountain, 10 miles north of Vernal. Good view in all directions; wagon road from Vernal to within one-fourth mile of station.

Signal and reference mark: A quadripod with targets, distance 2.5 feet, true azimuth  $197^{\circ} 41'$ .

Station mark: Tablet in solid rock.

[Latitude  $40^{\circ} 35' 39.62''$ . Longitude  $109^{\circ} 33' 14.78''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Little Mountain.....	63 10 57.62	243 05 18.88	4.1378363	8.54
Marsh.....	119 20 54.22	299 10 11.76	4.4241722	10.80
Tabernacle.....	354 40 28	174 41 09	4.1963837	9.77
Vernal.....	358 39 29.50	178 39 44.88	4.3777653	14.83

## ROOSEVELT, UNTA COUNTY, UTAH.

On a sharp butte 3 miles east of Roosevelt, 1 mile south of road from Roosevelt to Fort Duchesne.

Station mark: Tablet in solid rock.

Signal: A cairn over station mark.

[Latitude  $40^{\circ} 16' 35.38''$ . Longitude  $109^{\circ} 55' 45.93''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Taft.....	212 56 05.29	33 01 13.79	4.3150383	12.84
Halfway.....	249 36 27.71	69 44 48.52	4.2899423	12.11
Randlett.....	290 02 14.38	110 07 35.28	4.0967381	7.77
Ouray.....	319 19 58.52	139 26 20.81	4.3327866	13.37

## TAFT, UNTA COUNTY, UTAH.

On a long bare ridge running northeast one-half mile west of Deep Creek, 2 miles north of Taft post office.

Station mark: Tablet in boulder.

Signal: Quadripod with targets, distance from station 3.8 feet, true azimuth  $83^{\circ} 35'$ .

[Latitude  $40^{\circ} 25' 57.16''$ . Longitude  $109^{\circ} 47' 49.40''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Roosevelt.....	33 01 13.79	212 56 05.29	4.3150383	12.84
Marsh.....	175 10 04.60	355 08 52.21	4.4922556	19.30
Little Mountain.....	215 17 33.57	35 21 23.30	4.1587528	8.96
Vernal.....	285 27 48.81	105 37 31.15	4.3421958	13.66
Halfway.....	326 20 16.21	146 23 29.13	4.1030978	7.88
Randlett.....	358 44 16.52	178 44 29.56	4.3349208	13.44

## VERNAL, UNTA COUNTY, UTAH.

On a range of bare hills 5 miles south of Vernal. Vernal and Fort Duchesne wagon road crosses ridge 1 mile west of station.

Station mark: Tablet in boulder.

Signal and reference mark: Large rock cairn, distance from station 5 feet, true azimuth  $304^{\circ} 02'$ .

[Latitude 40° 22' 46.12". Longitude 109° 32' 51.09".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Nipple.....	3 03 54.53	183 03 02.30	4.5545964	22.28
White.....	8 55 08.98	188 52 55.72	4.4953532	19.58
Ouray.....	33 44 06.98	213 35 41.30	4.5232847	20.73
Cone.....	38 41 22.87	218 30 09.70	4.5964331	24.53
Randlett.....	52 54 27.34	232 44 59.20	4.4154198	16.17
Halfway.....	71 50 21.23	251 43 52.27	4.1737941	9.27
Deep Creek.....	100 04 00	279 54 38	4.3171666	12.90
Taft.....	105 37 31.15	285 27 48.81	4.3421958	13.66
Little Mountain.....	144 02 12.60	323 56 19.23	4.3390033	13.56
Red.....	178 39 44.88	358 39 29.50	4.3777653	14.83

**VERNAL TABERNACLE, UNTA COUNTY, UTAH. (Not occupied.)**

Station mark: Center of spire of Mormon Tabernacle at Vernal.

[Latitude 40° 27' 12.27". Longitude 109° 32' 12.89".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Vernal.....	6 15 52	186 15 26	3.9163974	5.13
Little Mountain.....	124 35 03	304 28 44	4.2216261	10.35
Red.....	174 41 09	334 40 29	4.1963837	9.77

**WHITE, UNTA COUNTY, UTAH.**

On the east end of a high ridge 5 miles east of Ouray, 1 mile north of White River; wagon road from Watson to Ouray passes one-half mile south of station.

Station mark: Tablet in boulder over which is a cairn for signal.

[Latitude 40° 05' 56.62". Longitude 109° 36' 17.38".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Cone.....	90 52 31.61	270 43 33.27	4.2966286	12.30
Ouray.....	103 54 45.63	283 48 34.30	4.1479058	8.74
Randlett.....	134 09 55.28	314 02 41.84	4.3452465	13.76
Halfway.....	160 37 51.86	340 33 37.23	4.4481970	17.44
B. M. ....	179 05 58.63	359 05 51.93	3.9360875	5.36
Vernal.....	188 52 55.72	8 55 08.98	4.4953532	19.58
Nipple.....	327 31 50.12	147 33 10.85	3.7431804	3.44

**Camels Back, Dunstein, Fort Douglas, McDowell Mountain, Mammoth, Mercur, Provo, and Saltair 30' quadrangles.**

**JUAB, MILLARD, SALT LAKE, TOOELE, AND UTAH COUNTIES.**

The following positions on North American datum were determined by primary triangulation by Charles F. Urquhart in July, August, and September, 1915. The values are based upon United States Coast and Geodetic Survey stations Mount Nebo and Deseret.

Three stations of the United States Coast and Geodetic Survey were occupied and six were tied to by intersections. Ten new primary points were established and 35 secondary points were located by intersections. Bingham Geological Survey station, located by the three-point method by R. U. Goode in 1899, and Mammoth Peak (Eureka), located by same method by S. S. Gannett in 1896, were relocated.

**ALPINE, UTAH COUNTY, UTAH. (Not occupied.)**

Station is the highest point of mountain peak about 5 or 6 miles north of Alpine. It is about 4 miles southeast of Lone Peak Needle and not so high, but very prominent.

[Latitude  $40^{\circ} 29' 24.931''$ . Longitude  $111^{\circ} 41' 44.424''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Lake.....	42 31 34.03	222 21 53.40	Log. meters. Miles.
Cedar Point.....	70 56 23.93	250 45 16.60	4.4958027 19.460
Herriman.....	80 38 33.31	260 18 59.57	4.4091974 15.942
			4.6356300 26.852

**ANT HILL, UTAH COUNTY, UTAH.**

On a sagebrush hill about 10 miles southeast of Fairfield and about 15 miles north-northwest from Gothen. The Fairfield-Goshen road passes within a mile of point where it crosses the divide between Cedar Valley and Goshen Valley. Can be easily reached on horseback from any direction.

Signal: A rock cairn 6 feet at base and 7 feet high.

Station mark: A United States Geological Survey bronze triangulation tablet set under center of signal in solid rock.

[Latitude  $40^{\circ} 07' 55.364''$ . Longitude  $111^{\circ} 59' 46.707''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Boulder.....	• ′ ″	• ′ ″	Log. meters. Miles.
Lava.....	50 12 21.25	230 04 37.76	4.3469113 13.812
Lone Cedar.....	126 21 38.61	306 15 36.56	4.2168994 10.239
Fairfield.....	136 15 03.36	316 06 42.75	4.4228777 16.452
Herriman.....	148 42 14.03	328 38 12.19	4.2315855 10.591
Tank.....	152 19 05.13	332 11 15.41	4.5666387 22.908
Cedar Point.....	162 14 35.10	342 11 36.37	4.3309479 13.314
Lake.....	182 18 50.49	2 19 25.23	4.4967032 19.501
Provo No. 2.....	194 46 57.55	14 48 57.73	4.2384524 10.710
Y.....	240 38 55.53	60 54 45.31	4.6004240 24.761
Springville.....	247 52 47.81	68 07 20.64	4.5379087 21.442
Spanish Fork.....	251 24 46.18	71 41 48.24	4.5965579 24.542
Santaquin.....	276 47 10.91	97 05 19.09	4.6052714 25.039
Nebo.....	297 15 05.78	117 29 30.25	4.5545058 22.277
	331 01 08.29	151 10 01.35	4.6009874 25.313

**BENNIION, TOOKELE COUNTY, UTAH.**

On the summit of a high rocky peak at the source of Pine Canyon. There are two peaks to the north of it with about the same elevation. There is no local name for this mountain. It is about 10 miles in an air line south-southwest of Vernon and about 4 miles southwest of Israel Bennion's ranch. Can be reached on horseback by going up Pine Canyon. There is a spring in Pine Canyon about a mile below signal, but there is very little feed on the mountain. A party may camp at Mr. Bennion's ranch.

Signal and station mark: A spruce tree supported in a cleft in the solid rock by a small rock cairn.

Reference mark: A United States Geological Survey triangulation tablet set in top of high rock on north end of peak.

[Latitude 39° 58' 05.263". Longitude 112° 32' 23.275".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Skull.....	98 03 15.00	277 56 12.32	4.1974047	9.789
Granite.....	104 34 53.76	284 06 41.11	4.8085240	39.983
Castle.....	113 49 45.82	293 33 40.81	4.5890038	24.119
Round Top.....	136 12 59.87	318 05 41.51	4.3674218	14.480
Scrub.....	149 28 05.15	329 11 29.72	4.8534148	44.337
Deseret.....	172 08 03.84	352 04 44.12	4.7263053	33.087
Stokey.....	179 28 53.87	359 28 46.63	4.4672738	18.223
South.....	187 45 46.03	7 49 05.54	4.7314782	33.483
Faust.....	209 07 25.38	29 13 14.85	4.4211952	16.389
Herriman.....	210 35 52.00	30 49 06.02	4.7556079	35.396
Vernon.....	218 34 46.80	36 38 53.50	4.1830661	9.471
Center.....	220 30 21.32	40 36 29.57	4.3192931	12.961
Lava.....	231 34 08.69	51 49 07.53	4.6244640	26.171
Topliff.....	235 34 55.84	55 47 34.06	4.5288057	20.997
Lake.....	236 45 08.32	57 08 09.47	4.7819410	37.609
Boulter.....	265 47 16.46	86 00 31.19	4.4684884	18.274
Sabie.....	276 34 50.71	96 42 30.41	4.2328388	10.622
Eureka.....	278 47 13.85	99 04 03.61	4.5772146	23.473
Nebo.....	286 00 56.81	106 30 43.85	4.8385542	42.845
Sunrise.....	294 24 14.98	114 42 18.98	4.6447713	27.423
Salt Creek.....	297 13 01.04	117 43 39.02	4.8860569	47.798
Dutch.....	302 30 43.67	122 33 02.13	3.7829655	3.770
Maple.....	305 04 19.12	125 12 44.74	4.3594315	14.216
Sevier.....	326 03 11.75	146 15 29.10	4.6910962	30.574
Scipio.....	336 23 18.09	156 36 04.12	4.8553038	44.530

**BINGHAM, SALT LAKE COUNTY, UTAH. (Not occupied.)**

Same as the three-point station located by R. U. Goode and described in Twenty-first Annual Report of the United States Geological Survey, part 1, page 348, as follows:

"On the point on summit of Oquirrh Mountains, south of and about one-fourth mile from wagon road which crosses main divide from Bingham Canyon by way of United States mine to Middle Fork. The station is on the eastern one of two summits.

"Station mark: Rock cairn."

[Latitude 40° 30' 01.439". Longitude 112° 10' 31.037".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Herriman.....	13 11 03.21	193 10 09.85	3.9292942	5.280
Cedar Point.....	300 03 38.36	120 11 11.33	4.2791274	11.816
Lake.....	320 58 51.44	141 07 49.60	4.4936302	19.363

**BOULTER, TOOKEE COUNTY, UTAH.**

Station is on the most western of two high bald peaks about 6 miles east of Lofgreen, a station on the San Pedro, Los Angeles & Salt Lake Railroad, and about 6 miles northwest of Eureka. The mountains are locally known as the Boulter Mountains. Can be reached on horseback from any direction, but the mountain is rather rocky. A party may camp at Lofgreen or Eureka.

Signal: A rock cairn 6 feet high and 6 feet in diameter at the base, supporting a spruce tree in the center.

Station mark: A United States Geological Survey triangulation tablet set in solid rock under center of tree.

[Latitude 40° 00' 13.467". Longitude 112° 11' 46.750".]

To station--	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Scipio.....	0 44 55.02	180 44 31.37	4.8314061	42.146
Sevier.....	2 41 24.25	182 40 30.06	4.6336404	26.729
Maple.....	34 56 17.03	214 51 29.00	4.2700132	11.571
Sabie.....	71 46 26.98	251 40 52.19	4.1145377	8.089
Bennion.....	86 00 31.19	265 47 16.46	4.464884	18.274
Lookout .....	99 38 26.33	279 23 44.56	4.5180057	20.481
Vernon.....	116 41 20.07	296 32 11.18	4.3544334	14.033
Stookey.....	132 46 13.34	312 32 49.19	4.6039360	24.902
Deseret.....	144 19 22.09	324 02 43.67	4.7935244	38.804
South.....	156 55 59.75	336 46 00.60	4.7464508	34.658
Topliff.....	175 18 50.08	355 18 12.30	4.2304960	10.564
Herriman.....	179 48 45.21	359 48 41.01	4.6709339	29.126
Lava.....	188 51 32.48	8 55 14.82	4.3855460	15.097
Cedar Point.....	201 47 39.20	21 55 58.74	4.6914210	30.533
Lake.....	214 40 43.39	34 50 27.62	4.5734780	23.379
Ant Hill.....	230 04 37.76	50 12 21.25	4.3469113	13.812
Y.....	240 50 28.79	61 12 44.52	4.7489157	34.855
Springville.....	243 40 43.36	64 05 28.10	4.7845758	37.751
Spanish Fork.....	260 27 30.52	80 53 20.55	4.7624765	35.961
Santaquin.....	272 25 56.56	92 48 02.67	4.6901980	30.447
Nebo.....	300 02 57.32	120 19 31.61	4.6292985	26.464
Salt Creek.....	313 55 11.67	134 12 37.92	4.7327911	33.585
Eureka.....	314 57 49.00	135 01 24.66	4.0517938	7.001
Sunrise.....	332 11 04.66	152 15 55.52	4.3637293	14.358

## CASTLE, TOOELE COUNTY, UTAH. (Not occupied.)

Highest point of low but very prominent mountain in Skull Valley. All the country near by is desert.

[Latitude 40° 07' 31.022". Longitude 112° 57' 22.851".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Deseret.....	217 00 53.36	37 13 43.11	4.0682447	28.946
Stookey.....	248 34 00.60	68 50 01.00	4.5773784	23.482
Bennion.....	293 33 40.81	113 49 45.82	4.5890038	24.119

## CEDAR POINT, UTAH COUNTY, UTAH.

On the point of a low, bare ridge about 6 miles west-northwest of Lehi, and about 9 miles northeast of Cedar Valley. The road from Lehi to Cedar Valley passes within 2 miles of the point where it joins the road from Riverton to Lehi. Can be easily reached on horseback from any direction.

Signal: A rock cairn 5 feet at base and 5 feet high.

Station mark: A United States Geological Survey bronze triangulation tablet set in solid rock under center of monument.

[Latitude 40° 24' 52.030". Longitude 111° 58' 52.962".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Ant Hill.....	2 19 25.23	182 18 50.49	4.4967032	19.501
Boulder.....	21 55 58.74	201 47 39.20	4.6914210	30.533
Fairfield.....	31 05 10.27	211 00 32.94	4.2924258	12.184
Lava.....	33 57 49.89	213 51 12.01	4.4154210	16.172
Tank.....	33 28 22.52	215 24 48.47	4.1286278	8.356
Herriman.....	94 01 09.04	273 52 43.11	4.2637439	11.458
Fowler.....	106 17 30.99	280 10 10.71	4.2289825	10.528
Bingham.....	120 11 11.33	300 03 38.36	4.2791274	11.816
Capitol.....	191 06 24.52	11 10 04.25	4.6135882	25.541
Murray.....	193 49 48.35	15 53 19.94	4.4477362	17.422
Lone Peak.....	236 45 32.95	56 54 20.76	4.3595518	14.220
Alpine.....	250 45 16.60	70 56 23.93	4.4091974	15.942
Timpanogas Flag.....	275 05 25.44	95 18 29.51	4.4570313	17.798
Lehi Temple.....	283 07 34.51	103 12 44.66	4.0640373	7.201
Lehi.....	287 29 12.53	107 34 58.48	4.1206544	8.204
Provo.....	288 39 42.92	108 54 59.17	4.5472876	21.910
Provo No. 2.....	289 28 10.66	109 43 28.40	4.5501625	22.055
Y.....	300 53 47.82	121 07 48.42	4.5535612	22.229
Spanish Fork.....	312 59 56.82	133 17 33.46	4.7240430	32.915
Lake.....	347 58 47.88	168 00 13.61	4.1767220	9.334

## CENTER, TOOKELE COUNTY, UTAH.

On a bald hill about 4 miles northeast of Vernon and about 5 miles south of Faust, a station on the San Pedro, Los Angeles & Salt Lake Railroad. Can be easily reached on horseback from any direction. A party may camp at Vernon or at a ranch near Faust.

Signal: A rock cairn 6 feet in diameter at the base and 7 feet high.

Station mark: A United States Geological Survey bronze triangulation tablet under center of cairn.

[Latitude 40° 07' 39.089". Longitude 112° 22' 51.054".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Dutch.....	23 54 00.56	203 50 11.09	4.3200949	12.985
Bennion.....	40 36 29.57	220 31 21.32	4.3192631	12.901
Vernon.....	51 04 15.26	231 02 13.66	3.7594766	3.571
Lookout.....	63 42 31.97	243 34 56.88	4.2714403	11.609
Stookey.....	134 22 21.91	314 16 05.41	4.28573657	11.987
Deseret.....	150 38 35.53	330 29 05.45	4.0270070	26.324
South.....	170 37 07.55	350 34 17.27	4.5803847	23.645
Faust.....	174 26 30.21	354 24 11.15	3.8582885	4.484
East Poplar.....	189 56 21.19	9 58 01.49	4.3273009	13.202
Herriman.....	205 04 17.15	25 11 22.40	4.5634045	22.738
Lone Cedar.....	216 14 38.31	36 21 11.55	4.3860946	15.116
Lava.....	242 08 51.27	62 17 42.29	4.3428643	13.678
Lake.....	245 03 13.70	65 20 07.50	4.6119155	25.425
Topliff.....	257 21 37.19	77 28 07.62	4.1669033	9.127
Sabie.....	349 11 53.00	169 13 25.20	4.2587933	11.276

## CLOVER, TOOKELE COUNTY, UTAH. (No check; not occupied.)

Station is center of cupola on church at Clover, a post office in Rush Valley.

[Latitude 40° 20' 22.130". Longitude 112° 27' 38.378".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Stookey.....	34 50 39.83	214 47 28.32	4.0881213	7.612
South.....	182 18 58.10	2 19 13.69	4.1406747	8.710

## DESERET, TOOKEE COUNTY, UTAH.

United States Coast and Geodetic Survey station, described as follows in United States Coast and Geodetic Survey Special Publication 19:

"On the summit of the highest peak of the Onaqui Mountains, about 8 miles a little west of south from Grantsville and about 12 miles east of Stockton. The station is marked by a copper bolt set in solid rock between the bases of three small piers used for mounting the instrument. The station is nearly surrounded by a ring wall of rocks 4 feet high, with an inner diameter of 11 feet. Three reference marks are just outside the wall at the following distances and azimuths from the station: 3.10 meters,  $322^{\circ} 53'$ ; 2.18 meters,  $88^{\circ} 08'$ ; and 2.62 meters,  $198^{\circ} 38'$ . Deseret latitude station, marked by a stone and brick pier, is 10.85 meters from station in azimuth  $27^{\circ} 42'$ ." (Page 131.)

The circular wall described above had caved in on the east side, so a rock monument 10 feet at base and 9 feet high, was built around the pier used by the Coast Survey.

The best camping place on the east side of the mountain is at Mr. Wrathall's ranch, on Box Elder Creek. Go from this ranch over low divide to South Willow Creek; thence up South Willow Creek to foot of peak; thence on foot to summit.

The Coast Survey describes the station as being 10 miles east of Stockton, when it should be west.

[Latitude  $40^{\circ} 27' 35.301''$ . Longitude  $112^{\circ} 37' 32.551''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Skull.....	9 17 03.49	189 13 18.48	4.7094298	31.826
Round Top.....	13 45 56.04	193 41 55.55	4.5681320	22.987
Castle.....	37 13 43.11	217 00 53.36	4.6682447	28.948
Tree.....	53 29 16.48	233 25 20.36	4.0286209	6.637
Granite.....	56 20 07.20	235 53 06.23	4.8197025	41.025
Scrub.....	106 41 18.99	286 27 59.56	4.4806348	18.793
Onaqui.....	133 23 19.92	3 23 45.93	4.2019090	9.891
Smealter.....	253 27 41.48	73 43 20.32	4.5499679	22.045
Tooole.....	253 44 57.28	73 58 11.63	4.4769088	18.632
South.....	267 24 28.66	87 31 09.86	4.1637472	9.059
Herriman.....	275 47 18.30	96 03 56.83	4.5619576	22.662
Lone Cedar.....	296 03 04.12	116 19 09.82	4.5930705	24.346
East Poplar.....	303 03 01.94	123 14 13.77	4.4654817	18.143
Lava.....	303 21 07.76	123 39 31.22	4.6835226	29.983
Nebo.....	314 14 12.20	134 47 27.68	5.0118874	63.861
Boulder.....	324 02 43.67	144 19 22.09	4.7955244	38.804
Sable.....	336 01 18.44	156 12 20.10	4.7770450	37.187
Scipio.....	343 02 15.28	163 18 23.66	5.0925837	76.901
Stookey.....	343 15 20.46	163 18 33.45	4.3882959	15.193
Bennion.....	352 04 44.12	172 08 03.84	4.7263053	33.087

## DUTCH, TOOKEE COUNTY, UTAH. (Not occupied.)

Highest point of prominent mountain locally known as "Dutch Peak," about 10 miles a little west of south from Vernon.

[Latitude  $39^{\circ} 57' 19.482''$ . Longitude  $112^{\circ} 28' 47.740''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Bennion.....	122 33 02.13	302 30 43.67	3.7829655	3.770
Center.....	203 50 11.09	23 54 00.58	4.3200949	12.985
Sable.....	263 46 37.92	83 51 59.04	4.0768704	7.417

**EAST POPLAR, TOOKELE COUNTY, UTAH. (Not occupied.)**

The eastern one of two very prominent trees on Bates Creek, about a mile below the Bates ranch. The road from Fairfield to Stockton passes on the east side of point and by the Bates ranch. This is the only ranch between Fairfield and Stockton.

[Latitude 40° 18' 57.589". Longitude 112° 20' 15.734".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Center.....	9 58 01.49	189 58 21.19	4.3273009	13.202
Stookey.....	66 57 08.21	246 49 10.55	4.2781866	11.791
Deseret.....	123 14 13.77	303 03 01.94	4.4654817	18.148
South.....	149 18 59.65	329 14 28.39	4.2861388	12.009
Lava.....	304 00 04.61	124 07 16.27	4.2798307	11.835

**EUREKA (MAMMOTH PEAK), TOOKELE COUNTY, UTAH. (Not occupied.)**

The highest point of a prominent peak south of the town of Eureka, one-half mile east of Mammoth mine—the same point located by the United States Geological Survey for control of the Tintic quadrangle, in 1896, called Mammoth Peak.

Station mark: A cairn on highest part of summit.

[Latitude 39° 55' 55.191". Longitude 112° 06' 11.021".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bennion.....	99 04 03.61	278 47 13.85	4.5772146	23.473
Sabie.....	100 53 20.79	280 44 10.67	4.3160795	12.866
Boulder.....	135 01 24.66	314 57 49.00	4.0517938	7.001

**FAIRFIELD, UTAH COUNTY, UTAH. (Not occupied.)**

Smokestack on an old mill on west side of village of Fairfield, about 10 miles southeast of Lehi.

[Latitude 40° 15' 47.401". Longitude 112° 06' 01.402".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Lava.....	42 34 20.08	222 32 19.60	3.8141584	4.050
Cedar Point.....	211 00 32.94	31 05 10.27	4.2924258	12.184
Lake.....	260 55 16.29	81 01 18.85	4.1276734	8.337
Ant Hill.....	328 38 12.19	148 42 14.03	4.2315855	10.591

**FAUST, TOOKELE COUNTY, UTAH. (Not occupied.)**

Center of water tank at Faust station on the San Pedro, Los Angeles & Salt Lake Railroad. There is no town at this station.

[Latitude 40° 11' 31.941". Longitude 112° 23' 20.601".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bennion.....	29 13 14.85	209 07 25.38	4.4211952	16.389
Stookey.....	115 43 34.98	295 37 37.31	4.1623178	9.030
South.....	169 43 12.31	349 40 41.04	4.4893477	19.173
Herriman.....	211 57 54.31	32 05 18.96	4.4458073	19.018
Lava.....	261 14 47.38	81 23 57.83	4.3006160	12.675
Center.....	354 26 11.15	174 26 30.21	3.8582885	4.484

**FOWLER, SALT LAKE COUNTY, UTAH. (Not occupied.)**

Rock cairn built by Mr. Fowler on the east side of the range and about 3 miles north-northeast of Herriman triangulation station.

[Latitude  $40^{\circ} 27' 52.951''$ . Longitude  $112^{\circ} 10' 11.723''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Herriman.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Cedar Point.....	29 02 33.75	209 01 27.89	3.6924631	3.063
Lake.....	289 10 10.71	109 17 30.99	4.2280+25	10.528
	316 34 43.57	136 43 29.03	4.4452791	17.323

**GRANITE, TOOKEE COUNTY, UTAH. (Not occupied.)**

On highest point of Granite Mountain, a well-known peak. It was located by the United States Coast and Geodetic Survey.

[Latitude  $40^{\circ} 07' 42.220''$ . Longitude  $113^{\circ} 16' 13.478''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Deseret.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Stookey.....	235 55 06.23	56 20 07.20	4.8197025	41.025
Bennion.....	237 34 37.03	78 02 47.07	4.8019684	39.384
	284 06 41.11	104 34 53.76	4.8085240	39.983

**HERRIMAN, UTAH AND TOOKEE COUNTIES, UTAH.**

Herriman is a point located by the United States Coast and Geodetic Survey on which there was no signal. It is one of the highest points of the Oquirrh Range, but probably lower than the Flat Top Mountain, northwest of Cedar Valley. It is on the line between Utah and Tooele counties and about 2 miles south of Salt Lake County. Both the north and south forks of creek known as West Canyon head at the peak and flow east. The source of Bates Creek is also at this peak; the creek flows west.

The best way to reach the point on horseback is up the south fork of West Canyon. It can also be reached from the west up Bates Creek.

Signal: A rock cairn 6 feet at base and 6 feet high.

Station mark: A United States Geological Survey tablet set in solid rock under center of monument.

[Latitude  $40^{\circ} 25' 33.109''$ . Longitude  $112^{\circ} 11' 53.255''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Scipio.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Sabie.....	0 21 53.79	180 21 34.21	5.0595560	71.270
Center.....	13 28 41.49	183 23 09.43	4.7192358	32.553
Bennion.....	25 11 22.40	205 04 17.15	4.5634045	22.738
Faust.....	30 49 06.02	210 35 52.00	4.7550079	35.396
Stookey.....	32 05 18.96	211 57 54.31	4.4858073	19.018
Deseret.....	56 15 38.47	230 02 15.02	4.5475088	21.921
South.....	96 03 56.83	275 47 18.30	4.5619576	22.662
Onoqui.....	101 34 14.95	281 24 17.42	4.3453741	13.763
Bingham.....	119 11 57.76	298 58 43.77	4.6038886	25.104
Fowler.....	193 10 09.85	13 11 03.21	3.9292942	5.280
Capitol.....	209 01 27.89	29 02 33.75	3.6924631	3.063
Murray.....	213 50 13.03	34 02 20.60	4.6728449	29.255
Lone Peak.....	225 15 31.09	45 27 29.90	4.5631845	22.727
Alpine.....	233 10 17.15	73 27 31.54	4.5931168	24.348
Cedar Point.....	260 18 59.57	80 38 33.31	4.6356309	26.852
Lehi Temple.....	273 52 43.11	94 01 09.04	4.2657439	11.458
Lehi.....	277 23 28.61	97 37 04.61	4.4762558	18.603
Provo.....	279 29 34.75	99 43 46.49	4.4973306	19.529
Spanish Fork.....	283 30 17.21	103 53 58.97	4.7267679	33.122
Lake.....	303 04 50.77	123 30 51.78	4.8344067	42.438
Tank.....	306 27 40.63	126 37 31.62	4.4282809	16.638
Nebo.....	319 00 02 39	139 04 53.73	4.2062003	10.059
Ant Hill.....	331 30 20.33	151 47 03.20	4.8806558	48.218
Boulder.....	332 11 15.41	152 19 05.13	4.5666387	22.908
	359 48 41.01	179 48 45.21	4.6709339	29.126

## LAVA, TOOELE AND UTAH COUNTIES, UTAH.

On a peak in a low range of mountains dividing the counties of Tooele and Utah, and about 1 mile south of Fivemile Pass on road between Fairfield and Rush Valley. It is about 4 miles in an air line southwest of Fairfield. It can be reached on horseback from any direction.

**Signal:** A rock cairn 6 feet in diameter at base and 6 feet high.

**Station mark:** A United States Geological Survey triangulation tablet set in a rock which is buried under center of signal.

[Latitude  $40^{\circ} 13' 11.721''$ . Longitude  $112^{\circ} 09' 07.911''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Boulder.	8 55 14.82	188 53 32.48	4.3855400 15.097
Sabie.	29 53 30.01	200 46 12.16	4.5102086 20.117
Topliff.	36 06 41.07	216 04 20.70	3.9412791 5.428
Bennion.	51 49 07.53	231 34 08.69	4.6211640 26.171
Center.	62 17 42.29	212 08 51.27	4.3426843 13.678
Lookout.	63 00 42.62	212 44 16.48	4.6005115 25.285
Faust.	81 23 57.83	261 14 47.38	4.3006160 12.675
Stokey.	95 39 19.87	275 24 11.32	4.5283873 20.758
Deseret.	123 39 31.22	303 21 07.76	4.6835226 29.983
East Poplar.	124 07 16.27	304 00 04.61	4.2798307 11.835
South.	136 52 20.36	316 40 37.04	4.5733417 23.264
Lone Cedar.	151 33 38.19	331 33 19.82	4.0264669 6.604
Tank.	212 14 29.00	32 17 32.85	4.1000032 7.823
Cedar Point.	213 51 12.01	33 57 49.89	4.4154210 16.172
Fairfield.	222 32 19.60	42 34 20.08	3.8141564 4.050
Lake.	248 34 29.81	48 42 32.71	4.2779703 11.785
Provo.	257 45 41.76	78 07 33.64	4.6005637 30.473
Ant Hill.	306 15 36.56	126 21 38.61	4.2168994 10.239
Nebo.	323 53 02.51	144 07 56.91	4.7492308 34.880

## LAKE, UTAH COUNTY, UTAH.

On the northernmost high point of the Lake Mountains, a range on the west side of Utah Lake. It is about 10 miles in an air line southwest of Lehi and about 9 miles east of Fairfield. The summit, about a mile south, is a little higher than point on which station is situated. It can be easily reached on horseback.

**Signal:** A leaning cedar tree with lower branch removed.

**Station mark:** A United States Geological Survey bronze triangulation tablet set in solid rock under center of top of tree.

[Latitude  $40^{\circ} 16' 55.666''$ . Longitude  $111^{\circ} 56' 40.536''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Scipio.	12 52 55.29	192 42 51.02	5.0033861 62.912
Ant Hill.	14 48 57.73	194 46 57.55	4.2364524 10.710
Boulder.	34 50 27.62	214 40 43.39	4.5754788 23.379
Sabie.	44 07 45.69	223 52 25.92	4.6870508 30.227
Bennion.	57 08 09.47	236 45 08.32	4.7819410 37.609
Center.	65 20 07.50	245 03 13.70	4.6119155 25.425
Lava.	66 42 32.71	248 34 29.81	4.2779763 11.785
Fairfield.	81 01 18.85	260 55 16.29	4.1276734 8.337
Stokey.	86 02 54.60	265 39 42.42	4.7078210 31.708
Lone Cedar.	96 13 05.28	276 02 43.50	4.3586957 14.192
Herriman.	126 37 31.62	306 27 40.63	4.4282809 16.658
Fowler.	136 43 29.03	316 34 43.57	4.4452791 17.323
Bingham.	141 07 49.60	320 58 51.44	4.4936302 19.363
Cedar Point.	168 00 13.61	347 58 47.88	4.1767220 9.334
Capitol.	184 59 55.74	5 02 09.12	4.7422145 34.321
Murray.	186 12 53.75	6 14 39.11	4.6221265 26.042
Lone Peak.	210 28 27.46	30 35 48.72	4.4996190 19.632
Lehi Temple.	214 03 51.44	34 09 35.46	4.1631745 9.047
Lehi.	221 26 56.24	41 31 16.02	4.1551509 8.888
Alpine.	222 21 53.40	42 31 34.03	4.4958027 19.460
Timpanogas Flag.	244 27 37.82	64 39 15.12	4.4496181 17.497
Provo No. 2.	264 38 05.71	84 51 56.56	4.4838908 18.934
Springville.	277 04 03.19	97 19 06.51	4.3222988 20.685
Spanish Fork.	303 03 55.30	121 20 05.05	4.6187330 25.828
Santaquin.	320 19 27.98	140 31 53.82	4.6334099 26.721
Nebo.	343 41 13.55	163 48 07.66	4.7364366 33.888

**LEHI, UTAH COUNTY, UTAH. (Not occupied.)**

Large chimney at sugar factory about 1 mile southeast of Lehi.

[Latitude 40° 22' 43.070". Longitude 111° 49' 59.155".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Lake.....	• † 16.02	• † 56.24	4.1554509	8.888
Herriman.....	99 43 46.49	279 29 34.75	4.4974366	19.529
Cedar Point.....	107 34 58.48	287 29 12.53	4.1206544	8.204

**LEHI TEMPLE, UTAH COUNTY, UTAH. (Not occupied.)**

Station mark: Center of steeple on Mormon Temple in the town of Lehi.

[Latitude 40° 23' 26.431". Longitude 111° 50' 54.447".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Lake.....	34 09 35.46	214 05 51.44	4.1631745	9.047
Herriman.....	97 36 04.61	277 23 28.61	4.4762258	18.603
Cedar Point.....	103 12 44.66	283 07 34.51	4.0640373	7.201

**LONE CEDAR, TOOKEE COUNTY, UTAH. (Not occupied.)**

A pine tree near the summit of ridge between Cedar Valley and Mercur Canyon. Wagon road passes this point. It was not occupied and the tree resembled a cedar from other stations. Later it was discovered to be a pine tree.

Station mark: Center of tree.

[Latitude 40° 18' 14.764". Longitude 112° 12' 42.011".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Center.....	• † 11.55	• † 38.31	4.3860946	15.116
Stookey.....	36 21 07.78	216 14 38.31	4.4594684	17.915
Deseret.....	116 19 09.82	296 03 04.12	4.5930705	24.346
South.....	131 09 18.27	310 59 53.07	4.4360830	16.960
Lake.....	276 02 43.50	96 13 05.28	4.3586987	14.192
Ant Hill.....	316 06 42.75	136 15 03.38	4.4228777	16.452
Lava.....	331 33 19.82	151 35 38.19	4.0264669	6.604

**LONE PEAK NEEDLE, UTAH AND SALT LAKE COUNTIES, UTAH. (Not occupied.)**

This point is about 11 miles in an air line from Lehi and was located by the United States Coast and Geodetic Survey. It is the highest point in the vicinity and very prominent.

[Latitude 40° 31' 37.936". Longitude 111° 45' 19.779".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Nebo.....	0 38 10.86	180 37 46.90	4.9006091	49.426
Lake.....	30 35 48.72	210 28 27.46	4.4996190	19.632
Cedar Point.....	56 54 20.76	236 45 32.95	4.3595518	14.220
Herriman.....	73 27 31.54	253 10 17.15	4.5931168	24.348
Spanish Fork.....	338 12 36.10	158 21 27.93	4.7199045	32.603

**LOOKOUT, TOOKEE COUNTY, UTAH. (Not occupied.)**

On the highest point of Lookout Peak, about 8 miles a little south of west from Vernon.

[Latitude  $40^{\circ} 03' 10.189''$ . Longitude  $112^{\circ} 34' 37.724''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Stookey.....	187 38 07.61	7 38 27.07	4.3417620	13.649
Lava.....	242 44 16.48	63 00 42.62	4.6095115	25.285
Center.....	243 34 56.88	63 42 31.97	4.2714403	11.609
Boulder.....	279 23 44.56	99 38 26.33	4.5180057	20.481

**MAPLE, TOOKEE COUNTY, UTAH. (Not occupied.)**

Highest point of very prominent mountain locally known as Maple Peak. It is about 10 miles southwest of Eureka, near the Cherry Creek settlement.

[Latitude  $39^{\circ} 51' 58.275''$ . Longitude  $112^{\circ} 19' 15.446''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bennion.....	125 12 44.74	305 04 19.12	4.3594315	14.216
Sabie.....	171 16 57.08	351 16 10.69	4.0539323	7.035
Boulder.....	214 51 29.00	34 56 17.03	4.2700132	11.571
Nebo.....	277 11 14.85	97 32 35.16	4.6804632	29.772

**MURRAY, SALT LAKE COUNTY, UTAH. (Not occupied.)**

Large chimney at smelter in town of Murray.

[Latitude  $40^{\circ} 39' 26.395''$ . Longitude  $111^{\circ} 53' 27.400''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Lake.....	6 14 59.11	186 12 53.75	4.6223265	26.042
Cedar Point.....	15 53 19.94	195 49 48.35	4.4477362	17.422
Herriman.....	45 27 29.90	225 15 31.09	4.5631845	22.727

**NEBO, JUAB COUNTY, UTAH.**

Station is a United States Coast and Geodetic Survey station, described as follows in Special Publication 19:

"On the southernmost summit of Mount Nebo. The station is marked by a copper bolt in a drill hole in the solid rock. Three small brick piers used in mounting the instrument are about the station, and these in turn are nearly surrounded by a ring wall of rocks 10 to 12 feet in diameter. Four reference marks, each consisting of a drill hole in the rock, are just outside the wall at the following distances and azimuths from the stations: 2.56 meters,  $38^{\circ} 01'$ ; 2.66 meters,  $121^{\circ} 28'$ ; 4.25 meters,  $204^{\circ} 16'$ ; and 3.32 meters,  $309^{\circ} 39'$ .

"Mount Nebo astronomic station, marked by a brick pier, is 23.25 meters (given 25.25 meters in latitude record) from the station in azimuth  $321^{\circ} 35'$ . The vertical circle station is 4.60 meters distant in azimuth  $49^{\circ} 00'$ . The latitude pier is partly surrounded by a square rock wall, and the vertical circle station by a circular wall similar to that about the station, but smaller."

The circular wall described above had been destroyed, and a rock cairn 7 feet in diameter at the base and 9 feet high was erected.

There is a road and trail from Mono, a station on the San Pedro, Los Angeles & Salt Lake Railroad, to station, but some of the trail is rather rough. There is a spring about halfway up the mountain, but very little feed. A snow bank was found about 400 feet below the summit on September 1.

[Latitude  $39^{\circ} 48' 39.113''$ . Longitude  $111^{\circ} 45' 56.918''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Scipio.....	39 20 57.40	219 04 05.85	4.7773613	37.214
Sevier.....	61 10 28.56	240 53 04.21	4.6483730	27.652
Sunrise.....	92 13 47.89	272 02 05.79	4.4166094	16.217
Maple.....	97 32 35.16	277 11 14.85	4.6804632	29.772
Bennion.....	106 30 43.85	286 00 56.61	4.8385542	42.845
Sabie.....	109 35 29.06	289 13 21.03	4.7173868	32.414
Boulder.....	120 19 31.61	300 02 57.42	4.6292985	26.464
Stookey.....	126 29 58.93	305 59 59.53	4.9151530	51.110
Deseret.....	134 47 27.68	314 14 12.20	5.0118874	63.561
Lava.....	144 07 56.91	323 53 02.51	4.7492308	34.580
Ant Hill.....	151 10 01.35	331 01 08.29	4.6099874	25.313
Herriman.....	151 47 03.20	331 30 20.33	4.8898558	48.218
Lake.....	163 48 07.66	343 41 13.55	4.7364366	33.868
Lone Peak.....	180 37 46.90	0 38 10.86	4.9006091	49.426
Santaquin.....	212 24 52.36	32 30 21.73	4.3565866	14.123
Spanish Fork.....	213 26 37.50	33 35 49.25	4.5674605	22.951
Springville.....	200 18 05.73	20 26 10.71	4.7107099	31.920
Salt Creek.....	352 59 15.16	173 00 08.52	4.2121034	10.126

#### ONAQUI, TOOKEE COUNTY, UTAH. (Not occupied.)

A prominent peak in the Onaqui Range, located by the United States Coast Survey. It is about 10 miles west of Grantsville.

[Latitude  $40^{\circ} 36' 10.481''$ . Longitude  $112^{\circ} 36' 52.528''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Deseret.....	3 23 45.93	183 23 19.92	4.2019000	9.891
Herriman.....	298 58 43.77	119 14 57.76	4.6063846	25.104
South.....	318 11 46.96	138 18 02.73	4.2103835	12.698

#### PROVO, UTAH COUNTY, UTAH. (Not occupied.)

Small rock cairn on the northern of two peaks on south side of Provo River, 8 or 10 miles southeast of Provo.

[Latitude  $40^{\circ} 18' 43.827''$ . Longitude  $111^{\circ} 35' 18.193''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Lava.....	78 07 33.64	257 45 41.76	4.8905637	30.473
Herriman.....	103 53 58.97	283 30 17.21	4.7267679	33.122
Cedar Point.....	108 54 59.17	288 39 42.92	4.5472876	21.910

#### PROVO NO. 2, UTAH COUNTY, UTAH. (Not occupied.)

Southern of two peaks on the south side of Provo River, 8 or 10 miles northeast of Provo.

[Latitude  $40^{\circ} 18' 26.057''$ . Longitude  $111^{\circ} 35' 15.821''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Ant Hill.....	60 54 45.31	240 38 55.53	4.6004240	24.761
Lake.....	84 51 56.56	264 38 05.71	4.4838908	18.934
Cedar Point.....	109 43 28.40	289 28 10.66	4.5501625	22.065

**ROUND TOP, TOOKELE COUNTY, UTAH. (Not occupied.)**

On the highest point of a group of hills in Skull Valley, about 15 or 20 miles west of Vernon, a post office in Rush Valley.

[Latitude  $40^{\circ} 08' 10.193''$ . Longitude  $112^{\circ} 43' 44.382''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Deseret.....	193 41 55.55	13 45 56.04	4.5681320	22.987
Stookey.....	231 37 43.09	51 44 56.30	4.3052294	12.548
Bennion.....	316 05 41.51	136 12 59.87	4.3674218	14.480

**SABIE, TOOKELE COUNTY, UTAH.**

A lone peak covered with mahogany brush about 4 miles southwest of Lofgreen, a station on the San Perdo, Los Angeles & Salt Lake Railroad. The trees were cut from the summit. A party can camp at Lofgreen.

Signal and station mark: A mahogany tree 10 feet high supported by a rock cairn 6 feet in diameter at the base and 5 feet high. Azimuth from tree to tablet  $289^{\circ} 32'$ , distance 4.5 feet.

Reference mark: A triangulation tablet set in solid rock.

Instrument was set over center of tablet. The mountain is locally known as Sabie Peak and can be easily reached on horseback from any direction.

[Latitude  $39^{\circ} 58' 01.132''$ . Longitude  $112^{\circ} 20' 27.752''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Dutch.....	83 51 59.04	263 46 37.92	4.0768704	7.417
Bennion.....	96 42 30.41	276 34 50.71	4.2328388	10.622
Vernon.....	151 02 46.03	330 59 12.46	4.2107957	10.096
Stookey.....	151 15 41.06	331 07 52.86	4.4520603	17.632
Deseret.....	156 12 20.10	336 01 18.44	4.7770456	37.187
Centre.....	169 13 25.20	349 11 53.00	4.2587933	11.276
Herriman.....	193 23 09.43	13 28 41.49	4.7192358	32.553
Topliff.....	207 28 56.73	27 33 54.29	4.3749297	14.733
Lava.....	209 46 12.16	29 53 30.01	4.5102086	20.117
Lake.....	233 52 25.92	44 07 45.69	4.6870508	30.227
Boulder.....	251 40 52.19	71 46 26.98	4.1145377	8.089
Eureka.....	280 44 10.67	100 53 20.79	4.3160795	12.866
Nebo.....	289 13 21.03	105 35 29.06	4.7173868	32.414
Sunrise.....	305 10 04.43	125 20 29.33	4.4525140	17.614
Sevier.....	345 00 46.96	165 05 26.23	4.6047707	25.010
Maple.....	351 16 10.69	171 16 57.08	4.0539323	7.035

**ST. JOHN, TOOKELE COUNTY, UTAH. (No check; not occupied.)**

Center of cupola on school building at St. John post office, in Rush Valley.

[Latitude  $40^{\circ} 21' 23.227''$ . Longitude  $112^{\circ} 27' 18.511''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Stookey.....	32 01 40.61	211 58 16.22	4.1486761	8.750
South.....	180 27 55.25	0 27 58.06	4.0835215	7.531

**ST. JOHN RAILROAD STATION, TOOKEE COUNTY, UTAH. (Not occupied. No check.)**

Chimney in center of railroad station at St. John, on the San Pedro, Los Angeles & Salt Lake Railroad.

[Latitude  $40^{\circ} 22' 00.280''$ . Longitude  $112^{\circ} 24' 35.689''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Stookey.....	40 52 32.86	220 47 23.10	4.237595	10.745
South.....	161 12 04.58	341 10 21.73	4.0643992	7.207

**SALT CREEK, JUAB COUNTY, UTAH. (Not occupied by United States Geological Survey.)**

Rock cairn located by the United States Coast and Geodetic Survey. It is on a prominent mountain on south side of Salt Creek near the point where creek enters Juab Valley.

[Latitude  $39^{\circ} 39' 54.642''$ . Longitude  $111^{\circ} 44' 33.450''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Scipio.....	52 59 33.09	232 41 49.97	4.8994370	31.102
Bennion.....	117 43 39.02	297 13 01.04	4.8860569	47.798
Boulier.....	134 12 37.92	313 55 11.67	4.7327911	33.585
Nebo.....	173 00 08.52	352 59 15.16	4.2121034	10.126

**SALT LAKE CITY CAPITOL, SALT LAKE COUNTY, UTAH. (Not occupied.)**

Center of dome on the State Capitol in Salt Lake City.

[Latitude  $40^{\circ} 46' 39.517''$ . Longitude  $111^{\circ} 53' 15.295''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Lake.....	5 02 09.12	184 59 55.74	4.7422145	34.321
Cedar Point.....	11 10 04.25	191 06 24.52	4.6138882	25.541
Herriman.....	34 02 20.60	213 50 13.03	4.6728449	29.255

**SANTAQUIN, UTAH COUNTY, UTAH. (Not occupied.)**

On highest point of high mountain about 10 miles in an air line east of the town of Santaquin on the Utah Central Railroad.

[Latitude  $39^{\circ} 58' 00.939''$ . Longitude  $111^{\circ} 37' 23.413''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Nebo.....	32 30 21.73	212 24 52.36	4.3565546	14.123
Boulier.....	92 48 02.67	272 25 56.56	4.6901980	30.447
Ant Hill.....	117 29 30.25	297 15 05.76	4.5545058	22.277
Lake.....	140 31 53.82	320 19 27.98	4.6334999	26.721

**SCIPIO, MILLARD COUNTY, UTAH. (Not occupied by the United States Geological Survey.)**

Described in United States Coast and Geodetic Survey Special Publication 19, page 134, as follows:

"On the highest peak of the Canon Mountains, east of the town of Oak City, and northwest of the town of Scipio. The station is on the highest part of the summit,

about 10 or 12 feet from the edge of the abrupt slope on the eastern and northeastern side of the peak. The station is marked by a copper bolt set in a drill hole in solid rock. It is also marked, about 15 inches above the bolt, by a drill hole in a flat stone embedded in the top of a low masonry pier used for mounting the instrument. The station is nearly surrounded by a ring wall about 5 feet high, with an inner diameter of about 11 feet. Four reference marks, each a drill hole in solid rock, are just outside the wall at the following distances and azimuths from the station: 2.74 meters,  $177^{\circ} 55'$ ; 2.77 meters,  $284^{\circ} 55'$ ; 2.94 meters,  $41^{\circ} 33'$ ; and 2.47 meters,  $126^{\circ} 51'$ .

[Latitude  $39^{\circ} 23' 34.370''$ . Longitude  $112^{\circ} 12' 23.783''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Bennion.	156 36 04.12	336 23 18.09	4.85534038	44.530
Deseret.	163 18 23.66	343 02 15.28	5.0926837	76.901
Herriman.	180 21 34.21	0 21 53.79	5.0695560	71.270
Boulder.	180 44 31.37	0 44 55.02	4.8314061	42.146
Lake.	192 42 51.02	12 52 55.29	5.0053861	62.912
Nebo.	219 04 05.85	39 20 57.40	4.7773613	37.214
Salt Creek.	232 41 49.97	52 59 33.09	4.6994370	31.102

#### SCRUB, TOOKELE COUNTY, UTAH. (Not occupied.)

Highest point on prominent peak about 20 miles a little north of east of Deseret triangulation station. There is scrub timber on the mountain, probably a summit of Cedar Mountains.

[Latitude  $40^{\circ} 32' 15.053''$ . Longitude  $112^{\circ} 58' 03.525''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Deseret.	286 27 59.56	106 41 18.99	4.4806348	18.703
Stookey.	311 29 19.21	131 45 50.06	4.6834330	29.977
Bennion.	329 11 29.72	149 28 05.15	4.8534148	44.337

#### SEVIER, JUAB COUNTY, UTAH. (Not occupied.)

Tree or cairn on the highest of three rather prominent peaks. It is on the north side of the San Pedro, Los Angeles & Salt Lake Railroad, and about 16 miles in an air line north of Scipio triangulation station.

[Latitude  $39^{\circ} 37' 00.211''$ . Longitude  $112^{\circ} 13' 11.388''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Bennion.	146 15 29.10	326 03 11.75	4.6919962	30.574
Sabie.	165 05 26.23	345 00 46.96	4.6047707	25.010
Boulder.	182 40 30.06	2 41 24.25	4.6336404	26.729
Nebo.	210 53 04.21	61 10 28.56	4.6483730	27.652

#### SKULL, TOOKELE COUNTY, UTAH. (Not occupied.)

Highest point of rather sharp peak in group of hills about 10 miles west of Bennion triangulation station; a flat-topped mountain north of peak is a little higher.

[Latitude  $40^{\circ} 00' 16.314''$ . Longitude  $112^{\circ} 43' 20.922''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Deseret.	189 13 18.48	9 17 03.49	4.7084298	31.826
Stookey.	209 22 02.76	29 28 59.36	4.4935103	19.358
Bennion.	277 56 12.32	98 03 15.00	4.1974047	9.789

**SMELTER, TOOKEE COUNTY, UTAH. (No check; not occupied.)**

Large chimney on smelter at foot of mountains east-northeast of town of Tooele.

[Latitude  $40^{\circ} 33' 00.213''$ . Longitude  $112^{\circ} 13' 27.101''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
South.....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Deseret.....	64 22 00.86 73 43 20.32	244 13 03.53 253 27 41.48	4.3347827 4.5499679	13.432 22.045

**SOUTH, TOOKEE COUNTY, UTAH.**

On the westernmost summit of a low range of mountains connecting the Oquirrh Mountains and the Onaqui Range, about 6 miles west of Stockton, 6 miles south of Grantsville, and 10 miles north of St. John. The road from St. John to Grantsville passes about a mile and a half west of station at point where it crosses the divide. Can be easily reached on horseback from any direction.

Signal: A rock cairn 6 feet at base and 7 feet high.

Station mark: A United States Geological Survey tablet set in solid rock under center of cairn.

[Latitude  $40^{\circ} 27' 56.218''$ . Longitude  $112^{\circ} 27' 14.333''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
St. John.....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Clover.....	0 27 58.06	180 27 55.35	4.0835115	7.531
Bennion.....	2 19 13.69	182 18 58.10	4.1466747	8.710
Stookey.....	7 49 05.54	187 45 46.03	4.7314782	33.453
Deseret.....	17 27 34.74	197 24 07.41	4.4017603	15.671
Onaqui.....	87 31 09.86	267 24 28.66	4.1637472	9.059
Tooele.....	138 18 02.73	318 11 46.96	4.3103835	12.698
Smelter.....	241 34 54.28	61 41 27.17	4.2002018	10.059
Herriman.....	244 13 03.53	64 22 00.86	4.3347827	13.432
Lone Cedar.....	281 24 17.42	101 34 14.95	4.3453741	13.763
Lava.....	310 59 53.07	131 09 18.27	4.4360830	16.960
East Poplar.....	316 40 37.04	136 52 20.36	4.5733417	23.264
Boulder.....	329 14 28.39	149 18 59.65	4.2861388	12.009
St. John R. R. station.....	336 46 00.60	156 55 59.75	4.7464506	34.658
Faust.....	341 10 21.73	161 12 04.58	4.0643992	7.207
Center.....	349 50 41.04	169 43 12.31	4.4893477	19.173

**SPANISH FORK PEAK, UTAH COUNTY, UTAH. (Not occupied.)**

This point was located by the United States Coast and Geodetic Survey and is marked by a rock cairn. It was also occupied by a United States Geodetic Survey party in 1897. It is on the highest point of mountains between Hobble Creek and North Creek and about 6 miles in an air line southeast of Springville.

[Latitude  $40^{\circ} 05' 17.553''$ . Longitude  $111^{\circ} 31' 37.652''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Nebo.....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Boulder.....	33 35 49.25	213 26 37.50	4.5674605	22.951
Ant Hill.....	80 53 20.55	260 27 30.52	4.7624765	35.961
Lake.....	97 05 19.09	276 47 10.91	4.6052714	25.039
Herriman.....	121 20 05.05	301 03 55.30	4.6187330	25.828
Cedar Point.....	123 30 51.78	303 04 50.77	4.8344067	42.438
Lone Peak.....	133 17 33.46	312 59 56.82	4.7240430	32.915
	158 21 27.93	338 12 36.10	4.7199045	32.603

**SPRINGVILLE PEAK, UTAH COUNTY, UTAH. (Not occupied.)**

On highest point of peak, about 5 miles east of Provo.

[Latitude  $40^{\circ} 14' 40.528''$ . Longitude  $111^{\circ} 33' 22.854''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Nebo.....	20 26 10.71	200 18 05.73	4.7107099	31.920
Boulder.....	64 05 28.10	243 40 43.36	4.7835758	37.751
Ant Hill.....	71 41 4x.24	251 24 46.18	4.5905579	24.542
Lake.....	97 19 06.51	277 04 03.19	4.5222986	20.685

**STOOKEY, TOOKEE COUNTY, UTAH.**

On the highest point of the Stansbury Mountains, south of Clover Creek, about 8 miles in an air line southwest of Clover post office. The nearest water and forage is at Alonzo S. Stookey's ranch, about 1 mile west of Clover post office. There is a road and trail from this ranch to summit of peak. There is a small spring three-quarters of a mile west of the peak, but grass is scarce on the mountain.

Signal: A rock cairn 6 feet at base and 7 feet high with spruce tree in center.

Station mark: A United States Geological Survey triangulation tablet set in solid rock under center of tree.

[Latitude  $40^{\circ} 14' 56.084''$ . Longitude  $112^{\circ} 32' 34.501''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Lookout.....	7 38 27.07	187 37 07.61	4.3417620	13.649
Skull.....	29 28 59.36	209 22 02.76	4.4935103	19.358
Round Top.....	51 44 56.30	231 37 43.99	4.3052294	12.548
Castle.....	68 50 01.00	248 34 00.60	4.5773784	23.482
Granite.....	78 02 47.07	257 34 37.03	4.8019684	39.384
Scrub.....	131 45 50.06	311 29 19.21	4.6834340	29.977
Tree.....	137 33 29.25	317 26 20.78	4.3642907	14.376
Deseret.....	163 18 33.45	343 15 20.46	4.3882959	15.193
South.....	197 24 07.41	17 27 34.74	4.4017603	15.671
St. John.....	211 58 16.22	32 01 40.61	4.1486781	8.750
Clover.....	214 47 28.32	34 50 39.83	4.0881213	7.612
St. John railroad station.....	220 47 23.10	40 52 32.84	4.2378595	10.745
Herriman.....	238 02 15.02	56 15 38.47	4.5475088	21.921
East Poplar.....	249 49 10.55	66 57 08.21	4.2781866	11.791
Lone Cedar.....	257 37 16.85	77 50 07.78	4.4598684	17.915
Lake.....	265 39 42.42	86 02 54.60	4.7078210	31.708
Lava.....	275 24 11.32	95 39 19.87	4.5239373	20.758
Topliff.....	289 58 08.14	110 10 55.67	4.4762747	18.605
Faust.....	295 37 37.31	115 43 34.98	4.1623178	9.030
Nebo.....	305 58 59.53	126 29 58.93	4.9151530	51.110
Boulder.....	312 32 49.19	132 46 13.34	4.6039360	24.962
Center.....	314 16 05.41	134 22 21.91	4.2853657	11.987
Sabie.....	331 07 52.86	151 15 41.06	4.4529603	17.632
Vernon.....	331 18 39.41	151 22 54.03	4.2895084	12.102
Bennion.....	359 28 46.63	179 28 53.87	4.4672738	18.223

**SUNRISE, TOOKEE AND JUAB COUNTIES, UTAH. (Not occupied.)**

The highest point of a prominent, long mountain at the west end of Mead Valley and probably on county line between Juab and Tooele counties.

[Latitude  $39^{\circ} 49' 10.600''$ . Longitude  $112^{\circ} 04' 13.413''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Bennion.....	114 42 18.99	294 24 14.98	4.6447713	27.423
Sabie.....	125 20 29.33	305 10 04.43	4.4525140	17.614
Boulder.....	152 15 55.52	332 11 04.66	4.3637293	14.358
Nebo.....	272 02 05.79	92 13 47.89	4.4166094	16.217

## TANK, UTAH COUNTY, UTAH. (Not occupied.)

Water tank on railroad between Lehi Junction and Topliff, about 2 miles east of Cedar Fort.

[Latitude  $40^{\circ} 18' 56.853''$ . Longitude  $112^{\circ} 04' 23.461''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Lava.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
	32 17 32.85	212 14 29.00	4.1000052	7.823
Herriman.....	139 04 53.73	319 00 02.39	4.2092003	10.059
Cedar Point.....	215 24 48.47	35 28 22.52	4.1286278	8.356
Ant Hill.....	342 11 36.37	162 14 35.10	4.3309479	13.314

## TIMPANAGOS FLAG, UTAH COUNTY, UTAH. (No check; not occupied.)

Metal flag near the summit of Timpanagos Mountain, a very high mountain about 12 miles east of Lehi. Flag was established by citizens of Pleasant Grove in 1915.

[Latitude  $40^{\circ} 23' 27.875''$ . Longitude  $111^{\circ} 38' 43.269''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Lake.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Cedar Point.....	64 39 15.12	244 27 37.82	4.4496181	17.497
	95 18 29.51	275 05 25.44	4.4576313	17.798

## TOOELE, TOOELE COUNTY, UTAH. (No check; not occupied.)

Center of cupola on a building (probably school) in town of Tooele.

[Latitude  $40^{\circ} 32' 05.546''$ . Longitude  $112^{\circ} 17' 09.380''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
South.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Deseret.....	61 41 27.17	241 34 54.28	4.2092018	10.059
	73 58 11.63	253 44 57.28	4.4769088	18.632

## TOPLIFF, TOOELE COUNTY, UTAH. (Not occupied.)

Center of derrick near water tank at railroad station and post office, Topliff.

[Latitude  $40^{\circ} 09' 22.862''$ . Longitude  $112^{\circ} 12' 45.439''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Sabie.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Bennion.....	27 33 54.29	207 28 56.73	4.3749297	14.733
Center.....	55 47 34.06	235 34 55.84	4.5288057	20.997
Stookey.....	77 28 07.62	257 21 37.19	4.1660933	9.127
Lava.....	110 10 55.67	289 58 08.14	4.4762747	18.605
Boulder.....	216 04 20.70	36 06 41.07	3.9412791	5.428
	355 18 12.30	173 18 50.08	4.2304960	10.564

**VERNON, TOOKEE COUNTY, UTAH. (Not occupied.)**

Center of cupola on Mormon Church at Vernon, a post office in Rush Valley.

[Latitude  $40^{\circ} 05' 41.955''$ . Longitude  $112^{\circ} 25' 59.801''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Bennion.....	• ' " 36 38 53.50	• ' " 216 34 46.80	4.1830661	9.471
Stoekey.....	151 22 54.03	331 18 39.41	4.2895084	12.102
Center.....	231 02 13.66	51 04 15.26	3.7594769	3.571
Boulder.....	296 32 11.18	116 41 20.07	4.3544334	14.053
Sable.....	330 59 12.46	151 02 46.03	4.2107957	10.096

**Y, UTAH COUNTY, UTAH. (Not occupied.)**

Bottom of a large "Y" placed on side of mountain by students of Brigham Young College, in Provo. It is just above the town of Provo.

[Latitude  $40^{\circ} 14' 54.448''$ . Longitude  $111^{\circ} 37' 14.161''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Boulder.....	• ' " 61 12 44.52	• ' " 240 50 28.79	4.7189157	34.855
Ant Hill.....	68 07 20.64	247 52 47.81	4.5379087	21.412
Cedar Point.....	121 07 48.42	300 53 47.82	4.5535612	22.229

## UTAH AND IDAHO.

### TRIANGULATION STATIONS.

#### Logan quadrangle.

##### CACHE AND RICH COUNTIES, UTAH; ONEIDA COUNTY, IDAHO.

During the field season of 1913 triangulation was extended over part of Cache County, Utah, by H. H. Hodgeson. The old stations, Swan Creek and Red Spot (see pp. 134, 135), both in Rich County, were occupied as base stations.

The following positions were computed on North American datum, accepting the azimuth and distance Swan Creek to Red Spot given in Bulletin 496 (pp. 354, 355).

#### BEAVER, CACHE COUNTY, UTAH. (Not occupied; unchecked.)

Summit near point of ridge between Beaver and Logan creeks and about 0.7 mile north from the junction of these creeks. Elevation above sea, 8,845 feet.

[Latitude  $41^{\circ} 57' 50.9''$ . Longitude  $111^{\circ} 33' 27.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Logan Peak.....	25 32 43	205 26 20	4.48851	19.14
Naomi.....	59 09 06	239 04 24	4.05430	7.04

#### BERGESON, CACHE COUNTY, UTAH.

On summit of bare hill about 3 miles southwest from Cornish Railroad station on land belonging to Ephraim Bergeson and locally known as Bergeson Hill. This station can be easily reached by road and trail from the ranch of Ephraim Bergeson, which is located about 2 miles south of Cornish Railroad station. Can take animals to station. Approximate elevation above sea 6,000 feet.

Signal: Six-foot cairn directly over station mark.

Station mark: Bronze triangulation tablet cemented in rock.

Reference marks: Cross cut in quartz rock 54.7 feet distant from center in true azimuth  $124^{\circ} 22'$ ; cross cut in quartz rock 69.3 feet distant from center in true azimuth  $147^{\circ} 00'$ . Distance between witness marks is 28.3 feet.

[Latitude  $41^{\circ} 59' 38.94''$ . Longitude  $111^{\circ} 59' 58.99''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	1 37 50 81	181 37 18.96	4.5893712	24.139
Naomi.....	288 38 56.78	108 51 58.88	4.4541738	17.682
Logan Peak.....	322 53 26.53	143 04 45.48	4.5094119	24.227
Newton.....			4.04870	6.95
Logan College.....			4.50600	19.92
Logan Temple.....			4.50770	20.00
Cache Junction elevator.....			4.24263	10.86
Smart Mountain.....			4.17364	9.27
T. 14 N., Rs. 1 E. and 1 W. Salt Lake meridian, crossroads at corner to secs. 13, 18, 19, and 24.....			4.00733	6.32

**CACHE JUNCTION ELEVATOR, CACHE COUNTY, UTAH. (Not occupied.)**

Center of gray-roofed elevator at Cache Junction, Utah.

Signal and station mark: Center of elevator.

[Latitude  $41^{\circ} 50' 12.4''$ . Longitude  $112^{\circ} 00' 13.6''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Wellsville.....	2 03 27	182 03 05	4.32972	13.28
Logan Peak.....	299 42 09	119 33 36	4.43888	17.97
Naomi.....			4.45571	17.74
Bergeson.....			4.24263	10.86

**LOGAN COLLEGE, CACHE COUNTY, UTAH. (Not occupied.)**

Spire on main building of Utah State College at Logan.

Signal: Center of spire.

[Latitude  $41^{\circ} 44' 28.0''$ . Longitude  $111^{\circ} 48' 40.8''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Wellsville.....	57 09 28	237 01 31	4.29552	12.27
Logan Peak.....	290 34 37	110 38 28	3.93464	5.35
Bergeson.....			4.50600	19.92

**CLARKSTON, CACHE COUNTY, UTAH. (Not occupied; unchecked.)**

North summit of Clarkston Mountains about 8 miles west from the town of Clarkston. Approximate elevation above sea, 8,245 feet.

Signal: Apparent highest point of summit.

[Latitude  $41^{\circ} 55' 28.7''$ . Longitude  $112^{\circ} 07' 37.1''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Naomi.....	272 01 52	92 19 58	4.57451	23.33
Logan Peak.....	304 22 04	124 38 29	4.61623	25.68

**LOGAN PEAK, CACHE COUNTY, UTAH.**

On summit of Logan Peak, on south side of Logan River and about 7 miles southeast from the city of Logan. This station can easily be reached from Logan River by road and log slides up Spring Creek. The nearest water is in the head of Providence Canyon, just south of station. Elevation of Logan Peak is 9,723 feet. Can take animals to station.

Signal: Bushy top pine guyed by wires. Limestone cairn around base of pine and the guy wires are anchored by stone mounds.

Station mark: Bronze triangulation tablet cemented in limestone rock and directly beneath signal.

Reference marks: Cross cut in limestone rock 40.7 feet distant from center, true azimuth  $261^{\circ} 31'$ . Cross cut in limestone rock 46.7 feet distant from center, true azimuth  $37^{\circ} 09'$ .

[Latitude  $41^{\circ} 42' 49.88''$ . Longitude  $111^{\circ} 43' 01.43''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Sharp.....	• ' "	• ' "	4.47482	18.54
Tit.....	1 38 18	181 37 54	4.56015	22.57
Wellsville Tabernacle.....	9 55 56	189 52 56	4.29649	12.30
Wellsville.....	64 45 17	244 36 43	4.4118940	16.042
T. 11 N., R. 1 W. Salt Lake meridian, northwest corner of sec. 27.....	72 44 37.44	252 32 49.04		
T. 11 N., R. 1 W. Salt Lake meridian, north corner of secs. 1 and 2.....	76 13 46	256 04 32	4.29770	12.33
Tps. 11 and 12 N., Rs. 1 E. and 1 W. Salt Lake meridian, corner to.....	96 04 44	275 57 01	4.20924	10.06
Logan Temple.....	96 43 30	276 36 33	4.16454	9.08
Logan College.....	104 01 08	283 56 44	3.97671	5.89
Narrows.....	110 38 28	290 34 37	3.93464	5.35
Cache Junction elevator.....	117 40 54	297 27 46	4.48895	19.16
Clarkston.....	119 53 36	299 42 09	4.43888	17.07
Bergeson.....	124 38 29	304 22 04	4.61623	25.68
T. 14 N., Rs. 1 E. and 1 W. Salt Lake meridian, crossroads at corner to secs. 13, 18, 19, and 24.....	143 04 45.48	322 53 26.53	4.5909419	24.227
Smart Mountain.....	150 24 04	330 16 58	4.47418	18.52
Naomi.....	165 34 19	345 29 59	4.5594	22.35
Beaver.....	189 04 26.85	9 06 06.41	4.3475412	13.832
Swan Creek.....	205 26 20	25 32 43	4.48851	19.14
Red Spot.....	215 09 59.71	35 20 05.09	4.5565565	22.538
	289 32 04.28	109 44 15.92	4.4317904	16.794

## LOGAN TEMPLE, CACHE COUNTY, UTAH. (Not occupied.)

West spire on Mormon Temple in city of Logan, Utah.

Signal and station mark: Center of west spire.

[Latitude  $41^{\circ} 44' 04.1''$ . Longitude  $111^{\circ} 49' 39.3''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Wellsville.....	57 08 57	237 01 33	4.26449	11.42
Logan Peak.....	283 56 44	104 01 08	3.97671	5.89
Bergeson.....			4.50770	20.00

## NAOMI, CACHE COUNTY, UTAH.

On highest point of rocky, limestone mountain (occupied by the Wheeler Survey) locally known as Naomi Peak. At head of Smithfield and Tony Grove canyons, about 9 miles northeast from town of Smithfield, Cache County, Utah. This station overlooks Cache Valley. Best route to peak is up Tony Grove Creek (by trail from Tony Grove ranger station) to within 1.5 miles of its head, thence south into saddle and follow ridge to station. Can take animals to within half a mile of station. Elevation above sea, 9,980 feet.

Signal: Bushy top pine set in mound of stone and directly over station mark.

Station mark: Bronze triangulation tablet cemented in limestone rock at center of mound built by Wheeler Survey.

Reference marks: Cross cut in limestone rock 17.1 feet distant from center, true azimuth  $247^{\circ} 50'$ . Cross cut in limestone rock 18.2 feet distant from center, true azimuth  $353^{\circ} 44'$ .

[Latitude 41° 54' 42.35". Longitude 111° 40' 29.00".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Logan Peak.....	9 06 08.41	189 04 26.85	4.3475412	13.832
Wellsville.....	43 33 58.44	223 20 27.17	4.6115960	25.407
Newton.....	86 19 42	266 08 15	4.37652	14.79
Clarkston.....	92 19 58	272 01 52	4.57451	23.33
Bergeson.....	108 51 58.88	288 38 56.78	4.4541738	17.682
Beaver.....	239 04 24	59 09 06	4.05430	7.04
Swan Creek.....	246 13 09.80	66 21 34.52	4.2786045	11.804
Red Spot.....	324 43 52.93	144 54 24.51	4.5798491	23.616
Cache Junction elevator.....			4.45571	17.74
Narrows.....			4.50172	19.73
Wellsville Tabernacle.....			4.57057	23.12
T. 11 N., R. 1 W., northwest corner of sec. 27.....			4.54540	21.81
T. 11 N., R. 1 W., north corner of secs. 1 and 2.....			4.45028	17.52
Tps. 11 and 12 N., Rs. 1 E. and 1 W., corner of.....			4.43328	16.85

**NARROWS, CACHE COUNTY, UTAH. (Not occupied.)**

Summit of a rocky hill on north side of Bear River at Cache Junction Narrows, about 5 miles northwest of Cache Junction, Utah. Approximate elevation above sea, 5,500 feet.

Signal: Apparent highest point of hill.

[Latitude 41° 50' 32.4". Longitude 112° 02' 44.8".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Logan Peak.....	297 27 46	117 40 54	4.48895	19.16
Wellsville.....	352 54 34	172 55 53	4.34514	13.76
Naomi.....			4.50172	19.73

**NEWTON, CACHE COUNTY, UTAH. (Not occupied.)**

On bare summit of Newton Hill, about 2 miles northeast from town of Newton and 2 miles southwest from town of Trenton. Approximate elevation above sea, 5,700 feet.

Signal: Tripod 12 feet high, 2 by 4 inch, with targets.

Station mark: None.

[Latitude 41° 43' 51.7". Longitude 111° 57' 39.3".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Wellsville.....	8 46 09	188 44 05	4.45408	17.68
Naomi.....	266 08 15	86 19 42	4.37652	14.79
Bergeson.....			4.04870	6.95

**RED SPOT, RICH COUNTY, UTAH.**

On rather high flat-topped ridge at source of Old Canyon Creek, a stream flowing into Bear River. It is about 12 miles a little south of west of Randolph. Station can be reached by road up Old Canyon 7 or 8 miles, thence on horseback the best way you can find up ridge. Numerous quaking asp trees to go through. It can also be reached by going up the Logan road, or from the north by going by the Twin Peaks on horseback.

Signal: A cairn 6 feet high with tree in center.

Station mark: A triangulation tablet set in rock under center of cairn.

[Latitude 41° 37' 55.49". Longitude 111° 24' 41.02".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Sharp.....	51 54 01	231 41 27	4.52562	20.84
Wellsville.....	91 46 42.99	271 42 44.02	4.7002198	31.158
Logan Peak.....	109 44 15.92	289 32 04.28	4.4317904	16.794
Naomi.....	144 54 24.51	324 43 52.93	4.5798491	23.616
Swan Creek.....	173 27 04.71	353 24 56.06	4.5905941	.....
Lakeview.....	202 18 41.01	22 25 54.81	4.5964006	.....
South Twin.....	209 18 49.69	29 21 55.98	4.1210225	.....
Red.....	216 44 55.03	36 59 58.54	4.7169770	.....
Nugget.....	258 15 58.51	78 39 24.61	4.6083003	.....
Randolph.....	258 50 18.49	78 59 20.87	4.2843303	.....
Rex.....	264 03 42.43	84 16 23.13	4.4253802	.....
Limestone.....	283 04 49.60	103 12 05.02	4.1927773	.....
Woodruff.....	300 48 12.21	120 58 06.11	4.3830813	.....

**SHARP, CACHE COUNTY, UTAH. (Not occupied.)**

Sharp timbered west summit of mountain off south edge Logan quadrangle.  
Signal: Apparent highest point.

[Latitude 41° 26' 43.0". Longitude 111° 43' 38.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Logan Peak.....	181 37 54	1 38 18	4.47482	18.54
Red Spot.....	231 41 27	51 54 01	4.52562	20.84
Swan Creek.....			4.80160	39.35

**SMART MOUNTAIN, ONEIDA COUNTY, IDAHO. (Not occupied.)**

The summit of a low mountain locally known as Mount Smart,<sup>1</sup> about 2 miles northwest from town of Franklin, Idaho. Approximate elevation above sea, 5,215 feet.

Signal: Large permanent flagpole.

Station mark: Large permanent flagpole.

[Latitude 42° 01' 38.8". Longitude 111° 49' 31.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	20 11 44	200 04 13	4.65608	28.15
Logan Peak.....	345 29 59	165 34 19	4.55594	22.35
Bergeson.....			4.17364	9.27

**SWAN CREEK, RICH COUNTY, UTAH.**

On highest point of timbered mountain at source of Swan Creek and just above Garden City on Bear Lake. There are higher mountains west of this point.

Signal: A tree trimmed up.

Station mark: A triangulation tablet set in rock 0.7 meter south-southeast from signal.

[Latitude 41° 58' 49.93". Longitude 111° 27' 54.01".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Logan Peak.....	35 20 05.09	215 09 59.71	4.5595365	22.538
Naomi.....	66 21 34.52	246 13 09.80	4.2784445	11.804
Sharp.....			4.80160	39.35
Lakeview.....	276 21 25.74	96 30 50.08	4.2912251	.....
South Twin.....	338 05 27.40	158 10 42.99	4.4667274	.....
Redspot.....	353 24 56.06	173 27 04.71	4.5905941	.....

<sup>1</sup> See p. 173.

## TIT, CACHE COUNTY, UTAH. (Not occupied.)

The timbered west summit of a mountain group known in the vicinity of Logan as the Eastern Range.

Signal: Apparent highest point.

[Latitude 41° 23' 30.3". Longitude 111° 47' 31.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	146 45 56	326 37 08	4.52620	20.87
Logan Peak.....	189 52 56	9 55 58	4.56015	22.57
Bergeson.....	.....	.....	4.83950	42.94

## T. 11 N., R. 1 W. SALT LAKE MERIDIAN, CACHE COUNTY, UTAH. (Three-point station; uncheckd.)

North corner to secs. 1 and 2. Unmarked stone in place.

Station mark: Section corner stone.

[Latitude 41° 43' 44.9". Longitude 111° 54' 38.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	42 15 39	222 11 34	4.10346	7.89
Logan Peak.....	275 57 01	98 04 44	4.20924	10.06
Naomi.....	.....	.....	4.45028	17.52

## T. 14 N., RS. 1 E. AND 1 W. SALT LAKE MERIDIAN, CACHE COUNTY, UTAH. (Three-point station; checked.)

Center of crossroads at corner of secs. 13, 18, 19, and 24.

Station mark: None.

[Latitude 41° 56' 49.2". Longitude 111° 53' 40.4".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	16 22 19	196 17 35	4.54415	21.76
Logan Peak.....	330 16 58	150 24 04	4.47418	18.52
Bergeson.....	.....	.....	4.00733	6.32

## T. 11 N., R. 1 W. SALT LAKE MERIDIAN, CACHE COUNTY, UTAH. (Three-point station; uncheckd.)

Northwest corner of sec. 27. No stone in place.

Station mark: None.

[Latitude 41° 40' 15.9". Longitude 111° 56' 54.7".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	61 13 44	241 11 10	3.78718	3.81
Logan Peak.....	258 04 32	76 13 46	4.29770	12.33
Naomi.....	.....	.....	4.54540	21.81

## TPS. 11 AND 12 N., RS. 1 E. AND 1 W. SALT LAKE MERIDIAN, CACHE COUNTY, UTAH. (Three-point station; uncheckd.)

Unmarked stone in place.

Station mark: Township corner stone.

[Latitude 41° 43' 44.9". Longitude 111° 53' 29.6".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	47 10 17	227 05 26	4.14028	8.58
Logan Peak.....	276 36 33	96 43 30	4.16454	9.08
Naomi.....			4.43328	16.85

## WELLSVILLE, CACHE COUNTY, UTAH.

On bare cone (north summit) of Wellsville Mountains, about 5 miles west from town of Wellsville. First summit north from saddle at head of Brushy Canyon. This station can easily be reached by going up Red Point Ridge from the town of Wellsville (this ridge separates Pine and Brushy canyons) to within 1,000 feet of the summit, the trail then leads into Brushy Canyon and up the canyon to the saddle, thence north to station. Small but excellent spring at head of Brushy. Can take animals to station. Approximate elevation above sea, 9,355 feet.

Signal: Six-foot cairn directly over station mark.

Station mark: Bronze triangulation tablet cemented in limestone rock.

Reference marks: Cross cut in limestone rock 20.15 feet distant from center, true azimuth 303° 38'. Cross cut in limestone rock 109.0 feet distant from center, true azimuth 32° 51'.

[Latitude 41° 38' 40.28". Longitude 112° 00' 46.76".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Narrows.....	172 55 53	352 54 34	4.34514	13.76
Bergeson.....	181 37 18.96	1 37 50.81	4.5993712	24.139
Cache Junction elevator.....	182 03 05	2 03 27	4.32972	13.28
Newton.....	188 44 05	8 46 09	4.45408	17.68
T. 14 N., Rs. 1 E. and 1 W. Salt Lake meridian, crossroads at corner of secs. 13, 18, 19, 24.....	196 17 35	16 22 19	4.54415	21.75
Smart Mountain.....	200 04 13	20 11 44	4.65608	28.15
T. 11 N., R. 1 W. Salt Lake meridian, north corner of secs. 1 and 2.....	222 11 34	42 15 39	4.10346	7.89
Naomi.....	223 20 27.17	43 33 58.44	4.6115660	25.407
Tps. 11 and 12 N., Rs. 1 E. and 1 W. Salt Lake meridian, corner to.....	227 05 26	47 10 17	4.14028	8.58
Logan College.....	237 01 31	57 09 28	4.29552	12.27
Logan Temple.....	237 01 33	57 08 57	4.26449	11.42
T. 11 N., R. 1 W. Salt Lake meridian, north- west corner sec. 27.....	241 11 10	61 13 44	3.78718	3.81
Logan Peak.....	252 32 49.04	72 44 37.44	4.4118940	16.042
Red Spot.....	271 42 44.02	91 46 42.99	4.7002198	31.158
Wellsville Tabernacle.....	276 25 23	96 28 37	3.8233	4.22
Wt.....	326 37 08	146 45 56	4.52620	20.87

## WELLSVILLE TABERNACLE, CACHE COUNTY, UTAH. (Not occupied.)

Spire on Mormon Tabernacle in town of Wellsville, Utah.

Signal: Center of spire.

[Latitude 41° 38' 15.6". Longitude 111° 55' 54.9".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wellsville.....	96 28 37	276 25 23	3.8233	4.22
Logan Peak.....	244 36 43	64 45 17	4.29649	12.30
Naomi.....			4.57057	23.12

## COLORADO AND WYOMING.

### TRIANGULATION STATIONS.

Boulder 15', Eagle, Glenwood Springs, Home, Jackson, James Peak, Kremmling, Leadville, Leon Peak, Longs Peak, Mount Powell, North Park, Pagoda, Rabbit Ears, Rifle, and Snow Mass quadrangles, Colo.; Laramie and Sherman quadrangles, Wyo.

**BOULDER, DELTA, EAGLE, GARFIELD, GRAND, GUNNISON, JACKSON, LARIMER, MESA, PITKIN, RIO BLANCO, ROUTT, AND SUMMIT COUNTIES, COLO.; ALBANY AND LARAMIE COUNTIES, WYO.**

For this work 8 old stations were reoccupied, 34 new positions determined, and 20 secondary points cut in. The field work on the Boulder, James Peak, Longs Peak, and Mount Powell quadrangles was done by C. F. Urquhart during the season of 1913. That for the Eagle, Glenwood Springs, Mount Jackson, Kremmling, Leadville, Leon Peak, Pagoda, Rabbit Ears, Rifle, and Snow Mass was done by C. B. Kendall during the season of 1914.

During the season of 1915, C. B. Kendall did the field work on the Laramie and Sherman quadrangles in Wyoming and the Home and North Park quadrangles in Colorado.

Positions are based on the United States Coast and Geodetic Survey stations Horsetooth-Twin, and are carried south and west to a tie with positions based on United States Coast and Geodetic Survey stations Tavaputs, Mount Waas at Leon Peak, and North Mam and with triangulation from the north at North Mam and Rio Blanco. A tie was also made with previous work at stations Hogback, Sugarloaf on the east and Holy Cross on the south.

### **ARAPAHOE, BOULDER-GRAND COUNTIES, COLO.**

Arapahoe Mountain is on the line between Boulder and Grand counties, Colo. It is at the source of Boulder Creek and the highest of several peaks in the vicinity. There is a wagon road from Eldora to the summit of the range or the county line and a trail on the west side. This road crosses the range about 2 miles south of the peak. Parties can camp at an old mine on the east side of the range at timber line. From this mine a trail goes east up the ridge, then north and west to the summit of a high mountain northeast of the mine. From summit of this mountain go west and north along rough ridge to peak.

Station mark: A rock monument 8 $\frac{1}{2}$  feet high and 31 feet in circumference is on highest point of peak. There is a copper tablet in center of large flat rock on top of monument, stamped "Erected by the City of Boulder in 1910—Mann & Heinze."

Reference mark: Bronze tablet set in solid rock 10.76 feet east of signal; true azimuth 280° 03' 53".

[Latitude 40° 01' 36.038". Longitude 105° 38' 59.196".]

To station—	Azimuth.	Back azimuth.	Distance.	
Ptarmigan.....	40 55 54.52	220 41 26.94	Log. meters.	Miles.
Byers.....	54 45 28.48	234 34 02.18	4.6922537	30.592
Elk.....	110 24 03.49	290 05 35.01	4.4928574	19.329
Parkview.....	129 19 53.27	309 01 04.89	4.6380472	27.002
Richthofen.....	157 09 32.33	337 00 03.85	4.7275240	33.180
Hague.....	180 22 41.58	0 22 50.79	4.7062917	31.507
Longs Peak.....	186 44 58.07	6 46 19.98	4.4073647	15.875
Hogback.....	238 45 56.46	59 03 27.14	4.6538537	28.002
Bald.....	246 43 47.35	66 47 33.67	3.9578731	5.639
Sugarloaf.....	280 50 30.50	89 50 27.02	4.2062388	12.291

**BALD MOUNTAIN, BOULDER COUNTY, COLO.**

High, round-topped peak (end of spur from Continental Divide) 4 miles southwest of Ward, Colo. Locally known as Bald Mountain.

Station mark: Aluminum tablet under rock monument.

[Latitude 40° 03' 32.141". Longitude 105° 33' 07.424".]

To station—	Azimuth.	Back azimuth.	Distance.	
Arapahoe.....	66 47 33.67	246 43 47.35	Log. meters.	Miles.
Longs Peak.....	166 18 14.26	346 15 49.34	3.9578731	5.639
Twin.....	186 41 23.57	6 42 45.28	4.3508207	13.937
Lillie.....	187 24 10.80	7 25 38.93	4.4096472	15.959
Sugarloaf.....	287 12 38.19	107 17 48.57	4.3887818	15.564

**BLACK, LARIMER COUNTY, COLO. (Not occupied.)**

On highest part of Black Mountain which lies between the North Fork of Lone Pine Creek and Sheep Creek, about 8 miles west of Cherokee Park.

Station and signal: Highest tree on top of mountain.

[Latitude 40° 52' 19.4". Longitude 105° 38' 17.1".]

To station—	Azimuth.	Back azimuth.	Distance.	
North Bald.....	25 39 16.6	205 36 54.2	Log. meters.	Miles.
Little Bald.....	81 34 13.9	261 29 34.8	4.07197	7.34
Bull.....	107 09 02.8	287 01 21.2	4.00428	6.28
Dead Tree.....	183 27 40.7	3 27 57.0	4.23719	10.73
Gale.....	191 56 29.6	11 58 23.6	3.99174	6.10
Cap Rock.....	233 36 24.7	53 43 43.9	4.29299	12.20

**BUFFALO, GRAND-JACKSON COUNTIES, COLO. (Not occupied.)**

On Buffalo Mountain, a peak of the east branch of the Park Range, on the Continental Divide and on line between Grand and Jackson counties, at the head of the West Fork of Troublesome Creek on the south and Arapahoe Creek on the north, about 12 miles west of Parkview Mountain and 25 miles north of the town of Kremmling on the Denver & Salt Lake (Moffat) Railroad.

Station mark and signal: Rock cairn on highest point.

[Latitude 40° 21' 40.1". Longitude 106° 15' 54.6".]

To station—	Azimuth.	Back azimuth.	Distance.	
Kremmling.....	11 20 37	191 17 16	Log. meters.	Miles.
Rabbit Ears.....	104 09 53	283 56 28	4.57584	23.40
Parkview.....	287 13 13	107 18 15	4.48005	18.77
Elk.....	332 05 20	152 10 40	4.06171	7.16

**BULL, LARIMER COUNTY, COLO.**

On the highest part of Bull Mountain which lies between Larimer River and Sand Creek and just south of where the Boulder Ridge road crosses the "Sand Gap," from which place the station can be reached by saddle animals. The mountain is heavily timbered on the southwest end and has dead trees on the extreme top.

Signal: Pine tree nailed in fork of a large dead pine. White cloth was tacked on the trunk of the dead tree.

Station mark: Bronze tablet in sandstone set 2 feet in the ground 2.65 feet southwest of signal; true azimuth 18° 00'.

[Latitude 40° 55' 04.18". Longitude 105° 50' 01.80".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Shipman.....	64 18 38.45	244 09 04.88	4.3577621	14.162
Red.....	135 17 40.50	315 13 43.27	4.080098	7.472
Jelm.....	148 57 45.15	328 52 08.02	4.3665273	14.450
Gale.....	235 23 59.04	55 33 35.26	4.3967232	15.491
Dead Tree.....	254 30 45.53	74 38 44.00	4.2484522	11.010
Black.....	287 01 21.2	107 09 02.8	4.237191	10.73
Little Bald.....	315 11 50.18	135 14 52.38	3.9662174	5.749

**BYERS, GRAND COUNTY, COLO.**

This station is on the highest point of Byers Peak, a fairly well known point on the range between Williams River and Fraser Creek at the source of Rough Gulch. There is a trail from the Horseshoe ranger station on Williams River up Rough Gulch and across the ridge to Fraser, a small town on Denver & Salt Lake Railroad. This trail across ridge is about 1.5 miles north of the peak. From the summit of ridge horses can be ridden along ridge south to within a very short distance of station.

Signal: A rock cairn 6 or 7 feet at base and 8 feet high.

Station mark: Hole in solid rock 6.4 feet west of signal; true azimuth 87° 39'.

[Latitude 39° 51' 52.880". Longitude 105° 56' 48.103".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Ptarmigan.....	19 24 03.73	199 21 01.52	4.3102188	12.693
Holy Cross.....	46 15 54.32	225 55 26.33	4.8037768	39.548
Ute.....	51 47 46.36	231 42 46.97	4.1509118	8.796
Powell.....	71 10 08	250 55 02	4.55147	22.12
Eagles Nest.....	74 11 23	253 55 57	4.55469	22.29
Piney.....	83 59 51.80	263 38 43.17	4.6753682	29.425
Lone Peak.....	92 19 30.83	272 00 50.78	4.6185878	25.819
Kremmling.....	117 51 22.83	297 35 46.05	4.5924932	24.313
Elk.....	154 57 53.03	334 50 53.68	4.5619737	22.663
Parkview.....	162 45 29.24	342 38 11.23	4.7336831	33.654
Arapahoe.....	234 34 02.18	54 45 28.48	4.4928574	19.329

**CAP ROCK, LARIMER COUNTY, COLO.**

On the easternmost of three large rocks which form the summit of "Cap Rock," a well-known peak which lies just south of Fish Creek and about 3 miles southeast of Mr. Edwin Shaffer's ranch and residence and about 7 miles by road northwest of Virginia Dale stage station. Can be easily reached by taking road to south about  $\frac{1}{2}$  mile east of Mr. Shaffer's residence to foot of peak. Climb peak from the south end.

Signal: A pole quadrupod with flags.

Station mark: Bronze tablet in solid rock under signal.

[Latitude  $40^{\circ} 58' 32.97''$ . Longitude  $105^{\circ} 27' 06.90''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
North Bald.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Black.....	43 15 55.54	223 06 13.75	4.4831240	18.901
Dead Tree.....	53 43 43.9	233 36 24.7	4.28949	12.10
Diamond.....	83 31 10.86	263 24 08.14	4.1811197	9.429
Gale.....	92 32 30	272 28 17	3.95602	5.615
Twin.....	123 35 01.77	303 29 36.10	4.1434427	8.646
Livermore.....	242 31 07.75	62 38 23.72	4.2427743	10.867
	330 51 55.97	150 58 13.12	4.4436064	17.257

**CASTLE, EAGLE COUNTY, COLO.**

In T. 3 S., R. 84 W., near north-south line between secs. 19 and 20. Station is on the highest (second from the east) of four large cliff-like rocks which are on the southeast end of Castle Mountain, a well-known peak at the head of Castle Creek, 9 miles due north of Eagle, a town on the Denver & Rio Grande Railroad. Can be best reached by wagon road from Eagle up Castle Creek to ranger station, thence by ranger trail to station. Animals can be ridden to foot of cliff about 0.25 mile south of station.

**Station mark:** A bronze triangulation tablet set in solid rock 8.5 feet northeast of signal; true azimuth  $246^{\circ} 09'$ .

**Signal:** A United States Forest Service fire lookout telephone tripod of hewn poles with United States flag at top. Tripod is weighted at the north end by a heap of stones.

[Latitude  $39^{\circ} 46' 20.991''$ . Longitude  $106^{\circ} 49' 46.922''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Sopris.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Lookout.....	26 59 00.42	206 46 14.44	4.8035053	39.523
Quartzite.....	55 59 36.47	235 42 45.71	4.65917	28.35
Limestone.....	75 36 59.95	255 18 17.73	4.6355323	26.846
Shingle.....	91 10 49.95	270 48 03.61	4.70614	31.59
Flattop.....	114 06 05	293 51 58	4.54688	21.89
Rabbit Ears.....	141 18 45.04	321 09 01.27	4.5382438	21.458
Parkview.....	194 21 56.40	14 30 25.30	4.8754314	46.643
Kremmling.....	223 29 45.17	43 56 33.10	4.9329814	53.252
Piney.....	235 00 36.36	55 18 59.57	4.6970212	30.929
Holy Cross.....	259 41 23.38	79 54 10.57	4.4620398	18.005
Red Table.....	318 26 59.35	138 40 19.66	4.6554340	28.105
	349 11 19	169 14 38	4.60021	24.75

**CHAIR, GUNNISON COUNTY, COLO. (Not occupied.)**

On Chair Mountain, a well-known point on west side of Rock Creek about 3 miles southwest of Prospect.

**Signal and station mark:** Large rock monument on highest point.

[Latitude  $39^{\circ} 03' 20.9''$  (K);  $39^{\circ} 03' 24.0''$  (D). Longitude  $107^{\circ} 16' 53.5''$  (K);  $107^{\circ} 17' 00.6''$  (D).]

To station—	Azimuth.	Back azimuth.	Distance.	
Leon.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
North Mam.....	92 58 08	272 36 53	4.68750	30.26
Divide.....	125 03 57	305 41 48	4.79404	38.67
Sunlight.....	147 25 06	327 16 30	4.56391	22.765
Sopris.....	168 20 26	348 16 43	4.61954	25.88
(K) Sopris.....	(K) 204 11 27	54 15 54	4.39324	(K) 15.37
(D) Sopris.....	(D) 204 11 27.5	24 15 54	4.393718	(D) 15.384

**Note.** — K = value obtained by Kendall from the north; D = value obtained by Douglas from the south. (See Bull. 122, p. 289.)

## CLARK, LARIMER-JACKSON COUNTIES, COLO. (Not occupied.)

On highest point of Clarks Peak which is the highest peak of the Medicine Bow Range and is about 5 miles west of Chambers Lake.

' Signal and station mark: Rock cairn.

[Latitude 40° 38' 25.22". Longitude 105° 55' 45.66".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Shipman.....	153 06 59.48	333 01 12.02	4.4409279	17.151
Little Bald.....	207 31 39.13	27 38 25.18	4.4987823	19.594
North Bald.....	225 58 53.99	46 07 54.99	4.4323100	16.814
Hague.....	299 24 34.80	119 35 38.32	4.4406578	17.148
Richthofen.....	348 56 20.91	168 57 43.19	4.1915898	9.659

## DEAD TREE, LARIMER COUNTY, COLO.

On the highest of several peaks forming the ridge lying at the headwaters of Trail Creek and between that creek and Sheep Creek. The ridge is fire scarred, leaving many dead trees, from which fact the station derived its name. Station is about 3 miles south of the Boulder Ridge road at a point about 3 miles east of the Eaton Dam and Reservoir. A road leads from this point to the foot of ridge, which can be easily ascended by following tie trails.

Station mark: A bronze tablet in solid rock over which is erected a rock cairn 7 feet high with tree and flagpole in center.

Signal: The cairn.

[Latitude 40° 57' 36.95". Longitude 105° 37' 51.64".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Black.....	3 27 57.0	183 27 40.7	3.99174	6.10
North Bald.....	15 38 57.35	195 36 17.49	4.3270751	13.195
Little Bald.....	43 11 42.20	223 06 46.30	4.1892380	9.807
Bull.....	74 38 44.00	254 30 45.53	4.2484522	11.010
Red.....	98 37 50.30	278 25 54.15	4.4119216	16.042
Jelm.....	117 43 48.71	297 30 12.12	4.5158409	20.379
Gale.....	200 13 00.16	20 14 37.57	4.0014830	6.235
Ames.....	225 52 43	46 01 55	4.43625	19.97
Diamond.....	250 30 44	70 33 33	3.80673	3.98
Cap Rock.....	263 24 08.14	83 31 10.86	4.1811197	9.429

## DIAMOND, LARIMER COUNTY, COLO. (Not occupied.)

A well-known rocky peak locally known as "Diamond Rock." It is on the west side of the Cherokee Park-Tie Siding road and probably lies between Trail Creek and Sheep Creek.

Signal and station mark: Highest part of peak.

[Latitude 40° 58' 46.0". Longitude 105° 33' 33.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Dead Tree.....	70 33 33	250 30 44	3.80673	3.98
Gale.....	160 34 22	340 33 10	3.88797	4.81
Cap Rock.....	272 28 17	92 32 30	3.95602	5.615

## DIVIDE, MESA COUNTY, COLO.

In T. 8 S., R. 91 W., near the southeast corner of township, on the highest point of ridge between East Divide and West Divide creeks, about 4 miles east of the Johnson Springs ranger station on West Divide Creek. Can be easily reached from Rifle or New Castle by wagon road up West Divide Creek to a point 1 mile north of Johnson Spring ranger station whence a good ranger's trail leads across the mountain into East Divide Creek. Follow trail east up mountain to where it reaches summit, then follow cattle trail southeast, keeping on up and out of timber. Station is on the second top north of the head of Mosquito Creek.

Station mark: A bronze tablet set in solid rock over which was erected a cairn 7 feet high.

Signal: A cairn 7 feet high with pole and flag in center.

[Latitude 39° 20' 10.2". Longitude 107° 30' 37.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
North Mam.....	* / "	* / "		
	100 32 24.36	280 18 53.44	<i>Log. meters.</i>	<i>Miles.</i>
Quartzite.....	203 44 14.13	23 51 35.61	4.49312	19.341
Sunlight.....	228 37 19.73	48 42 19.07	4.61372	25.531
Chair.....	327 16 30	147 25 06	4.17722	9.345
			4.56391	22.765

EAGLES NEST, SUMMIT-EAGLE COUNTIES, COLO. (Not occupied; probably on line between Summit and Eagle counties.)

Highest peak of Eagles Nest Mountain, which is composed of several sharp peaks. It is on the Park Range or Gores Mountains, which is the divide between Blue River on the east and Piney River on the west, and is just northwest of Mount Powell and about 20 miles south of the town of Kremmling on the Denver & Salt Lake (Moffat) Railroad).

Signal and station mark: Center of highest peak.

[Latitude 39° 46' 33.5". Longitude 106° 20' 58.7".]

To station—	Azimuth.	Back azimuth.	Distance.	
Holy Cross.....	* / "	* / "		
	18 15 32	198 10 30	<i>Log. meters.</i>	<i>Miles.</i>
Piney.....	110 41 02	290 35 23	4.55756	22.43
Lone Peak.....	148 19 18	328 16 08	4.12912	8.36
Kremmling.....	179 35 56	359 35 51	4.12782	8.34
Byers.....	233 55 57	74 11 23	4.44804	17.43
Ute.....	267 15 47	87 26 32	4.55469	22.29
Ptarmigan.....	288 39 09	108 51 34	4.36925	14.54
			4.46700	18.21

ELK, GRAND COUNTY, COLO.

On the highest point of Elk Mountain, well-known point about 6 miles (air line) north from Sulphur Springs and 12 or 13 miles north and east of Granby. There is a road and trail on east side of the mountain that horses can be ridden up, but there should be an easier route from the west side, as the slope is more gradual from that direction.

Signal: A cairn 6 feet high.

Station mark: A bronze tablet set in solid rock 5.5 feet from signal; true azimuth 348° 39' 08".

[Latitude 40° 09' 43.630". Longitude 106° 07' 40.314".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Lone Peak.....	39 38 04.32	219 26 20.20	4,6105488	23.345
Kremmling.....	52 16 05.24	232 07 25.62	4,3835962	15.030
Flattop.....	78 57 46.93	258 20 53.73	4,9192948	51.599
Whiteley.....	119 16 06.32	299 01 58.01	4,5567498	22.085
Rabbit Ears.....	125 49 10.79	305 30 27.72	4,7031490	31.369
Buffalo.....	152 10 40	332 05 20	4,39787	15.54
Parkview.....	177 59 08.05	357 58 50.07	4,2716203	11.614
Aspahoe.....	290 05 35.00	110 24 03.49	4,6309472	27.002
Byers.....	334 50 53.68	154 57 53.03	4,5619737	22.063
Piarmigan.....	350 29 45.75	170 33 41.57	4,7244747	32.948
Ute.....	353 59 42.14	174 01 40.81	4,6234818	26.112

## FLATTOP, GARFIELD COUNTY, COLO.

In T. 1 N., R. 86 W., in the southwest corner of township, on the highest point (about the center) of Dome Peak, forming the extreme northeast end of White River Plateau, at the head of the White and Bear rivers and tributaries to Grand River. Plateau is locally known as the "Flattop." Sunnyside Creek heads on the east slope of the peak, the east prong of Derby Creek on the southwest slope, and Egeria Creek is on the northeast. It is about 15 miles west of Toponus, on the Moffat Railroad. Station can be easily reached from Burns post office, at the junction of Sunnyside Creek with Grand River, by following main road up creek through irrigated farms and across divide into Dry Gulch, thence by cow trails about 7 miles to station. Animals were ridden to within 100 yards of station. A nearer way would be to approach from the north by leaving the Yampa-Trappers Lake trail at a point near the 13-mile post from Yampa and follow up the slope of ridge that runs from station to the Bear River. From this side animals were ridden to a point under the peak about one-half mile northeast of station. A very large and well-built rock cairn was found which had a stick in top on which was carved what appeared to be land corner markings. Probably a point on or near the base line along the fortieth degree parallel.

Station mark: A bronze tablet in solid rock 13.6 feet from signal; true azimuth, 14° 14' 34".

Signal: A large rock cairn 12 feet at base and 18 feet high.

[Latitude 40° 00' 54.006". Longitude 107° 04' 57.114".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Sopris.....	4 48 34.18	184 45 26.88	4,9240419	52.167
Quartzite.....	28 06 16.92	207 57 15.01	4,6313498	26.589
Turret.....	31 55 20	211 50 49	4,27455	11.80
Shingle.....	39 54 01	219 49 16	4,21549	10.21
North Mam.....	44 10 05.18	223 40 04.66	4,9859326	60.157
Limestone.....	48 17 16.92	228 04 10.94	4,59177	24.27
Plateau.....	80 23 40.09	260 14 22.67	4,3194980	12.067
Pagoda.....	123 08 26	302 58 46	4,40375	15.82
Pyramid.....	155 16 10	335 13 23	4,16592	9.10
Rabbit Ears.....	221 08 33.37	41 26 51.29	4,7847386	37.852
Whiteley.....	236 00 14.75	56 23 04.51	4,7815885	37.578
Gore.....	237 18 48	57 35 17	4,63453	26.78
Parkview.....	246 13 47.44	66 50 26.55	4,9441459	54.638
Elk.....	258 20 53.73	78 57 46.93	4,9192948	51.599
Lone Peak.....	285 00 29.14	105 25 32.78	4,7050316	35.800
Piney.....	293 19 34.36	113 42 07.55	4,7373526	33.939
Castle.....	321 09 01.27	141 18 45.04	4,5382436	21.458

**GORE, ROUTT COUNTY, COLO. (Not occupied.)**

A partly bald rocky peak of the Park Range, locally known as Gore Mountain, on divide between Bear River and Muddy Creek, at the head of Red Dirt Creek, which flows southeast into Muddy Creek. Station is in the NE.  $\frac{1}{4}$  T. 3 N., R. 83 E., and about 12 miles southwest of Muddy Pass.

Signal and station mark: Highest point of rock forming top of peak.

[Latitude  $40^{\circ} 13' 25.3''$ . Longitude  $106^{\circ} 39' 22.6''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Flattop.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Rabbit Ears.....	57 35 17	237 18 48	4.63453	26.78
Whitley.....	189 48 38	9 50 26	4.36050	14.25
Kremmling.....	232 58 29	53 04 50	4.24118	10.83
	300 45 40	129 57 26	4.52877	21.00

**HAGUE, LARIMER COUNTY, COLO.**

Station is on the highest of three points known as Fairchild, Hague, and Mummy. Hague is the central point and is northwest of Lawn Lake. To reach the station, take wagon road from Estes Peak to Horseshoe Flats, thence trail up Roaring River to Lawn Lake camp at this lake. Horses can be ridden to the pass between Fairchild and Hague.

Signal: A rock cairn 6 or 7 feet high.

Reference mark: A triangulation tablet set in solid rock 3.1 feet northwest of signal.

[Latitude  $40^{\circ} 29' 04.636''$ . Longitude  $105^{\circ} 38' 44.944''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Arapahoe.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Parkview.....	0 22 50.79	180 22 41.58	4.7062017	31.597
Richthofen.....	67 45 52.53	247 26 49.59	4.6528901	27.941
Lulu.....	85 33 20.16	265 23 39.75	4.3248338	13.128
Clark.....	98 10 36.8	278 02 35.5	4.24619	10.95
Rawah.....	119 35 38.32	299 24 34.80	4.4408578	17.148
Shipman.....	126 39 57.7	306 27 53.4	4.51372	20.28
North Bald.....	136 26 54.49	316 10 02.43	4.7228605	32.825
South Bald.....	172 07 25.19	352 05 20.85	4.5142423	20.305
Twin.....	171 58 57.26	351 57 00.85	4.4782220	18.688
Livermore.....	206 55 04.95	27 09 54.59	4.8465583	43.673
Whitepine.....	224 34 51.09	44 48 40.84	4.6293164	26.465
Horsetooth.....	231 39 36.9	51 47 24.9	4.33404	13.41
Hogback.....	260 44 19.95	81 01 51.42	4.5865260	23.981
Sugarloaf.....	305 44 00.01	126 01 26.43	4.6726149	29.239
Longs Peak.....	339 03 16.99	159 12 06.85	4.7355109	33.796
	354 01 35.74	174 02 48.81	4.4085248	15.917

**HOGBACK, BOULDER COUNTY, COLO.**

Highest point of Hogback Ridge about 3 miles northwest of Hygiene, Colo. Locally known as Rabbit Mountain.

Station mark: Tablet in bed rock.

Reference mark: An arrow with crossbar cut in the rock and pointing to the station. True azimuth from station  $244^{\circ} 42'$ ; distance 2.22 feet.

Signal: A pine tree 74 feet northwest of tablet.

[Latitude  $40^{\circ} 14' 10.524''$  (U);  $40^{\circ} 14' 10.67''$  (T). Longitude  $105^{\circ} 11' 49.091''$  (U);  $105^{\circ} 11' 49.02''$  (T).]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Sugarloaf (U).....	39 06 17.39	218 57 44.40	4.4759726	18.582
Sugarloaf (T).....	39 05 48	218 57 15	4.475977	18.592
Arapahoe.....	59 03 27.14	238 45 56.46	4.6538537	28.003
Longs Peak.....	93 31 04.75	273 14 53.68	4.5513024	22.113
Lillie.....	100 54 27.60	280 42 09.77	4.4388088	17.067
Twin.....	102 10 13.71	281 57 49.40	4.4444957	17.282
Hague.....	126 01 26.43	303 44 00.01	4.6726149	29.239

NOTE.—(U)—values obtained by Urquhart from the northwest; (T)—values obtained by Tweedy from the east.

#### HOLY CROSS, EAGLE COUNTY, COLO.

In T. 7 S., R. 81 W., near the northwest corner of the township (approximate). On the highest point of the Holy Cross Mountain, about 7 miles (air line) southwest of Red Cliff on the Rio Grande Railroad and 10 miles southwest of Minturn. Roche Moutonnee (or Cross) Creek flows along the north base of the mountain. Station was reached from the town of Minturn by road and trail to the halfway cabin on Cross Creek and thence on foot to the summit, a climb of about 4,000 feet. Station is the same as that used by the Hayden Survey and also cut in later by the Coast and Geodetic Survey.

Signal and station mark: A rock cairn about 7 feet high.

Reference mark: An aluminum tablet distant 26 feet; true azimuth  $312^{\circ} 51'$ .

[Latitude  $39^{\circ} 28' 01.528''$ . Longitude  $106^{\circ} 28' 51.911''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Sopris.....	69 01 09.20	248 35 09.70	4.8002642	39.230
Red Table.....	77 03 00	256 53 01	4.36438	14.38
Castle.....	138 40 19.66	318 26 59.35	4.6554340	28.106
Piney.....	178 02 00.11	358 01 24.15	4.5917769	24.273
Lone Peak.....	185 14 49.31	365 16 42.09	4.6618523	28.523
Eagles Nest.....	198 10 30	18 15 32	4.55756	22.43
Powell.....	200 21 20	20 26 44	4.54103	21.60
Byers.....	225 55 26.33	46 15 54.32	4.8037768	39.548
Ptarmigan.....	237 24 39.54	57 42 03.84	4.6660692	28.802

#### HORSETOOTH, LARIMER COUNTY, COLO.

This station of the United States Coast and Geodetic Survey is identical with the United States Geological Survey station of the same name. It is 8 miles southwest of Fort Collins on a high, bare rocky point of the divide immediately east of Redstone Creek and  $1\frac{1}{2}$  miles north of the point where the Fort Collins-Esteem Park road crosses the divide. Deep vertical clefts divide the peak into three nearly equal parts, which have the appearance of gigantic teeth when viewed from the eastward. The station is on the highest and most southern one of the three divisions of the peak and is marked by a United States Geological Survey triangulation tablet set in solid rock. A reference mark, Coast and Geodetic Survey standard disk, is 0.04 meter below the station and 4.74 meters distant in azimuth  $171^{\circ} 24'$ .

[Latitude  $40^{\circ} 32' 22.856''$  (K);  $40^{\circ} 32' 23.00''$  (C). Longitude  $105^{\circ} 11' 46.319''$  (K);  $105^{\circ} 11' 46.21''$  (C).]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Hague.....	81 01 51.42	280 44 19.95	4.5865260	23.981
White Pine.....	109 00 45.0	288 51 00.5	4.34920	13.885
Livermore (K).....	161 31 38.54	341 27 54.35	4.4061788	15.832
Livermore (C).....	161 31 44.63	341 28 00.49	4.4061105	15.829
Twin.....	173 57 12.15	353 54 24.76	4.7543881	35.297

NOTE.—(K)—values obtained by Kendall from Coast and Geodetic Survey base, Twin-Horsetooth; (C)—values obtained by Chapman.

**KREMMLING, GRAND COUNTY, COLO.**

In T. 1 N., R. 80 W., near corner of secs. 21, 22, 27, and 28, on highest point of Junction Butte, a bald hill lying in the junction of the Grand and Blue rivers about 2 miles southeast of the town of Kremmling, on the Denver, Northwestern & Pacific Railroad.

Signal: Cairn 8 feet high.

Station mark: Bronze triangulation tablet in 6 by 8 by 24-inch stone over which is the cairn 8 feet high.

[Latitude  $40^{\circ} 01' 42.92''$ . Longitude  $106^{\circ} 21' 07.092''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Lone Peak.....	22 22 55.53	202 19 50.48	4.2548646	11.174
Piney.....	28 01 20.09	207 55 45.61	4.4213461	16.394
Castle.....	55 18 59.57	235 00 36.36	4.6670212	30.928
Gore.....	129 57 26	309 45 40	4.52877	20.99
Rabbit Ears.....	153 40 18.13	333 30 17.63	4.6838827	30.707
Whiteley.....	159 35 56.28	339 30 29.59	4.5352979	21.313
Buffalo.....	191 17 16	11 20 37	4.57584	23.40
Parkview.....	208 44 33.61	28 52 56.16	4.5825067	23.761
Elk.....	232 07 25.62	52 16 05.24	4.3835962	15.030
Byers.....	297 35 46.05	117 51 22.83	4.5924932	24.313
Ute.....	318 46 43.44	138 57 19.53	4.5539286	22.247
Powell.....	358 00 51	178 01 19	4.47404	18.50
Eagles Nest.....	359 35 51	179 35 56	4.44804	17.434

**LEON, MESA-DELTA COUNTY LINE, COLO.**

On summit of Leon Peak on the Delta-Mesa county line; a well-known peak at the head of Big Creek about 11 miles south and 6 miles east of Collbron. Station is in T. 11 S., R. 94 W., near east edge of sec. 24, and can be easily reached by wagon road from Collbron up Big Creek via Big Creek ranger station to sawmill, thence by ranger's trail to summit. Animals can be ridden to foot of peak about 0.25 mile northeast of summit. Good feed and water.

Signal: Center of cupola of Forest Service lookout house.

Station mark: A standard bronze tablet set in large boulder under center of cupola of Forest Service lookout house, 10 feet square. House built of wood and tin and painted white.

[Latitude  $39^{\circ} 04' 46.912''$  (K);  $39^{\circ} 04' 46.864''$  (U). Longitude  $107^{\circ} 50' 36.725''$  (K);  $107^{\circ} 50' 37.173''$  (U).]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
North Mam—(Mams) (K).....	176 49 33.26	356 48 43.28	4.5334545	21.223
North Mam—(Mams) (U).....	176 49 08.25	356 48 18.18	4.5332803	21.214
Quartzite.....	214 17 12.33	34 37 13.83	4.9037615	49.787
Sunlight.....	226 04 35.46	46 22 13.11	4.7443496	34.491
Sopris.....	250 49 10.64	71 14 55.62	4.7930130	38.580
Chair.....	272 36 53	92 58 08	4.68750	30.26

NOTE.—(K)—values obtained by Kendall from the east; (U)—values obtained by Urquhart from the west.

**LILLIE, LARIMER COUNTY, COLO. (Not occupied.)**

On Lillies Peak, also known as Sheep Mountain, 8 miles north of Estes Park, Colo. Station mark: A monument on the southeast peak.

[Latitude  $40^{\circ} 16' 57.470''$ . Longitude  $105^{\circ} 30' 50.802''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bald.....	7 25 38.93	187 24 10.80	4.3987818	15.564
Longs Peak.....	70 22 44.43	250 18 50.87	3.9574063	5.633
Hogback.....	280 42 09.77	100 54 27.60	4.4388068	17.067
Sugarloaf.....	343 53 16.81	163 56 59.81	4.4705158	18.380

## LIMESTONE, GARFIELD COUNTY, COLO.

In T. 3 S., R. 89 W., in the west-central part of the township (approximate). A point on White River Plateau, which is the divide between Grand and White rivers. Station is about 7 miles northwest of the old mining town of Carbonate and 18 miles southeast of Bufart, a post office on the White River. The old Ute trail from Deep Lake to Meeker crosses the divide about 1.25 miles south of the station, from which point a cow trail leads north along the ridge to station. Station is on the first summit north of the Ute trail and is about 2 miles south of the highest point of the ridge. Top of ridge is clear of both timber and brush.

Station mark: Bronze tablet in 6 by 6 inch sandstone set 15 inches in ground on solid rock distant 5.6 feet; true azimuth  $21^{\circ} 24'$  from signal.

Signal: Rock cairn 8 feet high.

[Latitude  $39^{\circ} 48' 49.5''$ . Longitude  $107^{\circ} 25' 22.8''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
North Mam.	* * "	* * "	4.76282	36.00
Rio Blanco.	41 09 59.90	220 53 04.77	4.63110	26.574
Flattop.	81 08 23.81	260 49 29.37	4.59177	24.273
Castle.	228 04 10.94	48 17 16.92	4.70614	31.586
Quarzite.	270 48 03.61	91 10 49.95	4.17049	9.201
	322 19 35.05	142 23 37.73		

## LITTLE BALD, LARIMER COUNTY, COLO.

On the central of three small rises forming the summit of Little Bald Mountain, which is a spur of the Green Ridge and lies between the head waters of the North and South Forks of Lone Pine Creek. A wagon road leads from the Eaton Ditch camp on Sand Creek and passes about  $1\frac{1}{2}$  miles to west of the station and continues on to a junction with the "State Road" near the head of Deadman Creek.

Signal: A cairn 8 feet high with tree and flags in center.

Station mark: Bronze tablet in solid rock 1.5 feet northwest of signal.

[Latitude  $40^{\circ} 51' 31.28''$ . Longitude  $105^{\circ} 45' 23.46''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Clark.	* * "	* * "	4.4987823	19.594
Shipman.	27 38 25.18	207 31 39.13	4.4355270	16.939
Bull.	83 03 53.90	262 51 18.62	3.9662174	5.749
Jelm.	135 14 52.38	315 11 50.18	4.504200	20.080
Gale.	145 06 25.18	324 57 45.72	4.3980700	15.539
Dead Tree.	214 05 59.14	34 12 32.58	4.1892380	9.607
Black.	223 06 46.30	43 11 42.20	4.00428	6.28
North Bald.	261 29 34.8	81 34 13.9	4.0162804	6.451
	332 02 28.52	152 04 44.19		

## LIVERMORE, LARIMER COUNTY, COLO.

On the highest point of a rocky mountain, about 3 miles southwest of Livermore post office. It is between Lone Pine Creek and Main North Fork of Cache la Poudre River. It is about 4 miles north of Grey Rock, a bare peak with cliff on east, south, and west. Horses can be ridden to station. Easily reached via long ridge southwest from Livermore post office via Griffith's ranch.

Station mark: A bronze tablet cemented in solid rock.

Signal: Pole quadriod, with flags.

[Latitude  $40^{\circ} 45' 26.156''$  (K);  $40^{\circ} 45' 26.18''$  (C). Longitude  $105^{\circ} 17' 30.479''$  (K);  $105^{\circ} 17' 30.29''$  (C).]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
White Pine.....	37 37 56.0	217 31 54.7	4.32922	13.26
Hague.....	44 48 40.84	224 34 51.09	4.6293104	26.465
South Bald.....	89 18 01.66	205 02 12.92	4.5326838	21.185
North Bald.....	93 36 55.83	273 20 58.94	4.5369750	21.396
Gale (K).....	141 56 32.72	321 44 50.36	4.6089706	25.23(K)
Gale (C).....	141 56 35.40	321 44 53.11	4.6089354	25.252(C)
Cap Rock.....	150 58 13.12	330 51 55.97	4.4436084	17.257
Twin.....	183 38 08.85	3 39 06.44	4.5104191	20.127
Horsetooth (K).....	341 27 54.35	161 31 38.54	4.4061788	15.832(K)
Horsetooth (C).....	341 28 00.49	161 31 44.63	4.4061105	15.829(C)

NOTE.—(K)=values obtained by Kendall from Coast and Geodetic Survey base; (C)=values obtained by Chapman.

#### LONE PEAK, SUMMIT-EAGLE COUNTIES, COLO.

Station is on highest point of Lone Peak or Sheep Mountain on divide between Sheephorn Creek and Blue River. It is about 20 miles a little west of south of Kremmling, a town on Moffat (Denver & Salt Lake) Railroad. Animals can be taken to the summit by going up Sheephorn Creek, on road about 4.5 miles above Mr. C. L. Gutzler's ranch, which is 2 miles above Sheephorn post office; thence northeast up ridge to summit of mountain. It is a timber-covered mountain, with bald peak on summit. Animals may also be ridden up the long slope from Blue Riverside, but this route will be through timber all the way up.

Signal: A cairn 8 feet high on highest peak.

Station mark: A triangulation tablet set in rock about 4.4 feet southeast of signal. True azimuth  $286^{\circ} 31'$ .

[Latitude  $39^{\circ} 52' 43.686''$ . Longitude  $106^{\circ} 25' 55.254''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Holy Cross.....	5 16 42.09	185 14 49.31	4.6618523	28.523
Piney.....	39 43 57.57	219 41 28.26	3.9390361	5.388
Flattop.....	105 25 32.78	285 00 29.14	4.7605316	35.900
Whiteley.....	173 58 08.01	353 55 47.44	4.6905859	30.474
Kremmling.....	202 19 50.48	382 22 55.53	4.2548646	11.174
Elk.....	219 26 20.20	39 38 04.32	4.6105488	25.345
Byers.....	272 00 50.78	92 19 30.83	4.6185873	25.819
Ute.....	288 38 46.29	108 52 25.99	4.5070077	19.969
Ptarmigan.....	300 47 29.44	121 03 05.22	4.6081278	25.205
Eagles Nest.....	328 16 08	148 19 18	4.12782	8.340

#### LONGS PEAK, BOULDER COUNTY, COLO.

On the highest point on Longs Peak, near the corner of Boulder, Grand, and Larimer counties. It can be ascended from Longs Peak draw. Animals can be ridden within about 2 miles' distance and 2,000 feet in elevation.

Reference mark: A copper tablet set in large boulder at the summit, 5 feet south of cairn.

Station mark: A rock cairn built on high boulder. (Not on Continental Divide.)

Latitude  $40^{\circ} 15' 18.613''$ ;  $40^{\circ} 15' 20.8''$  (Hayden). Longitude  $105^{\circ} 36' 52.140''$ ;  $105^{\circ} 36' 38.2''$  (Hayden).

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Arapahoe.....	6 46 19.98	186 44 58.07	4.4074647	15.875
Parkview.....	100 50 10.91	280 29 57.71	4.6540764	28.017
Richtofen.....	135 09 15.54	314 58 23.44	4.5268160	20.901
Hague.....	174 02 48.81	354 01 35.74	4.4085248	15.917
Twin.....	245 50 43.10	65 54 30.24	3.9588714	5.652
Lillie.....	250 18 50.87	70 22 44.43	3.9574063	5.633
Hogback.....	273 14 53.68	93 31 04.75	4.5513024	22.113
Sugarloaf.....	326 29 22.32	146 36 58.20	4.4824674	18.872
Bald.....	346 15 49.34	166 18 14.26	4.3508207	13.937

**LOOKOUT, GARFIELD COUNTY, COLO.**

In T. 6 S., R. 88 and 89 W., near the corner of secs. 1, 6, 7, and 12 (approximate). On the highest point of Lookout Mountain, which lies between Grand River and Roaring Fork and is about 4 miles southeast of Thur junction, at Glenwood Springs, and is nearly south and opposite the mouth of Grizzly Canyon. The mountain has three peaks, the station being on the third from the west end. A good trail leads from Glenwood Springs to a pavilion (now burnt) on the west end of the mountain. From there a cow trail leads along the ridge to the station. Can also be reached by old wood road and trail from a ranch about 2 miles southeast of the station. Animals were ridden to the station. Feed good. No water.

Station mark: Bronze tab'et set in 6 by 8 by 30 inch stone 24 inches in ground.

Signal: Of five sides, constructed of dead poles, with a center pole set on tablet and carrying white and red flags.

[Latitude  $39^{\circ} 32' 30.51''$ . Longitude  $107^{\circ} 16' 10.71''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Sunlight.....	•   '   "	•   '   "	4.20353	9.93
North Mam.....	36 11 52.97	216 07 42.11	4.73308	33.607
Rio Blanco.....	71 38 45.26	251 16 01.90	4.77012	36.599
Castle.....	109 50 26.23	289 25 42.48	4.65917	28.348
Sopris.....	235 42 45.71	55 59 36.47	4.51088	20.148
	343 40 58.81	163 45 00.00		

**LULU, JACKSON-LARIMER COUNTIES, COLO. (Not occupied.)**

On Lulu Mountain, on line between Jackson and Larimer counties, about 3 miles northwest of La Poudre Pass, at the headwaters of the South Fork of Cache la Poudre River.

Signal and station mark: Rock cairn on highest point. Sighted from two points; position doubtful.

[Latitude  $40^{\circ} 30' 25.3''$ . Longitude  $105^{\circ} 51' 06.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Richthofen.....	•   '   "	•   '   "	3.74032	3.42
Hague.....	40 57 54.9	220 56 15.5	4.24619	10.95
	278 02 35.5	98 10 38.8		

**NORTH BALD, LARIMER COUNTY, COLO.**

On the most northern of the five peaks forming Bald Mountain, which is at the headwaters of Lone Pine and Seven-Mile creeks on the east and Roaring and Nun creeks on the west. The peak is timbered on all sides but has a small rocky summit which is bare. Station is on west end of bare space. A good wagon road and ranger's trail lead from Manhattan on the Livermore-Log Cabin-Home road passing a point about  $1\frac{1}{2}$  miles south of the peak. A ranger's trail also leads direct from the Lone Pine ranger station which is on the State road about 4 miles northeast of the station. This trail joins the road from Manhattan in the gap between North and South Bald.

Signal: A rock cairn 7 feet high with pine tree and flagpole in center.

Station mark: Bronze tablet in solid rock under center of cairn.

[Latitude  $40^{\circ} 46' 33.964''$ . Longitude  $105^{\circ} 41' 55.894''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Richthofen.....	25 57 54.36	205 50 16.55	4.5778913	23.509
Clark.....	46 07 54.99	225 58 53.99	4.4323100	16.814
Rawah.....	59 10 21.0	239 00 19.7	4.40169	15.67
Shipman.....	100 28 11.10	280 13 20.83	4.5114089	20.172
Jelm.....	146 49 44.44	326 38 49.41	4.6298236	26.496
Little Bald.....	152 04 44.19	332 02 28.52	4.0162904	6.451
Dead Tree.....	195 36 17.49	15 38 57.35	4.3270751	13.195
Gale.....	197 04 07.62	17 08 24.80	4.4948318	19.417
Black.....	203 36 54.2	25 39 16.6	4.07197	7.34
Cap Rock.....	223 06 13.75	43 15 55.54	4.4831240	18.901
Twin.....	230 06 34.16	50 23 31.46	4.6746935	29.379
Livermore.....	273 20 58.94	93 36 55.83	4.5369750	21.396
White Pine.....	311 31 47.3	131 41 41.3	4.45656	17.779
South Bald.....	353 42 55.49	173 43 03.43	3.4152968	1.617
Hague.....	352 03 20.85	172 07 25.19	4.5142423	20.305

## NORTH MAM, GARFIELD COUNTY, COLO.

On summit of the North Mam Peak, the highest point of the Battlement Mesa, about 10 miles south and 5 miles west of Rifle, from which point it can be easily reached by wagon road up Beaver Creek to Fondett's ranch and thence by trail till peak first shows on the right. The best way from this point is to turn nearly north and approach the peak from the northeast side. Animals can be ridden to foot of peak on northeast side about 0.25 mile from summit.

Signal: A cairn 6 feet high with 10-foot pine pole in center.

Station mark: A bronze tablet set in stone and placed in crevice of rock over which which was built a cairn 6 feet high.

[Latitude  $39^{\circ} 23' 12.25''$  (C. & G. S.);  $39^{\circ} 23' 12.758''$  (K);  $39^{\circ} 23' 11.71''$  (U-N);  $39^{\circ} 23' 12.259''$  (U-W). Longitude  $107^{\circ} 51' 56.34''$  (C. & G. S.);  $107^{\circ} 51' 55.749''$  (K);  $107^{\circ} 51' 55.98''$  (U-N);  $107^{\circ} 51' 56.336''$  (U-W).]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Rio Blanco (K).....	173 20 39.76	353 18 44.36	4.5710099	23.140
Rio Blanco (U-N).....	173 20 40.76	353 18 45.36	4.5710313	23.141
Sleepy Cat (K).....	199 06 49.57	19 19 46.95	4.9438947	54.607
Sleepy Cat (U-N).....	199 06 35.44	19 19 32.69	4.9439031	54.608
Plateau.....	214 54 05.42	35 14 51.55	4.9080739	50.283
Limestone.....	220 53 04.77	41 09 59.90	4.76282	26.00
Flattop.....	223 40 04.66	44 10 05.18	4.9859326	60.157
Quartzite.....	235 40 13.44	56 01 09.15	4.7553972	35.379
Lookout.....	251 16 01.90	71 38 45.26	4.73308	33.607
Sunlight.....	263 58 55.09	84 17 26.37	4.6243113	26.161
Divide.....	280 18 53.44	100 32 24.36	4.49312	19.341
Sopris.....	282 44 27.82	103 11 07.96	4.7928455	38.565
Chair.....	305 41 48	125 03 57	4.79404	38.671
Leon (K).....	356 48 43.28	176 49 33.26	4.5334545	21.223
Leon (U-W).....	356 48 18.18	176 49 08.25	4.5332803	21.214

NOTE.—(C. & G. S.)—values of Coast and Geodetic Survey cut in from 2 points; (K)—value of Kendall from east; (U-N)—Urquhart from north; (U-W)—Urquhart from west.

## PAGODA, RIO BLANCO COUNTY, COLO. (Not occupied.)

Station is the highest point of Pagoda Peak, a high sharp peak about 11 miles east of Sleepy Cat Mountain.

[Latitude  $40^{\circ} 08' 24.3''$  (K);  $40^{\circ} 08' 23.49''$  (U). Longitude  $107^{\circ} 19' 57.5''$  (K);  $107^{\circ} 19' 57.92''$  (U).]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Sleepy Cat (K).....	87 50 04	267 42 31	4.22138	10.34
Sleepy Cat (U).....	87 49 50.12	267 42 17.06	4.2214469	10.347
Flattop.....	302 58 46	123 08 26	4.40575	15.82
Plateau.....	357 24 46	177 25 07	4.24065	10.82

NOTE.—(K)—values obtained by Kendall from the south; (U)—values obtained by Urquhart from the north.

## PARKVIEW, GRAND-JACKSON COUNTIES, COLO.

On the highest point of Parkview Mountain, on Continental Divide, and on line between Jackson and Grand counties. It is at the source of Willow Creek and East Troublesome Creek flowing south and Willow Creek flowing north. There is a road from Granby to North Park which crosses the divide 4 or 5 miles east of signal. Leave this road at Forestry station and go up trail along telephone line to summit of mountain. Animals can be ridden all the way up.

Signal and station mark: A rock cabin 9 by 8 by 7 feet high, erected by the Forestry Service.

Reference mark: A United States Geological Survey triangulation tablet set in southeast corner of rock cabin.

[Latitude 40° 19' 49.228". Longitude 106° 08' 08.145".]

To station—	Azimuth.	Back azimuth.	Distance.	
Kremmling.....	28 52 56.16	208 44 33.61	Log. meters.	Miles.
Castle.....	43 56 33.10	223 29 45.17	4.5825067	23.761
Flattop.....	66 50 26.55	246 13 47.44	4.9329814	53.252
Rabbit Ears.....	105 05 33.43	284 47 06.45	4.9441450	54.638
Buffalo.....	107 18 15	287 13 13	4.6203235	25.922
Richterhofen.....	232 53 07.62	53 02 30.90	4.06171	7.162
Hague.....	247 26 49.59	67 45 52.53	4.4065087	15.954
Lone Peak.....	280 29 57.71	100 50 10.91	4.6528901	27.941
Arapahoe.....	309 01 04.89	129 19 53.27	4.6540764	28.017
Byers.....	342 38 11.23	162 45 29.24	4.7273518	33.167
Elt.....	357 58 50.07	177 58 08.05	4.7366831	33.654
			4.2716203	11.614

## PINEY, EAGLE COUNTY, COLO.

Station is on the southern of two peaks on ridge between Sheeporn and Piney creeks. A forest-reserve trail from Mr. Ross's ranch on Sheeporn Creek about 5 miles above Sheeporn post office crosses the ridge about 1 mile north of signal. Animals can be ridden to summit of mountain.

Signal: Rock cairn 7 feet high.

Station mark: A United States Geological Survey triangulation tablet set in solid rock 3.3 feet southeast of signal; true azimuth 309° 47'.

[Latitude 39° 49' 07.425". Longitude 106° 29' 48.277".]

To station—	Azimuth.	Back azimuth.	Distance.	
Red Table.....	25 36 54	205 27 26	Log. meters.	Miles.
Castle.....	79 54 10.57	259 41 23.38	4.60063	30.48
Flattop.....	113 42 07.55	293 19 34.36	4.4620698	18.005
Rabbit Ears.....	171 53 13.48	351 48 50.17	4.8341032	42.409
Whiteley.....	180 21 38.05	00 21 47.57	4.7438366	34.450
Kremmling.....	207 55 45.61	28 01 20.09	4.4213461	16.394
Lone Peak.....	219 41 28.26	39 43 57.57	3.9390361	5.388
Byers.....	263 38 43.17	83 59 51.80	4.6753682	29.425
Eagles Nest.....	280 35 23	110 41 02	4.12912	8.36
Powell.....	295 38 49	115 44 50	4.17340	9.26
Holy Cross.....	358 01 24.15	178 02 00.11	4.5917769	24.273

## PLATEAU (OLD MARVINE), RIO BLANCO-GARFIELD COUNTIES, COLO.

In T. 1 S., R. 88 W., sec. 30 (approximate). On the highest and most northern of two peaks at the head of Marvine Creek to northwest and Doe Creek to the south. It is about 5 miles northeast of Marvine Lake and 6 miles west of Trappers Lake, both well-known fishing resorts. The peak is known as Plateau Peak and is about 3 miles north of Mount Marvine. Both peaks rise abruptly from the plateau forming the divide between the north and south forks of the White River and tributary of the

Grand River, which plateau can be reached by trails from Marvine Lake or Hanes ranch on the North Fork of White River. Wagon roads lead to Meeker from both places. It can also be reached by trails leading off from the Glenwood Springs-Trappers Lake trail. Station is near the Garfield-Rio Blanco county line. This is the same point cut in by Charles F. Urquhart under the name of Marvine.

Station mark: Bronze tablet in stone over which was erected a rock cairn 8 feet high. Old cairn was torn down and tablet set under center.

Signal: Rock cairn 8 feet high.

[Latitude  $39^{\circ} 59' 00.202''$  (K);  $39^{\circ} 58' 59.45''$  (U). Longitude  $107^{\circ} 19' 24.327''$  (K);  $107^{\circ} 19' 24.92''$  (U).]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
North Mam.	* * *	* * *	4.900739	50.283
Sleepy Cat (K).	35 14 51.35	214 54 05.42	4.3834892	15.026
Sleepy Cat (U).	133 54 37.55	313 46 43.97	4.3834442	15.024
Pagoda.	133 54 23.19	313 46 29.63	4.24095	10.82
Pyramid.	177 25 07	357 24 46	4.34538	13.76
Flattop.	220 33 08	40 39 39	4.3194980	12.967
Shingle.	260 14 22.67	80 23 40.09	4.13237	8.43
Turret.	312 05 23	132 09 55	4.21728	10.25
Quartzite.	319 58 13	140 02 59	4.5348564	21.292
	359 08 46.37	179 09 00.09		

NOTE.—(K)=values obtained by Kendall from the south; (U)=values obtained by Urquhart from the north.

#### POWELL MOUNTAIN, EAGLE-SUMMIT COUNTIES, COLO. (Not occupied.)

Highest point of Mount Powell, a well-known peak of the Park Range (or Gores Mountains) on divide between Blue River on the east and Piney River on the west. It is about 20 miles south of the town of Kremmling on the Denver & Salt Lake (Moffat) Railroad. Station is probably on line between Eagle and Summit counties and is in T. 3 S., R. 80 W., in south part of the township. It is a station of the Hayden Survey.

Station mark and signal: Highest part of mountain.

[Latitude  $39^{\circ} 45' 37.7''$ . Longitude  $106^{\circ} 20' 23.8''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Holy Cross.	* * *	* * *	4.54103	21.60
Piney.	20 26 44	200 21 20	4.17340	9.26
Kremmling.	115 44 50	295 38 49	4.47404	18.50
Byers.	178 01 19	358 00 51	4.55147	22.12
Ute.	250 55 02	71 10 08	4.35672	14.13
	262 50 22	83 00 47		

#### PTARMIGAN, GRAND-SUMMIT COUNTIES, COLO.

Station is on the highest point of Ptarmigan Peak, a bald mountain at the source of West Fork of Williams River and on the divide between Blue River and Williams River. It is about 7 miles a little east of north of Dillon. It was ascended from Mrs. Sundragger's ranch on Blue River 5 miles below Dillon, but I think animals can be ridden to it by going up any ridge from Blue River.

Signal: A rock cairn 8 feet high.

Station mark: A 4-inch hole drilled in rock about 4 inches deep, 2.7 feet southwest of signal; true azimuth  $18^{\circ} 46'$ .

[Latitude  $39^{\circ} 41' 27.844''$ . Longitude  $106^{\circ} 01' 32.882''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Holy Cross.....	57 42 03.84	237 24 39.54	4.6660692	28.802
Eagles Nest.....	108 51 34	288 39 09	4.46700	18.21
Lone Peak.....	121 03 05.22	300 47 29.44	4.6081278	25.205
Ute.....	157 31 44.82	337 29 48.03	4.0558764	7.067
Elk.....	170 33 41.57	350 29 45.75	4.7244747	32.948
Byers.....	199 21 01.52	19 24 03.73	4.3102188	12.693
Arapahoe.....	220 41 26.94	40 55 54.52	4.6922537	30.592

**PYRAMID, RIO BLANCO COUNTY, COLO. (Not occupied.)**

Highest point of Pyramid Peak, a well-known peak at the north end of the White River Plateau and about 15 miles nearly west of Yampa.

Signal and station mark: Highest point of peak.

Sighted from two stations, position doubtful.

[Latitude  $40^{\circ} 08' 05.4''$ . Longitude  $107^{\circ} 00' 16.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Plateau.....	40 39 39	220 33 08	4.34538	13.76
Flattop.....	335 13 23	155 16 10	4.16592	9.10

**QUARTZITE, GARFIELD COUNTY, COLO.**

In T. 4 S., R. 88 W., near the west quarter corner of section 30 (approximate). On the highest point of Quartzite Ridge a well-known ridge which forms the divide between Grizzly Canon and Canon Creek. Station is on the highest point of a bare portion of the ridge at the head of No Name Creek and overlooks the brooks of that creek to the south and Grizzly Canon to the north and east. It is about 12 miles north of Glenwood Springs and 2 miles north of the Bennett or peaked-roof sawmill. The old road from Glenwood Springs via Bennetts Mill and the old town of Carbonate to Deep Lake crosses the ridge about 1 mile northwest of the station, from which point it can be easily reached with animals. A thick clump of pine trees on the hill was cut, leaving a lone tree for signal. The tree is near the line of the 11th Guide Meridian west and bears land markings which could not be deciphered.

Station mark: Bronze tablet in 6 by 8 by 30 inch sandstone set 24 inches in the ground, 6.3 feet, true azimuth  $280^{\circ} 48'$  from signal.

Signal: Lone pine tree with flag in top.

[Latitude  $39^{\circ} 40' 29.305''$ . Longitude  $107^{\circ} 19' 02.903''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Sunlight.....	10 52 45.61	190 50 24.07	4.4497888	17.504
Divide.....	23 51 35.61	203 44 14.13	4.61372	25.531
Leon.....	34 37 13.83	214 17 12.33	4.9037615	49.787
North Mam.....	56 01 09.15	235 40 13.44	4.7553972	35.379
Limestone.....	142 23 37.73	322 19 35.05	4.17049	9.201
Plateau.....	179 09 00.09	339 08 46.37	4.5348564	21.292
Turret.....	205 05 30	25 10 03	4.37769	14.827
Flattop.....	207 57 15.01	28 06 16.92	4.6313498	26.589
Castle.....	255 18 17.73	75 36 59.95	4.6355323	26.846
Red Table.....	299 36 49	119 58 46	4.75521	35.364
Sopris.....	343 54 13.74	164 00 04.75	4.6789794	29.671

## RABBIT EARS, JACKSON COUNTY, COLO.

In T. 6 N., R. 82 W., near the corner of secs. 28, 29, 32, and 33 (approximate). A point on the Park Range about 2 miles east of the Continental Divide and about 5 miles north of the west corner of Grand and Jackson counties. Station is on the western and higher of two large rock columns locally known as "Rabbit Ears." The peak is just east of the Continental Divide between the headwaters of Big Grizzly Creek on the south and Colorado Creek on the north. The Kremmling-Steamboat Springs road crosses the divide at a point about 2.5 miles southwest of the station, from which point it can be easily approached. The rock is precipitous on all sides and the top has to be gained from the south side by ladders.

Station mark: Bronze tablet set in solid rock over which was erected a rock cairn about 5 feet high and around this is a pole quadripod with flags at top and brush nailed to quadripod.

Signal: Rock cairn and quadripod with flags and brush.

[Latitude 40° 25' 37.896". Longitude 106° 36' 36.868".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Gore.....	9 50 26	189 48 38	4.36650	14.25
Castle.....	14 30 25.30	194 21 56.40	4.8754314	46.643
Flattop.....	41 26 51.29	221 08 33.37	4.7847356	37.852
Buffalo.....	293 56 28	104 09 53	4.48005	18.77
Parkview.....	284 47 06.45	105 05 33.43	4.6203235	25.922
Elk.....	305 30 27.72	125 49 10.79	4.7031490	31.369
Whiteley.....	320 28 15.12	140 32 49.36	4.1960495	9.759
Kremmling.....	333 30 17.63	153 40 18.13	4.6938827	30.707
Piney.....	351 48 50.17	171 53 13.48	4.8341032	42.409

## RAWAH, LARIMER-JACKSON COUNTIES, COLO. (Not occupied.)

Round bare peak on the Medicine Bow Range at the head of Rawah Creek on the northeast and a prong of the East Fork of Platte River on the west.

Station mark and signal: What appears to be a low rock cairn on highest part of peak.

[Latitude 40° 39' 34.0". Longitude 105° 57' 17.7".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Shipman.....	151 12 48.4	331 08 00.8	4.33125	13.32
North Bald.....	239 00 19.7	59 10 21.0	4.40169	15.67
Hague.....	306 27 53.4	126 39 57.7	4.51372	20.28
Richthofen.....	346 11 06.5	166 13 29.8	4.33722	13.51

## RED, LARIMER COUNTY, COLO. (Not occupied.)

On the southwest or highest part of Red Mountain about 4 miles southeast of the Boswell ranch on the Laramie River and 3 miles south of the Lindsay ranch on the Tie Siding-North Park public road. Station is near the Colorado-Wyoming State line.

Signal and station mark: A clump of 4 pine trees, with flagpole in center. The end of mountain was cleared leaving only the signal trees standing.

[Latitude 40° 59' 41.08". Longitude 105° 56' 03.74".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Shipman.....	33 10 50.13	213 05 13.13	4.3430520	13.690
Jelm.....	162 41 40.76	342 40 01.03	4.0760940	7.404
Gale.....	258 58 40.34	79 12 14.59	4.4701158	18.343
Dead Tree.....	278 25 54.15	98 37 50.30	4.4119216	16.042
Bull.....	315 13 43.27	135 17 40.50	4.0900898	7.472

**RED TABLE (MOUNT THOMAS), EAGLE COUNTY, COLO. (Not occupied.)**

On Red Table Mountain in T. 7 S., R. 83 W., near the southwest corner of township, near the head of Freeman Creek on the south, and a prong of Brush Creek on the north. On round bare knob.

Signal and station mark: Rock cairn.

[Latitude  $39^{\circ} 25' 12.3''$ . Longitude  $106^{\circ} 44' 34.6''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Sopris . . . . .	* * "	* * "		
	64 15 56	243 59 55	4.80588	25.07
Quartzite . . . . .	119 58 46	299 36 49	4.75521	35.36
Castle . . . . .	169 14 38	349 11 19	4.80021	24.75
Piney . . . . .	205 27 26	25 36 54	4.88063	30.48
Holy Cross . . . . .	256 53 01	77 03 00	4.36438	14.38

**RICHTHOFEN, LARIMER-JACKSON-GRAND COUNTIES, COLO.**

On the summit of Mount Richthofen at the headwaters of Grand, Cache, La Poudre, and Michigan rivers. Station is on the southwest end of the summit and can be best reached by going up Saw Mill Creek from the Grand River Ditch camp, which can be reached from Poudre Pass by following up ditch or from Cameron Pass by ditch to old road, thence along the road via Lula Pass. Animals were ridden to a point just under the peak on the east side.

Signal: Rock cairn 7 feet high.

Station mark: Bronze tablet in stone set 2 feet in loose rock under the center of the cairn.

[Latitude  $40^{\circ} 28' 10.597''$ . Longitude  $105^{\circ} 53' 39.052''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Parkview . . . . .	* * "	* * "		
	53 02 30.90	232 53 07.62	4.4095087	15.954
Walden Standpipe . . . . .	131 46 51	311 31 53	4.63765	26.97
Shipman . . . . .	158 49 33.89	338 42 24.43	4.6311193	26.575
Rawah . . . . .	166 13 29.75	346 11 06.46	4.33722	13.51
Clark . . . . .	168 57 43.19	348 56 20.91	4.1915808	9.659
North Bald . . . . .	205 50 16.55	25 57 54.36	4.5778913	23.509
South Bald . . . . .	208 04 09.12	28 11 54.72	4.5521945	22.159
Lulu . . . . .	220 56 15.51	40 57 54.88	3.74032	3.42
Hague . . . . .	265 23 39.75	85 33 20.16	4.3249337	13.128
Long Peak . . . . .	314 58 23.44	135 09 15.54	4.5268160	20.901
Arapahoe . . . . .	337 00 03.85	157 09 32.33	4.7275240	33.180

**RIO BLANCO, GARFIELD COUNTY, COLO.**

Station is on the highest point of peak about 3.5 miles southeast of Rio Blanco stage station and post office. The post office is on Meeker and Rifle road, 24 miles from Meeker and 20 miles from Rifle. Animals can be ridden to summit of peak. Signal is a rock cairn 7 feet high. Station mark a United States Geological Survey triangulation tablet under center of cairn.

[Latitude  $39^{\circ} 43' 12.104''$  (K);  $39^{\circ} 43' 11.12''$  (U). Longitude  $107^{\circ} 54' 56.965''$  (K);  $107^{\circ} 54' 57.19''$  (U).]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Limestone . . . . .	* * "	* * "		
	260 49 29.37	81 08 23.81	4.63110	26.574
Lookout . . . . .	289 25 42.48	109 50 26.23	4.77012	36.599
Sunlight . . . . .	305 09 43.43	125 30 14.09	4.7521907	35.119
Sopris . . . . .	307 58 18.52	128 26 59.59	4.9154230	51.141
North Mam (K) . . . . .	333 18 44.36	173 20 39.76	4.5710099	23.140
North Mam (U) . . . . .	353 18 45.36	173 20 40.76	4.5710313	23.141

Note.—(K)=values obtained by Kendall from the east; (U)=values obtained by Urquhart from the north.

**SHINGLE, GARFIELD COUNTY, COLO. (Not occupied.)**

On Shingle Peak on the east edge of White River Plateau about 10 miles southeast of Marvins Lake and about 7 miles south of Trappers Lake.

Signal and station mark: Rock cairn on highest point of peak.

[Latitude  $39^{\circ} 54' 05.2''$  Longitude  $107^{\circ} 12' 20.6''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Plateau.....	132 09 55	312 05 23	4.13237	8.43
Flattop.....	219 49 16	39 54 01	4.21549	10.21
Castle.....	293 51 58	114 06 05	4.54688	21.89

**SHIPMAN, LARIMER-JACKSON COUNTIES, COLO.**

On the Medicine Bow Range about 1.5 miles northwest of the Ute Pass where the State road to Walden crosses the Medicine Bow Range 15 miles east of Walden. Station is on the first high point northwest of the Ute Pass and is probably on the line between Larimer and Jackson counties. It can be easily reached by following ranger's trail from Ute Pass to Village Belle mine. Wycola Trail leaves the State road at firebox 46 in the pass and runs within a few feet of the station.

Signal: A six-sided pole signal carrying white and black flags with white on sides and pine bushes at apex.

Station mark: Standard bench mark tablet set in solid rock, centered under signal.

[Latitude  $40^{\circ} 49' 42.976''$ . Longitude  $106^{\circ} 04' 38.312''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Walden Standpipe.....	56 58 21	236 50 31	4.30454	12.53
Jelm.....	195 50 32.61	15 54 30.39	4.4914620	19.267
Red.....	213 05 13.13	33 10 50.13	4.3430520	13.660
Bull.....	244 09 04.88	64 18 38.45	4.3577621	14.162
Little Bald.....	262 51 18.62	83 03 53.90	4.4355270	16.939
North Bald.....	280 13 20.83	100 28 11.10	4.5114089	20.172
South Bald.....	284 30 44.73	104 45 42.73	4.5225470	20.697
Hague.....	316 10 02.43	136 26 54.49	4.7228005	32.825
Rawah.....	331 08 00.8	151 12 48.4	4.33125	13.33
Clark.....	333 01 12.02	153 06 59.48	4.4409279	17.151
Richthofen.....	338 42 24.43	158 49 33.89	4.6311193	26.575

**SLEEPY CAT, RIO BLANCO COUNTY, COLO.**

Station is on a rocky peak about 0.5 or 0.8 mile northeast of Sleepy Cat Peak, a well-known mountain about 25 miles north-northeast of Meeker. The latter mountain is higher and more prominent than station, but can not be used on account of dense growth of timber at summit. There is a road from Meeker and from Thornburg to the Riley-Merritt sawmill at foot of peak. The mill is not being operated at present, but there is a United States forestry station there.

Signal: A rock cairn 6 feet high with spruce tree in center.

Station mark: A triangulation tablet set in center of cairn. Animals can be taken very near the point.

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[Latitude  $40^{\circ} 08' 03.35''$  (K);  $40^{\circ} 08' 02.46''$  (U). Longitude  $107^{\circ} 31' 40.24''$  (K);  $107^{\circ} 31' 40.75''$  (U).]

To station—	Azimuth.	Back azimuth.	Distance.	
Mams Peak (U).....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Petrolite (U).....	19 19 32.69	199 06 35.44	4.9439031	54.608
Cathedral (U).....	57 24 17.44	237 05 49.11	4.6866763	30.201
Colorow (U).....	63 01 09.57	242 21 48.79	4.9924938	61.072
Devils Hole (U).....	95 43 03.65	275 17 53.95	4.7455392	34.585
Juniper (U).....	99 50 48.40	279 36 25.30	4.5099846	19.968
North Main (K).....	129 32 58.47	309 13 32.53	4.7411607	34.238
North Main (U).....	19 19 46.95	199 06 49.57	4.9438947	54.607
Pagoda (K).....	19 19 32.69	199 06 35.44	4.9439031	54.608
Pagoda (U).....	267 42 31	87 50 04	4.22138	10.34
Plateau (K).....	267 42 17.06	87 49 50.12	4.2214469	10.347
Plateau (U).....	313 46 43.97	133 54 37.55	4.3834892	15.020
	313 46 29.63	133 54 23.19	4.3834442	15.024

NOTE.—(K)=values obtained by Kendall from the south; (U)=values obtained by Urquhart from the north.

## SOPRIS, PITKIN COUNTY, COLO.

In T. 9 S., R. 88 W., near the corner of secs. 23, 24, 25, and 26 (approximate). On the highest point of the southeastern peak of Sopris Mountain, a well-known mountain about 15 miles south of Carbondale on the Denver & Rio Grande and Colorado Midland railroads, from which place it can be easily reached by road up Antler (or Province) Creek to a sawmill near its head. A good trail leads from the sawmill to the top of the divide 1 mile south of the station.

Station mark: Bronze tablet in 8 by 8 by 24 inch stone set in loose rock, distant 6.2 feet; true azimuth  $65^{\circ} 18'$  from cairn.

Signal: A large rock cairn 8 feet high replacing the one used by the Hayden Survey and E. M. Douglas in former work.

[Latitude  $39^{\circ} 15' 41.280''$  (K);  $39^{\circ} 15' 36.2''$  (D). Longitude  $107^{\circ} 09' 50.705''$  (K);  $107^{\circ} 09' 57.4''$  (D).]

To station—	Azimuth.	Back azimuth.	Distance.	
Chair (K).....	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Chair (D).....	24 15 54	204 11 27	4.39324	15.37
Leon.....	24 15 54	204 11 27.5	4.393718	15.384
North Main.....	71 14 55.02	250 49 10.64	4.7930130	38.580
Rio Blanco.....	103 11 07.96	282 44 27.82	4.7928453	38.505
Sunlight.....	128 26 59.59	307 58 18.52	4.9154230	51.141
Lookout.....	134 33 58.77	314 25 47.71	4.4150042	16.157
Quartzite.....	163 45 00.00	343 40 58.81	4.51088	20.148
Flattop.....	164 00 04.75	343 54 13.74	4.6789794	29.671
Castle.....	184 45 26.88	4 48 34.18	4.9240419	52.167
Red Table.....	206 46 14.44	26 59 00.42	4.8035053	39.524
Holy Cross.....	243 59 55	64 15 56	4.60588	25.074
	248 35 09.70	69 01 09.20	4.8002642	39.230

NOTE.—(K)=value obtained by Kendall from the north; (D)=value obtained by Douglas from the south. (See Bull. 122, p. 289.)

## SOUTH BALD, LARIMER COUNTY, COLO.

On the central and highest of five peaks forming Bald Mountain, which is at the headwaters of Lone Pine and Seven-Mile creeks on the east and Roaring and Nun creeks on the west. Peak is bare on all sides and station is on the summit, which runs up very sharp. A good wagon road and rangers' trail leads from Manhattan on the Livermore-Log Cabin and Home road to a point just north of the peak. A ranger's trail also leads direct from the Lone Pine ranger station on the State road, which is about 5 miles northeast of the station.

Signal: A rock cairn 6 feet high with small flagpole in the center.

Station mark: A bronze tablet in stone set 2 feet in the ground 5.4 feet southeast of the signal; true azimuth  $324^{\circ} 58'$ .

[Latitude  $40^{\circ} 45' 10.12''$ . Longitude  $105^{\circ} 41' 43.76''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Richtshofen.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Shipman.....	28 11 54.72	208 04 09.13	4. 5521945	22.159
North Bald.....	104 45 42.73	284 30 44.73	4. 5225470	20.697
Gale.....	173 43 03.43	353 42 55.49	3. 4152968	1.617
Livermore.....	195 18 54.70	15 23 03.88	4. 5270298	20.911
Hague.....	269 02 12.92	89 18 01.66	4. 5326838	21.185
	351 57 00.85	171 58 57.26	4. 4782220	18.688

**SUGAR LOAF, BOULDER COUNTY, COLO.**

High conical timbered mountain (bare rock on summit) known as Sugar Loaf Mountain, on south side of Four Mile Creek between Wall Street and Copper Rock. Reached by old railroad grade (now wagon road) from Sunset.

Station mark: Aluminum tablet under rock cairn.

[Latitude  $40^{\circ} 01' 36.974''$  (U) final;  $40^{\circ} 01' 36.99''$  (T). Longitude  $105^{\circ} 25' 04.992''$  (U);  $105^{\circ} 25' 04.78''$  (T).]

To station—	Azimuth.	Back azimuth.	Distance.	
Arapahoe.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Bald.....	89 59 27.02	269 50 30.50	4. 2962388	12.291
Longs Peak.....	107 17 48.57	287 12 38.19	4. 0782957	7.441
Hague.....	146 36 58.20	326 29 22.32	4. 4824674	18.873
Twin.....	159 12 06.85	339 03 16.99	4. 7355109	33.796
Lillie.....	163 52 24.33	343 48 34.90	4. 4807944	18.799
Hogback (U).....	163 56 59.81	343 53 16.81	4. 4706158	18.360
Hogback (T).....	218 57 44.40	39 06 17.39	4. 4750726	18.592
	218 57 15	39 05 48	4. 475077	18.592

NOTE.—(U)—values obtained by Urquhart from the northwest; (T)—values obtained by Tweedy from the east.

**SUNLIGHT, GARFIELD COUNTY, COLO.**

In T. 7 S., R. 89 W., in the southwest corner of the township (approximate). Station is on the highest point of ridge forming the divide between waters of Roaring Fork River and West Divide Creek. Four Mile Creek, a tributary of Roaring Fork, flows along the south base of the ridge, and Three Mile and Garfield creeks head against the ridge and flow north and northwest, respectively. Station can be easily reached from Glenwood Springs by wagon road up Roaring Fork and Four Mile Creek via the Sunlight Mines to Likes ranch and sawmill, thence by trail north up Likes Branch to the divide, thence along or near the top of the ridge east to station. It is about 3 miles by trail north of Likes ranch. Timber was cut in order to afford a good view in all directions. A lone pine tree was left on the highest point for signal.

Station mark: Bronze tablet set in sandstone boulder distant 6 feet; true azimuth  $233^{\circ} 57'$  from signal.

Signal: Lone pine tree about 15 feet northwest of highest point with flag in top and braced by four poles carrying white targets.

[Latitude  $39^{\circ} 25' 32.235''$ . Longitude  $107^{\circ} 22' 45.192''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Leon.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Divide.....	46 22 13.11	226 04 35.46	4. 7443596	34.491
North Mam.....	48 42 19.07	228 37 19.73	4. 17722	9.345
Rio Blanco.....	84 17 26.37	263 58 55.09	4. 6243113	26.161
Quartzite.....	125 30 14.09	305 09 43.43	4. 7521907	35.119
Lookout.....	190 50 24.07	10 52 45.61	4. 4497888	17.504
Sopris.....	216 07 42.11	36 11 52.97	4. 20353	9.93
Chair.....	314 25 47.71	134 33 58.77	4. 4150042	16.157
	348 16 43	168 20 26	4. 61954	25.88

**TURRET, GARFIELD COUNTY, COLO. (Not occupied.)**

A small turret-shaped peak on the White River Plateau near the head of the South Fork of White River and about 12 miles southeast of Marvine Lake.

Signal and station mark: Center of peak.

[Latitude 39° 52' 10.5". Longitude 107° 11' 58.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Quartzite.....	25 10 03	205 06 30	4.37769	14.83
Plateau.....	140 02 59	319 58 13	4.21728	10.25
Flattop.....	211 50 49	31 55 20	4.27855	11.80

**TWIN, LARIMER COUNTY, COLO.**

This station is on the northwestern of two prominent peaks locally known as the Twin Sisters but called Lilly Mountain in United States Geological Survey notes. There is a small mountain about 3 miles north-northwest of this point and half a mile north of Lilly Lake, locally known as Lilly Mountain. There is still another mountain about 5 miles northwest of the Twin Sisters, locally known as Sharp Mountain, consequently it would be confusing to call the station by any other name than Twin Sisters. The station is less than 3 miles in air line from Longs Peak. There is a trail from Longs Peak to the summit but horses can not be ridden more than two-thirds of the way.

Signal and station mark: A rock cairn 6.5 feet high.

Reference mark: A United States Geological Survey triangulation tablet set in solid rock 3 feet northeast of cairn.

[Latitude 40° 17' 19.147". Longitude 105° 31' 00.758".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Bald.....	6 42 45.28	186 41 23.57	4.406472	15.959
Longs Peak.....	65 54 30.24	245 50 43.10	3.9588714	5.652
Hogback.....	281 57 49.40	102 10 13.71	4.4444957	17.292
Sugarloaf.....	343 48 34.90	163 52 24.33	4.4807944	18.799

**UTE, GRAND-SUMMIT COUNTIES, COLO.**

Station is on the higher and southeastern of two small peaks on summit of a ridge lying between Blue River and Williams River and locally known as the Blue Ridge. It is about 3 miles south of the Big Ute pass, through which there is a very fair trail from Blue River to Williams River. Animals can be ridden along summit from pass to station, though there is no well-defined trail. The above-mentioned trail crosses Blue River at Mr. Andrew Linstrom's ranch, about 16 miles northwest of Dillon, and crosses Williams River at the Marble Bros. ranch.

Signal: A rock cairn about 6 feet high.

Station mark: A United States Geological Survey triangulation tablet set in rock, distant 3.5 feet southeast of signal; true azimuth 326° 46' 41".

[Latitude 39° 47' 08.568". Longitude 106° 04' 35.563".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Powell.....	83 00 47	262 50 22	4.35672	14.128
Eagles Nest.....	87 26 32	267 15 47	4.36925	14.541
Lone Peak.....	108 52 25.90	288 38 46.20	4.5070077	19.969
Kremmling.....	138 57 19.53	318 46 43.44	4.5539286	22.247
Elk.....	174 01 40.81	353 59 42.14	4.6234818	26.112
Byers.....	231 42 46.97	51 47 46.36	4.1500118	8.796
Ptarmigan.....	337 29 48.03	157 31 44.82	4.0558764	7.067

**WALDEN STANDPIPE, JACKSON COUNTY, COLO. (Not occupied.)**

Standpipe in the town of Walden.

Signal and station mark: Center of standpipe.

Sighted from two stations; position doubtful.

[Latitude  $40^{\circ} 43' 46.1''$ . Longitude  $106^{\circ} 16' 38.7''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Shipman.....	236 50 31	56 58 21	4.30454	12.53
Richthofen.....	311 31 53	131 46 51	4.63765	26.97

**WHITELEY, GRAND COUNTY, COLO.**

On the highest part of the Whiteley Mountain about 1.5 miles north of Muddy Creek, and about 25 miles north of Kremmling by the Kremmling-Steamboat road. The station is about 2 miles northeast of Martin post office on Muddy Creek, from which a good trail leads around the north side of the mountain to gap at east side, from which the station was reached. Pack animal was taken to the top, but climbing was rough. There was water in gap of timber on west side of draw to north, about 800 feet from gap. Water can also be had farther down the draw. Feed good.

Signal: Cairn 7 feet high with pine tree in center.

Station mark: United States Geological Survey bronze tablet, set in 6 by 8 by 24 inch stone, over which was built the cairn, 7 feet high, with pine tree in center.

[Latitude  $40^{\circ} 19' 04.948''$ . Longitude  $106^{\circ} 29' 33.500''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Piney.....	00 21 47.57	180 21 38.05	4.7438366	34.450
Gore.....	53 04 50	232 58 29	4.24118	10.43
Flattop.....	56 23 04.51	236 00 14.75	4.7815885	37.578
Rabbit Ears.....	140 32 49.36	320 28 15.12	4.1960495	9.759
Elk.....	299 01 58.01	119 16 06.32	4.5507498	22.085
Kremmling.....	339 30 29.59	159 35 56.28	4.5352979	21.313
Lone Peak.....	353 55 47.44	173.58 08.01	4.6905859	30.474

**WHITE PINE, LARIMER COUNTY, COLO. (Not occupied.)**

Highest tree on summit of White Pine Mountain, which lies between the headwaters of Big Thompson River and Buckhorn Creek.

Signal and station mark: Highest tree on summit.

[Latitude  $40^{\circ} 36' 18.0''$ . Longitude  $105^{\circ} 20' 44.9''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Hague.....	51 47 24.9	231 39 36.9	4.33404	13.41
North Bald.....	131 41 41.3	311 31 47.3	4.45656	17.78
Livermore.....	217 31 54.7	37 37 56.0	4.32922	13.26
Horsetooth.....	288 51 00.5	109 00 45.0	4.34920	13.39

**AMES, ALBANY COUNTY, WYO. (Not occupied.)**

Ames monument on summit of the Sherman Hill near the town of Sherman, on the Union Pacific Railroad. The monument is about 25 feet high, and was built by the Union Pacific Railroad.

Station mark and signal: Apex of monument.

[Latitude 41° 07' 52.3". Longitude 105° 23' 51.3".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Dead Tree.....	46 01 55	225 52 43	4.43625	16.98
Gale.....	59 25 02	239 17 27	4.27349	11.67
Twin.....	310 01 09	130 06 17	4.15523	8.88

**GALE, ALBANY COUNTY, WYO.**

A prominent rocky peak near the north end of Boulder Ridge about 1½ miles north of Colorado-Wyoming boundary line. About 9 miles southwest of Tie Siding and 500 yards north of road from there to North Park via Boulder Ridge. About 5 miles northwest of well-known rocky peak called Diamond Peak.

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

Signal: A pole quadripod with flags and target.

[Latitude 41° 02' 42.170" (K); 41° 02' 42.12" (T). Longitude 105° 35' 23.180" (K); 105° 35' 22.88" (T).]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Black.....	11 58 23.6	191 56 29.6	4.29299	12.20
South Bald.....	15 23 03.88	195 18 54.70	4.5270298	20.911
North Bald.....	17 08 24.80	197 00 07.62	4.4948318	19.417
Dead Tree.....	20 14 37.57	200 13 00.16	4.0014830	6.235
Little Bald.....	34 12 32.58	214 05 59.14	4.3980700	15.539
Bull.....	55 33 35.26	235 23 59.04	4.3967232	15.491
Red.....	79 12 14.59	258 58 40.34	4.4701158	18.343
Jelm (K).....	100 13 24.05	279 58 09.24	4.5187672	20.517
Jelm (T).....	100 13 17.46	279 58 02.71	4.5187373	20.516
Ames.....	239 17 27	59 25 02	4.27349	11.67
Twin.....	269 07 07.21	89 19 49.38	4.4331210	16.845
Cap Rock.....	303 29 36.10	123 35 01.77	4.1434427	8.646
Livermore (K).....	321 44 50.36	141 56 32.72	4.6089706	25.253
Livermore (T).....	321 44 53.11	141 56 35.40	4.6089354	25.252
Diamond.....	340 33 10	160 34 22	3.88797	4.81

NOTE.—(K)—values obtained by Kendall from the southeast; (T)—values obtained by Tatum from the south.

**JELM, ALBANY COUNTY, WYO.**

Situated about 3 miles east-southeast of Woods post office on the highest part of the mountain by that name. A tripod of poles erected over center.

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

[Latitude 41° 05' 49.810" (K); 41° 05' 49.71" (T). Longitude 105° 58' 35.600" (K); 105° 58' 35.22" (T).]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Shipman.....	15 54 30.39	195 50 32.61	4.4914620	19.267
Twin.....	274 57 51.29	95 25 48.70	4.7707594	37.189
Gale (K).....	279 58 09.24	100 13 24.05	4.5187672	20.517
Gale (T).....	279 58 02.71	100 13 17.46	4.5187373	20.516
Dead Tree.....	297 30 12.12	117 43 48.71	4.5158409	20.379
Little Bald.....	324 57 45.72	145 06 25.18	4.5094200	20.080
North Bald.....	326 38 49.41	146 49 44.44	4.6298236	26.496
Bull.....	328 52 08.02	148 57 45.15	4.3665273	14.450
Red.....	342 40 01.03	162 41 40.76	4.0760940	7.404

NOTE.—(K)—values obtained by Kendall from the southeast; (T)—values obtained by Tatum from the south.

**TWIN, LARAMIE COUNTY, WYO.**

A station of the United States Coast and Geodetic Survey.

On the highest point of the more eastern one of the two peaks known as Twin Mountain, about 20 miles a little south of west from Cheyenne and 7 miles by road southwest

of Granite Canyon, a station on the Union Pacific Railroad. The station is marked by a standard disk of the United States Coast and Geodetic Survey, is 0.15 meter above the station and 3.494 meters distant in azimuth  $159^{\circ} 58'$ . The bronze tablet marking the United States Geological Survey triangulation station "East Twin" is 0.16 meter above the station and 2.674 meters distant in azimuth  $96^{\circ} 08'$ . Azimuth observations were made at this station.

[Latitude  $41^{\circ} 02' 54.064''$ . Longitude  $105^{\circ} 16' 02.530''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Livermore.....	•     "	•     "	4.5104191	20.127
Hague.....	3 39 06.44	183 38 08.85	4.8468583	43.673
North Bald.....	27 09 54.59	206 55 04.95	4.6746935	29.379
Cap Rock.....	50 23 31.46	230 06 34.16	4.2427743	10.867
Gale.....	62 38 23.72	242 31 07.75	4.4331210	16.845
Jelm.....	89 19 48.38	269 07 07.21	4.7770594	37.189
Ames.....	95 25 48.70	274 57 51.29	4.15523	8.88
Horsetooth.....	130 06 17	310 01 09	4.7543881	35.297
	353 54 24.76	173 57 12.15		

## IDAHO.

### TRIANGULATION STATIONS.

**Ammon, Cranes Flat, Henry, Irwin, Lanes Creek, Malad City, Mink Creek, Pocatello, Portneuf, Shelley, Soda Springs, and Sterrett quadrangles.**

#### **BANNOCK, BEAR LAKE, BINGHAM, BONNEVILLE, FRANKLIN, AND ONEIDA COUNTIES.**

The following geographic positions were determined in 1915 by T. M. Bannon and H. H. Hodgeson and are based on United States Coast and Geodetic Survey preliminary positions of triangulation stations Henry and Woodall, North American datum.

#### **ALEXANDER, BANNOCK COUNTY, IDAHO. (Not occupied.)**

On the northwest end of old volcanic crater, about  $2\frac{1}{2}$  miles west of Alexander. One-half mile south of Oregon Short Line Railroad, one-half mile north of the wagon road west from Alexander to Central and Lund. A north-south section line passes by the station. Easily reached from the ranch at the northwest foot of mountain.

Reference marks: (1) A tablet 12.25 feet east; (2) chiseled cross on rock 51 feet southwest at the outer edge of base of mountain. (The latter was the instrument station.)

Station mark: An iron rod driven in the ashes under a big monument.

[Latitude  $42^{\circ} 39' 19.2''$ . Longitude  $111^{\circ} 44' 57.3''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Baldy.....	42 41 14	222 34 04	4.32271	13.064
Backbone.....	165 16 56	345 14 53	4.21143	10.110
Tennile.....	187 16 51	7 17 28	3.98547	6.000

#### **BACKBONE, BANNOCK COUNTY, IDAHO.**

About 5 miles southeast of Hatch, on highest point of rocky backbone, about 4 miles northwest of Tennile Pass. It is in the southeast corner of sec. 20, T. 7 S., R. 40 E., Boise meridian. The station can best be reached from the east side.

Signal: Cedar tree, bushy top, cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 10 feet and in true azimuth  $321^{\circ} 31'$ .

Reference mark B: Chiseled cross in rock, distant from station 5 feet and in true azimuth  $76^{\circ} 02'$ .

Station mark: Bronze triangulation tablet cemented in rock.

[Latitude  $42^{\circ} 47' 49.27''$ . Longitude  $111^{\circ} 47' 59.23''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Baldy.....	17 56 30.10	197 51 30.28	4.5157369	20.375
Lund.....	39 25 20	219 18 58	4.30511	12.545
Bancroft.....	39 53 10	219 49 41	4.03831	6.787
Thirty-five.....	75 32 34	255 25 24	4.17266	9.247
Putnam.....	120 22 18	300 07 28	4.53739	21.416
Twenty-four Mile.....	157 20 45.20	337 17 23.37	4.2421081	10.851
Corral.....	219 25 14.80	39 30 17.48	4.2013538	9.879
Woodall.....	281 58 17.14	102 09 45.24	4.3720733	14.636
Three Mile.....	298 16 49	118 25 59	4.31886	12.948
Ten Mile.....	318 51 32.25	138 54 12.39	3.9113267	5.066
Alexander.....	345 14 53	165 16 56	4.21143	10.110

**BALDY, BANNOCK COUNTY, IDAHO.**

Sharp peak known as Baldy Mountain, in sec. 29, T. 10 S., R. 39 E., on the divide between Bear River and Marsh Lake of Portneuf River.

Signal and station mark: Seven-foot rock cairn.

[Latitude  $42^{\circ} 30' 58.06''$ . Longitude  $111^{\circ} 55' 21.70''$ ]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Cottonwood.....	16 37 31	196 35 48	4.08625	7.578
Oxford.....	27 46 50.92	207 39 47.33	4.4898346	19.195
Elkhorn.....	66 23 02	246 08 05	4.52073	20.610
Lund.....	170 01 38	350 00 17	4.19060	9.839
Bancroft.....	187 38 59	7 40 16	4.36218	14.306
Backbone.....	197 51 30.28	17 56 30.10	4.5157369	20.375
Tenmile.....	211 36 04.41	31 43 43.79	4.4689889	18.295
Alexander.....	222 34 04	42 41 14	4.32271	13.064
Soda.....	280 13 09.98	100 28 20.42	4.4954038	19.443
Paris.....	318 18 03.46	138 33 11.27	4.0671326	28.872
Cleveland.....	332 37 47	152 44 11	4.46028	17.932
Treasureton.....	348 04 12.53	168 06 38.66	4.3803534	14.918

**BANCROFT, BANNOCK COUNTY, IDAHO. (Not occupied.)**

Steel railroad water tank in the town of Bancroft, Idaho.

Station mark and signal: Center of tank.

[Latitude  $42^{\circ} 43' 17.5''$ . Longitude  $111^{\circ} 53' 07.1''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Baldy.....	7 40 16	187 38 59	4.36218	14.306
Backbone.....	219 49 41	39 53 10	4.03831	6.787
Tenmile.....	259 40 09	79 46 18	4.09930	7.810

**BLACKFOOT, BINGHAM COUNTY, IDAHO.**

On bare summit near the south end of Blackfoot Mountains, near the head of and on the west side of Brush Creek. It is about 2 miles west of an old sawmill site in Brush Creek and the signal can be seen from near this site. To reach Blackfoot triangulation station the best route is to follow the road up left fork of Mill Creek from the Mill Creek crossing of the Blackfoot Dam and Idaho Falls road. Cross over the head of Mill Creek into Brush Creek drainage and continue on road to the old sawmill site mentioned above. Thence up Brush Creek for about 1 mile, thence climb to summit of ridge on left and follow ridge north to station. An abundance of good water in Brush Creek at the old sawmill site.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 3.6 feet, true azimuth  $338^{\circ} 09'$ .

Reference mark B: Chiseled cross in rock, distant from station 5.8 feet, true azimuth  $36^{\circ} 05'$ .

Station mark: Bronze triangulation tablet cemented in rock.

[Latitude  $43^{\circ} 11' 52.48''$ . Longitude  $111^{\circ} 52' 29.89''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Twenty-four Mile.....	1 11 15.36	181 10 57.61	4.4547736	17.665
Higham.....	69 45 28.18	249 36 56.50	4.2556054	11.183
Sugarloaf.....	266 03 12.14	86 14 54.13	4.3655046	14.416
Paradise.....	318 30 57.61	138 54 39.75	4.0475095	6.932

**CAMP, BANNOCK COUNTY, IDAHO.**

In the northeast corner of sec. 29, T. 5 S., R. 42 E., Boise meridian. It is about 7 miles north from the town of Henry on summit of sharp ridge northwest of Goose Lake. Can be reached from any direction.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Flagpole, cairn around base and cemented over station mark.

Reference mark A: Chiseled cross in rock, distant from station 8.8 feet, true azimuth  $306^{\circ} 11'$ .

Reference mark B: Chiseled cross in rock, distant from station 11.3 feet, true azimuth  $106^{\circ} 20'$ .

[Latitude  $42^{\circ} 57' 43.4''$ . Longitude  $111^{\circ} 33' 04.4''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Corral.....	• ' "	• ' "		
	59 19 18	239 14 12	4.07424	7.372
Limerock.....	141 30 08	321 27 57	3.84322	4.331
Henry.....	230 35 57	110 41 58	4.11006	8.006

**CARIBOU, BONNEVILLE COUNTY, IDAHO.**

On highest peak on Caribou Mountain, which is a high, isolated mountain 7 or 8 miles east of John Gray Lake. This station can best be reached from Gray, Idaho, by following road up the north fork of Eagle Creek to the Evergreen mine, thence by trail to the second saddle south of station; thence along ridge north. Can take animals to station. An abundance of good water in head of North Eagle Creek.

Signal: Pine tree, brushy top cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 18.9 feet, true azimuth  $50^{\circ} 58'$ .

Reference mark B: Chiseled cross in rock, distant from station 27.1 feet, true azimuth  $356^{\circ} 24'$ .

Station mark: Bronze tablet cemented in rock.

[Latitude  $43^{\circ} 05' 37.58''$ . Longitude  $111^{\circ} 18' 39.31''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Henry.....	• ' "	• ' "		
	21 31 05.56	201 27 18.23	4.3140253	12.805
Grays Lake ranger station.....	37 57 00.00	217 54 17.00	3.94288	5.448
Corral.....	55 20 02.89	235 05 06.13	4.5504929	22.534
Limerock.....	69 06 14.83	248 51 13.47	4.4084954	15.916
Paradise.....	94 51 10.94	274 31 45.20	4.5877197	24.047
Sugarloaf.....	120 07 18.34	208 55 30.84	4.4188445	16.300

**CLEVELAND, BANNOCK COUNTY, IDAHO.**

On a rocky-topped, grassy hill divide, at the extreme east head of Battle Creek. Visible from both Treasureton, 5 miles west, and Cleveland, 5 miles northeast. The Oneida power plant on Bear River is at the east foot of hill or mountain 2 miles distant.

Reference mark: A tablet cemented in solid rock 13 feet northeast.

Station mark: A chiseled cross on solid rock under a large monument.

[Latitude 42° 17' 07.0". Longitude 111° 45' 42.5".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Oneida.....	30 56 26	210 54 04	3.54830	2.196
Clifton.....	50 25 06	230 17 20	4.30632	12.580
Oxford.....	86 35 33	266 22 00	4.44280	17.225
Treasureton.....	104 33 48	284 26 44	3.93340	5.330
Baldy.....	152 44 11	332 37 47	4.46028	17.932
Surge.....	176 01 27	356 01 32	4.45941	17.896
Soda.....	221 13 19	41 21 57	4.42568	16.559

## CLIFTON, ONEIDA COUNTY, IDAHO.

On a lone hill in Cache Valley, north of Bear River and west of Battle Creek. About 2 miles southeast of Clifton, Idaho. The wagon road from Clifton to Preston passes along the west foot of the hill. The hill is between the present location of Oregon Short Line Railroad and the abandoned narrow-gage roadbed.

Station mark: A tablet cemented in rock under a very small monument and tree signal.

Reference mark: A chiseled cross on small rock cropping on the west slope of hill 35.25 feet west.

[Latitude 42° 10' 08.33". Longitude 111° 57' 02.22".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Burgeson.....	8 55 47	188 54 10	4.28742	12.040
Oxford.....	132 52 02.15	312 46 07.53	4.2175164	10.253
Treasureton.....	205 44 00.94	25 47 34.16	4.2235743	10.397
Cleveland.....	230 17 29	50 25 06	4.30632	12.580
Oneida.....	234 16 14	54 22 57	4.22825	10.534
Paris.....	263 20 30.55	83 36 42.82	4.5242844	20.779
Doubletop.....	311 39 33	131 51 12	4.50711	19.976
Smart.....	326 30 28.73	146 35 31.60	4.2749506	11.703

## CORRAL, BANNOCK COUNTY, IDAHO.

About 7 miles by road south of Blackfoot dam, on one of highest points on ridge lying directly west of and 10 miles from the town of Henry and on the west side of Blackfoot Storage Reservoir. It is the south part of sec. 8, T. 6 S., R. 41 E., Boise meridian. It can be reached easily from any direction.

Signal: Flagpole, rock cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock distant from station 12 feet and in true azimuth 222° 42'.

Reference mark B: Chiseled cross in rock distant from station 14 feet and in true azimuth 316° 55'.

Station mark: Bronze tablet cemented in rock.

[Latitude 42° 54' 27.03". Longitude 111° 40' 34.19".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Tenmile .....	14 29 20.38	194 26 58.16	4.2792015	11.818
Backbone.....	39 30 17.48	219 25 14.80	4.2013538	9.879
Twenty-four Mile.....	102 55 21.85	282 46 56.72	4.2368640	10.720
Limerock.....	206 55 04.51	26 58 00.47	4.1111331	8.026
Caribou.....	235 05 06.13	55 20 02.89	4.5594929	22.534
Camp.....	239 14 12	59 19 18	4.07424	7.372
Henry.....	266 00 34.48	86 11 42.85	4.3486254	13.967
Woodall.....	323 03 45.50	143 10 11.77	4.3324755	13.361
Lake.....	315 11 44	135 15 41	4.05034	6.978

**COTTONWOOD, BANNOCK COUNTY, IDAHO. (Not occupied.)**

On a sharp prominent peak in sec. 1, T. 12 S., R. 38 E., on divide, west side of Cottonwood Creek, near the head of the creek, about 5 miles northeast of Swan Lake post office.

Station mark: Flag on highest point.

[Latitude 42° 24' 38.8". Longitude 111° 57' 54.5".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Oxford.....	• ' "	• ' "	4.28043	11.852
Baldy.....	34 51 02	214 45 31	4.08625	7.578
Treasureton.....	196 35 48	16 37 31	4.16173	9.027
	324 18 50	144 22 59		

**DAK, BANNOCK COUNTY, IDAHO.**

The station is on the highest point of ridge about 3 miles west of Blackfoot dam. It can be reached easily by going northwest up long ridge from the center of sec. 11, T. 5 S., R. 40 E. Boise meridian; the station is on the highest part of this ridge.

Signal: Cairn 9 feet high centered over station mark.

Reference mark A: Chiseled cross in rock distant from station 11 feet southwest.

Reference mark B: Chiseled cross in rock distant from station 7.8 feet northwest.

[Latitude 43° 00' 44.4". Longitude 111° 46' 29.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Twenty-four Mile.....	• ' "	• ' "	4.06049	7.292
Paradise.....	48 19 53	228 15 40	4.08776	7.605
Limerock.....	176 11 30	356 11 05	4.14264	8.630
	270 28 56	90 35 54		

**ELKHORN, BANNOCK AND ONEIDA COUNTIES, IDAHO. (Not occupied.)**

A station of the Wheeler Survey.

Station mark: Summit of peak.

[Latitude 42° 23' 45.3". Longitude 112° 17' 30.4".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Baldy.....	• ' "	• ' "	4.52073	20.610
Treasureton.....	246 08 05	68 23 02	4.56582	22.865
Oxford.....	285 51 00	106 08 23	4.32804	13.224
	311 02 30	131 10 22		

**GRAYS LAKE RANGER STATION, BONNEVILLE COUNTY, IDAHO. (Not occupied.)**

Grays Lake ranger station is at the southeast end of John Gray Lake and is a square frame house, with a pyramid roof.

Station mark and signal: Center of house.

[Latitude 43° 01' 53.5". Longitude 111° 22' 37.5".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Limerock.....	• ' "	• ' "	4.27118	11.602
Caribou.....	83 07 07	262 57 48	3.94288	5.448
	217 54 17	37 57 00		

**HENRY, BANNOCK COUNTY, IDAHO.**

About 6.5 miles nearly east of Henry post office, probably 1 mile north. It can be reached by road running toward south end of Grays Lake and then to north of canyon. From here trail by horseback to top of hill which is bald on top and all sides except on north, which is covered with pine trees. The top of hill is covered with small rock. Station is on highest part of peak.

Signal: Cairn 6 feet at base and 7 feet high, with small pine in middle with tuft on top.

Station mark: Tablet set under signal cairn.

[Latitude  $42^{\circ} 55' 16.19''$ . Longitude  $111^{\circ} 24' 12.50''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Woodall.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Lake.....	26 40 50.00	206 36 08.92	4.3209418	13.010
Corral.....	56 38 11	236 30 33	4.29000	10.699
Camp.....	86 11 42.85	266 00 34.48	4.3486254	13.867
Limerock.....	110 41 58	290 35 57	4.11006	8.006
Caribou.....	121 26 35.03	301 18 21.99	4.2833539	11.932
	201 27 18.23	21 31 05.56	4.3140253	12.805

**HIGHAM, BINGHAM COUNTY, IDAHO.**

On Higham Peak in the southeast corner of T. 3 S., R. 37 E. Boise meridian, in the northeast corner of the Fort Hall Indian Reservation. It is at the head of Cold and Wood creeks and about 5 miles east of Old Fort Hall. A public road passes within a mile of the peak (and on the south side) and the climb to the summit from the road is easily made.

Station mark: Bronze tablet cemented in rock and stamped with the elevation above sea level, 6,725.

Signal: Aspen, brushy top, cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 28.4 feet, true azimuth  $94^{\circ} 00'$ .

Reference mark B: Chiseled cross in rock, distant from station 6.2 feet, true azimuth  $200^{\circ} 10'$ .

[Latitude  $43^{\circ} 08' 29.84''$ . Longitude  $112^{\circ} 04' 57.77''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Putnam.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Blackfoot.....	17 37 37	197 34 17	4.31140	13.638
Paradise.....	249 36 56.50	69 45 28.18	4.2550054	11.193
Twenty-four Mile.....	274 58 03.45	95 10 16.78	4.3863043	15.124
	323 32 23.14	143 40 35.86	4.4309866	17.113

**LAKE, BANNOCK COUNTY, IDAHO.**

Six miles south of Henry and 2 miles west of Dovell's shearing corral; on second hill north of China Hat. It is on south edge of the Blackfoot storage reservoir.

Station mark: Bronze tablet cemented in rock.

Signal: Flagpole, cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 10.5 feet southwest.

Reference mark B: Chiseled cross in rock, distant from station 8.35 feet northwest.

[Latitude  $42^{\circ} 50' 08.7''$ . Longitude  $111^{\circ} 34' 45.8''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Corral.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Henry.....	135 15 41	315 11 44	4.05034	6.973
Woodall.....	236 30 33	56 38 11	4.23400	10.699
	331 32 55	151 35 25	4.02098	6.522

## LIMEROCK, BANNOCK COUNTY, IDAHO.

In the southwest corner of sec. 1, T. 5 S., R. 41 E. Boise meridian. On highest point of limestone ridge about 10 miles by road from the town of Henry and about 2 miles west of Meadow Creek Springs. It can be reached from Henry by following northward for about 4 miles the road to Wayan post office, thence by road westward across Meadow Creek, thence northwest to low saddle on the road from Grays Lake to Blackfoot Dam. From this point the station is about a 1,000-foot climb to northward.

Reference mark A: Chiseled cross in rock, distant from station 19.5 feet, true azimuth  $152^{\circ} 44'$ .

Reference mark B: Chiseled cross in rock, distant from station 11.5 feet, true azimuth  $304^{\circ} 48'$ .

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Station mark: Bronze tablet cemented in rock.

[Latitude  $43^{\circ} 00' 40.16''$ . Longitude  $111^{\circ} 36' 15.99''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Corral .....	• ' "	• ' "		
Twenty-four-Mile.....	26 58 00.47	206 55 04.51	4.1111331	8.026
Paradise.....	71 22 40.35	251 11 18.72	4.3788028	14.865
Sugarloaf.....	130 06 11.46	309 58 48.18	4.2829820	11.922
Caribou.....	182 58 55.42	2 59 30.60	4.3480806	13.878
Grays Lake ranger station.....	248 54 13.47	69 08 14.83	4.4084954	15.916
Henry.....	262 57 48	83 07 07	4.27118	11.802
Dam.....	301 18 21.99	121 28 35.03	4.2833539	11.932
Camp.....	90 35 54	270 28 56	4.14264	8.630
	321 27 57	141 30 08	3.84322	4.331

## LUND, BANNOCK COUNTY, IDAHO. (Not occupied.)

Station mark: Dead tree.

[Latitude  $42^{\circ} 39' 23.5''$ . Longitude  $111^{\circ} 57' 22.1''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Backbone.....	• ' "	• ' "		
Soda.....	219 18 58	39 25 20	4.30511	12.545
Baldy.....	302 12 37	122 29 10	4.59818	24.634
	350 00 17	170 01 38	4.19900	9.839

## ONEIDA POWER PLANT, BANNOCK COUNTY, IDAHO.

On a grassy hill ridge on west side of Bear River about 3 miles southwest of the Oneida power plant, 5 miles east of Treasureton. The power line passes through the pass just north of signal. Easily reached from Cleveland, Treasureton, or the power plant.

Station mark: Chiseled cross on rock under a large monument.

[Latitude  $42^{\circ} 15' 28.7''$ . Longitude  $111^{\circ} 47' 02.8''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Smart.....	• ' "	• ' "		
Clifton.....	7 36 19	187 34 56	4.41206	16.048
Treasureton.....	54 22 57	234 16 14	4.22925	10.534
Cleveland.....	128 38 36	308 35 25	3.91944	5.162
Doubletop.....	210 54 04	30 56 26	3.54830	2.196
	341 56 37	162 01 44	4.51729	20.448

## OXFORD, ONEIDA COUNTY, IDAHO.

Coast and Geodetic Survey station about 6 miles west of the town of Oxford and about 15 miles east of Malad City, Idaho.

The best way to reach Oxford station is probably from the town of Oxford as this town is only 2 miles from the railroad station Oxford on the Oregon Short Line Railroad. There is a log road leading from the base of the mountain two-thirds of the distance to the summit, and from the end of this road a trail could be made with little labor to the summit.

This station was occupied by the Wheeler Survey about the year 1877; a rock cairn was found marking the place of their station. This cairn was torn down and a three-fourth-inch copper bolt was set firmly with lead in the solid surface rock, indicating the station selected by Assistant Welker. A heliotrope stand was erected at this point.

Four reference marks consisting of holes, drilled into ledges of rocks, each distant 22½ feet from the center station mark, were placed approximately north, south, east, and west.

[Latitude 42° 16' 11.82" (11.78a). Longitude 112° 05' 49.96" (49.95a).]

To station—	Azimuth.	Back azimuth.	Distance.	
Elkhorn.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Baldy.....	131 10 22	311 02 30	4.3204	13.224
Cottonwood.....	207 39 47.33	27 46 50.92	4.499346	19.195
Thatcher.....	214 45 31	34 51 02	4.28043	11.852
Soda.....	234 08 24	54 18 02	4.39548	15.446
Treasureton.....	244 09 06.65	64 31 18.32	4.7004074	31.171
Cleveland.....	258 39 37.80	78 49 06.31	4.2953071	12.265
Paris.....	266 22 09	86 35 33	4.44240	17.225
Clifton.....	279 06 48.20	99 28 56.16	4.6618328	28.522
Smart.....	312 46 07.53	132 52 02.15	4.2175164	10.233
	320 02 29.76	140 13 27.10	4.5431415	21.802

<sup>a</sup>Coast and Geodetic Survey preliminary value for 1915.

## PARADISE, BINGHAM COUNTY, IDAHO.

On highest point on divide between Willow Creek to northeast and Paradise Creek to south and southwest of station. It is about 12 miles northwest of Blackfoot Dam from which place it can be reached via road to Idaho Falls which passes within a mile (and on east side) of base of mountain.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 7.0 feet, true azimuth 89° 14'.

Reference mark B: Chiseled cross in rock, distant from station 5.1 feet, true azimuth 203° 16'.

Station mark: Bronze tablet cemented in rock.

[Latitude 43° 07' 20.14". Longitude 111° 47' 05.15".]

To station—	Azimuth.	Back azimuth.	Distance.	
Twenty-four Mile.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Putnam.....	21 40 03.92	201 36 04.58	4.3331803	13.382
Higham.....	58 52 07	238 36 33	4.55834	22.474
Blackfoot.....	95 10 16.78	274 58 03.45	4.3863043	15.124
Sugarloaf.....	138 54 39.75	318 50 57.61	4.0475095	6.932
Caribou.....	237 44 48.47	57 52 47.80	4.2718678	11.620
Limerock.....	274 31 45.20	94 51 10.94	4.5877197	24.047
Dam.....	309 58 48.18	130 06 11.46	4.2829820	11.225
	336 11 05	176 11 30	4.08776	7.635

**PARIS, BEAR LAKE COUNTY, IDAHO.**

On high rocky peak about 6 miles west of Paris, Idaho, on the Wasatch Range. A trail leads from Paris up gulch to small lake on north side of peak where good water and a fine place to camp can be found.

**Signal:** A cairn 6 feet high and 4 feet in diameter on west point of summit.

**Station mark:** An aluminum tablet cemented in solid rock 6 feet northeast of cairn.

[Latitude 42° 12' 11.46". Longitude 111° 32' 54.36".]

To station—	Azimuth.	Back azimuth.	Distance.	
Doubletop.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Clifton.....	20 16 33	200 12 02	4.42928	16.697
Oxford.....	83 36 42.82	263 20 30.55	4.5212844	20.779
Treasureton.....	99 28 56.16	279 06 48.20	4.6618328	28.522
Baldy.....	113 36 26.65	293 23 46.37	4.4512144	17.562
Soda.....	138 33 11.27	318 18 03.46	4.6671326	28.872
	180 01 24.95	0 1 25.30	4.4645239	18.108

**PUTNAH, BANNOCK COUNTY, IDAHO. (Not occupied.)**

A former station of the Hayden Survey on the northern of the two highest peaks of the Putnam Mountains, about 15 miles southeast of Rossfork, 15 miles northeast of Pocatello and 15 miles north of west from Chesterfield.

**Station mark:** A cairn 5 feet high.

[Latitude 42° 57' 11.9". Longitude 112° 09' 51.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
Higham.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Paradise.....	197 34 17	17 37 37	4.34140	13.638
Twenty-four Mile.....	238 36 33	58 52 07	4.55834	22.474
	273 00 46	93 12 18	4.36261	14.320

**SMART MOUNTAIN,<sup>1</sup> FRANKLIN COUNTY, IDAHO.**

Sharp rocky point 1.5 miles northeast of Franklin in sec. 19, T. 16 S., R. 40 E.

**Signal and station mark:** Large flagpole.

[Latitude 42° 01' 39.00". Longitude 111° 49' 30.44".]

To station—	Azimuth.	Back azimuth.	Distance.	
Burgeson.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Oxford.....	75 41 03	255 34 33	4.14102	8.597
Clifton.....	140 13 27.10	320 02 29.76	4.5451415	21.802
Treasureton.....	146 35 31.60	326 30 28.72	4.2749506	11.703
Oneida.....	174 16 54.33	354 15 23.98	4.4005081	19.225
Doubletop.....	187 34 56	7 36 19	4.41206	16.048
	292 37 54	112 44 30	4.16872	9.164

**SODA (SHERMAN PEAK), BEAR LAKE COUNTY, IDAHO.**

On the highest of three peaks which lie about 10 miles south of Soda Springs and about 9 miles west of Georgetown. It is locally known as Sherman Peak. The station can be best reached by going from Georgetown by wagon to Mr. Minnick's sawmill on west side of Nounan Valley, thence on horseback west on trail up canyon to divide, then follow divide southward to peak, which is bald on top.

**Signal:** Rock cairn 7 feet at base and 7½ feet high.

**Station mark:** Tablet set under rock cairn.

<sup>1</sup> See p. 135.

[Latitude 42° 27' 55.95". Longitude 111° 32' 53.84".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Paris.....	0 1 25.30	180 01 24.95	4.4645239	18.108
Cleveland.....	41 21 57	221 13 19	4.42568	16.559
Treasureton.....	55 28 29.91	235 15 47.36	4.4975961	19.541
Oxford.....	64 31 18.32	244 09 06.65	4.7004074	31.171
Thatcher.....	74 04 33	253 52 14	4.41575	16.185
Baldy.....	100 28 20.42	280 13 09.98	4.4954038	19.443
Surge.....	114 06 42	293 57 04	4.33033	13.296
Lund.....	122 29 10	302 12 37	4.59818	24.634
Tennmile.....	153 36 45.22	333 29 11.98	4.5348718	21.292
Woodall.....	184 23 46.87	4 24 59.88	4.5050444	19.879

**SUGARLOAF, BINGHAM COUNTY, IDAHO.**

On rocky summit of hill northwest of John Gray Lake (hill locally known as Sugar Loaf). It is between Grays Lake Outlet and Homer Creek, and can be reached easily from a public road (Grays Lake to Idaho Falls), which passes about 2 miles south of the peak.

Signal: Aspen, brushy top, cairn around base and centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 7.2 feet, true azimuth 294° 41'.

Reference mark B: Chiseled cross in rock, distant from station 7.4 feet, true azimuth 41° 14'.

Station mark: Bronze tablet cemented in rock.

[Latitude 43° 12' 42.95". Longitude 111° 35' 24.51".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Limerock.....	2° 58 30.60	182 58 55.42	4.3489896	13.878
Paradise.....	57 52 47.80	237 44 48.47	4.2718678	11.620
Blackfoot.....	86 14 54.13	266 03 12.14	4.3655046	14.416
Caribou.....	299 55 50.84	120 07 18.34	4.4188445	16.300

**SURGE, BANNOCK COUNTY, IDAHO. (Not occupied.)**

A black steel surge tank at the Grace plant of the Utah Power & Light Co. It is located about 3 miles west from the town of Grace.

Station mark and signal: Center of tank.

[Latitude 42° 32' 38.3". Longitude 111° 47' 09.7".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Tennmile.....	190 55 11	10 57 17	4.34972	13.902
Soda.....	293 57 04	114 06 42	4.33033	13.296
Cleveland.....	356 01 32	176 01 27	4.45041	17.886

**TENNMLE, BANNOCK COUNTY, IDAHO.**

About 12 miles northwest of Soda Springs, on sharp point near north end of Soda Springs Hills and just south of Tennmile Pass, from which it can be easily reached.

Reference mark A: Chiseled cross in rock, distant from station 33.2 feet, true azimuth 61° 34'.

Reference mark B: Chiseled cross in rock, distant from station 28.6 feet, true azimuth 104° 52'.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Station mark: Bronze triangulation tablet cemented in rock.

[Latitude 42° 44' 30.22". Longitude 111° 44' 03.40".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Alexander.....	7 17 28	187 16 51	3.98547	6.009
Surge.....	10 57 17	190 55 11	4.34972	13.902
Baldy.....	31 43 43.79	211 36 04.41	4.4689889	18.295
Bancroft.....	79 46 18	259 40 09	4.09930	7.810
Thirty-five.....	97 01 58	276 52 03	4.29942	12.381
Backbone.....	138 54 12.39	318 51 32.25	3.9113267	5.066
Corral.....	194 26 58.16	14 29 20.38	4.2792015	11.818
Woodall.....	265 59 09.52	86 07 57.19	4.2485258	11.012
Threemile.....	284 04 46	106 11 12	4.13074	8.396
Soda.....	333 29 11.98	153 36 45.22	4.5348718	21.292

**THATCHER, BANNOCK COUNTY, IDAHO. (Not occupied.)**

On a bald rock-dome hill on the south end of the high ridge between Bear River and Cottonwood Creek. From the hill the ridge breaks off very suddenly to Cottonwood Creek. About 6 miles east of Thatcher and the same distance northwest of Cleveland, in sec. 12, T. 12 S., R. 39 E.

Station mark: Flag held up by guys and a few rocks.

[Latitude 42° 24' 02.9". Longitude 111° 51' 09.1".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Treasureton.....	4 24 14	184 23 50	4.02983	6.655
Oxford.....	54 18 02	234 08 24	4.39548	15.446
Soda.....	253 52 14	74 04 33	4.41575	16.185

**THIRTY-FIVE, BANNOCK COUNTY, IDAHO. (Not occupied.)**

The summit of a low rock-capped hill in sec. 35, T. 8 S., R. 38 E. Boise meridian. There are apparently three large rocks on the summit of this hill, the south rock being the highest and is the point sighted in each case.

Station mark and signal: Apparent highest point.

[Latitude 42° 45' 48.4". Longitude 111° 58' 32.9".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Twenty-four Mile.....	201 03 19	21 07 08	4.32768	13.214
Backbone.....	255 25 24	75 32 34	4.17266	9.247
Threemile.....	276 52 03	97 01 58	4.29942	12.381

**THREEMILE, BANNOCK COUNTY, IDAHO.**

On the summit of a low hill about 3 miles north of Soda Springs and locally known as Threemile Hill. It is on the west side of the Soda Springs-Henry road, and the summit is easily reached.

Signal: Rock cairn centered over station mark.

Reference mark A: Chiseled cross in rock, distant from station 29 feet.

Reference mark B: Chiseled cross in rock, distant from station 54.2 feet.

Station mark: Bronze triangulation tablet cemented in large rock projection 3 feet above the ground.

[Latitude 42° 42' 28.5". Longitude 111° 34' 83.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
Tenmile.....	* * *	* * *	Log. meters.	Miles.
Backbone.....	106 11 12	286 04 46	4.13074	8.396
Woodall.....	118 25 59	298 16 49	4.31886	12.948
	223 24 57	43 27 17	3.83554	4.255

## TREASURETON, BANNOCK COUNTY, IDAHO.

Three miles north of Treasureton post office, on divide between Cottonwood and Battle creeks, on end of sharp hill in sec. 11, T. 13 S., R. 39 E.

Signal and station mark: Cairn 7 feet high; tablet under cairn.

[Latitude 42° 18' 16.74". Longitude 111° 51' 45.03".]

To station—	Azimuth.	Back azimuth.	Distance.	
Clifton.....	* * *	* * *	Log. meters.	Miles.
Oxford.....	25 47 34.16	205 44 00.94	4.2235743	10.397
Elkhorn.....	78 49 06.31	258 39 37.80	4.2953071	12.265
Cottonwood.....	106 08 23	285 51 00	4.56582	22.865
Baldy.....	144 22 59	324 18 50	4.16173	9.027
Thatcher.....	168 06 38.66	348 04 12.53	4.3803534	14.918
Soda.....	184 23 50	4 24 14	4.02983	6.655
Cleveland.....	235 15 47.36	55 28 29.91	4.4975961	19.541
Paris.....	284 29 44	104 33 48	3.93340	5.330
Oneida.....	293 23 46.37	113 36 26.65	4.4512144	17.562
Smart.....	308 35 25	128 38 36	3.91944	5.162
	354 15 23.98	174 16 54.33	4.4905081	19.225

## TWENTY-FOUR MILE, BANNOCK COUNTY, IDAHO.

On west side of sec. 34, T. 5 S., R. 39 E. Boise meridian. It is about 6 miles north of the town of Chesterfield, on highest point of limestone ridge between Corral Creek and Portneuf River. It is about 2 miles north of Devils Pass and can be reached from any direction.

Reference mark A: Chiseled cross in rock, distant from station 6.7 feet, true azimuth 60° 10'.

Reference mark B: Chiseled cross in rock, distant from station 13.3 feet, true azimuth 148° 01'.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Station mark: Bronze triangulation tablet cemented in rock.

[Latitude 42° 56' 31.40". Longitude 111° 52' 55.88".]

To station—	Azimuth.	Back azimuth.	Distance.	
Thirty-five.....	* * *	* * *	Log. meters.	Miles.
Putnam.....	21 07 08	201 03 19	4.32768	13.214
Higham.....	93 12 18	273 00 46	4.36281	14.320
Blackfoot.....	143 40 35.86	323 32 23.14	4.4399866	17.113
Paradise.....	181 10 57.61	1 11 15.36	4.4537756	17.065
Limerock.....	201 36 04.58	21 40 03.92	4.3331803	13.382
Corral.....	251 11 18.72	71 22 40.35	4.3788028	14.865
Backbone.....	282 46 56.72	102 55 21.85	4.2368640	10.720
Dam.....	337 17 23.37	157 20 45.20	4.2421081	10.851
	228 15 40	48 19 53	4.06949	7.292

**WOODALL, BANNOCK COUNTY, IDAHO.**

About 10 miles northeast of Soda Springs, on high, bald peak, and is in sec. 2, T. 8 S., R. 42 E. It is about 0.8 mile east of Mr. Woodall's ranch. It can be reached by wagon road from Soda Springs to Woodall's ranch, thence on horseback to top.

**Station mark:** Tablet set in rock under cairn 4 feet at base and 6 feet high, with small pine set in center of cairn.

**Signal:** Cairn 4 feet at base and 6 feet high, with small pine set in center of cairn.

[Latitude  $42^{\circ} 45' 09.69''$ . Longitude  $111^{\circ} 31' 06.00''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Soda.....	• 24 59.88	184 23 46.87	4.5050444	19.879
Threemile.....	43 27 17	223 24 57	3.83554	4.255
Tenmile.....	86 07 57.19	265 59 09.52	4.2485258	11.012
Backbone.....	102 09 45.24	281 58 17.14	4.3720733	14.636
Corral.....	143 10 11.77	323 03 45.50	4.3324755	13.361
Lake.....	151 35 25	331 32 55	4.02098	6.522
Henry.....	206 36 08.92	26 40 50.00	4.3209418	13.010

**DOUBLETOP, CACHE COUNTY, UTAH. (Not occupied.)**

**Station mark:** Summit of mountain.

[Latitude  $41^{\circ} 58' 34.3''$ . Longitude  $111^{\circ} 39' 38.8''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Smart.....	• 12 44 30	292 37 54	4.16872	9.164
Clifton.....	131 51 12	311 39 33	4.50711	19.976
Oneida.....	162 01 44	341 56 37	4.51729	20.448
Paris.....	200 12 02	20 16 33	4.42928	16.697

## IDAHO AND MONTANA.

### TRIANGULATION STATIONS.

**Argo, Bay Horse, Casto, Custer, Dickey, Gibbons Pass, Junction, Mackay, May, Noble, Rabbit Foot, Salmon, Tilden, Trapper Peak, Vinegar Hill, and Watchtower Peak quadrangles.**

**BINGHAM, BLAINE, BOISE, CUSTER, FREMONT, IDAHO, AND LEMHI COUNTIES, IDAHO; BEAVERHEAD AND RAVALLI COUNTIES, MONT.**

The following preliminary geographic positions were determined by T. M. Bannon in 1912 to 1915, inclusive. Positions north of stations Ram and Jerry, were originally computed on Hamilton-Helena mean datum (see Bull. 201) but 3.67" has been subtracted from all latitudes and 1.37" added to all longitudes to reduce them to approximate North American datum.

Positions, azimuths, and distances from Big Butte northwestward to Jerry were computed directly from preliminary values of United States Coast and Geodetic Survey stations Big Butte and Middle Butte on North American datum.

#### ADAMS SECTION CORNER, CUSTER COUNTY, IDAHO.

In center of east-west road starting from the Challis-Salmon road at Jack Adam's ranch. Northeast corner of Jack Adam's ranch.

Station mark: Section-corner stone.

[Latitude 44° 32' 11.78". Longitude 114° 11' 32.47".]

To station—	Azimuth.	Back azimuth.	Distance.	
Twin.....	°   '   "	°   '   "	<i>Log. meters.</i>	<i>Miles.</i>
Grouse.....	105 52 10.00 247 22 09.00	285 40 14.00 67 26 17.00	4.36906 3.92696	14.535 5.252

#### 1 A. P. 412, IDAHO-MONTANA BOUNDARY LINE (LEMHI COUNTY, IDAHO, AND RAVALLI COUNTY, MONT.).

On a sharp rocky peak, timbered on south, summit Bitter Root Range at State line (Idaho-Montana) angle stone 1 A. P. 412 M. Easily reached by State-line trail which passes through the three saddles on the north, southeast, and west slopes of the peak. Good camping place in saddle on State-line trail at milepost 410. At milepost 409 cut-off trail goes north to Alta, joining wagon road near the forks of Hughes Creek. At milepost 407 trail goes southeast to Salmon River.

Station mark: A small chiseled hole in solid rock under a large rock monument.

Reference mark: A chiseled cross on stone marked "1 A. P. 412 M. I. M."

[Latitude  $45^{\circ} 35' 31.5''$  Longitude  $114^{\circ} 05' 06.3''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Piquett.....	152 19 15.00	332 14 44.00	4.24641	10.958
Trapper.....	153 39 11.00	333 30 06.00	4.56852	23.000
Deer.....	182 50 17.00	02 51 37.00	4.68456	30.055
Rocky.....	260 52 16.00	80 53 37.00	3.38367	1.503

**ANDERSON, CUSTER COUNTY, IDAHO.**

On the highest rocky-topped grassy hill on divide between Worm Springs and Joe Anderson's fork of Road Canyon creeks, near their heads and about half a mile west of the main divide between Salmon and Lost rivers. About 6 miles a little south of west from Dickey. Visible from Mackey, Dickey, Chilly, and Challis. The hill is very prominent. Iron section corner post marked "T. 10 N., R. 21 E., secs. 7-8" is less than half a mile west, on same ridge east of the first saddle. Easily reached with horses from all directions. Good camping grounds at any of the numerous springs close by.

Station mark: A tablet set in solid rock over which a large monument is centered.

Reference marks: (1) A chiseled cross on solid rock 10.2 feet southwest; (2) a chiseled cross on solid rock 6 feet east.

[Latitude  $44^{\circ} 11' 53.65''$ . Longitude  $114^{\circ} 01' 23.86''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Jerry.....	23 42 00.73	203 38 30.38	4.2234693	10.395
Redwings.....	61 16 56.01	241 02 53.51	4.4873088	19.064
Spar.....	118 21 05.31	.....	4.0079358	6.328
Ram.....	126 29 51.15	.....	4.5016549	19.724
King.....	307 30 05.05	128 01 20.43	4.8814695	47.295
Mackay.....	322 46 05.29	142 59 35.09	4.631939	26.702
Shelly.....	329 50 31.55	150 02 56.21	4.6782155	29.619
Porphyry.....	349 21 05.85	169 23 59.89	4.4801275	18.771

**ANTE, CUSTER COUNTY, IDAHO.**

On a flat long hill on main divide between East Fork of Lost River and Antelope Creek. The hill is between the heads of the two main forks of Cherry Creek, a tributary of Antelope Creek, and the extreme northeast head of East Fork of Lost River. About 5 miles east of Reed & Davis copper mine and 3 miles south of Shelly Mountain. Easily reached from all directions.

Station mark: A bench-mark tablet set in solid rock centered under a large monument.

Reference mark: A chiseled cross on solid rock 19.30 feet north.

[Latitude  $43^{\circ} 47' 50.6''$ . Longitude  $113^{\circ} 44' 56.3''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*   '   "	*   '   "	Log. meters.	Miles.
Smiley.....	24 10 03	204 07 33	4.07471	7.390
Crawford.....	290 04 13	110 15 41	4.37489	14.732
Blizzard.....	348 47 53	168 51 15	4.52900	21.006

**ARCO, BLAINE COUNTY, IDAHO.**

On the first high grassy hill on the limestone ridges, north side of Big Lost River, 2 miles due north of Arco City. About 3 miles southeast of J. D. Martin's ranch on Lost River.

**Station mark:** An aluminum bench-mark tablet set in solid rock under center of a 7-foot monument.

**Reference mark:** A chiseled cross on solid rock 10.7 feet north.

[Latitude 43° 40' 00.92". Longitude 113° 17' 56.98".]

To station—	Azimuth.	Back azimuth.	Distance.	
Arco School.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Hades.....	3 57 54	183 57 53	3.55916	2.254
Inferno.....	21 11 44.08	201 04 49.13	4.5745275	23.328
Blizzard.....	39 26 16	219 15 52	4.50622	19.933
Crawford.....	58 02 22.29	237 47 07.32	4.5458668	21.838
King.....	114 23 25.36	294 16 13.96	4.1860354	9.536
Jumpoff.....	189 32 30.56	9 33 35.10	4.1002561	7.827
East Butte.....	237 41 55.08	57 49 54.50	4.2639317	11.410
Middle Butte.....	289 54 05.70	110 20 22.05	4.7374676	33.948
Big Butte.....	293 06 11.91	113 29 25.57	4.6936166	30.688
	323 10 34.06	143 22 01.73	4.5739009	23.294

**ARCO SCHOOL, BLAINE COUNTY, IDAHO. (Not occupied.)**

Center of large brick schoolhouse in town of Arco.

[Latitude 43° 38' 03.7". Longitude 113° 18' 08.4".]

To station—	Azimuth.	Back azimuth.	Distance.	
Blizzard.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Crawford.....	63 07 03	242 51 56	4.52040	20.596
Arco.....	125 57 33	305 50 30	4.22926	10.536
	183 57 56	3 58 14	3.55958	2.254

**BALDY, LEMHI COUNTY, IDAHO.**

On the highest point in center of a large flat-topped rocky mountain, locally known as Baldy or Salmon City Peak. About 6 miles by trail southwest of Salmon City. Easily reached by following timber road and Forest Service telephone line to a point southeast of peak, thence by trail to station. The Forest Service has a signal station on the west end of peak, and a small monument was built on east end of peak to sight Salmon City.

**Station mark:** A triangulation tablet cemented into rock set under a large monument.

**Reference mark:** A chiseled cross on solid rock 17.4 feet southeast.

[Latitude 45° 08' 43.45". Longitude 114° 00' 29.97".]

To station—	Azimuth.	Back azimuth.	Distance.	
Grouse.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Taylor.....	6 02 34.04	185 58 56.13	4.8113331	40.213
Black Mountain.....	29 32 36.87	209 23 49.98	4.5205400	20.603
Red Rock.....	38 09 27.54	217 55 14.24	4.6324732	26.658
Middle Fork.....	64 19 11.00	244 01 19.00	4.5659160	22.870
W.M. P. 12.....	68 29 05.84	248 01 38.91	4.7389049	34.061
Wilson.....	82 11 06.00	261 49 50.00	4.59916	24.689
Puddin.....	82 47 32.87	262 21 21.60	4.68914	30.373
Bee Hive.....	85 58 37.87	265 32 16.00	4.68941	30.392
Blue Nose.....	101 24 57.88	281 01 53.55	4.6374411	26.990
Sheep.....	143 13 13.26	322 58 20.14	4.657317	28.320
Goldstone.....	207 32 21.66	27 42 58.24	4.623444	26.134
Mill.....	274 41 20.59	94 59 45.10	4.5387146	21.236
Sal.....	297 35 26.00	117 43 25.00	4.27413	11.680
	317 41 20.43	137 48 24.08	4.2891545	12.092

**BAY HORSE, CUSTER COUNTY, IDAHO. (Not occupied.)**

On the second hill north of Bay Horse Creek and mining camp. Easily reached from the cut-off road from Challis to Bay Horse.

Station mark: Center of big monument.

[Latitude 44° 25' 32.47". Longitude 114° 21' 23.75."]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Twin.....	153 09 16.00	333 04 15.00	4.32112	13.016
Grouse.....	233 11 05.00	53 22 08.00	4.41569	16.182

**BEAUTY, CUSTER COUNTY, IDAHO. (Not occupied.)**

On the highest peak in the Big Lost River Range, divide between the waters of Pahsimeroi and Big Lost River. About 6 miles northeast and visible from Dickey post office on the Mackay-Challis stage road. Can be reached only by a long, difficult climb afoot. Best route up Rock Creek from Dickey.

Reference mark: A chiseled cross on solid rock 37 feet south.

Station mark: A hole drilled for tablet under center of large monument.

[Latitude 44° 08' 16.4". Longitude 113° 46' 49.1".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Porphyry (from south).....	31 13 58	211 06 44	4.42918	16.692
Jerry (from south).....	71 53 36	251 39 57	4.4025	17.124
Anderson (from south).....	109 07 13	288 57 38	4.31298	12.774
Redwings (from north).....	80 17 45	259 53 34	4.67276	29.249
Twin (from north).....	132 40 27	312 11 17	4.87564	46.664

**BEE HIVE, LEMHI COUNTY, IDAHO.**

On the highest of several rocky hills partly timbered, 4 miles northeast of Mount McGuire, about 0.5 mile northwest of the main divide between Middle Fork and Salmon rivers. The creek that empties into the Middle Fork near its junction with Salmon River heads in some lakes on both sides of the hill. The trail from the wagon road on the divide between Yellowjacket and Farney to Clear Creek, and down Clear Creek to Big Creek, passes about 4 miles north and east. About 34 miles northeast of Farney and Yellowjacket and 12 miles west of Shoup. Can be reached by following up the ridges from the river or from Clear Creek trail by taking the long timbered ridge at the big bend 7 miles from the passes between Wilson and Clear creeks.

Station mark: Triangulation tablet under monument.

Reference mark: A chiseled cross on solid rock 5.65 feet south.

[Latitude 45° 13' 17.31". Longitude 114° 33' 01.44".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Middle Fork.....	15 57 59.73	195 53 33.85	4.4758179	18.586
Blue Nose.....	208 19 50.98	28 28 05.53	4.5026912	19.772
Baldy.....	281 01 53.55	101 24 57.88	4.6378441	26.990
Taylor.....	324 36 26.09	144 50 40.01	4.6800668	28.406

**BELL (FINGER), FREMONT COUNTY, IDAHO. (Not occupied.)**

On Bell Mountain, a high, prominent bell-shaped peak on the main backbone of Little Lost River Range. About 10 miles northeast of Clyde post office. Can be reached by a long difficult climb afoot.

**Station mark:** A bench mark tablet set in placed rock under center of large monument.

**Reference mark:** A chiseled cross on solid rock.

[Latitude  $44^{\circ} 14' 11.62''$  (from north);  $44^{\circ} 14' 11.77''$  (from south). Longitude  $113^{\circ} 11' 35.00''$  (from north)  $113^{\circ} 11' 35.4''$  (from south).]

To station—	Azimuth.	Back azimuth.	Distance.	
Horse Prairie (from north).....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
E and W (from north).....	184 22 36	4 24 58	4.76622	36.272
King (from south).....	164 11 14	344 01 18	4.83559	42.554
Jumpoff (from south).....	7 13 11	187 09 51	4.70993	31.863
	352 33 38	172 37 15	4 73201	33.524

#### BEND, IDAHO COUNTY, IDAHO. (Not occupied.)

Highest peak south of Salmon in the vicinity where Lemhi, Idaho, and Salmon counties join.

[Latitude  $45^{\circ} 18' 37.5''$ . Longitude  $114^{\circ} 47' 06.5''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Blue Nose.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Trapper.....			4.58088	23.672
Rocky.....			4.87441	46.533
Piquett.....			4.81526	40.608
			4.81975	41.030

#### BENCH MARK 49, CUSTER COUNTY, IDAHO.

Cooperative bench-mark post at a corner of a fence on the main Challis-Salmon stage road about 3 miles northeast of Challis and 0.25 mile southwest of Jack Adams's ranch.

**Station mark:** Bench-mark post 49, elevation 4937.

[Latitude  $44^{\circ} 31' 52.73''$  Longitude  $114^{\circ} 12' 09.05''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Twin.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Grouse.....	107 50 16.00	287 38 46.00	4.35774	14.161
	245 57 31.00	66 02 05.00	3.97436	5.858

#### BIG BUTTE, BLAINE COUNTY, IDAHO.

A United States Coast and Geodetic Survey station on "Big Butte," a well-known landmark on the Lavas between Big Lost and Snake rivers, 4 miles south of Cerro Grande siding on the Mackay branch of the Oregon Short Line Railroad. Water at Hollau Springs on the east side and Lozier Springs on the north side. Tabor post office and station is the nearest supply point. Easiest ascended from the north side.

**Station mark:** A United States Coast and Geodetic Survey tablet.

**Reference mark:** A United States Geological Survey bench-mark tablet in placed rock centered under large monument 11 feet west.

[Latitude  $43^{\circ} 23' 47.33''$ . Longitude  $113^{\circ} 01' 18.56''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Hades.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Blizzard.....	82 18 06.88	261 59 47.29	4.5609470	22.610
Arco.....	102 29 45.13	282 03 05.83	4.7248455	33.253
Jumpoff.....	143 22 01.73	323 10 34.06	4.5739009	23.294
Middle Butte.....	170 17 36.87	350 14 06.88	4.6066291	25.118
East Butte.....	245 20 45.83	65 32 29.48	4.4030067	15.720
	248 38 48.63	08 53 34.45	4.4923903	19.308

**BIG HOLE PASS, IDAHO-MONTANA BOUNDARY LINE, LEMHI COUNTY, IDAHO, AND BEAVERHEAD COUNTY, MONT.**

On a grassy hill on the Continental Divide, Idaho-Montana boundary line. About 1 mile south of the Big Hole Pass, through which the new road from Gibbonsville, Idaho, to the Big Hole Valley passes. The old wagon road, now used as a trail, came up a ridge from Gibbonsville almost west from the station. Good camping grounds and water in the pass on the new road.

Station mark: The 3 A. P. 444 M State boundary line.

Reference mark: Nail driven in blazed tree 94.7 feet east.

[Latitude  $45^{\circ} 32' 30.38''$ . Longitude  $113^{\circ} 49' 31.87''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Rocky.....	108 34 30.00	288 24 41.00	4.27502	11.76
Ruby.....	232 13 56.00	52 17 16.00	3.88587	4.778

**BLACK CAP, BLAINE COUNTY, IDAHO.**

On a low, grassy peak east side of the mouth of Dry Fork of Antelope Creek valley. The peak has a peculiar capping of black rock. About 3 miles east of Grouse post office, Miller's ranch. Section corner between secs. 20, 21, 29, and 28, at ranch, is about 2,700 feet southeast. The Dry Fork of Antelope Creek curves around the south and east foot of the peak. Easily reached from the ranches in the vicinity of Grouse School.

Station mark: A large nail driven between rocks centered under a large monument.

[Latitude  $43^{\circ} 39' 40.1''$ . Longitude  $113^{\circ} 36' 40.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Smiley.....	105 07 44	284 59 41	4.21874	10.29
Shelly.....	153 26 42	333 21 57	4.31382	12.79
Crawford.....	237 59 48	58 05 32	4.11927	8.178

**BLACK MOUNTAIN, CUSTER COUNTY, IDAHO.**

On a high rocky peak on main divide. Water to the east, south, and west drains into Camas Creek; that to the north into Panther Creek. Morgan Creek heads 1 mile east. The wagon road from Forney to Challis, where it passes over the main divide between Panther and Morgan creeks, is about 4 miles northeast of peak. Forney is about 10 miles northwest. Rabbitfoot mine is about 4 miles northwest. The ranger station on Panther Creek at the mouth of Opal Lake Creek is about 4 miles north. Good camping ground at the base of the peak.

Station mark: A chiseled cross on rock set under monument.

Reference mark: A triangulation tablet in solid rock 19.7 feet northwest.

[Latitude  $44^{\circ} 50' 28.88''$ . Longitude  $114^{\circ} 20' 36.84''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Middle Fork.....	118 51 41.22	298 38 30.60	4.4475912	17.416
Forney.....	183 52 35.93	3 53 02.83	4.0918756	7.673
Baldy.....	217 55 14.24	38 09 27.54	4.6324732	26.658
Taylor.....	244 03 48.05	64 09 13.92	4.0519739	7.003

## BLIZZARD, BLAINE COUNTY, IDAHO.

On Iron Mountain, the highest rocky-topped grassy hill of Antelope Mountains, at the head of Lava and Cottonwood creeks to the north and east, and Iron Mine Creek and Fish Creek to the south and west. The hill is on the main divide between Lost River and Wood River drainage, about 6 miles due west of Martin post office and ranch, 30 miles southwest and visible from Arco town, 10 miles east of Crooks post office. Easily reached by following up Fish Creek from the west or Lava and Cottonwood creeks from north and east, quarter-section corner between secs. 24, 25, T. 2 N., R. 23 E., is on the east end of hill several hundred feet from top on north slope.

Station mark: A tablet set in placed rock under center of large monument.

Reference marks: (1) A chiseled cross on solid rock 8.7 feet southeast; (2) center of a smaller monument on east end of hill 141 feet east.

[Latitude 43° 29' 55.97". Longitude 113° 40' 04.17".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Buzz.....	65 47 03	245 35 06	4.41015	15.97
Freedom.....	92 54 16	272 46 33	4.18023	9.41
Garfield.....	114 42 07	294 29 08	4.44566	17.34
Scorpion.....	130 22 51.43	310 13 53.10	4.3614759	14.283
Pion.....	134 48 17	314 41 02	4.30030	12.41
Smiley.....	152 57 16.65	332 51 25.44	4.3993359	15.584
Crawford.....	212 09 54.03	32 17 58.74	4.4705007	18.359
Arco.....	237 47 07.32	58 02 22.29	4.5458668	21.838
Martin.....	260 55 45	81 00 13	3.94707	5.501
Hades.....	315 01 09.21	135 09 27.23	4.3632852	14.343

## BONANZA, CUSTER COUNTY, IDAHO.

On a rocky hill having scattering trees on top at the heads of Adair and Ramey creeks. It is the south one of two hills on the ridge south from the forks of Jordan and Yankee Fork creeks. About 3 miles south of Custer and the same distance southeast of Bonanza. Easily reached by trail up Adair Creek from Custer to the Black mine.

Station mark: A chiseled cross on rock set under a large rock monument and tree signal.

Reference mark: A chiseled cross on solid rock 12.3 feet west.

[Latitude 44° 21' 27.03". Longitude 114° 41' 25.72".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Mount Eustes.....	170 35 44.78	350 34 53.29	3.9981961	6.188
Ram.....	267 32 27.43	87 47 01.06	4.4423271	17.206

## BUZZ, BLAINE COUNTY, IDAHO. (Not occupied.)

On the west of the two highest hills on the grassy ridge dividing the waters of Fish and Muldoon creeks, about 5 miles south of Laidlow's big ranch on Muldoon Creek, 6 miles north and visible from Carey post office.

Station mark: Center of monument.

[Latitude 43° 24' 12.9". Longitude 113° 57' 26.3".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Scorpion.....	192 56 37	12 59 37	4.41703	16.233
Freedom.....	216 08 38	36 12 49	4.14758	8.728
Blizzard.....	245 35 06	65 47 03	4.4015	15.974
Crooks.....		85 02 04	4.12860	8.355
Hades.....	278 04 55	98 24 56	4.60395	24.963

**CHALLIS, CUSTER COUNTY, IDAHO.**

On the first sagebrush hill on the divide between Garden and Challis creeks. About  $1\frac{1}{2}$  miles northwest of Challis and 1 mile north of Alexander Klug's ranch on Garden Creek, 2 miles west of Challis. The station commands a good view of the Challis Valley. Easily reached from Challis in any direction.

Station mark: Triangulation tablet set in rock under large monument.

Reference mark: A chiseled cross on big rock standing 1 foot out of the ground 16.8 feet south.

[Latitude  $44^{\circ} 31' 01.49''$ . Longitude  $114^{\circ} 15' 46.30''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Twin.....	• / " 116 49 40	• / " 296 40 42	Log. meters.	Miles.
Grouse.....	247 56 43	68 03 49	4.27740 4.16020	11.769 8.956

**CHILLY, CUSTER COUNTY, IDAHO.**

On the highest point of a low isolated hill in Chilly Valley, about 2 miles west of Chilly post office and 5 miles south of Dickey post office. The junction of Thousand Springs Creek with Big Lost River at the Big Bend is about 4 miles southeast. Easily reached from Chilly and Dickey.

Station mark: A chiseled cross, hole with two big nails centered under a small rock monument.

Reference mark: A bench-mark aluminum tablet set in solid rock 9.4 feet north.

[Latitude  $44^{\circ} 04' 35.9''$ . Longitude  $113^{\circ} 54' 04.3''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Jerry.....	• / " 83 48 52	• / " 263 40 16	Log. meters.	Miles.
Anderson.....	144 10 13	324 05 07	4.22021 4.22024	10.317 10.361
Mackay.....	322 01 08	142 09 20	4.42010	16.347

**COPPER BASIN RANGER STATION, CUSTER COUNTY, IDAHO. (Not occupied.)**

Small house painted white, used as ranger station. About 25 miles southwest of Mackay by wagon road across the hills and 1 mile west of Reed & Davis copper mine camp, in Copper Basin.

Station mark: Center of house.

[Latitude  $43^{\circ} 48' 28.5''$ . Longitude  $113^{\circ} 50' 04.1''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Reed & Davis.....	• / " 124 04 43	• / " 324 55 21	Log. meters.	Miles.
Porphyry.....	145 00 10	76 29 31	3.26715 4.22285 3.95473	1.150 10.380 5.399
Shelly.....	256 25 00			

**CRAWFORD, BLAINE COUNTY, IDAHO.**

On Appendicitis Hill, the highest point of the grassy ridges between Antelope Creek and the Lavas, 20 miles west and visible from Arco town, 8 miles south of Darlington post office, 3 miles east of E. S. Crawford's ranch on Antelope Creek, the easiest and shortest climb to station.

Station mark: A triangulation tablet set in solid rock centered under a large monument.

Reference mark: A chiseled cross on solid rock 16.1 feet northwest.

[Latitude  $43^{\circ} 43' 25.80''$ . Longitude  $113^{\circ} 28' 21.45''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Inferno.....	11 30 15	191 27 01	4.50194	19.737
Timbered Dome (tree).....	24 24 52	204 21 28	4.12713	8.327
Blizzard.....	32 17 58.74	212 09 54.03	4.4705007	18.359
Black Cap.....	58 05 32	237 59 48	4.11927	8.18
Scorpion.....	73 12 10.89	252 55 06.14	4.5408977	21.590
Smiley.....	84 30 27.01	264 16 29.47	4.4355977	16.941
Ante.....	110 15 41	290 04 13	4.37489	14.734
Shelly.....	119 26 16.39	299 15 46.33	4.3685909	14.519
Mackay.....	135 20 40.04	315 11 14.08	4.4143959	16.134
King.....	249 08 12.41	69 16 28.82	4.2350095	10.675
Arco.....	294 16 13.96	114 23 25.36	4.1860354	9.536
Arco School.....	305 50 30	125 57 33	4.22926	10.535
Hades.....	359 19 13.97	179 19 28.99	4.6164004	25.689

**CROOKS, BLAINE COUNTY, IDAHO.**

On Pine Mountain, a prominent rocky, partly grassed hill, with scattered trees near top, about 1.5 miles east of the main forks of Fish Creek. About 4 miles south and visible from Rawls ranch, Crook post office, 15 miles northeast of Carey, the nearest supply point. The old Crooks ranch on Fish Creek is at the north foot of hill. The ridge on which the hill is located divides Fish Creek and drainage to the Lava Beds.

Station mark: A chiseled cross on flat solid rock under a monument.

Reference marks: (1) A bench-mark tablet set in big boulder 4 feet east; (2) a trimmed lone spruce tree about center of hill 133 feet west.

[Latitude  $43^{\circ} 24' 51.0''$ . Longitude  $113^{\circ} 47' 30.8''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Buzz.....	85 02 04	333 21 16	4.12860	8.355
Freedom.....	153 23 52	342 46 47	4.05567	7.064
Scorpion.....	162 50 37	104 51 30	4.40511	15.793
Hades.....	284 37 36		4.43546	16.936

**COPPER BASIN KNOB, CUSTER COUNTY, IDAHO. (Not occupied.)**

The highest rocky knob on the divide between the main head of the East Fork of Lost River and Lake Creek.

About 3 miles south and visible from Reed & Davis copper mine.

Mark: None.

[Latitude  $43^{\circ} 45' 21.9''$ . Longitude  $113^{\circ} 50' 52.9''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Porphyry.....	156 24 11	336 20 16	4.32668	13.183
Shelly.....	231 20 18	51 25 23	4.10078	7.839
Smiley.....	333 26 28	153 28 04	3.84400	4.339

**DIAMOND (THUMB), FREMONT COUNTY, IDAHO. (Not occupied.)**

On Diamond Peak, a high, very sharp peak on the main backbone of Little Lost River Range. About 10 miles southeast of Clyde post office and the same distance southwest of Kaufman post office.

Station mark: A tablet set in solid rock over which a large monument is centered.

Reference mark: A chiseled cross on solid rock 18 feet south.

[Latitude 44° 08' 30.13" (from north); 44° 08' 30.5" (from south). Longitude 113° 04' 54.78" (from north); 113° 04' 55.3" (from south).]

To station—	Azimuth.	Back azimuth.	Distance.	
Jumpoff (from south).....	* * "	* * "	Log. meters.	Miles.
King (from south).....	2 37 17.00	182 36 16.00	4.63361	26.728
Shelly (from south).....	20 53 38.00	200 45 40.00	4.63511	26.820
E and W (from north).....	56 05 55.00	235 39 04.00	4.79501	38.758
Horse Prairie (from north).....	160 14 59.00	340 00 23.00	4.90979	50.482
	176 22 53.00	356 20 34.00	4.83811	42.802

#### DICKEY PEAK, CUSTER COUNTY, IDAHO. (Not occupied.)

The first prominent peak on the main backbone of the Lost River Range, west of the road from Dickey to the Pahsimeroi Valley and about 5 miles north of Dickey post office, Custer County. Station mark: Center of peak.

[Latitude 44° 13' 47.1". Longitude 113° 52' 57.8".]

To station—	Azimuth.	Back azimuth.	Distance.	
Porphyry.....	* * "	* * "	Log. meters.	Miles.
Jerry.....	9 45 14	189 42 16	4.52735	20.927
Anderson.....	43 44 06	223 34 43	4.41529	16.169
Spar.....	72 43 24	252 37 45	4.07052	7.309
	92 55 31	.....	4.30913	12.662

#### DICKEY RED ROOF HOUSE, CUSTER COUNTY, IDAHO. (Not occupied.)

Station mark: Center of Al West's residence at Dickey post office. Bench mark, elevation 6,345 feet, is about 25 feet southeast of house.

[Latitude 44° 08' 04.8". Longitude 113° 54' 12.6".]

To station—	Azimuth.	Back azimuth.	Distance.	
Porphyry.....	* * "	* * "	Log. meters.	Miles.
Jerry.....	10 07 14	190 05 08	4.36142	14.280
Anderson.....	63 13 22	243 04 52	4.26209	11.362
	126 26 56	306 22 11	4.07573	7.398

#### E AND W, LEMHI COUNTY, IDAHO.

On the high east-west red, rocky ridge on the Continental Divide about halfway between Lemhi and the Pittsburgh & Gilmore Railroad passes on the divide. About 0.5 mile south of the 1 A. P. of 417 M. State boundary between Idaho and Montana. Easily reached from Lemhi River on the west by going up Eighteen Mile Creek or from Nip and Tuck Creek, a tributary of Horse Prairie Creek on the east.

Station mark: A chiseled cross on rock set under a large monument.

Reference mark: Chiseled cross on perpendicular rock by small rock pile.

[Latitude 44° 49' 45.49". Longitude 113° 25' 44.52".]

To station—	Azimuth.	Back azimuth.	Distance.	
Junction.....	* * "	* * "	Log. meters.	Miles.
Sal.....	9 09 55.00	189 06 56.00	4.54822	21.957
Goldstone.....	122 34 36.24	302 17 06.05	4.5870729	24.012
Bloody Dick.....	160 20 44.60	340 14 32.08	4.5346485	21.281
J. C. B.....	193 07 20.50	13 11 52.61	4.5685499	23.008
Brenner.....	224 52 15.02	44 59 40.97	4.2929420	12.198
Horse Prairie.....	237 56 30.78	58 08 03.10	4.4043716	15.766
Pass.....	288 14 02.86	108 26 24.12	4.3867031	15.137
Eighteen Mile Peak.....	307 36 45.20	127 45 35.14	4.32030	12.991
Thumb.....	320 48 07.00	141 06 23.00	4.73712	33.921
Finger.....	340 00 23.00	160 14 59.00	4.90979	50.482
Leodare Hill.....	344 01 18.00	164 11 14.00	4.83559	42.554
Timber Creek.....	351 34 11.86	171 36 18.12	4.43143	16.790
Ghost.....	357 02 27.73	177 03 28.56	4.56864	23.014
	358 56 03.00	178 56 15.00	4.29612	12.288

**EAST BUTTE, BINGHAM COUNTY, IDAHO.**

On the highest point of the east butte of the Twin Buttes north of Taber post office on the Mackay branch of the Oregon Short Line Railroad. Horses may be taken to the station from the east side. Nearest water is at William Dalzer's ranch, 7 miles southwest.

Station mark: Aluminum bench mark tablet set in solid rock under center of a 7-foot monument.

Reference mark: (1) A chiseled cross on solid rock 7.6 feet a little south of west; (2) a chiseled cross on solid rock 7.53 feet a little south of east.

[Latitude  $43^{\circ} 29' 51.94''$ . Longitude  $112^{\circ} 39' 50.44''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Big Butte.....	68 53 34.45	248 38 48.63	4.402303	19.308
Middle Butte.....	82 57 07.23	262 54 04.94	3.777843	3.726
Arco.....	110 20 22.05	289 54 05.70	4.737476	33.948
Jumpoff.....	128 50 00.28	308 31 41.33	4.6003249	28.423
Saddle.....	154 34 34	334 22 37	4.73392	33.673

**EIGHTEEN MILE PEAK, LEMHI COUNTY, IDAHO. (Not occupied.)**

The northern of two peaks on the east side of the low pass separating the Lemhi Valley from Birch Creek valley, Little Lost River drainage, about 18 miles southeast of Leadore, Idaho. The peak is very prominent and is visible the entire length of the Lemhi River. No monument.

[Latitude  $44^{\circ} 26' 51.96''$ . Longitude  $112^{\circ} 59' 44.18''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Timber Creek.....	99 34 20.00	279 17 08.00	4.51879	20.518
E and W.....	141 06 23.00	320 48 07.00	4.73712	33.921

**ELEVEN MILES, CUSTER COUNTY, IDAHO.**

On the highest point of a black-rock knob at the north end of a timbered ridge between Eleven Mile Creek and the west head of McCay Creek. On the south side of the Yankee Fork of Salmon River. About 11 miles east of Custer and 13 miles east of Bonanza. About 5 miles west of the summit where the old Custer-Challis wagon road crosses the divide between the Yankee Fork and Mill Creek. Easily reached from the camping grounds on Eleven Mile Creek.

Station mark: A triangulation tablet in rock set under a large rock monument and tree signal.

Reference mark: A chiseled cross on solid rock 8.05 feet north.

[Latitude  $44^{\circ} 27' 50.06''$ . Longitude  $114^{\circ} 33' 14.09''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Mount Eustes.....	80 58 09.89	260 51 34.04	4.1022616	7.863
Ram.....	302 27 23.58	122 36 13.96	4.2985382	12.356

**EUSTES MOUNTAIN, CUSTER COUNTY, IDAHO.**

On a sharp, red, rocky peak, known as Mount Eustes, on a ridge between Jordan and Eight Mile creeks, tributaries of the Yankee Fork of Salmon River. One mile south of the wagon-road crossing of the main divide between the head of Jordan and

Mayfield creeks. One mile east and visible from the Sunbeam Mill. The Montana Boy and McFadden mines are located on the peak a short distance from the top. Wagon roads and trails are all over and around the peak. Easily reached from the Sunbeam Mill.

Station mark: A triangulation tablet in rock set under a large monument, which is also a mineral monument.

Reference mark: A chiseled cross on rock set 18.8 feet northwest.

[Latitude  $44^{\circ} 26' 45.32''$ . Longitude  $114^{\circ} 42' 39.31''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Twin.....	228 36 21.49	48 46 15.16	4.3960898	15.469
Summit Rock.....	252 34 07.22	72 43 08.02	4.2522856	11.108
Eleven Miles.....	260 51 34.04	80 58 09.89	4.1022616	7.963
Ram.....	286 24 48.82	106 40 14.03	4.4848503	18.976
Bonanza.....	350 34 53.29	170 35 44.78	3.9981961	6.188

#### FORNEY, LEMHI COUNTY, IDAHO.

On a bald ridge between Mayer and Panther creeks. About 2 miles east of the Cabin Creek ranger station and 4 miles southwest of Forney post office. Station is easily reached by going up any of the grassy ridges from the ranger station.

Station mark: A bronze tablet cemented into solid rock under a rock monument and tree signal.

Reference mark: A chiseled cross on solid rock 12.60 feet south.

[Latitude  $44^{\circ} 57' 08.23''$ . Longitude  $114^{\circ} 19' 58.73''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Black Mountain.....	3 53 02.83	183 52 35.93	4.0918756	7.678
Taylor.....	308 30 23.75	128 35 22.98	4.0749643	7.384

#### FREEDOM, BLAINE COUNTY, IDAHO.

On a prominent, round, rocky, partly grassed hill on divide between Trail and West Fork of Fish creeks. About 0.25 mile north of point where wagon road from Muldoon Creek to Fish Creek crosses the divide. Five miles west and a little north of Crooks post office and a schoolhouse on Fish Creek, 3 miles northwest of Ward's ranch and a schoolhouse on West Fork of Fish Creek, 20 miles north of Carey post office, the nearest store.

Station mark: A small chiseled cross on perpendicular rock centered under a large monument.

Reference mark: Aluminum bench mark tablet set in solid flat rock 11.7 feet north.

[Latitude  $43^{\circ} 30' 20.3''$ . Longitude  $113^{\circ} 51' 17.4''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Buzz.....	• • "	• • "	4.14758	8.728
Scorpion.....	170 17 01	350 15 47	4.15609	8.901
Blizzard.....	272 46 33	92 54 16	4.18023	9.410
Crooks.....	333 21 16	153 23 52	4.05567	7.064

#### GARFIELD, BLAINE COUNTY, IDAHO. (Not occupied.)

On a black-rock knob on divide at west head of Garfield Creek. About 5 miles northwest of junction of Garfield and Muldoon creeks.

Station mark: Tallest monument.

[Latitude  $43^{\circ} 36' 12.3''$ . Longitude  $113^{\circ} 58' 54.5''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Scorpion .....	247 23 00	67 27 01	3.92839	5.269
Blizzard .....	294 29 08	114 42 07	4.44566	17.338
Freedom .....	316 35 28	000 00 00	4.17442	9.286

**GARFIELD MOUNTAIN, IDAHO-MONTANA.** (Not occupied.)

Center of a big round rocky peak named Garfield Mountain on Continental Divide, 20 miles west of Monida, Idaho. No monument.

[Latitude  $44^{\circ} 31' 15.08''$ . Longitude  $112^{\circ} 37' 12.47''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Timber Creek .....	87 47 12.00	267 14 12.00	4.79568	39.818
Horse Prairie .....	123 10 21.00	302 48 34.00	4.68907	30.368

**GHOST, LEMHI COUNTY, IDAHO.**

On a low isolated hill on the south side of Lemhi Valley and the west side of Timber Creek. About 6 miles southwest and visible from Leadore, Idaho. Easily reached from the ranch roads up the west side of Timber Creek.

Station mark: A chiseled cross under a large monument.

Reference mark: A chiseled cross on rock 14.20 feet east.

[Latitude  $44^{\circ} 39' 04.98''$ . Longitude  $113^{\circ} 23' 27.84''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
E and W .....	178 56 15.00	358 56 03.00	4.29612	12.288
Horse Prairie .....	241 55 16.00	62 07 24.00	4.41176	16.037

**GOLDSTONE, LEMHI COUNTY, IDAHO.**

On the last south high rocky peak on the Continental Divide Range. About 1,000 feet southwest of State-line boundary post 3 A. P. 468 M. On the headwaters of Kenny Creek, about 2 miles south of Goldstone mine on Pratt Creek. A good trail comes up Pratt Creek from Salmon River, and a wagon road comes into the mine from the Montana side. The station is easily reached by trail from the mine or by coming up the ridges from the ranches on Kenny Creek.

Station mark: A triangulation tablet cemented in a rock set under large monument.

Reference mark: A chiseled cross on solid rock 12.90 feet south.

[Latitude  $45^{\circ} 07' 10.00''$ . Longitude  $113^{\circ} 34' 31.58''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Sal .....	61 21 09.08	241 09 49.35	4.3794112	14.885
Mill .....	71 32 15.00	251 22 51.00	4.26426	11.419
Baldy .....	94 59 45.10	274 41 20.59	4.5337146	21.236
Graveyard .....	100 27 52.00	280 15 19.00	4.37301	14.668
E and W .....	340 14 32.08	160 20 44.60	4.5346485	21.281

## GRAVEYARD, LEMHI COUNTY, IDAHO.

On a low hill, the first or north hill on the divide between the forks of Lemhi and Salmon rivers. About 0.5 mile southeast of Salmon City. The cemetery is at the west foot of the hill.

**Station mark:** A triangulation tablet set in solid rock under a rock monument.

**Reference mark:** A chiseled cross on a big flat rock northwest of station.

[Latitude 45° 09' 27.51". Longitude 113° 52' 14.31".]

To station—	Azimuth.	Back azimuth.	Distance.	
Goldstone.....	280 15 19.00	100 27 52.00	<i>Log. meters.</i>	<i>Miles.</i>
Sal.....	331 53 18.00	171 54 31.00	4.37301 4.20204	14.668 9.885

## GROUSE, CUSTER COUNTY, IDAHO.

On a grassy hill on the main divide between Salmon and Pahsimeroi rivers. It is the beginning of the Little Lost River Mountain Range. About 10 miles northwest of Challis and the same distance southwest of May. The trail from Jack Adams's ranch on Salmon River up Dodge Gulch to the Pahsimeroi Valley crosses the ridge one-quarter of a mile north of hill. Good spring and grass at the head of Dodge Gulch. Challis and May are both visible.

**Station mark:** Triangulation tablet set in solid rock under large rock monument.

**Reference mark:** A chiseled cross on solid rock 16.8 feet east.

[Latitude 44° 33' 56.96". Longitude 114° 05' 38.93".]

To station—	Azimuth.	Back azimuth.	Distance.	
Spar.....	5 26 59.76	185 25 10.46	<i>Log. meters.</i>	<i>Miles.</i>
Lone Pine.....	13 47 01.00	193 43 51.00	4.5622512	22.678
Redwings.....	20 54 54.96	200 43 47.67	4.40146	15.661
Ram.....	42 03 03.33	221 55 34.76	4.7748586	37.001
Bay Horse.....	53 22 08.00	233 11 05.00	4.478106	18.415
Challis.....	68 03 49.00	247 56 43.00	4.41569	16.182
Twin.....	95 59 35.22	275 43 31.01	4.16020	8.986
Taylor.....	104 56 00.42	344 50 53.59	4.4838014	18.930
Baldy.....	185 58 56.13	6 02 34.04	4.5660021	22.875
Sal.....	201 38 16.65	21 49 55.82	4.8113331	40.243
Lem.....	217 03 02	37 12 40	4.7310495	33.450
Hill Peak.....	236 58 12	57 09 16	4.47729	18.650
Pahsimeroi.....	284 09 06	104 33 05	4.39484 4.67001	15.424 29.064

## HADES, BLAINE COUNTY, IDAHO.

On an old crater partly grassed, which from a distance appears as a round hill. It is the last big crater at the southeast end of the chain of craters that extend out in the lavas from the point of the high divide between Lava and Cottonwood creeks. About 16 miles southeast of Martins post office and ranch, the outfitting point. Eight miles southeast of the Bear Trap at the end of the road where all the craters of a comparative recent age are clustered. From Martin's ranch follow the Arco-Hailey road south about 3 miles and take the first left-hand road, built by Mr. Martin as a wood road, now used by autos for sight-seeing. A short distance beyond the Bear Trap and near the end of the road on the south slope of a black cinder crater a small monument on the edge of lava wall marks the beginning of the trail. For the first mile this trail is across the new lavas and is very rough, but well marked by small rock piles. The route then is southeast, leaving the big red-topped partly timbered (Aspen tree) crater to the right or west and the horseshoe crater to the left or north. About 1 mile southeast of the horseshoe crater a big monument and a lone pine tree mark the only

water, which is an ice cave in the crevice of the lavas. Grass sufficient for horses about a mile farther on the next two craters. The station is visible and about 4 miles southeast from water hole.

Station mark: A triangulation tablet set in placed rock centered under a large monument.

Reference mark: Chiseled cross on placed rock 11.2 feet northwest.

[Latitude  $43^{\circ} 21' 06.28''$ . Longitude  $113^{\circ} 27' 59.68''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Buzz.....	98 24 56	278 04 55	4.60395	24.963
Crooks.....	104 51 30	284 37 36	4.43546	16.936
Blizzard.....	135 09 27.23	315 01 09.21	4.3032852	14.343
Crawford.....	179 19 28.94	359 19 13.96	4.6164004	25.689
Arco.....	201 04 49.13	21 11 44.08	4.5745275	23.328
Big Butte.....	261 58 47.29	82 18 06.88	4.5609470	22.610

#### HERD, CUSTER COUNTY, IDAHO.

On a high grassy knob on the main divide between Big Lost River and East Fork of Salmon River. Near the head of the left-hand fork of Herd Creek. About 10 miles southeast of Stevens ranch on Herd Creek. Seven miles northwest of the mouth of East Fork of Big Lost River. Fifteen miles southwest of Chilly. Easily reached from Herd Creek or Big Lost River.

Station mark: A chiseled cross on solid rock under a large monument.

Reference mark: A chiseled cross on solid rock 8 feet north.

[Latitude  $43^{\circ} 59' 11.63''$ . Longitude  $114^{\circ} 13' 30.64''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Redwings.....	129 00 40.12	308 55 04.13	4.14135	8.604
Jerry.....	229 03 00.59	49 07 55.71	4.09741	7.777

#### HI PEAK, LEMHI COUNTY, IDAHO. (Not occupied.)

On the highest peak in the Lemhi Range between the Hayden Basin and Pahsimeroi Valley. Ten miles north of May, Idaho.

Station mark: Center of big monument.

[Latitude  $44^{\circ} 41' 14.22''$ . Longitude  $113^{\circ} 49' 53.89''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Grouse.....	57 09 15.55	236 58 11.65	4.30484	15.424
Sal.....	178 42 04.48	358 41 37.82	4.56247	22.689

#### HORSE PRAIRIE, LEMHI COUNTY, IDAHO-BEAVERHEAD COUNTY, MONT.

About 20 miles northeast of Junction and Leadore, Idaho, on a high hill at the head of East Fork of Canyon Creek on the Continental Divide boundary line between Montana and Idaho. Near Montana-Idaho State boundary post 537.12 M. Good wagon road to Crukshank's ranch on Canyon Creek, then a long gradual climb up ridge between two forks of creek about 1 mile east of ranch. The monument is visible the entire length of the creek.

Station mark: A chiseled cross on solid rock under a large monument.

Reference mark: The iron State boundary post marked 537.12, 52.40 feet south.

[Latitude 44° 45' 37.20". Longitude 113° 08' 12.48".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Finger.....	* * "	* * "	4.76622	36.272
Timber Creek.....	4 24 58.00	184 22 36.00	4.55911	22.514
Pahsimeroi.....	36 03 58.00	215 52 40.00	4.65580	28.129
Junction.....	42 56 40.00	222 40 21.00	4.59806	24.627
Leadore Hill.....	46 44 37.00	226 29 19.00	4.43234	16.815
Ghost.....	45 20 12.12	225 10 11.00	4.41176	16.037
E and W.....	62 07 24.00	241 55 16.00	4.3867031	15.137
Bloody Dick.....	108 26 24.12	288 14 02.86	4.6637226	28.647
Garfield Mountain.....	161 34 17.52	311 26 26.09	4.68907	30.368
Thumb.....	302 48 34.00	123 10 21.00	4.83811	42.802
	356 20 34.00	176 22 53.00		

**HOWE, BLAINE COUNTY, IDAHO.**

On the high grassy ridge between Argo Pass and the Lavas. About 16 miles northeast of Arco and 6 miles southwest of Howe Post Office. Spring on the wagon road on the north slope of Argo Pass is the nearest water. Best route is up the long canyon on the south side of the Pass.

Station mark: Bench mark tablet set in solid rock over which a big monument is centered.

Reference mark: A chiseled cross on solid rock 8.48 feet southeast.

[Latitude 43° 42' 48.5". Longitude 113° 05' 57.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Arco.....	* * "	* * "	4.22866	10.520
King.....	72 16 38	252 08 21	4.19810	9.804
Jumpoff.....	117 24 26	297 17 13	3.66814	2.894
	172 50 02	352 49 44		

**INFERNO, BLAINE COUNTY, IDAHO.**

On the highest point of a dome-shaped black cinder crater near the "Bear Trap" at the end of the wagon road. Eight miles southeast of Martin post office and ranch the nearest water. The crater 0.25 mile northwest is a few feet higher and has grass and scattering trees on northwest slope. The crater is easily recognized from the trimmed double tree that will appear as a single tree from an easterly or westerly direction. Wagon and automobile can be taken almost to the top.

Station mark: A 10-inch old drill driven in red solid cinder on top of the black cinder.

Reference mark: The base of the eastern of two trimmed trees slightly on the east slope of the crater 149 feet southeast.

[Latitude 43° 26' 37.1". Longitude 113° 33' 03.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Blizzard.....	* * "	* * "	4.05228	7.009
Crawford.....	122 58 31	302 53 20	4.50194	19.736
Arco.....	191 27 01	11 30 15	4.50622	19.933
	219 15 52	39 26 16		

**INVISIBLE, CUSTER COUNTY, IDAHO. (Not occupied.)**

On the highest point of a big ridge-shaped mountain at the south end of the high mountains of the Lost River Range just north of the head of Pass Creek. Seven miles northeast and visible from Mackay and about 5 miles west of Pass Creek ranger station.

Can only be reached from the south or Mackay side and is very rough and steep. Horses can be taken to the top in six hours by picking a route amongst the big boulders.

Station mark: Chiseled cross on placed rock centered under a large monument.

Reference mark: A hole drilled for tablet in solid rock 16 feet south.

[Latitude  $43^{\circ} 58' 00.5''$ . Longitude  $113^{\circ} 30' 51.6''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Shelly.....	47 37 18	227 28 04	4.36208	14.303
Mackay.....	60 11 53	240 04 10	4.23476	10.670
Crawford.....	352 54 16	172 56 00	4.43462	16.904

#### JERRY, CUSTER COUNTY, IDAHO.

On the highest grassy hill on the main divide between the waters of East Fork of Salmon River and Big Lost River. At the heads of Lake Creek, a tributary of Herd Creek, Salmon River, and Rogers Canyon, Lost River. Three miles east of Stevens Lake and 8 miles east of Stevens ranch on Herd Creek, 5 miles southwest of Peterson's ranch at the mouth of Rogers Canyon, 12 miles west and visible from Chilly post office. Easiest reached from Stevens Lake and Peterson's ranch. At 900 feet, by stepping southwest is iron section corner post marked "C. C. T. 9 N., sec. 33, secs. 4 and 5, T. 8 N., R. 20 E." About 90 feet north of iron post is section-corner stone marked with four scratches on east. In sighting the iron-post section corner the sight also passes over quarter section corner, small iron post, between secs. 5 and 6.

Station mark: A chiseled cross on solid rock over which a monument is centered.

Reference marks: (1) A chiseled cross on solid rock 8.85 feet south; (2) iron post, about 900 feet; true azimuth  $64^{\circ} 02' 25''$ .

[Latitude  $44^{\circ} 03' 37.16''$  (from north);  $44^{\circ} 03' 37.25''$  (from south). Longitude  $114^{\circ} 06' 25.97''$  (from north);  $114^{\circ} 06' 25.97''$  (from south).]

To station—	•	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	• ' "	Log. meters.	Miles.
Herd (from north).....	49 07 56	229 03 01	4.09741	7.777	
Potaman (from north).....	127 47 51.74	307 35 47.70	4.4654485	18.147	
Ram (from north).....	151 09 05.94	330 59 12.98	4.5912949	24.246	
Ram (from south).....	151 09 01.75	.....	4.5913160	24.247	
Spar (from south).....	173 02 17.66	.....	4.3006728	12.417	
Anderson (from south).....	203 38 30.38	23 42 00.73	4.2234690	10.395	
Mackay (from south).....	299 56 45.29	120 13 43.85	4.5773607	23.481	
Porphyry (from south).....	319 21 57.32	139 28 20.99	4.2769062	11.756	
Redwings (from south).....	91 31 54.11	271 21 22.57	4.3057368	12.563	

#### JUMPOFF, BLAINE COUNTY, IDAHO.

On the highest of several grassy hills on the ridges between Argo Pass and the Lavas. Ten miles a little north of east of Arco City and about 4 miles west of Howe post office. Water and feed at Howe post office and the spring on the north side of Argo Pass. Can be reached with horses from either east or west side.

Station mark: Aluminum bench-mark tablet set in solid rock over which a large monument is centered.

Reference mark: A chiseled cross on solid rock 5.7 feet north.

[Latitude 43° 45' 18.27". Longitude 113° 06' 23.20".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Arco.....	57 49 54.50	237 41 55.08	4.2639317	11.410
King.....	101 07 43.68	281 00 48.37	4.1362120	8.503
Bell.....	172 37 15	352 33 38	4.73201	33.524
Diamond.....	182 36 16	2 37 17	4.63361	26.728
Saddle.....	211 06 21	31 12 42	4.37533	14.746
East Butte.....	308 31 41.33	128 50 00.28	4.6603249	28.423
Middle Butte.....	314 26 25.89	134 41 42.04	4.6210830	25.968
Big Butte.....	350 14 06.88	170 17 36.87	4.6066291	25.118
Howe.....	352 49 44	172 50 02	3.66814	2.894

## JUNCTION, LEMHI COUNTY, IDAHO.

On a mountain in the Lemhi Range on the west side of Timber Creek and near its head. About 15 miles southwest of Leadore, Idaho. About 1 mile east of a very prominent yellow peak. Easily reached from the Timber Creek trail.

Station mark: A chiseled cross under a large monument.

Reference mark: A chiseled cross 12.55 feet north.

[Latitude 44° 30' 55.28". Longitude 113° 29' 59.37".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
E and W.....	189 06 56.00	9 09 55.00	4.54822	21.957
Horse Prairie.....	226 29 19.00	46 44 37.00	4.59806	24.627

## KING, BLAINE COUNTY, IDAHO.

On the northern of two high peaks on King Mountain between Big Lost and Little Lost rivers, about 8 miles due north of Arco City, 25 miles southeast and visible from Mackay City. Can only be reached with horses from the east side by leaving wagon road near Argo Pass.

Station mark: A triangulation tablet set in placed rock centered under a large monument.

Reference marks: (1) A chiseled cross on solid rock 52.4 feet north; (2) a chiseled cross on solid rock 16.15 feet east.

[Latitude 43° 46' 43.41". Longitude 113° 16' 23.60".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Arco.....	9 33 35.10	189 32 30.56	4.1002561	7.827
Crawford.....	69 16 28.82	249 08 12.41	4.2350095	10.675
Shelly.....	98 31 23.38	278 12 36.14	4.5657993	22.864
Mackay.....	109 56 29.76	289 33 46.36	4.5618031	22.654
Sunset.....	160 40 35	340 36 35	4.36698	14.467
Bell.....	187 09 51	7 13 11	4.70993	31.863
Diamond.....	200 45 40	20 53 38	4.63511	26.821
Saddle.....	235 20 53	55 34 10	4.49390	19.375
Jumpoff.....	281 00 48.37	101 07 43.68	4.1362120	8.503
Howe.....	297 17 13	177 24 26	4.19810	9.804

## KLUG, CUSTER COUNTY, IDAHO.

On a high timbered hill on the divide between Johns Gulch and Birch Creek. About 5 miles southwest and in view of Challis. Three miles south of Alexander Klug's ranch on Gordon Creek at the mouth of Johns Creek, 2 miles west of Challis. Good route up Johns Creek to station. The point commands a good view of the whole of Challis Valley.

Station mark: A chiseled cross on a large rock under monument and tree signal.

Reference mark: A chiseled cross on solid rock 18.10 feet east.

[Latitude 44° 27' 41.78". Longitude 114° 16' 21.61".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Twin...	132 22 38.00	312 14 05.00	4.33897	13.562
Grouse...	230 43 43.00	50 51 13.00	4.26291	11.383

**LEADORE HILL, LEMHI COUNTY, IDAHO.**

On the highest point of a rocky-topped timbered low hill on the west side of Timber Creek. About 5 miles south and visible from Leadore City. There is a large warm spring at the northeast foot of the hill.

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

**Reference mark:** A chiseled cross on solid rock 11.5 feet south.

[Latitude 44° 35' 20.07". Longitude 113° 22' 45.06".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
E and W...	171 36 18.12	351 34 11.86	4.43143	16.780
Horse Prairie...	225 10 10.61	45 20 24.12	4.43234	16.815

**LEATHERMAN, CUSTER COUNTY, IDAHO. (Not occupied.)**

The first high peak on main backbone of the Lost River Range east of Leatherman Pass about 7 miles east of Chilly and 20 miles a little west of north from Mackay City.

**Station mark:** Summit of peak.

[Latitude 44° 04' 57.0". Longitude 113° 43' 56.3".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Porphyry...	46 37 14	226 28 00	4.38862	15.204
Jerry...	85 26 48	265 11 09	4.47907	18.732
Mackay...	353 05 25	173 07 00	4.33366	13.397

**LEM, LEMHI COUNTY, IDAHO. (Not occupied.)**

On a high peak in the Lemhi Range near the head of Poison Creek, west of Hayden basin.

**Station mark:** Center of big monument.

[Latitude 44° 46' 52.20". Longitude 113° 51' 56.36".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Grouse...	37 12 40.00	217 03 01.65	4.47729	18.651
Sal...	184 04 00.06	4 04 59.82	4.41728	16.242

**LONE PINE, CUSTER COUNTY, IDAHO. (Not occupied.)**

On the highest point of the big prominent lone peak on the east side of Salmon River, about 10 miles southeast of Challis. The peak is known to the old settlers as Lone Pine and is visible from Challis and the whole valley.

**Station mark:** Center of big monument.

[Latitude 44° 20' 43.87". Longitude 114° 10' 10.02".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Twin.....	138 39 11.00	318 26 18.00	4.56600	22.874
Grouse.....	193 43 51.00	13 47 01.00	4.40146	15.661

**LOW, LEMHI COUNTY, IDAHO. (Not occupied.)**

On the only low rock hill in that vicinity, about 10 or 12 miles northeast of Forney. The hill is known to some as Swan Peak.

Station mark: Center of monument.

[Latitude 45° 00' 53.85". Longitude 114° 11' 29.18".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Taylor.....	7 27 52.00	187 26 51.00	4.16115	9.005
Red Rock.....	85 23 07.00	265 13 02.00	4.27401	11.678

**McCALEB, CUSTER COUNTY, IDAHO. (Not occupied.)**

On Mount McCaleb, a prominent locally known peak on end of ridge about 1 mile south of main backbone of the Lost River Range. About 3 miles north of and visible from Mackay.

Station mark: Small monument.

[Latitude 43° 59' 32.8". Longitude 113° 35' 48.1".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Mackay.....	36 00 22	215 56 05	4.14877	8.751
Porphyry.....	76 43 31	256 29 16	4.46927	18.307
Jerry.....	100 37 08	280 16 23	4.61931	25.862
Crawford.....	341 28 37	161 33 46	4.49784	19.553

**McGOWAN, CUSTER COUNTY, IDAHO.**

On the north end of the only rock ridge between the two main forks of Basin Creek and about half a mile south of the divide between Basin Creek and the West Fork of the Yankee Fork, about 8 miles west of Bonanza and 12 miles northeast of Stanley basin. The old hay trail from Stanley basin to Custer via Bonanza passes along the east and south foot of the ridge.

Station mark: The center of a rock monument.

Reference mark: A chiseled cross on solid rock several inches below surface under a small rock pile 6.60 feet north. This is the point occupied by instrument.

[Latitude 44° 20' 27.37". Longitude 114° 50' 35.12".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Trap.....	216 54 30.57	37 02 58.71	4.4262530	16.581
Ram.....	265 33 38.25	85 54 35.84	4.6015083	24.823

**McGUIRE, LEMHI COUNTY, IDAHO. (Not occupied.)**

On the highest of the very rough peaks, sometimes called the "Big Horn Crags," 12 miles southeast of the junction of the Middle Fork of Salmon River with the main Salmon River, about 15 miles southwest of Shoup, Idaho. The divide trail from the Forney-Yellow Jacket road at Red Rock passes down Clear Creek 6 miles east of station. Peak very difficult to reach.

Station mark: Center of big monument.

[Latitude  $45^{\circ} 10' 29.20''$ . Longitude  $114^{\circ} 38' 04.73''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Middle Fork.....	10 07 39.94	190 05 23.91	4.37922	14.879
Baldy.....	273 47 50.14	94 13 03.84	4.66968	29.042

**MACKAY, CUSTER COUNTY, IDAHO.**

On the northeast rocky knob of the north peak above the Mackay mine. About 4 miles south and visible from Mackay City. Easily reached with animals from Mackay by taking the main road to Mackay mine and following all left-hand roads which run in the creek bottom. At the end of the road go up a snow slide on the north side of peak. About a 3-hour ride from Mackay.

Station mark: A tablet set in solid rock over which a large monument is centered.

Reference mark: A chiseled cross on solid rock 16.4 feet northeast.

[Latitude  $43^{\circ} 53' 23.45''$ . Longitude  $113^{\circ} 41' 59.04''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Shelly.....	16 34 18.94	196 33 14.42	3.8630279	4.533
Porphyry.....	102 43 28.08	282 32 53.79	4.3204384	12.995
Anderson.....	142 59 35.09	322 46 05.20	4.6331939	26.702
McCaleb.....	215 56 05	36 00 22	4.14877	8.752
Invisible.....	240 04 10	60 11 53	4.23478	10.669
King.....	299 38 46.36	109 56 29.76	4.5618031	22.654
Crawford.....	315 11 14.08	135 20 40.04	4.4143959	16.134

**MARTIN, BLAINE COUNTY, IDAHO. (From two stations only; no check on this position.)**

On a round partly grassed lava hill at northeast foot of grassy divide, 0.25 mile southeast and visible from Martin's ranch and post office. The Arco-Hailey wagon road passes along the northeast foot of the hill.

Station mark: Aluminum bench mark tablet under center of monument.

Reference marks: (1) Cross on flat lava rock 35.7 feet east; (2) corner of secs. 11, 12, 13, and 14, T. 2 N., R. 24 E., is 1,500 feet distant; true azimuth  $289^{\circ} 10' 08''$ .

[Latitude  $43^{\circ} 30' 41.0''$ . Longitude  $113^{\circ} 33' 35.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Blizzard.....	81 00 13	260 55 45	3.94707	5.501
Arco.....	230 31 06	50 41 53	4.43503	16.919

**MIDDLE BUTTE, BINGHAM COUNTY, IDAHO.**

United States Coast and Geodetic Survey station on the highest part near north end of Middle Butte, which is the west butte of Twin Buttes. This butte is located on north side of the Mackay Branch of the Oregon Short Line Railroad. Can be

reached from either the wells at Tabor post office and railroad station, 15 miles southeast, or Delzers Bros. deep well and ranch, 5 miles southwest. Horses may be taken one-third way up by ascending from north side.

Station mark: A bronze tablet set by the United States Coast and Geodetic Survey.

Reference marks: (1) A bronze reference tablet set by the United States Coast and Geodetic Survey 13.7 feet west; (2) a Geological Survey bench mark tablet set in solid rock under center of large monument 9 feet north.

[Latitude  $43^{\circ} 29' 28.01''$ . Longitude  $112^{\circ} 44' 15.28''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Big Butte.....	65 32 29.48	245 20 45.83	4,403,099.7	15.720
Arco.....	113 29 25.57	293 06 11.91	4,693,616.6	30.688
Jumpoff.....	134 41 42.04	314 26 25.89	4,621,083.0	23.968
East Butte.....	262 54 04.94	82 57 07.23	3,777,884.3	3.726

#### MIDDLE FORK, LEMHI COUNTY, IDAHO.

A big rock knob on a timbered hill on main divide at the head of Warm Springs Creek to the west and Camp Creek to the east. About 12 miles west of Yellow Jacket and 5 miles east of the Mormon ranch on Middle Fork of Salmon River, 6 miles northeast of the junction of the Yellow Jacket and Camas creeks. The trail from Yellow Jacket to the Mormon ranch crosses the divide about a mile to the south.

Station mark: A triangulation tablet under a monument.

Reference mark: A chiseled cross on solid rock 7.9 feet south.

[Latitude  $44^{\circ} 57' 45.62''$ . Longitude  $114^{\circ} 39' 16.85''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Sleeping Deer.....	7 26 00.69	187 24 30.01	4,339,405.8	13.576
Bee Hive.....	195 53 33.85	15 57 59.73	4,475,817.9	18.586
Quartzite.....	236 24 34.00	56 33 25.00	4,294.96	12.254
Baldy.....	248 01 38.91	68 29 05.84	4,738,904.9	34.061
Red Rock.....	256 25 33.07	76 35 07.33	4,262,331.8	11.373
Taylor.....	233 42 18.83	104 00 55.98	4,553,066.0	22.203
Black Mountain.....	298 38 30.60	118 51 41.22	4,447,591.2	17.416

#### M. P. 12, LEMHI COUNTY, IDAHO.

On the northeast end of a burnt flat hill with scattering young pine. On the main divide between the waters of Middle Fork of Salmon and Salmon River. Deer Creek to the north and Yellow Jacket Creek to the south. Milepost 12 on the divide trail from the Forney-Yellow Jacket road crossing the main divide to Clear Creek via Red Rock and Cathedral is on the east slope of the hill about one-fourth mile from station. The station commands a good view but was not placed on the highest point of the flat top because it required too much cutting to sight the different points.

Station mark: A chiseled cross on rock set under a rock monument.

Reference mark: A triangulation tablet in solid rock 6.93 feet south.

[Latitude  $45^{\circ} 05' 44.50''$ . Longitude  $114^{\circ} 30' 30.27''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Baldy.....	261 49 50.00	82 11 06.00	4,599.16	24.686
Red Rock.....	329 13 21.00	149 16 43.00	4,087.47	7.600

**MILL, LEMHI COUNTY, IDAHO.**

On a low grassy hill south of Mill Creek about 10 miles southeast of Salmon City and 4 miles west of Baker post office on Lemhi River. Easily reached from Salmon by the Warm Springs road past the graveyard or from the Lemhi River. On the divide between Mulkey and Withington creeks.

Station mark: A triangulation tablet cemented into a large boulder.

Reference mark: A chiseled cross on rock 36 feet south.

[Latitude 45° 04' 00.70". Longitude 113° 47' 48.37".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Baldy.....	117 43 25.00	297 35 26.00	4.27113	11.681
Goldstone.....	251 22 51.00	71 32 15.00	4.26126	11.419

**PAHSIMEROI, LEMHI COUNTY, IDAHO.**

On a high rocky peak—main divide Lemhi Range—at the head of Timber Creek, a tributary of Lemhi River to the north, a tributary of Little Lost River to the east, and a tributary of the Pahsimeroi River to the west. The trail up Timber Creek leads to foot of hill but from here to top of peak is a long rocky climb. The hill on the divide half a mile northwest is the highest.

Station mark: A chiseled cross on solid rock under a rock monument.

Reference mark: A chiseled cross on solid rock.

[Latitude 44° 27' 41.29". Longitude 113° 31' 27.61".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Ram.....	81 12 30	260 38 06	4.82002	41.055
Grouse.....	104 33 05	284 09 06	4.67001	29.064
E. and W.....	190 26 49.00	10 30 50.00	4.61876	25.829
Horse Prairie.....	222 40 21.00	42 56 40.00	4.65580	28.129

**PASS, LEMHI COUNTY, IDAHO.**

On a high grassy hill about 10 miles northeast and visible from Leadore, Idaho. Best reached by following wagon road up Canyon Creek to the forks at first ranch, below creek water tank G. & P. Railroad, thence one-half mile up the east fork of Canyon Creek before going up the long grassy ridge to the south.

Station mark: Chiseled cross on slanting solid limestone under a large monument.

Reference mark: Triangulation tablet set in solid rock 13.90 feet south.

[Latitude 44° 42' 51.44". Longitude 113° 13' 12.07".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
E and W.....	127 45 35.14	307 36 45.20	4.32030	12.991
J. C. B.....	174 20 29.44	354 19 04.41	4.42829	16.659

**PION, CUSTER-BLAINE COUNTY LINE, IDAHO. (Not occupied.)**

On the west of the last two big dome-shaped mountains on the divide between Antelope and Muldoon creeks about 15 miles northwest of Grouse post office and 3 miles east of the pass through which the trail goes from East Fork of Big Lost River basin to Muldoon Creek.

Station mark: Small monument.

[Latitude 43° 37' 31.4". Longitude 113° 50' 36.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
Scorpion.....	• ′ ″	• ′ ″	Log. meters.	Miles.
Smiley.....	103 37 56	283 36 20	3.53644	2.137
Blizzard.....	198 21 06	18 22 31	3.91079	5.417
	314 41 02	134 48 17	4.30030	12.408

**PORPHYRY, CUSTER COUNTY, IDAHO.**

On a reddish rocky dome-shaped hill on grassy ridge  $\frac{1}{2}$  mile south of main divide between East Fork of Lost River and Big Lost River. About 12 miles south and visible from Chilly post office. About 4 miles east of Johnson ranch on the East Fork. The hill is very prominent and can be seen from the entire Copper Basin valley and from the Lost River valley in the vicinity of Dickey and Chilly. Good camping ground at head of gulches near station.

Station mark: A tablet set in placed rock centered under large monument.

Reference mark: A chiseled cross on solid rock 11.2 feet north.

[Latitude 43° 55' 51.69". Longitude 113° 57' 13.62".]

To station—	Azimuth.	Back azimuth.	Distance.	
Redwings.....	• ′ ″	• ′ ″	Log. meters.	Miles.
Jerry.....	114 42 44.00	294 25 49.51	4.5536465	22.23
Anderson.....	139 28 20.99	319 21 57.32	4.2769062	11.756
Dickey Peak.....	169 23 59.89	349 21 05.85	4.4801275	18.771
Dickey red roofed house.....	189 42 16	09 45 14	4.52735	20.927
Beauty.....	190 05 08	10 07 14	4.36142	14.28
Leatherman.....	211 06 44	31 13 58	4.42918	16.69
Mackay.....	226 28 00	46 37 14	4.38862	15.20
Shelly.....	232 32 53.79	102 43 28.08	4.3204384	12.995
Copper Basin ranger station.....	302 09 45.42	122 19 14.81	4.3361139	13.473
Reed & Davis.....	324 55 21	145 00 19	4.22285	10.390
Smiley.....	327 27 06	147 31 16	4.17590	9.316
Scorpion.....	335 35 55.40	155 41 55.53	4.4501498	17.519
	350 27 53.26	170 30 45.10	4.5264167	20.882

**POTAMAN, CUSTER COUNTY, IDAHO.**

On the highest rock knob on the narrow rock ridge on top of the grassy divide between Sullivan and Spud creeks to the north, and Smith Lake Creek to the south and east. Two miles south of Bradshaw's ranch on Spud Creek. This is the only ranch on Spud Creek and is about 1 mile south of Salmon River. Three miles southeast of Clayton post office and mill on Salmon River. It is the highest peak in the vicinity and commands a splendid view.

Station mark: A chiseled cross on a slanting solid rock under a rock monument and tree signal.

Reference mark: A triangulation tablet in solid rock 9.45 feet north.

[Latitude 44° 13' 15.75". Longitude 114° 23' 45.61".]

To station—	Azimuth.	Back azimuth.	Distance.	
Trap.....	• ′ ″	• ′ ″	Log. meters.	Miles.
Ram.....	150 37 40.17	330 27 22.10	4.5996871	24.719
Jerry.....	194 25 41.99	14 27 54.21	4.2259548	10.455
	307 35 47.70	127 47 51.74	4.4654485	18.147

**PROMINENT, CUSTER COUNTY, IDAHO.**

On the highest point of Pinyon Mountain on the divide between the waters of Big Loon and Rapid creeks. At the head of Canyon Creek to the east and Difficult Creek to the west. Two miles west of Ivers, Lost Pocket Mine, 6 miles east of Castro,

and 5 miles northwest of Loon Creek Center ranger station. Easily reached by road and trail from Ivers. It is a high large white-rock peak, timbered on west, and very prominent.

**Station mark:** A triangulation tablet under a large rock monument with tree in center.

**Reference mark:** A chiseled cross 7.45 feet south; tall flagpole in center of small monument 59.1 feet west.

[Latitude 44° 34' 12.70". Longitude 114° 54' 57.62".]

To station—	Azimuth.	Back azimuth.	Distance.	
Thompson Peak.....	* ' "	* ' "	<i>Log. meters.</i>	<i>Miles.</i>
Ramey.....	18 23 22.00	198 16 27.00	4.62109	25.968
Sleeping Deer.....	188 07 27.00	268 09 38.00	4.46266	18.030
Sheldon.....	219 06 15.23	39 15 46.25	4.4520672	17.596
Trap.....	242 45 26.00	63 00 24.00	4.50032	19.664
The General.....	280 41 47.32	100 53 20.66	4.3464774	13.798
	316 34 43.15	136 39 30.63	4.1199010	8.189

#### PUDDIN, LEMHI COUNTY, IDAHO. (Not occupied.)

On a high rough rock peak about 3 miles south of Mount McGuire. Puddin and Wilson creeks head around the peak. About 15 miles southeast of the junction of the Middle Fork with main Salmon River. Hard to reach but best approached from the east by leaving the divide trail from Forney to Clear Creek near the Cathedral Rock 17-mile post.

**Station mark:** Center of big monument.

[Latitude 45° 06' 46.25". Longitude 114° 37' 42.05".]

To station—	Azimuth.	Back azimuth.	Distance.	
Baldy.....	* ' "	* ' "	<i>Log. meters.</i>	<i>Miles.</i>
Taylor.....	265 32 16.00	85 58 37.87	4.68941	30.392
	307 38 14.00	127 55 45.98	4.61501	25.607

#### QUARTZITE, LEMHI COUNTY, IDAHO.

On a quartz knob and timbered hill on main divide between Middle Fork of Salmon River and Salmon River, Yellow Jacket Creek to west and Musgrove Creek to the east. Between mileposts 6 and 7 on the divide trail from the Forney-Yellow Jacket wagon road crossing the divide to Clear Creek; 14 miles northwest of Forney and 15 miles northeast of Yellow Jacket. Good camping ground 1 mile west, near milepost 8.

**Station mark:** A chipped place on edge of a sharp quartz boulder under a small monument and signal.

**Reference mark:** A chiseled cross on rock 14.35 feet west; also, a blazed tree 8.30 feet northwest.

[Latitude 45° 03' 38.41". Longitude 114° 26' 45.93".]

To station—	Azimuth.	Back azimuth.	Distance.	
Middle Fork.....	* ' "	* ' "	<i>Log. meters.</i>	<i>Miles.</i>
Taylor.....	56 33 25.00	236 24 34.00	4.24996	12.254
	316 48 28.00	136 58 15.00	4.42558	16.555

## RAM, CUSTER COUNTY, IDAHO.

On the highest bald rock peak 2 miles south of Bay Horse. About 5 miles southwest of the junction of Bay Horse Creek and Salmon River. At the head of the first south fork west of Salmon River and first east of Bay Horse City, of Bay Horse Creek. A good log slide up this creek nearly to the top. Best reached from Farren's ranch at the bridge across Salmon River at the mouth of Bay Horse Creek, by following the long ridge on south side of Bay Horse Creek. The peak is very prominent and furnishes a good view in all directions.

Station mark: A chiseled cross on top of long narrow rock buried under monument and tree signal.

Reference mark: A chiseled cross on long narrow rock 9.9 feet north.

[Latitude 44° 22' 03.62". Longitude 114° 20' 36.27".]

To station—	Azimuth.	Back azimuth.	Distance.	
Potaman.....	14 27 54.21	194 25 41.99	Log. meters.	Miles.
Robinson Bar.....	60 33 47.37	240 17 09.23	4.2259548	10.455
McGowan.....	85 54 35.84	265 33 38.25	4.5616082	22.644
Bonanza.....	87 47 01.06	267 32 27.43	4.6015083	24.822
Mount Eustes.....	106 40 14.63	286 24 48.82	4.4422371	17.206
Eleven Miles.....	122 36 13.96	302 27 23.58	4.4845503	18.976
Trap.....	127 49 00.61	307 36 29.14	4.2985382	12.356
Twin.....	157 19 00.00	337 13 26.23	4.4770013	18.636
Grouse.....	221 55 34.76	42 06 03.33	4.4352972	16.929
Pahsimeroi.....	260 38 06	81 12 30	4.4718106	18.415
Jerry.....	330 59 12.98	151 09 05.94	4.82002	41.055
			4.5912949	24.246

## RAMEY, IDAHO COUNTY, IDAHO.

On a sharp white hill with scattered trees on the divide extending west from the junction of Loon Creek and Middle Fork of Salmon River, about 4 miles west and visible from the barn of R. L. Ramey's ranch at the above junction. The best route is to cross Loon Creek over Ramey's Bridge and follow the old Thunder Mountain trail up Salmon River for a mile or so before fording the Middle Fork, thence up the long grassy ridge to station. Middle Fork can only be forded late in the summer. There is a cable across river at Ramey's, but only for passengers.

Station mark: A chiseled cross on solid rock under a big monument and tree signal.

Reference mark: A chiseled cross on solid rock 14.55 feet east.

[Latitude 44° 49' 43.27". Longitude 114° 51' 50.95".]

To station—	Azimuth.	Back azimuth.	Distance.	
Trap.....	231 41 27.00	151 50 51.00	Log. meters.	Miles.
Prominent.....	268 09 38.00	188 07 27.00	4.57197	23.191
			4.46266	18.030

## RAY SHEEP, CUSTER COUNTY, IDAHO. (Not occupied.)

On the big prominent rock peak 10 miles west of (Ivers) Lost Pocket Mine. The peak is locally known as Sheep and is reached from the Ivers-Greyhound trail.

Station mark: Center of rock monument.

[Latitude 44° 35' 58.67". Longitude 115° 00' 29.82".]

To station—	Azimuth.	Back azimuth.	Distance.	
Sleeping Deer.....	233 20 41.00	53 34 06.00	Log. meters.	Miles.
Trap.....	284 10 29.00	104 25 56.00	4.49652	19.402
			4.47815	18.685

**RED ROCK, LEMHI COUNTY, IDAHO.**

On a red-rock peak, called Independence Mountain, on divide between Fourth of July and Yellow Jacket creeks. Seven miles west of Forney and 8 miles east of Yellow Jacket. The wagon road joining these two places crosses the divide about  $1\frac{1}{2}$  miles south. The trail along the divide north from the road passes over the top of the peak.

Station mark: Tablet under a large monument.

Reference mark: A chiseled cross on solid rock 12.50 feet northwest.

[Latitude  $45^{\circ} 00' 03.98''$ . Longitude  $114^{\circ} 25' 44.49''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Middle Fork.....	76 35 07.33	256 25 33.07	4.265318	11.373
M. P. 12.....	149 16 43.00	329 13 21.00	4.08747	7.600
Baldy.....	244 01 19.00	64 19 11.00	4.5659159	22.870
Low.....	265 13 02.00	85 23 07.00	4.27401	11.678
Taylor.....	307 10 46.51	127 19 50.12	4.3262490	13.170

**REDWINGS, CUSTER COUNTY, IDAHO.**

On the northernmost one of five peaks of a short, isolated, high, red-rock mountain, locally known as Sheep Mountain, on ridge between the waters of Herd Creek and the main East Fork of Salmon River, at the head of McDonald and Fox creeks to the north and west into the East Fork of Salmon and Taylor Creek and other tributaries of Herd Creek to the east. About 15 miles south of the junction of the East Fork and main Salmon River, 6 miles south of the mouth of Herd Creek. Can be reached either from the East Fork or Herd Creek.

Station mark: A chiseled cross on rock under a very large monument.

Reference mark: A chiseled cross on rock set 7.25 feet west.

[Latitude  $44^{\circ} 03' 53.76''$  (from south). Longitude  $114^{\circ} 21' 34.08''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Twin (from north).....	171 04 24.45	350 59 31.97	4.7714793	36.968
Grouse (from north).....	200 43 47.67	20 54 54.96	4.7748586	37.001
Beauty (from north).....	259 53 34.45	80 17 45.35	4.67276	29.249
Herd (from north).....	308 55 04.13	129 00 40.12	4.14135	8.604
Ram (from south).....	182 10 35.84	.....	4.5272098	20.920
Spar (from south).....	222 28 48.89	.....	4.4190039	16.307
Anderson (from south).....	241 02 53.51	61 16 58.01	4.4873098	19.084
Jerry (from south).....	271 21 22.57	91 51 34.11	4.3057363	12.563
Porphyry (from south).....	294 25 49.51	114 42 44.00	4.5536465	22.233
Smiley (from south).....	312 20 33.65	132 43 26.60	4.7781759	37.284

**REED & DAVIS, CUSTER COUNTY, IDAHO.**

On a low lone grassy hill in upper Copper Basin, between East Fork of Lost River and Star Hope Creek. Two miles west of Reed & Davis copper mine and 25 miles southwest of Mackay. A good view of the entire copper basin from the point.

Station mark: A chiseled cross on solid rock over which is centered a large monument.

Reference mark: Aluminum tablet set in solid rock 5.7 feet north.

[Latitude  $43^{\circ} 49' 02.0''$ . Longitude  $113^{\circ} 51' 12.7''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Starhope.....	130 20 28	310 18 30	3.65732	3.024
Porphyry.....	147 31 16	327 27 06	4.17590	9.316
Shelly.....	263 59 14	84 04 33	4.01480	6.420

**ROBINSON BAR, CUSTER COUNTY, IDAHO.**

On the northern of two rocky peaks in the mountains on the west side of Warm Springs Creek and south of main Salmon River. About 5 miles south of Robinson Bar Hotel, on the stage road at the junction of Warm Springs Creek and Salmon River, 12 miles east of Stanley Basin. The station gives a good view of the Sawtooth Range. Easily reached from the Warm Springs Creek trail.

Station mark: A chiseled cross on solid rock under a tree signal and a monument of big boulders.

Reference mark: A chiseled cross on solid rock 12.5 feet northeast.

[Latitude  $44^{\circ} 12' 20.87''$ . Longitude  $114^{\circ} 44' 25.73''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Trap.....	192 13 07.94	12 17 17.16	4,5703090	23.103
Ram.....	240 17 09.23	60 33 47.37	4,5616082	22.644

**ROCKY, LEMHI COUNTY, IDAHO.**

On a high rocky peak locally known as Rocky, on a side ridge, between Twin and Ditch creeks, Salmon River basin, about 1 mile east of the main Bitter Root divide, milepost 412, Idaho-Montana boundary. Horses can be taken to the top by following the high divide east and north from State-line trail at milepost 411 or by coming up the trails from Gibbonsville to Alta, Mont. Cut-off trail leaves milepost 409 and joins wagon road on Hughes Creek, Mont.; also another at the 4 A. P. M. 405 connects with wagon road up the south fork of Hughes Creek at milepost 407 trail, goes southeast, connecting with Gibbonsville and Salmon City wagon road up North Fork of Salmon River at mouth of Ditch Creek. Fair summer camping grounds in basin on all sides of the peak, but good camping on saddle on State-line trail near milepost 410.

Station mark: Center of large monument 12 feet high.

Reference mark: Tablet 7.7 feet northwest.

[Latitude  $45^{\circ} 35' 43.92''$ . Longitude  $114^{\circ} 03' 15.72''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Blue Nose.....	60 15 04.58	240 02 06.28	4,435926	16.953
Castle.....	113 09 28.69	292 51 49.01	4,5422361	21.656
Piquett.....	145 14 24.24	325 08 34.41	4,262945	11.524
Trapper.....	150 09 06.90	329 58 41.61	4,577112	23.500
Deer.....	180 00 45.57	00 00 45.92	4,6805395	29.777
Saddle.....	202 04 06.24	22 07 09.50	4,1687967	9.165
Johnson.....	224 29 41.42	44 44 23.72	4,5791919	23.580
Ruby.....	272 55 29.00	93 08 38.00	4,37965	14.893
Big Hole Pass.....	288 24 41.00	108 34 30.00	4,27502	11.705
Sheep.....	298 54 01.02	119 06 38.37	4,4203509	16.356

**SADDLE, FREMONT COUNTY, IDAHO. (Not occupied.)**

On Saddle Mountain, a high rocky peak on Cedar Point, which is the southeast end of the Little Lost River Range. Ten miles north of Howe and 20 miles southwest of Reno. Water and grass at springs at head of South Creek, the nearest camping place. Horses can be taken about 1,000 feet below top.

Station mark: A triangulation tablet set in placed rock centered under a large monument.

Reference mark: A chiseled cross on solid rock 27 feet southwest.

[Latitude 43° 56' 16.3". Longitude 112° 57' 13.5".]

To station—	Azimuth.	Back azimuth.	Distance.	
Jumpoff.....	• ' "	• ' "	Log. meters.	Miles.
King.....	31 12 42	211 06 21	4.37533	14.748
East Butte.....	55 34 10	235 20 53	4.49390	19.375
	334 22 37	154 34 34	4.73392	33.673

**SAL, LEMHI COUNTY, IDAHO.**

On the highest dome-shaped, partly timbered rocky mountain between the forks of Lemhi and Salmon rivers. About 10 miles south of Salmon. Best reached by taking the Warm Springs road to Mill Creek, the end of the road, thence by trail along the east face of the mountain just below slide rock to a mine on top of hill north of station, thence along ridge to station.

**Station mark:** A triangulation tablet cemented in a large rock under big monument.

**Reference mark:** A chiseled cross on solid rock 14.9 feet south.

[Latitude 45° 00' 56.83". Longitude 113° 50' 31.70".]

To station—	Azimuth.	Back azimuth.	Distance.	
Lem.....	• ' "	• ' "	Log. meters.	Miles.
Grouse.....	4 04 59.82	184 04 00.00	4.41728	16.242
Baldy.....	21 49 55.82	201 39 16.65	4.7310495	33.450
Graveyard.....	137 48 24.08	317 41 20.43	4.2891545	12.092
Sheep.....	171 54 31.00	351 53 18.00	4.20204	9.895
Goldstone.....	181 07 04.56	7 10 35.54	4.7166018	32.356
Bloody Dick.....	241 09 49.35	61 21 09.08	4.3794112	14.885
E and W.....	249 17 02.37	69 39 08.08	4.6406653	27.165
Hi Peak.....	302 17 06.05	122 34 36.24	4.5870729	24.012
	358 41 37.82	178 42 04.48	4.56247	22.689

**SALMON, IDAHO COUNTY, IDAHO. (Not occupied.)**

**Station mark:** Monument on summit of Salmon Peak.

[Latitude 45° 37' 03.2". Longitude 114° 50' 09.3".]

To station—	Azimuth.	Back azimuth.	Distance.	
Trapper.....	• ' "	• ' "	Log. meters.	Miles.
Piquett.....	233 56 13.00	54 19 22.00	4.71405	32.166
	255 30 44.00	75 58 28.00	4.71525	32.255

**SCORPION, BLAINE COUNTY, IDAHO.**

On Scorpion Mountain on side ridge between Muldoon and Garfield creeks, 1 mile south of the main divide between East Fork of Lost River and Wood River basins. The trail from Copper Basin to Muldoon Creek comes through the first pass in sight and 1 mile east of station. Three miles north of the old mill on Muldoon Creek. The monument is about center of the mountain, the south end of which is several feet higher.

Good camping grounds in the head of the creeks around the mountain. About one hour's climb afoot.

**Station mark:** A chiseled cross on placed rock centered under large monument.

**Reference mark:** A triangulation tablet in solid rock 15.2 feet southwest.

[Latitude 43° 37' 57.78". Longitude 113° 53' 05.28".]

To station—	Azimuth.	Back azimuth.	Distance.	
Buzz.....	• ' "	• ' "	Log. meters.	Miles.
Garfield.....	12 59 37	192 56 37	4.41073	16.232
Porphyry.....	67 27 01	247 23 00	3.92289	5.269
Smiley.....	170 30 45.10	350 27 53.26	4.5264167	20.882
Crawford.....	219 12 21.21	39 15 28.89	3.9835889	5.983
Pion.....	252 55 06.14	73 12 10.89	4.5408377	21.590
Blizzard.....	283 36 20	103 37 56	3.53644	2.137
Crooks.....	310 13 53.10	130 22 51.43	4.3614759	14.283
Freedom.....	342 46 47	162 50 37	4.40511	15.793
	350 15 47	170 17 01	4.15609	8.901

**SHEEP 1 A. P. 452, IDAHO-MONTANA (LEMHI COUNTY, IDAHO; BEAVERHEAD COUNTY, MONT.).**

Station mark: State line boundary post.

[Latitude 45° 28' 50.46". Longitude 113° 45' 34.80".]

To station—	Azimuth.	Back azimuth.	Distance.	
Baldy.....	• ' "	• ' "	Log. meters.	Miles.
Blue Nose.....	27 42 58.24	207 32 21.66	4.6238484	26.134
Rocky.....	89 12 36.52	268 47 02.43	4.6968933	29.042
Johnson.....	119 06 38.37	29° 54 01.02	4.4203509	16.356
	185 18 33.53	5 20 16.04	4.6015059	24.823

**SHELLY, CUSTER COUNTY, IDAHO.**

On the east and highest of the five peaks on a high red-slate ridge extending northwest and southeast, locally known as Shelly Mountains. The peak is sometimes called Bird Peak and divides the waters of East Fork of Lost River and Antelope Creek. Cabin, Cherry, and Alder creeks all head at the peak. Eight miles south of Mackay City and 4 miles northeast of Reed & Davis copper mine in Copper basin. Easiest reached from the head of Cabin Creek, Cherry Creek, or the extreme tributary of northeast East Fork of Lost River.

Station mark: A chiseled cross on placed rock centered under large monument.

Reference mark: Triangulation tablet set in solid rock 8 feet south.

[Latitude 43° 49' 36.89". Longitude 113° 43' 32.16".]

To station—	Azimuth.	Back azimuth.	Distance.	
Smiley.....	• ' "	• ' "	Log. meters.	Miles.
Copper Basin Knob.....	25 32 53.54	205 29 25.14	4.1943469	9.721
Copper Basin ranger station.....	51 25 23	231 20 18	4.10078	7.84
Standhope.....	76 29 31	256 25 00	3.95473	5.60
Reed & Davis.....	79 09 44	258 57 19	4.38900	15.22
Starhope.....	84 04 33	263 59 14	4.01480	6.43
Porphyry.....	98 29 10	278 51 56	4.15079	8.79
Anderson.....	122 19 14.8	302 09 45.42	4.3361139	13.473
Mackay.....	150 02 56.21	329 50 31.58	4.6782155	29.619
King.....	196 33 14.42	16 34 18.94	3.8630279	4.533
Crawford.....	278 12 36.14	98 31 23.38	4.5657993	22.864
Lope.....	299 15 46.33	119 26 16.39	4.3685909	14.519
Timbered Dome (tree).....	308 16 45	128 22 19	4.13809	8.54
Taylor's White House.....	327 47 58	147 55 37	4.44620	17.4
Black Cap.....	328 22 41	148 27 31	4.24892	11.02
	333 21 57	153 26 42	4.31382	12.80

**SHELDON, LEMHI COUNTY, IDAHO. (Not occupied.)**

On a prominent red-rock peak on divide between Camas and Warm Spring creeks. About 10 miles southeast of Three Forks ranch. The trail from Camas Creek to Warm Springs Creek crosses the divide near the peak. Peak is locally known to the forest rangers.

Station mark: Center of peak; no monument.

[Latitude 44° 42' 00.01". Longitude 114° 33' 39.67".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Prominent.....	63 00 24.00	242 45 26.00	4.50032	19.665
Sleeping Deer.....	126 20 14.00	306 14 46.00	4.10429	7.900

## SLEEPING DEER, LEMHI COUNTY, IDAHO.

On the highest peak on the divide between Camas and Loon creeks. Cabin and Cache creeks, Loon Creek drainage, to the west; west part of Camas Creek to the east. Woodtick Creek heads about 1 mile north. About 15 miles southwest of Three Forks ranch, Myers Cove post office.; 30 miles southwest of Forney and 15 miles south-east of the junction of Loon Creek and Middle Fork of Salmon River, Ramey's ranch. The trail from the Three Forks ranch up the west fork of Camas Creek crosses the divide at the head of Woodtick Creek 1 mile north of station and goes down Cache Creek to Loon Creek and Middle Fork of Salmon River. From this trail in the pass a good route to the peak is south along the divide to a lake and grass at the north foot in the upper basin of Cache Creek.

Station mark: Triangulation tablet under a large monument.

Reference mark: A chiseled cross on a big boulder 53.9 feet west.

[Latitude 44° 46' 03.79". Longitude 114° 41' 25.39".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Prominent.....	39 15 46.26	219 06 15.23	4.4520672	17.596
Ray Sheep.....	53 34 06.00	233 20 41.00	4.49652	19.492
Middle Fork.....	187 24 30.01	7 26 00.69	4.3394058	13.576
Taylor.....	250 36 20.68	70 56 26.49	4.5998195	24.726
Sheldon.....	306 14 46.00	126 20 14.00	4.10429	7.900
Twin.....	318 33 22.77	138 42 26.15	4.4108000	16.001
Trap.....	351 31 54.03	171 33 57.75	4.4215253	16.401

## SMILEY, CUSTER COUNTY, IDAHO.

On Smiley Mountain, a very high prominent peak, half a mile east of the main divide between East Fork of Lost River and Antelope Creek. At the head of Bear and Iron Bog creeks, drainage of Antelope Creek and Lake Creek, a tributary of Starhope Creek. About 8 miles south of Reed & Davis copper mine, in Copper basin; 15 miles west of Grouse post office. Horses can be taken to the station from the Lake Creek side.

Station mark: A chiseled cross on placed rock centered under a very large monument.

Reference marks: (1) Aluminum bench-mark tablet set in rock buried 1 foot under rocks 5.6 feet northwest—a small stake marks the place; (2) chiseled cross on rock in hole 11.2 feet north.

[Latitude 43° 41' 59.46". Longitude 113° 48' 33.46".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Plon.....	18 22 31	198 21 06	3.94039	5.42
Scorpion.....	39 15 28.89	219 12 21.21	3.983899	5.983
Standhope.....	118 43 45	298 34 50	4.29551	12.27
Redwings.....	132 43 26.60	312 20 33.65	4.7781750	37.284
Big Black Dome.....	135 01 10	314 54 06	4.28689	12.03
Copper Basin Knob.....	153 28 04	333 26 28	3.84400	4.34
Porphyry.....	155 41 55.53	335 35 55.40	4.4501498	17.519
Ante.....	204 07 33	24 10 03	4.07471	7.380
Shelly.....	205 29 25.14	25 32 53.54	4.1943460	9.721
Lope.....	252 13 43	72 22 45	4.26501	11.44
Crawford.....	254 16 29.47	84 30 27.01	4.4355977	16.941
Taylors White House.....	273 28 31	93 36 46	4.20622	9.99
Timbered Dome (tree).....	293 42 27	113 53 33	4.37364	14.69
Blizzard.....	333 51 25.44	152 57 16.65	4.3993359	15.584

## SPAR, CUSTER COUNTY, IDAHO.

On a black-rock knob on a sagebrush hill on the divide between Spar Creek and Road Canyon, near their heads. About 8 miles east of the bridge across East Fork of Salmon River; between 2 and 3 miles south of the forks of the old Bay Horse road from the present Mackay-Clayton road at the elbow near Gossi Summer ranch.

Station mark: A chiseled cross under a rock monument.

Reference mark: A chiseled cross on solid rock 5.35 feet northeast.

[Latitude  $44^{\circ} 14' 19.88''$ . Longitude  $114^{\circ} 08' 15.13''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Twin.....	145 47 22.00	325 33 09.91	4.6790802	29.678
Grouse.....	135 25 10.46	5 26 59.76	4.5622512	22.678

## STANDHORSE, CUSTER COUNTY, IDAHO. (Not occupied.)

On one of a number of high peaks on the divide between Standhorse and Fall Creek. Three miles east of Mount Hyndman Peak and 8 miles west of Reed & Davis copper mine, in Copper basin. Best reached from the east by following up the west fork of Standhorse Creek. A long rough climb afoot.

Station mark: A tablet in placed rock under center of large monument.

Reference mark: A chiseled cross on solid rock 7.2 feet west.

[Latitude  $43^{\circ} 47' 06.3''$ . Longitude  $114^{\circ} 01' 27.9''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Shelly.....	258 57 19	79 09 44	4.38900	15.218
Smiley.....	298 34 50	118 43 45	4.29551	12.269
Scorpion.....	326 20 32	146 27 10	4.30804	12.630

## STARHOPE, CUSTER COUNTY, IDAHO.

On a grassy hill, bluffy on east, in Copper basin, on west side of Starhope Creek. One mile south of the junction of Starhope Creek and East Fork of Lost River; 4 miles west of Reed & Davis copper mine. Easily reached from all directions.

Station mark: Chiseled cross on placed rock centered under boulder monument.

Reference mark: Aluminum tablet 4.5 feet north.

[Latitude  $43^{\circ} 50' 44.1''$ . Longitude  $113^{\circ} 53' 58.7''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Porphyry.....	155 24 06	355 21 51	4.01883	6.488
Shelly.....	278 21 56	98 29 10	4.15079	8.793
Reed & Davis.....	310 18 30	130 20 28	3.68732	3.024

## SUMMIT ROCK, CUSTER COUNTY, IDAHO.

On a high rock knob on a timbered hill on the divide between the waters of the Yankee Fork to the west and Challis and Mill creeks to the east. Six miles west of Mosquito Flats, on Challis Creek, and 18 miles east of Bonanza. The wagon road from Challis, 16 miles east, to Custer, 16 miles west, crosses the divide at the heads of Mill and Summit creeks in view of and 1 mile southeast of station.

Station mark: A chiseled cross on solid rock under a large monument.

Reference mark: A triangulation tablet in solid rock 16.95 feet northeast.

[Latitude  $44^{\circ} 29' 38.09''$ . Longitude  $114^{\circ} 29' 47.35''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Mount Eustes.....	72 43 08.02	252 34 07.22	4.2522856	11.108
Twin.....	188 26 42.77	8 27 35.19	4.0501070	6.973

**SUNSET, CUSTER COUNTY, IDAHO. (Not occupied.)**

On the first high peak, main backbone Lost River Range, east of Pass Creek pass, through which the road from Mackay to Little Lost River goes; about 5 miles east and easily reached from the Pass Creek ranger station.

Station mark: Chiseled cross on placed rock centered under a large monument.

Reference mark: A triangulation tablet set in solid rock under small rock pile 17.10 feet southeast.

[Latitude  $43^{\circ} 58' 35.1''$ . Longitude  $113^{\circ} 22' 09.2''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Crawford.....	16 32 20	196 28 02	4.46640	18.188
Mackay.....	70 11 21	249 57 10	4.45068	17.540
King.....	340 36 35	160 40 35	4.36698	14.467

**TAYLOR, LEMHI COUNTY, IDAHO.**

On the highest rocky mountain on divide between Moyer Creek to the west and Hat Creek to the east, Morgan Creek to the south, all Salmon River drainage. About 8 miles southeast of Forney post office and 25 miles north of Challis, Idaho. The wagon road connecting these two places crosses the divide between Panther and Morgan creeks about 5 miles southwest of station. Best route is up the divide on the north side of Lake Creek; camping grounds in basins on all sides of the peak.

Station mark: A triangulation tablet under a large monument.

Reference mark: A chiseled cross on solid rock 6.9 feet north.

[Latitude  $44^{\circ} 53' 08.32''$ . Longitude  $114^{\circ} 12' 54.97''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Twin.....	32 33 00.40	212 22 08.38	4.5847348	23.883
Black Mountain.....	64 09 13.92	244 03 48.05	4.0619739	7.003
Sleeping Deer.....	70 56 26.49	250 36 20.68	4.5998195	24.726
Middle Fork.....	104 00 55.96	283 42 18.53	4.5330661	22.203
Wilson.....	125 00 49.98	304 48 28.90	4.59506	24.457
Red Rock.....	127 19 50.12	307 10 46.51	4.3262460	13.170
Puddin.....	127 55 45.98	307 38 14.00	4.61501	25.608
Forney.....	128 35 22.98	308 30 23.75	4.0749643	7.384
Quartzite.....	136 58 15.00	316 48 23.00	4.42558	16.555
Bee Hive.....	144 50 40.01	324 36 26.09	4.6800568	28.406
Low.....	187 26 51.00	7 27 52.00	4.16115	9.005
Baldy.....	209 23 49.98	29 32 36.87	4.5205800	20.603
Grouse.....	344 50 53.59	164 56 00.42	4.5660021	22.875

**TAYLOR'S WHITE HOUSE, CUSTER COUNTY, IDAHO. (Not occupied.)**

Two-story white frame, house owned by Mr. Taylor. On the flat between the junction of Antelope and Cherry creeks about 1 mile east of Grouse post office. Ranch is known as the old Cherry ranch.

Station mark: Center of house.

[Latitude  $43^{\circ} 41' 27.3''$ . Longitude  $113^{\circ} 36' 38.9''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Smiley.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
	93 36 46	273 28 31	4.20622	9.99
Ante.....	136 40 31	.....	4.21156	10.114
Shelly.....	148 27 31	328 22 44	4.24892	11.022

**THE GENERAL, CUSTER COUNTY, IDAHO.**

On the highest reddish-white peak on the main divide between Salmon and the Middle Fork of Salmon rivers, at the heads of Mayfield, Big Loon, and Lightning creeks; about 6 miles northwest of Sunbeam Mill and 8 miles south of Loon Creek Center ranger station. Can be reached by following up the above-named creeks. The best route is up Jordan Creek to Mount Jordan, thence along the main divide to station. There is only one saddle between the two peaks.

Station mark: A chiseled cross on rock set under large monument.

Reference mark: A triangulation tablet in large boulder 30.90 feet northwest.

[Latitude  $44^{\circ} 29' 02.37''$ . Longitude  $114^{\circ} 48' 07.67''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Prominent.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Trap.....	136 39 30.63 246 57 02.71	316 34 43.15 67 03 48.13	4.1199010 4.1422912	8.189 8.623

**THOMPSON PEAK, CUSTER-BOISE COUNTY, IDAHO. (Not occupied.)**

On the north high sharp peak of the Sawtooth Range. The mountains to the south are very rough and high, to the northwest they are much lower and smoother; about 10 or 15 miles west of Stanley. The peak is very prominent and well-defined.

Station mark: Center of peak.

[Latitude  $44^{\circ} 12' 47.46''$ . Longitude  $115^{\circ} 04' 51.83''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Prominent.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Trap.....	198 16 27.00 224 27 13.00	18 23 22.00 44 45 42.00	4.62109 4.69794	25.968 30.995

**TIMBER CREEK, LEMHI COUNTY, IDAHO.**

On the south one of two big rocky domes in the Lemhi Mountains on the east side of Timber creek; about 15 miles south of Leadore, Idaho. Easily reached from the Timber Creek trail.

Station mark: Triangulation tablet in large rock under monument.

Reference mark: A chiseled cross on solid rock 14.90 feet distant.

[Latitude  $44^{\circ} 29' 47.22''$ . Longitude  $113^{\circ} 24' 17.98''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
E and W.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Horse Prairie.....	177 03 28.56	357 02 27.73	4.56864	23.014
Garfield Mountain.....	215 52 40.00	36 03 58.00	4.55911	22.514
Eighteen-mile Peak.....	267 14 12.00	87 47 12.00	4.70568	38.818
	279 17 08.00	99 34 20.00	4.51879	20.518

**TIMBERED DOME, BLAINE COUNTY, IDAHO. (Not occupied.)**

A prominent partly timbered hill on grassy divide between waters of Grass Creek and drainage east to Lava Beds, about 3 miles north of the pass through which the road goes from Dry Fork of Antelope Creek to Champagne Creek.

Station mark: Tallest tree.

[Latitude  $43^{\circ} 36' 50.4''$ . Longitude  $113^{\circ} 32' 28.2''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Blizzard.....	• ' "	• ' "	4.21426	10.177
Smiley.....	38 42 16	218 37 13	4.37364	14.688
Shelly.....	113 53 33	293 42 27	4.44620	17.359
Crawford.....	147 55 37	327 47 58	4.12713	8.327
	204 21 28	24 24 52		

**XIII, IDAHO COUNTY, IDAHO. (Not occupied.)**

On round peak, about 6 miles south of Salmon Peak.

[Latitude  $45^{\circ} 31' 47.2''$ . Longitude  $114^{\circ} 45' 41.2''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Blue Nose.....	• ' "	• ' "	4.50110	20.019
Trapper.....			4.73247	33.540
Piquett.....			4.69827	31.018
Rocky.....			4.74573	34.600

**356 IDAHO-MONTANA BOUNDARY LINE. (Secondary point.)**

On a grassy hill with scattered trees on main divide Bitter Root Range, 93 feet south of small iron State-line angle post, marked "Idaho-Montana 1 A P 356 M" and 840 feet by stepping north of big iron post marked "Idaho-Montana 356.062 M." The Elk City trail passes by the side of the station. Good camping place in Nez Perce Pass, 1 mile south on State-line trail.

Station mark: A chisel cross in rock set under quadripod signal.

Reference mark: Small iron angle post 1 A P 356 M, 93 feet north.

[Latitude  $45^{\circ} 44' 07.00''$ . Longitude  $114^{\circ} 31' 51.87''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Trapper.....	• ' "	• ' "	4.3992043	15.580
Piquett.....	226 28 11.38	46 38 15.97		
Castle.....	270 31 54.71	90 46 33.44	4.4237628	16.486
	290 35 51.71	110 38 39.58	3.7337278	33.658

**TRAP, CUSTER COUNTY, IDAHO.**

On a very conspicuous red-rock cone-shaped peak (called Sherman Peak) on a high ridge between East Mayfield Creek and Trappers Creek, a fork of Warm Springs Creek. About 1 mile north of the main divide between the waters of main Salmon and Middle Fork of Salmon River. Ten-mile Creek, a tributary of Yankee Fork, heads in a low saddle opposite the head of Trappers Fork of Warm Springs Creek, about 2 miles south. The new trail from Challis, via Mosquito Flat and Yankee Fork, crosses the ridge between Trappers Fork and East Mayfield Creek about 1 mile south of peak. Challis is about 30 miles east and Loon Creek Center 15 miles west. Only grass is at the head of Yankee Fork and at the forks of East Mayfield Creek.

Station mark: A bronze tablet under a large monument.

Reference mark: A chiseled cross on rock set under small rock pile 6.50 feet north. This was the point occupied.

[Latitude 44° 31' 57.98". Longitude 114° 38' 29.34".]

To station—	Azimuth.	Back azimuth.	Distance.	
Robinson Bar.....	12 17 17.16	192 13 07.94	Log. meters.	Miles.
McGowan.....	37 02 58.71	216 54 30.57	4.5703090	23.103
Thompson Peak.....	44 45 42.00	224 27 13.00	4.4262330	16.51
The General.....	67 03 48.13	246 57 02.71	4.69794	30.995
Prominent.....	100 53 20.66	280 41 47.32	4.1422912	8.623
Ray Sheep.....	104 25 56.00	284 10 29.00	4.27815	18.685
Ramey.....	151 50 51.00	231 41 27.00	4.51797	23.191
Sleeping Deer.....	171 33 57.75	351 31 54.03	4.4215253	16.401
Twin.....	242 41 22.82	62 48 21.54	4.1706285	9.294
Ram.....	307 36 29.14	127 49 00.61	4.4770013	18.636
Potaman.....	330 27 22.10	150 37 40.17	4.5996871	24.719

**TWIN, CUSTER COUNTY, IDAHO.**

On the south peak of Twin Peaks on the main divide between the basins of main Salmon and Middle Fork of Salmon rivers. Bear Creek to the east and Warm Springs Creek, a tributary of Loon Creek, to the west. About 20 miles northwest of Challis. Six miles east of the old Parker Mountain Mine. The trail and telephone line from Challis up Bear Creek and down Warm Springs Creek passes through the saddle between the two peaks about a quarter of a mile north of peak. About 1,000-foot climb from pass to top. A ranger cabin is at the head of Bear Creek but no horse feed within 6 miles. The peak is used as a lookout station point by the Forest Service. Besides the Survey monument there is a large half-circle rock wind wall protecting the telephone.

Station mark: A triangulation tablet under a large monument.

Reference marks: The center of three posts used as a protractor station, the north end of the rock wall, the center of the rock wall, and the south end of the rock wall.

[Latitude 44° 35' 37.72". Longitude 114° 28' 32.62".]

To station—	Azimuth.	Back azimuth.	Distance.	
Summit Rock.....	8 27 35.19	188 26 42.77	Log. meters.	Miles.
Mount Eustes.....	48 46 15.16	228 36 21.49	4.0501070	6.973
Trap.....	62 48 21.54	242 41 22.82	4.3900898	15.468
Sleeping Deer.....	138 42 26.15	318 33 22.77	4.1706285	9.294
Taylor.....	212 22 09.38	32 33 09.40	4.4108000	16.001
Grouse.....	275 43 31.01	95 59 35.22	4.5847348	23.883
Challis.....	296 40 42.00	116 49 40.00	4.4838014	18.930
Beauty.....	312 11 16.97	132 40 27.38	4.27740	11.769
Long Pine.....	318 26 18.00	138 39 11.00	4.87564	46.664
Spar.....	325 33 09.91	145 47 22.00	4.50600	22.874
Bay Horse.....	333 04 15.00	153 09 16.00	4.6700802	29.678
Ram.....	337 13 26.23	157 19 00.00	4.32112	13.016
Redwings.....	350 59 31.97	171 04 24.45	4.4352802	16.929
			4.7744793	36.908

**WAUGH MOUNTAIN, IDAHO COUNTY, IDAHO. (Not occupied.)**

Station mark: Monument on summit of Waugh Mountain.

[Latitude 45° 29' 41.4". Longitude 114° 47' 31.4".]

To station—	Azimuth.	Back azimuth.	Distance.	
Blue Nose.....	* * *	* * *	Log. meters.	Miles.
Trapper.....			4.53206	21.184
Piquett.....			4.76718	36.332
Rocky.....			4.73131	33.470
			4.76855	36.467

## WILSON, LEMHI COUNTY, IDAHO. (Not occupied.)

On a high peak at the head of Wilson Creek. It is the last high rocky peak south of Mount McGuire. Can be reached by following the divide north from the Yellow Jacket-Mormon ranch trail. No monument.

[Latitude  $45^{\circ} 05' 18.81''$ . Longitude  $114^{\circ} 37' 27.57''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Baldy.....	262 21 21.60	82 47 32.87	4.68914	30.373
Taylor.....	304 48 28.90	125 05 49.98	4.59306	24.457

## BLOODY DICK, BEAVERHEAD COUNTY, MONT.

On the highest peak on the Bloody Dick Divide, which separates the waters of the Big Hole River to the north and the waters of the Horse Prairie Creek to the south. About 15 miles south of Jackson in the Big Hole and the same distance northwest of Grant, a station on the Pittsburgh & Gilmore Railroad on Horse Prairie Creek. It is easily reached from a cow ranch in the Bloody Dick basin.

Station mark: A triangulation tablet cemented into a solid rock under a large monument.

Reference mark: A chiseled cross on solid rock 14 feet south.

[Latitude  $45^{\circ} 09' 13.54''$ . Longitude  $113^{\circ} 19' 19.66''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
E and W.....	13 11 52.61	193 07 20.50	4.5685499	23.009
Sal.....	69 39 08.08	249 17 02.37	4.6406653	27.185
South Pyramid.....	122 22 12.00	302 07 06.00	4.51723	20.445
Torrey Mountain.....	219 05 44.00	39 20 40.00	4.63786	26.991
Polaris.....	225 49 40.00	46 02 18.00	4.51056	20.133
Brenner.....	329 58 38.81	150 05 40.71	4.4169157	16.228
Horse Prairie.....	341 26 26.09	161 34 17.52	4.6637226	28.646
J. C. B.....	346 16 11.33	166 19 06.14	4.3581100	14.173

## BLUE NOSE, RAVALLI COUNTY, MONT. (IDAHO-MONTANA STATE BOUNDARY LINE).

On a rocky mountain, old burn on south, on State line at angle point between mile-post 389.245 and 390.181, about 1.5 miles west of South Pass, where the old Shoup trail crosses the State-line trail and about 2 miles east of the Shoup wagon road crossing the State-line trail. The point is easily reached by the State-line trail on the south slope of the mountain. Good camping place on south slope of hill. Spring below Shoup trail. Miner's cabin in basin north foot of same hill.

Station mark: A chiseled cross on slanting solid rock under an 8-foot monument.

Reference mark: A bronze triangulation tablet cemented into a large boulder 11.25 feet southwest.

[Latitude  $45^{\circ} 28' 23.97''$ . Longitude  $114^{\circ} 21' 26.26''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bee Hive.....	28 28 05.53	208 19 50.98	4.5026912	19.772
Trapper.....	185 46 34.85	5 49 10.48	4.6083359	28.953
Piquett.....	204 16 53.09	24 20 02.83	4.4999057	19.649
Rocky.....	210 02 06.28	60 15 04.58	4.4358926	16.953
Sheep.....	268 47 02.43	89 12 36.52	4.6696893	29.042
Baldy.....	322 58 20.14	143 13 13.26	4.6387317	28.320

## BRENNER, BEAVERHEAD COUNTY, MONT.

On the north end of a grassy hill at the high north end of divide between Horse Prairie and Sage creeks. In view from both Brenner and Grant railroad stations, Grant being about 7 miles northeast and Brenner about 6 miles northwest.

Station mark: A triangulation tablet cemented in rock set under a large monument.

Reference mark: A chiseled cross on solid rock 18.9 feet south.

[Latitude  $44^{\circ} 57' 00.59''$ . Longitude  $113^{\circ} 09' 23.55''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
E and W.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Bloody Dick.....	58 08 03.10	237 56 30.78	4.4043716	15.766
Polaris.....	150 05 40.71	329 58 38.81	4.4169157	16.228
Torrey Mountain.....	192 48 09.00	12 53 43.00	4.66577	28.782
	194 23 13.00	14 31 03.00	4.76430	36.112

## CASTLE, RAVALLI COUNTY, MONT.

A secondary point on an isolated, rocky knob locally called Castle Rock. About 1 mile east of State line (Idaho-Montana) monument 1 A. P. 359 on the ridge leaving the main summit of the Bitter Root Range at that point and dividing the waters of Blue Joint Creek on the south and Nez Perce Fork or the West Fork of the Bitter Root on the north. The Elk City trail down the ridge passes on south foot of knob and about 500 feet lower than monument. The junction of the two trails, one down the ridge and the other down Nez Perce Fork, is in Nez Perce Pass.

Station mark: A chiseled cross in solid rock under an 8-foot monument.

Reference mark: A hole chiseled for tablet 9.8 feet southeast.

[Latitude  $43^{\circ} 43' 05.21''$ . Longitude  $114^{\circ} 27' 57.42''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
358.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Piquett.....	110 38 39.58	290 35 51.71	3.7337278	33.658
Rocky.....	265 37 30.89	85 49 21.61	4.3329241	13.375
	292 51 49.01	113 09 28.09	4.5422361	21.656

## COUNTY LINE, RAVALLI AND BEAVERHEAD COUNTIES, MONT.

On a high, rocky, dome-shaped peak on the Continental Divide at the junction of the divide that separates the waters of Bitter Root River and Rock Creek. East Fork of Bitter Root River, Rock Creek, a tributary of Clarks Fork, and Rock Creek, a tributary of Big Hole River, head at the peak. The station is easily reached by following the road and trail up East Fork of Bitter Root River to the divide and then the divide for about 1 mile to the north foot of the peak, where horses are left, thence a short climb over rocks and boulders. Good camping grounds at old miner's cabin in the northeast corner of the basin at the head of East Fork of Bitter Root River.

Station mark: The center of a large rock monument.

Reference mark: A bronze tablet cemented in rock set 10 feet northeast of station.

[Latitude  $45^{\circ} 58' 22.05''$ . Longitude  $113^{\circ} 30' 55.08''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Saddle.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Shirley.....	56 07 41.73	235 47 33.55	4.6422064	27.262
Deer.....	78 05 06.01	258 49 01.06	4.4713759	18.396
Kent.....	103 15 54.98	282 52 39.73	4.6321601	20.639
Warren.....	122 56 32.33	302 44 31.95	4.4090435	15.937
	219 32 49.18	30 35 15.45	3.8373995	4.273

## DEER, RAVALLI COUNTY, MONT.

Summit of peak locally known as Deer Peak, about 6 miles east of Darby and 6 miles north of Ray's ranch on Rye Creek. Easily reached from west or south. Ray's ranch is the closest camp place.

Station mark: A chiseled cross on solid rock under a large monument and tripod signal.

Reference mark: A triangulation tablet set in solid rock 25.40 feet north.

[Latitude  $46^{\circ} 01' 36.10''$ . Longitude  $114^{\circ} 03' 15.23''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Rocky.....	00 00 45.92	180 00 45.57	4.6803395	29.778
Piquett.....	17 56 44.35	197 50 52.88	4.5309015	21.348
Trapper.....	51 14 28.10	231 04 00.18	4.3829476	15.007
Ward (2).....	131 48 29.40	311 38 31.12	4.3783358	14.849
Palisades.....	204 55 38.43	25 03 33.92	4.5246532	20.799
Kent.....	258 06 53.32	78 18 09.10	4.3142370	12.811
County line.....	282 52 39.73	103 15 54.98	4.6321691	26.639
Johnson.....	308 06 37.42	128 21 22.59	4.5287627	20.993
Shirley.....	320 57 09.33	141 04 18.27	4.3101738	12.692
Saddle.....	350 49 37.25	170 52 40.84	4.5402883	21.559

## J. C. B., BEAVERHEAD COUNTY, MONT.

On a sharp, prominent low peak in the Horse Prairie Valley. One-quarter mile east of Pittsburgh & Gilmore Railroad track. One mile east of Brenner station; 0.5 mile east of J. C. Brenner's ranch.

Station mark: A triangulation tablet under a large monument.

Reference mark: A chiseled cross on solid rock 7.5 feet northwest.

[Latitude  $44^{\circ} 57' 15.70''$ . Longitude  $113^{\circ} 15' 12.67''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
E and W.....	44 59 40.97	224 52 15.02	4.292420	12.198
Bloody Dick.....	166 19 06.14	346 16 11.33	4.3581100	14.173
Pass.....	354 19 04.41	174 20 29.44	4.42829	16.650

## JOHNSON, RAVALLI AND BEAVERHEAD COUNTIES, MONT.

On a big, flat burnt-rock hill on Continental Divide, boundary between Ravalli and Beaverhead counties. The divide trail passes along the south slope of the hill. The trail that leaves East Fork of Bitter Root River at Johnson's ranger cabin 10 miles east of Sula post office passes over the north end of the hill and joins the divide trail in the saddle on the east.

Station mark: A chiseled cross on solid rock under a large monument and tripod signal.

Reference mark: A triangulation tablet.

[Latitude  $45^{\circ} 50' 18.84''$ . Longitude  $113^{\circ} 42' 43.31''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Sheep.....	5 20 36.04	185 18 33.53	4.6015059	24.823
Ruby.....	5 36 44.00	185 35 12.00	4.45356	17.657
Rocky.....	44 44 23.72	224 29 41.42	4.5791919	23.580
Saddle.....	57 46 11.39	237 34 31.78	4.3971479	15.507
Deer.....	128 21 22.59	308 06 37.42	4.5287627	20.993
Kent.....	165 55 29.58	345 51 58.90	4.4133835	16.097

## PIQUETT, RAVALLI COUNTY, MONT.

On an isolated rocky dome-shaped mountain at the extreme south head of Piquett, Little Boulder, and Warm Springs creeks, about 25 miles south of Darby. Four miles east of the West Fork of Bitter Root, where Blue Joint Creek comes in from the west. Can be reached from the divide between Overwhich and Slate creeks on the south or either of the divide trails from the north. The trail passes by the lakes on the east and north slope of the hill. Good camping place on the lake at the head of creek on trail 500 feet from summit of peak. Horses can be taken nearly to the top.

Station mark: A chiseled cross on placed rock under a large monument.

Reference mark: A bronze tablet cemented into rock by small rock pile 27.5 feet southeast.

[Latitude 45° 43' 57.18". Longitude 114° 11' 24.82".]

To station—	Azimuth.	Back azimuth.	Distance.	
Blue Nose.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Castle.....	24 24 02.83	204 16 53.09	4.499957	19.649
356.....	85 45 21.61	265 37 30.89	4.3329241	13.375
Trapper.....	90 46 33.44	270 31 54.71	4.4237628	16.486
Deer.....	154 44 57.28	334 40 21.98	4.2879001	12.057
Saddle.....	197 50 52.88	17 56 44.35	4.5360015	21.348
Rocky.....	275 27 40.04	95 36 34.32	4.2093231	10.062
	325 08 34.41	145 14 24.24	4.268245	11.524

## POLARIS, BEAVERHEAD COUNTY, MONT. (Not occupied.)

A monument on "Old Baldy," a big lone mountain west of Dillon; Mont., near Polaris mine. Very prominent.

Station mark: The monument.

[Latitude 45° 21' 23.50". Longitude 113° 01' 31.98".]

To station—	Azimuth.	Back azimuth.	Distance.	
Brenner.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Bloody Dick.....	12 53 43.00	192 48 09.00	4.60577	28.782
	46 02 18.00	225 49 40.00	4.51056	20.132

## RUBY, BEAVERHEAD COUNTY, MONT.

A low partly timbered hill grassy on top and on east slope. One of first hills west of Big Hole Valley lying between the wagon roads from Gibbonsville, Idaho, to Wisdom, Mont., and the new Forest Service interstate road from the Bitter Root Valley to the Big Hole Valley. About 6 miles south of the Battle Grounds. Easily reached from the Gibbonsville road. The hill commands a fine view of the entire Big Hole Valley.

Station mark: A tablet set in big boulder buried flush with ground under a large monument and quadripod signal.

Reference mark: A chiseled cross on rock set 14.03 feet north.

[Latitude 45° 35' 02.83". Longitude 113° 44' 51.49".]

To station—	Azimuth.	Back azimuth.	Distance.	
Big Hole Pass.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Rocky.....	52 17 16.00	232 13 56.00	3.88587	4.778
Johnson.....	93 08 38.00	272 55 29.00	4.37965	14.894
	185 35 12.00	5 36 44.00	4.45356	17.657

**SADDLE MOUNTAIN, RAVALLI COUNTY, MONT.**

On the east knob of Saddle Mountain, on a side ridge about 1 mile north of the Idaho-Montana boundary line, visible from and 12 miles south of Sula, Mont. Easily reached by State-line trail by going west 3 miles from the pass through which the old snow road from the Bitter Root Valley to Salmon River goes.

Station mark: A chiseled cross on solid rock under a rock monument and tree signal.

Reference mark: A tablet set in solid rock 23.95 feet east.

[Latitude 45° 43' 06.60" Longitude 113° 58' 59.47".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Rocky.....	22 07 09.50	202 04 06.24	4.1687967	9.165
Piquett.....	95 36 34.32	275 27 40.64	4.2093231	10.062
Trapper.....	128 11 34.02	307 58 04.36	4.4910654	19.249
Deer.....	170 52 40.84	350 49 37.25	4.5402883	21.559
Kent.....	200 52 37.45	21 00 47.81	4.6147950	23.594
Shirley.....	201 47 56.74	21 52 01.20	4.2994486	12.303
County line.....	235 47 33.55	56 07 41.73	4.6422064	27.262

**SHIRLEY, RAVALLI COUNTY, MONT.**

On the highest point of a hill at the south edge of thick timber with grassy ridges to the south. The hill is locally known as Shirley Hill and is about 3 miles east and visible from Sula post office. It is easily reached by wood road from Sula via Thompson's ranch. Water and grass near station at Thompson's ranch.

Station mark: Chiseled cross on placed rock under a small rock pile and quadripod signal.

Reference mark: A bronze tringulation tablet cemented in solid rock 45.2 feet south.

[Latitude 45° 53' 01.88" Longitude 113° 53' 18.49".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Saddle.....	21 52 01.20	201 47 56.74	4.2994486	12.303
Deer.....	141 04 18.27	320 57 09.33	4.3101738	12.092
County line.....	258 49 01.06	78 05 06.01	4.4713759	18.396

**SOUTH PYRAMID, BEAVERHEAD COUNTY, MONT. (Not occupied.)**

The south one of two pyramid-shaped peaks about 6 miles apart and east of the Continental Divide, but considerably higher. The Black Horse mine is somewhere south of peak.

[Latitude 45° 18' 42.18" Longitude 113° 40' 35.36".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Sal.....	21 39 46.00	201 32 43.00	4.54868	21.980
Bloody Dick.....	302 07 06.00	122 22 12.00	4.51723	20.445

**SULA PEAK, RAVALLI COUNTY, MONT. (Not occupied.)**

On sharp peak south end of timbered ridge about 2 miles west of Sula post office.

Station mark: Dead tree.

62510°—Bull. 644—17—15

[Latitude  $45^{\circ} 51' 38.30''$ . Longitude  $113^{\circ} 59' 55.59''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Shirley.....	• ' "	• ' "	Log. meters.	Miles.
Saddle.....	253 11 18.00 335 36 26.00	73 16 03.00 175 37 06.00	3.9515 4.1997	5.355 9.845

**TORREY MOUNTAIN, BEAVERHEAD COUNTY, MONT. (Not occupied.)**

A very high peak of that name west of Dillon, Mont.

Station mark: Rock monument.

[Latitude  $45^{\circ} 27' 23.59''$ . Longitude  $112^{\circ} 58' 18.95''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Brenner.....	• ' "	• ' "	Log. meters.	Miles.
Bloody Dick.....	14 31 03.00 39 20 40.00	194 23 13.00 219 05 44.00	4.76430 4.63786	36.112 26.991

**TRAPPER, RAVALLI COUNTY, MONT.**

On the highest peak, called Trapper Peak, in the Bitter Root Range, about 15 miles southwest of Darby, Mont. Easily reached from the ridge to the southeast. The best route is to leave the wagon road up South Fork of Bitter Root River at Fuller's ranch at the mouth of Boulder Creek, 1 mile north of South Fork bridge, and follow up the long ridge dividing the waters of Boulder Creek and the main river. Good camping grounds at timber line about half a mile from peak and 1,000 feet lower.

Station mark: A chiseled hole in slanting solid rock under center of a big monument.

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

[Latitude  $45^{\circ} 53' 25.46''$ . Longitude  $114^{\circ} 17' 48.74''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Blue Nose.....	• ' "	• ' "	Log. meters.	Miles.
356.....	5 49 10.48 46 38 15.97	185 46 34.85 226 28 11.38	4.668359 4.3992043	28.933 15.580
Ward (2).....	181 42 32.18	01 43 03.26	4.4923012	19.304
Deer.....	231 04 00.18	51 14 28.10	4.3829476	15.007
Kent.....	213 25 23.35	63 47 06.48	4.6390032	27.062
Saddle.....	307 58 04.36	128 11 34.02	4.4910454	19.249
Rocky.....	329 58 41.61	150 09 06.90	4.5777112	23.300
Piquett.....	334 40 21.98	154 44 57.28	4.2879001	12.057

## WYOMING.

### -TRIANGULATION STATIONS.

#### Como Ridge quadrangle.

##### CARBON COUNTY.

During the season of 1915 triangulation was extended north-eastward by George T. Hawkins, from two stations of the United States Geological Survey, Elk and Rock, described in Bulletin 245, in order to control the northeast quarter of the Widdowfield 30' quadrangle.

One old station, Rock, was occupied and the other one, Elk, sighted from three new stations and two stations cut in from three primary stations. Positions are on approximate North American datum.

##### COMO, CARBON COUNTY, WYO.

In sec. 17, T. 22 N., R. 77 W., about 7 miles east of Medicine Bow, on a high, bold ridge locally known as Como Ridge. This station can be reached by driving east along the railroad from Medicine Bow to a point where the road bends sharp toward the south, then follow a dim trail on the south side of the ridge for a mile when one drives up to the station. The station is nearly due south of the east end of Como Lake.

Signal: Tripod of sawed lumber.

Station mark: Tablet in solid rock.

Reference marks: (1) Arrowhead cut in rock, distant 9.9 feet north, 60° east. (2) Arrowhead cut in rock distant 24.3 feet west.

[Latitude 41° 53' 05.70". Longitude 106° 03' 32.51".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Rock.....	21 06 04.50	200 59 19.99	4.5924583	24.311
Pine.....	41 41 58.33	221 37 32.12	4.1415286	8.608
Derrick.....	49 25 02	229 17 23	4.32168	13.033
Tank.....	96 52 15	276 46 40	4.06681	7.248
Flat.....	136 46 08.71	316 41 16.99	4.1665121	9.11

##### DERRICK, CARBON COUNTY, WYO. (Not occupied.)

A tall oil derrick about 12 miles southwest of Medicine Bow on high ground about  $\frac{1}{4}$  miles north of the Medicine Bow River, in Carbon County.

Signal: Oil derrick.

Station mark: Oil well.

[Latitude 41° 45' 42.88". Longitude 106° 15' 01.99".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Como.....	229 17 23	49 25 02	4.32168	13.033
Pine.....	243 40 53	63 44 06	3.87402	4.649
Rock.....	335 16 12	175 17 02	4.36045	14.250

## ELK, CARBON COUNTY, WYO.

A high dome-shaped mountain about 15 miles south of Hanna and about 10 miles west of Elk Mountain post office. The mountain is precipitous with much down timber, making ascent difficult. The most practicable route is from Rattlesnake Pass on northwest side. At one time there was a trail along this route, but at present only traces are found at intervals. Time required to ascend peak, 6 hours. Summit is above timber line and consequently bald.

Station mark: A cairn about 5 feet in diameter at base and about 6 feet high.

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

True azimuth from station mark,  $198^{\circ} 19' 22''$ .

Distance, 13.1 feet.

[Latitude  $41^{\circ} 37' 59.46''$ . Longitude  $106^{\circ} 31' 31.76''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Flat.....	216 28 25.02	36 42 13.45	4.6823858	23.904
Pine.....	239 07 36.35	59 21 48.15	4.5370357	21.399

## FLAT, CARBON COUNTY, WYO.

In sec. 9, T. 23 N., R. 78 W., on the west end of a hill locally known as Flat Top, and about 1 mile east and 6 miles north of Medicine Bow. The road from Medicine Bow to the T-B ranch passes close to the east end of the hill and one can drive to within 100 yards of the station.

Signal: Sawed lumber tripod.

Station mark: Survey tablet in solid rock.

Reference marks: (1) Arrowhead chiseled in solid rock pointing to center is 13.5 feet northeast. (2) Arrowhead pointing to center chiseled in solid rock is 15 $\frac{1}{2}$  feet south  $30^{\circ}$  west.

[Latitude  $41^{\circ} 58' 51.97''$ . Longitude  $106^{\circ} 10' 49.06''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Rock.....	4 48 25.74	184 46 31.64	4.6754542	29.431
Tank.....	9 15 56	189 15 12	3.97398	5.853
Elk.....	36 42 13.45	216 28 25.02	4.6823858	29.904
Como.....	316 41 16.99	136 46 08.71	4.1665121	9.117
Pine.....	357 38 45.00	177 39 10.00	4.3232526	13.080

## MEDICINE BOW TANK, CARBON COUNTY, WYO. (Not occupied.)

A water tank 110 feet high, completed in July, 1915, and used for city water supply in Medicine Bow, Carbon County.

Signal: Center of tank.

Station mark: Center of tank.

[Latitude  $41^{\circ} 53' 50.64''$ . Longitude  $106^{\circ} 11' 54.84''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Flat.....	189 15 12	9 15 56	3.97398	5.853
Como.....	276 46 40	96 52 15	4.06681	7.248
Pine.....	348 31 21	168 32 30	4.07830	7.441

**PINE, CARBON COUNTY, WYO.**

Near the west end of ridge where it breaks off in steep bluff, in sec. 16, T. 21 N., R. 78 W. The station is nearly on a line with a wire fence running north and south to the south of the ridge. The station can be reached by wagon, going about 10 miles from Medicine Bow on the Arlington road, then drive to near the top from the south side of ridge.

Signal: Poles and plank.

Station mark: Tablet set in sandstone.

Reference marks: (1) Arrow pointing to center, east, distance 14 feet. (2) Arrow pointing to center S.  $70^{\circ}$  W. distant 21 feet.

[Latitude  $41^{\circ} 47' 30.27''$ . Longitude  $106^{\circ} 10' 11.61''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Rock.....	• ′ ″	• ′ ″		
	10 28 25.66	190 26 06.98	4.4230210	16.534
Elk.....	59 21 48.15	239 07 36.35	4.5370357	21.399
Derrick.....	63 44 06	243 40 53	3.87402	4.649
Tank.....	168 32 30	348 31 21	4.07830	7.441
Flat.....	177 39 10.00	357 38 45.00	4.3222528	13.080
Como.....	221 37 32.12	41 41 58.33	4.1415286	8.608

**ROCK, CARBON COUNTY, WYO.**

About 3 miles south of Arlington post office and 1.5 miles east of Rock Creek. The point locally known as Rock Mountain was cleared of timber and a quadrupod signal erected on highest point. Can be reached with pack outfit by blind trail from Arlington. On account of windfalls this point is difficult of approach except by trail.

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

[Latitude  $41^{\circ} 33' 22.12''$ . Longitude  $106^{\circ} 13' 40.34''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Derrick.....	• ′ ″	• ′ ″		
	175 17 02	355 16 12	4.30045	14.250
Flat.....	184 46 31.64	4 48 25.74	4.6754542	29.431
Pine.....	190 26 06.98	10 28 25.66	4.4230210	16.534
Como.....	200 59 19.99	21 06 04.50	4.5924583	24.311

## ILLINOIS.

### PRIMARY TRAVERSE.

**Augusta, Beardstown, Camp Point, Liberty, Mendon, Meredosia, Mount Sterling, Quincy, Bushville, and Vermont quadrangles.**

#### **ADAMS, BROWN, HANCOCK, AND SCHUYLER COUNTIES.**

The following geographic positions on approximate North American datum were determined by E. L. McNair in 1914. They are based upon La Grange and Quincy Courthouse, triangulation points of the United States Corps of Engineers, and also on primary traverse positions of the United States Geological Survey in Colchester and Macomb quadrangles. The latter are described in Bulletins 496 and 551.

#### **AUGUSTA QUADRANGLE.**

**Along highways near east border of north half of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 2 N., R. 3 W., in W. $\frac{1}{4}$ sec. 20, 35 feet northeast of intersection of crossroads; iron post stamped "Prim. Trav. Sta. No. 13, 1914, Illinois".	40 08 30.4	90 46 14.9	.....
T. 2 N., R. 3 W., corner of secs. 7, 8, 17, and 18; center of north and south road at.....	40 09 49.4	90 46 30.5	8,086
T. 2 N., R. 3 W., corner of secs. 5, 6, 7, and 8; T road west.....	40 10 41.7	90 46 29.2	5,300
T. 2 N., R. 3 W., north corner of secs. 5 and 6.....	40 11 35.4	90 46 28.0	5,431
T. 3 N., R. 3 W., corner of secs. 29, 30, 31, and 32; center of north and south road.....	40 12 27.0	90 46 24.6	5,240
T. 3 N., R. 3 W., quarter corner between secs. 29 and 30; T road west.....	40 12 53.4	90 46 24.2	2,670
T. 3 N., R. 3 W., corner of secs. 19, 20, 29, and 30; center of roads north and east.....	40 13 19.2	90 46 23.8	2,610
Brooklyn, west side of schoolhouse square, 30 feet east of intersection of Kentucky Street and Broadway; iron post stamped "Prim. Trav. Sta. No. 57, 1910, Illinois".	40 13 32.6	90 45 48.8	3,042

**Along highways near east border of south half of quadrangle.**

Forks of road, 20 feet west to oak tree in fence line.....	40 07 40.9	90 46 16.8	.....
Little Mississippi Creek; center of iron span bridge over.....	40 07 09.7	90 46 00.7	3,396
T. 2 N., R. 3 W., in middle of sec. 32; T road east.....	40 06 45.1	90 46 00.9	2,497
Brown-Schuylerville county line, at crossing of the Mount Sterling-Camden public road.....	40 06 18.7	90 46 06.1	2,711
T road east.....	40 05 29.4	90 46 07.9	3,395
T. 1 N., R. 3 W., quarter corner between secs. 8 and 17; T road east.....	40 04 30.7	90 46 02.9	5,951
Daisy, 0.25 mile west of store at; T road east.....	40 03 48.7	90 46 03.8	4,252
T road east.....	40 03 15.3	90 46 04.4	3,390
T. 1 N., R. 3 W., at quarter corner between secs. 20 and 29; T road west.....	40 02 45.6	90 46 05.3	3,010
T. 1 N., R. 3 W., at quarter corner between secs. 29 and 32; T road west.....	40 01 53.0	90 46 06.7	5,329
Tps. 1 N. and 1 S., R. 3 W., approximately at quarter corner between secs. 5 and 32; crossroads.....	40 01 00.3	90 46 06.8	5,330
T. 1 S., R. 3 W., quarter corner between secs. 5 and 8, fence line east; center of north and south road.....	40 00 08.0	90 46 06.4	5,297

## AUGUSTA QUADRANGLE—Continued.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 1 S., R. 4 W., corner of secs. 4, 5, 8, and 9; 20 feet east and 3 feet north of stone at, is T road west.....	40 00 10.9	90 52 24.6	Feet.
Timewell, 0.25 mile south and 0.5 mile west of, 25 feet north and 45 feet east of T road north at quarter corner between secs. 5 and 8, T. 1 S., R. 4 W., 18 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 15, 1914, Illinois".....	40 00 11.5	90 52 58.7	2,656
T. 1 S., R. 4 W., corner of secs. 5, 6, 7, and 8; center of east and west road at north and south fences.....	40 00 11.6	90 53 33.6	2,710
T road north.....	40 00 12.4	90 54 25.1	4,011
Tps. 1 S. and 1 N., on north side of sec. 6, R. 4 W.; center of road at T road south.....	40 01 04.9	90 54 31.4	5,343
Tps. 1 N. and 1 S., Rs. 4 and 5 W.; center of east and west road at wire fence south, on Brown-Adams county line.....	40 01 05.1	90 54 52.2	1,620
Tps. 1 N. and 1 S., R. 5 W., corner of secs. 35, 36, 1, and 2; T road north.....	40 01 05.6	90 56 01.8	5,410
Tps. 1 N. and 1 S., R. 5 W., quarter corner between secs. 2 and 35; T road south.....	40 01 05.8	90 56 35.5	2,620
T. 1 S., R. 5 W., north corner of secs. 2 and 3; T road south (130 feet west of above corner is south corner of secs. 34 and 35, T. 1 N., R. 5 W.).....	40 01 06.1	90 57 09.3	2,630
T. 1 S., R. 5 W., quarter corner on north side of sec. 3; T road south, 140 feet west of above is south corner of sec. 34, T. 1 N., R. 5 W.....	40 01 06.4	90 57 44.3	2,720
T. 1 S., R. 5 W., north corner of secs. 3 and 4; center of east and west road at fence south (210 feet west is south corner of secs. 33 and 34, R. 5 W., center east and west road at hedge north)....	40 01 06.6	90 58 17.9	2,620
T. 1 N., R. 5 W., south corner of secs. 32 and 33; T road north....	40 01 07.0	90 59 30.8	5,665

## Along highways through center of quadrangle.

T. 1 N., R. 5 W., quarter corner between secs. 20 and 29; T road north.....	40 08 07.7	90 59 55.1	.....
T. 1 N., R. 5 W., corner of secs. 20, 21, 28, and 29, hedge line north; T road south.....	40 08 07.0	90 59 20.8	2,660
T. 1 N., R. 5 W., quarter corner between secs. 21 and 28, fence south; T road north.....	40 08 06.3	90 58 46.6	2,660
T. 1 N., R. 5 W., corner of secs. 21, 22, 27, and 28; T road north.....	40 08 05.7	90 58 12.3	2,661
T. 1 N., R. 5 W., quarter corner between secs. 22 and 27; T road south.....	40 08 05.0	90 57 38.0	2,670
T. 1 N., R. 5 W., corner of secs. 22, 23, 26, and 27; center of east-west road at fence line south.....	40 08 04.3	90 57 03.3	2,690
T. 1 N., R. 5 W., quarter corner between secs. 23 and 26; center of crossroads.....	40 08 03.4	90 56 28.8	2,680
T. 1 N., R. 5 W., corner of secs. 23, 24, 25, and 26, at hedge line south; T road north.....	40 08 02.9	90 55 54.3	2,680
T. 1 N., Rs. 4 and 5 W., east corner of secs. 24 and 25, in line with roads north and west (west corner of secs. 19 and 30 in T. 1 N., R. 4 W., not determined; road north on Adams-Schuyler county line).....	40 08 01.8	90 54 46.5	5,270
T. 1 N., R. 4 W., quarter corner between secs. 19 and 30; T road south.....	40 08 00.9	90 54 14.0	2,526
T. 1 N., R. 4 W., 20 feet south and 20 feet east of center of crossroads, at quarter corner between secs. 20 and 29, 5 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 18, 1914, Illinois".....	40 08 01.4	90 52 52.1	6,356
T. 1 N., R. 4 W., quarter corner between secs. 20 and 21; crossroads.....	40 08 28.2	90 52 17.5	3,812
T. 1 N., R. 4 W., center of sec. 21; T road north.....	40 08 28.4	90 51 42.8	2,090
T. 1 N., R. 4 W., quarter corner between secs. 21 and 22; T road north.....	40 08 28.8	90 51 08.1	2,700
T. 1 N., R. 4 W., center of sec. 22; public crossroads.....	40 08 23.0	90 50 34.1	2,640
T. 1 N., R. 4 W., quarter corner between secs. 22 and 23, center of east-west road; fence north, hedge south.....	40 08 29.5	90 50 00.1	2,640
T. 1 N., R. 4 W., quarter corner between secs. 23 and 24.....	40 08 31.3	90 48 52.4	5,258
T. 1 N., R. 4 W., in S.E. $\frac{1}{4}$ sec. 24; T road south.....	40 08 25.9	90 48 01.2	4,012
T. 1 N., Rs. 3 and 4 W., quarter corner between secs. 19 and 24, near junction of east and west fence line and fence north.....	40 08 32.1	90 47 44.1	1,470
T. 1 N., R. 3 W., quarter corner between secs. 19 and 20; center of east-west road at north and south fences.....	40 08 30.5	90 46 32.6	5,555

Magnetic declination for north border of quadrangle,  $5^{\circ} 39' E.$ ; for south border,  $5^{\circ} 31' E.$ ; for east border,  $5^{\circ} 28' E.$ ; for west border,  $5^{\circ} 39' E.$ ; for center,  $5^{\circ} 55' E.$

## BEARDSTOWN QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 1 N., R. 1 W., corner of secs. 14, 15, 22, and 23; roads north and west.....	* * *	* * *	Ft.
T road south, near cemetery; center of triangle at.....	40 03 26.0	90 29 30.7	2,113
T. 1 N., R. 1 W., in east part of sec. 10; T road west.....	40 03 51.5	90 29 39.4	2,113
T. 1 N., R. 1 W., corner of secs. 2, 3, 10, and 11; roads south and east.....	40 04 47.8	90 29 46.6	5,411
T. 1 N., R. 1 W., in east part of sec. 3; T road west.....	40 05 13.2	90 29 22.6	2,485
T. 2 N., R. 1 W., corner of secs. 2, 3, 10, and 11; T road west.....	40 05 33.9	90 29 46.9	3,118
Tps. 2 and 3 N., quarter corner on north side of sec. 2.....	40 10 31.4	90 29 41.7	2,485
Ray station, 100 feet east of; public road crossing Burlington R. R. at.....	40 11 21.6	90 29 45.5	5,755
T road corners, roads east, west, and north.....	40 12 22.4	90 29 30.1	6,142
T. 3 N., R. 1 W., in E. 1/4 sec. 22; T road west.....	40 12 40.0	90 29 30.4	2,470
Iron bridge; center of.....	40 13 31.0	90 29 41.4	6,940
T. 3 N., R. 1 W., quarter corner between secs. 11 and 14; center of north and south road.....	40 13 53.4	90 29 33.5	2,490
	40 14 51.0	90 29 46.6	6,585

Magnetic declination for west border of quadrangle, 5° 25' E.

## CAMP POINT QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 1 S., R. 5 W., quarter corner on north side of sec. 5; T road south.....	* * *	* * *	Ft.
T. 1 N., R. 5 W., south corner of secs. 31 and 32, 25 feet south of T road north at, 2 feet north of fence line; iron post stamped "Prim. Trav. Sta. No. 16, 1914, Illinois".....	40 01 07.3	91 00 02.6	.....
T. 1 N., R. 5 W., quarter corner between secs. 31 and 32; public crossroads.....	40 01 34.2	91 00 40.0	2,456
T. 1 N., R. 5 W., near corner secs. 29, 30, 31, and 32; Wabash R. R. crossing.....	40 02 00.7	91 00 38.9	2,674
T. 1 N., R. 5 W., quarter corner between secs. 29 and 30; public crossroads.....	40 02 27.2	91 00 38.0	2,400
T. 1 N., R. 5 W., corner of secs. 19, 20, 29, and 30; T road west.....	40 02 53.9	91 00 37.1	2,740
T. 1 N., R. 5 W., corner of secs. 17, 18, 19, and 20, center of north and south road at hedge east and fence west.....	40 03 46.4	91 00 35.2	5,321
T. 1 N., R. 5 W., quarter corner between secs. 17 and 18; public crossroads.....	40 04 12.8	91 00 33.4	2,695
T. 1 N., R. 5 W., corner of secs. 7, 8, 17, and 18; public crossroads at Union Schoolhouse.....	40 04 39.2	91 00 31.5	2,475
T. 1 N., R. 5 W., corner of secs. 5, 6, 17, and 18; T road east.....	40 05 41.7	91 00 31.6	5,239
T. 1 N., R. 5 W., north corner of secs. 5 and 6; granite boulder on north side of east and west road, 150 feet west of above corner is south corner of secs. 31 and 32, T. 2 N., R. 5 W., center of east and west road on township line.....	40 06 22.3	91 00 29.6	5,122
T. 2 N., R. 5 W., corner of secs. 29, 30, 31, and 32; crossroads.....	40 07 15.7	91 00 30.6	5,299
Burlington R. R., 100 feet northeast of road crossing; center line of north and south road.....	40 07 46.4	91 00 29.9	3,110
T. 2 N., R. 5 W., 25 feet west by 23 feet south of crossroads at corner of secs. 19, 20, 29, and 30, 4 feet southeast of corner fence post; iron post stamped "Prim. Trav. Sta. No. 17, 1914, Illinois".....	40 08 06.1	91 00 29.7	2,148
T. 2 N., R. 5 W., corner of secs. 17, 18, 19, and 20; center of north and south road in line with center of road west on section line.....	40 09 01.3	91 00 29.3	5,360
T. 2 N., R. 5 W., corner of secs. 5, 6, 7, and 8; public crossroads at schoolhouse.....	40 10 46.7	91 00 28.7	10,471
T. 3 N., R. 5 W., south corner of secs. 31 and 32, stone near center of east and west road, in line with road north, on Alton-Hanock county line, 140 feet east of above corner is south corner of secs. 5 and 6, T. 2 N., R. 5 W., granite stone in center of east and west road in line with T road south.....	40 11 36.0	91 00 28.3	5,291
T. 3 N., R. 5 W., corner of secs. 29, 30, 31, and 32; center of north and south road at fence line east and T road west.....	40 12 30.9	91 00 27.4	5,256
T. 3 N., R. 5 W., quarter corner of secs. 29 and 30, hedge line west, T road east.....	40 12 56.2	91 00 26.9	2,770
T. 3 N., R. 5 W., corner of secs. 19, 20, 29, and 30, fence line east, T road west.....	40 13 24.7	91 00 26.4	2,646

## CAMP POINT QUADRANGLE—Continued.

## Along highway near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 3 N., R. 5 W., quarter corner between secs. 19 and 20; public road crossing.....	° ' "	° ' "	Ft.
	40 13 51.3	91 00 26.0	2,690
T. 3 N., R. 5 W., corner of secs. 17, 18, 19, and 20; stone in center of north and south road at fence east and west.....	40 14 17.8	91 00 25.6	2,680
T. 3 N., R. 5 W., quarter corner between secs. 17 and 18, at hedge line east; T road west.....	40 14 44.2	91 00 25.0	2,679
T. 3 N., R. 5 W., 40 feet northeast of stone at corner of secs. 7, 8, 17, and 18, at corner of hedge in northeast corner of T road east; iron post stamped "Prim. Trav. Sta. No. 55, 1910, Illinois".....	40 15 11.0	91 00 24.1	2,713

## Along highways near south border of quadrangle.

Tps. 1 N. and 1 S., T.s. 5 and 6 W.; stone in southwest corner of yard.....	40 01 08.0	91 01 50.6	.....
T. 1 S., R. 6 W., quarter corner between secs. 1 and 2; T road east.....	40 00 41.4	91 02 56.9	5,818
T. 1 S., R. 6 W., quarter corner between secs. 2 and 3; T road east; Road forks; center of north and south road at northeast corner of triangle.....	40 00 42.8	91 04 04.8	5,288
McKees Creek, north and south branch of; center of iron truss bridge over.....	40 00 11.1	91 04 23.0	3,510
T. 1 S., R. 6 W., on line between secs. 9 and 10; center of east and west road, fences north and south.....	40 00 08.0	91 04 51.8	2,263
T. 1 S., R. 6 W., in northeast quarter of sec. 9; T road east.....	40 00 05.2	91 05 13.0	1,678
T. 1 S., R. 6 W., 0.25 mile west of corner of secs. 3, 4, 9, and 10, on line between secs. 4 and 9; T road south.....	40 00 04.3	91 05 30.3	1,345
T. 1 S., R. 6 W., corner of secs. 4, 5, 8, and 9, east and west road in line with fence north from back of school yard.....	40 00 17.9	91 05 30.1	1,370
McKees Creek; center of iron bridge over.....	40 00 18.5	91 06 21.6	4,000
T. 1 S., R. 6 W., stone at quarter corner of secs. 6 and 7, roads south and east, fences north and west.....	40 00 31.7	91 07 24.0	5,034
T. 1 S., R. 7 W., corner of secs. 3, 4, 9, and 10; T road west, hedge line east.....	40 00 20.7	91 08 03.8	3,294
T. 1 S., R. 7 W., corner of secs. 4, 5, 8, and 9; T road north, hedge line south.....	40 00 22.1	91 12 15.9	.....
T. 1 S., R. 7 W., quarter corner between secs. 5 and 8; T road south, hedge line north.....	40 00 23.2	91 13 24.5	5,340
T. 1 S., R. 7 W., corner of secs. 5, 6, 7, and 8; center of east and west road at north and south hedge line.....	40 00 23.7	91 13 59.1	2,680
	40 00 24.1	91 14 33.7	2,680

Magnetic declination for east border of quadrangle,  $5^{\circ} 39' E.$ ; for south border,  $6^{\circ} 12' E.$

## LIBERTY QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 1 S., Rs. 6 and 7 W., corner of secs. 12, 13, 7, and 18; stone in north and south road.....	° ' "	° ' "	Ft.
	39 59 28.8	91 08 51.9	.....
T. 1 S., Rs. 6 and 7 W., about 380 feet south by 825 feet west of corner of secs. 12, 13, 7, and 18, at southwest corner of angle in road; iron post stamped "Prim. Trav. Sta. No. 19, 1914, Illinois".....	39 59 25.0	91 09 02.5	912
T. 1 S., R. 7 W., corner of secs. 11, 12, 13, and 14; center of crossroads.....	39 59 29.2	91 09 59.8	4,478
T. 1 S., R. 7 W., quarter corner between secs. 11 and 14; T road north.....	39 59 29.2	91 10 33.6	2,630
T. 1 S., R. 7 W., corner of secs. 10, 11, 14, and 15; T road south, hedge line north.....	39 59 29.3	91 11 07.4	2,630
T. 1 S., R. 7 W., quarter corner between secs. 10 and 15, 10 feet east to hedge south; T road north.....	39 59 29.2	91 11 41.2	2,630
T. 1 S., R. 7 W., center of sec. 10; crossroads.....	39 59 55.8	91 11 41.6	2,690

Magnetic declination for north border of quadrangle,  $6^{\circ} 12' E.$

## MENDON QUADRANGLE.

Along highways near southeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Chicago, Burlington & Quincy R. R.; public road crossing.....	•   /   "	•   /   "	
T. 1 S., Rs. 7 and 8 N., 35 feet south by 15 feet west of T road south at, 150 feet north of railroad crossing west of Fowler, 8 feet south of corner fence post; iron post stamped "Prim. Trav. Sta. No. 20, 1914, Illinois".	40 00 24.5	91 15 18.9	.....
T. 1 S., R. 8 W., on line between secs. 11 and 12; north and south road crossing.....	40 00 24.6	91 15 46.4	2,142
	40 00 05.5	91 16 54.1	5,606

Magnetic declination near southeast corner of quadrangle,  $6^{\circ} 24' E.$ 

## MEREDOSIA QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
La Grange triangulation station, situated at apex of an Indian mound, at the top of river bluff, 1 mile south of La Grange Landing, 600 feet southwest of dwelling house owned by John Prudence, 2,004 feet north by 258 feet east of southwest corner of sec. 32, T. 1 S., R. 1 W., established in March, 1903; station mark stone and pipe.....	•   /   "	•   /   "	
La Grange, 60 feet south of gate to yard in front of residence; cross-roads.....	39 55 54.754	90 32 51.572	.....
T road north.....	39 56 49.4	90 32 12.5	6,317
T road corners; roads east, west, and north.....	39 58 10.2	90 32 42.3	8,498
Crooked Creek; center of iron truss bridge over.....	39 58 36.4	90 33 55.3	6,269
T. 1 S., R. 2 W., on line between secs. 12 and 13; crossroads.....	39 58 48.1	90 34 55.7	4,850
Crossroads.....	39 59 07.6	90 34 53.5	1,974
T. 1 S., R. 2 W., center of sec. 12; T road south.....	39 59 33.5	90 34 53.2	2,620
T. 1 S., R. 2 W., center of sec. 12; T road south.....	39 59 34.1	90 34 37.5	1,383
T. 1 S., Rs. 1 and 2 W.; center of east and west road, at lane north to house.....	39 59 35.2	90 34 02.3	2,744
T. 1 S., R. 1 W., quarter corner between secs. 7 and 8, in line with road north; center of east and west road.....	39 59 35.3	90 32 53.6	5,350
T. 1 S., R. 1 W., quarter corner between secs. 8 and 9; T road south.....	39 59 34.9	90 31 45.6	5,290
Green Creek; center of iron bridge over.....	39 59 36.0	90 31 12.2	2,604
T. 1 S., R. 3 W., on line between secs. 15 and 16; center of east and west road at T road south.....	39 58 59.9	90 44 25.1	.....
T. 1 S., R. 3 W., in northeast corner of sec. 15; public crossroads.....	39 59 02.3	90 43 32.6	4,089
T. 1 S., R. 3 W., on line between secs. 13 and 14; road crossing.....	39 59 01.0	90 42 03.3	6,957
T. 1 S., Rs. 2 and 3 W.; center of east and west road at road south.....	39 58 59.9	90 40 37.4	6,678
T. 1 S., R. 2 W., in northwest quarter of sec. 17; center of small iron bridge.....	39 58 56.3	90 39 42.7	4,277
T. 1 S., R. 2 W., at quarter corner between secs. 16 and 17; crossroads.....	39 58 42.7	90 38 39.9	5,077
T. 1 S., R. 2 W., near center of sec. 16, about 15 feet south of east and west road, in line with road north and fence line south, on bank 3 feet above road, 35 feet southwest of elm tree, in triangle between roads; iron post stamped "Prim. Trav. Sta. No. 9, 1914, Illinois".....	39 58 41.9	90 38 04.7	2,738
T road south.....	39 58 41.8	90 37 47.0	1,369
T. 1 S., R. 2 W., in sec. 15; center of small iron bridge.....	39 58 30.3	90 37 04.5	3,513
T. 1 S., R. 2 W., quarter corner between secs. 15 and 22; center of north and south road.....	39 58 15.3	90 36 55.3	1,681
T. 1 S., R. 2 W., over small branch of Crooked Creek; center of small wooden bridge.....	39 58 38.3	90 35 22.0	7,621

Magnetic declination for north border of quadrangle,  $5^{\circ} 27' E.$

## MOUNT STERLING QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 1 S., R. 3 W., about 0.25 mile north of quarter corner between secs. 8 and 17; 820 feet north of street in Mount Sterling, on Mount Sterling-Camden road, 35 feet west of center of north and south road, 2 feet east of wire fence on bank opposite frame cottage on east side of road; iron post stamped "Prim. Trav. Sta. No. 14, 1914, Illinois".	39 59 29.1	90 46 07.2	Feet.
Mount Sterling, on west side of, on Quincy road; crossroads.	39 59 15.6	90 46 24.0	1,889
T. 1 S., R. 3 W., corner of secs. 7, 8, 17, and 18; center of east and west road at north and south fences.	39 53 15.7	90 46 40.7	1,300
Wabash R. R.; public road crossing.	39 59 15.8	90 46 55.5	1,150
T. 1 S., R. 3 W., west corner of secs. 7 and 18 (40 feet north of above corner is east corner of secs. 12 and 13, T. 1 S., R. 4 W., crossroads north and south).	39 59 16.2	90 47 48.4	4,120
T. 1 S., R. 4 W., center of sec. 12; T road forks.	39 59 43.5	90 48 24.1	3,918
T. 1 S., R. 4 W., center of sec. 11; public crossroads at school-house.	39 59 44.1	90 49 32.6	5,330
T. 1 S., R. 4 W., center of sec. 10; T road north.	39 59 43.8	90 50 41.6	5,370
T. 1 S., R. 4 W., at quarter corner between secs. 8 and 9; T road east.	39 59 44.4	90 52 24.9	8,039

Magnetic declination for north border of quadrangle, 5° 31' E.

## QUINCY QUADRANGLE.

Along Chicago, Burlington &amp; Quincy R. R. in northern part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 1 S., R. 8 W., on line between secs. 11 and 14; crossing of east and west road.	39 59 35.1	91 17 49.0	Feet.
T. 1 S., R. 8 W., crossing of north and south road between secs. 14 and 15.	39 59 25.5	91 18 02.6	1,436
Eubanks siding; center of railroad track opposite switch stand at east end of.	39 58 59.8	91 18 39.2	3,835
T. 1 S., R. 8 W., corner of secs. 15, 16, 21, and 22; T road north.	39 58 42.5	91 19 10.8	3,014
Eubanks, west end of siding near; center of tracks opposite switch stand.	39 58 14.8	91 19 36.8	3,460
T. 1 S., R. 8 W., corner of secs. 19, 20, 29, and 30; T road north.	39 57 52.1	91 21 28.2	8,972
T. 1 S., R. 8 W., center of sec. 30; east and west road crossing.	39 57 26.4	91 22 03.1	3,770
T. 1 S., R. 8 and 9 W., on line between secs. 25 and 30; north and south road crossing.	39 57 20.4	91 22 38.6	2,824
Quincy; center of intersection of North Seventh Street and Elm Street.	39 56 26.5	91 24 16.7	9,336
Quincy; center of tower on courthouse.	39 56 06.57	91 24 26.77	2,166

Magnetic declination near Quincy, 6° 32' E.

## RUSHVILLE QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 1 N. and 1 S., R. 1 W., near quarter corner of secs. 3 and 34, 66 feet east of north and south road on west side of levee, on top of levee, in line with road west, on township line; iron post stamped "Prim. Trav. Sta. No. 10, 1914, Illinois".	40 00 40.2	90 30 05.0	Feet.
T road corners, roads north, south, and west.	40 01 14.0	90 30 08.7	3,436
Drainage canal; center pier of double span truss bridge.	40 01 42.7	90 30 08.8	2,907
T. 1 N., R. 1 W., quarter corner between secs. 22 and 27; a stone 390 feet north of crossroads, 26 feet east of road.	40 02 32.7	90 30 05.2	5,072
T road corners, roads east, west, and north.	40 02 58.0	90 30 14.6	2,662
T. 1 N., R. 1 W., stone at quarter corner between secs. 3 and 34; road east on township line, road north 25 feet west of stone.	40 06 06.7	90 30 01.2	2,931

**RUSHVILLE QUADRANGLE—Continued.****Along highways near east border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 2 N., R. 1 W., quarter corner between secs. 27 and 34; center of north and south road at fence west.....	• ' "	• ' "	
T. 2 N., R. 1 W., near center of sec. 27, 40 feet south of center of east and west road, 20 feet east of road south, about in line with road north, 10 feet south of corner fence post; iron post stamped "Prim. Trav. Sta. No. 11, 1914, Illinois".....	40 06 59.8	90 30 00.6	Feet. 5,371
T. 2 N., R. 1 W., quarter corner between secs. 22 and 27; T road south.....	40 07 25.8	90 30 00.3	2,632
T. 2 N., R. 1 W., quarter corner between secs. 22 and 27; T road south.....	40 07 52.6	90 30 00.0	2,710
T. 2 N., R. 1 W., quarter corner between secs. 21 and 22; roads east and north.....	40 08 19.4	90 30 33.9	3,779
T. 2 N., R. 1 W., corner of secs. 15, 16, 21, and 22; T road west.....	40 08 46.0	90 30 33.8	2,695
T. 2 N., R. 1 W., quarter corner between secs. 15 and 16; crossroads.....	40 09 12.4	90 30 33.7	2,640
T. 2 N., R. 1 W., on line between secs. 9 and 10; T road west.....	40 09 51.7	90 30 33.4	3,970

**Along highways through center of quadrangle.**

T. 2 N., R. 1 W., center of sec. 28; crossroads.....	40 07 26.6	90 31 08.6	.....
T. 2 N., R. 1 W., quarter corner between secs. 28 and 29.....	40 07 26.8	90 31 42.5	2,630
Iron bridge; center of.....	40 07 23.1	90 32 07.3	1,955
Rushville, street intersection; Presbyterian Church on southwest corner.....	40 07 26.1	90 33 43.8	7,501
Rushville station, 600 feet north of; road north.....	40 07 33.7	90 34 08.6	2,073
T road west.....	40 08 00.9	90 34 42.6	3,814
T. 2 N., R. 2 W., corner of secs. 13, 14, 23, and 24; T road south.....	40 08 47.5	90 35 07.3	5,089
T. 2 N., R. 2 W., quarter corner between secs. 14 and 23; crossroads.....	40 08 47.5	90 35 41.8	2,680
T. 2 N., R. 2 W., quarter corner between secs. 15 and 22; T road south.....	40 08 48.0	90 36 49.5	5,325
T. 2 N., R. 2 W., 35 feet east and 30 feet south of crossroads at corner of secs. 15, 16, 21, and 22, 2 feet north of fence line; iron post stamped "Prim. Trav. Sta. No. 12, 1914, Illinois".....	40 08 48.0	90 37 23.7	2,580
T. 2 N., R. 2 W., on line between secs. 20 and 21; T road south.....	40 08 39.2	90 38 32.2	5,383
T. 2 N., R. 2 W., in sec. 20; T road east.....	40 08 33.1	90 39 06.6	2,744
T. 2 N., R. 2 W.; T road north.....	40 08 13.6	90 41 22.9	10,765
Crooked Creek; center of iron truss bridge over.....	40 08 03.8	90 41 53.2	2,546
T. 2 N., R. 3 W., stone at quarter corner between secs. 23 and 26; roads south and west.....	40 08 00.7	90 42 32.5	3,070
T. 2 N., R. 3 W., stone at corner of secs. 22, 23, 26, and 27; T road east.....	40 08 01.2	90 43 07.2	2,694
Mabel store; T road west at.....	40 08 23.2	90 43 40.5	3,407
Mabel store, about 0.4 mile west of; T road south.....	40 08 27.2	90 44 06.1	2,024
Mabel store, about 0.7 mile west of; T road north.....	40 08 28.2	90 44 26.3	1,567

Magnetic declination for north border of quadrangle,  $5^{\circ} 37' E.$ ; for south border,  $5^{\circ} 27' E.$ ; for east border,  $5^{\circ} 25' E.$ ; for west border,  $5^{\circ} 28' E.$ ; for center,  $5^{\circ} 34' E.$

**VERMONT QUADRANGLE.****On highway near southwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 3 N., R. 1 W., in center of sec. 11; crossroads.....	• ' "	• ' "	Feet.
T. 3 N., R. 1 W., quarter corner between secs. 10 and 11, 95 feet north and 18 feet east of, on east side of north-south road; iron post stamped "Prim. Trav. Sta. No. 48, Ill., 1911".....	40 15 17.5	90 28 46.0	.....
	40 15 19.4	90 29 22.2	2,812

**Good Hope, La Harpe, Lomax, Monmouth, and Oquawka quadrangles.****HANCOCK, HENDERSON, McDONOUGH, AND WARREN COUNTIES.**

The following geographic positions upon North American datum were determined by E. L. McNair in 1914. They are based on positions given in Bulletins 496 and 551.

**GOOD HOPE QUADRANGLE.****Along highways through center of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 1 W., 30 feet north and 30 feet west of center of crossroads, at corner secs. 3, 4, 9, and 10, in corner of schoolhouse yard, 6 feet north of corner fence post; iron post stamped "Prim. Trav. Sta. No. 16, 1912"	* * "	* * "	Fed.
T. 7 N., R. 1 W., corner secs. 4, 5, 8, and 9; center of crossroads	40 36 54.4	90 30 13.0	-----
T. 7 N., R. 1 W., at center of T road south; north corner secs. 4 and 5 (55 feet west to south corner secs. 32 and 33, T. 8 N., R. 1 W., T road north)	40 36 55.9	90 31 21.0	5,247
T. 7 N., R. 1 W., north corner secs. 5 and 6; at T road south (110 feet west is south corner secs. 31 and 32, T. 8 N., R. 1 W., at hedge north)	40 37 47.1	90 31 20.3	5,180
Tps. 7 and 8 N., Rs. 1 and 2 W., corner secs. 1, 6, 31, and 36; crossroads on Warren-McDonough county line	40 37 48.6	90 32 28.9	5,299
T. 7 N., R. 2 W., north corner secs. 1 and 2, at T road south, 170 feet east of south corner secs. 35 and 36, T. 8 N., R. 2 W.	40 37 50.2	90 33 35.9	5,170
T. 8 N., R. 2 W., south corner secs. 34 and 35, on Warren-McDonough county line, at north-south fence; center of east-west road	40 37 51.2	90 34 42.9	5,170
T. 7 N., R. 2 W., north corner secs. 3 and 4; at T road south (200 feet west to south corner secs. 33 and 34, T. 8 N., R. 2 W., T road north)	40 37 51.9	90 35 54.9	5,551
T. 8 N., R. 2 W., 15 feet north and 35 feet west of T road corners, apparently at south corner secs. 32 and 33, 15 feet west of corner fence post and 2 feet south of fence line; iron post stamped "Prim. Trav. Sta. No. 1, 1914, Ill."	40 37 52.5	90 37 02.0	5,171
T. 7 N., R. 2 W., at apparent north corner secs. 5 and 6; stone at T road south	40 37 53.4	90 38 14.8	5,630
T. 7 N., 1s. 2 and 3 W., north corner secs. 1 and 6; T road south (70 feet west of this point is T road north, at south corner secs. 31 and 36, T. 8 N., 1s. 2 and 3 W.)	40 37 53.6	90 39 20.6	5,070
T. 7 N., R. 3 W., at north corner secs. 1 and 2; T road south (240 feet west of this point is south corner secs. 35 and 36, T. 8 N., R. 3 W., T road north)	40 37 53.9	90 40 22.4	4,760
T. 7 N., R. 3 W., north corner secs. 2 and 3; T road south (140 feet west is south corner secs. 34 and 35, T. 8 N., R. 3 W., at T road north)	40 37 56.3	90 41 31.5	5,334
T. 8 N., R. 3 W., at T road north, south corner secs. 33 and 34	40 37 58.5	90 42 41.0	5,365
	40 38 00.8	90 43 53.8	5,620

**Along highways near north border of quadrangle.**

T. 9 N., Rs. 2 and 3 W., corner secs. 19, 30, 24, and 25; T road corners east-west-north	40 44 43.2	90 33 29.2	-----
T. 9 N., R. 2 W., approximately corner secs. 23, 24, 25, and 26, is 50 feet south of road and in line with hedge north	40 44 44.9	90 34 38.7	5,350
T. 9 N., R. 2 W., quarter corner secs. 23 and 26; crossroads	40 44 45.6	90 35 13.3	2,669
T. 9 N., R. 2 W., corner secs. 22, 23, 26, and 27; at north-south hedge row	40 44 46.2	90 35 47.9	2,664
T. 9 N., R. 2 W., corner secs. 21, 22, 27, and 28; T road east	40 44 47.8	90 36 56.4	5,268

**Along highways near west border of quadrangle.**

T. 6 N., R. 3 W., near middle sec. 4; T road south	40 32 16.7	90 44 34.6	-----
T road corners east-west-north	40 31 22.3	90 44 17.2	5,663
T road corners east-west-south	40 31 23.2	90 44 48.3	2,400
T. 6 N., R. 3 W., approximately quarter corner secs. 9 and 16; T road south	40 30 56.0	90 44 36.6	2,892
T. 6 N., R. 3 W., 30 feet north by 15 feet east of quarter corner between secs. 18 and 21, 35 feet northeast of intersection of crossroads, inside front yard; iron post stamped "Prim. Trav. Sta. No. 47, 1910, Illinois"	40 30 02.67	90 44 32.21	5,398

Magnetic declination for north border of quadrangle,  $5^{\circ} 33' E.$ ; for south border,  $5^{\circ} 36' E.$ ; for east border,  $5^{\circ} 34' E.$ ; for west border,  $5^{\circ} 40' E.$ ; for center,  $5^{\circ} 44' E.$

## LA HARPE QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 9 N., R. 4 W., quarter corner secs. 26 and 27; crossroads.....	40 44 29.4	90 49 37.6	
T. 9 N., R. 4 W., corner secs. 21, 22, 27, and 28; T road west.....	40 44 55.8	90 50 46.5	5,946
T. 9 N., R. 4 W., corner secs. 20, 21, 28, and 29; crossroads.....	40 44 56.9	90 51 55.4	5,300
T. 9 N., R. 4 W., 3,069 feet west of corner secs. 20, 21, 28, and 29, 400 feet east of farmhouse on south side of road, 20 feet north of center of road, close to hedge fence; iron post stamped "Prim. Trav. Sta. No. 5, 1914, Illinois".....	40 44 57.0	90 52 35.2	3,069
T. 9 N., R. 4 W., corner secs. 19, 20, 29, and 30; T road south.....	40 44 56.7	90 53 04.7	2,269
T. 9 N., R. 5 W., east corner secs. 24 and 25, 900 feet from Stronghurst station, 330 feet south of public road crossing Santa Fe Ry.; T road west.....	40 44 57.4	90 54 13.5	5,292
Crossroads.....	40 44 57.3	90 54 48.3	2,675
T. 9 N., R. 5 W., near corner secs. 23, 24, 25, and 26; small bridge over stream.....	40 44 57.3	90 55 21.9	2,590
T. 9 N., R. 5 W., corner secs. 22, 23, 26, and 27; private lane south and T road north.....	40 44 57.9	90 56 32.0	5,390
T. 9 N., R. 5 W., quarter corner between secs. 22 and 27; T road south.....	40 44 58.0	90 57 06.1	2,625
T. 9 N., R. 5 W., corner secs. 21, 22, 27, and 28; crossroads.....	40 44 58.0	90 57 39.9	2,605
T. 9 N., R. 5 W., corner secs. 20, 21, 28, and 29; crossroads.....	40 44 58.8	90 58 49.2	5,330
T. 9 N., R. 5 W., corner secs. 19, 20, 29, and 30; center of east-west road at hedge fence north-south.....	40 44 59.2	90 59 57.9	5,285
T. 9 N., R. 5 W., about 0.25 mile east of corner secs. 29, 30, 31, and 32; center of east-west road at T road south.....	40 44 06.9	90 59 40.4	
Tps. 8 and 9 N., at right angle turn in road, west of T road north, near quarter corner on south side sec. 32.....	40 43 14.4	90 59 24.6	5,448

## Along highways near west border of quadrangle.

T. 8 N., R. 5 W., quarter corner between secs. 5 and 8; center of north-south road.....	40 42 38.1	90 59 25.9	
T road forks, north-south-west.....	40 42 11.2	90 59 26.0	2,720
T. 8 N., R. 5 W., apparent quarter corner between secs. 8 and 17; turn in road north and east.....	40 41 44.8	90 59 26.2	2,677
T. 8 N., R. 5 W., corner secs. 16, 17, 20, and 21; road crossing.....	40 40 52.7	90 58 51.1	5,919
T. 8 N., R. 5 W., corner secs. 20, 21, 28, and 29; public road crossing at Terre Haute.....	40 39 58.8	90 58 51.7	5,460

## Along highways near east border of quadrangle.

T. 9 N., R. 4 W., quarter corner between secs. 20 and 29, at center of north-south road, lane west, fence east.....	40 44 53.4	90 45 35.2	
T. 9 N., R. 4 W., quarter corner between secs. 29 and 32, at public crossroads.....	40 44 01.3	90 45 36.2	5,271
T. 8 N., R. 4 W., quarter corner north side sec. 5; T road south (east-west road is on line between Tps. 8 and 9 N.).....	40 43 08.8	90 45 33.6	5,308
T. 8 N., R. 4 W., quarter corner between secs. 5 and 8; public crossroads.....	40 42 26.8	90 45 34.1	4,250
T. 8 N., R. 4 W., quarter corner between secs. 8 and 17; T road north.....	40 41 34.4	90 45 35.2	5,290
T. 8 N., R. 4 W., corner secs. 16, 17, 20, and 21; T road south.....	40 40 41.0	90 45 00.3	6,036
T. 8 N., R. 4 W., corner secs. 20, 21, 28, and 29, 50 feet south of T road east; small stone in center of north-south road at T road west.....	40 39 48.2	90 45 00.7	5,335
T. 8 N., R. 4 W., corner secs. 28, 29, 32, and 33; road crossing.....	40 38 55.3	90 45 01.5	5,345
T. 7 N., R. 3 W., at north corner secs. 4 and 5, and 50 feet east of corner secs. 32 and 33, at north side of road east and in line with road south; iron post stamped "Prim. Trav. Sta. No. 2, 1914, Ill.".....	40 38 03.7	90 45 01.8	5,214
T. 7 N., R. 3 W., corner secs. 4, 5, 8, and 9; crossroads.....	40 37 04.6	90 45 03.3	5,991
T. 7 N., R. 3 W., corner secs. 8, 9, 16, and 17; crossroads.....	40 36 12.0	90 45 04.6	5,320
T. 7 N., R. 3 W., corner secs. 16, 17, 20, and 21; crossroads.....	40 35 19.5	90 45 05.5	5,311
T. 7 N., R. 3 W., corner secs. 20, 21, 28, and 29; crossroads.....	40 34 26.8	90 45 05.7	5,330
T. 7 N., R. 3 W., corner secs. 28, 29, 32, and 33; crossing of Toledo, Peoria & Western Ry. at Scioto.....	40 33 33.9	90 45 06.1	5,356
T. 7 N., R. 3 W., quarter corner between secs. 32 and 33; crossroads.....	40 33 07.5	90 45 06.4	2,670
T. 7 N., R. 3 W., south corner secs. 32 and 33; stone in wire-fence line.....	40 32 41.2	90 45 07.2	2,659

## LA HARPE QUADRANGLE—Continued.

## Along highways through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 5 W., T road south at north corner secs. 4 and 5, stone on north side east-west road, and 190 feet west of south corner secs. 32 and 33, T. 8 N., R. 5 W.; stone at road north.....	* * "	* * "	Feet.
T. 7 N., R. 5 W., north corner secs. 3 and 4; T road south.....	40 38 11.4	90 58 55.2	5,363
T. 7 N., R. 5 W., north corner secs. 2 and 3, center of east-west road at hedge line south, and 250 feet west of T road north, on south side secs. 34 and 35, T. 8 N., R. 5 W.....	40 38 14.0	90 57 45.7	
T. 7 N., R. 5 W., north corner secs. 1 and 2; T road south, 130 feet west of T road north, at south corner secs. 35 and 36, T. 8 N., R. 5 W.....	40 38 15.5	90 56 36.2	5,353
Tps. 7 and 8 N., Rs. 4 and 5 W., corner Henderson, Hancock, and McDonough counties, at T road south.....	40 38 15.9	90 55 25.3	5,465
Tps. 7 and 8 N., R. 4 W., 25 feet north of T road south, at north corner secs. 5 and 6, 3 feet from hedge fence, 250 feet east of road north; iron post stamped "Prim. Trav. Sta. No. 8, 1914, Illinois".....	40 38 21.4	90 54 14.8	5,466
T. 7 N., R. 4 W., T road south at north corner secs. 4 and 5, is 100 feet west of T road north at south corner secs. 32 and 33, T. 8 N., R. 4 W.; stone in center of east-west road.....	40 38 19.0	90 53 04.9	5,392
T. 8 N., R. 4 W., south corner secs. 33 and 34; T road north (30 feet east of this point is T road south at north corner secs. 3 and 4, T. 7 N., R. 4 W.).....	40 38 16.7	90 51 57.2	5,224
Tps. 7 and 8 N., R. 4 W., apparent quarter corner secs. 3 and 34; crossroads.....	40 38 15.0	90 50 48.8	5,274
Tps. 7 and 8 N., R. 4 W., approximately corner secs. 2, 3, 34, and 35; crossroads.....	40 38 14.1	90 50 14.2	2,673
Tps. 7 and 8 N., R. 4 W., apparent corner secs. 1, 2, 35, and 36; crossroads.....	40 38 13.6	90 49 39.0	2,706
Tps. 7 and 8 N., Rs. 3 and 4 W., corner of Henderson, McDonough, and Warren counties.....	40 38 11.3	90 48 30.6	5,279
T. 8 N., R. 3 W., south corner secs. 31 and 32; T road north (165 feet west of this point is T road south at north corner secs. 5 and 6, T. 7 N., R. 3 W.).....	40 38 08.9	90 47 22.4	5,260
	40 38 06.3	90 46 12.0	5,435

Magnetic declination for north border of quadrangle,  $4^{\circ} 49' E.$ ; for south border,  $5^{\circ} 29' E.$ ; for east border,  $5^{\circ} 40' E.$ ; for west border,  $5^{\circ} 40' E.$ ; for center,  $5^{\circ} 33' E.$

## LOMAX QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 9 N., R. 5 W., quarter corner secs. 19 and 30, at right angle in road.....	* * "	* * "	Feet.
T. 9 N., R. 5 W., about 0.5 mile south of quarter corner secs. 19 and 30, 25 feet north of center of east-west road, 95 feet south of small iron bridge; iron post stamped "Prim. Trav. Sta. No. 6, 1914, Illinois".....	40 44 59.1	91 00 32.2	
Carman triangulation station, Mississippi River Commission.....	40 44 33.0	91 00 32.0	2,636
	40 43 31.34	91 01 01.93	

## Along highways near east border of quadrangle.

T. 8 N., R. 5 W., near corner secs. 19, 20, 29, 30, center of road west, at north-south hedge on section line; road east is about 50 feet north of above.....	40 39 57.2	91 00 02.6	
T. 8 N., R. 5 W., quarter corner between secs. 19 and 30; T road south.....	40 39 57.4	91 00 37.6	2,698
Dugout Creek; center of iron truss bridge over.....	40 39 13.8	91 00 37.7	4,410
T. 8 N., R. 5 W., near quarter corner secs. 30 and 31, at top of hill; T road forks.....	40 38 59.4	91 00 37.9	1,450
T. 8 N., Rs. 5 and 6 W., on line between secs. 31 and 36; T road south.....	40 38 58.7	91 01 19.8	3,234
Tps. 7 and 8 N., Rs. 5 and 6 W., 20 feet south and 25 feet east of crossroads, near corner fence post; iron post stamped "Prim. Trav. Sta. No. 7, 1914, Illinois".....	40 38 05.8	91 01 19.4	5,355
T. 7 N., R. 5 W., north corner secs. 5 and 6; stone in east-west road at hedge south (75 feet east of fence line north).....	40 38 09.2	91 00 04.4	5,791
Disco, north side of; railroad crossing.....	40 37 18.4	91 01 19.4	
Disco, at intersection of main public crossroads, corner secs. 1, 6, 7, and 12, T. 7 N., Rs. 5 and 6 W.....	40 37 13.1	91 01 19.2	535

**LOMAX QUADRANGLE**—Continued.

Along highways near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 6 W., east corner secs. 12 and 13; T road west (60 feet south of this point is west corner secs. 7 and 18, at road east).....	° ' "	° ' "	
T. 7 N., R. 6 W., east corner secs. 13 and 24; fence line west (70 feet south of this point is west corner secs. 18 and 19, T. 7 N., R. 5 W., fence line east).....	40 36 20.1	91 01 19.3	5,360
Center of east-west road, at T road north.....	50 35 27.2	91 01 19.9	5,350
T road forks east-west-north, center of.....	40 34 49.4	91 01 20.1	3,830
T. 7 N., R. 5 and 6 W., quarter corner secs. 25 and 30; T road east (road north only goes about 300 feet to house).....	40 34 08.1	91 01 01.0	4,425
T. 7 N., Rs. 5 and 6 W., corner secs. 25, 30, 31, and 36; T road west.....	40 34 07.6	91 01 20.1	1,480
Tps. 6 and 7 N., Rs. 5 and 6 W.; T road forks east-west-north.....	40 33 40.9	91 01 20.3	2,710
T road forks east-west-south.....	40 32 47.4	91 01 20.6	5,411
La Cross station, at center of Toledo, Peoria & Western R. R. tracks.....	40 32 48.2	91 01 01.0	1,510
T. 6 N., Rs. 5 and 6 W., corner secs. 7, 12, 13, and 18; T road west.....	40 31 41.6	91 01 22.5	6,937
T. 6 N., Rs. 5 and 6 W., 30 feet northwest of quarter corner between secs. 13 and 18, northwest corner of crossroads, at corner of front yard; iron post stamped "Prim. Trav. Sta. No. 49, 1910, Illinois".....	40 31 01.5	91 01 23.3	4,060
	40 30 35.70	91 01 23.90	2,613

Magnetic declination for north border of quadrangle,  $4^{\circ} 35'$  E.; for east border,  $5^{\circ} 40'$  E.

**MONMOUTH QUADRANGLE.**

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 9 N., R. 1 W., corner secs. 16, 17, 20, and 21, at right angle in road. Iron bridge over creek, center of.....	° ' "	° ' "	
T road corners, roads north-south-east.....	40 45 36.4	90 31 13.3	
T. 9 N., R. 2 W., 30 feet north and 25 feet east of crossroads at corner secs. 15, 16, 21, and 22, near schoolhouse; iron post stamped "Prim. Trav. Sta. No. 3, 1914, Illinois".....	40 45 28.5	90 31 40.5	2,243
T. 9 N., R. 2 W., corner secs. 17, 18, 19, and 20, hedge row north-south, lane southwest to house.....	40 45 22.8	90 33 28.4	8,322
T. 9 N., R. 2 W., quarter corner secs. 18 and 19; crossroads.....	40 45 40.5	90 36 55.0	
T. 9 N., R. 2 W., corner secs. 17, 18, 19, and 20, hedge row north-south, center of east-west road.....	40 45 41.0	90 38 04.1	5,320
T. 9 N., R. 2 W., quarter corner secs. 18 and 19; crossroads.....	40 45 41.0	90 39 13.8	5,360
T. 9 N., R. 2 W., quarter corner secs. 18 and 19; crossroads.....	40 45 41.6	90 39 47.8	2,620
T. 9 N., R. 3 W., corner secs. 13, 14, 23, and 24; road crossing.....	40 45 42.3	90 40 24.4	2,819
T. 9 N., R. 3 W., corner secs. 14, 15, 22, and 23; road crossing.....	40 45 43.3	90 41 33.2	5,291
T. 9 N., R. 3 W., corner secs. 15 and 22; road crossing.....	40 45 44.9	90 42 42.1	5,310
T. 9 N., R. 3 W., corner secs. 15, 16, 21, and 22, road crossing.....	40 45 45.1	90 43 10.6	2,650
T. 9 N., R. 3 W., corner secs. 15, 16, 21, and 22, road crossing.....	40 45 45.2	90 43 51.2	2,660

Magnetic declination for south border of quadrangle,  $5^{\circ} 33'$  E

**OQUAWKA QUADRANGLE.**

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 9 N., R. 3 W., corner secs. 16, 17, 20, and 21; T road south.....	° ' "	° ' "	
T. 9 N., R. 3 W., quarter corner secs. 17 and 20, 40 feet east and 30 feet south of crossroads; iron post stamped "Prim. Trav. Sta. No. 4, 1914, Illinois".....	40 45 45.6	90 45 00.0	
T. 9 N., R. 3 W., corner secs. 17, 18, 19, and 20; road crossing.....	40 45 45.9	90 45 34.2	2,627
T. 9 N., R. 3 W., quarter corner secs. 18 and 19; center road crossing.....	40 45 46.4	90 46 09.1	2,690
T. 9 N., R. 3 W., west corner secs. 18 and 19, right angle turn in road, on line between Henderson and Warren counties.....	40 45 46.8	90 46 44.1	2,690
T. 9 N., R. 4 W., quarter corner secs. 23 and 24; T road south.....	40 45 46.9	90 47 18.5	2,650
T. 9 N., R. 4 W., quarter corner secs. 22 and 23; T road south.....	40 45 21.8	90 48 28.0	5,917
T. 9 N., R. 4 W., quarter corner secs. 22 and 23; T road south.....	40 45 21.8	90 49 37.3	5,330

Magnetic declination for south border of quadrangle,  $4^{\circ} 49'$  E.

62510°—Bull. 644—17—16

**Birds, Merom, and Vincennes quadrangles.****CRAWFORD AND LAWRENCE COUNTIES.**

The following geographic positions on North American datum were determined by primary traverse by C. B. Kendall, in 1913. Beginning with adjusted position at Robinson the line follows public roads via Palestine to Riverton, Ind., and is tied to the United States Coast and Geodetic Survey triangulation station Merom and also to the United States Corps of Engineers bench mark No. 32 at Riverton.

A line was also run which begins at United States Coast and Geodetic Survey astronomic station at Vincennes, follows public roads north to center of Birds quadrangle at Canaan Church, thence west, and is tied to the United States Coast and Geodetic Survey station Honey Creek.

**BIRDS QUADRANGLE.****Along public roads.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 4 N., R. 10 W., corner secs. 19, 20, 29, 30, public T road east at, 5 feet west to corner fence, 40 feet northeast to southwest corner of house.	* * "	* * "	Fct.
T. 4 N., R. 10 W., quarter corner between secs. 19 and 20, public T road north, 15 feet north to center of triangle.	38 45 44.1	87 33 25.1	2,726
T. 4 N., R. 10 W., corner secs. 17, 18, 19, and 20, public T road west.	38 46 11.0	87 33 27.0	2,643
T. 4 N., R. 10 W., quarter corner between secs. 17 and 18, second-class T road east, 5 feet east to center of triangle.	38 46 37.6	87 33 26.3	2,679
T. 4 N., R. 10 W., corner secs. 7, 8, 17, and 18, center of north-south road at east and west fences.	38 47 04.1	87 33 26.0	2,800
T. 4 N., R. 10 W., quarter corner between secs. 7 and 8, at T road east.	38 47 30.8	87 33 26.7	2,720
T. 4 N., R. 10 W., corner secs. 5, 6, 7, and 8, at 90° bend in road to west, 890 feet north of public T road east.	38 47 57.7	87 33 27.1	2,720
T. 4 N., R. 10 W., corner secs. 5, 6, 7, and 8, 2,920 feet west of; public T road north.	38 48 25.0	87 33 27.6	2,761
T. 4 N., Rs. 10-11 W., stone at west corner secs. 6 and 7; stone is in east-west road 20 feet west of public T road south.	38 48 25.1	87 34 17.2	3,920
T. 4 N., Rs. 10-11 W., stone at west corner secs. 6 and 7, 4,030 feet north of; Union Schoolhouse, 1.3 miles south of; 3-cornered public T road west, 10 feet west to center of triangle.	38 48 25.0	87 34 32.8	1,240
Union schoolhouse, 1 mile south of: three-corners public T road east.	38 49 04.9	87 34 32.8	4,034
Union schoolhouse, 0.5 mile south of; three-corners public T road east, 20 feet to culvert.	38 49 22.7	87 34 32.8	1,800
Union schoolhouse, public T road west at.	38 49 49.7	87 34 32.5	2,730
Union schoolhouse, 1 mile north of, T. 5 N., Rs. 10 and 11 W., east corner secs. 24 and 25, on line between Crawford and Lawrence counties, at picket fence west of southeast corner of an oak grove and 1,370 feet north of a public T road west.	38 50 12.3	87 34 32.9	2,200
NOTE.—200 feet north of the above is T. 5 N., Rs. 10 and 11 W., west corner secs. 19 and 30, and is also line between Crawford and Lawrence counties at wire fence nearly opposite the northeast corner of oak grove.	38 51 06.3	87 34 32.4	5,461
Canaan Church, public crossroads, 15 feet southwest to two mail boxes, 15 feet north to box drain.	38 51 46.7	87 34 32.0	4,000
NOTE.—1,280 feet north of the above is T. 5 N., Rs. 10 and 11 W., east corner secs. 13 and 24, at wire fence west, 200 feet north of this corner is the west corner secs. 18 and 19, at wire fence east.	38 51 46.6	87 35 39.9	5,370
Canaan Church, 1 mile west of, public T road north on line between secs. 13 and 14. T. 5 N., R. 11 W.	38 51 46.6	87 35 39.9	5,370
T. 5 N., R. 11 W., corner secs. 14, 15, 22, and 23, 35 feet north of; in the northwest corner of the Higgins schoolhouse yard, 35 feet east of center of north-south road opposite and in line with center of public T road west; iron post stamped "Prim. Trav. Sta. No. 12, 1913, Illinois".	38 52 00.0	87 36 48.1	5,560
T. 5 N., R. 11 W., stone corner secs. 15, 16, 21, and 22, public T road south.	38 52 00.2	87 37 56.1	5,380
T. 5 N., R. 11 W., quarter corner between secs. 16 and 21, 560 feet south of; public T road west.	38 51 55.0	87 38 30.2	2,750
T. 5 N., R. 11 W., corner secs. 16, 17, 20, and 21, at corner of wire fence, 50 feet northwest of the northwest corner of schoolhouse...	38 52 00.7	87 39 04.1	2,738

## BIRDS QUADRANGLE—Continued.

## Along public roads—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 5 N., R. 11 W., quarter corner between secs. 17 and 20, at public crossroads.....	* * "	* * "	Feet.
Flat Rock, 2.25 miles south of; east-west public road crossing Big Four R. R., center of track at.....	38 52 00.6	87 39 38.4	2,717
T. 5 N., R. 11 W., west corner secs. 18 and 19, at public T road east, 240 feet north of bridge over Sugar Creek.....	38 52 00.8	87 40 10.9	2,570
Note.—270 feet south of the above is T. 5 N., R. 12 W., east corner secs. 13 and 24, corner is in creek about 50 feet east of center of north-south road at T road west, 40 feet south of center of iron bridge over Sugar Creek.	38 52 01.4	87 41 03.9	4,192
T. 5 N., R. 12 W., stone corner secs. 13, 14, 23, and 24, at public crossroads.....	38 51 56.9	87 42 11.9	5,405
T. 5 N., R. 12 W., corner secs. 22, 23, 26, and 27; corner is about 10 feet west of oak tree, 15 feet north of a gate and 100 feet west of a 90° bend of road to north.....	38 51 55.3	87 43 18.4	5,263
T. 5 N., R. 12 W., center sec. 15 at public T road west.....	38 52 20.4	87 43 52.9	3,721
T. 5 N., R. 12 W., corner secs. 2, 3, 10, and 11, at fences north and south.....	38 53 41.0	87 43 19.4	8,581
Union Church, 1.2 miles south of, public T road west at tool house.	38 53 42.0	87 42 46.3	2,620
Union Church and schoolhouse, Tps. 5 and 6 N., R. 12 W., quarter corner between secs. 2 and 35, at public T road west.....	38 54 41.4	87 42 46.0	6,013
Honey Creek triangulation station, U. S. Coast and Geodetic Survey.....	38 55 28.78	87 42 36.78	4,849

Magnetic declination for east border of quadrangle,  $3^{\circ} 03' E.$ ; for center,  $3^{\circ} 14' E.$ ; for north border,  $3^{\circ} 07' E.$

## MEROM QUADRANGLE.

## Along public roads on south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Robinson, primary traverse station No. 13, 1907 (Bull. 440).....	* * "	* * "	Feet.
Robinson, Main Street crossing Big Four R. R., center of main track.....	39 00 18.2	87 44 21.6	-----
Robinson, 1.2 miles east of, second-class road northeast (may be old Indian grant line); center of main road.....	39 00 21.3	87 43 51.6	2,393
T. 7 N., R. 12 W., quarter corner between secs. 35 and 36; public T road south.....	39 00 21.9	87 43 01.0	3,900
T. 7 N., R. 11 and 12 W., quarter corner between secs. 31 and 36; public crossroads.....	39 00 28.5	87 42 13.1	3,837
T. 7 N., R. 11 and 12 W., quarter corner between secs. 31 and 32; public T road north, 15 feet north to center of triangle.....	39 00 29.2	87 41 05.0	5,379
T. 7 N., R. 11 W., quarter corner between secs. 31 and 32; public T road north, 15 feet north to center of triangle.....	39 00 28.8	87 40 04.3	4,790
T. 7 N., R. 11 W., quarter corner between secs. 32 and 33; center of east-west road at wire fence north at white house.....	39 00 27.7	87 38 57.3	5,290
T. 7 N., R. 11 W., center of sec. 33; public crossroads.....	39 00 27.0	87 38 23.4	2,680
T. 7 N., R. 11 W., quarter corner between secs. 33 and 34; center of east-west road opposite T fence south.....	39 00 26.5	87 37 49.6	2,670
Palestine, 800 feet northwest of pumping station; public T road north, center of east-west road at.....	39 00 26.2	87 37 33.0	1,310
Palestine, in the northwest corner of public-school grounds, 130 feet northwest of the northwest corner of school building, 40 feet south and 70 feet east of the intersection of Franklin and West Mainstreets; iron post stamped "Prim. Trav. Sta. No. 11, 1913, Illinois".....	39 00 23.2	87 37 16.6	1,326
Palestine, in the northwest corner of public-school grounds, 130 feet northwest of the northwest corner of school building, 40 feet south and 70 feet east of the intersection of Franklin and West Mainstreets; iron post stamped "Prim. Trav. Sta. No. 11, 1913, Illinois".....	39 00 13.3	87 36 44.9	2,695
T. 7 N., R. 11 W., quarter corner between secs. 35 and 36, at public T road north, 300 feet south of bridge over Super Creek.....	39 00 24.6	87 36 42.8	1,142
Palestine, 1 mile east of, west rail of Illinois Central R. R. at public east-west road crossing (530 feet east of the above is T. 7 N., R. 11 W., quarter corner between secs. 35 and 36).....	39 00 24.3	87 35 43.0	4,716
Riverton, 1 mile southwest of; center of Illinois Central R. R. over drainage ditch.....	39 00 54.3	87 34 58.3	4,654
Riverton, Illinois Central R. R. bridge over Wabash River; center of draw span.....	39 01 13.7	87 34 07.8	4,444
Riverton, U. S. Engineers iron bench mark No. 32.....	39 01 07.99	87 34 04.55	621

Magnetic declination for south border of quadrangle,  $3^{\circ} 07' E.$

## VINCENNES QUADRANGLE.

## Along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
Vincennes, Baltimore & Ohio R. R. crossing; First Street, center of main track at (Dup.)	38 41 04.2	87 31 32.3	.....
Vincennes, Wabash River bridge, 0.8 mile northwest of; three-corners public T road south	38 41 24.5	87 32 44.0	6,047
T. 3 N., R. 10 W., corner secs. 7, 8, 17, and 18, 1,620 feet south of; public T road north	38 41 54.3	87 33 20.5	4,181
T. 3 N., R. 10 W., corner secs. 7, 8, 17 and 18; T road west at, 460 feet south of railroad crossing	38 42 10.3	87 33 20.7	1,625
T. 3 N., R. 10 W., corner secs. 7, 8, 17, and 18, 480 feet north of; north and south road crossing Baltimore & Ohio Southwestern R. R.; center of track at	38 42 15.0	87 33 21.0	479
T. 3 N., R. 10 W., corner secs. 5, 6, 7, and 8; center of north-south road at small bridge and hedge east	38 43 03.9	87 33 21.2	4,942
T. 3 N., R. 10 W., north corner secs. 5 and 6, at 90° bend in road to west	38 43 58.6	87 33 21.6	5,540
NOTE.—300 feet west of the above is T. 4 N., R. 10 W., south corner secs. 31 and 32, at 90° bend of road to north.	38 44 51.8	87 33 25.2	5,384
T. 4 N., R. 10 W., corner secs. 29, 30, 31, and 32; crossroads at (Dup.)	38 45 44.1	87 33 25.1	5,296

Magnetic declination for northeast border of quadrangle, 3° 14' E.

## EARLVILLE, GENOA, KIRKLAND, PLANO, ROCHELLE, SHABBONA, AND SYCAMORE QUADRANGLES.

## DEKALB, LEE, AND OGLE COUNTIES.

The following geographic positions upon North American datum were determined by E. L. McNair in 1914. They are based on positions in this locality given in Bulletin 551.

## EARLVILLE QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 38 N., R. 2 E., about 0.25 mile south of corner secs. 21, 22, 27, and 28, 35 feet south and 25 feet east of center of road crossing, 8 feet west of corner hedges; iron post stamped "Prim. Trav. Sta. No. 4, 1912, Illinois" (new position)	41 44 32.9	88 59 58.4	Feet.
T. 38 N., R. 2 E., corner secs. 21, 22, 27, and 28; center of north-south road at fence east	41 44 46.5	88 59 59.2	1,377
T. 38 N., R. 2 E., corner secs. 23, 24, 25, and 26; T road east	41 44 47.5	88 57 38.8	.....
T. 38 N., R. 2 E., at east corner secs. 24 and 25; north-south road at road west of Dekalb-Lee county line (25 feet south of above is west corner secs. 19 and 30, T. 38 N., R. 3 E., center of north-south road, in line with road east and fence line west)	41 44 47.1	88 56 28.3	5,330
T. 38 N., R. 3 E., corner secs. 19, 20, 29, and 30; T road north	41 44 47.1	88 55 30.5	4,380
Chicago, Burlington & Quincy R. R. crossing at east rail	41 44 47.1	88 55 17.7	970
T. 38 N., R. 3 E., corner secs. 20, 21, 28, and 29; center of east-west road at fences north-south	41 44 47.3	88 54 20.8	4,320
Big Indian Creek; center of iron truss bridge	41 44 48.0	88 53 16.4	4,885
T. 38 N., R. 3 E., corner secs. 21, 22, 27, and 28; center of east-west road at private lane south; fence north	41 44 48.0	88 53 10.8	426
T. 38 N., R. 3 E., quarter corner between secs. 22 and 27; T road west at fence east	41 44 48.4	88 52 34.4	2,608
T. 38 N., R. 3 E., about 0.25 mile west of corner secs. 26, 27, 34, and 35, 30 feet south and 35 feet west of center of crossroads; 2 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 26, 1914, Illinois"	41 43 56.0	88 52 19.1	5,462
T. 38 N., R. 3 E., corner secs. 26, 27, 34, and 35; center of east-west road at fence lines north-south	41 43 56.4	88 52 01.5	1,339
Shabbona Grove, center of east-west road at T road south; under Chicago & North Western R. R. bridge	41 43 56.4	88 51 08.5	4,020
T. 38 N., R. 3 and 4 E., corner secs. 25, 36, 30, and 31; center of east-west road at north-south fences	41 43 56.5	88 49 41.3	6,610
T. 38 N., R. 4 E., quarter corner between secs. 30 and 31; T road north	41 43 56.6	88 49 17.7	1,795

**KARLVILLE QUADRANGLE—Continued.****Along highways near north border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 38 N., R. 4 E., corner secs. 29, 30, 31, and 32; center of east-west road at north-south fences.....	• • "	• • "	Feet.
Clinton schoolhouse, center of public crossroads at.....	41 43 56.5	88 48 42.7	2,655
T. 38 N., R. 4 E., corner secs. 28, 29, 32, and 33; center of east-west road at north-south fence lines.....	41 43 56.6	88 48 25.6	1,300
T. 38 N., R. 4 E., corner secs. 27, 28, 33, and 34; crossroads.....	41 43 56.8	88 47 33.1	3,980
T. 38 N., R. 4 E., corner secs. 26, 27, 34, and 35; center of east-west road at north-south fence.....	41 43 57.2	88 46 23.6	5,270
	41 43 57.6	88 45 13.7	5,305

Magnetic declination near north border of quadrangle,  $3^{\circ} 35'$  E.**GENOA QUADRANGLE.****On highway near southwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 41 N., R. 4 E., near center of sec. 26; 30 feet south and 40 feet east of crossroads, 750 feet north of Chicago & Great Western R. R. tracks; iron post stamped "Prim. Trav. Sta. No. 29, 1914, Illinois".....	• • "	• • "	Feet.
	42 00 06.7	88 44 23.6	.....

Magnetic declination near southwest corner of quadrangle,  $3^{\circ} 17'$  E.**KIRKLAND QUADRANGLE.****Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 41 N., R. 4 E., Chicago & Great Western R. R. crossing.....	• • "	• • "	Feet.
T. 41 N., R. 4 E., quarter corner between secs. 27 and 28; center of east-west road at north-south fences.....	42 00 06.7	88 45 14.4	.....
T. 41 N., R. 4 E., quarter corner between secs. 27 and 28, about 0.25 mile west of T road south.....	42 00 06.4	88 46 22.7	5,155
T. 41 N., R. 4 E., near center of sec. 28, 110 feet west of T road north; Illinois, Iowa & Minnesota R. R. crossing.....	42 00 06.3	88 46 40.4	1,335
T. 41 N., R. 4 E., quarter corner between secs. 28 and 29; center of east-west road at north-south fence line.....	42 00 06.2	88 46 55.5	1,140
T. 41 N., R. 4 E., quarter corner between secs. 29 and 30; center of east-west road at north-south fence line.....	42 00 06.1	88 47 32.9	2,825
T. 41 N., R. 3 E., quarter corner between secs. 25 and 30; center of public road crossing.....	42 00 05.8	88 48 43.2	5,305
T. 41 N., R. 3 E., quarter corner between secs. 25 and 24; at fence south and T road north.....	42 00 05.6	88 49 44.8	4,650
T. 41 N., R. 3 E.; crossroads at center of sec. 26.....	42 00 04.7	88 50 55.0	5,301
T. 41 N., R. 3 E., 25 feet north and 47 feet west of crossroads; in center of sec. 27, 17 feet west of corner fence post and 2 feet south of fence line; iron post stamped "Prim. Trav. Sta. No. 30, 1914, Illinois".....	42 00 04.4	88 51 29.9	2,630
T. 41 N., R. 3 E., center of road crossing at center of sec. 28.....	42 00 04.4	88 52 41.2	5,382
T. 41 N., R. 3 E., quarter corner between secs. 28 and 29; east-west road at north-south fence line.....	42 00 04.0	88 53 50.7	5,250
T. 41 N., R. 3 W., center of sec. 29; road crossing.....	42 00 03.7	88 54 25.8	2,650
T. 41 N., R. 3 E., center of sec. 30; T road east.....	42 00 03.6	88 55 01.1	2,660
T. 41 N., R. 3 E., quarter corner between secs. 19 and 30; T road west at fence east.....	42 00 03.4	88 56 11.6	5,320
T. 41 N., Rs. 2 and 3 E., corner secs. 24, 25, 19, and 30, on DeKalb-Ogle county line; center of east-west road at north-south fence line.....	42 00 29.4	88 56 11.7	2,635
T. 41 N., R. 2 E., corner secs. 23, 24, 25, and 26; center of cross-roads.....	42 00 29.3	88 56 30.0	1,380
T. 41 N., R. 2 E., corner secs. 22, 23, 26, and 27; stone at cross-roads.....	42 00 28.4	88 57 40.5	5,325
	42 00 27.5	88 58 50.6	5,290

Magnetic declination near south border of quadrangle,  $3^{\circ} 27'$  E.

## PLANO QUADRANGLE.

Along highways near northwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 38 N., R. 4 E., about 0.25 mile east of corner secs. 26, 27, 34, and 35, 25 feet south of center of east-west road, in line with road north, 30 feet west of center of road south, 3 feet north of fence corner; iron post stamped "Prim. Trav. Sta. No. 27, 1914, Illinois".	* * "	* * "	Feet.
T. 38 N., R. 4 E., 0.25 mile east of corner secs. 22, 23, 26, and 27; public road crossing.....	41 43 57.5	88 44 56.7	.....
	41 44 49.9	88 44 56.9	5,300

Magnetic declination near northwest corner of quadrangle,  $3^{\circ} 21' E.$ 

## ROCHELLE QUADRANGLE.

On highway near southeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 38 N., R. 2 E., corner secs. 15, 16, 21, and 22; center of crossroads at school and church buildings.....	* * "	* * "	Feet.
	41 45 39.4	89 00 00.4	.....

## SHABBYNA QUADRANGLE.

Along highways near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 38 N., R. 2 E., quarter corner between secs. 21 and 22; T road east.....	* * "	* * "	Feet.
T. 38 N., R. 2 E., corner secs. 14, 15, 22, and 23; T road north at fence line south.....	41 45 39.4	88 58 49.8	.....
T. 38 N., R. 2 E., corner secs. 13, 14, 23, and 24; center of crossroads.....	41 45 39.9	88 57 38.7	5,335

Along highways near east border of quadrangle.

T. 38 N., R. 4 E., corner secs. 14, 15, 22, and 23; T road north.....	41 45 42.0	88 45 14.4	.....
T. 38 N., R. 4 E., quarter corner between secs. 14 and 15; center of Chicago, Burlington & Quincy R. R. crossing (azimuth of railroad at above point is $260^{\circ} 21' 11''$ ).....	41 46 08.6	88 45 14.5	2,690
T. 38 N., R. 4 E., corner secs. 10, 11, 14, and 15; 1 mile east of Waterman; center of public crossroads.....	41 46 34.2	88 45 14.6	2,585
T. 38 N., R. 4 E., corner secs. 2, 3, 10, and 11; public crossroads.....	41 47 26.9	88 45 14.0	5,335
Tps. 38 and 39 N., R. 4 E., corner secs. 2, 3, 34, and 35; center of road crossing (10-foot jog in north-south fence line on each side of road).....	41 48 20.6	88 45 13.4	5,440
T. 39 N., R. 4 E., corner secs. 26, 27, 34, and 35; road crossing.....	41 49 13.0	88 45 13.2	5,300
T. 39 N., R. 4 E., corner secs. 22, 23, 26, and 27; T road west.....	41 50 05.2	88 45 13.5	5,290
T. 39 N., R. 4 E., corner secs. 14, 15, 22, and 23; crossroads.....	41 50 57.5	88 45 13.2	5,290
T. 39 N., R. 4 E., corner secs. 10, 11, 14, and 15; 25 feet east of center of north-south road at T road west; iron post stamped "Prim. Trav. Sta. No. 28, 1914, Illinois".....	41 51 49.8	88 45 12.5	5,296
T. 39 N., R. 4 E., corner secs. 2, 3, 10, and 11; center of crossroads.....	41 52 42.2	88 45 12.6	5,302
T. 40 N., R. 4 E., south corner secs. 34 and 35; center of east-west road in line with T road north (40 feet west of above is north corner secs. 2 and 3, T. 39 N., R. 4 E., at center of east-west road at T road south).....	41 53 34.6	88 45 11.8	5,305
Chicago & North Western R. R. crossing (azimuth of railroad at this point is $204^{\circ} 12' 46''$ ).....	41 53 59.2	88 45 11.5	2,480
T. 40 N., R. 4 E., corner secs. 26, 27, 34, and 35; center of crossroads.....	41 54 26.8	88 45 11.6	2,800

**SHABBONA QUADRANGLE—Continued.**  
**Along highways through center of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 39 N., R. 2 E., corner secs. 10, 11, 14, and 15; center of crossroads.	• / " 41 51 45.0	• / " 88 58 50.9	Feet.
T. 39 N., R. 2 E., corner secs. 11, 12, 13, and 14; center of crossroads.	41 51 45.3	88 57 39.7	5,390
T. 39 N., R. 2 E., east corner secs. 12 and 13; T road west on Lee-Dekalb county line (110 feet north of this point is west corner secs. 7 and 18, T. 39 N., R. 3 E., at T road east).	41 51 46.2	88 56 27.5	5,470
T. 39 N., R. 3 E., corner secs. 7, 8, 17, and 18; road crossing.....	41 51 47.3	88 55 29.2	4,409
T. 39 N., R. 3 E., corner secs. 8, 9, 16, and 17; crossroads.....	41 51 48.3	88 54 18.5	5,351
T. 39 N., R. 3 E., corner secs. 9, 10, 15, and 16; crossroads.....	41 51 48.7	88 53 09.9	5,195
T. 39 N., R. 3 E., 355 feet west and 23 feet north of center of crossroads at corner secs. 10, 11, 14, and 15, opposite house of Thomas Maley; iron post stamped "Prim. Trav. Sta. No. 31, 1914, Illinois".	41 51 48.1	88 52 05.0	4,915
T. 39 N., R. 3 E., corner secs. 11, 12, 13, and 14; road crossing.....	41 51 48.2	88 50 51.2	5,585
T. 39 N., R. 3 E., east corner secs. 12 and 13, at T road west (60 feet north of above corner is west corner secs. 7 and 18, T. 39 N., R. 4 E., T road east).	41 51 48.3	88 49 39.6	5,418
T. 39 N., R. 4 E., corner secs. 7, 8, 17, and 18; T road south.....	41 51 49.0	88 48 42.6	4,312
T. 39 N., R. 4 E., corner secs. 8, 9, 16, and 17; center of crossroads.	41 51 49.6	88 47 32.9	5,280
Eloa, center of Chicago & North Western R. R. tracks at.....	41 51 49.6	88 46 29.4	4,800
T. 39 N., R. 4 E., corner secs. 9, 10, 15, and 16; center of crossroads.	41 51 49.6	88 46 23.0	486

Magnetic declination near north border of quadrangle,  $3^{\circ} 27' E.$ ; near south border,  $3^{\circ} 35' E.$ ; near east border,  $3^{\circ} 09' E.$ ; near west border,  $1^{\circ} 57' E.$ — $3^{\circ} 56' E.$  (from Bulletin 551); near center,  $3^{\circ} 28' E.$

**SYCAMORE QUADRANGLE.**  
**Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 38 N., R. 4 E., 0.25 mile east of corner secs. 14, 15, 22, and 23; T road south.....	• / " 41 45 42.2	• / " 88 44 57.2	Feet.
Dekalb, center of crossing of Chicago & North Western R. R. and Fourth Street.....	41 55 46.5	88 44 59.1	.....
Dekalb, just north of; center of iron truss bridge over the Kishwaukee River.....	41 56 22.2	88 44 58.7	3,608
T. 40 N., R. 4 E., near quarter corner between secs. 2 and 11; crossing of Chicago, Milwaukee & Gary R. R.....	41 57 48.1	88 44 35.0	8,875
T. 40 N., R. 4 E., forks at schoolhouse; roads northeast, northwest, and southwest.....	41 58 18.0	88 44 04.8	3,793
T. 41 N., R. 4 E., at east side of sec. 35; roads north-south-west.....	41 59 20.4	88 44 16.5	6,368

Magnetic declination near north border of quadrangle,  $3^{\circ} 09' E.$

Dwight, Essex, Joliet, Kankakee, Morris, Peotone, Wilmington, and Yorkville quadrangles.

**GRUNDY, KANKAKEE, KENDALL, AND WILL COUNTIES.**

The following geographic positions were determined by primary traverse and are based on North American datum positions of United States Corps of Engineers triangulation stations, Dresden Heights, Devine, and Rock Run, and on United States Geological Survey primary traverse stations published in Bulletin 551.

The work in Dwight, Morris, and Yorkville quadrangles was done by E. L. McNair in 1914; that in Essex, Joliet, Kankakee, and Peotone quadrangles by J. H. Wilson in 1915; and that in Wilmington quadrangle by McNair in 1914 and by Wilson in 1915.

## DWIGHT QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°   °   "	°   °   "	<i>Feet.</i>
Primary traverse station No. 9 (published in Bull. 551, p. 163).....	41 14 31.5	88 29 35.9	
T. 32 N., Rs. 6 and 7 W., corner secs. 13, 24, 1 <sup>v</sup> and 19; T road south.....	41 14 24.2	88 28 26.5	5,351
T. 32 N., R. 7 E., corner secs. 17, 18, 19, and 20; crossroads.....	41 14 25.7	88 27 27.0	4,331
T. 32 N., R. 7 E., corner secs. 16, 17, 20, and 21; crossroads.....	41 14 27.4	88 26 17.5	5,309
T. 32 N., R. 7 E., corner secs. 15, 16, 21, and 22; crossroads.....	41 14 29.2	88 25 08.0	5,310
T. 32 N., R. 7 E., corner secs. 14, 15, 22, and 23; crossroads.....	41 14 30.8	88 23 58.7	5,299
T. 32 N., R. 7 E., corner secs. 13, 14, 23, and 24; center east and west roads.....	41 14 32.4	88 22 49.6	5,279
T. 32 N., R. 7 E., quarter corner between secs. 13 and 24; crossroads.....	41 14 33.2	88 22 14.6	2,669
T. 32 N. (approximate) on line between Rs. 7 and 8, center of iron truss bridge.....	41 14 34.0	88 21 40.6	2,600
T. 32 N., R. 8 E., about 0.20 mile east of west corner of secs. 18 and 19, 25 feet south of center of road, 2 feet from corner post at northwest corner of fence, in yard of M. Z. Bullock; iron bench-mark post stamped "Prim. Trav. Sta. No. 21, 1914, Illinois".....	41 14 34.2	88 21 27.7	987
T. 32 N., R. 8 E., 45 feet north of south end of (iron) truss bridge in line with road west on section line, apparent corner secs. 17, 18, 19, and 20.....	41 14 35.5	88 20 30.8	4,345
T. 32 N., R. 8 E., corner secs. 16, 17, 20, and 21; crossroads.....	41 14 37.4	88 19 21.1	5,327
T. 32 N., R. 8 E., approximate corner secs. 15, 16, 21, and 22; T road W.....	41 14 38.7	88 18 11.9	5,286

Magnetic declination for north border of quadrangle, 2° 45' E.

## ESSEX QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°   °   "	°   °   "	<i>Feet.</i>
Custer Park, on north side of road opposite store of F. A. Buza; iron post stamped "Prim. Trav. Sta. No. 17, 1915, Ill." elevation, 563 feet.....	41 14 43.6	88 07 48.4	
Custer Park, Wabash R. R. bridge over Kankakee River, west end of.....	41 14 42.6	88 07 41.7	521
Railroad crossing, north and south section line.....	41 14 54.9	88 07 29.2	1,570
T. 32 N., R. 10 E., road east on line between secs. 17 and 20.....	41 14 53.9	88 05 43.2	
T. 32 N., R. 10 E., corner of secs. 16, 17, 20, and 21, north and south fence line.....	41 14 54.2	88 05 24.3	1,440
T. 32 N., R. 10 E., corner of secs. 15, 16, 21, and 22, north and south fence line at schoolhouse.....	41 14 54.9	88 04 15.1	5,290
T. 32 N., R. 10 E., corner of secs. 14, 15, 22, and 23, north and south fence just west of mail box 50.....	41 14 56.1	88 03 05.0	5,350
T. 32 N., R. 10 E., corner of secs. 13, 14, 23, and 24; T road south.....	41 14 56.6	88 01 54.7	5,370
T. 32 N., Rs. 10 and 11 E., corner of secs. 13, 21, 18, and 19, crossroads at schoolhouse, Will-Kankakee county line.....	41 14 56.9	88 00 46.2	5,230

Magnetic declination for north border of quadrangle, 3° E.

## JOLIET QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°   °   "	°   °   "	<i>Feet.</i>
T. 35 N., R. 11 E., corner of secs. 17, 18, 19, 20, and 30 feet east and 25 feet north of, at northeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 21, 1915, Ill.".....	41 30 41.8	88 00 15.3	
T. 35 N., R. 11 E., west corner of secs. 18 and 19, in line with road east (45 feet south of above corner is T. 35 N., R. 10 E., east corner of secs. 13 and 24, in line with road west).....	41 30 40.2	88 01 24.4	5,264
T. 35 N., R. 10 E., corner of secs. 13, 14, 23, and 24; crossroads.....	41 30 38.1	88 02 33.4	5,235
T. 35 N., R. 10 E., quarter corner between secs. 23 and 24; T road north.....	41 30 12.1	88 02 32.6	2,635
T. 35 N., R. 10 E., quarter corner between secs. 22 and 23, crossroads at Baldororganis's grocery store.....	41 30 10.6	88 03 41.6	5,250
Joliet, center of street-car track at intersection of Richards Street and Mills Road, quarter corner in center of sec. 22.....	41 30 09.8	88 04 16.2	2,640
Joliet, intersection of Chicago Street and Mills Road, quarter corner between secs. 21 and 22, T. 35 N., R. 10 E.....	41 30 09.0	88 04 50.9	2,640

Magnetic declination for south border of quadrangle, 21° E.

## KANKAKEE QUADRANGLE.

Station.	Latitude.	Longitude.	Distance between stations.
	• ′ ″	• ′ ″	Feet.
T. 32 N., R. 11 E., corner of secs. 17, 18, 19, and 20, 30 feet north and 20 feet east of, at northeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 18, 1915, Ill.".....	41 14 57.4	87 59 35.3	.....

## MORRIS QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	• ′ ″	• ′ ″	Feet.
T. 32 N., R. 8 E., corner secs. 9, 10, 15, and 16; road crossing.....	41 15 31.1	88 18 13.5	.....
T. 32 N., R. 8 E., near quarter-section line between secs. 10 and 11; railroad crossing, center of.....	41 15 31.8	88 17 37.8	2,725
T. 32 N., R. 8 E., corner secs. 10, 11, 14, and 15; crossroads.....	41 15 32.3	88 17 04.2	2,570
T. 32 N., R. 8 E., corner secs. 11, 12, 13, and 14; crossroads.....	41 15 33.8	88 15 55.0	5,280
T. 34 N., Rs. 8 and 9 E., corner secs. 18, 19, 13, and 24; T road north on Grundy-Will county line.....	41 25 09.0	88 15 02.2	.....
T. 34 N., R. 9 E., apparent (north) corner secs. 7 and 18, fence line east, 80 feet north of above is apparent east corner of secs. 12 and 13, T. 34 N., R. 8 E., fence line west, at center of north and south road on Grundy-Will county line.....	41 26 00.9	88 15 04.0	5,250
T. 34 N., Rs. 8 and 9 E., approximate corner secs. 1, 6, 7, and 12, 65 feet north of east and west road, in line with T road south, near east and west fence.....	41 26 53.4	88 15 05.6	5,320
Minooka station, 200 feet west of; railroad crossing, center of.....	41 27 17.7	88 15 41.1	3,657
Tps. 34 and 35 N., R. 8 E., quarter corner between secs. 1 and 36, on Kendall-Grundy county line; center of north and south road, at east and west fence.....	41 27 45.2	88 15 42.1	2,775
T. 35 N., R. 8 E., center of sec. 36; T road south.....	41 28 11.3	88 15 43.3	2,649
T. 35 N., Rs. 8 and 9 E., quarter corner between secs. 31 and 36; T road west on Kendall-Will County line.....	41 28 12.2	88 15 08.5	2,649
T. 35 N., R. 9 E., apparent west corner secs. 30 and 31, north and south road at fence east, 25 feet north of above is apparent east corner secs. 25 and 36, T. 35 N., R. 8 E., north and south road at fence west.....	41 28 38.2	88 15 09.4	2,635
T. 35 N., R. 8 E., quarter corner east side sec. 25; T road west.....	41 29 04.6	88 15 10.5	2,675
T. 35 N., R. 9 E., west corner secs. 19 and 30; T road east.....	41 29 30.3	88 15 11.3	2,601
T. 35 N., R. 8 E., quarter corner east side sec. 24; T road west.....	41 29 56.4	88 15 12.2	2,641

## Along highways through center of quadrangle.

T. 33 N., R. 7 E., corner secs. 9, 10, 15, 16; T road south.....	41 20 35.1	88 25 17.5	.....
T. 33 N., R. 7 E., corner secs. 10, 11, 14, 15; T road south.....	41 20 37.0	88 24 07.9	5,314
T. 33 N., R. 7 E., about 0.25 mile west of corner of secs. 11, 12, 13, and 14; T road south.....	41 20 37.9	88 23 15.7	3,980
Mazon River, east end of iron truss bridge over.....	41 20 37.9	88 22 40.1	2,117
T. 33 N., R. 7 E., quarter corner secs. 12 and 13; T road south.....	41 20 38.6	88 22 23.3	1,276
T. 33 N., Rs. 7 and 8 E., corner secs. 12, 13, 7, and 18, on north side east and west road, in line with fence south, near district No. 55 schoolhouse; stone.....	41 20 39.6	88 21 48.2	2,681
T. 33 N., R. 8 E., corner secs. 7, 8, 17 and 18; T road south.....	41 20 41.0	88 20 38.9	5,289
T. 33 N., R. 8 E., apparent corner secs. 8, 9, 16, and 17, 350 feet west of, public road crossing.....	41 20 45.8	88 19 30.0	5,275
T. 33 N., R. 8 E., corner secs. 4, 5, 8, and 9, north and south road at east and west fence, lane east.....	41 21 34.6	88 19 31.0	4,931
Devine triangulation station (U. S. Corps of Engineers), about 2.5 miles south west of Devine station on Elgin, Joliet & Eastern R. R., and 0.25 mile northwest of residence of D. E. Thomas, on the west side of the highway, 1,175 feet north and 32 feet west of the southwest corner of secs. 4, T. 33 N., R. 8 E., Goose Lake Township; marked by stone and iron pipe.....	41 21 46.02	88 19 31.53	1,162
T. 33 N., R. 8 E., corner secs. 9, 10, 15, and 16; T road south.....	41 20 43.8	88 18 20.9	5,274
Elgin, Joliet & Eastern R. R. crossing.....	41 20 44.6	88 17 45.8	2,680
T. 33 N., R. 8 E., corner secs. 10, 11, 14, and 15; T road south.....	41 20 45.3	88 17 12.0	2,575

Magnetic declination for north border of quadrangle,  $3^{\circ} 30'$  E.; for south border,  $2^{\circ} 45'$  E., for east border,  $3^{\circ} 00'$  E.; for west border,  $2^{\circ} 45'$  E.; for center,  $3^{\circ} 30'$  E.

## PEOTONE QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 32 N., R. 11 E., corner of secs. 7, 8, 17, and 18; crossroads.....	* * "	* * "	
T. 32 N., R. 11 E., corner of secs. 5, 6, 7, and 8; crossroads at schoolhouse.....	41 15 50.1	87 59 37.2	5,320
T. 32 N., R. 11 E., north corner of secs. 5 and 6; T road south, Will-Kankakee county Line.....	41 16 42.6	87 59 38.4	
T. 33 N., R. 11 E., south corner of secs. 31 and 32; T road north.....	41 17 34.1	87 59 40.5	5,210
T. 33 N., R. 11 E., corner of secs. 29, 30, 31, and 32; crossroads.....	41 17 34.0	87 59 47.3	5,20
T. 33 N., R. 11 E., corner of secs. 19, 20, 29, and 30; crossroads.....	41 18 26.3	87 59 49.0	5,290
T. 33 N., R. 11 E., corner of secs. 17, 18, 19, and 20; crossroads.....	41 19 18.6	87 59 50.4	5,300
T. 33 N., R. 11 E., corner of secs. 7, 8, 17, and 18; crossroads.....	41 20 10.9	87 59 51.5	5,290
T. 33 N., R. 11 E., corner of secs. 5, 6, 7, and 8; crossroads.....	41 21 03.4	87 59 52.6	5,310
T. 33 N., R. 11 E., north corner of secs. 5 and 6, 30 feet north and 20 feet west of, on north side of east and west road at T road south; iron post stamped "Prim. Trav. Sta. No. 19, 1915, Ill.".....	41 21 55.7	87 59 53.7	5,300
T. 34 N., R. 11 E., south corner stone of secs. 31 and 32; T road west.....	41 22 49.6	87 59 55.0	5,450
T. 34 N., R. 11 E., north corner of secs. 4 and 5; crossroads (20 feet east of above corner is T. 35 N., R. 11 E., south corner of secs. 32 and 33).....	41 22 51.6	87 59 59.0	370
T. 35 N., R. 11 E., corner of secs. 28, 29, 32, and 33; crossroads at schoolhouse.....	41 28 06.2	87 59 00.7	
T. 35 N., R. 11 E., corner of secs. 20, 21, 28, and 29; T road south.....	41 28 58.3	87 59 02.1	5,280
	41 29 50.5	87 59 04.1	5,280

Magnetic declination for west border of quadrangle  $2^{\circ} 10'$  E.

## WILMINGTON QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 32 N., Rs. 8 and 9 E., 20 feet north and 30 feet east of corner of secs. 12, 13, 7, and 18, on county line between Grundy and Will counties, 7 feet southwest of fence corner, 3 feet west of large power-line pole; iron bench-mark post stamped "Prim. Trav. Sta. No. 22, 1914, Illinois".....	* * "	* * "	
T. 32 N., Rs. 8 and 9 E., corner secs. 1, 2, 6, and 7; road crossing Tps. 32 and 33 N., Rs. 8 and 9 E., corner secs. 1, 6, 31, and 36; road crossing.....	41 15 35.2	88 14 45.0	
T. 33 N., Rs. 8 and 9 E., corner secs. 25, 30, 31, and 36; T road east.....	41 16 27.6	88 14 47.1	5,308
Chicago & Alton R. R. crossing.....	41 17 19.3	88 14 48.9	5,240
T. 33 N., Rs. 8 and 9 E., corner secs. 19 and 24; crossroads.....	41 18 11.4	88 14 50.3	5,274
T. 33 N., Rs. 8 and 9 E., 25 feet east and 30 feet north of intersection of roads at corner of secs. 12, 13, 7, and 18, 5 feet north of corner fence post, 2 feet from telephone pole; iron bench-mark post stamped "Prim. Trav. Sta. No. 23, 1914, Illinois".....	41 18 54.0	88 14 51.3	4,311
T. 33 N., Rs. 8 and 9 E., fence line east; stone.....	41 19 30.0	88 14 52.1	3,650
Dresden Heights triangulation station (U. S. Corps of Engineers), on line of Kankakee bluffs, 3 miles south of Chanmahon, on land owned by Thomas Patterson, 2,415 feet east and 925 feet south of the northwest corner of sec. 31, T. 34 N., R. 9 E., Chanmahon Township; stone and pipe.....	41 20 48.8	88 14 53.8	7,985
Dupage River, south end of bridge over.....	41 21 40.9	88 14 55.3	5,270
Tps. 33 and 34 N., Rs. 8 and 9 E., fence line east; stone.....	41 21 57.3	88 14 55.6	1,660
T. 34 N., R. 9 E., quarter corner of secs 18 and 19; T road south.....	41 22 32.7	88 14 56.7	3,590
	41 23 14.86	88 14 32.24	4,656
	41 25 09.4	88 14 32.7	11,397

Magnetic declination for west border of quadrangle,  $3^{\circ} 00'$  E.

## WILMINGTON QUADRANGLE—Continued.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Prim. Trav. Sta. 22, 1914, Ill. (see preceding page).....	° ' "	° ' "	Fect.
T. 32 N., R. 9 E., corner of secs. 7, 8, 17, and 18; crossroads.....	41 15 35.2	88 14 45.0	.....
Braidwood, Chicago & Alton R. R. main track, at northwest and southeast road crossing about 800 feet southwest of depot.....	41 15 36.8	88 13 35.6	5,303
T. 132 N., R. 9 E., corner of secs. 8, 9, 16, and 17; crossroads.....	41 15 44.7	88 12 51.1	3,491
T. 32 N., R. 9 E., corner of secs. 9, 10, 15, and 16; T road south.....	41 15 38.0	88 12 27.6	1,922
T. 32 N., R. 9 E., corner of secs. 10, 11, 14, and 15, 10 feet east of lane south.....	41 15 39.4	88 11 18.7	5,260
T. 32 N., R. 9 E., corner of secs. 11, 12, 13, and 14; crossroads at schoolhouse.....	41 15 40.4	88 10 10.3	5,220
Ritchie, road forks, at road west on quarter-section line, just west of wagon bridge over creek.....	41 15 41.7	88 09 01.1	5,290
	41 15 91.1	88 06 21.1	.....

## Along highways through center of quadrangle.

Tps. 33 and 34 N., Rs. 10 and 11 E., corner of; T road south.....	41 22 49.9	88 01 08.1	.....
Tps. 33 and 34 N., R. 10 E., stone corner of secs. 1, 2, 35, and 36; crossroads.....	41 22 48.6	88 02 17.5	5,290
Tps. 33 and 34 N., R. 10 E., corner of secs. 2, 3, 34, and 35; crossroads.....	41 22 47.4	88 03 27.4	5,330
Tps. 33 and 34 N., R. 10 E., corner of secs. 3, 4, 33, and 34; crossroads.....	41 22 46.2	88 04 37.0	5,310
Tps. 33 and 34 N., R. 10 E., corner of secs. 4, 5, 32, and 33; crossroads.....	41 22 45.0	88 05 46.3	5,290
Tps. 33 and 34 N., R. 10 E., corner of secs. 5, 6, 31, and 32; crossroads.....	41 22 43.6	88 06 55.9	5,310
Tps. 33 and 34 N., Rs. 9 and 10 E., 20 feet south and 50 feet east of corner of, at southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 20, 1915, Ill.".....	41 22 41.6	88 08 04.6	5,236
T. 34 N., R. 9 E., south corner of secs. 35 and 36; center of east and west road at fence north.....	41 22 39.4	88 09 14.6	5,346
Tps. 33 and 34 N., R. 9 E., corner of secs. 2, 3, 34, and 35; center of east and west road at north and south fence line.....	41 22 37.9	88 10 23.8	5,275
Tps. 33 and 34 N., R. 9 E., corner of secs. 3, 4, 33, and 34; crossroads at Blodgett.....	41 22 36.9	88 11 32.3	5,230
T. 34 N., R. 9 E., south corner of secs. 32 and 33; fence north.....	41 22 35.5	88 12 41.4	5,270
Tps. 33 and 34 N., R. 9 E., corner of secs. 5, 6, 31, and 32; T road north.....	41 22 34.2	88 13 50.4	5,260

## Along highways near north border of quadrangle.

T. 35 N., R. 10 E., corner of secs. 21, 22, 27, and 28; T road west.....	41 29 42.7	88 04 50.0	.....
T. 35 N., R. 10 E., near the corner of secs. 20, 21, 28, and 29, 30 feet east of north and south section line, at southeast corner of crossroads 1,330 feet southeast of Brandon's bridge over Des Plaines River; iron post stamped "Prim. Trav. Sta. No. 22, 1915, Ill." elevation 582 feet.....	41 29 46.6	88 05 59.9	5,332
Brandon's bridge over Des Plaines River, south end of.....	41 29 56.8	88 06 10.9	1,331
Center of river road in line with fence on north and south section line.....	41 29 55.4	88 07 08.5	4,385
Center of river road at probable north and south township line, 30 feet east of railroad crossing.....	41 29 36.0	88 08 25.4	6,174
T road northwest.....	41 28 57.8	88 09 32.7	6,419
Bridge over canal, south end of.....	41 29 14.1	88 09 47.2	1,989
T. 35 N., R. 9 E., line between secs. 23 and 24; center of road at north and south fence line.....	41 29 38.4	88 09 31.7	2,725
Rock Run triangulation station, Illinois River Survey, 4 miles southwest of Joliet on top of small mound, at the north line of highway, about 500 feet west of farm buildings owned by J. Reardon, 630 feet east of the point where aforesaid highway intersects the west line of sec. 24, T. 35 N., R. 9 E., Troy Township, Will County, Ill.; established in March, 1904; marked by stone and pipe.....	41 29 41.8	88 09 24.1	679
T. 35 N., R. 9 E., sec. 28, on south side of road in line with road north on quarter-section line; iron post stamped "Ill. 588".....	41 29 19.4	88 10 05.7	3,895
T. 35 N., R. 9 E., quarter corner between secs. 27 and 28, T road east.....	41 29 06.9	88 11 49.9	8,031
T. 35 N., R. 9 E., corner of secs. 21, 22, 27, and 28; T road west.....	41 29 33.1	88 11 50.7	2,650
T. 35 N., R. 9 E., corner of secs. 20, 21, 28, and 29; crossroads.....	41 29 32.6	88 13 00.0	5,270
T. 35 N., R. 9 E., corner of secs. 19, 20, 29, and 30; T road south at schoolhouse.....	41 29 32.0	88 14 09.6	5,300

## WILMINGTON QUADRANGLE—Continued.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 34 N., R. 11 E., corner of secs. 29, 30, 31, and 32; crossroads at schoolhouse.....	* * "	* * "	Feet.
T. 34 N., R. 11 E., corner of secs. 19, 20, 29, and 30; crossroads.....	41 23 43.5	88 00 00.6	.....
Manhattan, 0.75 mile west of crossroads.....	41 24 35.8	88 00 02.4	5,290
T. 34 N., R. 11 E., corner of secs. 17, 18, 19, and 20; center of north and south road at east and west fence line.....	41 25 15.0	88 00 03.8	3,970
T. 34 N., R. 11 E., corner of secs. 7, 8, 17, and 18; T road east and road southeast.....	41 25 28.1	88 00 04.3	1,330
T. 34 N., R. 11 E., corner of secs. 5, 6, 7, and 8; crossroads.....	41 26 20.3	88 00 06.3	5,290
Tps. 34 and 35 N., R. 11 E., corner of secs. 5, 6, 31, and 32.....	41 27 12.6	88 00 08.1	5,297
T. 35 N., R. 11 E., corner of secs. 19, 20, 29, and 30; crossroads.....	41 28 05.0	88 00 09.4	5,300
	41 29 49.5	88 00 13.8	.....

Magnetic declination for south border of quadrangle,  $3^{\circ}$  E.; for east border,  $24^{\circ}$  E.; for north border,  $24^{\circ}$  E.; through center,  $24^{\circ}$  E.

## YORKVILLE QUADRANGLE.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 35 N., R. 9 E., west corner secs. 18 and 19; T road east.....	* * "	* * "	Feet.
T. 35 N., R. 8 E., 25 feet west of T road corners at quarter corner on west side sec. 13, 70 feet north of quarter corner on west side sec. 18, T. 35 N., R. 9 E., 3 feet from north-south fence line; iron bench-mark post stamped "Prim. Trav. Sta. No. 24, 1914, Illinois".....	41 30 22.6	88 15 13.3	.....
T. 35 N., R. 8 E., at quarter corner between secs. 13 and 14; crossroads.....	41 30 49.5	88 15 14.0	2,717
T. 35 N., R. 8 E., at quarter corner between secs. 14 and 15; T road north.....	41 30 47.7	88 16 23.8	5,319
Auxsable Creek, center of iron truss bridge over.....	41 30 46.1	88 17 33.0	5,259
T. 35 N., R. 8 E., quarter corner between secs. 16 and 17; T road south.....	41 30 44.6	88 18 39.3	5,050
T. 35 N., R. 8 E., quarter corner between secs. 17 and 18, at schoolhouse; crossroads.....	41 30 43.3	88 19 51.4	5,490
T. 35 N., Rs. 7 and 8 E., quarter corner between secs. 13 and 18, crossroads at.....	41 30 42.2	88 20 59.9	5,210
T. 35 N., R. 7 E., 20 feet south and 40 feet east of crossroads, at quarter corner between secs. 13 and 14, 10 feet east of fence corner, 3 feet north of hedge line; iron bench-mark post stamped "Prim. Trav. Sta. No. 25, 1914, Illinois".....	41 30 41.5	88 21 56.2	4,281
T road forks, roads north, east, and west.....	41 30 40.2	88 23 05.9	5,307
T. 35 N., R. 7 E., near or at quarter corner between secs. 15 and 16; center of east-west road, at hedge running north.....	41 30 39.0	88 24 16.6	5,385
T. 35 N., R. 7 E.; center of sec. 16, T road forks north, south, and east.....	41 30 37.0	88 25 25.5	5,246
Road crossing about 1,670 feet north of above forks.....	41 30 36.2	88 26 01.7	2,750
Intersection of highway and "The Fox" and Illinois Union Ry. Co. tracks.....	41 30 32.6	88 26 01.1	1,670
Fork in road, at point in line with road west, roads northeast, southwest, and west.....	41 30 52.4	88 26 01.9	70
T. 35 N., R. 7 E., apparent quarter corner between secs. 17 and 18; center of east and west road, at hedge south and fence north.....	41 30 35.0	88 26 53.3	4,285
T. 35 N., Rs. 6 and 7 E., at southeast corner of intersection of crossroads; iron bench-mark post stamped "Prim. Trav. Sta. No. 10, 1912".....	41 30 33.5	88 27 44.3	3,886
	41 30 31.4	88 28 59.0	5,685

Magnetic declination for south border of quadrangle,  $3^{\circ} 30'$  E.

**Campbell Hill quadrangle.****JACKSON COUNTY.**

The following positions were determined by J. H. Wilson in 1915. The line begins at Ava and was run westward along public roads to O'Harrah triangulation station of the Mississippi River Commission.

**CAMPBELL HILL QUADRANGLE.****Along public roads.**

Station.	Latitude.	Longitude.	Distance between stations.
	°   '   "	°   '   "	Ft.
Ava, at west edge of town, T. 7 S., R. 4 W., quarter corner between secs. 25 and 26; T road east at.....	37 53 18.5	89 30 16.8	.....
T. 7 S., R. 4 W., center of east-west road at lane south, also lane north through gate, approximate corner of secs. 26, 27, 34, and 35.	37 52 53.6	89 31 23.6	5,920
Forks of road on north-south quarter-section line through sec. 34.	37 52 47.7	89 31 56.8	2,734
Little Kincaid Creek, center of ford at.....	37 52 35.7	89 32 39.2	3,609
T. 7 S., R. 4 W., quarter corner between secs. 32 and 33, right-angle bend in road at second-class road southwest.....	37 52 27.4	89 33 37.2	4,724
T. 7 S., R. 4 W., in sec. 30, crossroads, 20 feet northwest of oak tree with advertising sig.s.....	37 53 05.2	89 34 58.6	7,550
T. 7 S., R. 5 W., in sec. 36, T road east on north-south road on quarter-section line.....	37 52 51.8	89 36 23.0	6,907
T. 7 S., R. 5 W., in center of sec. 35, T road south.....	37 52 32.2	89 37 28.9	5,650
T. 7 S., R. 5 W., on south side of sec. 35, quarter corner in line with road north and road west, 40 feet east of above is fence south at probable quarter corner on north side of sec. 2.....	37 52 06.3	89 37 30.6	2,630
Deonia, southwest corner of T road south at, 2 feet east of corner of paling fence; iron post stamped "Prim. Trav. Sta. No. 10, 1915"	37 51 41.5	89 37 48.6	2,890
T. 8 S., R. 5 W., line between secs. 2 and 11, center of north-south road, fence line east.....	37 51 15.2	89 37 48.3	2,670
T. 8 S., R. 5 W., S.E. $\frac{1}{4}$ sec. 10, road forks at road west, Dilday's mail box.....	37 50 31.6	89 38 14.1	4,873
Sec. 15, north part of, where road crosses top of ridge, opposite small white house, mail box on south edge of road.....	37 50 19.0	89 38 46.6	2,896

**Brownfield, Dongola, Equality, Fords Ferry, Golconda, Joppa, Marion, Mound City, Paducah, Stonefort, and Vienna quadrangles.**

**HARDIN, JOHNSON, MASSAC, PIKE, PULASKI, AND SALINE COUNTIES.**

The following geographic positions on Henderson, Ky., astronomic datum were determined by C. B. Kendall in 1913 and J. H. Wilson in 1915. Lines were based on positions of primary traverse station No. 34, 1908, at Peters Creek store, described in Bulletin 440, on primary traverse stations Nos. 8 and 10, 1911, described in Bulletin 551, and on United States Corps of Engineers triangulation points at Elizabethtown, Bay City, Golconda, and Grand Chain Landing. Control for Brownfield, Equality, Fords Ferry, Golconda, Paducah, and Stonefort quadrangles was done by Kendall in 1913; that for Mound City quadrangle by Wilson in 1915; and that for Marion and Vienna quadrangles by Kendall in 1913 and Wilson in 1915.

## BROWNFIELD QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Three corners, public T road east, center of north-south road at, 10 feet northwest to dead oak, 10 feet southeast to center of triangle.....	° ' "	° ' "	Ft.
	37 29 17.2	88 30 37.6	.....
Three corners, public T road west, center of north-south road at, 15 feet west to mail box No. 60, in center of triangle.....	37 29 07.0	88 30 37.6	1,039
Second-class T road north at corner of orchard.....	37 28 58.4	88 31 10.7	2,804
T. 12 S., R. 6 E., corner secs. 10, 11, 14, and 15 (this point is within a very few feet of the above corner).....	37 29 06.6	88 31 25.6	1,457
Lusk Creek, 200 feet south of Iose Ford, 25 feet north to sycamore tree, 25 feet east to elm tree, fork in road to south and southeast.....	37 29 15.2	88 32 04.8	3,279
T. 13 S., R. 6 E., 0.25 mile east of corner secs. 3, 4, 9, and 10; stone corner.....	37 29 50.9	88 32 18.2	4,363
T. 12 S., R. 6 E., quarter corner between secs. 5 and 8; crossroads, second-class road north and south.....	37 29 54.5	88 34 12.4	.....
T. 12 S., R. 6 E., quarter corner between secs. 6 and 7; cross fences.....	37 29 54.3	88 35 18.3	.....
T. 12 S., R. 5 E., stone 0.25 mile west of corner secs. 2, 3, 10, and 11 (set by county surveyor).....	37 29 54.0	88 38 25.4	.....
Three corners, public T road west, 15 feet west to center of triangle.....	37 29 34.1	88 38 25.4	2,012
L. A. Walter's mail box in center of triangle at public road fork northwest.....	37 28 44.6	88 39 06.3	5,994
T. 12 S., R. 5 E., 0.25 mile north of corner secs. 15, 16, 21, and 22, corner on north and south section line.....	37 28 23.1	88 39 14.1	2,263
T. 12 S., R. 5 E., quarter corner between secs. 16 and 21, public T road south and second-class road west, 8 feet southwest to corner fence post, 18 feet north to old stump.....	37 28 10.4	88 40 03.2	4,162
T. 12 S., R. 5 E., stone corner secs. 16, 17, 20, and 21; stone is in woods 40 feet southwest of the southwest corner of clearing, on south side of road at bend to south.....	37 28 11.0	88 40 36.2	2,667
Big Bay Creek, center of iron bridge over.....	37 28 50.4	88 41 24.7	5,579
Big Bay Creek, 75 feet northwest of ford in forks of road; large sycamore tree.....	37 29 20.4	88 41 25.5	3,045
Three corners, 400 feet northwest of church; public T road south, 50 feet south to oak, 35 feet southeast to oak.....	37 29 39.6	88 41 56.9	3,184
T. 12 S., Rs. 4 and 5 E.; stone quarter corner between secs. 12 and 7, also line between Pope and Johnson counties.....	37 29 29.2	88 42 33.3	3,115
Three corners; public T road north, center of east and west road at, 12 feet southwest to two mail boxes.....	37 29 28.2	88 43 14.2	3,305
T. 12 S., R. 4 E., quarter corner between secs. 11 and 12, on south edge of road opposite fence north, and about 200 feet east of new house.....	37 29 27.6	88 43 39.4	2,031
Four corners, near top of hill; public crossroads, 5 feet west to oak stump, 50 feet southwest to center of bushy triangle, 20 feet north to center of triangle.....	37 29 16.8	88 44 09.4	2,655

## Along highways through center of quadrangle.

Grantsburg, 30 feet west of west end of bridge over Big Bay Creek; public T road south, center of east-west road at.....	37 23 31.3	88 44 43.1	.....
Grantsburg, 0.75 mile east of; center of east-west road at public T road south, 10 feet south to center of triangle, 15 feet north to oak.....	37 23 09.6	88 43 57.9	4,263
T. 13 S., R. 4 E., 720 feet north of center of sec. 13; center of intersection of public crossroads.....	37 23 23.5	88 43 08.8	4,199
T. 13 S., Rs. 4 and 5 E.; stone at east corner secs. 12 and 13, on north-south line between Johnson and Pope counties.....	37 23 47.8	88 42 34.3	3,714
T. 13 S., R. 5 E., 0.25 mile east of center of sec. 18, 50 feet east of public T road south, 25 feet north to maple tree in yard, 10 feet south to center of triangle.....	37 23 15.5	88 41 49.0	4,909
Dixon Springs, 0.75 mile southwest of, three corners, public T road north; center of triangle.....	37 22 57.2	88 40 38.7	5,976
T. 13 S., R. 5 E., corner secs. 16, 17, 20, and 21, at corner of fence south and west (position is within a few feet of true corner).....	37 22 59.0	88 40 26.6	990
Dixon Springs; center of spring No. 1 ("Old Ironsides").....	37 23 04.7	88 40 09.6	1,487
Dixon Springs, 1 mile southeast of; center of east-west road, at public T road north, 25 feet northwest to oak in triangle, 75 feet east of small stream, three corners.....	37 22 22.4	88 39 54.2	4,457
Allens Spring post office, intersection of crossroads at.....	37 22 12.4	88 39 21.0	2,869
Three corners; center of east-west road at public T road north, 25 feet north to center of triangle, 15 feet south to old stump, 25 feet southwest to oak tree.....	37 22 02.6	88 38 34.9	3,855
T. 13 S., R. 5 E.; post at corner of secs. 22, 23, 26, and 27, post in corner of fences south and west, 420 feet north of public T roads south.....	37 21 58.6	88 38 15.2	1,642
T. 13 S., R. 5 E., 1,350 feet south of corner secs. 23, 24, 25, and 26, 25 feet south and 20 feet west of intersection of roads; 5 feet north of corner of wire (and rail) fence; iron post stamped "Prim. Trav. Sta. No. 9, 1913, Illinois".....	37 21 44.8	88 37 09.8	5,464

## BROWNFIELD QUADRANGLE—Continued.

## Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Threecorners; public T road south, at north edge of east-west road, 30 feet south to center of bridge over creek.....	°   "   "	°   "   "	Feet,
T. 13 S., Rs. 5 and 6 E.; stone corner secs. 25, 30, 31, and 36, 3,010 feet south of public T road south on range line, on west edge of north-south road, at fence corner.....	37 21 35.1	88 36 04.0	5,398
Old Brownfield, three corners at, public T road north, 5 feet north to center of triangle.....	37 21 05.4	88 36 04.0	3,012
T. 13 S., R. 6 E., 3,970 feet south of corner secs. 17, 18, 19, and 20.....	37 21 36.4	88 35 43.1	3,563
T. 13 S., R. 6 E., corner secs. 17, 18, 19, and 20; center of north-south road at public T road east.....	37 22 11.9	88 34 56.8	5,185
T. 13 S., R. 6 E., corner secs. 16, 17, 20, and 21, 10 feet north and 25 feet east of center of main road at T road east, 200 feet south of Walter Bros.' store at Waltersburg.....	37 22 51.2	88 34 56.6	3,970
Waltersburg, 1.3 miles southeast of, three corners, 100 feet east of bridge over small creek, 15 feet north to wheel with 4 mail boxes; center of main road at second-class T road north.....	37 22 40.2	88 33 48.1	5,527
T. 13 S., R. 6 E., 550 feet north of corner secs. 22, 23, 26, and 27; center of main road, at second-class T road north.....	37 22 13.0	88 32 36.9	6,822
	37 21 58.6	88 31 30.5	4,857

## Along highways near east border of quadrangle.

T. 13 S., R. 6 E.; center of sec. 36, 100 feet northeast of Fairview schoolhouse, oak tree in center of triangle at public T road south.....	37 20 40.5	88 30 01.1	.....
T. 14 S., R. 6 E., north quarter corner sec. 1, oak tree in center of second-class T road east; 60 feet east of the above is south quarter corner sec. 36, T. 13 S., R. 6 E.....	37 20 11.6	88 30 00.4	2,923
T. 14 S., R. 6 E.; stone corner secs. 1, 2, 11, and 12, center of crossroads, at 90° angle in main road to west, second-class road south and east.....	37 19 17.8	88 30 33.6	6,064
Three corners; center of main road at T road east, 15 feet east to center of triangle, 15 feet north to 6 mail boxes on wheel.....	37 18 46.4	88 31 45.7	6,627
T. 14 S., R. 6 E., stone quarter corner, between secs. 10 and 15, west edge of north-south road at center of T road west at store at Old Tomio post office.....	37 18 25.4	88 32 13.6	3,103
T. 14 S., R. 6 E., 0.75 mile south of quarter corner between secs. 10 and 15; center of north-south road in line with center of public T road west, 25 feet west to center of clump of bushes in triangle.....	37 17 45.9	88 32 14.3	3,001
T. 14 S., R. 6 E., 570 feet east of quarter corner between secs. 22 and 23; three corners public T road south, 10 feet southwest to center of triangle, 28 feet east to persimmon tree.....	37 17 05.0	88 31 34.0	5,265
Bay Creek, center of iron bridge over.....	37 16 32.4	88 31 25.2	3,333
T. 14 S., R. 6 E., 1,330 feet south and 20 feet east of corner secs. 26, 27, 34, and 35, 20 feet north and 15 feet east of center of public crossroads, in corner of wire fence; iron post stamped "Prim. Trav. Sta. No. 6, 1913, Illinois".....	37 15 32.4	88 31 41.3	6,152

## Along highways near south border of quadrangle.

T. 14 S., R. 6 E., on line between secs. 27 and 34, three corners public T road west, 15 feet west to center of triangle, 20 feet south to mailbox.....	37 15 45.3	88 32 31.4	4,257
T. 14 S., R. 6 E., 0.25 mile west of corner secs. 27, 28, 33, and 34; stone on north edge of road.....	37 15 45.4	88 33 05.0	2,720
T. 14 S., R. 6 E., 0.25 mile west of corner secs. 28, 29, 32, and 33; center of north-south road, at public T road east, 5 feet east to center of triangle.....	37 15 45.6	88 34 11.7	5,390
Forks public road southwest, second-class road west, 23 feet south to stump, 10 feet northwest to mailbox.....	37 15 46.5	88 34 49.7	3,072
T. 14 S., R. 6 E., stone corner secs. 29, 30, 31, and 32, 1,000 feet west of forks public road southwest, second-class road west.....	37 15 46.7	88 35 01.7	970
Tps. 14 and 15 S., R. 6 E., 0.25 mile north and 0.25 mile east of corner secs. 1, 6, 31, and 36; stone on south edge of east-west road and 25 feet west of second-class T road south.....	37 15 08.5	88 35 49.7	5,478
Tps. 14 and 15 S., R. 5 E., 210 feet west of south corner sec. 33, on north edge of east-west road at public T road south, is north quarter corner of sec. 4.....	37 15 00.2	88 39 59.0	.....
Massac Creek, 1,160 feet west of concrete bridge over, in southeast corner of public crossroads; large poplar snag.....	37 15 01.8	88 40 52.2	4,299
Tps. 14 and 15 S., R. 5 E., north corner secs. 5 and 6, 160 feet west of concrete bridge over small creek; center of east-west road at fence south.....	37 15 02.8	88 41 39.2	3,809
Tps. 14 and 15 S., Rs. 4 and 5 E., 400 feet west of corner secs. 1, 6, 31, and 36; public crossroads, 20 feet, southeast to oak, 20 feet northwest to telephone pole.....	37 15 03.0	88 42 41.7	5,050

**BROWNFIELD QUADRANGLE—Continued.****Along highways near south border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 14 and 15 S., R. 4 E., corner secs. 1, 2, 35, and 36; center of east-west road at second-class T road north and drainage ditch south.....	° ' "	° ' "	Fect.
Round Knob, 1 mile northwest of: center of north-south road at public T road west (may be quarter corner between secs. 34 and 35, T. 14 N., R. 4 E.).....	37 15 03.0	88 43 42.3	4,900
	37 15 30.0	88 44 59.6	.....

**Along highway near southwest corner of quadrangle (spur line to Army engineers' bench mark at Bay City and is not adjusted).**

Bay City, about 1 mile west of, wooden bridge over Cave Creek, center of.....	37 15 26.1	88 30 50.2	.....
Bay City, about 0.80 mile west of; center of iron bridge over Barn Creek.....	37 15 21.7	88 30 38.8	1,016

**Along highways near west border of quadrangle.**

T. 13 S., R. 4 E., corner secs. 26, 27, 34, and 35, intersection of public crossroads, 35 feet southwest to corner wire fence, 45 feet south-east to oak tree.....	37 21 03.0	88 44 45.9	.....
T. 13 S., R. 4 E., stone corner secs. 22, 23, 26, and 27, in center of north and south road, at wire fence west.....	37 21 56.0	88 44 45.9	5,358
T. 13 S., R. 4 E., 210 feet south of approximate corner secs. 14, 15, 22, and 23, three corners at bridge over creek, center of old north-south road, 25 feet west to center of new road, 35 feet north to center of creek.....	37 22 46.3	88 44 47.2	5,090

Magnetic declination for north border of quadrangle,  $4^{\circ} 37' E.$ ; for south border,  $4^{\circ} 23' E.$ ; for east border,  $4^{\circ} 27' E.$ ; for west border,  $4^{\circ} 23' E.$ ; for center,  $4^{\circ} 25' E.$

**DONGOLA QUADRANGLE.****Along Big Four and Chicago & Eastern Illinois railroads and highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 14 S., R. 2 E., crossroads 350 feet south of corner of secs. 28, 29, 32, and 33.....	° ' "	° ' "	Fect.
Grand Chain, at fence corner 18 feet north of stock pen, on the west side of track, 180 feet north of depot; iron post stamped "Prim. Trav. Sta. No. 15, 1915, Ill. Elev. 405".....	37 15 13.5	89 01 11.0	4,932
Second-class road crossing just north of milepost 237.....	37 16 13.8	89 00 04.5	8,135
Rago, railroad crossing, 380 feet west of west end of bridge over Cache River.....	37 18 45.3	89 00 30.0	.....
Whitehill, railroad crossing, main track.....	37 19 12.2	89 01 16.1	♦ 4,612
Joppa Junction, main track of railroad at line between secs. 6 and 31, Tps. 13 and 14 S., R. 2 E., 10 feet south of center of east and west road crossing.....	37 19 52.2	89 01 36.3	4,362
T. 13 S., R. 2 E., railroad at line between secs. 29 and 32.....	37 20 45.5	89 01 18.0	5,585
East-west road crossing.....	37 20 58.7	89 01 13.5	1,399
T. 13 S., R. 2 E., center of main track of railroad at line between secs. 20 and 29, 70 feet north of railroad crossing.....	37 21 37.8	89 01 00.2	4,101
Cypress, main track in front of window of telegraph office.....	37 21 53.3	89 00 54.9	1,619
T. 13 S., R. 2 E., line between secs. 16 and 17, bend in road 0.25 mile north of corner of secs. 16, 17, 20, and 21.....	37 22 46.2	89 00 08.1	6,558
Cypress, railroad crossing, 180 feet southeast of yard limit sign.....	37 22 45.3	89 00 41.1	2,662
Cypress, 1 mile north of, at the southeast corner of crossroads, 3 feet east of C. A. Davidson's mail box and 20 feet east of section line, 0.25 mile north of corner of secs. 17, 18, 19, and 20, T. 13 S., R. 2 E.; iron post stamped "Prim. Trav. Sta. No. 12, 1915, Ill.".....	37 22 44.4	89 01 13.6	2,631
T. 13 S., R. 2 E., corner of secs. 17, 18, 19, and 20.....	37 22 31.3	89 01 13.9	1,325
T. 13 S., R. 2 E., corner of secs. 7, 8, 17, and 18; center of north and south road at fence west.....	37 23 23.2	89 01 13.6	5,255
Crossroads at Mount Pisgah schoolhouse.....	37 24 04.0	89 01 13.0	4,124

## DONGOLA QUADRANGLE—Continued.

Along Big Four and Chicago & Eastern Illinois railroads and highways near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 13 S., R. 2 E., corner of secs. 5, 6, 7, and 8.....	° ' "	° ' "	Feet.
Crossroads.....	37 24 17.2	89 01 12.8	1,345
Crossroads.....	37 24 21.5	89 02 12.6	4,840
Twp. 12 and 13 S., R. 2 E.; center of north and south road at line between secs. 6 and 31.....	37 24 44.6	89 02 12.3	2,340
T. 12 S., R. 2 E., quarter corner between secs. 30 and 31; center of north and south road at fence, 50 feet north of bridge over creek.	37 25 13.6	89 02 12.2	2,930
NOTE.—West half of section is long; east half correct.	37 26 07.1	89 01 45.5	5,832
Pleasant Grove, crossroads, 25 feet southwest of oak tree.....	37 26 31.4	89 01 45.6	2,455
T. 12 S., R. 2 E., quarter corner between secs. 19 and 30; center of north and south road in line with fence east.....	37 27 00.1	89 01 46.0	2,905
T road south, line between secs. 18 and 19; northwest corner of wooden culvert.....	37 27 53.6	89 01 24.3	5,600
North end of bridge over Cache River.....	37 28 14.1	89 01 37.5	2,331
T. 12 S., R. 2 E., stone quarter corner between secs. 7 and 18, 100 feet north of T road east and 12 feet east of mail box No. 29.....	37 28 46.1	89 01 45.9	3,305
Elvira schoolhouse, 30 feet north of road forks; iron post stamped "Prim. Trav. Sta. No. 13, 1915, Ill."	37 29 36.9	89 01 49.5	5,144
T. 12 S., R. 2 E., quarter corner between secs. 6 and 7, T lane north.	37 29 39.6	89 01 46.1	389
T. 12 S., R. 2 E., corner of secs. 5, 6, 7, and 8; center of east and west road at north and south fence line.....	37 29 39.9	89 01 12.6	2,609
T road north.....	37 29 41.6	89 00 22.9	4,010
T. 12 S., R. 2 E., corner of secs. 4, 5, 8, and 9; fence corner 1,330 feet east of T road north.....	37 29 42.8	89 00 06.5	1,330

Magnetic declination for quadrangle,  $4^{\circ} 44'$  E.

## EQUALITY QUADRANGLE.

Along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
Lusk, 1.5 miles northwest of; three corners at top of hill, public T road west, 55 feet west to three mail boxes, 10 feet northwest to center of triangle, 80 feet north to oak tree.....	° ' "	° ' "	Feet.
Hartsville, 0.25 mile south of, 300 feet northeast of church; public T road south, 30 feet south to center of triangle, 5 feet northeast to corner fence.....	37 30 28.0	88 28 36.7	.....
Hartsville, three corners; public T road east, 20 feet east to center of triangle.....	37 31 53.0	88 28 57.4	8,763
Three corners, 300 feet south of church; second-class T road south, 15 feet south to center of plank bridge.....	37 32 25.8	88 28 54.9	8,326
T. 11 S., Rs. 6 and 7 E., stone corner secs. 19, 24, 25, and 30; stone is in center of lane 60 feet east of dwelling and about 1,200 feet south of T road south.....	37 32 45.1	88 29 11.8	2,390
Ford of Little Lusk Creek, 500 feet northwest of; second-class T road north, center of triangle at.....	37 32 33.3	88 29 11.5	1,150
	37 33 10.7	88 29 53.8	5,006

Magnetic declination for south border of quadrangle,  $4^{\circ} 43'$  E.; for southwest half,  $4^{\circ} 44'$  E.

## FORDS FERRY QUADRANGLE.

At Peters Creek.

Station.	Latitude.	Longitude.	Distance between stations.
Peters Creek store, 1,500 feet north of, on north edge of public road 200 feet east of 90° bend to east; iron post stamped "Prim. Trav. Sta. No. 34, 1908, Illinois"	° ' "	° ' "	Feet.
Peters Creek store, 1,400 feet west of; public T road south, 5 feet south to center of triangle.....	37 29 37.8	88 14 05.6	.....
	37 29 21.6	88 14 24.5	2,230

## GOLCONDA QUADRANGLE.

## Along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
T. 12 S., R. 9 E., west corner secs. 7 and 18; stone in center of second-class road at T fence east.....	37 28 58.1	88 15 43.5	Feet.
NOTE.—100 feet north of the above is T. 12 S., R. 8 E., corner secs. 12 and 13.			
Three corners; public T road north, 5 feet north to center of triangle.....	37 28 40.7	88 16 23.0	3,222
Bassett schoolhouse, 0.5 mile east of, 20 feet east of public T road north and 125 feet north of brick house; stone on south edge of east and west road.....	37 28 04.6	88 17 13.5	5,462
Bassett schoolhouse, 400 feet west of, three corners; second-class T road west, 50 feet north of public fork east.....	37 28 04.8	88 17 46.9	2,690
T. 12 S., R. 8 E., stone corner sections 14, 15, 22, and 23; stone is in center of east-west second-class road, 1,700 feet west of Bassett schoolhouse.....	37 28 04.8	88 18 04.2	1,400
Elizabethtown, Hardin County courthouse, center of front or south door.....	37 26 54.3	88 18 13.8	7,167
Elizabethtown, on limestone point on bank of river, directly in front of the Rose House, 5 feet west of summer house; a triangle and letters "U. S." cut in solid rock, "U. S. Engineers' Base line triangulation station".....	37 26 46.2	88 18 11.8	835
NOTE.—The engineers' position for this point is (U. S. standard datum); Latitude, 37° 26' 41.746"; longitude, 88° 18' 15.349". Difference: Latitude, 4.45"; longitude, 3.55".			
Elizabethtown, 0.6 mile northwest of; stone at T road north said to be quarter corner between secs. 22 and 27, T. 12 S., R. 8 E.....	37 27 10.6	88 18 38.2	3,265
T. 12 S., R. 8 E., stone corner secs. 21, 22, 27, and 28; stone is at fence corner on telephone line, about 670 feet west of 45° bend in road to northwest.....	37 27 10.6	88 19 11.1	2,648
Big Creek, center of iron bridge over.....	37 27 14.0	88 19 26.7	1,304
Stone Church, three corners opposite public T road north, 10 feet west to telephone pole, 35 feet east to center of triangle.....	37 27 10.8	88 20 36.9	5,674
NOTE.—130 feet east of the above is an old engine cylinder buried in center of east-west road and may be one-sixteenth corner between the SE. $\frac{1}{4}$ sec. 20 and NE. $\frac{1}{4}$ sec. 29, T. 12 S., R. 8 E.....			
T. 12 S., R. 8 E., quarter corner secs. 19 and 20, at second-class T road north and wire fence south, 10 feet northwest to three mail boxes.....	37 27 37.0	88 21 26.2	4,753
T. 12 S., R. 8 E., stone center sec. 19, on south edge of road at second-class T road north, 100 feet east of top of hill.....	37 27 37.3	88 22 00.2	2,740
T. 12 S., R. 8 E., west corner secs. 18 and 19, about 1,000 feet south of, 50 feet west of range line between secs. 19 and 24, on the north edge of east-west road opposite and in line with public T road south and 40 feet north of center of triangle; iron post stamped "Prim. Trav. Sta. No. 1, 1913, Illinois".....	37 27 54.7	88 22 38.2	3,533
T. 12 S., R. 8 E., west corner secs. 18 and 19 at T fence east.....	37 28 04.6	88 22 37.4	1,005
NOTE.—20 feet north of the above is T. 12 S., R. 7 E., corner of secs. 13 and 24, at T fence west.			
T. 12 S., R. 7 E., east corner secs. 13 and 24, about 0.6 mile northwest of; three corners public T road west, 20 feet southwest to four mail boxes, 25 feet northwest to corner wire fence.....	37 28 32.6	88 22 53.6	3,122
T. 12 S., R. 7 E., quarter corner between secs. 13 and 14, 660 feet south of; three corners second-class T road north, 15 feet north to oak, 30 feet southwest to telephone pole.....	37 28 26.0	88 23 42.6	4,008
NOTE.—660 feet north and 25 feet west of the above is within a few feet of T. 12 S., R. 7 E., quarter corner between secs. 13 and 14, at gate on east edge of road.			
T. 12 S., R. 7 E., corner secs. 10, 11, 14, and 15, 1,560 feet south of, four corners on Pope-Hardin county line; second-class cross-road.....	37 28 30.8	88 24 48.2	5,313
NOTE.—1,560 feet north of the above is T. 12 S., R. 7 E., corner secs. 10, 11, 14, and 15.			
Bridge over Grand Pierre Creek, 0.6 mile east of; three corners public T road south, center of triangle at.....	37 28 55.5	88 25 46.3	5,313
NOTE.—55 feet north and 620 feet west of the above is T. 12 S., R. 7 E., corner secs. 10, 11, 15, and 16; corner is said to be on north-south yard fence on line between kitchen and smokehouse of residence of Mr. Shetler, about 0.5 mile east of Grand Pierre Creek.			
Bridge over Grand Pierre Creek, 400 feet west of; forks of public roads northwest and southwest, 5 feet north to center of triangle, 15 feet southwest to two mail boxes.....	37 29 04.4	88 26 27.0	3,398
Bridge over Grand Pierre Creek, 0.8 mile west of; fence corner 300 feet north of public road and may be T. 12 S., R. 7 E., corner secs. 8, 9, 16, and 17.....	37 28 56.8	88 27 09.0	3,472
T. 12 S., R. 7 E., stone corner secs. 7, 8, 17, and 18; stone is at corner of picket fence on south edge of road 1,200 feet east of cross-roads at Lusk.....	37 29 02.6	88 28 08.2	4,814

## GOLCONDA QUADRANGLE—Continued.

## Along public roads—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Lusk, store and post office, 50 feet east and 20 feet north of the northeast corner of, 220 feet north of crossroads, on east edge of north and south roads, at the southwest corner of Mrs. Lucy Barger's front yard; iron post stamped "Prim. Trav. Sta. No. 2, 1913, Illinois".....	° ' "	° ' "	
Lusk, 0.75 mile north of; three corners public T road west, mail box at telephone pole in center of triangle.....	37 29 04.8 37 29 42.8	88 28 22.8 88 28 10.0	Feet. 1,190 3,992

Magnetic declination for north border of quadrangle,  $4^{\circ} 43' E.$ 

## Along highways near north border of quadrangle.

T. 12 S., Rs. 6 and 7 E., corner secs. 7, 12, 13, and 18, three corners; center of east and west road at second-class T road south..... Lusk, 1.2 miles west of center of triangle at three corners; public T road north, 50 feet east of ford of Little Grand Pierre.....	37 29 02.5 37 29 02.5	88 29 15.2 88 29 36.9	..... 1,745
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## Along highways near west border of quadrangle.

Golconda, at south edge of forks of public roads south and southwest, 60 feet north to oak tree, 60 feet southwest to oak tree.... Golconda, in Pope County courthouse yard, west and south of north gate, U. S. Corps of Engineers' bench-mark post, stamped "991" (Henderson astronomic datum).....	37 21 39.3 37 22 04.7	88 29 23.2 88 29 02.0	..... 3,085
NOTE.—The position of the above on approximate United States standard: Latitude, $37^{\circ} 22' 01.2''$ ; longitude, $88^{\circ} 29' 03.8''$ .			
Golconda, in northwest corner of courthouse yard and 71 feet northwest of U. S. Corps of Engineers' bench mark, in center of triangle formed by supports of city fire bell; iron post stamped "Prim. Trav. Sta. No. 10, 1913, Illinois".....	37 22 05.0	88 29 02.8	71
Golconda, at north edge of town; center of iron bridge over Lusk Creek.....	37 22 20.9	88 29 13.3	1,821
T. 13 S., Rs. 6 and 7 E., stone corner secs. 13, 18, 19, and 24; corner in pile of stones at wire and picket fence corner at old north and south road and telephone line.....	37 22 53.2	88 29 20.9	3,317
Forks at top of hill, public roads north and northeast center of triangle at.....	37 23 12.2	88 29 20.6	1,920
T. 13 S., Rs. 6 and 7 E., corner secs. 7, 12, 13, and 18; center of road opposite hedge north and east.....	37 23 46.1	88 29 20.4	3,426
T. 13 S., Rs. 6 and 7 E., corner secs. 1, 6, 7, and 12; center of main road, 25 feet south of T lane west to barn with cupola.....	37 24 38.6	88 29 19.6	5,310
T. 12 and 13 S., Rs. 6 and 7 E., stone corner secs. 1, 6, 31, and 36, at fence corner in northwest corner of pasture and about 700 feet west of public road.....	37 25 31.4	88 29 18.5	5,342
Little Grand Pierre Creek, 700 feet west of ford at; stone in center of triangle at second-class road west and $45^{\circ}$ bend in main road to northeast.....	37 26 10.7	88 28 54.0	4,437
T. 12 S., R. 7 E., quarter corner between secs. 30 and 31 (?) ; center of road at east and west fence.....	37 26 24.0	88 28 44.4	1,552
Gowen's store, 125 feet south of; fork in roads, public roads north and northeast, 30 feet southeast to northwest corner shop, 60 feet northwest to front gate.....	37 26 38.4	88 28 36.6	1,577
T. 12 S., R. 7 E., corner secs. 29, 30, 31, and 32, on east and west fence row, 0.5 miles southeast of store at "Gowens".....	37 26 24.1	88 28 10.9	2,529
T. 12 S., R. 7 E., stone quarter corner between secs. 19 and 20, in corner of cross fences.....	37 27 43.3	88 28 09.9	8,010
Lusk, about 1 mile south of, 810 feet west of corner secs. 17, 18, 19, and 20, T. 12 S., R. 7 E., three corners; center of north and south road at public T road east; 5 feet northeast to center of triangle, 12 feet southeast to wire fence corner.....	37 28 09.8	88 28 19.6	2,788
Lusk, on east edge of north and south road at the southwest corner of Mrs. Lucy Bayers' front yard, 50 feet east and 20 feet north of the northeast corner of store and 220 feet north of crossroads; iron bench-mark post stamped "Prim. Trav. Sta. No. 2, 1913, Illinois".....	37 29 04.8	88 28 22.8	5,550
Bay City, 70 feet north of Glass's store, 30 feet west of center of north-south road; U. S. Corps of Engineers' bench-mark post (Henderson astronomic datum).....	37 15 03.1	88 29 47.6	.....
NOTE.—The position of above on approximate United States standard: Latitude, $37^{\circ} 14' 59.6''$ ; longitude, $88^{\circ} 29' 50.4''$ .			

Magnetic declination for west border of quadrangle  $4^{\circ} 27' E.$

## JOPPA QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Center of east and west road, just north of telephone pole with signboard; road east, west, southeast, and southwest.....	° ′ ″ 37 14 30.3	° ′ ″ 88 59 58.1	Ft.
U. S. Corps of Engineers' bench mark 46, Grand Chain Landing, about 300 feet above shore end of current deflecting crib and rock dike and about 60 feet below, near corner of white frame house, on slope of hill, about 150 feet back from top of river bank, in small ravine at corner of orchard and about 25 feet from river-side corner of shed and privy respectively; top of cap of 2-inch galvanized pipe.....	37 13 44.0	88 59 37.6	4,966
Tps. 14 and 15 S., Rs. 2 and 3 E., corner of; center of north-south road on county line at fence east.....	37 14 51.3	88 55 41.3	.....
Crossroads on ridge, north-south road on Pulaski-Massac county line.....	37 14 32.3	88 55 40.6	1,926
Crossroads, 290 feet west of line between secs. 5 and 6, T. 15 S., R. 3 E.....	37 14 38.3	88 54 43.4	4,666
T. 15 S., R. 3 E., road north on line between secs. 4 and 5, just north of schoolhouse.....	37 14 24.6	88 53 37.4	5,514
Hillerman, T road east.....	37 14 13.8	88 53 21.5	1,688
T. 15 S., R. 3 E., corner of secs. 3, 4, 9, and 10; center of east-west road at north-south fence line.....	37 14 13.1	88 52 32.5	3,965
T. 15 S., R. 3 E., corner of secs. 2, 3, 10, and 11; crossroads.....	37 14 11.9	88 51 26.2	5,360
T. 15 S., R. 3 E., in SW. $\frac{1}{4}$ sec. 2, 50 feet east and 25 feet north of Chicago & Eastern Illinois R. R. at east-west road crossing; iron post stamped "Prim. Trav. Sta. No. 16, 1915, Ill.".....	37 14 20.1	88 51 05.1	1,902
T. 15 S., R. 3 E., road south on line between secs. 1 and 2.....	37 14 23.6	88 50 20.8	3,603
Tucker schoolhouse, 530 feet north of; wooden culvert at crossroads, line between secs. 1 and 6, T. 15 S., Rs. 3 and 4 E.....	37 14 17.0	88 49 15.0	5,362
T. 15 S., R. 4 E., stone quarter corner between secs. 5 and 8.....	37 14 10.5	88 47 31.2	8,419

Magnetic declination for quadrangle,  $4^{\circ} 3^{\prime}$  E.

## MARION QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 12 S., R. 4 E., stone quarter corner between secs. 3 and 4, 1,000 feet north of J. F. Russell's house, 5 feet north of corner rail fence at $90^{\circ}$ angle in road to west.....	° ′ ″ 37 30 32.1	° ′ ″ 88 45 49.7	Ft.
Tps. 11 and 12 S., R. 4 E., within a few feet of quarter corner between secs. 4 and 33 (corner could not be found).....	37 30 46.9	88 46 22.4	3,030
Tps. 11 and 12 S., R. 4 E., 0.25 mile north and 1,000 feet east of corner secs. 4, 5, 32, and 33, three corners at Reynoldsburg, at northeast corner of triangle, 20 feet west of north-south road; iron bench-mark post stamped "Prim. Trav. Sta. No. 4, 1913, Ill.".....	37 30 58.8	88 46 30.7	1,388
Reynoldsburg, 1.3 miles northeast of; three corners, public T road west, at center of north-south road, 10 feet west to center of triangle, 20 feet northwest to elm tree.....	37 32 00.2	88 46 19.7	6,267
T. 11 S., R. 4 E., quarter corner between secs. 21 and 28, 0.5 mile west of Ozark intersection of public crossroads.....	37 32 33.6	88 46 19.7	3,390
T. 11 S., R. 4 E., stone in center of sec. 21, on north edge of east and west road at public T road south.....	37 32 59.2	88 46 19.7	2,689
T. 11 S., R. 4 E., stone corner secs. 15, 16, 21, and 22, in center of intersection of second-class crossroads.....	37 33 25.2	88 45 45.8	3,714
T. 11 S., R. 4 E., stone corner secs. 9, 10, 15, and 16, at junction of east-west wire fence and T fence south.....	37 34 27.8	88 46 19.2	6,883
New Burnside station, 300 feet east of; center of main track Big Four R. R. at north-south road crossing.....	37 34 51.5	88 46 16.9	2,414
T. 11 S., R. 4 E., stone quarter corner between secs. 4 and 9, 15 feet northwest of center of second-class east-west crossroad.....	37 35 13.1	88 46 19.0	2,105
Tps. 10 and 11 S., R. 4 E., 25 feet east of the south corner secs. 33 and 34, is north corner secs. 3 and 4; center of north-south road at east-west fence is also Johnson-Williamson county line.....	37 36 04.3	88 45 45.6	5,831
T. 10 S., R. 4 E., 12 feet north and 20 feet west of corner secs. 27, 28, 33, and 34, at northwest corner of crossroads; iron bench mark post stamped "Prim. Trav. Sta. No. 10, 1911, Illinois."....	37 36 57.3	88 45 45.8	5,305

Magnetic declination for east border of quadrangle,  $4^{\circ} 15'$  E.

**MARION QUADRANGLE—Continued.****Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 12 S., R. 2 E.; center of east-west road at fence on line between secs. 3 and 4.....	37 30 03.7	88 59 01.5	Feet. ....
T. 12 S., R. 2 E.; road forks at road south on line between secs. 2 and 3; 130 feet north of road forks is north corner of secs. 2 and 3, T. 12 S., R. 2 E., and 20 feet east of this corner is south corner of secs. 34 and 35, T. 11 S., R. 2 E.....	37 30 37.7	88 57 54.9	6,376
Chicago & Eastern Illinois R. R. crossing, 260 feet northeast of store building now used for storage purposes.....	37 31 04.4	88 57 21.6	3,806
T. 11 S., R. 2 E.; center of road at line between secs. 35 and 36, T lane north.....	37 31 16.5	88 56 48.3	2,949
T road southeast, 450 feet southwest of O. A. Lenon's mailbox No. 20 in front of house.....	37 31 45.2	88 55 30.0	6,947
T. 11 S., R. 3 E.; center of road at fence on line between secs. 30 and 31.....	37 31 37.6	88 55 15.2	1,415
T. 11 S., R. 3 E., at the northeast corner of crossroads in the southwest part of the N.W. 1/4 sec. 32, 60 feet northeast of mail boxes 14, 15, and 16, on the Vienna-Goreville road, old one-story frame house stands at the southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 14, 1915, Ill.".....	37 31 17.8	88 54 33.3	3,927
T. 11 S., R. 3 E., T road north; road west is second class, line between secs. 28 and 33.....	37 31 37.1	88 53 16.6	6,485
Right-angle bend in road just north of mail box 56; road west is on line between secs. 27 and 34.....	37 31 37.4	88 52 26.1	4,065
Road at creek just east of R. Riley's mail box.....	37 31 26.2	88 52 12.7	1,568
T. 11 S., R. 3 E.; center of east-west road at T lane north on line between secs. 34 and 35.....	37 31 25.7	88 51 19.6	4,277
Tunnel Hill; railroad crossing just south of depot.....	37 31 24.3	88 50 17.0	5,052
T. 11 S., R. 3 E., quarter corner between secs. 35 and 36; center of east-west road, just north of paling gate and 370 feet east of T road east, which is above and just southwest of north entrance of tunnel.....	37 31 12.8	88 50 13.6	1,587
T road south.....	37 31 13.4	88 49 57.4	1,310
T. 11 S., Rs. 3 and 4 E., quarter corner between secs. 31 and 36; T lane north.....	37 31 14.0	88 49 08.3	3,950
T road north.....	37 31 14.3	88 48 35.2	2,671
T. 11 S., R. 4 E.; T road south on line between secs. 32 and 33.....	37 31 00.8	88 46 54.6	8,220
Prim Trav. Sta. No. 4, 1913, Ill.....	37 30 58.8	88 46 30.7	1,936

**Magnetic declination for south border of quadrangle, 41° E.****MOUND CITY QUADRANGLE.****Near northeast corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 14 S., R. 2 E., south corner of secs. 32 and 33; T road west.....	37 14 41.0	89 00 15.8	Feet. ....

**PADUCAH QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 14 and 15 S., Rs. 5 and 6 E., stone corner secs. 1, 6, 31, and 36, on west edge of traveled part of north and south road, 10 feet east of center of triangle at public T road west; also corner between Pope and Massac counties.....	37 14 55.5	88 36 05.9	Feet. ....
Tps. 14 and 15 S., R. 5 E., stone corner secs. 1, 2, 35, and 36; public T roads, on south edge of east-west road.....	37 14 56.8	88 37 12.4	5,374
Tps. 14 and 15 S., R. 5 E., 750 feet south and 1,500 feet east of corner secs. 2, 3, 34, and 35, 15 feet south and 25 feet east of intersection of crossroads; iron bench mark post stamped "Prim. Trav. Sta. No. 7, 1913, Illinois".....	37 14 50.2	88 37 59.6	3,878
Three corners, second-class T road northwest, center of northeast-southwest road at intersection, 5 feet northwest to center of triangle, 5 feet south to George Meyer's mail box.....	37 14 52.6	88 39 01.9	5,044

## PADUCAH QUADRANGLE—Continued.

Along highways near north border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Forks of public roads northeast and northwest, 10 feet east to center of triangle.....	* * "	* * "	Feet.
Round Knob, 60 feet north and 35 feet west of intersection of cross streets at Dr. Dixon's residence and drug store; iron bench-mark post stamped "Prim. Trav. Sta. No. 8, 1913, Illinois"....	37 14 30.8	88 39 37.0	3,593
	37 14 54.6	88 44 11.5	.....

Magnetic declination for north border of quadrangle,  $4^{\circ} 23' E.$ 

## STONEFORT QUADRANGLE.

Along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
T. 11 S., R. 6 E., stone corner secs. 13, 14, 23, and 24; stone is in corner of cross fences 1,300 feet north of G. L. Hancock's residence, Oak store and post office, 0.25 mile south of; public T road west, 5 feet west to center of triangle, 30 feet north to oak tree.....	* * "	* * "	Feet.
T. 11 S., R. 6 E., quarter corner between secs. 11 and 14, at $90^{\circ}$ bend in road to west 0.5 mile north of Oak post office.....	37 33 24.2	88 30 16.7	.....
T. 11 S., R. 6 E., corner secs. 2, 3, 10, and 11; public T road east..	37 33 37.9	88 30 49.8	3,004
Tps. 10 and 11 S., R. 6 E., on east-west line between secs. 2 and 35; line between Pope and Saline counties center of Harrisburg road at.....	37 34 16.7	88 30 49.0	3,930
NOTE.—2,220 feet west of the above is T. 10 S., R. 6 E., stone (south) corner of secs. 34 and 35; 140 feet east of this corner is T. 11 S., R. 6 E. (north) corner secs. 2 and 3.	37 35 08.3	88 31 02.3	5,330
Pope-Saline county line, 1.2 miles north of; second-class road south at bend of main road to north, 30 feet west to oak on bank, 30 feet south to center of triangle.....	37 35 03.5	88 30 53.6	5,627
T. 10 S., R. 6 E., east-west line between secs. 23 and 26; center of road at crossing.....	37 37 08.6	88 31 02.9	6,638
NOTE.—1,330 feet west of the above is T. 10 S., R. 6 E., corner secs. 22, 23, 26, and 27; near creek bank at corner post of wire fence. Bridge over McSparrin Branch, 500 feet north of; public T road east to Rudement, center of triangle at.....	37 37 49.3	88 31 03.4	4,115
T. 10 S., R. 6 E., stone corner secs. 23, 24, 25, and 26, at fourcorners, 1,000 feet east of Spring Valley Church.....	37 38 02.5	88 31 03.2	1,350
Rudement, primary traverse station No. 8, 1911.....	37 37 49.4	88 30 13.2	4,236
	37 38 15.7	88 29 22.9	4,850

Magnetic declination for southeast border of quadrangle,  $4^{\circ} 44' E.$ 

Along highways near south border of quadrangle.

Three corners, center of north and south road at public T road east, 25 feet southeast to post in corner of fence.....	37 30 25.0	88 32 30.2	.....
Three corners, public T road east, center of triangle at.....	37 30 26.7	88 33 36.0	5,300
Tps. 11 and 12 S., R. 6 E., stone corner secs. 4, 5, 32, and 33, 10 feet west of oak tree at $90^{\circ}$ bend in road to north.....	37 30 46.7	88 33 38.7	2,032
Eddyville, cross streets at Hathaway's Hotel, 35 feet northeast to corner hotel porch, 10 feet south to plank bridge.....	37 30 07.5	88 35 11.5	.....
T. 12 S., Rs. 5 and 6 E., stone quarter corner between secs. 1 and 6, 750 feet west of ford of small stream, 150 feet east of second-class fork southwest, 10 feet south of wire fence and 15 feet east of a blazed walnut tree and on line of wire fence.....	37 30 20.0	88 35 58.0	.....
Tps. 11 and 12 S., Rs. 5 and 6 E., 0.25 mile west of corner secs. 1, 6, 31, and 36, three corners, public T road west.....	37 30 45.8	88 36 14.4	2,936
Tps. 11 and 12 S., Rs. 5 and 6 E., stone corner secs. 1, 6, 31, and 36, at fence corner 0.25 mile east of three corners on township line between Tps. 11 and 12 S.....	37 30 45.8	88 35 57.7	1,342
Tps. 11 and 12 S., R. 5 E., 0.25 mile north and 0.25 mile east of corner secs. 1, 2, 35, and 36, in fence corner on south edge of east and west road in line with public T road north; iron bench-mark post stamped "Prim. Trav. Sta. No. 3, 1913, Ill.".....	37 30 58.8	88 36 47.2	1,202
Tps. 11 and 12 S., R. 5 E., stone at south corner secs. 35 and 36; 300 feet east of above is stone north corner secs. 1 and 2.....	37 30 45.9	88 37 08.9	1,872
Simon Miller's mail box, at bend of main road southwest and second-class road west.....	37 30 43.6	88 38 02.5	4,729

Magnetic declination for south border of quadrangle,  $4^{\circ} 37' E.$ ; for west border,  $4^{\circ} 16' E.$

## VIENNA QUADRANGLE.

Along highways near northeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Simpson, 0.5 mile northeast of; public T road east, 12 feet northeast to telephone pole.....	37 28 29.0	88 45 01.4	Feet.....
Simpson station, 50 feet south of intersection of main track Illinois Central R. R. and public road crossing.....	37 28 04.3	88 45 16.3	2,776
T. 12 S., R. 4 E., corner secs. 9, 10, 15, and 16, at 90° bend in road to north.....	37 29 04.4	88 45 50.8	6,694
Simpson station, about 2 miles north of, 500 feet west of double bridges, 100 feet east of public T road south, intersection of Illinois Central R. R. and public road crossing.....	37 29 49.7	88 45 25.6	5,011

Along highways near east border of quadrangle.

T. 12 S., R. 4 E., quarter corner between secs. 15 and 22, 210 feet west of railroad crossing, 35 feet north of front door of shop; iron rod.....	37 28 05.1	88 45 18.7	.....
T. 12 S., R. 4 E., corner secs. 15, 16, 21, and 22; public T road south, 10 feet southeast to center of triangle.....	37 28 05.5	88 45 52.7	2,747
T. 12 S., R. 4 E., 740 feet west of quarter corner between secs. 16 and 21, on top of small hill, intersection of public crossroads.....	37 28 05.7	88 45 34.8	3,390
Simpson station, about 2 miles south of, at bottom of hill center of north and south road at second class T road through gateway, to west 25 feet northeast to hickory, 25 feet southwest to mail box.....	37 27 06.7	88 46 32.3	5,978
T. 12 S., R. 4 E., stone corner secs. 28, 29, 32, and 33, in orchard 25 feet north of center of public road at a point 25 feet east of gate to Mr. T. H. Sharpe's barn.....	37 26 20.5	88 46 58.1	5,113
Four corners, intersection of public crossroads, 30 feet northeast to corner post of wire fence, 40 feet northwest to two telephone poles. Three corners, public T road west, 10 feet west to center of triangle, 10 feet northeast to telephone pole.....	37 26 07.5	88 47 30.3	2,917
T. 13 S., R. 4 E., corner secs. 4, 5, 8, and 9, 1,370 feet east of T road north, in center of east and west road opposite rail fence north.....	37 25 15.3	88 47 12.2	5,483
Wartrace, 900 feet southeast of, in the N.E. $\frac{1}{4}$ sec. 9, T. 13 S., R. 4 E., on the north edge of road opposite public T road south to New Columbia; iron bench-mark post stamped "Prim. Trav. Sta. No. 5, 1913, Illinois".....	37 24 31.8	88 46 56.1	4,595
T. 13 S., R. 4 E., stone corner secs. 9, 10, 15, and 16, in corner of east and west wire fence and T fence south, in woods 10 feet north of road.....	37 23 57.8	88 46 42.9	3,604
T. 13 S., R. 4 E., stone in center of sec. 34, 15 feet west of a gate about 300 feet southwest of John Comer's residence.....	37 23 39.8	88 45 50.8	4,582
Tps. 13 and 14 S., R. 4 E., west line between secs. 3 and 34; also line between Massac and Johnson counties, center of public road.....	37 20 36.6	88 45 20.6	.....
T. 14 S., R. 4 E., quarter corner between secs. 3 and 10; center of north and south road at second-class T road east, 0.25 mile south of schoolhouse.....	37 20 10.0	88 45 17.7	2,704
New Columbia, about 1 mile east of and 100 feet west of T road north; center of bridge over creek.....	37 19 29.2	88 45 22.3	4,137
T. 14 S., R. 4 E., stone quarter corner between secs. 10 and 15, in center of north and south road.....	37 18 50.3	88 45 22.3	3,938
Three corners, at foot of hill, 35 feet south of small stream, 20 feet west of center of triangle; center of north and south road at public T road east.....	37 18 36.7	88 45 22.1	1,373
Four corners, public T road east, second-class T road west, 80 feet south of plank bridge at south end of levee, 35 feet southeast of oak tree, 25 feet west of center of triangle.....	37 18 22.7	88 45 38.8	1,950
T. 14 S., R. 4 E., quarter corner between secs. 23 and 27, 60 feet west of road at first bridge at south end of levee.....	37 17 49.8	88 45 23.1	3,559
Three corners, near center of sec. 27, T. 14 N., R. 4 E., 150 feet north of Pleasant Union Schoolhouse; public T road west 10 feet northwest to oak.....	37 16 49.5	88 45 22.1	6,006
T. 13 S., R. 3 E., quarter corner between secs. 1 and 12; bend in road, 130 feet south of T road south.....	37 16 23.6	88 45 23.6	2,631

Along highways through center of quadrangle.

Prim. Trav. Sta. No. 5, 1913, Ill. (See above).....	37 23 57.8	88 46 42.9	.....
Wartrace Schoolhouse, telephone pole in front of, 20 feet south of line between secs. 5 and 8, T. 13 S., R. 4 E.....	37 24 30.6	88 47 29.4	5,010
T lane north, 25 feet southwest of L. L. Hogg's mail box 47.....	37 24 43.6	88 48 04.0	3,086
T. 13 S., Rs. 3 and 4 E., center of east and west road in line with road south on town line between Rs. 3 and 4 E.....	37 24 40.0	88 49 09.3	5,282
T. 13 S., R. 4 E., west corner of secs. 6 and 7; center of north and south road at fence east.....	37 24 30.7	88 49 09.5	935
T. 13 S., R. 3 E., quarter corner between secs. 1 and 12; bend in road, 130 feet south of T road south.....	37 24 36.4	88 49 42.0	2,683

## VIENNA QUADRANGLE—Continued.

## Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 13 S., R. 3 E., center of east and west road at line between secs. 1 and 2, 200 feet south of schoolhouse and in line with fence north, 10 feet west of T lane north.....	37 24 39.2	88 50 14.9	2,669
T. 13 S., R. 3 E., T road south on line between secs. 2 and 3.....	37 24 48.1	88 51 21.1	5,418
T. 13 S., R. 3 E., T road south on line between secs. 3 and 4.....	37 25 03.6	88 52 27.3	5,570
Vienna, railroad crossing, main track, just south of depot.....	37 25 02.4	88 53 11.0	3,523
Vienna, in yard of Johnson County courthouse, 9 feet west of concrete base of gun near the northwest corner of courthouse; iron post stamped "Prim. Trav. Sta. No. 11, 1915, Ill.".....	37 24 55.6	88 53 47.0	2,980
T. 13 S., R. 3 E., line between secs. 5 and 6; bend in road at fence north, 240 feet west of small bridge.....	37 24 53.8	88 54 42.2	4,460
T. 13 S., R. 2 E., east corner of secs. 1 and 12; T road west (20 feet north of above corner) is T. 13 S., R. 3 E., west corner of secs. 6 and 7, fence east).....	37 24 37.6	88 55 41.7	5,072
T. 13 S., R. 2 E., corner of secs. 1, 2, 11, and 12; 20 feet north is T. 13 S., R. 3 E., center of east and west road at north and south fence line, 210 feet east of top of hill.....	37 24 28.6	88 56 47.5	5,382
T. 13 S., R. 2 E., line between secs. 2 and 11; T road south at Oak Grove schoolhouse, 2 feet east and 6 feet north of J. B. Stanley's mail box 30.....	37 24 27.4	88 57 04.0	1,339
T. 13 S., R. 2 E., quarter corner between secs. 10 and 11, 10 feet east of T lane south.....	37 23 58.2	88 57 54.9	5,056
Railroad crossing, Chicago, Burlington & Quincy R. R., east-west quarter-section line through sec. 10, T. 13 S., R. 2 E.....	37 23 56.9	88 58 20.2	2,050
Cache River, east end of bridge over.....	37 23 44.1	88 58 32.1	1,609
T. 13 S., R. 2 E., line between secs. 15 and 16; T road west, 0.25 mile north of corner of secs. 15, 16, 21, and 22.....	37 22 49.0	88 59 01.8	6,070

## Along highways near south border of quadrangle.

T. 14 S., R. 2 E., corner of secs. 27, 28, 33, and 34; center of east-west road at fence north, 200 feet east of large white house on north side of road.....	37 15 36.8	88 59 06.0	.....
T road south at Swan Lake Schoolhouse, 620 feet east of T road north.....	37 15 37.9	88 58 41.3	2,000
T. 14 S., R. 2 E., corner of secs. 26, 27, 34, and 35; T road north.....	37 15 39.8	88 57 57.1	3,580
West end of bridge over big ditch.....	37 15 41.6	88 57 08.5	3,930
T. 14 S., R. 2 E., corner of secs. 25, 26, 35, and 36; wooden post driven flush with ground in center of east and west road, in line with north and south fence.....	37 15 42.4	88 56 49.1	1,570
T. 14 S., R. 2 E., east corner of secs. 25 and 36, Pulaski-Massac county line (180 feet south of above corner is T. 14 S., R. 3 E. west corner of secs. 30 and 31; T road east).....	37 15 44.9	88 55 41.4	5,484
Right-angle bend in road at lane east; township line.....	37 15 03.0	88 47 26.9	.....
T. 14 S., R. 4 E., center of sec. 32; T road east.....	37 15 30.4	88 47 36.0	2,858
T. 14 S., R. 4 E., quarter corner between secs. 32 and 33; center of east and west road at north and south fence line.....	37 15 30.2	88 47 02.9	2,670
T. 14 S., R. 4 E., quarter corner between secs. 33 and 34; T road south.....	37 15 30.3	88 45 56.0	5,410
Round Knob, 1 mile northwest of; T road west.....	37 15 30.0	88 44 59.6	4,560

## Along highways, Chicago &amp; Eastern Illinois R. R., and Cleveland, Cincinnati, Chicago &amp; St. Louis R. R. near west border of quadrangle.

Buncombe, 1.5 miles northwest of; north end of bridge over Lick Creek.....	37 29 25.6	88 59 59.2	.....
Chicago & Eastern Illinois R. R., at second-class road crossing, 600 feet west of milepost "J 12".....	37 18 04.7	88 59 12.0	.....
Karnak, junction of Chicago & Eastern Illinois and Big Four railroads.....	37 17 48.6	88 58 29.9	3,774
T. 14 S., R. 2 E., corner of secs. 15, 16, 21, and 22; corner fence post, 40 feet northeast of crossing.....	37 17 22.6	88 59 03.1	3,756

Magnetic declination through center of quadrangle,  $4\frac{1}{2}$ ° E.; for west border,  $4\frac{1}{2}$ ° E. for north border,  $4\frac{1}{2}$ ° E.; for south border,  $4\frac{1}{2}$ ° E.; for east border,  $4^{\circ} 23'$  E.

## ILLINOIS AND WISCONSIN.

### PRIMARY TRAVERSE.

**Belvidere, Oregon, Pecatonica, and Rockford quadrangles, Ill.; Brodhead quadrangle, Wis.**

**STEPHENSON AND WINNEBAGO COUNTIES, ILL.; GREEN AND ROCK COUNTIES, WIS.**

The following geographic positions on North American datum were determined in 1915 by J. H. Wilson and are based on primary traverse positions determined in 1911, described in Bulletin 551:

#### BELVIDERE QUADRANGLE.

**Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 46 N., R. 2 E., corner secs. 3, 4, 9, and 10, 650 feet south of cross-roads; center of north-south road.....	42° 29' "	88° 59' 59.7"	<i>Feet.</i>
T. 46 N., R. 2 E., corner secs. 9, 10, 15, and 16; crossroads.....	42 28 17.7	88 59 59.3	5,290
T. 46 N., R. 2 E., corner secs. 15, 16, 21, and 22; crossroads.....	42 27 25.4	88 59 59.0	5,300
T. 46 N., R. 2 E., corner secs. 21, 22, 27, and 28; T road north.....	42 26 33.1	88 59 58.8	5,290

Magnetic declination near west border,  $2^{\circ} 41'$  E.

#### OREGON QUADRANGLE.

**Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 26 N., R. 9 E., corner of secs. 16, 17, 20, and 21, 30 feet west and 30 feet north of, at northwest corner of crossroads, 0.8 mile south of Evans, at district No. 5 schoolhouse; iron post stamped "Prim. Trav. Sta. No. 33, Ill., 1911".....	42 14 39.60	89 28 26.80	<i>Feet.</i>
T. 26 N., R. 9 E., corner of secs. 15, 16, 21, and 22; crossroads.....	42 14 40.5	89 27 17.4	5,218
T. 26 N., R. 9 E., corner of secs. 14, 15, 22, and 23; center of east-west road.....	42 14 42.0	89 26 07.8	5,240
T. 26 N., R. 9 E., quarter corner between secs. 14 and 23; crossroads.....	42 14 42.6	89 25 32.8	2,630
T. 26 N., R. 9 E., corner of secs. 13, 14, 23, and 24; center of east-west road.....	42 14 43.3	89 24 58.2	2,605
T. 26 N., Rs. 9 and 10 E., corner of secs. 13, 24, 18, and 19; crossroads on Stephenson-Winnebago county line.....	42 14 43.8	89 23 47.8	5,300
T. 26 N., R. 10 E., corner of secs. 17, 18, 19, and 20; crossroads.....	42 14 44.7	89 22 38.1	5,240
T. 26 N., R. 10 E., corner of secs. 16, 17, 20, and 21; crossroads at Seward town hall.....	42 14 45.5	89 21 28.4	5,241
T. 26 N., R. 10 E., corner of secs. 15, 16, 21, and 22; T road south.....	42 14 46.2	89 20 18.4	5,270
T. 26 N., R. 10 E., corner of secs. 14, 15, 22, and 23; crossroads 20 feet north of concrete bridge.....	42 14 46.7	89 19 08.2	5,280
T. 26 N., R. 10 E., 25 feet south and 30 feet west of corner of secs. 13, 14, 23, and 24, at southwest corner of crossroads, 2 feet west of Wilke Braver's mail box; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	42 14 47.4	89 17 59.0	5,205

Magnetic declination near north border of quadrangle,  $4^{\circ} 19'$  E.

## PECATONICA QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 28 N., R. 10 E., corner secs. 25, 26, 35, and 36; crossroads at schoolhouse.....	42 23 25.6	89 18 04.8	.....
T. 28 N., R. 10 E., corner secs. 23, 24, 25, and 26; crossroads.....	42 24 17.7	89 18 05.9	5,279
T. 28 N., Rs. 10 and 11 E., corner secs. 24, 25, 19, and 30; crossroads.....	42 24 20.1	89 16 56.6	5,207
T. 28 N., Rs. 10 and 11 E., corner secs. 13, 24, 18, and 19; crossroads.....	42 25 10.3	89 16 58.3	5,085
T. 28 N., R. 10 E., east corner secs. 12 and 13; T road west (235 feet north of above corner is west corner of secs. 7 and 18, T. 28 N., R. 11 E., T road east).....	42 26 02.2	89 16 59.8	5,250
Chicago, Milwaukee & St. Paul Ry.; center of north-south road crossing.....	42 26 20.2	89 17 00.4	1,820
T. 28 N., R. 10 E., quarter corner east side sec. 1, T road west (215 feet north of above corner is quarter corner west side sec. 6, T. 28 N., R. 11 E., T road east at church).....	42 27 20.0	89 17 02.2	6,066
Tps. 28 and 29 N., Rs. 10 and 11 E.: crossroads.....	42 27 45.8	89 17 02.9	2,610
T. 29 N., R. 10 E., quarter corner east side sec. 25; right-angle turn in road.....	42 29 03.9	89 17 04.9	7,910
Center of north-south road at crossing of east-west section line.....	42 29 29.6	89 17 22.8	2,936
T. 29 N., R. 10 E., about 0.25 mile west of north corner of fractional secs. 19 and 24, 30 feet south and 42 feet west of center of road forks, 30 feet south of Illinois-Wisconsin State line; iron post stamped "Prim. Trav. Sta. No. 4, 1915, Ill.".....	42 29 56.7	89 17 23.3	2,740
T. 29 N., R. 10 E., north corner fractional secs. 23 and 24, 160 feet east of center of road forks at road northeast; center of east-west road.....	42 29 57.7	89 18 15.7	3,928
T. 1 N., R. 10 E., south corner secs. 33 and 34; center of road on State line.....	42 29 57.8	89 18 24.8	680
T. 29 N., R. 10 E., north corner fractional secs. 22 and 23; T road south on Illinois-Wisconsin State line.....	42 29 58.9	89 19 26.6	4,631
T. 1 N., R. 10 E., south corner secs. 32 and 33; center of State line road.....	42 29 59.1	89 19 35.6	680
T. 29 N., R. 11 E., quarter corner between secs. 31 and 32, center of east-west road.....	42 28 13.2	89 15 52.9	.....
Sugar River, west end of bridge over.....	42 28 31.1	89 15 01.1	4,290
T. 26 N., R. 10 E., corner of secs. 11, 12, 13, and 14; crossroads at schoolhouse.....	42 15 39.9	89 17 59.5	.....
T. 26 N., R. 10 E., corner of secs. 1, 2, 11, and 12; crossroads.....	42 16 32.2	89 18 00.1	5,290
Chicago & North Western Ry., track at north-south road crossing, 80 feet north to Rockford & Interurban Electric Ry. crossing.....	42 17 13.5	89 18 00.7	4,180
T. 26 N., R. 10 E., north corner of secs. 1 and 2 (60 feet west of above corner is south corner of secs. 33 and 36, T. 27 N., R. 10 E.).....	42 17 23.0	89 18 01.0	970
T. 27 N., R. 10 E., approximate quarter corner between secs. 35 and 36; crossroads.....	42 17 48.9	89 18 02.0	2,623
T. 27 N., R. 10 E., corner of secs. 25, 26, 35, and 36, T road east.....	42 18 15.3	89 18 02.2	2,665
T. 27 N., R. 10 E., corner of secs. 23, 24, 25, and 26; T road south.....	42 19 07.6	89 18 02.8	5,235
Center of north-south road at east-west section line.....	42 19 59.8	89 17 45.2	5,439
Watson Schoolhouse, T road south at.....	42 20 25.8	89 17 45.3	2,640
North-south line of township, at south end of jog in road, in line with road west.....	42 20 38.1	89 16 52.6	4,149
T. 27 N., R. 11 E., corner of secs. 7, 8, 17, and 18, right-angle turn in road.....	42 20 53.0	89 15 45.0	5,295
T. 27 N., R. 11 E., quarter corner between secs. 8 and 17; crossroads.....	42 20 53.4	89 15 10.0	2,634

Magnetic declination near east border of quadrangle, 4° 00' E.

Along highways near north border of south half of quadrangle.

North-south section line center of road.....	42 22 00.4	89 15 44.9	.....
Pecatonica River, north end of Trask Bridge over, 25 feet north to large elm tree at north end of railing.....	42 22 20.6	89 15 53.4	2,143
Trask Bridge, about 0.5 mile northwest of; T road north.....	42 22 35.4	89 16 19.3	2,456
Mail box No. 31 (Haughton's).....	42 22 35.2	89 17 12.7	4,005
T. 27 N., R. 10 E., 20 feet east of center of road north, on line between secs. 35 and 36, at northeast corner of road forks; iron post stamped "Prim. Trav. Sta. No. 2, 1915".....	42 22 43.5	89 18 03.7	3,17
Tps. 27 and 28 N., R. 10 E., about 500 feet south of apparent corner of secs. 2, 3, 34, and 35; center of north-south road at crossroads.....	42 22 39.5	89 19 08.5	4,881
T. 28 N., R. 10 E., quarter corner on south side of sec. 34; T road north.....	42 22 32.3	89 19 47.8	3,045
T. 27 N., R. 10 E., north corner of secs. 3 and 4; T road south (55 feet west of above corner is south corner of secs. 33 and 34, T. 28 N., R. 10 E.).....	42 22 32.2	89 20 22.4	2,590

## PECATONICA QUADRANGLE—Continued.

Along highways near north border of south half of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 27 and 28 N., R. 10 E., corner of secs. 4, 5, 32, and 33; stone at crossroads.....	42 22 32.1	89 21 33.1	Feet. 5,309
T. 27 N., R. 10 E., 35 feet south and 45 feet east of north corner of secs. 5 and 6, and 35 feet south and 20 feet east of south corner of secs. 31 and 32, T. 28 N., R. 10 E., at southeast corner of crossroads just north of Blake schoolhouse; iron post stamped "Prim. Trav. Sta. No. 3, 1915".....	42 22 31.6	89 22 42.7	5,223
Tps. 27 and 28 N., Rs. 9 and 10 E., crossroads at corner of Stephenson-Winnebago county line.....	42 22 31.4	89 23 52.0	5,202
T. 27 N., R. 9 E., north corner of secs. 35 and 36; center of east-west road.....	42 22 31.4	89 25 02.6	5,299
T. 28 N., R. 9 E., quarter corner south side of sec. 35; crossroads at schoolhouse (25 feet west of above corner) is quarter corner north side of sec. 2, T. 27 N., R. 9 E.).....	42 22 31.4	89 25 37.2	2,600
T. 28 N., R. 9 E., south corner of secs. 33 and 34; T road north (135 feet west of above corner) is north corner of secs. 3 and 4, T. 27 N., R. 9 E.).....	42 22 30.3	89 27 22.0	7,861
T. 27 N., R. 9 E., north corner of secs. 4 and 5, 25 feet east and 30 feet south of, at southeast corner of T road south, 100 feet west of T road north; iron post stamped "Prim. Trav. Sta. No. 30, Ill., 1911".....	42 22 29.40	89 28 33.30	5,356

Along highways south through center of south half of quadrangle.

T. 27 N., R. 9 E., southeast corner of sec. 1; T road west.....	42 21 39.6	89 23 51.6	.....
T. 27 N., R. 10 E., southwest corner of sec. 7; T road east.....	42 20 50.2	89 23 51.2	5,000
T. 27 N., R. 9 E., east corner of secs. 12 and 13; T road west at schoolhouse.....	42 20 48.0	89 23 51.3	225
T. 27 N., R. 10 E., quarter corner west side of sec. 18; T road east.....	42 20 23.7	89 23 51.1	2,460
T. 27 N., R. 10 E., quarter corner between secs. 17 and 18; T road west.....	42 20 24.2	89 22 43.1	5,110
Road forks; center of concrete culvert at.....	42 19 55.3	89 22 38.4	2,933
T road west, probably a quarter corner.....	42 19 32.7	89 21 32.5	5,525
Pecatonica; north end of concrete bridge over Pecatonica River.....	42 19 03.2	89 21 32.9	2,987
Pecatonica, just east of station; center of main track of Chicago & North Western Ry. at Main Street crossing.....	42 18 54.0	89 21 33.1	933
Pecatonica, 300 feet north of pumping station cross streets.....	42 18 35.1	89 21 32.8	1,910
Pecatonica, about 1 mile west of pumping station on north-south section line; T road south.....	42 18 30.5	89 22 42.2	5,236
T. 27 N., R. 10 E., corner of secs. 29, 30, 31, and 32; center of north-south road.....	42 18 13.6	89 22 41.9	1,720
Pecatonica, about 2.5 miles southwest of pumping station; cross-roads.....	42 17 13.9	89 22 41.5	6,040
T. 26 N., R. 10 E., corner of secs. 5, 6, 7, and 8; T road west.....	42 16 29.6	89 22 40.3	4,491
T. 26 N., R. 10 E., west corner of secs. 6 and 7; T road east just south of schoolhouse (30 feet south of above corner is east corner of secs. 1 and 12; county line).....	42 16 28.4	89 23 49.2	5,182
T. 26 N., R. 9 and 10 E., corner of secs. 12, 13, 7, and 18; crossroads.....	42 15 35.9	89 23 48.4	5,320

Magnetic declination near south border of quadrangle,  $4^{\circ} 19' E.$ ; near east border of south half,  $4^{\circ} 11' E.$ ; near north border of south half,  $4^{\circ} 29' E.$ ; through center of south half,  $4^{\circ} 18' E.$

## ROCKFORD QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 29 N., R. 11 E., corner secs. 27, 28, 33, and 34; crossroads at Wilson schoolhouse, No. 19.....	42 28 42.1	89 13 32.3	Feet.
T. 29 N., R. 11 E., corner secs. 26, 27, 34, and 35; T road north.....	42 28 43.5	89 12 22.2	5,250
T. 29 N., R. 11 E., quarter corner between secs. 26 and 35; crossroads at district 16 schoolhouse.....	42 28 44.1	89 11 47.1	2,631
T. 29 N., R. 11 E., corner secs. 25, 26, 35, and 36; center east-west road.....	42 28 44.9	89 11 12.2	2,620
T. 11 N., R. 11 E., 20 feet north and 615 feet west of east corner secs. 25 and 36, 20 feet north and 50 feet east of T road south; iron post stamped "Prim. Trav. Sta. No. 6, 1915, Ill.".....	42 28 44.9	89 10 36.2	2,696

## ROCKFORD QUADRANGLE—Continued.

Along highways near north border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 29 N., R. 11 E., east corner secs. 25 and 36; center of road at crossing of third principal meridian (no fence, indefinite).....	* * "	* * "	
T. 46 N., R. 1 E., quarter corner between secs. 7 and 8; T road north at schoolhouse.....	42 28 44.7	89 10 28.0	614
T. 46 N., R. 1 E., quarter corner between secs. 8 and 9, 400 feet east of bridge; T road south.....	42 28 36.7	89 09 25.6	4,749
T. 46 N., R. 1 E., quarter corner between secs. 9 and 10, 1,320 feet west of T road south; center of east-west road.....	42 28 37.3	89 08 15.6	5,241
T. 46 N., R. 1 E., quarter corner between secs. 10 and 11; crossroads at schoolhouse.....	42 28 37.9	89 07 05.2	5,280
T. 46 N., R. 1 E., corner secs. 2, 3, 10, and 11; center of north-south road.....	42 28 38.3	89 05 55.5	5,225
T. 46 N., R. 1 E., stone at quarter corner between secs. 2 and 3; T road east.....	42 29 04.4	89 05 55.3	2,650
T. 46 N., R. 1 E., quarter corner between secs. 1 and 2; T road south.....	42 29 30.6	89 05 55.2	2,646
T. 46 N., R. 1 E., north corner of fractional secs. 1 and 6, on Illinois-Wisconsin Stateline; T road south.....	42 29 31.2	89 04 45.1	5,255
Beloit, east edge of west abutment of Shirland Avenue bridge over Rock River.....	42 29 47.3	89 03 34.3	5,549
Beloit, intersection of Broad and Prospect streets; manhole.....	42 29 47.5	89 02 31.8	4,683
Beloit, 80 feet southeast of railway crossing; north end of Grand Avenue Bridge.....	42 29 56.2	89 01 50.4	3,225
T. 46 N., R. 2 E., 35 feet north of north corner of fractional secs. 3 and 4, on State line, on north side of east-west road, at T road south; iron post stamped "Prim. Trav. Sta. No. 7, 1915, Ill.".....	42 29 54.5	89 01 16.0	2,579
Roscoe, 200 feet southeast of station, 155 feet west of T road north; center of main track of Chicago & North Western R. R. ....	42 29 46.9	89 00 00.0	5,745
Roscoe, at southeast corner of Bridge and Main streets; iron post stamped "Prim. Trav. Sta. No. 8, 1915, Ill.".....	42 25 40.6	89 00 11.7	
Roscoe, north end of bridge over Rock River.....	42 24 47.6	89 00 32.8	5,504
	42 24 48.0	89 00 58.5	1,930

Along highways near south border of north half of quadrangle.

Roscoe siding, intersection of main track and east-west road.....	42 24 45.4	89 02 42.0	7,772
Tps. 45 and 46 N., Rs. 1 and 2 E.; crossroads at corner of.....	42 24 44.4	89 03 34.2	3,920
T. 45 N., R. 1 E., north corner secs. 1 and 2; T road south (30 feet west of above corner is south corner of secs. 35 and 36, T. 46 N., R. 1 E., to road north).....	42 24 43.6	89 04 43.0	5,160
T. 45 N., R. 1 E., north corner secs. 2 and 3; T road south (360 feet west of above corner is south corner of secs. 34 and 35, T. 46 N., R. 1 E.; T road north).....	42 24 43.0	89 05 50.6	5,009
T. 45 N., R. 1 E., north corner secs. 3 and 4 (375 feet west of above corner is south corner secs. 33 and 34, T. 46 N., R. 1 E.).....	42 24 42.3	89 07 00.9	5,280
T. 45 N., R. 1 E., quarter corner between secs. 3 and 4; T road west.....	42 24 16.9	89 07 00.7	2,575
T. 45 N., R. 1 E., quarter corner between secs. 4 and 5, 1,800 feet west of road north; center of east-west road.....	42 24 16.3	89 08 12.4	5,390
T. 45 N., R. 1 E., quarter corner between secs. 5 and 6, 1,350 feet west of; T road south, center of east-west road.....	42 24 15.7	89 09 21.7	5,200
T. 45 N., R. 1 E., quarter corner west side sec. 6, on principal meridian; T road east.....	42 24 15.5	89 10 28.1	4,980

Along highways on or near third principal meridian.

Tps. 28 and 29 N., R. 11 E., east corner secs. 1 and 36.....	42 27 53.6	89 10 28.3	
T. 46 N., R. 1 E., corner secs. 18 and 19; stone.....	42 27 18.3	89 10 28.3	3,568
T. 46 N., R. 1 E., quarter corner west side sec. 19, 150 feet north of road forks, in line with fence on principal meridian; center of road.....	42 26 52.1	89 10 28.4	2,650
Shirland, 100 feet west of station, main street crossing Chicago, Milwaukee & St. Paul Ry.....	42 26 37.9	89 11 51.3	6,377
Sugar River, south end of bridge over, between Harrison and Shirland.....	42 26 08.9	89 11 51.0	2,935
Harrison, 260 feet east of road forks, east end of bridge over Pecatonica River.....	42 25 40.2	89 11 42.7	2,968
T. 46 N., R. 1 E., 175 feet north of road forks and 45 feet north of a stone is a stone at corner of secs. 19 and 30.....	42 25 33.7	89 10 28.5	5,605
Tps. 45 and 46 N., R. 1 E., east corner secs. 6 and 31; center of north-south road.....	42 24 41.1	89 10 28.1	5,319
T. 45 N., R. 1 E., west corner secs. 6 and 7; center north and south road.....	42 23 49.2	89 10 27.7	
T. 45 N., R. 1 E., west corner secs. 7 and 18; center north and south road.....	42 22 56.8	89 10 27.3	5,300

## ROCKFORD QUADRANGLE—Continued.

## Along highways on or near third principal meridian—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 27 and 28 N., R. 11 E., east corner secs. 1 and 36; T road west.....	• • "	• • "	
T. 45 N., R. 1 E., west corner secs. 18 and 19; T road east.....	42 22 41.3	89 10 27.0	1,570
T. 27 N., R. 11 E., 15 feet south and 25 feet east of east corner fractional secs. 1 and 12, on east of north-south road, along third principal meridian; iron post stamped "Prim. Trav. Sta. No. 9, 1915, Ill.".....	42 22 04.4	89 10 26.8	3,740
	42 21 50.7	89 10 26.2	1,384

## Along highways near west border of quadrangle.

T. 27 N., R. 11 E.; corner secs. 1, 2, 11, and 12; crossroads.....	42 21 50.6	89 11 05.4	2,940
T. 27 N., R. 11 E., corner secs. 2, 3, 10, and 11; T road south at cemetery.....	42 21 49.3	89 12 15.3	5,250
T. 27 N., R. 11 E., corner secs. 3, 4, 9, and 10; crossroads.....	42 21 47.7	89 13 24.4	5,191
T. 27 N., R. 11 E., corner secs. 4, 5, 8, and 9; roads northeast and southwest.....	42 21 46.4	89 14 34.6	5,272

Magnetic declination near north border of quadrangle,  $3^{\circ} 40'$  E.; near south border of north half,  $3^{\circ} 25'$  E.; near third principal meridian,  $3^{\circ} 23'$  E.

## On highway near middle of west border of quadrangle.

Road forks, 20 feet from concrete culvert.....	42 21 37.9	89 14 55.3	.....
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## BRODHEAD QUADRANGLE.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 29 N., R. 10 E., north corner secs. 21 and 22; T road south.....	• • "	• • "	
T. 1 N., R. 10 E., south corner secs. 31 and 32; T road north.....	42 30 00.4	89 20 45.7	665
T. 29 N., R. 10 E., north corner fractional secs. 20 and 21; State line.....	42 30 01.1	89 21 47.3	4,620
T. 1 N., Rs. 9 and 10 E., south corner secs. 31 and 36; State line road at corner of Green and Rock counties.....	42 30 01.2	89 21 56.4	680
T. 29 N., R. 10 E., near fractional secs. 19 and 20; T road south.....	42 30 02.0	89 22 57.8	4,599
T. 1 N., R. 9 E., south corner secs. 35 and 36; T road north.....	42 30 02.1	89 23 06.6	664
T. 29 N., Rs. 9 and 10 E., 20 feet south and 30 feet west of north corner of fractional secs. 19 and 24, at southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 5, 1915, Ill.".....	42 30 02.8	89 24 04.7	4,351
T. 1 N., R. 9 E., south corner secs. 34 and 35; center of road on State line.....	42 30 03.1	89 24 17.3	949
T. 29 N., R. 9 E., north corner fractional secs. 23 and 24; T road south.....	42 30 03.8	89 25 14.6	4,290
T. 1 N., R. 9 E., south corner secs. 33 and 34; T road north.....	42 30 03.9	89 25 27.9	1,000
T. 1 N., R. 9 E., south corner secs. 32 and 33; T road north.....	42 30 04.8	89 26 38.1	5,260
T. 29 N., R. 9 E., quarter corner north side of fractional sec. 22; T road south.....	42 30 05.0	89 26 59.4	1,600
T. 1 N., R. 9 E., south corner secs. 31 and 32; stone at T road north.....	42 30 05.5	89 27 49.1	3,721
T. 29 N., R. 9 E., about 0.3 mile west of northeast corner sec. 20, on south of State line road, 25 feet south and 50 feet west of T road south; iron post stamped "Prim. Trav. Sta. No. 29, Ill., 1911".....	42 30 06.3	89 29 03.9	5,607

Magnetic declination near south border of quadrangle,  $3^{\circ} 40'$  E.

# WISCONSIN.

## PRIMARY TRAVERSE.

**Cambria, Fisk, Fox Lake, Montello, Neshkoro, Oshkosh, Portage, Poysippi, Ripon, Spring Lake, and Waupun quadrangles.**

### **FOND DU LAC, GREEN LAKE, MARQUETTE, WAUSHARA, AND WINNEBAGO COUNTIES.**

The following geographic positions on North American datum were determined by E. L. McNair in 1914 and are based upon United States Lake Survey triangulation stations Springvale and Observatory Hill, and upon a primary traverse position at South Oshkosh determined in 1908, described in Bulletin 440.

#### CAMBRIA QUADRANGLE.

##### **Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., R. 11 E., quarter corner on west side of sec. 31, at Green Lake and Marquette county line; fence corners 120 feet south of center of public road.....	°   '   "	°   '   "	
T. 15 N., R. 11 E., at approximate quarter corner between secs. 31 and 32, near schoolhouse and at angle in road.....	43 44 16.7	89 14 43.0	.....
T. 15 N., R. 11 E., at quarter corner between secs. 32 and 33; T road forks east, west, and south, and fence line north.....	43 44 16.5	89 13 35.7	4,940
T. 15 N., R. 11 E., quarter corner between secs. 33 and 34; east and west road at north-south fence line.....	43 44 16.8	89 12 23.6	5,290
T. 15 N., R. 11 E., in E. $\frac{1}{4}$ sec. 34; T road forks east, west, and south.....	43 44 16.8	89 11 11.2	5,320
T. 15 N., R. 11 E., at apparent quarter corner between secs. 34 and 35; fence corners south and west.....	43 44 16.7	89 10 16.6	4,010
T. 15 N., R. 11 E., 25 feet east of T road forks north, south, and west, at quarter corner between secs. 35 and 36, $2\frac{1}{2}$ feet west of corner fence post in line with fence east; iron bench-mark post stamped "Prim. Trav. Sta. No. 19, Wis., 1914".....	43 44 16.6	89 09 58.4	1,333
T. 15 N., R. 11 E., corner secs. 25, 26, 35, and 36, 370 feet north of T road forks north, south, and east, at private lane west, center of north-south road.....	43 44 16.7	89 08 46.5	5,282
T. 15 N., Rgs. 11 and 12 E., secs. 30 and 36; T road forks east and west on line between.....	43 44 43.1	89 08 46.9	2,670
T. 15 N., R. 12 E., on line between secs. 29 and 30; east-west road at north and south fence line.....	43 44 34.5	89 07 35.2	5,335
T. 15 N., R. 12 E., in southeast quarter of sec. 29; T road forks east, west, and south.....	43 44 11.8	89 06 23.2	5,768
T. 15 N., R. 12 E., on line between secs. 28 and 29, at lane north and fence line south, east, and west road.....	43 44 15.4	89 05 28.7	4,019
T. 15 N., R. 12 E., in east half of sec. 28; T road forks east, west, and north.....	43 44 19.0	89 05 11.1	1,338
T. 15 N., R. 12 E., in east half of sec. 28; T road forks east, west, and north.....	43 44 28.8	89 04 15.9	4,171
T. 15 N., R. 12 E., 0.25 mile south of corner of secs. 27, 28, 21, and 22, on line between secs. 7 and 28, at fence lines north and south, east and west road.....	43 44 41.6	89 03 57.9	1,847
At road forks bearing S. $27^{\circ} 30'$ E. and S. $12^{\circ} 30'$ W., 65 feet north of signpost marked "To Markesan, Marquette, and Princeton" in triangle formed by road forks.....	43 44 54.9	89 03 18.3	3,206

Magnetic declination for north border of quadrangle,  $4^{\circ} 00' E.$

#### FISK QUADRANGLE.

##### **Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., R. 15 E., near center of sec. 20; crossroads.....	°   '   "	°   '   "	
Springvale triangulation station, in W. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 17, T. 15 N., R. 15 E., about 2 miles north and 2 miles east of boundary, on a rocky wooded knoll about 900 feet west of north and south road. (A stone post with hole in top seems to be the center point. No reference stones found. They may be below surface of ground).....	43 45 23.8	88 44 05.1	.....

## FISK QUADRANGLE—Continued.

## Along highways near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., R. 15 W., corner secs. 7, 8, 17, and 18, 175 feet south of east and west fence, and at center of north and south private road.....	* * "	* * "	Fed. 5,134
T road corners north, south, and west, private road south to residence.....	43 46 41.9	88 44 41.9	5,048
Tps. 15 and 16 N., R. 15 E., about quarter mile east of corner of secs. 31, 32, 5, and 6; T road forks east, west, and south at.....	43 47 40.4	88 44 25.1	4,840
Tps. 15 and 16 N., R. 15 E., at corner secs. 31, 32, 5, and 6, center of east and west road, at north-south fence lines.....	43 48 28.2	88 44 24.9	1,260
T. 16 N., R. 15 E., apparent corner secs. 7, 8, 17, and 18; T road forks north, south, and east.....	43 48 28.1	88 44 42.1	-----
T. 16 N., R. 15 E., 30 feet south and 30 feet east of crossroads at corner of secs. 5, 6, 7, and 8, 10 feet south of fence corner, 8 feet south of telephone pole, 24 feet from fence line, and opposite schoolhouse; iron bench-mark post stamped "Prim. Trav. Sta. No. 7, 1914".....	43 51 56.9	88 44 42.9	-----
T. 16 N., R. 15 E., at quarter corner between secs. 5 and 6; T road corners north, south, and east.....	43 52 49.0	88 44 41.9	5,280
Fond du Lac-Winnebago county line; center of road at crossing of.....	43 53 15.5	88 44 41.2	2,679
T. 17 N., R. 15 E., at apparent quarter corner between secs. 31 and 32, and about 330 feet south of Chicago, Milwaukee & St. Paul Ry. crossing; T road forks north, south, and west.....	43 53 41.4	88 44 34.2	2,670
Pickett, west of, crossing of public road and Chicago, Milwaukee & St. Paul Ry.....	43 54 07.3	88 44 34.2	2,628
Pickett station, 1,070 feet east of, crossing of public road and Chicago, Milwaukee & St. Paul Ry.....	43 54 31.7	88 44 05.7	3,208
T. 17 N., R. 15 E., in N.E. $\frac{1}{4}$ sec. 29; T road forks, north, south, and west.....	43 54 47.8	88 43 46.4	2,156
T. 17 N., R. 15 E., at center of E. $\frac{1}{4}$ sec. 20; T road forks north, south, and east, fence line west.....	43 55 12.8	88 43 46.3	2,535
T. 17 N., R. 15 E., at center of N. $\frac{1}{4}$ sec. 20; T road forks east, west, and north.....	43 55 51.6	88 43 46.2	3,925
T. 17 N., R. 15 E., corner secs. 17, 18, 19, and 20, set at junction of fence lines north, south, and east; square stone with cross cut in top.....	43 56 06.5	88 44 04.8	2,030
T. 17 N., R. 15 E., corner secs. 7, 8, 17, and 18; square cut stone.....	43 56 17.8	88 44 40.7	2,864
T. 17 N., R. 15 E., quarter corner secs. 7 and 8; square cut stone.....	43 57 10.3	88 44 40.8	5,314
T. 17 N., R. 15 E., corner secs. 5, 6, 7, and 8; cut stone.....	43 57 36.6	88 44 40.9	2,663
T. 17 N., R. 15 E., at apparent north corner secs. 5 and 6; T road corners east, west, and south.....	43 58 02.9	88 44 41.0	2,659
Tps. 17 and 18 N., R. 15 E., at quarter corner between secs. 5 and 32; public crossroads.....	43 58 56.4	88 44 41.3	5,416
	43 58 56.3	88 44 04.4	2,705

## Along highways near north border of quadrangle.

T. 18 N., R. 15 E., 35 feet south and 28 feet east of quarter corner secs. 29 and 32, at crossroads opposite schoolhouse and 2 feet west of fence corner; iron bench-mark post stamped "Prim. Trav. Sta. No. 8, 1914, Wis.".....	43 59 48.6	88 44 04.2	5,299
T. 18 N., R. 15 E., at apparent corner secs. 32, 33, 28, and 29, at fence line south; center of east-west road.....	43 59 48.7	88 43 28.4	2,618
T. 18 N., R. 15 E., corner secs. 33, 34, 27, and 28, at schoolhouse; public crossroads.....	43 59 48.4	88 42 15.5	5,330
T. 18 N., R. 15 E., at apparent corner of secs. 34, 35, 26, and 27, at fence line south; center of east-west road.....	43 59 48.6	88 41 03.0	5,300
T. 18 N., R. 15 E., quarter corner between secs. 26 and 35; T road forks east, west, and north, at.....	43 59 48.6	88 40 26.8	2,650
T. 18 N., R. 15 E., corner secs. 25, 36, 25, and 26; T road corners east, west, and south, at.....	43 59 48.6	88 39 50.4	2,600
T. 18 N., R. 15 E., quarter corner secs. 25 and 36; T road forks east, west, and north, at.....	43 59 48.5	88 39 14.0	2,660
T. 18 N., R. 15 and 16 E., on range line and at corner secs. 25, 36, 30, and 31, at fence lines north and south; center of east and west road.....	43 59 48.5	88 38 37.1	2,700
T. 18 N., R. 16 E., corner secs. 29, 30, 31, and 32; public crossroads at.....	43 59 47.8	88 37 24.0	5,345
T. 18 N., R. 16 E., at corner secs. 28, 29, 32, and 33; T road forks east, west, and north.....	43 59 47.1	88 36 10.8	5,349
T. 18 N., R. 16 E., between secs. 28 and 33; crossing of Chicago, Milwaukee & St. Paul Ry. and public road.....	43 50 46.8	88 35 22.8	3,510
T. 18 N., R. 16 E., at corner secs. 27, 28, 33, and 34; public road crossing.....	43 50 46.6	88 34 57.5	1,850
T. 18 N., R. 15 E., at apparent corner secs. 29, 30, 31, and 32; T road corners east, west, and north, at.....	43 59 48.8	88 44 41.3	-----

Magnetic declination for north border of quadrangle,  $3^{\circ} 14'$  E.; for west border,  $2^{\circ} 59'$  E.

## FOX LAKE QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., Rs. 13 and 14 E., at quarter corner secs. 25 and 30, county line between Green Lake and Fond du Lac counties; T road corners east, west, and north.....	°   '   "	°   '   "	
T. 15 N., R. 14 E., on section line between secs. 29 and 30, 60 feet east of Fairwater station, crossing of street and Chicago, Milwaukee & St. Paul Ry.....	43 44 33.2	88 53 06.3	Feet.
T. 15 N., R. 14 E., at apparent corner secs. 29, 30, 31, and 32; T road corners north, south, and east.....	43 44 37.2	88 51 55.4	5,225
T. 15 N., R. 14 E., corner secs. 28, 29, 32, and 33, crossroads at.....	43 44 06.4	88 51 55.0	3,120
T. 15 N., R. 14 E., corner secs. 27, 28, 33, and 34, crossroads at.....	43 44 06.3	88 50 43.1	5,280
T. 15 N., R. 14 E., corner secs. 26, 27, 34, and 35, crossroads at.....	43 44 06.0	88 49 31.1	5,290
Brandon, at apparent corner to secs. 25, 26, 35, and 36, T. 15 N., R. 14 E., intersection of streets at Congregational Church on north-west street corner.....	43 44 06.0	88 48 18.2	5,354
Brandon station, 190 feet north of, street crossing of Chicago, Milwaukee & St. Paul Ry.....	43 44 09.3	88 47 06.2	5,290
T. 15 N., quarter mile north of east corner of secs. 25 and 36, on range line between Rs. 14 and 15 E.; T road corners north, south, and west.....	43 44 18.6	88 45 53.8	4,315

Magnetic declination for north border of quadrangle,  $3^{\circ} 16' E.$ 

## MONTELLO QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 17 N., R. 10 E., on line between secs. 25 and 36; T road corners north, south, and west.....	°   '   "	°   '   "	
Tps. 16 and 17 N., on line between fence and private road east; center of road.....	43 54 32.4	89 15 05.8	.....
Germany, 1,000 feet east of; iron bridge over Mecan River.....	43 53 40.2	89 15 06.3	5,288
T. 16 N., R. 10 E., on apparent section line between secs. 12 and 13; road forks, road west.....	43 53 28.6	89 15 12.2	1,245
T. 16 N., R. 10 E., east half of sec. 13, 15 feet west of T road corners, north, south, and east, 9 feet north and 5 feet west of signpost reading "Germany 2 miles, Princeton 6 miles"; iron post stamped "Prim. Trav. Sta. No. 17, Wis., 1914.".....	43 52 33.7	89 15 12.4	5,561
T. 16 N., R. 10 E., in N. $\frac{1}{4}$ sec. 24, at public roads crossing railroad, main crossing, north, south, east, and west, center of track at.....	43 52 07.5	89 15 06.0	2,694
T. 16 N., R. 10 E., section line between secs. 24 and 25, at fence line west center of north-south private road.....	43 51 29.3	89 15 32.4	4,331
T. 16 N., R. 10 E., about 690 feet north of line between secs. 25 and 36; T road forks east, west, and north.....	43 50 49.4	89 15 05.0	4,511
T. 15 N., R. 10 E., quarter corner between secs. 1 and 12; T road corners north, south, and east.....	43 50 04.0	89 15 05.2	4,590
T. 15 N., R. 10 E., at middle of soc. 13; T road corners north, south, and west.....	43 48 11.6	89 15 20.5	.....
T. 15 N., R. 10 E., at crossing of line between secs. 15 and 16, as indicated by cross fences in field; center of road.....	43 46 52.8	89 15 18.4	7,974
Montello, 25 feet southwest to edge of curb at Montello State Bank, 60 feet southeasterly to curb at Smart Block, 10 feet north to curbing.....	43 46 53.0	89 15 54.4	2,640
T. 15 N., R. 10 E., line between secs. 14 and 15, at north and south fence line; center of east-west road.....	43 46 51.7	89 17 12.3	5,720
T road corners east, west, and south.....	43 46 51.7	89 17 30.4	1,330
T. 15 N., R. 10 E., about 670 feet south of corner of secs. 9, 10, 15, and 16, at crossing of line between secs. 15 and 16, as indicated by cross fences in field; center of road.....	43 47 12.4	89 18 24.2	4,472
Montello, 25 feet southwest to edge of curb at Smart Block, 10 feet north to curbing.....	43 47 31.7	89 19 37.9	5,745
Montello, public road bridge at center of lock on Fox River.....	43 47 10.7	89 19 32.5	2,166
T. 15 N., R. 10 E., apparent line between secs. 17 and 20; center of angling road at fence line east and private line west.....	43 46 26.0	89 19 56.1	4,839
T. 15 N., R. 10 E., on quarter line in west half of sec. 20; road crossing.....	43 45 59.3	89 20 22.5	3,333
T. 15 N., R. 10 E., at approximate quarter corner between secs. 29 and 30, 27 feet west of corner fence post in line with fence east and 30 feet south of center of T road west.....	43 45 33.1	89 20 48.7	3,276
	43 45 06.8	89 20 48.4	2,661

Magnetic declination along east border of quadrangle,  $3^{\circ} 47' E.$

## MESHKORO QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 18 N., R. 12 E., apparent corner of secs. 27, 28, 33, and 34, 1,000 feet north of crossroads, near schoolhouse at fence line east and west; center of north-south road.....	43 59 51.4	89 03 59.0	Ft.
T. 18 N., R. 12 E., 750 feet north of south corner of secs. 31 and 36, 15 feet south and 15 feet east of T road corners north, south, and west, 1 foot from north-south fence line; iron post stamped "Prim. Trav. Sta. No. 15, Wis., 1914".....	43 59 06.6	89 07 40.3	.....
T. 18 N., R. 11 E., line between secs. 35 and 36, at T road forks east, west, and north.....	43 59 18.2	89 08 54.8	5,573
T. 18 N., R. 11 E., line between secs. 34 and 35, at T road forks east, west, and north.....	43 59 24.7	89 10 06.2	5,262
T. 18 N., R. 11 E., line between secs. 33 and 34, at fence line south; center of east-west road.....	43 59 24.3	89 11 18.4	5,284
T. 18 N., R. 11 E., line between secs. 33 and 34, at fence line south; center of east-west road.....	43 59 11.1	89 13 07.1	8,054
T. 18 N., R. 11 E., line between secs. 33 and 34, at fence line south; center of east-west road.....	43 59 10.7	89 13 34.3	1,990
T. 18 N., R. 11 E., in SW. $\frac{1}{4}$ sec. 31, 1,950 feet north of Waushara-Marquette county line, 35 feet south and 20 feet west of center of public crossroads, 6 feet south and 2 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 16, Wis., 1914".....	43 59 16.3	89 14 37.8	4,679
T. 17 N., R. 11 E., on line between secs. 6 and 7, fence lines east and west, 140 feet north of T road forks north, south, and east; center of north and south road.....	43 58 01.2	89 14 29.4	7,634

## Along highways near west border of quadrangle.

T. 17 N., R. 11 E., in west half of sec. 7; public crossroads.....	43 57 35.0	89 14 36.6	2,698
T. 17 N., R. 11 E., at line between secs. 7 and 18; public crossroads.....	43 57 08.9	89 14 32.2	2,665
T. 17 N., R. 11 E., at approximate line between secs. 18 and 19, and near quarter corner; T road forks north, south, and west.....	43 56 19.0	89 14 13.2	5,237
T. 17 N., Rs. 10 and 11 E., apparent quarter corner between secs. 19 and 24, near right angle in road; fence north and south.....	43 55 50.9	89 14 48.1	3,829
T. 17 N., Rs. 10 and 11 E., apparent corner of secs. 19, 30, 24, and 25, at crossroads.....	43 55 24.4	89 14 47.8	2,680
T. 16 N., Rs. 10 and 11 E., apparent corner of secs. 25, 36, 30, and 31, east-west fence line in line with fence north from angle of public road.....	43 49 57.2	89 14 47.0	.....
T. 16 N., Rs. 10 and 11 E., at line between secs. 25, 36, 30, and 31, east-west fence line in line with fence north from angle of public road.....	43 49 41.8	89 14 10.0	3,134
T. 16 N., R. 11 E., in southwest quarter of sec. 31, at Lutheran Church; T road forks southwest, west and northeast.....	43 49 15.6	89 14 20.8	2,766
T. 15 N., R. 11 E., at quarter corner between secs. 5 and 6; T road forks east, west, and south.....	43 48 38.7	89 13 41.5	4,716
T. 15 N., R. 11 E., at corner of secs. 5, 6, 7, and 8; crossroads.....	43 48 12.5	89 13 40.9	2,653
T. 15 N., R. 10 and 11 E., at apparent corner of secs. 6, 7, 1, and 12, second-class road turns north, open field on south; center of east-west road.....	43 48 11.8	89 14 44.7	4,681

## Along highways through center of quadrangle.

Mecan River; center of iron truss bridge over.....	43 52 07.9	89 13 46.4	.....
T. 16 N., R. 11 E., approximate quarter corner between secs. 16 and 17; east and west road at private lane north.....	43 52 08.4	89 12 30.4	5,569
T. 16 N., R. 11 E., in west half of sec. 16; T road forks east, west, and north.....	43 52 05.6	89 12 10.9	1,463
T. 16 N., R. 11 E., near corner of secs. 15, 16, 21, and 22, at east-west section line; center of east and west road.....	43 51 42.3	89 11 27.4	3,966
T. 16 N., R. 11 E., in SW. $\frac{1}{4}$ sec. 22, 40 feet west of mail box at road forks, in line with roads east and southwest.....	43 51 19.6	89 10 52.1	3,461
T. 16 N., R. 11 E., 875 feet west of line between secs. 22 and 23; T road forks east, west, and north.....	43 51 18.0	89 10 16.3	2,633
T. 16 N., R. 11 E., approximate quarter corner between secs. 23, and 24, at fence line north and south; center of east-west road.....	43 51 16.8	89 08 51.9	6,180
T. 16 N., R. 11 E., 1,290 feet east of quarter corner between secs. 23 and 24, 45 feet west and 25 feet north of road crossing, in line with roads north, south, and west, 5 feet west of corner fence post, opposite northeast corner of cemetery; iron post stamped "Prim. Trav. Sta. No. 20, Wis., 1914".....	43 51 17.0	89 08 34.4	1,290
Princeton station, about 200 feet west of center of public road at crossing of Chicago & North Western Ry.....	43 51 07.8	89 07 35.6	4,407
T. 16 N., R. 12 E., at quarter corner between secs. 16 and 17; T road forks east, west, and northeast.....	43 51 27.7	89 06 57.8	3,429
T. 16 N., R. 12 E., at quarter corner between secs. 16 and 17; T road forks north, south, and west, and private lane east.....	43 51 28.6	89 06 14.1	7,600

## NESHKORO QUADRANGLE—Continued.

## Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 16 N., R. 12 E., 670 feet north of apparent corner of secs. 8, 9, 16, and 17; T road forks east, west, and south.....	43 52 01.5	89 05 13.9	3,329
T. 16 N., R. 12 E., line between secs. 9 and 10, at fence lines north and south; center of east-west road.....	43 52 01.8	89 04 01.8	5,289
T. 16 N., R. 12 E., S. $\frac{1}{4}$ sec. 10; public road crossing.....	43 52 04.8	89 03 26.0	2,640
T. 16 N., R. 12 E., on line between secs. 10 and 11, at north and south fence lines; center of east-west road.....	43 52 07.7	89 02 49.9	2,661
T. 16 N., R. 12 E., at line between secs. 11 and 12; T road forks east, west, and north.....	43 52 13.4	89 01 37.0	5,368
T. 16 N., R. 12 E., apparent quarter corner east side of sec. 12; at T road forks north, south, and west.....	43 52 17.2	89 00 24.2	5,350
T. 16 N., Rs. 12 and 13 E., on range line, apparent quarter corner on west side of sec. 7; T road forks north, south, and east.....	43 52 24.0	89 00 23.8	690

## Along highways near south border of quadrangle.

T. 15 N., R. 12 E., center of sec. 23, fences north and south, at cemetery; center of east-west road.....	43 45 21.9	89 02 11.4	.....
T. 15 N., R. 12 E., 30 feet south and 35 feet east of T road corners at corner of secs. 23, 24, 25, and 26, 6 feet east of signpost at fence corners; iron post stamped "Prim. Trav. Sta. No. 12, 1914, Wis.".	43 45 22.1	89 01 34.9	2,681
T. 15 N., Rs. 12 and 13 E., quarter corner between secs. 19 and 24; T road corners east, west, and south.....	43 45 24.3	89 00 23.9	5,220

## Along highways near east border of quadrangle.

T road forks north, south, and west.....	43 59 25.6	89 00 53.6	.....
Tps. 17 and 18 N., R. 12 E., near quarter corner between secs. 1 and 36, at Waushara-Green Lake county line; T road forks north, south, and east.....	43 59 00.0	89 00 58.3	2,617
T. 17 N., R. 12 E., in S. $\frac{1}{4}$ sec. 1; T road corners east, west, and north.....	43 58 16.7	89 00 58.0	4,384
T. 17 N., Rs. 12 and 13 E., near corner of secs. 1, 6, 7, and 12, at crossing of range line; at center of road.....	43 58 09.6	89 00 21.8	2,750
T. 16 N., Rs. 12 and 13 E., on range line, apparent quarter corner on west side of sec. 7; T road forks north, south, and east.....	43 52 24.0	89 00 23.8	.....
Chicago & Northwestern Ry. and public road crossing.....	43 51 30.6	89 03 26.2	.....
T. 16 N., R. 12 E., apparent center of sec. 22; T road forks east, west, and north.....	43 50 36.9	89 03 26.1	5,440
T. 16 N., R. 12 E., center of sec. 21; T road forks east, west, and south.....	43 50 36.2	89 04 38.4	5,295
T. 16 N., R. 12 E., quarter corner between secs. 21 and 28; public road crossing.....	43 50 10.1	89 04 38.4	2,640
T. 16 N., R. 12 E., quarter corner between secs. 28 and 33, at fence lines east and west; center of north-south road.....	43 49 17.6	89 04 38.2	5,323
T. 16 N., R. 12 E., center of sec. 33; public road crossing.....	43 48 51.3	89 04 38.3	2,660
Tps. 15 and 16 N., R. 12 E., at quarter corner between secs. 4 and 33; T road forks north, south, and west.....	43 48 25.1	89 04 38.1	2,649
T. 15 N., R. 12 E., apparent quarter corner between secs. 4 and 9, at east and west fence line; center of north-south road.....	43 47 32.1	89 04 37.9	5,370
T. 15 N., R. 12 E., near center of sec. 9; T road corners east, west, and north.....	43 47 06.2	89 04 37.4	2,620
T. 15 N., R. 12 E., corner of secs. 9, 10, 15, and 16; T road forks east, west, and south.....	43 46 39.4	89 04 01.4	3,788
T. 15 N., R. 12 E., corner of secs. 15, 16, 21, and 22, at fence lines east and west; at center of north-south road.....	43 45 47.2	89 03 00.0	5,285
T. 15 N., R. 12 E., in NE. $\frac{1}{4}$ sec. 21; T road forks north, south, and west.....	43 45 34.1	89 03 59.7	1,331
T. 15 N., R. 12 E., quarter corner between secs. 21 and 22, in line with road north at fence line west and 30 feet south of road east.....	43 45 21.0	89 03 59.4	1,320

Magnetic declination along north border of quadrangle,  $1^{\circ} 45' E.$  to  $5^{\circ} 46' E.$  (range),  $3^{\circ} 36' E.$  (mean); for south border,  $4^{\circ} E.$ ; for east border,  $3^{\circ} 30' E.$ ; for west border,  $3^{\circ} 47' E.$ ; near center,  $3^{\circ} 50' E.$

## OSHKOSH QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 18 N., R. 16 E., on line between secs. 26 and 27; center of public road at north and south road.....	• • "	• • "	Fed.
South Oshkosh, at crossing of Tenth Street and "Soo" Ry.....	44 00 16.2	88 33 44.4	.....
Oshkosh, in T. 18 N., R. 16 E., at crossing of line between secs. 25 and 26, intersection of Oregon and Tenth streets.....	44 00 34.1	88 33 02.3	3,372
South Oshkosh, second track of Chicago & North Western Ry., east of station and opposite bay window (description and position also in Bull. 440, p. 611).....	44 00 34.2	88 32 32.4	2,185
	44 00 32.8	88 32 04.3	2,058

Magnetic declination near south border of quadrangle, 3° 14' E.

## PORTAGE QUADRANGLE.

Along highways near north border of northeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., R. 10 E., at corner of secs. 29, 30, 31, and 32, 870 feet north of overhead crossing of Chicago & North Western Ry., at fence line east and west; center of north and south road.....	• • "	• • "	Fed.
Tps. 14 and 15 N., R. 10 E., quarter corner between secs. 31 and 32; north and south road at east and west fence line.....	43 44 40.8	89 20 48.0	.....
Tps. 14 and 15 N., R. 10 E., approximate corner of secs. 31, 32, 5, and 6, at east and west fence line; center of north and south road.....	43 44 14.6	89 20 47.2	2,650
T. 14 N., R. 10 E., approximate quarter corner between secs. 5 and 6, in line with roads north and west.....	43 43 48.6	89 20 47.1	2,638
T. 14 N., R. 10 E., in S.W. $\frac{1}{4}$ sec. 6; T road corners east, west, and south.....	43 43 22.1	89 20 46.2	2,662
Observatory Hill triangulation station of the Coast and Geodetic Survey, in sec. 8, T. 14 N., R. 10 E., 864 feet east and 1,044 feet south of west quarter corner; underground mark; drill hole in rock ledge, rough surface, 3 feet below surface of ground; no surface mark.....	43 43 06.5	89 20 27.5	2,005
Chicago & North Western Ry., 500 feet south and a little west of bridge over tracks; T road corners north, south, and east.....	43 42 19.62	89 20 32.96	4,764
T. 14 N., R. 10 E., about 0.25 mile west of corner of secs. 3, 4, 9, and 10, 30 feet south of road east, 15 feet east of center of road running west of south, 8 feet south of corner fence post, 1.5 feet from fence, in line with road north; iron post stamped "Prim. Trav. Sta. No. 18, 1914, Wis.".....	43 42 46.8	89 18 45.1	.....
T. 14 N., R. 10 E., quarter corner between secs. 3 and 4; T road forks north, south, and west.....	43 42 56.2	89 18 38.7	1,058
Tps. 14 and 15 N., R. 10 E., corner of secs. 3, 4, 33, and 34, at fence line west; center of north and south road.....	43 43 22.7	89 18 21.8	2,862
Grand River; old bridge across and center of stream.....	43 43 49.5	89 18 22.7	2,710
T. 15 N., R. 10 E., on line between secs. 35 and 36.....	43 44 00.6	89 16 09.5	9,945
	43 44 00.7	89 15 55.0	1,053

Magnetic declination near north border of northeast quarter of quadrangle, 4° E.

## RIPON QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 16 N., R. 15 E., at quarter corner between secs. 30 and 31; T road corners east, west, and north.....	• • "	• • "	Fed.
T. 16 N., R. 15 E., 120 feet south of apparent quarter corner between secs. 19 and 30; crossing of public road and Chicago & North Western Ry.....	43 49 20.6	88 45 18.1	.....
T road corners north, south, and east.....	43 50 11.7	88 45 18.2	5,180
T road corners east, west, and south.....	43 50 38.6	88 45 16.9	2,724
Chicago, Milwaukee & St. Paul Ry. and public road crossing.....	43 51 04.9	88 45 16.2	2,663
T. 18 N., Rs. 14 and 15 E., corner of secs. 25, 30, 31, and 36.....	43 59 48.9	88 45 32.4	.....
	43 59 49.0	88 45 51.8	1,420

## RIPON QUADRANGLE—Continued.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 18 N., R. 14 E., apparent corner of secs. 25, 26, 35, and 36, at fence line north and south; center of east and west public road.	43 59 50.0	88 47 04.5	5,317
T. 18 N., R. 14 E., corner of secs. 34, 35, 26, and 27; public crossroads.	43 59 50.8	88 48 17.6	5,340
T. 18 N., R. 13 E., corner of secs. 26, 27, 34, and 35; T road forks east, west, and north.	43 59 52.8	88 55 34.6	.....
T. 18 N., R. 13 E., quarter corner between secs. 27 and 34; T road forks east, west, and north.	43 59 52.8	88 56 11.4	2,690
T. 18 N., R. 13 E., corner of secs. 27, 28, 33, and 34; public crossroads.	43 59 52.9	88 56 47.5	2,645
T. 18 N., R. 13 E., quarter corner between secs. 28 and 33; T road forks north, south, and east.	43 59 52.8	88 57 23.8	2,650

## Along highways near west border of quadrangle.

T. 17 N., R. 13 E., in S. $\frac{1}{2}$ sec. 6; T road corners east, west, and north.	43 58 11.1	88 59 48.5	.....
T. 17 N., R. 13 E., corner of secs. 5, 6, 7, and 8, in lane north and south, at fence west and about 200 feet south of center of public road.	43 58 04.6	88 59 12.8	2,691
T. 17 N., R. 13 E., corner of secs. 7, 8, 17, and 18; stone.	43 57 12.8	88 59 12.5	5,238
T. 17 N., R. 13 E., corner of secs. 17, 18, 19, and 20; public crossroads.	43 56 20.4	88 59 12.5	5,306
T. 17 N., R. 13 E., corner of secs. 16, 17, 20, and 21; public crossroads.	43 56 21.6	88 58 00.1	5,305
T. 17 N., R. 13 E., quarter corner between secs. 20 and 21; T road west.	43 55 55.4	88 58 00.2	2,650
North and south road at fence line east.	43 55 27.4	88 58 00.0	2,840
T. 17 N., R. 13 E., quarter corner between secs. 28 and 29; public crossroads.	43 55 02.7	88 57 59.9	2,500
T. 17 N., R. 13 E., corner of secs. 28, 29, 32, and 33, at fence line east; center of north and south road.	43 54 36.6	88 57 59.5	2,640
Tps. 16 and 17 N., R. 13 E., corner of secs. 31, 32, 5, and 6; road corners east and south.	43 53 43.0	88 59 11.6	7,586
T. 16 N., R. 13 E., quarter corner between secs. 5 and 6; crossroads.	43 53 16.5	88 59 11.3	2,690
T. 16 N., R. 13 E., 30 feet north and 25 feet west of T road corners at quarter corner between secs. 7 and 8, 2 feet northeast of corner fence post, signpost reads "Princeton 8 miles, Ripon 8 miles, Berlin 8 miles"; iron post stamped "Prim. Trav. Sta. No. 11, 1914, Wis."	43 52 24.6	88 59 11.8	5,257
T. 16 N., R. 13 E., center of sec. 8; T road south.	43 52 24.0	88 58 34.7	2,723
T. 16 N., R. 13 E., quarter corner between secs. 8 and 9; center of east and west road at north and south fence line.	43 52 23.8	88 57 58.4	2,655
T. 16 N., R. 13 E., center of sec. 9; T road forks east, west, and north.	43 52 23.4	88 57 21.6	2,700
T. 16 N., R. 13 E., quarter corner between secs. 9 and 10, brick schoolhouse at corners; public crossroads.	43 52 23.0	88 56 44.2	2,740
Public crossroads; center of .	43 52 18.1	88 55 32.1	5,305
T. 16 N., R. 13 E., corner of secs. 10, 11, 14, and 15; center of north and south road at fence line east.	43 51 56.5	88 55 32.2	2,185
Public crossroads.	43 51 17.4	88 55 32.6	3,960
T. 16 N., R. 13 E., corner of secs. 14, 15, 22, and 23, at fence line east and west near schoolhouse; center of north and south road.	43 51 04.4	88 55 32.8	1,321
T. 16 N., R. 13 E., quarter corner between secs. 22 and 23; T road forks east, west, and north.	43 50 38.2	88 55 33.5	2,646
T road forks north, south, and west.	43 50 38.3	88 54 38.8	4,010
Green Lake; small iron bridge over inlet of .	43 50 23.9	88 54 30.6	1,578
T. 16 N., R. 13 E., approximate corner of secs. 23, 24, 25, and 26, 20 feet east to fence line north; T road corners northeast, southwest, and south.	43 50 12.8	88 54 21.1	1,323
T. 16 N., R. 13 E., corner of secs. 25, 26, 35, and 36; T road corners north, south, and west.	43 49 20.5	88 54 21.2	5,298
T. 16 N., R. 13 E., quarter corner between secs. 35 and 36; T road south.	43 48 54.3	88 54 21.1	2,650
T. 16 N., R. 13 E., corner of secs. 1, 2, 35, and 36; crossroads.	43 48 28.1	88 54 20.4	2,650
T. 15 N., R. 13 E., north corner of secs. 2 and 3; T road corners east, west, and south.	43 48 27.3	88 55 32.4	5,278
T. 15 N., R. 13 E., corner of secs. 2, 3, 10, and 11; crossroads.	43 47 35.5	88 55 31.5	5,240
T. 15 N., R. 13 E., corner of secs. 10, 11, 14, and 15; center of north and south road.	43 46 43.4	88 55 31.0	5,275
T. 15 N., R. 13 E., quarter corner between secs. 14 and 15; crossroads.	43 46 16.8	88 55 30.8	2,695

## RIPON QUADRANGLE—Continued.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., R. 13 E., quarter corner between secs. 19 and 20; center of east and west road at north and south fence line.....	* * "	* * *	
T. 15 N., R. 13 E., quarter corner between secs. 20 and 21; center of east and west road at fence line north.....	43 45 24.8	88 59 09.1	5,410
T. 15 N., R. 13 E., center of sec. 21; crossroads.....	43 45 25.1	88 57 55.4	2,670
T. 15 N., R. 13 E., quarter corner between secs. 23 and 24; at cross-roads.....	43 45 25.0	88 57 19.0	7,955
T. 15 N., R. 13 E., quarter corner between secs. 23 and 24; at cross-roads.....	43 45 25.0	88 55 30.6	5,305
T. 15 N., R. 13 E., at quarter corner between secs. 19 and 24, 30 feet north and 35 feet west of center of public crossroads, 5 feet west of guide-post at fence corner, 2 feet from fence; iron post (not stamped) "Prim. Trav. Sta. No. 13, 1914, Wis." .....	43 45 25.2	88 54 18.4	5,252
	43 45 25.8	88 53 06.8	

## Along highways through center of quadrangle.

T. 16 N., Rs. 14 and 15 E., 280 feet east of corner of secs. 1, 6, 12, and 7; T road forks east, northeast, and southwest.....	43 52 49.6	88 45 49.8	
T. 16 N., R. 14 E., on line between secs. 11 and 12; T road forks north, northeast, and southwest.....	43 52 10.5	88 47 07.3	6,920
T. 16 N., R. 14 E., on line between secs. 11 and 14; T road forks west, southwest, and northeast.....	43 51 58.1	88 47 31.8	2,196
Chicago, Milwaukee & St. Paul Ry. and public road crossing.....	43 51 58.2	88 48 07.8	2,645
T. 16 N., R. 14 E., 0.25 mile east of corner of secs. 9, 10, 15, and 16; public road crossing.....	43 51 58.4	88 49 14.9	4,915
Chicago, Milwaukee & St. Paul Ry. and public road crossing; 60 feet east of T road forks east, west, and north.....	43 51 58.4	88 49 50.4	2,600
Ripon, intersection of Eureka and Oshkosh streets, also quarter corner between secs. 16 and 21, T. 16 N., R. 14 E.....	43 51 05.5	88 50 09.7	5,534
Ripon; crossing of Oshkosh Street and Chicago & North Western Ry. (This is very close to corner of secs. 16, 17, 20, and 21, T. 16 N., R. 14 E.).....	43 51 05.1	88 50 45.0	2,588
T. 16 N., R. 14 E., in sec. 18; T road forks northwest and southeast.....	43 51 31.6	88 52 19.3	7,412
T. 16 N., Rs. 13 and 14 E., 25 feet south and 12 feet west of T road corners east, west, and north at quarter corner between secs. 13 and 18, 2 feet from fence and 4 feet from fences; iron post stamped "Prim. Trav. Sta. No. 14, 1914, Wis." (also county line between Fond du Lac and Green Lake counties).....	43 51 31.6	88 53 07.0	3,490
T. 16 N., R. 13 E., in sec. 13; T road forks, east, west, and northwest.....	43 51 35.6	88 53 39.8	2,441
T. 16 N., R. 13 E., at section line between secs. 13 and 14; T road forks east, west, and south.....	43 51 30.3	88 54 19.6	2,967

Magnetic declination for north border of quadrangle,  $3^{\circ} 23' E.$ ; for south border,  $3^{\circ} 16' E.$ ; for east border,  $2^{\circ} 59' E.$ ; for west border,  $3^{\circ} 30' E.$ ; for center,  $3^{\circ} 36' E.$

## POYSIPPI QUADRANGLE.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 18 N., R. 14 E., line between secs. 27 and 28, at fence line north and south; center of public road.....	* * "	* * "	
Eureka, crossroads at; Methodist Church on northeast corner.....	44 00 00.8	88 49 29.7	
Eureka; drawbridge over Fox River.....	44 00 08.1	88 50 29.1	4,407
T. 18 N., R. 14 W., line between secs. 29 and 30; turn in public road south at private lane north.....	44 00 20.1	88 50 35.8	1,312
T. 18 N., Rs. 13 and 14 E., on line between, about 1,570 feet south of quarter corner between secs. 25 and 30, in line with road north on south side of road, 3 feet north of fence line, 4 feet northwest of oak tree at gateway to lane south; iron post stamped "Prim. Trav. Sta. No. 9, 1914, Wis.".....	44 00 21.3	88 51 56.1	5,870
T. 18 N., Rs. 13 and 14 E., on line between, about 1,570 feet south of quarter corner between secs. 25 and 30, in line with road north on south side of road, 3 feet north of fence line, 4 feet northwest of oak tree at gateway to lane south; iron post stamped "Prim. Trav. Sta. No. 9, 1914, Wis.".....	44 00 02.6	88 53 09.8	5,710
T. 18 N., Rs. 13 and 14 E., quarter corner between secs. 25 and 30; T road forks north, south, and west.....	44 00 18.1	88 53 09.9	1,570
T. 18 N., R. 13 E., in W. $\frac{1}{2}$ sec. 25; T road forks north, south, and east.....	44 00 18.4	88 54 04.6	4,005
T. 18 N., R. 13 E., on line between secs. 21 and 28; crossroads.....	44 00 44.7	88 57 34.1	
T. 18 N., R. 13 E., corner of secs. 20, 21, 28, and 29, at fence line north and south; center of east and west road.....	44 00 44.7	88 58 00.0	1,905

**POYSEIPPI QUADRANGLE—Continued.****Along highways near south border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 18 N., R. 13 E., at quarter corner between secs. 20 and 29; T road forks east, west, and south.....	° ' "	° ' "	
	44 00 44.4	88 58 35.7	Feet. 2,605
T. 18 N., R. 13 E., corner of secs. 19, 20, 29, and 30; T road forks north, south, and east.....	44 00 44.2	88 59 11.7	2,630
T. 18 N., R. 13 E., quarter corner between secs. 29 and 30; T road forks north, south, and west.....	44 00 18.3	88 59 11.8	2,620

Magnetic declination for south border of quadrangle,  $3^{\circ} 23'$  E.**SPRING LAKE QUADRANGLE.****Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 18 N., R. 12 E., near center of sec. 25, 25 feet east of center of road north, in line with road south and in line with lane west to house, 10 feet northeast of mail boxes; iron post stamped "Prim. Trav. Sta. No. 10, 1914, WIs.".....	° ' "	° ' "	
	44 00 11.3	89 00 57.4	Feet. .....
T. 18 N., R. 12 E., in N. $\frac{1}{4}$ sec. 25; T road forks north, south, and west.....	44 00 30.6	89 00 59.0	.....
T. 18 N., R. 12 E., at quarter corner between secs. 22 and 23; T road forks north, south, and west.....	44 01 10.0	89 02 47.5	8,878
T. 18 N., R. 12 E., line between secs. 28 and 29, at north and south fence line; center of east and west road.....	44 00 07.3	89 05 12.1	.....
T. 18 N., R. 12 E., SW. $\frac{1}{4}$ sec. 29; T road forks northeast, southwest, and south.....	44 00 02.2	89 06 05.7	3,956
T. 18 N., R. 12 E., S. $\frac{1}{4}$ sec. 30; public crossroads.....	44 00 04.0	89 07 00.0	3,968
T. 18 N., R. 12 E., SW. $\frac{1}{4}$ sec. 30; T road forks east, west, and south.....	44 00 09.2	89 07 29.5	2,223

Magnetic declination near south border of quadrangle,  $3^{\circ} 36'$  E. (range from  $1^{\circ} 45'$  E. to  $5^{\circ} 46'$  E.).**WAUPUN QUADRANGLE.****Along highways near northwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., R. 15 E., quarter corner between secs. 29 and 30; east and west road at fence line north and south.....	° ' "	° ' "	
	43 44 31.3	88 44 40.8	Feet. .....
T. 15 N., R. 15 E., in center of sec. 29; T road corners east, west, and north.....	43 44 31.4	88 44 04.9	2,640
T. 15 N., R. 15 E., quarter corner between secs. 20 and 29, at fence line east and west; at north and south road.....	43 44 57.9	88 44 05.0	2,680

Magnetic declination near northwest corner of quadrangle,  $3^{\circ} 16'$  E.

## WISCONSIN AND MINNESOTA.

### PRIMARY TRAVERSE.

**Carlton, Superior, and Rockmont quadrangles.**

**DOUGLAS COUNTY, WIS.; ST. LOUIS COUNTY, MINN.**

The following geographic positions on North American datum were determined by primary traverse and are based on Coast and Geodetic Survey triangulation stations Annie, Dedham, Superior, and Minnesota Point, south base. The work was done by E. L. McNair in 1914.

### CARLTON QUADRANGLE.

**Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>WISCONSIN.</b>			
T. 47 N., R. 15 W., corner secs. 8, 9, 16, and 17; stake.....	46 33 40.4	92 15 56.8	.....
T. 47 N., R. 15 W., corner secs. 20, 21, 28, and 29, as located by south local surveyor.....	46 31 56.1	92 15 59.3	10,568
T. 47 N., R. 15 W., corner secs. 28, 29, 32, and 33; center north and south road.....	46 31 02.8	92 15 55.9	5,397
T. 47 N., R. 15 W., south corner secs. 32 and 33, 20 feet south and 5 feet east to T road forks, 2 feet northwest of post in east and west fence, and about 1 mile east of Foxboro; iron bench mark post stamped "Prim. Trav. Sta. No. 4, 1914, Wisconsin".....	46 30 13.2	92 15 54.5	5,032
T. 46 N., R. 15 W., north corner secs. 4 and 5; T road south.....	46 30 13.3	92 15 30.6	1,685

**Along highways and Duluth, Winnipeg & Pacific Ry.**

MINNESOTA.			
Spirit Line Park station, about 300 feet northwest of; center of bridge over center of main track of Northern Pacific R. R.....	46 40 44.3	92 15 37.6	.....
Duluth, Winnipeg & Pacific R. R.; public road crossing.....	46 41 08.2	92 15 42.2	2,450
Duluth, Winnipeg & Pacific R. R.; road crossing under trestle.....	46 41 32.3	92 16 19.9	3,585
Duluth, Winnipeg & Pacific R. R.; north and south road crossing.....	46 42 03.8	92 16 46.1	3,682
Annie triangulation station, in SW. $\frac{1}{4}$ SE. $\frac{1}{4}$ sec. 20, T. 49 N., R. 15 W., on highest point of a prominent wooded hill one-fourth mile south of Carlton and Duluth wagon road, 10 miles by road northeast of West Duluth; cross cut on rock; over this was set a piece of terra-cotta pipe 4 inches in diameter; pipe was filled with concrete and wire nail set in center of top marking station; reference mark, center of rude cross inscribed in circle about 8 inches in diameter, cut on surface of outcropping ledge, and distant 16.78 meters north of east from the station.....	46 42 28.60	92 15 55.55	4,324
T. 49 N., R. 15 W., quarter corner between secs. 20 and 21; forks of roads north, south, and west .....	46 42 48.4	92 15 31.7	2,606
T. 49 N., R. 15 W., apparent corner secs. 16, 17, 20, and 21.....	46 43 14.4	92 15 31.6	2,635

Magnetic declination near east border of quadrangle,  $7^{\circ} 30' E.$

## SUPERIOR QUADRANGLE.

Along highways and railroad near center to east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
<b>WISCONSIN.</b>			
Superior triangulation station, in south side center of SE. 1/4 sec. 11, T. 48 N., R. 14 W., about 1.8 miles southeast of South Superior and 20 paces north of wagon road along side of sec. 11; station and reference marks, usual type; the latter is 41.71 meters east from station, just inside fence along north side of road.....	46 38 52.84	92 05 06.22	Feet.
"Soo" Ry., 595 feet west of Great Northern R. R. crossing; overhead bridge.....	46 38 52.3	92 04 27.2	2,719
T. 48 N., R. 14 W., quarter corner secs. 12 and 18; T road forks, roads north and south, second-class road west.....	46 38 52.2	92 03 58.3	2,015
United States Steel Co.'s Belt Line R. R., north rail main track, at road crossing.....	46 38 23.1	92 03 58.7	2,950
United States Steel Co.'s Belt Line R. R., at intersection with range line between secs. 13 and 14; center of track.....	46 38 24.7	92 03 21.2	2,619
T. 48 N., R. 13 W., intersection United States Steel Co.'s Belt Line R. R., and line between secs. 17 and 18; center of track.....	46 38 30.3	92 02 09.8	5,010
United States Steel Co.'s Belt Line R. R., overhead crossing at road east and west.....	46 38 52.1	92 01 31.6	3,466
T. 48 N., R. 13 W., corner secs. 8, 9, 16, and 17; road crossing.....	46 38 52.2	92 00 55.2	2,535
Intersection of Northern Pacific Ry. and public road east and west known as "Lake Shore" road, in sec. 4.....	46 40 20.8	92 00 02.9	3,031
Intersection Northern Pacific Ry. and highway.....	46 40 44.4	92 00 30.1	3,031
Crossing of Northern Pacific Ry. and track used by Great Northern Ry. leading to Itasca elevator.....	46 41 06.0	92 00 59.3	2,993
Allouez flag station, Northern Pacific Ry. street crossing at.....	46 41 24.6	92 01 23.1	2,510
Minnesota Point, south base, triangulation station; St. Louis County, Minn., situated on Minnesota Point near its southern extremity. Station mark, intersection of two cross lines cut in the surface of a brass frustum leaded in end of a stone post 1 by 1 by 3 feet, 2 feet below surface. Observer, Lake Survey, 1870-71; Coast and Geodetic Survey, 1905. New station mark, a solid granite monument, 1 foot square at top, stands 15 inches above ground. No reference monuments visible. A well-made tower painted white erected over station. E. L. McNair, 1914.....	46 42 49.77	92 01 54.39	8,889

## Along highways through center of quadrangle.

T. 48 N., R. 14 W., on line between secs. 13 and 24; T road forks, roads north, south, and west.....	46 38 00.1	92 04 01.6	235
"Soo" Ry. crossing; center of track.....	46 38 00.0	92 04 05.9	
T. 48 N., R. 14 W., at quarter corner secs. 14 and 23; roads east, west, and south (a good graveled road leads south and west).....	46 38 00.1	92 05 15.5	4,961
T. 48 N., R. 14 W., on line between secs. 15 and 22; crossroads.....	46 38 00.3	92 06 15.6	4,190
T. 48 N., R. 14 W., 425 feet west of quarter corner of secs. 13 and 22, 25 feet north of center of road east and in line with road south to Boylston, 230 feet east of center of Great Northern Ry. tracks, 3 feet south of wire fence and about 1,500 feet south of Saunders station; iron bench mark post stamped "Prim. Trav. Sta. No. 2, 1914, Wis.".....	46 38 00.7	92 06 36.8	1,473
Saunders station, about 400 feet north of; center of west track of Great Northern R. R., at center of trestle over United States Steel Co.'s Belt Line R. R.....	46 38 19.4	92 06 32.2	1,924
T. 48 N., R. 14 W., at apparent center of sec. 16; intersection of roads north and south.....	46 38 27.3	92 07 46.1	5,213
T. 48 N., R. 14 W., through middle of sec. 9; T roads forks, northeast, southwest, and south.....	46 39 02.1	92 07 45.3	3,530
Crossing of Northern Pacific R. R. and United States Steel Co.'s Belt Line R. R., about 500 feet southeast of.....	46 38 48.9	92 08 46.1	4,450
T. 48 N., R. 14 W., approximate at quarter corner between secs. 17 and 18; road forks (a cleared out but unused road to east).....	46 38 28.6	92 09 38.9	4,214
T. 48 N., Rs. 14 and 15 W., on range line between secs. 19 and 24; center of road (an old cutting is visible north and south although much grown up; line is 60 feet east of telephone post No. 5895).....	46 37 45.7	92 10 54.4	6,826
T. 48 N., R. 15 W., at crossroads, at telephone post No. 5868; north and south road is in middle of sec. 24.....	46 37 23.0	92 11 32.9	3,534
T. 48 N., R. 15 W., in southwest quarter of sec. 26, near angle in road, and opposite telephone pole No. 5322; center of road.....	46 36 35.5	92 12 55.9	7,527
T. 48 N., R. 15 W., about 750 feet south of corner secs. 27, 28, 33, and 34, 55 feet south and 20 feet west of T road with newly cleared road south, not graded or traveled; at edge of right-of-way cutting; iron bench mark post stamped "Prim. Trav. Sta. No. 3, 1914, Wis.".....	46 36 08.7	92 14 42.8	7,937

## SUPERIOR QUADRANGLE—Continued.

## Along highways near west border of southwest quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 47 and 48 N., R. 15 W., corner secs. 3, 4, 33, and 34; iron pipe T. 47 N., R. 15 W., corner secs. 3, 4, 9, and 10; north and south road.....	° ' " 46 35 23.8 46 34 32.8	° ' " 92 14 42.1 92 14 41.7	.Feet. 4,550 5,170

## Along highways near south border of quadrangle.

T. 47 N., R. 15 W., south corner of secs. 34 and 35; T road north .....	46 30 14.0	92 13 25.2	.....
T. 47 N., R. 15 W., approximate south corner secs. 35 and 36, right angle in road; roads north and west.....	46 30 14.5	92 12 10.2	5,250
T. 47 N., R. 15 W., at right angle in road, corner secs. 23, 24, 25, and 26.....	46 31 57.5	92 12 10.5	10,440
T. 47 N., Rs. 14 and 15 W., corner secs. 19, 30, 24, and 25; fence line north and south.....	46 31 58.6 46 31 58.2	92 10 55.9 92 10 17.6	5,220 2,089
Forks at schoolhouse; roads east, west, and south.....	46 31 58.7	92 09 39.2	2,690
T. 47 N., R. 14 W., corner secs. 19, 20, 29, and 30; forks, roads east, west, and south.....			
Dedham triangulation station in NW. $\frac{1}{4}$ sec. 29, T. 47, R. 14, about 900 feet south of Dedham and Black River Falls wagon road, 2.5 miles south of east from Dedham railway station on Great Northern Ry., and 2 miles southwest from Black River Falls on top of small rocky hill covered with small poplar brush. The point of 40-penny nail is subsurface stationmark. Piece of terra-cotta pipe was set over subsurface mark, and filled with concrete level with surface. A 60-penny wire nail in center of pipe marks center of surface station mark.....	46 31 49.93	92 09 27.46	1,213
T. 47 N., R. 14 W., quarter corner between secs. 20 and 29; stake.....	46 31 58.8	92 09 02.3	1,975
Manitow Falls, 415 feet northeast of concrete bridge over Black River, 40 feet west of center of north and south road on line between secs. 21 and 22, T. 47 N., R. 14 W.; iron bench-mark post stamped "Prim. Trav. Sta. No. 5, 1914, Wis.".....	46 32 11.7	92 07 10.1	7,949
T. 47 N., R. 14 W., corner secs. 22, 23, 26, and 27; road forks east, west, and south, fence line north.....	46 31 58.4	92 05 53.2	5,541
T. 47 N., R. 14 W., corner secs. 23, 24, 25, and 26; forks of roads east, west, and south (schoolhouse is at forks).....	46 31 58.0	92 04 37.3	5,309
T. 47 N., R. 14 W., quarter corner secs. 24 and 25; center of public road crossing Borden Avenue north and south.....	46 31 57.7	92 03 59.2	2,665

## Along highways on checked line.

T. 47 N., R. 14 W., center of sec. 25; T road west .....	46 31 31.2	92 03 59.5	2,690
T. 47 N., R. 14 W., quarter corner secs. 25 and 36; center of north and south road.....	46 31 05.1	92 03 59.8	2,640
T. 47 N., R. 14 W., quarter corner south side sec. 36, in line with road north and fence west.....	46 30 12.6	92 04 00.1	5,320

## Main line continued.

T. 47 N., R. 13 W., apparent west corner of secs. 19 and 30; forks in road, east, west, and south; double fence line north.....	46 31 56.7	92 03 21.6	.....
T road corners; roads east, west, and north.....	46 31 56.5	92 02 45.8	2,505
T. 47 N., R. 13 W., corner secs. 19, 20, 29, and 30, east and west road at fence line south; clearing north.....	46 31 57.3	92 02 07.9	2,649
T. 47 N., R. 13 W., corner secs. 20, 21, 28, and 29; crossroads at signpost reading "Borden Ave. $2\frac{1}{2}$ miles," "Rossiter Ave. $1\frac{1}{2}$ miles," "South Range $6\frac{1}{2}$ miles".....	46 31 56.5	92 00 52.2	5,294

## Along highways near west border of northwest quarter of quadrangle.

Carnegie station, about 0.25 mile west of; road crossing (this crossing is close to quarter corner secs. 13 and 24, T. 48 N., R. 15 W.).....	46 38 01.2	92 11 32.4	.....
T. 48 N., Rs. 14 and 15 W., corner secs. 12, 13, 7, and 18.....	46 38 53.5	92 10 53.9	5,945
United States Steel Co. Ry.; public road crossing.....	46 39 27.1	92 11 00.4	3,429
MINNESOTA.			
St. Louis River, west end abutment of United States Steel Co.'s bridge over.....	46 39 30.6	92 12 51.8	.....
New Duluth, intersection of Commonwealth Avenue and Peary Street.....	46 39 35.8	92 13 34.3	3,015
New Duluth, 0.50 mile northwest of; T road north (road west to sand pit).....	46 39 49.8	92 14 06.0	2,623

**SUPERIOR QUADRANGLE—Continued.****Along highways on checked line.**

Station.	Latitude.	Longitude.	Distance between stations.
Forks of roads northwest, east, and southwest; roads to Carlton and Cloquet branch here.....	° ' "	° ' "	Feet.
T. 49 N., R. 15 W., on north and south line between secs. 15 and 16; crossroads.....	46 43 26.0	92 14 47.9	.....
T. 49 N., R. 15 W., corner secs. 9, 10, 15, and 16; center of north and south road.....	46 43 21.3	92 14 16.1	2,267
T. 49 N., R. 15 W., about 0.25 mile south of corner secs. 3, 4, 9, and 10, 30 feet north and 25 feet west of T road east and 20 feet north of lane west, 9 feet north of telephone pole; iron bench-mark post stamped "Prim. Trav. Sta. No. 1, 1914, Minnesota".....	46 44 06.7	92 14 16.2	4,600
Proctor station, 100 feet north of; street crossing, center of double tracks.....	46 44 45.8	92 14 16.3	3,965
Proctor, water tower at (Proctor Knott tank connected with this point by topographer using plane-table stadia and solar chart).....	46 44 38.6	92 13 35.6	2,934
	46 44 51.2	92 12 42.6	3,903

Magnetic declination for east border of quadrangle,  $8^{\circ}$  E.; for west border,  $7^{\circ} 30'$  E.; for south border,  $8^{\circ} 30'$  E.; for center,  $8^{\circ} 15'$  E.

**ROCKMONT QUADRANGLE.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 47 N., R. 13 W., corner secs. 21, 22, 27, and 28; T road south.....	° ' "	° ' "	Feet.
	46 31 57.0	91 59 36.7	.....

**Along highways on unchecked spur line.**

T. 47 N., R. 13 W., quarter corner secs. 27 and 28; T road west.....	46 31 31.1	91 59 36.3	
T. 47 N., R. 13 W., approximate corner secs. 27, 28, 33, and 34, 20 feet south of T road west; crossing of logging railway and public road.....	46 31 05.0	91 59 36.2	2,630
T. 47 N., R. 13 W., south corner secs. 33 and 34, 20 feet south of T road north, in line with road north; iron bench-mark post stamped "Prim. Trav. Sta. No. 6, 1914, Wis.".....	46 30 12.7	91 59 35.7	2,640

**Main line continued.**

T. 47 N., R. 13 W., quarter corner secs. 22 and 27; roads north and west.....	46 31 56.9	91 58 58.9	
T. 47 N., R. 13 W., quarter corner secs. 15 and 22; crossroads.....	46 32 49.2	91 58 59.0	5,300
T. 47 N., R. 13 W., apparent quarter corner secs. 10 and 15; center of north and south road at east and west fence.....	46 33 41.2	91 59 01.2	5,264
T. 47 N., R. 13 W., apparent quarter corner secs. 3 and 10; center of north and south road.....	46 34 33.2	91 59 00.3	5,274
T. 47 N., R. 13 W., center of sec. 3, at Lundeen School; center of public crossroads.....	46 34 59.3	91 58 59.5	2,640
T. 48 N., R. 13 W., quarter corner secs. 27 and 34; T road west.....	46 36 15.5	91 59 00.6	7,720
T. 47 N., R. 13 W., apparent quarter corner between secs. 22 and 27; T road corners, roads north, south, and east.....	46 37 07.8	91 59 00.9	5,300
T. 48 N., R. 13 W., apparent quarter corner between secs. 15 and 22, at center of north and south road, 440 feet south of junction of Rossiter Avenue and Grand Avenue roads.....	46 38 00.1	91 59 01.4	5,295
T road forks, roads northeast, southwest, and north; center of....	46 38 35.2	91 59 40.5	4,486

**Along highways near west border of quadrangle.**

Crossing of Chicago & North Western R. R.; also used by Duluth, South Shore & Atlantic Ry.....	46 38 52.2	91 59 57.4	
T. 48 N., R. 13 W., 125 feet west and 20 feet south of T road south at quarter corner secs. 10 and 15, 2 feet south of east and west fence and 1 foot east of fence north, 0.75 mile east of Chicago & North Western R. R. at Parkland; iron bench-mark post stamped "Prim. Trav. Sta. No. 1, 1914, Wisconsin".....	46 38 52.3	91 59 02.3	3,842
Northern Pacific R. R.; public road crossing.....	46 38 52.0	91 58 35.1	1,899
T. 48 N., R. 13 W., on section line between secs. 3 and 10, at public road crossing Northern Pacific R. R.....	46 39 43.9	91 59 30.8	6,535

Magnetic declination near west border of quadrangle,  $8^{\circ}$  E.

## MINNESOTA.

### PRIMARY TRAVERSE.

**Anoka, Elk River, Lakenetta, Tarn, and Walbo quadrangles.**

#### ANOKA AND ISANTI COUNTIES.

The following geographic positions on North American datum were determined by J. H. Wilson in 1915 and are based on Mississippi River Commission triangulation stations Carvel and Clark.

#### ANOKA QUADRANGLE.

**Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Anoka, about 1 mile northwest of, in NW. $\frac{1}{4}$ SW. $\frac{1}{4}$ sec. 36, T. 32 N., R. 25 W., 400 meters north of Great Northern Ry., 500 meters west of north-south State road, 250 meters north of residence of B. Nye, and 8.1 meters east of southeast corner of small vacant house used as a granary on property of R. D. Carvel. Blazed trees, 24-inch double oak 190°, 10.8 meters; 10-inch double oak 137°, 8.4 meters; tile and pipe on high ground in cultivated field; Carvel triangulation station.	°   '   "	°   '   "	
Anoka, center of Great Northern Ry. track in front of telegraph-office window of station.	45 13 05.40	93 24 08.42	Feet.
Tps. 31 and 32 N., R. 24 W., quarter corner between secs. 6 and 31; center of north-south road.	45 12 19.8	93 22 35.6	8,090
T. 32 N., R. 24 W., quarter corner between secs. 30 and 31; center of north-south road.	45 12 45.0	93 22 39.8	2,561
T. 32 N., R. 24 W., quarter corner between secs. 19 and 30; center of north-south road at fence line, lane east.	45 13 37.0	93 22 39.5	5,269
	45 14 28.6	93 22 38.4	5,231

Magnetic declination for north border of quadrangle, 8° 26' E.

#### ELK RIVER QUADRANGLE.

**Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Itasca, 1.5 miles north of railroad station, 0.5 mile east of Anoka-Sherburne county line, 1,000 meters northeast of George Clark's house, on quarter-section line of N. $\frac{1}{4}$ sec. 18, T. 32 N., R. 25 W., 15 meters west and 4 meters south of fence corner at southeast corner of cultivated field, in edge of pasture, tile and pipe; Mississippi River Commission triangulation station Clark.	°   '   "	°   '   "	Feet.
T. 32 N., R. 25 W., quarter corner between secs. 6 and 7; T road east.	45 16 04.43	93 30 04.39	
Tps. 32 and 33 N., R. 25 W., quarter corner between secs. 6 and 31, 660 feet south of T road east at schoolhouse; crossroads.	45 17 05.6	93 30 02.1	6,206
T. 33 N., R. 25 W., quarter corner between secs. 30 and 31, north-south road at fence line.	45 17 57.9	93 30 00.9	5,296
T. 33 N., R. 25 W., quarter corner between secs. 19 and 30, at German Lutheran Church; crossroads.	45 18 49.9	93 30 01.5	5,270
T. 33 N., R. 25 and 26 W., corner secs. 18, 19, 13, and 24, 20 feet west of right-angle bend in road.	45 19 42.0	93 30 02.0	5,278
T. 33 N., Rs. 25 and 26 W., corner secs. 7, 18, 12, and 13; center of county line road at fence west.	45 20 33.3	93 30 36.4	5,746
T. 33 N., Rs. 25 and 26 W., corner secs. 6, 7, 1, and 12, 20 feet east of T road west.	45 21 25.8	93 30 35.8	5,312
	45 22 18.1	93 30 35.5	5,302

## ELK RIVER QUADRANGLE—Continued.

## Along highways near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 33 N., Rs. 25 and 26 W., 1,319 feet north of corner of secs. 6, 7, 1, and 12; 20 feet north of T road east, on Anoka-Sherburne county line; iron post stamped "Prim. Trav. Sta. No. 8, 1915, Minn.".....	45 22 31.2	93 30 35.3	1,319
Tps. 33 and 34 N., Rs. 25 and 26 W., 15 feet east to T fence east; probable corner.....	45 23 08.2	93 30 34.8	3,750
Fork in road, 690 feet north of road east; road south.....	45 24 18.8	93 30 37.5	7,148
T. 34 N., Rs. 25 and 26 W., corner secs. 18, 19, 13, and 24; T road east.....	45 25 44.5	93 30 36.1	8,692
T. 34 N., Rs. 25 and 26 W., stone at corner secs. 7, 18, 12, and 13, 12 feet east of center of crossroads.....	45 26 36.6	93 30 37.0	5,278
T. 34 N., R. 25 W., on line between secs. 6 and 7; center of road at fence.....	45 27 28.1	93 30 02.8	5,758

Magnetic declination for east border of quadrangle,  $7^{\circ} 36'$  E.

## LAKENETTA QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 32 N., R. 23 W., corner secs. 17, 18, 19, and 20; center of east-west road, at fence line.....	45 15 19.0	93 14 42.7	.....
T. 32 N., R. 23 W., 20 feet north and 20 feet east of quarter corner of secs. 17 and 20, on east side of Minneapolis-Duluth road; iron post stamped "Prim. Trav. Sta. No. 5, 1915, Minn.".....	45 15 19.6	93 14 04.8	2,715
T. 32 N., R. 23 W., 3,940 feet north of quarter corner secs. 17 and 20; crossroads.....	45 15 58.4	93 14 05.5	3,940
T. 32 N., R. 23 W., quarter corner secs. 5 and 8, 1,190 feet south of road forks at church, 150 feet south of road east to Coon Lake, center of north-south road at fence line.....	45 17 03.9	93 14 05.3	6,630
Tps. 32 and 33 N., R. 23 W., quarter corner secs. 5 and 32; T road west.....	45 17 53.2	93 14 03.0	4,990
T. 33 N., R. 23 W., approximate quarter corner secs. 29 and 32.....	45 18 45.0	93 14 08.7	5,268
T. 33 N., R. 23 W., center of sec. 29; crossroads.....	45 19 11.1	93 14 10.3	2,640
T. 33 N., R. 23 W., center of sec. 20, 640 feet south of road west, 1 road east.....	45 20 03.1	93 14 12.5	5,269
T. 33 N., R. 23 W., quarter corner between secs. 17 and 20; center of north-south road at road southwest.....	45 20 29.6	93 14 12.7	2,690
T. 33 N., R. 23 W., quarter corner between secs. 8 and 17; T road west.....	45 21 21.7	93 14 12.7	5,270
T. 31 N., R. 23 W., 20 feet south and 30 feet west of quarter corner between secs. 5 and 8, just inside of fence corner at southwest corner of crossroads at Methodist Church and district No. 40 schoolhouse; iron post stamped "Prim. Trav. Sta. No. 6, 1915, Minn.".....	45 22 14.0	93 14 12.6	5,300
T. 33 N., R. 23 W., on line between secs. 5 and 32; T road west.....	45 23 05.4	93 14 05.1	5,236
T. 34 N., R. 23 W., quarter corner between secs. 29 and 32, just north of district No. 3 schoolhouse; crossroads.....	45 23 57.3	93 14 04.7	5,258
T. 34 N., R. 23 W., quarter corner between secs. 20 and 29, on Isanti-Anoka County line; T road east.....	45 24 49.8	93 14 06.4	5,310
T. 34 N., R. 23 W., quarter corner between secs. 17 and 20; T lane east.....	45 25 41.8	93 14 07.2	5,270
T. 34 N., R. 23 W., quarter corner between secs. 8 and 17; crossroads at schoolhouse.....	45 26 34.0	93 14 08.2	5,290
T. 34 N., R. 23 W., quarter corner between secs. 5 and 8; T road east.....	45 27 26.6	93 14 06.0	5,331
Tps. 34 and 35 N., R. 23 W., quarter corner between secs. 5 and 32; center of north-south road at fence line.....	45 28 16.6	93 14 04.9	5,060
T. 35 N., R. 23 W., line between secs. 29 and 32, 0.25 mile south and 0.25 mile east of Isanti.....	45 29 08.6	93 14 16.9	5,330
T. 35 N., R. 23 W., 30 feet south of east-west half section line in sec. 29, 0.70 mile east of public-school building at Isanti, and just south of district school at crossroads; iron post stamped "Prim. Trav. Sta. No. 11, 1915, Minn.".....	45 29 34.5	93 14 13.5	2,634

Magnetic declination for west border of quadrangle,  $8^{\circ} 37'$  E.

## TARN QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 32 N., R. 24 W., 15 feet west of quarter corner between secs. 18 and 19, on west side of north-south road in line with road east; 700 feet south of yellow brick schoolhouse; iron post stamped "Prim. Trav. Sta. No. 4, 1915, Minn.".....	45 15 20.7	93 22 38.0	Feet.
T. 32 N., R. 24 W., corner secs. 17, 18, 19, and 20, center of east-west road.....	45 15 20.8	93 22 01.0	2,650
T. 32 N., R. 24 W., corner secs. 16, 17, 20, and 21, 55 feet north and 70 feet east of northeast corner of town hall.....	45 15 20.0	93 20 47.5	5,250
T. 32 N., R. 24 W., quarter corner between secs. 16 and 17, 10 feet north of lane west; T road east.....	45 15 46.2	93 20 47.9	2,643
T. 32 N., R. 24 W., quarter corner between secs. 15 and 16, 890 feet east of road northeast, at fence south; center of east-west road.....	45 15 46.7	93 19 33.7	5,310
T. 32 N., R. 24 W., center of sec. 15, 45 feet west of Christenson's mail box; T road south.....	45 15 46.0	93 18 57.8	2,568
T. 32 N., R. 24 W., quarter corner secs. 14 and 15, 100 feet south of crossroads; center of north-south road.....	45 15 45.4	93 18 20.8	2,648
Constance, just north of milepost 129; railroad crossing.....	45 15 44.6	93 17 23.9	3,928
T. 32 N., R. 24 W., quarter corner between secs. 13 and 14; crossroads at Constance post office.....	45 15 44.3	93 17 07.6	1,310
T. 32 N., R. 24 W., corner secs. 13, 14, 23, and 24; crossroads.....	45 15 18.1	93 17 07.3	2,655
T. 32 N., Rs. 23 and 24 W., near corner secs. 13, 24, 18, and 19; T road south.....	45 15 22.0	93 15 54.4	5,226

## Along highways through center of quadrangle.

T. 33 N., Rs. 23 and 24 W., corner secs. 1, 12, 6, and 7; crossroads.....	45 22 14.2	93 15 55.7	.....
Bethel, 2 miles south of; east-west roads, at railroad crossing.....	45 22 13.9	93 16 26.7	2,215
T. 33 N., R. 24 W., corner secs. 1, 2, 11, and 12; T road north.....	45 22 13.6	93 17 09.5	3,055
T. 33 N., R. 24 W., corner secs. 2, 3, 10, and 11; east-west road.....	45 22 13.3	93 18 24.0	5,320
T. 33 N., R. 24 W., corner secs. 3, 4, 9, and 10, 1,320 feet west of road north; center of east-west road.....	45 22 13.3	93 19 37.8	5,266
T. 33 N., R. 24 W., corner secs. 4, 5, 8, and 9; T road east.....	45 22 14.0	93 20 51.0	5,229
St. Francis, 330 feet west of west end of bridge over Rum River, in northwest corner of park, at southeast corner of T road south; iron post stamped "Prim. Trav. Sta. No. 7, 1915, Minn.".....	45 23 12.8	93 21 33.2	6,670
Seeley Brook, 760 feet southwest of bridge over, just east of east end of Norris Lake, 45 feet west of mail box on twin oak tree; center of triangle at road forks.....	45 22 45.7	93 23 01.2	6,856
Norris Lake, center of road along north side of, at fence north.....	45 22 49.0	93 23 17.9	1,244
O. E. Liens' and two other mail boxes at road forks.....	45 22 45.3	93 24 31.7	5,280
T. 33 N., R. 25 W., corner secs. 2, 3, 10, and 11, at district No. 49 schoolhouse; crossroads.....	45 22 16.2	93 25 45.6	6,047
Nordtrom's, Westlund's, and Anderson's mail boxes, at road east.....	45 22 16.0	93 26 46.5	4,347
T. 33 N., R. 25 W., 0.25 mile south of corner of secs. 3, 4, 9, and 10, 400 feet west of road forks, at fence line; center of east-west road.....	45 22 03.3	93 26 59.4	1,581
T road north.....	45 22 03.6	93 27 54.7	3,950
Road forks, center of, at road west.....	45 22 30.2	93 29 13.8	6,258

## Along highways near west border of quadrangle.

Blue Lake, on banks of, 300 feet east of green house, at end of lane west; T road south.....	45 28 12.3	93 29 55.5	.....
Blue Lake, on east side of, at fence east, center of road; probably on line between secs. 6 and 31, Tps. 34 and 35 N., R. 25 W.....	45 28 18.5	93 29 49.1	785
T. 35 N., R. 25 W., corner secs. 29, 30, 31, and 32, 10 feet west of T road east.....	45 29 12.0	93 29 29.8	5,594
T. 35 N., R. 25 W., in NW. $\frac{1}{4}$ sec. 29, at top of rise at northeast corner of T road south, 125 feet north of small frame shack; iron post stamped "Prim. Trav. Sta. No. 9, 1915, Minn.".....	45 29 47.0	93 29 07.5	3,882

## Along highways near north border of quadrangle.

T. 35 N., Rs. 24 and 25 W., 20 feet south and 20 feet west of corner of secs. 19, 30, 24, and 25, at Union Mercantile Co.'s store at Oxlip; iron post stamped "Prim. Trav. Sta. No. 10, 1915, Minn.".....	45 29 59.6	93 23 20.1	.....
T. 35 N., R. 24 W., on line between secs. 27 and 28, at south end of Lake Francis; road south.....	45 29 54.4	93 19 39.0	.....
T. 35 N., R. 24 W., quarter corner secs. 25 and 26; T road east.....	45 29 35.5	93 17 10.7	.....
Isanti, at public-school building; crossroads.....	45 29 34.8	93 15 02.8	9,112

Magnetic declination for north border of quadrangle,  $8^{\circ}$  E.; for south border,  $8^{\circ} 26'$  E.; for east border,  $8^{\circ} 37'$  E.; for west border,  $7^{\circ} 36'$  E.; for center,  $8^{\circ} 16'$  E.

## WALBO QUADRANGLE.

Along highway near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Baxter Lake, near east edge of, at fence line, between secs. 20 and 29, T. 35 N., R. 25 W.; center of road.....	* * *	* * *	Feet.
T. 35 N., R. 25 W., quarter corner between secs. 20 and 21; T road north.....	45 30 03.8	93 28 51.0	.....
T. 35 N., R. 25 W., center of sec. 21; T road west.....	45 30 29.6	93 28 16.1	3,601
T. 35 N., R. 25 W., corner secs. 21, 22, 27, and 28; T road south.....	45 30 29.1	93 27 39.5	2,609
T. 35 N., R. 25 W., quarter corner between secs. 22 and 27; T road west.....	45 30 02.9	93 27 02.7	3,727
T. 35 N., R. 25 W., 0.25 mile north of corner of secs. 22, 23, 26, and 27, at north-south section line; center of east-west road.....	45 30 02.7	93 26 25.7	2,635
T. 35 N., R. 25 W., quarter corner between secs. 23 and 26, 1,320 feet north of T road east; center of north-south road.....	45 30 15.4	93 25 48.7	2,934
T. 35 N., R. 25 W., corner secs. 23, 24, 25, and 26; roads northeast and southwest.....	45 30 01.8	93 25 11.6	2,988
T. 35 N., R. 24 W., corner secs. 19, 20, 29, and 30; T road north.....	45 30 00.4	93 24 34.4	2,651
T. 35 N., R. 24 W., corner secs. 20, 21, 28, and 29; T road south.....	45 30 00.2	93 22 06.4	.....
T. 35 N., R. 24 W., corner secs. 22, 23, 26, and 27; crossroads.....	45 30 01.8	93 20 53.3	5,213
T. 35 N., R. 24 W., corner secs. 23, 24, 25, and 26; T road west.....	45 30 01.6	93 18 24.5	.....
			5,276

Magnetic declination near south border of quadrangle 8° E.

**Belle Prairie, Brainerd, Browerville, Cushing, Lastrup, Little Falls, Motley, Pine River, Swanville, and Sylvan quadrangles.****CASS, CROW WING, MORRISON, AND TODD COUNTIES.**

The following geographic positions on North American datum were determined by J. H. Wilson in 1915 and are based upon United States Coast and Geodetic Survey and Mississippi River Commission triangulation and United States Geological Survey primary traverse of 1912. The latter is described in Bulletin 551.

**BELLE PRAIRIE QUADRANGLE.**

Along Northern Pacific Railway and highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Big Mound triangulation station, Mississippi River Commission, in NE. $\frac{1}{4}$ sec. 23, T. 132 N., R. 30 W., about 4 miles above old Fort Ripley, on right bank of the Mississippi River and 1.5 miles from river. It is on the top of the largest mound in the vicinity, which is the largest mound east of Chadwick Lake. A small log cabin stands at the junction of the above road with the river road. Station mark, tile and pipe.....	* * *	* * *	*
T. 132 N., Rs. 29 and 30 W., corner of secs. 18, 19, 13, and 24, 120 feet west of; gate in west and east fence line.....	46 13 52.5	94 26 11.2	Feet.
Road northwest about 90 feet from river bank.....	46 14 18.4	94 23 31.0	7,517
Road west on line between secs. 25 and 36, T. 132 N., R. 30 W., 75 feet from river bank.....	46 13 10.4	94 23 46.3	6,970
Tps. 131 and 132 N., Rs. 29 and 30 W., corner of, in line with roads east and south, 30 feet west and 80 feet north of above corner is in line with roads west and north, exact corner of townships not ascertained because of roads being out of alignment.....	46 12 27.4	94 23 39.7	4,330
T. 131 N., Rs. 29 and 30 W., corner of secs. 1, 12, 6, and 7, T road east.....	46 11 40.7	94 23 31.0	4,760
Bend in road in line with road north and road west.....	46 10 48.3	94 23 31.0	5,260
Fort Ripley triangulation station; Mississippi River Commission; tile and pipe on right bank of river, 1 mile west of blockhouses at old Fort Ripley, near center of large concave bend in crest of bluff, 5 meters from crest of bluff at lower side of grove of black oak trees, and about 50 meters east of mouth of large ravine.....	46 10 09.4	94 23 31.5	3,985
T. 131 N., R. 29 W., corner of secs. 5, 6, 7, and 8, center of road in line with fence north.....	46 10 19.0	94 23 45.0	1,381
	46 10 46.9	94 22 15.6	.....

## BELLE PRAIRIE QUADRANGLE—Continued.

Along Northern Pacific Railway and highways near north border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Fort Ripley, 1 mile above, west end of bridge over Mississippi River.....	° ° "	° ° "	
Railroad crossing.....	46 10 48.5	94 22 00.4	1,080
T. 43 N., R. 32 W., railroad crossing on line between secs. 15 and 22.....	46 11 35.8	94 21 51.6	4,833
T. 43 N., R. 32 W., railroad crossing on line between secs. 10 and 15.....	46 12 03.7	94 21 54.8	2,839
Railroad crossing just southeast of Thunder Lake.....	46 12 55.2	94 21 39.8	5,328
T. 43 N., R. 31 W., corner of secs. 1, 2, 11, and 12.....	46 13 51.8	94 21 18.8	5,920
T. 43 N., Rs. 31 and 32 W., corner of secs. 1, 12, 6, and 7; crossroads.....	46 13 48.7	94 20 03.8	5,285
T. 43 N., R. 31 W., corner of secs. 5, 6, 7, and 8; center of east and west road, 810 feet west of crossroads.....	46 13 46.0	94 18 49.2	5,247
T. 43 N., R. 31 W., corner of secs. 4, 5, 8, and 9; center of east and west road at fence south just east of J. E. Stuard's residence.....	46 13 47.4	94 17 33.9	5,300
T. 43 N., R. 31 W., corner of secs. 3, 4, 9, and 10; crossroads at schoolhouse.....	46 13 47.2	94 16 18.4	5,310
Prim. Trav. Sta. No. 28, 1912 (Bull. 351, p. 235).....	46 13 46.5	94 15 03.5	5,260
	46 13 46.0	94 13 48.9	5,248

## Along highways near east border of quadrangle.

Road south one-half mile southwest of St. Mathias Church.....	46 13 01.2	94 15 40.8	.....
T. 43 N., R. 31 W., quarter corner between secs. 9 and 16; center of small wooden bridge about 450 feet north of bridge over Nokay River.....	46 12 54.6	94 15 40.7	680
T. 43 N., R. 31 W., quarter corner between secs. 16 and 21, T road east, 250 feet south of T road west, No. 16 schoolhouse.....	46 12 02.2	94 15 40.8	5,300
T. 43 N., R. 31 W., quarter corner between secs. 21 and 28.....	46 11 10.5	94 15 41.4	5,242
T. 43 N., R. 31 W., corner stake of secs. 20, 21, 28, and 29, in east and west road.....	46 11 10.8	94 16 19.4	2,678
Tps. 42 and 43 N., R. 31 W., approximate corner of secs. 5, 6, 31, and 32; crossroads, Crow Wing-Morrison county line.....	46 09 26.0	94 17 31.3	11,767
T. 42 N., R. 31 W., corner of secs. 5, 6, 7, and 8; crossroads.....	46 08 36.0	94 17 36.2	5,077
T. 42 N., R. 31 W., approximate corner of secs. 4, 5, 8, and 9; east and west road in line with road south.....	46 08 32.7	94 16 18.5	5,483
T. 42 N., R. 31 W., corner of secs. 8, 9, 16, and 17; T road east.....	46 07 40.8	94 16 22.2	5,273
T. 42 N., R. 31 W., corner of secs. 16, 17, 20, and 21, 10 feet south and 5 feet east of; on south side of east and west road at T road north; from post stamped "Prim. Trav. Sta. No. 18, 1915, Minn.".....	46 06 48.5	94 16 18.7	5,300
T. 42 N., R. 31 W., corner of secs. 20, 21, 28, and 29; T road south.....	46 05 56.6	94 16 15.2	5,262
T. 42 N., R. 31 W., corner of secs. 28, 29, 32, and 33; T road north, 0.25 mile west of schoolhouse.....	46 05 03.8	94 16 13.7	5,316
T. 41 N., R. 31 W., corner of secs. 20, 21, 28, and 29; T road west.....	46 00 44.7	94 16 14.3	.....

## Along highways near west border of quadrangle.

T. 129 N., R. 30 W., corner of secs. 5, 6, 7, and 8; center of north and south road at fence line.....	46 00 22.3	94 29 36.8	.....
Tps. 129 and 130 N., R. 30 W., corner of secs. 5, 6, 31, and 32; T fence east.....	46 01 14.1	94 29 36.9	5,250
T. 131 N., R. 30 W., corner of secs. 17, 18, 19, and 20; right-angle bend in road.....	46 09 03.7	94 29 44.9	.....
T. 131 N., R. 30 W., corner of secs. 7, 8, 17, and 18; center of north and south road 160 feet north of crossroads.....	46 09 56.2	94 29 45.6	5,315
T. 131 N., R. 30 W., corner of secs. 5, 6, 7, and 8, 0.25 mile east of; center of north and south road at east and west section line.....	46 10 48.7	94 29 28.4	5,462
Southeast corner of schoolhouse.....	46 11 21.5	94 29 27.9	3,328
Roads, south, east, and northwest, line between Tps. 131 and 132 N., about 0.25 mile east of corner of secs. 5, 6, 31, and 32.....	46 11 39.9	94 29 27.9	1,870
Road forks on east edge of Lake Alexander.....	46 12 00.4	94 29 58.6	2,997
T. 132 N., R. 30 W., corner of secs. 29, 30, 31, and 32; right angle bend in road 0.25 mile east of Lake Alexander.....	46 12 31.7	94 29 46.7	3,291
T. 132 N., R. 30 W., corner of secs. 19, 20, 29, and 30; 70 feet east of road west at Rail Prairie.....	46 13 23.8	94 29 46.2	5,284
T. 132 N., R. 30 W., corner of secs. 17, 18, 19, and 20; crossroads at schoolhouse.....	46 14 15.7	94 29 47.1	5,255

## Along highways through center of quadrangle.

T. 131 N., R. 30 W., corner of secs. 29, 30, 31, and 32; center of east and west road at fence line.....	46 07 18.5	94 29 42.7	.....
T. 131 N., R. 30 W., corner of secs. 28, 29, 32, and 33; center of east and west road at fence south.....	46 07 18.4	94 28 28.3	5,210
T. 131 N., R. 30 W., quarter corner between secs. 27 and 28; T road west on west side of Round Lake.....	46 07 45.3	94 27 12.8	5,980

**BELLE PRAIRIE QUADRANGLE—Continued.****Along highways through center of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Center of road forks at road northwest, line between secs. 27 and 34, T. 131 N., R. 30 W. ....	° ' "	° ' "	Feet.
Center of crossroads just east of swamp. ....	46 07 20.0	94 26 38.1	3,542
Center of triangle at road forks at southeast corner of clearing where house originally stood. ....	46 07 16.5	94 26 00.0	2,705
Crossroads, east and west section line. ....	46 07 33.7	94 25 21.4	3,228
T. 131 N., Rs. 29 and 30 W., corner of secs. 30, 31, 25, and 36. ....	46 07 19.6	94 24 18.9	4,634
T. 131 N., R. 29 W., on east side of river road, at road west in sec. 30, 230 feet south of small iron bridge over small creek; iron post stamped "Prim. Trav. Sta. No. 23, 1915, Minn." ....	46 07 20.8	94 23 26.4	3,700
Road forks, at road west, just east of elm tree with DeLaval Cream Separator's sign and 400 feet below upper prong of same road fork. ....	46 07 27.3	94 22 28.5	4,132
Center of river road directly over pipe culvert just north of gates on both sides of road. ....	46 08 24.9	94 22 53.3	6,001
	46 08 52.8	94 22 39.9	2,982

Magnetic declination for north border of quadrangle,  $8^{\circ}$  E.; for east border,  $8\frac{1}{4}^{\circ}$  E.; for south border,  $8\frac{1}{4}^{\circ}$  E.; for west border,  $8\frac{1}{4}^{\circ}$  E.; for center,  $8\frac{1}{4}^{\circ}$  E.

**BRAINERD QUADRANGLE.****Near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 133 N., R. 28 W., corner of secs. 5, 6, 7, and 8. ....	° ' "	° ' "	Feet.
	46 21 16.1	94 14 39.7	.....

**BROWERVILLE QUADRANGLE.****Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 132 N., R. 32 W., corner of secs. 29, 30, 31, and 32; T. lane east. ....	° ' "	° ' "	Feet.
Tps. 131 and 132 N., R. 32 W., corner of secs. 5, 6, 31, and 32, center of north-south road in line with fence, west. ....	46 12 33.5	94 45 06.2	.....
T road west at quarter corner. ....	46 11 41.3	94 45 06.8	5,292
T. 131 N., R. 32 W., corner of secs. 5, 6, 7, and 8; T road west. ....	46 11 15.2	94 45 07.1	2,650
T. 131 N., R. 32 W., corner of secs. 7, 8, 17, 18; crossroads. ....	46 10 48.9	94 45 07.2	2,650
Road forks at road north near northwest corner of Rice Lake. ....	46 09 56.6	94 45 07.4	5,300
T. 131 N., R. 32 W., center of north-south road, at telephone line west between secs. 18 and 19. ....	46 09 14.8	94 45 07.0	4,241
T. 131 N., R. 32 W., 15 feet north and 15 feet east of center of crossroads, 15 feet north of line between secs. 19 and 30, and about 0.25 mile west of corner of secs. 19, 20, 29, and 30; iron post stamped "Prim. Trav. Sta. No. 26, 1915, Minn." ....	46 09 04.0	94 45 25.4	1,695
Crossroads just south of Thunder Lake. ....	46 08 11.6	94 45 25.9	5,309
Tps. 130 and 131 N., R. 32 W., road forks at road southwest near northwest corner of Round Lake, 20 feet north of line between secs. 6 and 31. ....	46 06 53.7	94 45 20.1	7,907
Long Lake, about 200 feet west of, gate in fence. ....	46 06 27.6	94 45 39.1	.....
T. 130 N., R. 33 W., stake at quarter corner between secs. 1 and 12, bend in road. ....	46 05 39.4	94 46 16.9	5,361
T. 130 N., R. 33 W., quarter corner between secs. 12 and 13, T road north. ....	46 05 34.0	94 46 53.9	2,667
T. 130 N., R. 33 W., corner of secs. 11, 12, 13, and 14, crossroads at concrete block schoolhouse. ....	46 04 41.8	94 46 54.2	5,292
T. 130 N., R. 33 W., corner of secs. 13, 14, 23, and 24, T road east. ....	46 04 41.3	94 47 31.7	2,645
T. 130 N., R. 33 W., quarter corner between secs. 23 and 26, east-west road at fence south. ....	46 03 49.3	94 47 32.9	5,275
T. 130 N., Rs. 32 and 33 W., quarter corner between secs. 25 and 30, T road south. ....	46 02 31.2	94 47 33.8	7,912
T. 130 N., R. 32 W., road south on line between secs. 29 and 30, at northwest corner of cleared field. ....	46 02 31.9	94 46 18.4	5,310
	46 02 35.7	94 45 05.4	5,163

## BROWERVILLE QUADRANGLE—Continued.

## Along highways near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Lone triangulation station (C. & G. S.); in the NE. $\frac{1}{4}$ sec. 29, T. 130 N., R. 32 W., the high sharp hill on which it is located is quite prominent, two trees on it; about 0.5 mile from the middle of the east side of Lake McTire, in Hartford Township; it is 5 miles north and 6 miles east from Long Prairie on the Great Northern Railway; station mark: A terra-cotta pipe set in concrete...	• • "	• • "	
T. 130 N., R. 32 W., corner of secs. 29, 30, 31, and 32, T road west...	46 02 24.6	94 43 59.6	4,777
Tps. 129 and 130 N., R. 32 W., corner of secs. 5, 6, 31, and 32, 10 feet south of, in south side of east-west road on line with T road north; iron post stamped "Prim. Trav. Sta. No. 28, 1915, Minn.".	46 02 05.7	94 45 05.8	5,047
	46 01 13.4	94 45 07.4	5,308

Magnetic declination for east border of quadrangle,  $94^{\circ}$  E.

## CUSHING QUADRANGLE.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 130 N., Rs. 30 and 31 W., quarter corner between secs. 31 and 36.	• • "	• • "	Feet.
T. 130 N., Rs. 30 and 31 W., corner of secs. 30, 31, 25, and 36, T road west...	46 01 39.7	94 30 52.1	.....
T. 130 N., Rs. 30 and 31 W., corner of secs. 19, 30, 24, and 25, T road west...	46 02 05.9	94 30 52.8	2,655
T. 130 N., Rs. 30 and 31 W., corner of secs. 18, 19, 13, and 24, T road west...	46 02 58.1	94 30 55.3	5,290
T. 130 N., Rs. 30 and 31 W., corner of secs. 7, 18, 12, and 13, center of east-west road at fence line east, 470 feet south of bridge over Little Elk River...	46 03 50.6	94 30 52.3	5,318
T. 130 N., Rs. 30 and 31 W., quarter corner between secs. 7 and 12, T road east...	46 04 42.2	94 30 52.6	5,230
T. 130 N., 1 $\frac{1}{4}$ sec. 30 and 31 W., corner of secs. 6, 7, 1, and 12, T road south, 0.5 mile west of Randall...	46 05 08.4	94 30 52.8	2,655
Randall, main track at east-west road crossing, about 1,000 feet northwest of depot...	46 05 35.0	94 30 53.3	2,694
Randall, 1 mile north of, T road east on east-west section line...	46 05 35.5	94 30 18.1	2,485
Randall, 2 miles north of, at southwest corner of crossroads at district 85 schoolhouse, 30 feet south and 25 feet west of quarter corner between secs. 30 and 31, T. 131 N., R. 30 W., iron post stamped "Prim. Trav. Sta. No. 22, 1915, Minn."	46 06 26.6	94 30 15.1	5,179
T. 131 N., Rs. 30 and 31 W., corner of secs. 30, 31, 25, and 36...	46 07 18.2	94 30 20.4	5,238
T. 131 N., Rs. 30 and 31 W., corner of secs. 19, 30, 24, and 25, T road west...	46 07 18.1	94 30 51.6	2,199
T. 131 N., Rs. 30 and 31 W., quarter corner between secs. 19 and 24, T road east...	46 08 10.2	94 30 54.0	5,284
T. 131 N., Rs. 30 and 31 W., quarter corner between secs. 19 and 24, T road east...	46 08 36.4	94 30 54.5	2,650
Johnson triangulation station (C. & G. S.). In the northern half of SW. $\frac{1}{4}$ sec. 7, T. 131 N., R. 30 W., on the highest part of a mound on a prominent brush-covered hill. In Prairie Township, 0.5 mile northwest of the Randall and Alexander wagon road, on land belonging to Ed. Johnson, whose house is 95 paces from station. Station mark: A terra cotta pipe set in concrete.....	46 10 22.0	94 30 42.7	.....

## Along highways near north border of quadrangle.

T. 132 N., Rs. 30 and 31 W., corner of secs. 18, 19, 13, and 24, cross-roads...	46 14 15.2	94 30 57.4	.....
T. 132 N., R. 31 W., corner of secs. 13, 14, 23, and 24, corner stake in small open swamp, 350 feet east of east end of graded road...	46 14 14.3	94 32 12.5	5,280
T. 132 N., R. 31 W., corner of secs. 14, 15, 22, and 23, crossroads...	46 14 13.5	94 33 27.2	5,258
T. 132 N., R. 31 W., corner of secs. 15, 16, 21, and 22, T road south...	46 14 14.5	94 34 42.0	5,258
T. 132 N., R. 31 W., corner of secs. 16, 17, 20, and 21, stake in center of east-west road, at north and south fence line...	46 14 14.5	94 35 58.0	5,340
T. 132 N., R. 31 W., corner of secs. 17, 18, 19, and 20, fence south Lincoln, 2 miles north of, at bend in road, 30 feet south of gate and 20 feet south of approximate corner of secs. 18, 19, 13, and 24, Morrison-Todd county line; iron post stamped "Prim. Trav. Sta. No. 24, 1915, Minn." (NOTE.—West tier of sections in R. 31 W. are long).....	46 14 16.3	94 37 13.3	5,297
Lincoln, 1 mile north of, corner of secs. 19, 30, 24, and 25, T road east, county line.....	46 14 17.2	94 38 50.2	6,817
Staples Auto Club sign at road forks.....	46 13 26.8	94 38 50.0	5,105
	46 14 12.2	94 39 34.1	5,549

## CUSHING QUADRANGLE—Continued.

## Along highways near north border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Road forks, 30 feet southwest of jackpine tree with sign reading "Motley 6½ miles".....	46 14 47.3	94 39 40.4	Feet. 3,577
North end of bridge over Fish Trap Creek, 750 feet north and 10 feet east of stake in center of sec. 16, T. 132 N., R. 32 W.....	46 14 51.5	94 43 12.9	.....
Road forks, at road north, about 150 feet southeast of concrete-block house.....	46 13 25.9	94 43 27.5	8,731
T. 132 N., R. 32 W., corner of secs. 20, 21, 28, and 29, center of east and west road, at fence line.....	46 13 25.9	94 43 50.7	1,630
T. 132 N., R. 32 W., about 900 feet east of corner of secs. 19, 20, 29, and 30, 15 feet north and 5 feet east of T road south at schoolhouse; iron post stamped "Prim. Trav. Sta. No. 25, 1915, Minn.".....	46 13 24.8	94 44 53.3	4,405

## Along highways near south border of quadrangle.

Tps. 129 and 130 N., R. 32 W., corner of secs. 4, 5, 32, and 33; flagpole, 20 feet west of north-south telephone line.....	46 01 13.0	94 43 52.4	.....
Gate in fence.....	46 01 22.8	94 41 46.8	8,922
T. 130 N., R. 32 W., center of north-south road at line between secs. 34 and 35.....	46 01 30.9	94 41 22.6	1,899
J. Schrupp's small box at road northwest.....	46 01 13.7	94 40 46.0	3,109
Tps. 129 and 130 N., R. 32 W., corner of secs. 1, 2, 35, and 36, fence corner 125 feet south of road forks at road north.....	46 01 14.6	94 40 07.8	2,698
T. 129 N., Rs. 31 and 32 W., quarter corner between secs. 1 and 6; 15 feet north and 15 feet west of, set at northwest corner of T road east, Morrison-Todd county line; iron post stamped "Prim. Trav. Sta. No. 29, 1915, Minn.".....	46 00 47.2	94 38 52.4	6,010
Center of gate at northwest corner of barn-yard; about 250 feet northwest of white-washed frame house, on top of hill.....	46 00 49.1	94 37 53.1	4,190
Tps. 129 and 130 N., R. 31 W., corner of secs. 5, 6, 31, and 32, center of east and west road, 20 feet east of west end of small swamp which is about 150 feet wide, no stake or fence but corner was pointed out by old settler.....	46 01 16.2	94 37 06.3	4,297
Tps. 129 and 130 N., R. 31 W., corner of secs. 4, 5, 32, and 33, cross-roads.....	46 01 15.7	94 35 51.1	5,305
T. 129 N., R. 31 W., corner of secs. 4, 5, 8, and 9, T road east.....	46 00 20.7	94 35 51.3	5,370
T. 129 N., R. 31 W., corner of secs. 3, 4, 9, and 10, center of east-west road at fence line.....	46 00 21.4	94 34 36.4	5,289
T. 129 N., R. 31 W., quarter corner between secs. 3 and 10, cross-roads.....	46 00 21.5	94 33 59.5	2,610
T. 129 N., R. 31 W., corner of secs. 2, 3, 10, and 11, center of east-west road at fence line.....	46 00 21.7	94 33 22.2	2,630
T. 129 N., R. 31 W., quarter corner between secs. 2 and 11, cross-roads.....	46 00 21.9	94 32 44.3	2,680
T. 129 N., R. 31 W., corner of secs. 1, 2, 11, and 12, center of east-west road at fence north, 20 feet west of T lane north.....	46 00 21.7	94 32 06.9	2,640
Cross-roads; north-south section line.....	46 00 07.4	94 30 51.1	5,542

## Along highways through center of quadrangle.

Road forks near southeast corner of Thunder Lake, roads east, west, and southwest.....	46 06 46.9	94 44 48.0	.....
T. 131 N., R. 32 W., line between secs. 32 and 33, bend in road in line with road south and road east; about 250 feet southeast of yellow frame house.....	46 07 09.9	94 43 51.9	4,392
T. 131 N., R. 32 W., corner of secs. 27, 28, 33, and 34, center of east-west road at center of line south between north-south fences about 60 feet apart, just north of Pine Island Lake, and about 300 feet west of green residence on north side of road.....	46 07 20.2	94 42 36.5	5,411
T. 131 N., R. 32 W., center of sec. 26, fence corner at right angle bend in road.....	46 07 45.3	94 40 44.2	8,303
T. 131 N., R. 32 W., corner of secs. 23, 24, 25, and 26, center of east-west road, 15 feet north of fence corner at northeast corner of Tipperry's farm, 15 feet northwest of white pine stump.....	46 08 12.0	94 40 06.8	3,777
T. 131 N., Rs. 31 and 32 W., corner of secs. 19, 30, 24, and 25, 20 feet north and 4 feet west of; iron post set on north side of east-west road, 4 feet west and 1 foot south of fence north on Morrison-Todd county line, about 650 feet east of schoolhouse; iron post stamped "Prim. Trav. Sta. No. 27, 1915, Minn.".....	46 08 13.1	94 38 50.8	5,345
T. 131 N., R. 31 W., corner of secs. 19, 20, 29, and 30, center of east-west road at telephone line north, 250 feet west of wooden bridge.....	46 08 14.0	94 37 09.2	7,156
Center of wooden culvert.....	46 08 38.4	94 35 53.1	5,901
Cushing railroad crossing, main track, about 100 feet northwest of depot.....	46 08 22.6	94 34 37.3	5,573

## CUSHING QUADRANGLE—Continued.

Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 131 N., R. 31 W., corner of secs. 22, 23, 26, 27, roads east and northwest and cut-out line south.....	46 08 11.4	94 33 23.6	Feet. 5,316
T. 131 N., R. 31 W., corner of secs. 23, 24, 25, and 26, crossroads at schoolhouse.....	46 08 11.4	94 32 09.0	5,250

Magnetic declination for east border of quadrangle,  $84^{\circ}$  E.; for north border,  $91^{\circ}$  E.; for center,  $91^{\circ}$  E.; for south border,  $91^{\circ}$  E.; for west border,  $91^{\circ}$  E.

## MOTLEY QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 133 N., R. 30 W., quarter corner between secs. 7 and 18, T road north.....	46 20 24.7	94 30 21.7	Feet. ....
T. 133 N., R. 30 W., quarter corner between secs. 6 and 7, center of north and south road, line west is cut out.....	46 21 17.0	94 30 23.6	5,300
Road forks, 5 feet north and 12 feet west of advertising sign on jack-pine tree.....	46 22 41.2	94 31 13.8	9,228
T. 134 N., Rs. 30 and 31 W., big square stone at corner of secs. 25, 30, 31, and 36, just south of bend in road at south end of north-south road.....	46 23 01.0	94 31 03.6	2,125
T. 134 N., Rs. 30 and 31 W., corner of secs. 24, 25, 19, and 30, 30 feet south and 25 feet east of, at southeast corner of crossroads $\frac{1}{4}$ mile south of Fairview schoolhouse; iron post stamped "Prim. Trav. Sta. No. 13, 1915, Minn.".....	46 23 53.1	94 31 03.6	5,274
T. 134 N., Rs. 30 and 31 W., stone corner of secs. 13, 24, 18, and 19, crossroads.....	46 24 45.8	94 31 05.3	5,340
T. 134 N., Rs. 30 and 31 W., corner of secs. 7, 18, 12, and 13; iron pipe.....	46 25 38.1	94 31 06.6	5,298
T. 134 N., Rs. 30 and 31 W., corner of secs. 6, 7, 1, and 12, wooden hub on transit line.....	46 26 30.1	94 31 07.8	5,270
Sunrise schoolhouse, 1 mile east of, second-class road at cut-out north-south section line.....	46 26 30.6	94 31 07.8	50
Gate in east-west fence.....	46 26 42.8	94 30 26.0	3,176

## Near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 132 N., R. 32 W., approximate corner of secs. 11, 12, 13, and 14, tall jack-pine tree with signboard reading "Philbrook"; just north of east-west road, 420 feet west of gate in fence.....	46 15 10.8	94 40 05.8	....
Philbrook, 2.5 miles southeast of, east-west railroad crossing, apparently east-west section line.....	46 15 12.6	94 41 17.7	5,055
Road forks, 900 feet northeast of abandoned log house.....	46 15 02.2	94 42 12.5	3,994

Magnetic declination for east border of quadrangle,  $9^{\circ}$  E.; for south border,  $91^{\circ}$  E.

## LASTRUP QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 42 N., R. 31 W., corner of secs. 27, 28, 33, and 34, T road north.....	46 05 03.3	94 14 58.6	Feet. ....
T. 42 N., R. 31 W., corner of secs. 26, 27, 34, and 35, T road south.....	46 05 05.4	94 13 44.6	5,216
Tps. 41 and 42 N., R. 31 W., corner of secs. 2, 3, 34, and 35, crossroads.....	46 04 12.6	94 13 43.2	5,340
T. 41 N., R. 31 W., corner of secs. 2, 3, 10, and 11; crossroads.....	46 03 21.8	94 13 41.9	5,150
T. 41 N., R. 31 W., corner of secs. 10, 11, 14, and 15, crossroads.....	46 02 29.2	94 13 44.1	5,327
T. 41 N., R. 31 W., corner of secs. 14, 15, 22, and 23, crossroads.....	46 01 37.3	94 13 43.2	5,260
T. 41 N., R. 31 W., corner of secs. 22, 23, 26, and 27, T road west.....	46 00 45.5	94 13 44.0	5,252
T. 41 N., R. 31 W., corner of secs. 21, 22, 27, and 28, 15 feet north of fence corner.....	46 00 45.3	94 14 59.3	5,320

Magnetic declination for west border of quadrangle,  $84^{\circ}$  E.

## LITTLE FALLS QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 41 N., R. 31 W., corner of secs. 28, 29, 32, and 33, 15 feet south and 5 feet east of, in south side of east-west road at T road north; iron post stamped "Prim. Trav. Sta. No. 19, 1915, Minn."	* * "	* * "	Fct.
T. 41 N., R. 31 W., corner of secs. 29, 30, 31, and 32, center of east-west road at fence south	45 59 52.0	94 16 14.8	-----
T. 41 N., Rs. 31 and 32 W., corner of secs. 30, 31, 25, and 26, center of east-west road at fence line	45 59 51.2	94 18 47.3	5,440
T. 41 N., R. 32 W., quarter corner between secs. 25 and 36, T road east	45 59 51.4	94 19 24.9	2,655
Calvary Cemetery, center of east-west road in front of gate	45 59 25.6	94 20 40.3	5,935
Road east, 335 feet west of railroad crossing	45 59 25.6	94 21 07.2	1,993
Little Falls, intersection of Fifth Street and Seventh Avenue NE	45 59 02.9	94 21 13.4	2,335
Little Falls, spire of public-school building, originally the high school	45 58 38.2	94 21 27.6	2,699
Little Falls, west end of Broadway Street Bridge over Mississippi River	45 58 38.0	94 22 08.8	2,914
Little Falls, southwest corner of T road south, 1,340 feet west of Broadway Street Bridge; iron post stamped "Prim. Trav. Sta. No. 20, 1915, Minn."	45 58 37.2	94 22 27.7	1,339
Little Falls, cross streets at west edge of, corner of secs. 18, 19, 13, and 24, T. 129 N., Rs. 29 and 30 W.	45 58 36.6	94 23 15.9	3,407
Railroad crossing	45 58 36.9	94 24 07.8	3,665
T. 129 N., R. 30 W., corner of secs. 13, 14, 23, and 24, crossroads	45 58 36.7	94 24 31.2	1,655
T. 129 N., R. 30 W., corner of secs. 14, 15, 22, and 23, center of east-west road in line with north-south road	45 58 36.9	94 25 46.3	5,300
T. 129 N., R. 30 W., approximate corner of secs. 15, 16, 21, and 22, 35 feet north of east-west road	45 58 37.6	94 27 02.3	5,370
T. 129 N., R. 30 W., quarter corner between secs. 16 and 21, crossroads	45 58 37.4	94 27 40.5	2,700
Center of road at north-south section line	45 58 48.3	94 28 19.4	2,959
T. 129 N., R. 30 W., corner of secs. 17, 18, 19, and 20, center of east-west road at fence line	45 58 37.5	94 29 35.7	5,496

Magnetic declination for north border of quadrangle  $84^{\circ}$  E.

## PINE RIVER QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Prim. Trav. Sta. No. 32, 1912	* * "	* * "	Fct.
Hubert, railroad crossing just west of depot	46 29 37.0	94 13 30.9	-----
Railroad crossing at north and south section line	46 30 05.1	94 15 25.2	8,489
Nisswa, railroad crossing just east of depot	46 30 18.8	94 15 57.5	2,682
Railroad crossing east-west section line	46 31 15.6	94 17 18.7	8,088
Road forks, 30 feet south of sign reading "Pine River Garage 15½ miles"	46 31 43.8	94 17 41.3	3,265
Road forks at road leading to Knudsen's farm	46 31 54.4	94 18 05.9	2,027
Road forks at blind trail down lake	46 31 47.2	94 18 29.1	1,774
Fence corner	46 31 29.8	94 19 04.4	3,035
Road forks, 25 feet northeast of W. Erickson's mail box	46 32 02.6	94 20 07.8	5,542
Gull Lake, center of bridge over inlet to	46 32 19.0	94 20 14.7	1,724
T. 135 N., R. 29 W., corner of secs. 5, 6, 7, and 8, T road south at Geo. Gehweiler's mail box	46 32 23.8	94 20 32.8	1,360
T. 135 N., R. 29 W., corner of secs. 7, 8, 17, and 18, 15 feet south and 15 feet west of, on east side of north and south road, 460 feet south of Jud. Bressler's mail box; iron post stamped "Prim. Trav. Sta. No. 1, 1915, Minn."	46 31 44.8	94 22 19.3	8,427
T. 135 N., R. 29 W., corner of secs. 17, 18, 19, and 20, 25 feet south and 30 feet west of, at southwest corner of crossroads at Portview schoolhouse; iron post stamped "Prim. Trav. Sta. No. 2, 1915, Minn."	46 30 52.2	94 22 19.3	5,327
Center of road on grade of old narrow-gage logging road at blind trail leading south, about 300 feet south of log cabin and 50 feet north of lone oak tree having no bark on its north side	46 30 00.0	94 22 20.0	5,296
Cross trails on old grade	46 30 34.3	94 24 19.0	9,024
T. 135 N., R. 30 W., on line between secs. 10 and 11, T road south at Collins-Cole mail box	46 31 04.6	94 25 08.2	4,605
Center of road at north and south line, 400 feet east of road north at 3 mail boxes	46 31 26.0	94 26 03.0	4,405
Crossroads, 1,815 feet north of corner of secs. 4, 5, 8, and 9, T. 135 N., R. 30 W.	46 31 43.2	94 27 17.9	5,526
T. 135 N., R. 30 W., corner of secs. 4, 5, 8, and 9	46 32 01.9	94 28 33.2	5,591
	46 31 44.0	94 28 32.4	1,815

## PINE RIVER QUADRANGLE—Continued.

## Along highways near south border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 135 N., R. 30 W., corner of secs. 8, 9, 16, and 17, crossroads at Gillman schoolhouse.....	° ' "	° ' "	Feet.
Fire tower at southwest corner of T road west at quarter corner between secs. 16 and 17, T. 135 N., R. 30 W.....	46 30 52.4	94 28 32.2	5,231
T. 135 N., R. 30 W., corner of secs. 16, 17, 20, and 21, 25 feet south and 30 feet west of, at southwest corner of T road west; iron post stamped "Prim. Trav. Sta. No. 3, 1915, Minn.".....	46 30 26.3	94 28 32.8	2,635
	46 30 00.2	94 28 33.1	2,645

Magnetic declination for south border of quadrangle,  $84^{\circ}$  E.

## SWANVILLE QUADRANGLE.

## Near northeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 129 N., Rs. 30 and 31 W., corner of secs. 18, 19, 13, and 24, 30 feet south and 25 feet west of; iron post set at southwest corner of crossroads stamped "Prim. Trav. Sta. No. 21, 1915, Minn.".....	° ' "	° ' "	Feet.
T. 129 N., Rs. 30 and 31 W., corner of secs. 7, 18, 12, and 13, T road west.....	45 58 37.1	94 30 52.1	.....
	45 59 29.5	94 30 51.4	5,308

Magnetic declination for quadrangle,  $7^{\circ} 45'$  E.

## SYLVAN QUADRANGLE.

## Along Northern Pacific Railway through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 133 N., Rs. 28 and 29 W., center of railroad at line between secs. 7 and 12, fence south, just south of east end of tangent and 990 feet east of milepost 122.....	° ' "	° ' "	Feet.
Railroad crossing, second class.....	46 20 54.9	94 15 54.9	.....
Baxter railroad crossing, 25 feet west of line between secs. 11 and 12, T. 133 N., R. 29 W.....	46 20 48.4	94 16 20.4	1,910
Railroad at milepost 124.....	46 20 35.5	94 17 10.6	3,750
Railroad crossing.....	46 20 22.2	94 18 31.8	5,954
Crow Wing-Cass county line, railroad at north and south section line.....	46 20 25.7	94 19 22.1	3,550
T. 133 N., R. 29 W., railroad at line between secs. 16 and 17.....	46 20 27.3	94 19 38.1	1,130
Gull River, east end of railroad bridge over.....	46 20 23.8	94 20 52.9	5,262
T. 133 N., R. 29 W., railroad crossing 45 feet west of line between secs. 17 and 18.....	46 20 20.9	94 21 13.3	1,460
T. 133 N., Rs. 28 and 30 W., railroad crossing 30 feet west of line between secs. 13 and 18.....	46 20 13.3	94 22 09.8	4,039
Sylvan, railroad crossing at depot.....	46 20 08.7	94 23 25.7	5,349
T. 133 N., R. 30 W., railroad at line between secs. 13 and 14.....	46 20 05.9	94 21 28.4	4,405
T. 133 N., R. 30 W., railroad at line between secs. 14 and 15, 120 feet east of milepost No. 130.....	46 20 07.3	94 24 40.5	858
Railroad crossing.....	46 20 13.0	94 25 57.0	5,401
Pillager, at railroad crossing sign, 30 feet north and 20 feet east of crossing at depot, 20 feet east of north and south section line; iron post stamped "Prim. Trav. Sta. No. 12, 1915, Minn."; elevation, 1,210 feet.....	46 20 00.1	94 27 21.2	6,053
	46 19 47.7	94 28 27.5	4,820

## Along highways near west border of quadrangle.

T. 135 N., R. 30 W., corner of secs. 17, 18, 19, and 20; line is cut out east and north.....	46 29 58.8	94 29 48.7	.....
Home Brook, center of bridge over.....	46 29 59.8	94 29 16.2	2,270
T. 135 N., R. 30 W., corner of secs. 20, 21, 28, and 29, T road east.....	46 29 08.3	94 28 32.3	.....
T. 135 N., R. 30 W., corner of secs. 21, 22, 27, and 28, T road south.....	46 29 08.2	94 27 15.9	5,345
T. 135 N., R. 30 W., corner of secs. 27, 28, 33, and 34, center of north and south road.....	46 28 15.8	94 27 14.1	5,310
T road east at quarter corner.....	46 27 49.8	94 27 14.7	2,630

**SYLVAN QUADRANGLE**-Continued.**Along highways near west border of quadrangle**-Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 134 and 135 N., R. 30 W., corner of secs. 3, 4, 33, and 34, center of north and south road at fence line, road northwest leading to Hardy Lake.....	• • "	• • "	Feet.
Road forks at east end of Hardy Lake, in line with road east.....	46 27 24.0	94 27 15.4	2,625
Hardy Lake, road at outlet of.....	46 27 34.3	94 28 24.5	4,450
Small poplar tree on north side of road, about 100 feet east of second-class road forks; tree is blazed on the south and west sides and five nails are in blaze on west side 10 inches above ground.....	46 27 18.5	94 28 51.0	2,448
T. 133 N., R. 30 W., corner of secs. 7, 8, 17, and 18, center of east and west road at fence south.....	46 27 26.5	94 29 35.9	3,244
T. 133 N., R. 30 W., quarter corner between secs. 8 and 17, cross-roads.....	46 20 25.1	94 29 44.1	.....
T. 133 N., R. 30 W., corner of secs. 16, 17, 20, and 21, cross streets near south edge of Pillager.....	46 20 24.5	94 29 06.1	2,665
T. 133 N., R. 30 W., corner of secs. 20, 21, 28, and 29, crossroads.....	46 19 32.3	94 28 27.6	.....
T. 133 N., R. 30 W., corner of secs. 28, 29, 32, and 33, center of north and south road at fence line.....	46 18 40.7	94 28 26.3	5,240
Tps. 132 and 133 N., R. 30 W., corner of secs. 4, 5, 32, and 33, telephone line east.....	46 17 48.6	94 28 25.4	5,280
T. 132 N., R. 30 W., corner of secs. 4, 5, 8, and 9, telephone line east, 810 feet south of T road east.....	46 16 56.1	94 28 25.9	5,326
T. 132 N., R. 30 W., corner of secs. 8, 9, 16, and 17, 40 feet north and 20 feet west of, at northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 16, 1915, Minn."; elevation, 1,305 feet.....	46 16 05.9	94 28 28.6	5,086
Home Brook schoolhouse, 20 feet north of gate and just inside of fence; iron post stamped "Prim. Trav. Sta. No. 14, 1915, Minn.", elevation, 1,293 feet.....	46 15 09.4	94 28 30.1	5,734
T. 134 N., R. 30 W., corner of secs. 2, 3, 10, and 11, flagpole in swamp Second-class road at dirt road north.....	46 27 10.3	94 27 16.7	.....
Road forks about 500 feet south of old log barn.....	46 26 29.6	94 26 03.4	6,585
Road forks; roads north, northeast, and southwest.....	46 25 56.5	94 25 09.5	5,052
Fence corner at southwest corner of fenced-in ground, east side of road.....	46 25 22.4	94 24 51.0	3,686
Wilson Lake, old white-pine stump at west end of, in line with roads west and south.....	46 24 56.7	94 25 01.6	2,715
Center of triangle at road forks on top of ridge, junction of Brainerd-Pillager roads.....	46 24 46.0	94 25 01.2	1,086
Nail in small oak tree, 5 feet above ground; west side of road at east end of Wilson Lake at point where Brainerd road leaves lake, about 30 feet east of lake shore.....	46 23 52.0	94 25 01.0	5,468
Road forks at second-class road northeast.....	46 23 32.9	94 25 05.9	1,998
West end of bridge over stream connecting two lakes.....	46 23 21.4	94 23 53.5	5,211
In angle formed by road forks on top of rise, about 570 feet southeast of bridge over stream connecting small lake with Gull Lake, and 810 feet southeast of cottage on strip of land between lakes; iron post stamped "Prim. Trav. Sta. No. 15, 1915, Minn.".....	46 23 09.5	94 22 46.9	4,821
Road forks, west end of triangle.....	46 23 08.4	94 21 55.9	3,576
Apparent line between secs. 5 and 8, T. 133 N., R. 29 W., not in road.....	46 21 18.0	94 21 46.4	1,926

**Along highways near south border of quadrangle.**

T. 132 N., R. 30 W., corner of secs. 7, 8, 17, and 18, 25 feet east of crossroads at church.....	46 15 07.7	94 29 45.2	.....
Prim. Trav. Sta. No. 16, 1915 (see description above).....	46 15 09.4	94 28 30.1	5,276
T. 132 N., R. 30 W., stake at corner of secs. 9, 10, 15, and 16, center of east and west road; two telephone lines north, one on each side of section line.....	46 15 08.9	94 27 14.4	5,323
T. 132 N., R. 30 W., corner of secs. 10, 11, 14, and 15, telephone line south.....	46 15 10.8	94 25 59.0	5,305
T. 132 N., R. 30 W., corner of secs. 11, 12, 13, and 14, T road north.....	46 15 10.8	94 24 43.8	5,287
T. 132 N., R. 29 and 30 W., corner of secs. 7, 8, 12, and 13; 30 feet south and 25 feet west of, at northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 17, 1915, Minn."; elevation, 1198 feet.....	46 15 10.9	94 23 29.8	5,205

**On north border of quadrangle.**

T. 135 N., R. 29 W., corner of secs. 17, 18, 19, and 20, 25 feet south and 30 feet west of; at southwest corner of crossroads at Portview schoolhouse; iron post stamped "Prim. Trav. Sta. No. 2, 1915, Minn.".....	46 30 00.0	94 22 20.0	.....
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Magnetic declination for north border of quadrangle,  $8\frac{1}{2}$ ° E.; for center,  $8\frac{1}{4}$ ° E.; for west border, 9° E.; for south border, 8° E.

# MINNESOTA, NORTH DAKOTA, AND SOUTH DAKOTA.

## PRIMARY TRAVERSE.

**Beardsley, New Effington, Marvin, Peever, Sisseton, and White Rock quadrangles.**

**BIG STONE AND TRAVERSE COUNTIES, MINN.; RICHLAND COUNTY, N. DAK.; ROBERTS COUNTY, S. DAK.**

The following geographic positions on North American datum were determined by George T. Hawkins in 1915. Lines were run around the borders and through the center of quadrangles and tied to the following stations of the United States Coast and Geodetic Survey: Homer Siding, Enwiler, Layden, and Brown Valley southeast base.

### BEARDSLEY QUADRANGLE.

**Along highways near south border of quadrangle.**

Station..	Latitude.	Longitude.	Distance between stations.
<b>MINNESOTA.</b>			
Beardsley, 1.5 miles southwest of, 30 feet north and 20 feet east of corner secs. 13, 18, 19, and 24, 4 feet from corner of fence; iron post stamped "Prim. Trav. Sta. No. 11, 1915".....	45 32 44.6	96 44 25.5	.....
T. 124 N., R. 48 W., corner secs. 17, 18, 19, and 20, crossroads.....	45 32 43.3	96 43 11.8	5,250
T. 124 N., R. 48 W., corner secs. 16, 17, 20, and 21, crossroads.....	45 32 43.4	96 41 58.8	5,197
T. 124 N., R. 48 W., corner secs. 15, 16, 21, and 22, crossroads.....	45 32 42.8	96 40 44.3	5,300
T. 124 N., R. 48 W., corner secs. 14, 15, 22, and 23, crossroads.....	45 32 41.8	96 39 30.1	5,280
T. 124 N., R. 48 W., corner secs. 13, 14, 23, and 24, crossroads.....	45 32 40.7	96 38 15.7	5,300
T. 124 N., Rs. 47 and 48 W., 30 feet north and 60 feet east of corner secs. 13, 24, 18, and 19, and 4 feet south of corner of fence; iron post stamped "Prim. Trav. Sta. No. 12, 1915".....	45 32 40.0	96 37 00.2	5,374
T. 124 N., R. 47 W., corner secs. 17, 18, 19, 20, crossroads.....	45 32 38.6	96 35 45.6	5,310
T. 124 N., R. 47 W., corner secs. 16, 17, 20, and 21, crossroads.....	45 32 37.8	96 34 31.7	5,260
T. 124 N., R. 47 W., corner secs. 15, 16, 21, and 22, crossroads.....	45 32 37.9	96 33 17.2	5,300
T. 124 N., R. 47 W., corner secs. 14, 15, 22, and 23, crossroads.....	45 32 38.2	96 32 02.4	5,328
T. 124 N., R. 47 W., 35 feet south and 20 feet east of crossroads, at corner secs. 13, 14, 23, and 24, at northwest corner of grove; iron post stamped "Prim. Trav. Sta. No. 13, 1915".....	45 32 37.2	96 30 48.5	5,260

**Along highways near east border of quadrangle.**

T. 124 N., R. 47 W., corner secs. 11, 12, 13, and 14, crossroads.....	45 33 29.7	96 30 49.7	5,316
Graceville, 4 miles west of, railway crossing.....	45 33 52.9	96 30 50.0	2,350
T. 124 N., R. 47 W., corner secs. 1, 2, 11, and 12, crossroads.....	45 34 22.0	96 30 50.0	2,950
T. 124 N., R. 47 W., north corner secs. 1 and 2, T road south.....	45 35 08.0	96 30 50.5	4,670
T. 125 N., Rs. 46 and 47 W., south corner secs. 31 and 36, T road north.....	45 35 08.1	96 30 38.7	840
T. 125 N., Rs. 46 and 47 W., corner secs. 25, 30, 31, and 36.....	45 35 59.9	96 30 38.1	5,250
T. 125 N., Rs. 46 and 47 W., corner secs. 24, 25, 19, and 30, T road north.....	45 36 52.6	96 30 38.1	5,342
T. 125 N., Rs. 46 and 47 W., 20 feet south and 30 feet west of crossroads, at corner secs. 13, 18, 19, and 24, 3 feet from corner of fence; iron post stamped "Prim. Trav. Sta. No. 14, 1915".....	45 37 44.4	96 30 38.6	5,249
T. 125 N., Rs. 46 and 47 W., corner secs. 7, 12, 13, and 18, crossroads.....	45 38 37.0	96 30 38.5	5,329
T. 125 N., Rs. 46 and 47 W., corner secs. 1, 6, 7, and 12, crossroads.....	45 39 29.1	96 30 38.7	5,280
Tps. 125 and 126 N., Rs. 46 and 47 W., corner secs. 1, 6, 31, and 36, T road east.....	45 40 21.6	96 30 38.8	5,310
T. 126 N., Rs. 46 and 47 W., corner secs. 30, 31, 36, and 25, crossroads.....	45 41 13.6	96 30 38.8	5,270
T. 126 N., Rs. 46 and 47 W., corner secs. 19, 30, 24, and 25, crossroads.....	45 42 05.8	96 30 38.7	5,290
T. 126 N., Rs. 46 and 47 W., corner secs. 13, 24, 18, and 19, crossroads.....	45 42 57.9	96 30 38.7	5,280
T. 126 N., Rs. 46 and 47 W., corner secs. 12, 13, 7, and 18, crossroads.....	45 43 50.1	96 30 38.6	5,280
T. 126 N., Rs. 46 and 47 W., corner secs. 1, 12, 6, and 7, crossroads.....	45 44 42.4	96 30 38.5	5,300

## BEARDSLEY QUADRANGLE—Continued.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
MINNESOTA.			
T. 126 N., R. 47 W., corner secs. 2, 3, 10, and 11, crossroads.....	45 44 42.0	96 33 07.2	
T. 126 N., R. 47 W., corner secs. 3, 4, 9, and 10, crossroads.....	45 44 42.2	96 34 21.8	5,290
T. 126 N., R. 47 W., corner secs. 4, 5, 8, and 9, crossroads.....	45 44 42.5	96 35 36.4	5,290
T. 126 N., R. 47 W., 20 feet north and 10 feet east of T road south, at corner secs. 5, 6, 7, and 8, 3 feet from corner of wire fence; iron post stamped "Prim. Trav. Sta. No. 16, 1915".....	45 44 43.4	96 36 51.0	5,290
T. 126 N., R. 47 W., corner secs. 7, 8, 17, and 18, crossroads.....	45 45 51.3	96 36 51.0	5,272
T. 126 N., R. 47 W., corner secs. 17, 18, 19, and 20, crossroads.....	45 45 59.2	96 36 51.4	5,280
T. 126 N., Rs. 47 and 48 W., corner secs. 18, 19, 13, and 24, crossroads.....	45 45 59.2	96 38 08.9	5,497
T. 126 N., Rs. 47 and 48 W., corner secs. 24, 25, 19, and 30, crossroads.....	45 42 06.9	96 38 08.8	5,296
T. 126 N., R. 48 W., corner secs. 23, 24, 25, and 26, T road east.....	45 42 07.0	96 39 24.4	5,360
T. 126 N., R. 48 W., corner secs. 25, 26, 35, and 36, crossroads.....	45 41 14.9	96 39 24.3	5,240
T. 126 N., R. 48 W., corner secs. 26, 27, 34, and 35, crossroads.....	45 41 15.0	96 40 38.8	5,290
T. 126 N., R. 48 W., corner secs. 27, 28, 33, and 34, road north.....	45 41 15.4	96 41 53.0	5,270
T. 126 N., R. 48 W., corner secs. 28, 29, 32, and 33, T road south.....	45 41 15.4	96 43 08.7	5,369

## Along highways near west border of quadrangle.

T. 125 N., R. 48 W., corner secs. 32, 33, 34, and 35, crossroads.....	45 40 23.1	96 43 08.1	5,291
T. 125 N., R. 48 W., quarter corner secs. 4 and 5, crossroads.....	45 39 57.2	96 43 08.3	2,630
T. 125 N., R. 48 W., corner secs. 4, 5, 8, and 9, crossroads.....	45 39 31.0	96 43 08.4	2,649
T. 125 N., R. 48 W., corner secs. 5, 6, 7, and 8, crossroads.....	45 39 31.1	96 44 23.5	5,330
T. 125 N., R. 48 W., corner secs. 7, 8, 17, and 18, crossroads.....	45 38 38.7	96 44 23.6	5,300
Layden triangulation station, U. S. Coast and Geodetic Survey (Traverse County, Minn., 1903-4) in the SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 17, T. 125 N., R. 48 W., on land belonging to James Layden; station is on a prominent mound 3.5 miles north and 4.5 miles east of Brown Valley. Mark is a terra-cotta pipe 4 inches in diameter, filled with concrete, and has 60-penny wire nail embedded in top. Reference mark is also a terra-cotta pipe with nail in top, and is at the southwest corner of section, in southwest corner of field, and 371.128 meters from the station in azimuth 46° 27' 31"; is 6.4 meters lower in elevation than the station. The following azimuths and distances are from the triangulation station: William Cobert's house, chimney, 96° 03' 51", about $\frac{1}{2}$ mile; James Layden's house, chimney, 170° 30' 20", about $\frac{1}{2}$ mile; windmill tower at William Boner's house, 271° 58' 21" about $\frac{1}{2}$ mile. The quarter corner in the center of the west side of this section is connected with the station.....	45 38 21.13	96 44 10.6	2,005
T. 125 N., R. 48 W., 20 feet south and 20 feet east of, corner secs. 17, 18, 19, and 20, 3 feet from corner of fence; iron post stamped "Prim. Trav. Sta. No. 17, 1915".....	45 37 46.1	96 44 23.0	3,657
T. 125 N., R. 48 W., corner secs. 19, 20, 29, and 30.....	45 36 54.2	96 44 23.3	5,265
T. 125 N., R. 48 W., corner secs. 29, 30, 31, and 32, crossroads.....	45 36 02.0	96 44 23.2	5,290
T. 125 N., R. 48 W., south corner secs. 31 and 32, T road north.....	45 35 06.6	96 44 23.4	5,300
T. 124 N., Rs. 48 and 49 W., north corner secs. 1 and 6, T road south.....	45 35 09.6	96 44 26.5	220
T. 124 N., Rs. 48 and 49 W., corner secs. 1, 6, 7, and 12.....	45 34 28.8	96 44 26.4	4,130
Beardsley, 1 mile west of road crossing.....	45 33 45.4	96 44 26.1	4,400
T. 124 N., Rs. 48 and 49 W., corner secs. 7, 12, 13, and 18.....	45 33 36.8	96 44 26.1	870

## Along highways through center of quadrangle.

T. 125 N., R. 48 W., corner secs. 16, 17, 20, and 21, crossroads.....	45 37 46.3	96 43 08.3	
T. 125 N., R. 48 W., corner secs. 15, 16, 21, and 22, crossroads.....	45 37 46.5	96 41 53.0	5,350
T. 125 N., R. 48 W., corner secs. 14, 15, 22, and 23, road north.....	45 37 46.4	96 40 38.4	5,300
T. 125 N., R. 48 W., corner secs. 14, 15, 10, and 11, road east.....	45 38 38.8	96 40 38.1	5,300
T. 125 N., R. 48 W., corner secs. 11, 12, 13, and 14, crossroads.....	45 38 38.4	96 39 24.6	5,230
T. 125 N., Rs. 48 and 47 W., quarter corner between secs. 13 and 18, road south.....	45 38 12.3	96 38 09.5	5,937
T. 125 N., Rs. 47 and 48 W., 30 feet north and 15 feet east of crossroads at corner secs. 13, 18, 19, and 24; iron post stamped "Prim. Trav. Sta. No. 18, 1915".....	45 37 46.5	96 38 09.1	2,608
T. 125 N., R. 47 W., corner secs. 17, 18, 19, and 20, crossroads.....	45 37 45.7	96 36 52.0	5,473
T. 125 N., R. 47 W., corner secs. 16, 17, 20, and 21, crossroads.....	45 37 45.8	96 35 37.3	5,310
T. 125 N., R. 47 W., corner secs. 15, 16, 21, and 22, crossroads.....	45 37 45.4	96 34 22.6	5,310
T. 125 N., R. 47 W., corner secs. 14, 15, 22, and 23, crossroads.....	45 37 45.1	96 33 07.9	5,306
T. 125 N., R. 47 W., corner secs. 13, 14, 23, and 24, crossroads.....	45 37 45.3	96 31 52.8	5,339

Magnetic declination for north border of quadrangle, 11° 40' E.; for south border, 11° 29' E.; for east border, 11° 21' E.; for west border, 11° 30' E.; for center, 10° 57' E.

## NEW EFFINGTON QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
<b>NORTH DAKOTA.</b>			
T. 129 N., R. 50 W., near corner secs. 17, 18, 19, and 20, 500 feet northwest of small white house, windmill, and barn, 70 feet east of north-south section line, and on east-west section line; iron post stamped "Prim. Trav. Sta. No. 3, 1915".....	45 58 48.0	96 59 27.4	.....
T. 129 N., R. 50 W., corner secs. 7, 8, 17, and 18, crossroads.....	45 59 40.2	96 59 28.0	5,285
T. 129 N., R. 50 W., corner secs. 8, 9, 16, and 17, crossroads.....	45 59 39.9	96 58 14.4	5,200
T. 129 N., R. 50 W., corner secs. 9, 10, 15, and 16, crossroads.....	45 59 39.2	96 56 59.4	5,300
T. 129 N., R. 50 W., corner secs. 10, 11, 14, and 15, crossroads.....	45 59 38.7	96 55 43.8	5,340
T. 129 N., R. 50 W., corner secs. 11, 12, 13, and 14, crossroads.....	45 59 38.7	96 54 29.4	5,260
T. 129 N., Rs. 49 and 50 W., at corner secs. 7, 12, 13, and 18, 15 feet northwest to telephone pole, 50 feet southeast to telephone pole; from post stamped "Prim. Trav. Sta. No. 4, 1915".....	45 59 38.6	96 53 15.2	5,242
T. 129 N., R. 49 W., corner secs. 7, 8, 17, and 18, crossroads.....	45 59 38.4	96 52 00.6	5,269
T. 129 N., R. 49 W., corner secs. 8, 9, 16, and 17, crossroads.....	45 59 38.1	96 50 45.0	5,339
T. 129 N., R. 49 W., corner secs. 9, 10, 15, and 16, crossroads.....	45 58 37.9	96 49 30.6	5,257
T. 129 N., R. 49 W., corner secs. 10, 11, 14, and 15, crossroads.....	45 59 38.1	96 48 16.0	5,268
T. 129 N., R. 49 W., corner secs. 11, 12, 13, and 14, crossroads.....	45 59 36.7	96 47 01.9	5,240
T. 129 N., Rs. 48 and 49 W., 40 feet from corner secs. 7, 18, 12, and 13, at east end of row of cottonwood trees; iron post stamped "Prim. Trav. Sta. No. 5, 1915".....	45 59 36.9	96 45 47.4	5,261
T. 129 N., Rs. 48 and 49 W., corner sections, crossroads.....	45 58 44.5	96 45 48.0	5,308
T. 129 N., Rs. 48 and 49 W., corner sections, T road north.....	45 57 52.9	96 45 48.2	5,221

Along highways through center of quadrangle.

SOUTH DAKOTA.			
T. 128 N., R. 49 W., corner secs. 13, 14, 23, and 24, T road south.....	45 51 48.7	96 45 02.9	.....
T. 128 N., R. 49 W., corner secs. 14, 15, 23, and 23, crossroads.....	45 51 48.4	96 46 16.9	5,238
T. 128 N., R. 49 W., corner secs. 15, 16, 21, and 22, crossroads.....	45 51 48.8	96 47 32.6	5,359
T. 128 N., R. 49 W., corner secs. 17, 18, 19, and 20, crossroads.....	45 51 48.4	96 50 02.6	10,615
T. 128 N., R. 49 W., corner secs. 18, 19, 13, and 24, crossroads.....	45 51 48.4	96 51 16.8	5,250
T. 128 N., R. 50 W., corner secs. 13, 14, 23, and 24, four corners.....	45 51 48.4	96 52 31.8	5,310
T. 128 N., R. 50 W., 1,770 feet east of corner of secs. 14, 15, 22, and 23, on north side of road, near white church; iron post stamped "Prim. Trav. Sta. No. 2, 1915".....	45 51 48.4	96 53 22.0	3,550
T. 128 N., R. 50 W., corner secs. 15, 16, 21, and 22, crossroads.....	45 51 47.8	96 55 02.0	7,080
Effington, 0.30 mile west of, second class, T road north.....	45 51 21.8	96 55 39.5	3,743
T. 128 N., R. 50 W., corner secs. 20, 21, 28, and 29, four corners.....	45 50 55.4	96 56 16.5	2,744
T. 128 N., R. 50 W., corner secs. 19, 20, 29, and 30, crossroads.....	45 50 55.1	96 57 31.8	5,330
T. 128 N., Rs. 50 and 51 W., corner secs. 19, 24, 25, and 30, crossroads.....	45 50 55.4	96 58 45.0	5,180
T. 128 N., R. 51 W., corner secs. 23, 24, 25, and 26, crossroads.....	45 50 50.3	96 59 59.5	5,279

Along highways near south border of quadrangle.

T. 127 N., R. 49 W., corner secs. 23, 24, 25, and 26, crossroads.....	45 46 41.3	96 45 00.4	.....
T. 127 N., R. 49 W., corner secs. 22, 23, 26, and 27, crossroads.....	45 45 41.7	96 46 15.6	5,330
T. 127 N., R. 49 W., corner secs. 21, 22, 27, and 28, crossroads.....	45 45 41.7	96 47 30.6	5,320
T. 127 N., R. 49 W., corner secs. 20, 21, 28, and 29, crossroads.....	45 45 41.5	96 48 45.6	5,320
T. 127 N., R. 49 W., corner secs. 19, 20, 29, and 30, crossroads.....	45 45 41.5	96 50 00.6	5,320

Magnetic declination along north border of quadrangle,  $12^{\circ} 02' E.$ ; along south border,  $11^{\circ} 31' E.$ ; along east border,  $10^{\circ} 50' E.$ ; along west border,  $11^{\circ} 34' E.$ ; in center,  $11^{\circ} 25' E.$

## PEEVER QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.				
	°	'	"	°	'	"	Feet.
<b>SOUTH DAKOTA.</b>							
T. 126 N., R. 51 W., corner secs. 11, 12, 13, and 14, crossroads.....	45 42 13.1	96 59 57.0					
T. 126 N., Rs. 50 and 51 W., corner secs. 7, 12, 13, and 18, crossroads.....	45 42 11.9	96 58 42.6	5,280				
T. 126 N., Rs. 50 and 51 W., corner secs. 13, 18, 19, and 24, crossroads.....	45 41 20.1	96 58 41.8	5,257				
T. 126 N., Rs. 50 and 51 W., corner secs. 19, 24, 25, and 30, T road north.....	45 40 28.0	96 58 41.2	5,282				
T. 126 N., R. 51 W., corner secs. 23, 24, 25, and 26, T road south.....	45 40 28.5	96 59 56.1	5,317				
T. 126 N., R. 51 W., corner secs. 25, 26, 35, and 36, crossroads.....	45 39 35.6	96 59 55.6	5,370				
Tps. 125 and 126 N., R. 51 W., corner secs. 1, 2, 35, and 36, crossroads.....	45 38 42.9	96 59 55.1	5,340				
T. 125 N., R. 51 W., corner secs. 1, 2, 11, and 12, crossroads.....	45 37 50.7	96 59 56.4	5,289				
T. 125 N., R. 51 W., corner secs. 11, 12, 13, and 14.....	45 36 58.7	96 59 56.3	5,272				
T. 125 N., R. 51 W., corner secs. 13, 14, 23, and 24.....	45 36 06.3	96 59 56.5	5,307				
T. 125 N., R. 51 W., 1,008 feet south of corner secs. 13, 14, 23, and 24, on west side of north and south road; iron post stamped "Prim. Trav. Sta. No. 9, 1915".	45 35 56.4	96 59 56.7	1,008				
T. 125 N., R. 51 W., corner secs. 23, 24, 25, and 26, crossroads.....	45 35 13.9	96 59 57.6	4,314				
T. 125 N., R. 51 W., corner secs. 25, 26, 35, and 36, crossroads.....	45 34 21.0	96 59 58.7	5,360				
T. 125 N., R. 51 W., quarter corner between secs. 35 and 36, T road west.....	45 33 55.3	96 59 59.4	2,610				
Tps. 124 and 125 N., corner secs. 1, 2, 35, and 36, T road west.....	45 33 28.9	96 59 59.3	2,650				
T. 124 N., R. 51 W., corner secs. 1, 2, 11, and 12, crossroads.....	45 32 37.7	96 59 58.6	5,190				
T. 124 N., R. 51 W., corner secs. 11, 12, 13, and 14, T road north.....	45 31 45.4	96 59 58.3	5,310				
T. 124 N., R. 50 and 51 W., corner secs. 7, 12, 13, and 18.....	45 31 44.7	96 58 45.0	5,218				
T. 124 N., R. 50 W., corner secs. 13, 18, 19, and 24, crossroads.....	45 30 52.8	96 58 43.8	5,260				
T. 124 N., R. 50 W., 15 feet north and 20 feet east of corner secs. 18, 30, 24, and 25, east side of north and south road and north of east and west road, 5 feet from corner of wire fence; iron post stamped "Prim. Trav. Sta. No. 10, 1915".	45 30 00.6	96 58 43.9	5,293				

## Along highways near south border of quadrangle.

T. 124 N., R. 50 W., corner secs. 19, 20, 29, and 30.....	45 30 00.6	96 57 29.8	5,280
T. 124 N., R. 50 W., corner secs. 20, 21, 28, and 29.....	45 30 00.9	96 58 15.1	5,319
Crossing of Sisseton Branch of the Chicago Milwaukee & St. Paul Ry.			
Tps. 123 and 124 N., R. 50 W., corner secs. 21, 22, 28, and 3, crossroads.....	45 30 00.6	96 55 52.1	1,639
T. 124 N., R. 49 W., corner secs. 25, 30, 31, and 36, crossroads.....	45 30 00.6	96 55 01.6	3,590
T. 124 N., R. 49 W., corner secs. 19, 24, 25, and 30, crossroads.....	45 30 51.0	96 51 41.1	
T. 124 N., R. 49 W., corner secs. 13, 18, 19, and 24.....	45 31 44.0	96 51 41.4	5,360
Brown Valley Southeast Base triangulation station C. & G. S. (Roberts County, S. Dak., O. W. F. 1903; 1906), situated near the south side of sec. 18, T. 124 N., R. 49 W., on land belonging to Smith & Engebrizen, bankers, in Brown Valley, and rented to Sanford Allen. It is $\frac{4}{5}$ miles south, $22^{\circ}$ west from Brown Valley. It is marked by a deep cross cut in a 4-inch copper bolt set in the head of a stone block resting in a mass of concrete, its top level with the surface of the ground. The reference mark is in the section line, in azimuth $356^{\circ} 44' 13''$ from the station; it is 1.49 meters lower in elevation than the station. The southeast corner of this section (18) is connected with the station. The following azimuths and distances are from the triangulation station: Windmill at Larson's house, $115^{\circ} 55' 08''$ , about 1 mile; Dittmann's red barn, south gable, $200^{\circ} 25' 22''$ , about 1,000 meters; Jim Bitner's house, chimney, $351^{\circ} 46' 30''$ , about 800 meters.....	45 32 36.0	96 51 41.2	5,260
45 32 38.72	96 50 48.02	3,793	

## Along highways through center of quadrangle.

T. 125 N., Rs. 50 and 51 W., corner secs. 7, 12, 13, and 18, crossroads.....	45 36 58.0	96 58 42.4	
T. 125 N., R. 50 W., corner secs. 7, 8, 17, and 18, crossroads.....	45 36 57.8	96 57 28.5	5,256
T. 125 N., R. 50 W., corner secs. 8, 9, 16, and 17, crossroads.....	45 36 58.0	96 56 13.1	5,360
T. 125 N., R. 50 W., corner secs. 9, 10, 15, and 16, 3 corners.....	45 36 57.7	96 54 59.2	5,250
T. 125 N., R. 50 W., iron and concrete bridge.....	45 36 53.9	96 54 31.1	2,040
T. 125 N., R. 50 W., corner secs. 10, 11, 14, and 15, crossroads.....	45 36 58.0	96 53 45.0	3,302
Brown Valley, 3 miles northwest of, 0.3 mile southwest of Mission Church; iron bridge.....	45 36 58.0	96 52 32.5	5,150

## MINNESOTA.

Brown Valley, in northwest part of elbow in road.....	45 35 53.7	96 50 55.5	
Brown Valley water tower triangulation station, U. S. C. & G. S., 1903.....	45 35 40.26	96 49 51.87	4,729
Brown Valley, 1.5 miles north of, elbow in road.....	45 36 54.5	96 50 01.1	7,548
T. 125 N., R. 49 W., corner secs. 21, 22, 27, and 28, crossroads.....	45 36 54.4	96 49 23.8	2,650
T. 125 N., R. 49 W., corner secs. 22, 23, 26, and 27, crossroads.....	45 36 54.5	96 48 08.7	5,340
T. 125 N., R. 49 W., corner secs. 23, 24, 25, and 26, crossroads.....	45 36 54.6	96 46 53.8	5,340
T. 125 N., R. 49 W., corner secs. 24, 25, 19, and 30, crossroads.....	45 36 54.6	96 45 38.9	5,310

Magnetic declination for north border of quadrangle,  $11^{\circ} 31' E.$ ; for south border,  $11^{\circ} 18' E.$ ; for east border,  $11^{\circ} 30' E.$ ; for west border,  $10^{\circ} 59' E.$ ; for center,  $11^{\circ} 02' E.$

## PEEVER QUADRANGLE—Continued.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°   '   "	°   '   "	Feet.
<b>SOUTH DAKOTA.</b>			
T. 127 N., Rs. 49 and 50 W., corner secs. 30, 31, 25, and 36, second-class T road south.....	45 44 48.1	96 51 15.5	.....
T. 127 N., R. 50 W., 12 feet south and 35 feet west of corner of secs. 26, 27, 34, and 35, 4 feet northwest of telephone pole; iron post stamped "Prim. Trav. Sta. No. 7, 1915".....	45 44 48.0	96 53 45.1	10,609
T. 127 N., R. 50 W., corner secs. 27, 28, 33, and 34, crossroads.....	45 44 47.3	96 54 59.5	5,283
T. 127 N., R. 50 W., corner secs. 28, 29, 32, and 33, crossroads.....	45 44 48.7	96 56 13.9	5,280
T. 127 N., R. 50 W., corner secs. 29, 30, 31, and 32, crossroads.....	45 44 48.8	96 57 28.4	5,290
T. 127 N., Rs. 50 and 51 W., corner secs. 30, 31, 25, and 36, crossroads.....	45 44 49.1	96 58 44.0	5,360
T. 127 N., R. 51 W., corner secs. 25, 26, 35, and 36, crossroads.....	45 44 49.0	96 59 57.7	5,230

Magnetic declination for north border of quadrangle, 11° 31' E.

## SISSETON QUADRANGLE.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°   '   "	°   '   "	Feet.
<b>SOUTH DAKOTA.</b>			
T. 128 N., R. 51 W., corner secs. 22, 23, 26, and 27, crossroads.....	45 50 55.4	97 01 14.5	.....
Harmer siding, about 0.40 mile south of, in sec. 23, T. 128 N., R. 51 W., very high steeple on church (U. S. C. & G. S. point).....	45 50 00.69	97 01 16.35	555
Harmer siding, crossroads at .....	45 51 21.7	97 01 15.3	2,130
T. 128 N., R. 51 W., corner secs. 14, 15, 22, and 23, crossroads.....	45 51 48.3	97 01 15.7	2,690
T. 128 N., R. 51 W., corner secs. 10, 11, 14, and 15, T road west.....	45 52 41.7	97 01 15.4	5,410
T. 128 N., R. 51 W., corner secs. 2, 3, 10, and 11, crossroads.....	45 53 33.2	97 01 15.4	5,210
T. 128 N., R. 51 W., in sec. 2, white church steeple.....	45 53 44.3	97 01 14.1	1,132
T. 128 N., R. 51 W., north corner secs. 2 and 3, T road south.....	45 54 21.2	97 01 15.2	4,040
T. 129 N., R. 51 W., south side secs. 35 and 36, T road north.....	45 54 24.3	97 01 09.6	358
T. 129 N., R. 51 W., corner secs. 25, 26, 35, and 36, crossroads.....	45 55 16.8	97 01 09.6	5,320
T. 127 N., R. 51 W., 20 feet north and 20 feet west of crossroads at corner secs. 26, 27, 34, and 35; iron post stamped "Prim. Trav. Sta. No. 8, 1915".....	45 44 49.2	97 01 13.0	.....
T. 127 N., R. 51 W., corner secs. 22, 23, 26, and 27, crossroads.....	45 45 41.2	97 01 14.1	5,268
T. 127 N., R. 51 W., corner secs. 14, 15, 22, and 23, crossroads.....	45 46 33.8	97 01 15.8	5,320
T. 127 N., R. 51 W., corner secs. 10, 11, 14, and 15, crossroads.....	45 47 26.1	97 01 16.2	5,299
T. 127 N., R. 51 W., corner secs. 2, 3, 10, and 11, crossroads.....	45 48 18.7	97 01 15.4	5,320
Tps. 127 and 128 N., R. 51 W., corner secs. 2, 3, 34, and 35, crossroads.....	45 49 10.2	97 01 14.5	5,220
T. 128 N., R. 51 W., corner secs. 28, 27, 34, and 35, crossroads.....	45 50 03.0	97 01 15.0	5,340

Magnetic declination for east border of north half of quadrangle, 11° 34' E.

## Along highways.

Prim. Trav. Sta. No. 8, 1915.....	45 44 49.17	97 01 13.04	.....
Tps. 126 and 127 N., R. 51 W., corner secs. 2, 3, 34, and 35, second-class crossroad.....	45 43 56.4	97 01 11.7	5,350
T. 126 N., R. 51 W., corner secs. 2, 3, 10, and 11, second-class crossroad.....	45 43 06.8	97 01 12.4	5,030
T. 126 N., R. 51 W., corner secs. 10, 11, 14, and 15, T road north.....	45 42 13.9	97 01 12.9	5,360

## Along highways near east border of quadrangle.

T. 129 N., R. 51 W., corner secs. 23, 24, 25, and 26, crossroads on Stateline.....	45 56 09.4	97 01 09.1	.....
T. 129 N., R. 51 W., corner secs. 13, 14, 23, and 24, crossroad.....	45 57 02.1	97 01 09.0	5,340
T. 129 N., R. 51 W., corner secs. 11, 12, 13, and 14, T road south.....	45 57 53.7	97 01 08.9	5,230
Second-class road crossing.....	45 58 48.9	97 00 42.4	5,900

**WHITE ROCK QUADRANGLE.****Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>MINNESOTA.</b>			
T. 126 N., Rs. 46 and 47 W., 20 feet north and 15 feet east of north corner secs. 1 and 6, 2 feet from corner of fence; iron post stamped "Prim. Trav. Sta. No. 15, 1915".....	45 45 34.8	96 30 38.0	
T. 126 N., R. 47 W., north corner secs. 1 and 2.....	45 45 34.8	96 31 52.8	5,300
T. 126 N., R. 47 W., north corner secs. 2 and 3, T road south.....	45 45 34.8	96 33 07.2	5,280

Magnetic declination for south border of quadrangle,  $11^{\circ} 40' E.$ **MARVIN QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>SOUTH DAKOTA.</b>			
Tps. 123 and 124 N., R. 50 E., corner secs. 2, 3, 22, and 35, crossroads.....	45 29 59.7	96 54 11.0	
Tps. 123 and 124 N., R. 50 E., corner secs. 1, 2, 35, and 36, crossroads.....	45 29 59.8	96 52 55.4	5,380
Tps. 123 and 124 N., R. 49 and 50 W., corner secs. 1, 6, 31, and 36, crossroads.....	45 29 59.5	96 51 41.3	5,280

Magnetic declination for north border of quadrangle,  $11^{\circ} 18' E.$ **WHITE ROCK QUADRANGLE.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>NORTH DAKOTA.</b>			
T. 129 N., Rs. 48 and 49 W., corner sections, 250 feet southwest of schoolhouse, four corners.....	45 57 53.6	96 44 33.1	
T. 129 N., Rs. 48 and 49 W., corner sections T road north at.....	45 57 01.5	96 44 33.7	5,270
T. 129 N., R. 49 W., corner sections, 30 feet northeast to letter box, four corners at.....	45 57 01.7	96 43 19.2	5,270
State line, 3 feet northwest of 12-inch stone post, 2.5 feet above ground, marked "N. D." on north side and "S. D." on south side; iron post stamped "Prim. Trav. Sta. No. 5, 1915".....	45 56 09.7	96 43 19.4	5,266
<b>SOUTH DAKOTA.</b>			
T road south.....	45 55 17.9	96 43 36.6	
T road north, jog in road to west.....	45 54 25.1	96 43 36.4	5,349
T road south, at north corner secs. 1 and 6.....	45 54 25.1	96 43 47.2	5,349
T. 128 N., Rs. 48 and 49 W., corner secs. 1, 6, 7, and 12, crossroads.....	45 53 34.2	96 43 47.4	5,160
T. 128 N., Rs. 48 and 49 W., corner secs. 7, 12, 13, and 18, T road west.....	45 52 41.6	96 43 47.4	5,330
Rosholt, east end of Main Street, 3 feet north of telephone pole, 80 feet southeast of blacksmith shop; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	45 52 00.4	96 43 47.7	4,170
T. 128 N., Rs. 48 and 49 W., corner secs. 18, 19, 24, and 13, four corners.....	45 51 49.3	96 43 47.4	1,125
T. 128 N., Rs. 48 and 49 W., corner secs. 19, 30, 24, and 25, four corners.....	45 50 56.7	96 43 47.5	5,330
T. 128 N., Rs. 48 and 49 W., corner secs. 30, 31, 25, and 36, four corners.....	45 50 04.2	96 43 47.4	5,320
Enwiller triangulation station, U. S. C. & G. S., T. 128 N., R. 49 W., near the east side of N.E. 1/4 sec. 36, in Victor Township, Sisseton Indian Reservation, about 0.25 mile due south of the northeast corner of sec. 36, on land belonging to Harry Enwiller; 2 miles east and 1.25 miles south of Crawford post office, on a prominent east and west ridge, 13 paces west from center of wagon road where it crosses the ridge, 4.39 meters east of fence line on east side of sec. 36; iron pipe filled with concrete and 60-penny nail in top.....	45 49 51.92	96 43 47.86	1,239
T corner and crossroads.....	45 49 11.9	96 43 47.2	4,060
T. 127 N., R. 48 W., at southwest quarter corner of sec. 6, 10 feet west of road; iron bench-mark post stamped "El. 1078".....	45 48 45.6	96 43 47.4	2,630
T. 127 N., R. 49 W., corner secs. 1, 6, 7, and 12, crossroads.....	45 48 19.3	96 43 47.0	2,660
T. 127 N., R. 49 W., corner secs. 7, 18, 12, and 13, crossroads.....	45 47 26.8	96 43 46.8	5,330
T. 127 N., R. 49 W., corner secs. 18, 19, 13, and 24, crossroads.....	45 46 34.2	96 43 46.3	5,330
T. 127 N., R. 49 W., 20 feet south and 15 feet east of corner of secs. 19, 30, 24, and 25, at northwest corner of grove; iron post stamped "Prim. Trav. Sta. No. 6, 1915".....	45 45 41.4	96 43 45.7	5,353

Magnetic declination for west border of quadrangle,  $10^{\circ} 50' E.$

## INDIANA.

### PRIMARY TRAVERSE.

**Birds, Merom, Montuers Pond, Oatkown, and Vincennes quadrangles.**

#### SULLIVAN AND KNOX COUNTIES.

The following geographic positions on North American datum were determined from primary traverse run by C. B. Kendall in 1913. The line begins with position of Merom triangulation. United States Coast and Geodetic Survey, and follows public roads east and south via Busseron to Vincennes, where it is tied to United States Coast and Geodetic Survey astronomic station, Vincennes. The line is also tied to the United States Corps of Engineers' traverse line along the Wabash River at Riverton and Vincennes.

#### BIRDS QUADRANGLE.

##### Along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
Four corners, public crossroads (dup.).....	•   •   "	•   •   "	<i>Feet.</i>
Tps. 6 and 7 N., R. 10 W., corner secs. 3, 4, 33, and 34, $\frac{1}{4}$ mile west of; public T road north, second-class road west.....	39 00 45.3	87 31 20.6	.....
T. 6 N., R. 10 W. (north) corner secs. 3 and 4, center of east and west road in line with two elm trees in field to south and the east edge of Jonesville schoolhouse on north.....	38 59 53.6	87 31 21.2	5,231
	38 59 53.3	87 31 07.8	1,060
NOTE.—250 feet east of the above is T. 7 N., R. 10 W., south corner secs. 33 and 34.			
T. 6 N., R. 10 W., north corner secs. 3 and 4, 710 feet east of; 15 feet south and 20 feet west of center of public T roads, 720 feet east of Jonesville schoolhouse, inside of wire fences; iron post stamped "Prim. Trav. Sta. No. 1, 1913, Indiana".....	38 59 53.0	87 30 58.9	700
Jonesville schoolhouse, $\frac{1}{4}$ mile south of, public T road south, 15 feet south to center of triangle, 35 feet northwest to sycamore, center sec. 10, T. 6 N., R. 10 W.....	38 58 46.0	87 30 37.9	6,972
T. 6 N., R. 10 W., quarter corner between secs. 10 and 15, public T road south, 150 feet east of public T road north.....	38 58 21.2	87 30 34.6	2,532
T. 6 N., R. 10 W., quarter corner between secs. 15 and 22, public T road north.....	38 57 28.5	87 30 34.5	5,323
T. 6 N., R. 10 W., corner secs. 14, 15, 22, and 23, center of east-west road at wire fence south.....	38 57 28.3	87 30 00.7	2,670

Magnetic declination for east border of quadrangle,  $3^{\circ} 03'$  E.

#### MEROM QUADRANGLE.

##### Along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
Merom triangulation station, U. S. C. & G. S. .... Riverton, U. S. Engineers iron bench mark No. 32, described as follows: "Riverton, 150 feet back from river, on left bank, 600 feet below east abutment of Illinois Central R. R. drawbridge, on east slope of levee, on land of P. H. Blue, 35 feet northeast of Houseboat shack outside of levee, residence of Richard Meek, 50 feet southeast of houseboat shack outside of levee, residence of Arthur Meek; iron pipe (U. S. C. E. b. m. No. 32)".....	•   •   " 39 03 02.71	•   •   " 87 33 53.02	<i>Feet.</i> .....

**MEROM QUADRANGLE**-Continued.**Along public roads**-Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Riverton, 1 mile east of, public T road west, center of north and south road at.....	* * "	* * "	Fect.
T. 7 N., R. 10 W., quarter corner between secs. 28 and 29.....	39 01 17.2	87 33 01.2	5,084
T. 7 N., R. 10 W., quarter corner between secs. 28 and 29, 1,200 feet east of; public T road west, 140 feet west of 90° bend of road to south.....	39 01 12.2	87 32 10.9	4,007
T. 7 N., R. 10 W., corner secs. 28, 29, 32, and 33, $\frac{1}{4}$ mile east of; public T road north.....	39 01 12.0	87 31 55.9	1,180
NOTE.—1,320 feet west of the above is T. 7 N., R. 10 W., corner secs. 28, 29, 32, and 33 at cross fences.	39 00 45.8	87 31 54.0	2,647
Four corners, public crossroads.....	39 00 45.3	87 31 20.6	2,604
NOTE.—1,310 feet east of the above is T. 7 N., R. 10 W., corner secs. 27, 28, 33, and 34.			

Magnetic declination for south border of quadrangle, 3° 07' E.

**MONTUERS POND QUADRANGLE.****Along public roads.**

Station.	Latitude.	Longitude.	Distance between stations.
Oak schoolhouse, $\frac{1}{4}$ miles southwest of, three-corner public T road northeast, center of triangle at, 20 feet east to mail box No. 44, on fence post, 25 feet north to corner fence post.....	* * " 38 44 36.7	* * " 87 28 15.4	Fect.
Ellis schoolhouse, 500 feet southwest of, on the southeast edge of the Vincennes-Terre Haute public road, 30 feet south and 10 feet west of center of public T road southeast, 10 feet west of large corner post of wire fence and 15 feet east of a large elm tree; iron post stamped "Prim. Trav. Sta. No. 3, 1913, Indiana".....	38 44 12.1	87 28 13.3	2,496
Ellis schoolhouse, 1 mile southwest of, second class T road southeast, 15 feet east to telephone pole, 20 feet south to corner of fence.....	38 43 40.6	87 29 09.8	5,489
Bridge over Snaps Creek, $\frac{1}{2}$ mile north of, four-cornered public crossroad, center of pike at.....	38 42 50.9	87 29 41.8	5,632
Snaps Creek, bridge, 500 feet north of; public roads north and northeast, 12 feet east to telephone pole.....	38 42 08.5	87 29 53.2	4,389

Magnetic declination for northwest border of quadrangle, 3° 04' E.

**OAKTOWN QUADRANGLE.****Along public roads.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 6 N., R. 10 W., corner secs. 13, 14, 23, and 24, public T road south.....	* * " 38 57 27.9	* * " 87 28 52.3	Fect.
T. 6 N., R. 10 W., corner secs. 23, 24, 25, and 26, second-class crossroad.....	38 56 34.6	87 28 52.7	5,400
Busseron Creek, center of iron bridge over.....	38 55 56.9	87 28 52.6	3,845
T. 6 N., R. 10 W., corner secs. 25, 26, 35, and 36, center of north-south road at fences east and west, 70 feet south of T road west.....	38 55 41.2	87 28 52.6	1,390
T. 6 N., R. 10 W., corner secs. 25, 26, 35, and 36, $\frac{1}{4}$ mile south of; public crossroads.....	38 55 27.7	87 28 52.5	1,370
T. 6 N., R. 10 W., (south) corner secs. 35 and 36, public T road north (120 feet east of the above may be T. 5 N., R. 10 W., stone north corner of secs. 1 and 2).....	38 54 47.8	87 28 52.4	4,030
Three-corners, public T road north.....	38 53 22.8	87 28 48.5	8,606
Oaktown, about 1 mile north and $\frac{1}{4}$ miles west of; three-corners public T road south, 20 feet south to center of triangle.....	38 53 24.3	87 28 19.0	2,336
Oaktown, $\frac{1}{4}$ mile north and $\frac{1}{4}$ miles west of, in sec. 13, T. 5 N., R. 10 W., on west edge of north-south road opposite and in line with center of public T road east to Oaktown; iron post stamped "Prim. Trav. Sta. No. 2, 1913, Indiana".....	38 52 30.7	87 28 20.1	5,422

**OAKTOWN QUADRANGLE—Continued.****Along public roads—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Oaktown, about $2\frac{1}{2}$ miles west of; forks, public roads west and northwest, 12 feet south to corner wire fence.....	38 51 34.7	87 28 17.6	5,668
Oaktown, about 2 miles southwest of; four-corners public cross-roads.....	38 50 55.4	87 27 31.3	5,406
Busseron station, 75 feet southwest of; public road crossing Chicago & Eastern Illinois R. R., center of main track at.....	38 50 09.0	87 26 59.1	5,347
Busseron station, $\frac{1}{4}$ miles southeast of; forks public roads west and southwest, 15 feet southwest to center of triangle.....	38 48 40.3	87 26 35.6	9,159
Briar Creek Bridge, $\frac{1}{2}$ mile northwest of; large sycamore tree at public T road west to Emison.....	38 47 54.9	87 26 31.8	4,605
Briar Creek, center of iron bridge over.....	38 47 42.2	87 26 22.1	1,496
Briar Creek, center of iron bridge over, 1,000 feet south of; forks, public roads south and southwest 30 feet north to telephone pole, 75 feet southwest to telephone pole and sign "Vincennes 12 miles".	38 47 33.1	87 26 21.6	923
Briar Creek Bridge, 1 mile southwest of, second-class fork southeast; large elm tree in center of triangle at.....	38 46 59.8	87 27 01.3	4,609
Oak schoolhouse, $\frac{1}{4}$ mile northeast of; three-corners public T road southeast, 10 feet southeast to center of triangle, 18 feet northwest to telephone pole and mail box.....	38 46 16.9	87 27 20.6	4,610
Oak schoolhouse, at forks northeast and north; chimney in center of house.....	38 45 50.7	87 27 53.1	3,690
Oak schoolhouse, $\frac{1}{4}$ mile southwest of; center of bridge over Small's creek.....	38 45 15.2	87 28 09.7	3,825

Magnetic declination for west border of quadrangle,  $3^{\circ} 03' E.$ **VINCENNES QUADRANGLE.****Along public road and streets in Vincennes.**

Station.	Latitude.	Longitude.	Distance between stations.
Snaps Creek Bridge, $\frac{1}{2}$ mile southwest of, Vincennes, $1\frac{1}{2}$ miles northeast of; Vincennes-Terre Haute public road crossing the Chicago & Eastern Illinois R. R., center of track at.....	38 41 57.5	87 30 13.6	.....
Vincennes, about 1 mile northeast of; four-corners near east end of bridge over Kelsaw Creek.....	38 41 54.3	87 30 34.9	1,721
Vincennes, First Street and Lyndale Avenue, center of intersection of.....	38 41 21.5	87 30 54.6	3,666
Vincennes, Baltimore & Ohio R. R. crossing First Street, center of main track at.....	38 41 04.2	87 31 32.3	3,465
Vincennes, U. S. Coast and Geodetic Survey astronomic station...	38 40 35.70	87 31 35.05	2,888

Magnetic declination for northeast border,  $3^{\circ} 14' E.$ **Farmland, Fort Recovery, Lynn, and Redkey quadrangles.****RANDOLPH AND WAYNE COUNTIES.**

The following geographic positions on North American datum were determined by J. H. Wilson in 1915 and are based on primary traverse positions, on and near the Indiana-Ohio State line, determined in 1910.

**FARMLAND QUADRANGLE.****Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 21 N., Rs. 13 and 14 E., corner of secs. 25, 30, 30, and 31, cross-roads 0.5 mile west of Clarke.....	40 14 12.2	85 00 59.2	.....
Tps. 20 and 21 N., Rs. 13 and 14 E., corner of; crossroads.....	40 13 20.0	85 00 58.7	5,280
Bethel M. E. Church, T road east, west corner of secs. 6 and 7... (300 feet south of above corner is T. 20 N., R. 13 E., east corner of secs. 1 and 12, T road west.)	40 12 31.1	85 00 58.4	4,956

## FARMLAND QUADRANGLE—Continued.

## Along highways near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 20 N., R. 13 E., east corner of secs. 12 and 13, T road west.....	• ' "	85 00 58.2	Fect.
White River, north end of bridge over.....	40 11 36.2		5,500
T. 20 N., R. 14 E., west corner of secs. 18 and 19, 130 feet north of Big Four R. R. crossing.....	40 10 55.5	85 00 58.1	4,120
Lykins station on traction line, crossroads 1.5 miles west of Winchester.....	40 10 44.8	85 00 58.1	1,080
T. 20 N., R. 14 E., west corner of secs. 19 and 30, fence east.....	40 10 19.3	85 00 58.0	2,580
(65 feet south of above corner is T. 20 N., R. 13 E., east corner of secs. 24 and 25.)	40 09 52.8	85 00 57.9	2,160
T. 20 N., R. 13 E., east corner of secs. 25 and 36, fence west.....	40 09 00.3	85 00 57.4	5,315
Tps. 19 and 20 N., Rs. 13 and 14 E., corner of, right angle bend in road.....	40 08 08.3	85 00 57.2	5,260
T. 19 N., R. 13 E., west corner of secs. 1 and 12, 5 feet north and 15 feet east of, and T. 19 N., R. 14 E., east corner of secs. 6 and 7, 155 feet south and 15 feet east of, on east side of north and south road at T road west; iron post stamped "Prim. Trav. Sta. No. 2, 1915".....	40 07 16.4	85 00 56.8	5,250
T. 19 N., R. 14 E., west corner of secs. 7 and 18, T road east.....	40 06 26.0	85 00 56.6	5,100
(175 feet south of above corner is T. 19 N., R. 13 E., east corner of secs. 12 and 13, T road west.)			
T. 19 N., R. 14 E., west corner of secs. 18 and 19, T road east.....	40 05 33.1	85 00 56.3	5,355
(95 feet south of above corner is T. 19 N., R. 14 E., east corner of secs. 13 and 24, T road west.)			
T. 19 N., R. 14 E., west corner of secs. 19 and 30, T road east.....	40 04 40.7	85 00 56.1	5,260
(80 feet south of above corner is T. 19 N., R. 13 E., east corner of secs. 24 and 25, T road west.)			
T. 19 N., R. 14 E., west corner of secs. 30 and 31, T road east.....	40 03 49.8	85 00 55.9	5,160
(190 feet south of above corner is T. 19 N., R. 13 E., east corner of secs. 25 and 36, T road west.)			
Tps. 18 and 19 N., Rs. 13 and 14 E., corner of, T road north.....	40 02 55.8	85 00 55.8	5,456
T. 18 N., R. 13 E., stone quarter corner between secs. 1 and 12, T road west.....	40 02 03.5	85 01 20.5	5,914
T. 18 N., Rs. 13 and 14 E., quarter corner between secs. 7 and 12, T road south.....	40 01 37.4	85 00 55.5	3,738
T. 18 N., Rs. 13 and 14 E., corner of secs. 12, 13, 7, and 18, crossroads.	40 01 11.4	85 00 55.5	2,130
T. 18 N., Rs. 13 and 14 E., corner of secs. 13, 24, 18, and 19, 15 feet north and 18 feet west of, at northwest corner of crossroads on Randolph-Wayne County line; iron post stamped "Prim. Trav. Sta. No. 4, 1915".....	40 00 19.3	85 00 55.6	5,274

Magnetic declination for east border of quadrangle,  $0^{\circ} 45'$  E.

## FORT RECOVERY QUADRANGLE.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 21 N., R. 15 E., corner of secs. 14, 15, 22, and 23, T road west at abandoned schoolhouse.....	• ' "	84 49 26.6	Fect.
T. 21 N., R. 15 E., corner of secs. 15, 16, 21, and 22, crossroads 0.5 mile east of Jackson school.....	40 15 59.2		-----
T. 21 N., R. 15 E., corner of secs. 16, 17, 20, and 21, crossroads 0.5 mile west of Jackson school.....	40 15 59.6	84 50 34.8	5,283
T. 21 N., R. 15 E., corner of secs. 17, 18, 19, and 20, crossroads at abandoned schoolhouse.....	40 15 57.6	84 51 43.0	5,290
T. 21 N., R. 14 and 15 E., corner of secs. 13, 24, 18, and 19, cross- roads.....	40 15 59.3	84 52 51.9	5,350
T. 21 N., R. 14 E., corner of secs. 13, 14, 23, and 24, T road east at abandoned schoolhouse.....	40 15 58.4	84 54 00.7	5,330
T. 21 N., R. and E., corner of secs. 14, 15, 22, and 23, center of north and south road, 150 feet north of crossroads.....	40 15 58.3	84 55 08.7	5,270
T. 21 N., R. 14 E., corner of secs. 15, 16, 21, and 22, crossroads just south of abandoned schoolhouse.....	40 15 59.1	84 56 16.4	5,251
Randolph railroad crossing, north track, 90 feet north of corner of secs. 16, 17, 20, and 21, T. 21 N., R. 14 E.....	40 15 58.4	84 57 25.1	5,322
T. 21 N., R. 14 E., quarter corner between secs. 20 and 21, cross- roads.....	40 15 58.8	84 58 33.6	5,314
T. 21 N., R. 14 E., quarter corner between secs. 19 and 20, cross- roads.....	40 15 31.8	84 58 33.6	2,725
	40 15 31.1	84 59 42.1	5,310

Magnetic declination for south border of quadrangle,  $1^{\circ}$  E.

## LYNN QUADRANGLE.

Along Randolph-Wayne county line near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°   '   "	°   '   "	Feet.
T. 18 N., R. 14 E., corner of secs. 17, 18, 19, and 20, crossroads.....	40 00 19.8	84 59 47.0	.....
T. 18 N., R. 14 E., corner of secs. 16, 17, 20, and 21, crossroads.....	40 00 19.6	84 58 39.1	5,280
T. 18 N., R. 14 E., stone corner of secs. 15, 16, 21, and 22, crossroads.....	40 00 20.0	84 57 30.8	5,320
Lynn, 3 miles south of, crossroads, corner of secs. 14, 15, 22, and 23, T. 18 N., R. 14 E.....	40 00 20.2	84 56 22.5	5,310
T. 18 N., R. 14 E., corner of secs. 13, 14, 23, and 24, center of east and west road at fence north.....	40 00 20.1	84 55 14.1	5,320
T. 18 N., R. 14 E., east corner of secs. 13 and 14, on line with telephone line west.....	40 00 19.8	84 54 08.1	5,139
(160 feet north of above corner is T. 18 N., R. 15 E., west corner of secs. 18 and 19, fence corner in line with telephone line east.)			
T. 18 N., R. 15 E., east corner of fractional secs. 18 and 19, center of road on Greenville treaty line at telephone line west.....	40 00 20.5	84 53 34.3	2,629
Tps. 10 and 11 N., R. 1 W., west corner of fractional secs. 5 and 32, T road east on county line.....	40 00 23.8	84 53 33.4	342
Tps. 10 and 11 N., R. 1 W., corner of secs. 4, 5, 32, and 33, fence south.....	40 00 23.6	84 53 10.2	1,807
T. 11 N., R. 1 W., south corner of secs. 33 and 34, 30 feet west of crossroads just south of Arba.....	40 00 22.6	84 52 01.0	5,380
(65 feet east of above corner is T. 10 N., R. 1 W., north corner of secs. 3 and 4, 35 feet east of crossroads.)			
Tps. 10 and 11 N., R. 1 W., corner of secs. 2, 3, 34, and 35, T road south.....	40 00 21.6	84 50 52.6	5,320
T. 10 N., R. 1 W., north corner of secs. 1 and 2, in line with road south.....	40 00 20.5	84 49 46.6	5,140
(30 feet east of above corner is T. 11 N., R. 1 W., south corner of secs. 35 and 36, in line with road north.)			
Tps. 10 and 11 N., Rs. 1 E. and 1 W., corner of, Ohio-Indiana State line, at east corner of Randolph and Wayne counties, Ind.....	40 00 19.3	84 48 37.9	5,350
Prim. Trav. Sta. No. 10, 1910, Ohio (Bulletin 552).....	40 01 11.4	84 47 51.9	6,373

## Along highways through center of quadrangle.

T. 19 N., R. 14 E., corner of secs. 5, 6, 7, and 8, center of east and west road at fence south.....	40 07 17.4	84 59 39.8	.....
Crossroads.....	40 07 17.2	84 59 14.7	1,955
T. 19 N., R. 14 E., corner of secs. 4, 5, 8, and 9, crossroads 1,620 feet west of Grand Rapids & Indiana R. R. crossing.....	40 07 16.2	84 58 32.5	3,275
T. 19 N., R. 14 E., corner of secs. 3, 4, 9, and 10, T road south, 50 feet west of crossroads.....	40 07 17.2	84 57 25.2	5,230
T. 19 N., R. 14 E., corner of secs. 2, 3, 10, and 11, T road south.....	40 07 16.5	84 56 18.0	5,219
T. 19 N., R. 14 E., corner of secs. 1, 2, 11, and 12, crossroads.....	40 07 14.9	84 55 10.4	5,260
T. 19 N., Rs. 14 and 15 E., corner of secs. 1, 12, 6, and 7, crossroads.....	40 07 16.7	84 54 05.1	5,075
Tps. 19 and 20 N., Rs. 14 and 15 E., 20 feet west and 570 feet south of, at northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 3, 1915".....	40 08 03.2	84 54 05.1	4,710
T. 19 N., R. 15 E., line between secs. 5 and 6, crossroads at abandoned schoolhouse.....	40 07 36.0	84 52 57.6	5,918
T. 19 N., R. 15 E., fence west on line between secs. 5 and 8, 60 feet northwest of road south.....	40 07 17.0	84 52 07.6	4,340
Crossroads on old Ohio-Indiana boundary line; line between sec. 9, T. 19 N., R. 15 E., and sec. 27, T. 12 N., R. 1 W.....	40 07 05.7	84 51 38.5	2,531
Bartonia; crossroads.....	40 06 56.0	84 51 02.7	2,946
T. 12 N., R. 1 W., line between secs. 22 and 27, east and west fence line at bend in road.....	40 07 21.2	84 51 02.2	2,551
T. 12 N., R. 1 W., quarter corner between secs. 22 and 23, center of east and west road at north and south fence line, 440 feet east of road east.....	40 07 47.0	84 50 43.0	3,012
T. 12 N., R. 1 W., quarter corner between secs. 23 and 24, crossroads at abandoned schoolhouse.....	40 07 46.4	84 49 35.9	5,210
T. 12 N., R. 1 W., east quarter corner of sec. 24, road west 25 feet north road east, State line.....	40 07 45.8	84 48 27.4	5,320
T. 12 N., R. 1 W., east corner of secs. 13 and 24.....	40 08 12.0	84 48 26.7	2,650
Prim. Trav. Sta. No. 41, 1910, Ohio (Bulletin 552).....	40 09 04.8	84 48 25.0	5,343

## Near north border of quadrangle.

T road east, just north of church and cemetery.....	40 14 46.5	84 49 26.7	.....
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Magnetic declination for north border of quadrangle, 1° E.; for west border, 4° E.; for south border, 1½° E.; through center, 1¼° E.

## BEDKEY QUADRANGLE.

Near southeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 21 N., R. 14 E., quarter corner, west side of sec. 19, 5 feet north and 15 feet west of, on west side of north and south road at T road east, 590 feet north of Grand Rapids & Indiana Railroad crossing; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	• ' "	• ' "	Fed.
T. 21 N., R. 14 E., west corner of secs. 19 and 30, crossroads..... (25 feet south of above corner is T. 21 N., R. 13 E., east corner of secs. 24 and 25.)	40 15 30.4 40 15 04.2	85 01 00.1 85 00 59.7	2,630

# MICHIGAN AND INDIANA.

## PRIMARY TRAVERSE.

Jones, Leonidas, Schoolcraft, Sturgis, and Three Rivers quadrangles, Mich.; Shipshewana quadrangle, Ind.

### ST. JOSEPH COUNTY, MICH.; ELKHART AND LAGRANGE COUNTIES, IND.

The following geographic positions on North American datum were determined by primary traverse run in 1913 by J. H. Wilson and are based on positions located in west part of Three Rivers quadrangle in 1911, described in Bulletin 551, from Porter triangulation station, United States Lake Survey, and were tied to Sherman triangulation station of latter survey.

#### JONES QUADRANGLE.

South along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Feet.
Mottville, south end of bridge over St. Joseph River.....	41 48 00.0	85 45 18.3	.....
T. 8 S., R. 12 W., quarter corner between secs. 6 and 7, center of north and south road.....	41 47 40.1	85 45 00.6	2,424
T. 8 S., R. 12 W., quarter corner between secs. 7 and 81, center of north and south road, 30 feet south of road west and 30 feet south of road west and 30 feet north of bridge over White Pigeon River.....	41 46 47.6	85 45 00.8	5,310
T. 8 S., R. 12 W., quarter corner between secs. 18 and 19, crossroads at church.....	41 45 55.0	85 45 01.0	5,320
Vistula, about 0.5 mile north and 1 mile west of; iron bench mark post set at southeast corner of crossroads, 40 feet south and 15 feet east of quarter corner, south side of sec. 19, T. 8 S., R. 12 W. (This corner is on the State line which is the north edge of the east and west road); post stamped "Prim. Trav. Sta. No. 20, 1913".....	41 45 32.3	85 45 00.8	2,305

Magnetic declination for east border of quadrangle, 0° 33' E.

#### STURGIS QUADRANGLE.

North along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Feet.
T. 8 S., R. 10 W., corner of secs. 8, 9, 16, 17, crossroads.....	41 46 50.9	85 29 11.2	.....
Sturgis, 3.5 mile west of, crossroads 700 feet south of railroad crossing.....	41 47 39.9	85 29 11.6	4,960
Ts. 7 and 8 S., R. 10 W., stone corner of sections 32, 33, 4, and 5, crossroads at schoolhouse.....	41 48 35.8	85 29 11.8	5,665
T. 7 S., R. 10 W., south corner (stone) of sections 33 and 34, crossroads.....	41 48 36.4	85 28 01.8	5,300
T. 7 S., R. 10 W., corner of secs. 21, 22, 27, and 28, 20 feet west of center of crossroads.....	41 50 20.8	85 28 08.0	10,570
T. 7 S., R. 10 W., stone quarter corner between secs. 22 and 27, T road south.....	41 50 21.2	85 27 28.0	2,650
Sherman triangulation station of the Lake Survey, in northeast quarter sec. 22, T. 7 S., R. 10 W., about 4 miles northwest from Sturgis. A stone post below surface, with another one directly over it as a surface mark.....	41 50 48.5	85 27 11.7	3,028
T. 7 S., R. 10 W., corner of sections 15, 16, 21, and 22, crossroads.....	41 51 13.3	85 28 03.8	4,680
T. 7 S., R. 10 W., corner of sections 16, 17, 20, and 21, crossroads.....	41 51 12.8	85 29 13.8	5,300
T. 6 S., R. 10 W., quarter corner between secs. 28 and 29, crossroads.....	41 55 08.2	85 29 15.4	.....
T. 6 S., R. 10 W., corner of secs. 20, 21, 28, 29, crossroads at schoolhouse.....	41 55 34.3	85 29 15.8	2,650
T. 6 S., R. 10 W., corner of secs. 16, 17, 20, and 21, 25 feet north of center of T road east.....	41 56 26.9	85 29 16.4	5,320
T. 6 S., R. 10 W., corner of secs. 8, 9, 16, and 17, T road south.....	41 57 19.4	85 29 17.1	5,330
East and west section line, center of east and west road at crossroads, in line with road north.....	41 58 12.1	85 28 50.7	5,688
East and west township line, center of road at road south.....	41 59 04.1	85 28 37.8	5,350
St. Joseph River, north end of bridge over.....	41 59 07.2	85 28 52.0	1,115
T. 5 S., R. 10 W., corner of secs. 28, 29, 32, and 33, T road west.....	41 59 56.3	85 29 17.8	5,341

Magnetic declination for west border of quadrangle, 0° 7' E.

## LEONIDAS QUADRANGLE.

Near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Mendon, 1.5 miles west of, north side of east and west road at T road south, 25 feet north of quarter corner between secs. 28 and 29, T. 5 S., R. 10 W.; iron post stamped "Prim. Trav. Sta. No. 24, 1913, Mich.".....	• ' "	• ' "	Feet. 42 00 22.7 85 29 18.0 .....

## SCHOOLCRAFT QUADRANGLE.

West along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 5 S., R. 10 W., quarter corner between secs. 29 and 30, T road south.....	• ' "	• ' "	Feet. 42 00 22.0 85 30 28.4 .....
T. 5 S., R. 10 W., quarter corner, west side of section 30 (5 feet south of above corner is T. 5 S., R. 11 W., quarter corner east side of sec. 25).....	42 00 21.6	85 31 41.9	.....
T. 5 S., R. 11 W., quarter corner between secs. 25 and 26, T road east.....	42 00 21.2	85 32 51.8	5,280
Parkville, crossroads at south edge of, corner of secs. 23, 24, 25, and 26, T. 5 S., R. 11 W.....	42 00 47.6	85 32 52.0	2,670
T. 5 S., R. 11 W., corner of secs. 22, 23, 26, and 27, crossroads.....	42 00 47.0	85 34 02.0	5,282
T. 5 S., R. 11 W., corner of secs. 21, 22, 27, and 28, crossroads at schoolhouse.....	42 00 46.7	85 35 12.7	5,340
T. 5 S., R. 11 W., corner of secs. 20, 21, 28, and 29, center of east and west road.....	42 00 46.8	85 36 22.5	5,270
Moore Park, 1 mile east of, at southwest corner of crossroads, 20 feet south and 45 feet west of quarter corner between secs. 20, 29, T. 5 S., R. 11 W.; iron post stamped "Prim. Trav. Sta. No. 25, 1913, Mich.".....	42 00 46.4	85 36 58.4	2,712
T. 5 S., R. 11 W., corner of secs. 19, 20, 29, and 30; center of east and west road.....	42 00 46.5	85 37 32.8	2,600
Moore Park, railroad at east and west road crossing just south of depot.....	42 00 46.4	85 37 59.3	2,000
Moore Park, quarter corner in center of sec. 30, T. 5 S., R. 11 W., T road west.....	42 00 20.2	85 38 07.7	2,721
Rocky River, south end of bridge over.....	42 00 19.8	85 38 48.1	3,050
T. 5 S., R. 12 W., quarter corner between secs. 25 and 26, cross-roads.....	42 00 20.1	85 39 51.1	4,758
T. 5 S., R. 12 W., quarter corner between secs. 26 and 27, cross-roads.....	42 00 19.7	85 41 01.4	5,310
T. 5 S., R. 12 W., quarter corner between secs. 27 and 28, T road east.....	42 00 19.3	85 42 11.2	5,270

Magnetic declination for south border of quadrangle, 0° 16' E.

## SHIPSEWANA QUADRANGLE.

East along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Vistula, center of north and south road at railroad crossing.....	• ' "	• ' "	Feet. 41 44 59.2 85 43 40.6 .....
T. 38 N., R. 8 E., quarter corner between secs. 16 and 17, cross-roads at schoolhouse.....	41 44 53.0	85 37 17.7	.....
T. 38 N., R. 8 E., quarter corner between secs. 15 and 16, cross-roads.....	41 44 54.0	85 36 07.1	5,348
T. 38 N., R. 8 E., quarter corner between secs. 14 and 15, cross-roads.....	41 44 55.0	85 34 57.4	5,288
White Pigeon River, west end of bridge over.....	41 44 54.7	85 34 35.4	1,696
Scott, four corners, church on northwest corner.....	41 44 30.1	85 33 23.4	6,015
T. 38 N., Rs. 8 and 9 E., corner of secs. 13, 24, 18, and 19, T road north $\frac{1}{4}$ mile east of Scott.....	41 44 29.9	85 32 35.8	3,609
T. 38 N., R. 9 E., stone corner of secs. 17, 18, 19, and 20, 15 feet north of center of east and west road.....	41 44 31.1	85 31 28.8	5,079
Evangelical Church, 200 feet north of, center of crossroads.....	41 44 29.8	85 30 53.6	2,674
T. 38 N., R. 9 E., corner of secs. 16, 17, 20, 21, center of east and west road.....	41 44 33.5	85 30 18.8	2,667

Magnetic declination for north border of quadrangle, 0° 19' E.

## THREE RIVERS QUADRANGLE.

East along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 8 S., R. 12 W., south corner of secs. 19 and 20, north edge of east and west road along Michigan-Indiana State line.....	41 45 32.5	85 44 26.1	Fect.
T. 38 N., R. 7 E., north corner of secs. 8 and 9 (Indiana data), 15 feet north of T road south.....	41 45 32.5	85 44 16.6	720
T. 38 N., R. 7 E., quarter corner, north side of sec. 9, State line, 20 feet north of center of crossroads.....	41 45 32.5	85 43 41.4	2,670
T. 8 S., R. 12 W., corner of secs. 13, 14, 23, and 24, T road west.....	41 45 36.2	85 39 45.3	2,420
T. 8 S., R. 11 and 12 W., corner of secs. 18, 19, 13 and 24, T road north.....	41 45 36.3	85 38 35.5	5,290
Michigan-Indiana State line, 15 feet east of north corner of fractional secs. 8 and 9, T. 38 N., R. 8 E., and 285 feet east of south corner of fractional secs. 19 and 20, T. 8 S., R. 11 W.; iron bench mark post stamped "Prim. Trav. Sta. No. 21, 1913".....	41 45 32.5	85 37 19.0	6,280

North along highways near east border of quadrangle.

Michigan-Indiana State line, east side of north and south road at south corner of fractional secs. 19 and 20, T. 8 S., R. 10 W., and 35 feet east of north corner of fractional secs. 8 and 9, T. 38 N., R. 9 E.; iron post stamped "Prim. Trav. Sta. No. 22, 1913".....	41 45 33.5	85 30 21.0	.....
T. 8 S., R. 10 W., corner of secs. 17, 18, 19, and 20, center of north and south road at ditch.....	41 45 58.2	85 30 21.3	2,500
T. 8 S., R. 10 W., corner of secs. 7, 8, 17, and 18, crossroads at schoolhouse.....	41 46 50.5	85 30 21.4	5,300
T. 8 S., R. 10 W., corner of secs. 17, 18, 19, and 20, crossroads.....	41 51 12.5	85 30 23.6	.....
T. 7 S., R. 10 W., corner of secs. 7, 8, 17, and 18, crossroads just west of German Lutheran Church.....	41 52 04.8	85 30 24.0	5,300
T. 7 S., R. 10 W., corner secs. 5, 6, 7, and 8, T road west.....	41 52 57.4	85 30 24.6	5,320
T. 7 S., R. 10 W., quarter corner between secs. 5 and 6, T road west just north of schoolhouse.....	41 53 23.7	85 30 24.8	2,660
Tps. 6 and 7 S., R. 10 W., corner of secs. 31, 32, 5, and 6, center of north and south road.....	41 53 49.1	85 30 24.9	2,580
T. 6 S., R. 10 W., corner of secs. 29, 30, 31, and 32, center of north and south road.....	41 54 41.7	85 30 25.2	5,320
Centerville, 1 mile east of quarter corner between secs. 29 and 30, T. 6 S., R. 10 W., center of triangulation at road forks.....	41 55 07.8	85 30 25.7	2,650

Near northwest corner of quadrangle.

T. 5 S., R. 12 W., stone corner of secs. 28, 29, 32, and 33, T road west	41 59 52.9	85 43 20.7	.....
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West along highways through center of quadrangle.

T. 7 S., R. 10 W., quarter corner west side of sec. 6, T road east at big oak tree.....	41 53 23.2	85 31 37.7	.....
Centerville, 1 mile south of, corner of Ts. 6 and 7 S., Rs. 10 and 11 W., T road west.....	41 53 48.7	85 31 38.2	2,580
T. 7 S., R. 11 W., north corner of secs. 1 and 2, 25 east of center of crossroads.....	41 53 48.2	85 32 48.1	5,290
T. 7 S., R. 11 W., north corner of secs. 2 and 3.....	41 53 47.8	85 33 57.3	5,240
(25 feet west of above corner is T. 6 S., R. 11 W., south corner of secs. 34 and 35, center of crossroads at schoolhouse.)			
T. 7 S., R. 11 W., north corner of secs. 3 and 4, 15 feet east of center of T road south (40 feet west of above corner is T. 6 S., R. 11 W., south corner of secs. 33 and 34). ....	41 53 47.4	85 35 07.5	5,310
T. 7 S., R. 11 W., north corner of secs. 4 and 5, T road south.....	41 53 47.1	85 36 17.5	5,300
Three Rivers, 3 miles south of, at southeast corner of crossroads 20 feet south and 35 feet east of north corner of secs. 5 and 6, T. 7 S., R. 11 W., and 20 feet south and 65 feet east of south corner of secs. 31 and 32, T. 6 S., R. 11 W.; iron post stamped "Prim. Trav. Sta. No. 23, 1913, Mich.".....	41 53 46.7	85 37 27.0	5,258
T road east on township line, 7 feet north and 15 feet west of mail box 58 and 1,230 feet west of railroad crossing.....	41 53 46.7	85 38 20.1	4,020
Florence station, T road west about 300 feet northwest of.....	41 53 21.9	85 38 19.5	2,510
St. Joseph River, east end of bridge over.....	41 53 21.3	85 38 51.0	2,609
T. 7 S., R. 12 W., quarter corner between secs. 1 and 2, T road east.....	41 53 20.3	85 39 48.9	4,159
T road north quarter mile east of north corner of secs. 2 and 3, T. 7 S., R. 12 W.....	41 53 46.7	85 40 40.4	4,728
Center of east and west road at north and south section line.....	41 53 59.6	85 40 58.0	1,869
Road at north and south section line, 10 feet east of center of road south.....	41 53 51.8	85 42 08.5	5,391

Magnetic declination for east border of quadrangle,  $0^{\circ} 7' E.$ ; through center,  $0^{\circ} 10' E.$

## THREE RIVERS QUADRANGLE—Continued.

South along highways near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between Stations.
	°   '   "	°   '   "	Fctd.
T road north about $\frac{1}{4}$ mile south of center of sec. 31.....	41 48 48.9	85 44 59.9	.....
T. 38 N., R. 7 E., quarter corner between secs. 9 and 16, center of north and south road.....	41 45 16.2	85 43 41.0	.....
Vistula, center of north and south road at railroad crossing.....	41 44 59.2	85 43 40.6	1,724
Center of east and west road at north and south section line.....	41 45 03.4	85 43 05.7	2,682
T road south on north and south section line.....	41 45 03.6	85 41 56.2	5,269
T. 38 N., R. 7 E., corner of secs. 1, 2, 11, and 12, 200 feet west of crossroads.....	41 45 17.6	85 40 46.3	5,487
T. 38 N., R. 7 E., east corner of secs. 1 and 2, right angle turn in road (50 feet north of above corner is T. 38 N., R. 8 E., west corner of secs. 7 and 18, line between Elkhart and La Grange counties, Indiana).	41 45 17.9	85 39 35.3	5,350
T. 8 S., R. 12 W., south corner of fractional secs. 23 and 24, center of north and south road at State line.....	41 45 32.3	85 39 45.3	1,649
T. 38 N., R. 8 E., corner of secs. 8, 9, 16, and 17, T road east.....	41 45 19.2	85 37 18.7	1,350

Magnetic declination near south border of quadrangle,  $0^{\circ} 19' E.$

# MICHIGAN.

## PRIMARY TRAVERSE.

**Cement City, Rives Junction, Spring Arbor, Springport, and Stockbridge quadrangles.**

**JACKSON, INGHAM, EATON, AND CALHOUN COUNTIES.**

The following geographic positions were determined by Oscar Jones in 1915, and are based on primary traverse positions determined by J. R. Ellis in 1912 and C. B. Kendall in 1908. (See Bulletins 551 and 440.)

### CEMENT CITY QUADRANGLE.

**Near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
McCain Corners, corner of secs. 1, 6, 7, and 12, T. 2 S., Rs. 1 and 2 W., center of T road west.....	42 13 57.6	84 23 58.3	
Crossroads.....	42 13 59.4	84 27 45.7	5,463
Jackson, center of Fourth and West Franklin streets.....	42 14 36.8	84 25 07.4	12,495
Jackson, center of Milwaukee and East Franklin streets.....	42 14 37.0	84 24 02.2	4,897
Jackson, center of Bridge and Belden streets.....	42 14 21.6	84 23 50.3	1,796
Jackson, center of Page Avenue and South Elm Avenue.....	42 14 35.9	84 23 04.7	3,723
Jackson, 1 mile east of, 10 feet north by 28 feet west, quarter corner between secs. 1 and 6, T. 3 S., R. 1 W., and 1 E., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 3, Mich. 1915".....	42 14 24.9	84 21 54.6	5,388
T road south.....	42 14 18.7	84 20 48.4	5,013
T road south.....	42 13 58.0	84 19 37.5	5,730
Ballard Corner, crossroads.....	42 13 59.6	84 18 50.1	3,566
Donleys Corner, corner of secs. 2, 3, 10, and 11, T. 1 S., R. 2 W., center of crossroads.....	42 13 57.3	84 17 19.3	6,830
Grass Lake, 3 miles west, 1 mile south of, 28 feet north by 30 feet east, corner of secs. 1, 2, 11, and 12, T. 3 S., R. 1 E., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 4, Mich. 1915".....	42 13 57.4	84 16 09.4	5,254
Leoni, crossroads at.....	42 14 37.6	84 16 09.9	4,067

Magnetic declination for north border of quadrangle,  $0^{\circ} 45' W.$

### RIVES JUNCTION QUADRANGLE.

**Near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 2 S., R. 1 E., corner of secs. 25, 26, 35, and 36, center of T road west.....	42 15 45.9	84 16 11.9	
T road south.....	42 17 12.0	84 16 29.8	8,826
T. 2 S., R. 1 E., corner of secs. 11, 12, 13, and 14, center of T road west.....	42 18 23.2	84 16 12.1	7,324
T. 2 S., R. 1 E., corner of secs. 1, 2, 11, and 12, center of T road south.....	42 19 15.6	84 16 12.4	5,305
T road east.....	42 19 15.0	84 18 13.0	9,063
Road fork.....	42 20 10.5	84 18 51.0	6,302
Grand Trunk Railroad crossing.....	42 20 29.0	84 18 51.2	1,879
Marletta, Grand Trunk Railroad crossing at.....	42 21 50.9	84 17 05.2	11,500
Munith, 1 mile southwest of, 42 feet north and 6 feet west, crossing of Grand Trunk R. R.; iron post stamped "Prim. Trav. Sta. No. 5, Mich. 1915".....	42 22 44.0	84 15 57.4	7,400
Munith, crossing of Grand Trunk R. R., 260 feet northeast of station.....	42 23 26.1	84 15 02.0	5,949
T. 1 S., Rs. 1 and 2 E., corner of secs. 7, 12, 13, and 18, center of T road west.....	42 23 36.4	84 15 01.8	1,082

## RIVES JUNCTION QUADRANGLE—Continued.

## Near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 1 N., Rs. 1 and 2 E., corner of secs. 31 and 36, center of T road north.....	42 25 28.4	84 15 29.8	.....
T. 1 N., R. 1 E., corner of secs. 25 and 30, center of T road west.....	42 26 20.6	84 15 30.2	5,290
T. 1 N., R. 1 E., corner of secs. 24 and 25, center of T road west.....	42 27 13.3	84 15 30.0	5,335
T. 1 N., R. 1 E., corner of secs. 12 and 13, center of crossroads.....	42 28 58.9	84 15 29.8	10,683
T. 1 N., R. 1 E., quarter corner between secs. 10 and 11, center of T road north.....	42 29 22.8	84 17 40.01	10,053
T. 1 N., R. 1 E., corner of secs. 2, 3, 10, and 11, center road fork.....	42 29 48.8	84 17 50.6	2,744

## Near west border of quadrangle.

Michigan Central Railroad crossing.....	42 23 47.9	84 29 19.1	.....
Rives Junction, 2 miles west of, 21 feet south by 23 feet west of center of sec. 13, T. 1 S., R. 2 W., center of T road east; iron post stamped "Prim. Trav. Sta. No. 7, Mich. 1915".....	42 23 0.91	84 29 33.1	4,038
T. 1 S., R. 2 W., center of sec. 24, center of crossroads.....	42 22 16.1	84 29 33.7	5,360
T. 1 S., R. 2 W., quarter corner between secs. 25 and 36, center of T road west.....	42 20 57.4	84 29 33.7	7,974
T. road west.....	42 20 50.4	84 28 58.4	2,740
Magoon Corners, corner of secs. 19 and 30, T. 2 S., R. 1 W.....	42 16 35.0	84 28 00.0	.....
T. 2 S., R. 2 W., corner of secs. 13 and 24, fence line.....	42 17 27.3	84 28 59.8	5,285
T. 2 S., R. 2 W., corner of secs. 12 and 13, fence line.....	42 18 19.7	84 28 59.5	5,305
Crossroads.....	42 19 50.0	84 28 58.9	9,142
Tps. 1 and 2 S., Rs. 1 and 2 W., corner of secs. 1, 6, 31, and 36, fence line.....	42 20 04.7	84 28 58.7	1,485

## Through center of quadrangle.

T. 1 S., R. 1 E., corner of secs. 13, 14, 23, and 24, fence line.....	42 22 44.0	84 16 12.8	.....
T. 1 S., R. 1 E., quarter corner between secs. 14 and 23, center of crossroads.....	42 22 43.9	84 16 48.2	2,655
T. 1 S., R. 1 E., corner of secs. 14, 15, 22, and 23, fence line.....	42 22 43.9	84 17 23.7	2,660
T. road west.....	42 23 06.4	84 18 00.9	3,569
T. 1 S., R. 1 E., corner of secs. 16, 17, 20, and 21, center of T road north.....	42 22 48.2	84 19 46.4	8,125
Henrietta Corners, corner of secs. 17, 18, 19, and 20, T. 1 S., R. 1 E., center of crossroads.....	42 22 48.1	84 20 57.5	5,337
T. 1 S., R. 1 W., corner of secs. 13 and 24, fence line.....	42 22 41.9	84 21 53.5	4,242
Henrietta, 1.5 miles west of, 29 feet south by 35 feet east of quarter corner between secs. 13 and 24, T. 1 S., R. 1 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 8, Mich. 1915".....	42 22 41.5	84 22 28.2	2,605
T. 1 S., R. 1 W., corner of secs. 13, 14, 23, and 24, fence line.....	42 22 41.7	84 23 04.0	2,679
Road fork.....	42 22 34.8	84 20 14.6	5,345
T. 1 S., R. 1 W., quarter corner between secs. 15 and 16, center of crossroads.....	42 22 42.3	84 25 43.0	6,669
T. 1 S., R. 1 W., corner of secs. 16, 17, 20, and 21, center of crossroads.....	42 22 42.6	84 26 36.1	3,994
T. road west.....	42 23 09.1	84 27 19.5	4,216
T. 1 S., R. 1 W., center of sec. 7, crossroads.....	42 24 00.4	84 28 23.1	7,054
T. road southwest.....	42 24 09.2	84 29 03.6	3,167
T. road west, at schoolhouse.....	42 24 27.7	84 29 32.0	2,831
Crossroads.....	42 25 18.9	84 29 50.0	5,362
Crossroads.....	42 26 10.9	84 29 49.7	5,263

Magnetic declination for east border of quadrangle,  $1^{\circ} 15' W.$ ; for west border,  $0^{\circ} 45' W.$ ; for center border,  $1^{\circ} W.$

## SPRING ARBOR QUADRANGLE.

## Near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 2 and 3 S., Rs. 3 and 4 W., quarter corner between secs. 6 and 31, center of T road north.....	42 14 48.0	84 42 30.2	.....
Tps. 2 and 3 S., R. 3 W., corner of secs. 4, 5, 32, and 33, center of crossroads.....	42 14 48.7	84 40 42.6	8,097
Tps. 2 and 3 S., R. 3 W., quarter corner between secs. 3 and 34, center of crossroads.....	42 14 49.1	84 38 56.8	7,957
Michigan Central R. R. crossing.....	42 14 49.8	84 37 22.6	7,086

**SPRING ARBOR QUADRANGLE—Continued.**  
**Near north border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Parma, 0.6 mile south and 1 mile west of, 21 feet north by 35 feet east of corner of secs. 1, 2, 35, and 36, Tps. 2 and 3 S., R. 3 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 1, Mich. 1915".	• ' "	• ' "	
Tps. 2 and 3 S., Rs. 2 and 3 W., corner of secs. 1, 6, 31, and 36, center of T road west.	42 14 50.0	84 37 10.4	Feet. 921
T. 3 S., Rs. 2 and 3 W., corner of secs. 1, 6, 7, and 12, center of T road east.	42 14 50.3	84 35 59.7	5,325
T. 3 S., R. 2 W., quarter corner between secs. 5 and 8, center of T road north.	42 13 57.8	84 35 56.8	5,320
T. 3 S., R. 2 W., corner of secs. 4, 5, 8, and 9, center of crossroads.	42 13 57.7	84 34 16.2	7,574
Crossroads.	42 13 57.7	84 33 40.6	2,680
Crossroads.	42 13 57.9	84 32 27.4	5,506
Jackson, 5 miles west of, 26 feet south by 25 feet east of corner of secs. 1, 2, 11, and 12, T. 3 S., R. 2 W., center of T road south; iron post stamped "Prim. Trav. Sta. No. 2, Mich. 1915".	42 13 58.1	84 31 01.9	6,439
	42 13 57.8	84 30 08.9	3,983

Magnetic declination for north border of quadrangle,  $0^{\circ} 30' W.$

**SPRINGPORT QUADRANGLE.**

**Near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Crossroads.	• ' "	• ' "	
T road north.	42 15 59.6	84 44 12.7	Feet. 5,270
Crossroads.	42 15 58.9	84 43 02.6	
	42 15 28.4	84 42 30.5	3,917

**Near east border of quadrangle.**

Cohoon Corners, crossroads at T road west.	42 15 09.1	84 31 04.5	
T. 2 S., R. 2 W., corner of secs. 23, 24, 25, and 26, center of T road north.	42 15 42.6	84 31 04.6	3,390
T. 1 N., R. 2 W., corner of secs. 23, 24, 25, and 26, center of T road north.	42 16 34.9	84 30 11.5	6,637
T. 1 N., R. 2 W., corner of secs. 13, 14, 23, and 24, center crossroads.	42 27 02.9	84 30 07.5	
T. 1 N., R. 2 W., corner of secs. 11, 12, 13, and 14, center of crossroads.	42 27 55.0	84 30 07.5	5,270
T. 1 N., R. 2 W., corner of secs. 1, 2, 11, and 12, center of T road east.	42 28 47.2	84 30 08.0	5,280
Tps. 1 and 2 N., R. 2 W., corner of secs. 1 and 2, center of crossroads, 15 feet west is corner secs. 35 and 36, T. 2. N., R. 2 W.....	42 29 39.2	84 30 08.6	5,265
	42 30 33.6	84 30 09.1	5,513

**Through center of quadrangle.**

T. 1 S., R. 2 W., quarter corner between secs. 22 and 23, center of T road south.	42 22 16.6	84 31 20.0	
Tompson Corner, T road north.	42 22 21.9	84 32 30.6	5,330
T road west.	42 22 42.8	84 33 20.3	4,290
T. 1 S., R. 2 W., corner secs. 17, 18, 19, and 20, center of T road north.	42 22 42.7	84 34 51.3	6,834
T. 1 S., Rs. 2 and 3 W., corner of secs. 13, 18, 19, and 24, center of crossroads.	42 22 42.6	84 36 02.0	5,310
Springport, 4 miles east of, 25 feet south by 29 feet east of corner of secs. 13, 14, 23, and 24, T. 1 S., R. 3 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 8, Mich. 1915".	42 22 41.2	84 37 12.8	5,316
T road east.	42 22 41.8	84 38 06.0	3,995
T. 1 S., R. 3 W., corner of secs. 15, 16, 21, and 22, center of T road west.	42 22 41.7	84 39 34.8	6,666
T. 1 S., R. 3 W., corner of secs. 16, 17, 20, and 21, center of crossroads.	42 22 41.5	84 40 45.8	5,330
Springport, New York Central R. R. crossing.	42 22 41.4	84 41 33.6	3,590
T. 1 S., R. 3 W., corner of secs. 17, 18, 19, and 20, center of crossroads.	42 22 41.2	84 41 56.5	1,719
T. 1 S., Rs. 3 and 4 W., corner of secs. 18 and 19, fence line.	42 22 41.5	84 43 07.3	5,320
Crossroads.	42 22 53.8	84 44 00.3	4,169

Magnetic declination through center of quadrangle,  $1^{\circ} W.$ ; for east border,  $0^{\circ} 45' W.$ ; for south border,  $0^{\circ} 30' W.$

## STOCKBRIDGE QUADRANGLE.

Near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Crossroads at schoolhouse.....	° ' "	° ' "	
T road south.....	42 24 12.4 42 25 28.5	84 14 47.1 84 14 36.2	7,742

## Galesburg, Hastings, Kalamazoo, and Wayland quadrangles.

## ALLEGAN, BARRY, AND KALAMAZOO COUNTIES.

The following geographic positions were determined by Oscar Jones in 1915 and are based on primary traverse positions by J. R. Ellis, 1911. (See Bulletin 551.) All are on North American datum.

## GALESBURG QUADRANGLE.

Near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 2 S., R. 10 W., corner of secs. 16, 17, 20, and 21, center of T road north.....	° ' "	° ' "	
T. 2 S., R. 10 W., corner of secs. 8, 9, 16, and 17, center of T road south.....	42 17 18.5	85 29 33.2	
T. 2 S., R. 10 W., corner of secs. 9, 10, 15, and 16, center of crossroads.....	42 18 10.8	85 29 33.5	5,300
T. 2 S., R. 10 W., corner of secs. 3, 4, 9, and 10, center of T road south.....	42 18 10.7	85 28 23.3	5,270
T. 2 S., R. 10 W., corner of secs. 4, 5, 8, and 9, center of T road north.....	42 19 02.9	85 28 23.9	5,288
T. 2 S., R. 10 W., corner of secs. 4 and 5, center of T road south.....	42 19 03.0	85 29 34.3	5,287
Crossroads.....	42 19 57.6	85 29 34.8	5,540
T. 1 S., R. 10 W., corner of secs. 28, 29, 32, and 33, center of T road west.....	42 20 24.9	85 29 36.7	2,770
T. 1 S., R. 10 W., corner of secs. 20, 21, 28, and 29, center of T road west.....	42 20 49.8	85 29 37.3	2,519
Springbrook, 2 miles south of, 24 feet south by 28 feet east, corner of secs. 16, 17, 20, and 21, T. 1 S., R. 10 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 2, Mich. 1915.".....	42 21 42.0	85 29 38.6	5,291
	42 22 34.4	85 29 40.2	5,314

Near east border of quadrangle.

Springbrook, crossing of Kalamazoo, Lake Shore & Chicago Ry. with Michigan Electric interurban.....	42 24 04.3	85 29 48.8	
Springbrook, 1 mile northeast of, at crossing of Kalamazoo, Lake Shore & Chicago Ry.....	42 24 45.0	85 29 15.2	4,831
T. 1 N., R. 10 W., quarter corner between secs. 33 and 34, center of crossroads.....	42 25 41.9	85 29 03.3	5,822
T road west.....	42 27 26.7	85 29 24.4	10,725
Crossroads.....	42 27 52.9	85 29 33.7	2,750
T. 1 N., R. 10 W., quarter corner between secs. 9 and 16, center of crossroads.....	42 28 45.1	85 29 38.1	5,287
Crossroads.....	42 29 46.2	85 29 38.3	6,188

Magnetic declination for west border of quadrangle,  $1^{\circ} 20' E.$

**HASTING QUADRANGLE.**

Near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Prairieville, 2 miles west of, 7 feet east of quarter corner of sec. 4, T. 1 N., R. 10 W., 35 feet south by 30 feet west of center of crossroads; iron post stamped "Prim. Trav. Sta. No. 4, Mich. 1915"	42° 30' 30.7"	85° 29' 39.2"	Feet.....

Magnetic declination for southwest corner of quadrangle,  $2^{\circ} 0' E.$ **KALAMAZOO QUADRANGLE.**

Near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 2 S., R. 12 W., quarter corner between secs. 20 and 21, center of crossroads.....	42° 16' 52.0"	85° 43' 34.2"	Feet.....
T. 2 S., R. 12 W., corner of secs. 20, 21, 28, and 29, center of T road east.....	42° 16' 25.8"	85° 43' 34.3"	2,640
T. 2 S., R. 12 W., quarter corner between secs. 28 and 29, center of T road east.....	42° 15' 59.6"	85° 43' 31.6"	2,650
Miller, crossing Michigan Central R. R.....	42° 16' 00.3"	85° 42' 29.9"	4,870
T. 2 S., R. 12 W., quarter corner between secs. 26 and 27, center of T road west.....	42° 16' 00.5"	85° 41' 14.8"	5,648
Oshkemo, crossroads at.....	42° 15' 32.5"	85° 40' 39.8"	3,863
T. 2 S., Rs. 11 and 12 W., corner of secs. 25, 20, 31, and 36, center of crossroads.....	42° 15' 35.5"	85° 38' 54.6"	7,916
T road west.....	42° 15' 34.8"	85° 36' 51.3"	9,278
T. 2 S., R. 11 W., corner of secs. 27, 28, 33, and 34, center of T road east.....	42° 15' 34.8"	85° 35' 23.2"	6,625
Burdock Street school, center of crossroads at school.....	42° 15' 34.4"	85° 34' 47.7"	2,668
T. 2 S., R. 11 W., corner of secs. 25, 26, 35, and 36, center of T road north.....	42° 15' 34.3"	85° 33' 02.5"	7,908
T. 2 S., Rs. 10 and 11 W., corner of secs. 25 and 26, center of T road west.....	42° 15' 34.1"	85° 31' 51.4"	5,350
Comstock, 2 miles south of, 30 feet east of center of T road east, and corner of secs. 29, 30, 31, and 32, T. 2 S., R. 10 W.; iron post stamped "Prim. Trav. Sta. No. 1, Mich. 1915".....	42° 15' 34.1"	85° 30' 42.6"	5,170

North near east border of quadrangle.

Comstock, T road south at.....	42° 17' 18.6"	85° 30' 48.6"	10,587
Springbrook, 1 mile southwest of Kalamazoo, Lake Shore & Chicago Ry. crossing.....	42° 23' 39.7"	85° 30' 15.8"	.....

## Through center of quadrangle.

T road west.....	42° 22' 47.6"	85° 30' 14.8"	.....
T. 1 S., Rs. 10 and 11 W., quarter corner between secs. 13 and 18, center of T road east.....	42° 23' 01.2"	85° 31' 55.2"	7,662
T. 1 S., Rs. 10 and 11 W., corner of secs. 13, 24, 18, and 19, center of T road west.....	42° 22' 34.6"	85° 31' 55.3"	2,691
crossroads at cemetery.....	42° 22' 34.5"	85° 33' 09.5"	5,367
Coopers, crossing, Lake Shore & Michigan Southern R. R.....	42° 22' 34.7"	85° 34' 27.7"	5,870
T. 1 S., R. 11 W., corner of secs. 15, 16, 21, and 22, center of T road south.....	42° 22' 35.3"	85° 35' 26.5"	4,415
Cooper Center, 20 feet north by 50 feet east of corner of secs. 16, 17, 20, and 21, T. 1 S., R. 11 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 3, Mich. 1915".....	42° 22' 35.5"	85° 36' 36.8"	5,276
T. 1 S., R. 11 W., corner of secs. 17, 18, 19, and 20, center of crossroads.....	42° 22' 35.3"	85° 37' 48.7"	5,397
T. 1 S., Rs. 11 and 12 W., corner of secs. 18 and 19, corner of secs. 13 and 24, 25 feet south of crossroads.....	42° 22' 35.3"	85° 38' 57.3"	5,149
T. 1 S., R. 12 W., corner of secs. 13, 14, 23, and 24, fence line.....	42° 22' 32.8"	85° 40' 08.2"	5,328
T. 1 S., R. 12 W., corner of secs. 15, 16, 21, and 22, center of crossroads at Alamo.....	42° 22' 30.1"	85° 42' 28.7"	10,552
T. 1 S., R. 12 W., corner of secs. 9, 10, 15, and 16, center of crossroads.....	42° 23' 22.2"	85° 42' 31.0"	5,283
T. 1 S., R. 12 W., corner of secs. 8, 9, 16, and 17, fence line north and south.....	42° 23' 22.1"	85° 43' 41.5"	5,289

Magnetic declination for south border of quadrangle,  $0^{\circ} 30' E.$ ; for center,  $1^{\circ} 30' E.$

**WAYLAND QUADRANGLE.**  
Near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Crossroads.	* * "	* * "	Feet.
T road northwest.....	42 30 30.7	85 30 40.2	6,275
T road southwest.....	42 30 16.6	85 32 01.9	4,432
T road west.....	42 30 53.0	85 32 34.9	2,740
Hooper station, road crossing of Michigan Ry. Co. electric line.....	42 30 31.6	85 32 58.2	3,653
T. 2 N., R. 10 W., corner of secs. 35 and 36.....	42 30 31.9	85 33 46.5	440
T. 2 N., R. 10 W., corner of secs. 34 and 35, center of T road north.....	42 30 31.8	85 34 57.4	5,270
T. 2 N., R. 10 W., corner of secs. 33 and 34, center of T road north.....	42 30 31.4	85 36 06.0	5,290
Monteith, 1 mile south of, 23 feet north by 72 feet west of, corner of secs. 32 and 33, T. 2 N., R. 10 W., center of T road north, 23 feet north by 63 feet east of, corner of secs. 4 and 5, T. 1 N., R. 10 W., center of T road south; iron post stamped "Prim. Trav. Sta. No. 5, Mich. 1915"	42 30 30.8	85 37 19.9	5,381
T. 2 N., R. 11 W., corner of secs. 31 and 32, 30 feet west of center of crossroads.....	42 30 29.6	85 38 29.4	5,210
Tps. 1 and 2 N., Rs. 11 and 12 W., township corner, center of T road north.....	42 30 28.6	85 39 43.0	5,510
Tps. 1 and 2 N., R. 12 W., corner of secs. 1, 2, 35, and 36, center of crossroads.....	42 30 28.5	85 40 53.6	5,288
T. 2 N., R. 12 W., corner of secs. 34 and 35, center of T road north.....	42 30 24.4	85 42 04.0	5,270
T. 1 N., R. 12 W., corner of secs. 3 and 4, center of T road south.....	42 30 28.3	85 43 15.0	5,320
Abronia, Lake Shore & Michigan Southern R. R. crossing, 360 feet south of station.....	42 30 31.1	85 44 28.1	5,481

Magnetic declination for south border of quadrangle, 1° 0' E.

**Cedar Springs, Grove, Ravenna, and Smyrna quadrangles.**

KENT COUNTY.

The following geographic positions on approximate North American datum were determined by primary traverse in 1915, by Oscar Jones, based upon positions of 1911, published in Bulletin No. 551.

**CEDAR SPRINGS QUADRANGLE.**

Near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 10 N., R. 10 W., corner secs. 16, 17, 20, and 21; T road west.....	43 14 58.3	85 30 41.3	Feet.
T. 10 N., R. 10 W., corner secs. 17, 18, 19, and 20; T road east.....	43 14 58.1	85 31 53.2	5,320
T. 10 N., R. 10 W., corner secs. 19, 20, 29, and 30; crossroads.....	43 14 05.5	85 31 52.4	5,320
T road east.....	43 13 54.3	85 33 05.8	5,546
T. 10 N., R. 11 W., quarter corner between secs. 23 and 24; T road west.....	43 14 30.0	85 34 17.5	.....
T. 10 N., R. 11 W., quarter corner between secs. 22 and 23, crossroads.....	43 14 29.6	85 35 29.4	5,320
T. 10 N., R. 11 W., corner of secs. 14, 15, 22, and 23; T road west.....	43 14 55.6	85 35 29.7	2,630
Cedar Springs, 3 miles west and 2 miles north of, 34 feet west by 30 feet south of crossroads and corner of secs. 15, 16, 21, and 22, T. 10 N., R. 11 W.; iron post stamped "Prim. Trav. Sta. No. 2, Mich. 1915".	43 14 54.6	85 36 42.0	5,354
T. 10 N., R. 11 W., corner secs. 17, 18, 19, and 20; T road north.....	43 14 54.8	85 39 04.8	10,508
T. 10 N., Rs. 11 and 12 W., corner secs. 13, 18, 19, and 24; stone post.....	43 14 56.0	85 40 20.9	5,635
T road west.....	43 14 03.5	85 40 20.3	5,321
T road north.....	43 14 04.2	85 41 32.6	5,350
T. 10 N., R. 12 W., corner secs. 22, 23, 26, and 27; T road south.....	43 14 04.0	85 42 43.8	5,275
T. 10 N., R. 12 W., quarter corner secs. 22 and 27; crossroads at schoolhouse.....	43 14 04.1	85 43 19.4	2,630
T. 10 N., R. 12 W., quarter corner between secs. 15 and 22; crossroads.....	43 14 56.5	85 43 20.1	5,298
T. 10 N., R. 12 W., corner secs. 15, 16, 21, and 22; crossroads.....	43 14 56.4	85 43 55.6	2,630
T. 8 N., R. 12 W., corner secs. 4, 5, 8, and 9; crossroads.....	43 06 09.6	85 44 56.3	.....
T. 8 N., R. 12 W., corner secs. 8, 9, 16, and 17; crossroads.....	43 05 17.7	85 44 55.6	5,260
T. 8 N., R. 12 W., corner secs. 16, 17, 20, and 21; crossroads.....	43 04 25.5	85 44 55.5	5,280
T. 8 N., R. 12 W., corner secs. 20, 21, 28, and 29; T case north.....	43 03 33.7	85 44 55.9	5,250
Tps. 7 and 8 N., R. 12 W., quarter corner between secs. 4 and 33; crossroads.....	43 01 48.7	85 44 20.5	10,946
T. 8 N., R. 12 W., quarter corner between secs. 4 and 9; T road north.....	43 00 55.5	85 44 19.4	5,391

## CEDAR SPRINGS QUADRANGLE—Continued.

East through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 9 N., R. 12 W., corner secs. 33 and 34; fence line north.....	• • "	• • "	Feet.
T. 9 N., R. 12 W., corner secs. 34 and 35; T road north.....	43 07 02.8	85 43 49.0	5,310
T. 8 N., R. 12 W., corner secs. 1 and 2; crossroads.....	43 07 00.6	85 41 25.5	5,336
Tps. 8 and 9 N., Rs. 11 and 12 W., corner of secs. 1, 6, 31, and 36; crossroads.....	43 07 00.1	85 40 13.9	5,305
Tps. 8 and 9 N., R. 11 W., corner of secs. 5, 6, 31, and 32; T road north.....	43 07 00.3	85 39 03.8	5,200
Rockford, 3 miles west of, 32 feet north by 32 feet east, T road north, corner of secs. 4, 5, 32, and 33, Tps. 8 and 9 N., R. 11 W.; iron post stamped "Prim. Trav. Sta. No. 5, Mich. 1915".....	43 07 01.6	85 36 39.7	10,690
T road north.....	43 07 02.0	85 35 07.7	6,824
T road south.....	43 07 02.8	85 33 57.2	5,230
Rockford, center of main track Grand Rapids & Indiana R. R., 460 feet south of station.....	43 07 11.6	85 33 41.5	1,465
Tps. 8 and 9 N., Rs. 10 and 11 W., corner secs. 1, 6, 31 and 36.....	43 07 03.1	85 33 04.0	2,914
T road north.....	43 07 13.6	85 31 51.1	5,506
Tps. 8 and 9 N., R. 10 W., corner of secs. 4, 5, 32, and 33, road fork.....	43 07 03.6	85 30 39.6	5,409

Magnetic declination for north border of quadrangle,  $0^{\circ} 40' W.$ ; for center,  $0^{\circ} 0'.$ 

## GROVE QUADRANGLE.

Near south border.

Station.	Latitude.	Longitude.	Distance between stations.
T. 10 N., R. 11 W., quarter corner between secs. 13 and 18; crossroads.....	• • "	• • "	Feet.
White Creek school and church, T. 10 N., R. 11 W., quarter corner secs. 14 and 13; crossroads.....	43 15 22.8	85 33 06.1	.....
	43 15 22.0	85 34 17.4	5,278

## RAVENNA QUADRANGLE.

Near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Kent City, 2 miles north of, 34 feet south by 24 feet west of, corner of secs. 16, 17, 20, and 21, T. 10 N., R. 12 W., at crossroads; iron post stamped "Prim. Trav. Sta. No. 3, Mich. 1915".....	• • "	• • "	Feet.
T. 10 N., R. 12 W., corner of secs. 20, 21, 28, and 29; crossroads.....	43 14 55.3	85 45 07.3	.....
Kent City, corner of secs. 28, 29, 32, and 33, T. 10 N., R. 12 W., crossroads.....	43 14 03.2	85 45 06.5	5,278
T. 10 N., R. 12 W., corner of secs. 32 and 33; 20 feet east is corner of secs. 4, 5, T. 9 N., R. 12 W.....	43 13 10.7	85 45 05.4	5,316
T. 9 N., R. 12 W., corner of secs. 4, 5, 8, and 9; crossroads.....	43 12 18.4	85 45 04.5	5,300
T. 9 N., R. 12 W., corner of secs. 8, 9, 16, and 17, crossroads at schoolhouse.....	43 11 26.2	85 45 03.6	5,279
T. 9 N., R. 12 W., corner of secs. 16, 17, 20, and 21; crossroads.....	43 10 33.7	85 45 02.8	5,320
T. 9 N., R. 12 W., corner of secs. 20, 21, 28, and 29; crossroads.....	43 09 41.3	85 45 01.7	5,300
T. 9 N., R. 12 W., corner of secs. 28, 29, 32, and 33; T road east.....	43 08 48.9	85 45 01.2	5,310
Ballardsville, 3 miles west of; 31 feet south by 24 feet east of T road north and corner of secs. 32 and 33, T. 9 N., R. 12 W.; iron post stamped "Prim. Trav. Sta. No 4, Mich. 1915".....	43 07 56.5	85 45 00.8	5,299
T. 8 N., R. 12 W., corner of secs. 5, 6, 7, and 8; T road south.....	43 07 03.6	85 45 00.4	5,358
Walker station, at crossroads, 30 feet south by 30 feet west of corner of secs. 7, 8, 17, and 18, T. 7 N., R. 12 W.; iron post stamped "Prim. Trav. Sta. No. 11, Mich. 1911".....	43 00 57.8	85 46 06.1	.....
	43 00 05.0	85 46 04.1	5,340

Magnetic declination for northeast corner of quadrangle,  $1^{\circ} 20' W.$ ; for southeast corner,  $1^{\circ} 20' E.$

## SMYRNA QUADRANGLE.

North along public highway near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Ada, 3 miles north by 0.5 mile east of, 300 feet south of corner of secs. 10, 11, 14, and 15, T. 7 N., R. 10 W., at fork of road; iron post stamped "Prim. Trav. Sta. No. 14, Mich. 1911".....	* * 01.4	85 28 18.3	.....
T road west.....	43 00 36.5	85 28 27.6	5,621
T. 7 N., R. 10 W., corner secs. 2 and 3, T road south, 200 feet east is T road north, corner secs. 34 and 35, T. 8 N., R. 10 W.....	43 01 43.0	85 28 17.3	4,761
T. 8 N., R. 10 W., corner secs. 26, 27, 34, and 35; crossroads.....	43 02 35.2	85 28 14.2	5,298
Cannonsburg, T road south.....	43 03 14.8	85 28 13.0	4,006
T. 8 N., R. 10 W., center sec. 2, cross roads.....	43 03 53.3	85 28 49.9	4,773
T. 8 N., R. 10 W., quarter corner between secs. 10 and 15; T road south.....	43 05 11.4	85 28 50.1	7,999
T. 8 N., R. 10 W., corner of secs. 10, 11, 14, and 15; T road north.....	43 05 11.9	85 28 14.4	2,651
T. 8 N., R. 10 W., corner secs. 2, 3, 10, and 11; crossroads at school house.....	43 06 04.1	85 28 14.5	5,280
Rockford, 5 miles east of, 15 feet south of T road north and corner secs. 34 and 35, T. 9 N., R. 10 W.; iron post stamped "Prim. Trav. Sta. No. 6, Mich. 1915".....	43 07 04.3	85 28 16.6	6,098
T. 9 N., R. 10 W., corner secs. 26, 27, 34, and 35; T road west.....	43 07 56.8	85 28 16.5	5,310
T. 9 N., R. 10 W., corner secs. 22, 23, 26, and 27; fence line east and west.....	43 08 49.0	85 28 16.5	5,290
T. 9 N., R. 10 W., corner secs. 14, 15, 22, and 23; T road south.....	43 09 41.4	85 28 16.8	5,310
T. 9 N., R. 10 W., corner secs. 10, 11, 14, and 15; T road north.....	43 10 34.0	85 28 14.1	5,322
T. 9 N., R. 10 W., corner secs. 2, 3, 10, and 11; T road west.....	43 11 26.4	85 28 14.2	5,310
Tps. 9 and 10 N., R. 10 W., corner secs. 2, 3, 34, and 35; T road south.....	43 12 21.8	85 28 14.1	5,600
T. 10 N., R. 10 W., corner secs. 26, 27, 34, and 35; T road west.....	43 13 13.9	85 28 17.4	5,286
T. 10 N., R. 10 W., corner secs. 22, 23, 26, and 27; crossroads.....	43 14 06.2	85 28 17.8	5,299
Cedar Springs, 2 miles north and 4 miles east of, 19 feet west by 32 feet south of crossroads and corner secs. 14, 15, 22, and 23, T. 10 N., R. 10 W.; iron post stamped "Prim. Trav. Sta. No. 1, Mich. 1915".....	43 14 58.3	85 28 18.3	5,289
T. 10 N., R. 10 W., corner secs. 15, 16, 21, and 22; T road east.....	43 14 58.6	85 29 29.5	5,269

Magnetic declination for west border of quadrangle,  $0^{\circ} 30' W.$ 

## Near east border of quadrangle.

	° ' "	° ' "	Fed.
T. 10 N., R. 8 W., corner of secs. 21, 22, 27, and 28, center of cross-roads.....	43 14 08.2	85 15 09.1	.....
T. 10 N., R. 8 W., corner of secs. 27, 28, 33, and 34, fence line.....	43 13 15.8	85 15 09.8	5,310
T. 10 N., R. 8 W., corner of secs. 33 and 34, 10 feet west, corner of secs. 3 and 4, T. 9 N., R. 8 W., center of T road west.....	43 12 23.3	85 15 10.5	5,320
Pere Marquette R. R. crossing.....	43 12 13.3	85 15 11.4	1,010
T. 9 N., R. 8 W., corner of secs. 3, 4, 9, and 10, center of T road east.....	43 11 31.1	85 15 11.7	4,270
T. 9 N., R. 8 W., corner of secs. 9, 10, 15, and 16, street crossing, Greenville.....	43 10 39.0	85 15 12.1	5,280
Greenville, intersection south Lafayette Street and Fairplain Street, quarter corner between secs. 15 and 16, T. 9 N., R. 8 W.....	43 10 12.8	85 15 12.2	2,658
T. 9 N., R. 8 W., corner of secs. 15, 16, 21, and 22, fence line.....	43 09 46.6	85 15 12.2	2,650
Crossroads.....	43 08 54.1	85 15 47.7	5,927
Belding, 2 miles west by 1.5 miles north of, 25 feet south by 31 feet east, is quarter corner of sec. 4, T. 8 N., R. 8 W., center of T road south, 25 feet south by 114 feet east, quarter corner of sec. 33, T. 9 N., R. 8 W., center of T road south; iron post stamped "Prim. Trav. Sta. No. 17, Mich. 1915".....	43 07 09.4	85 15 46.4	10,602
Smyrna, west end of iron bridge over Flat River.....	43 03 31.6	85 15 18.1	.....
Smyrna, center of crossroads, quarter corner between secs. 21 and 28, T. 8 N., R. 8 W.....	43 03 33.5	85 15 47.2	2,173
T. 8 N., R. 8 W., center of secs. 21, center of T road west.....	43 03 59.9	85 15 46.9	2,675
T. 8 N., R. 8 W., quarter corner between secs. 9 and 16, center of crossroads.....	43 05 18.3	85 15 46.0	7,939
T. 8 N., R. 8 W., quarter corner between secs. 4 and 9, center of crossroads.....	43 06 10.2	85 15 45.8	5,258
T. 8 N., R. 8 W., center of sec. 4, center of crossroads.....	42 06 36.4	85 15 46.3	2,654

## Near south border of quadrangle.

Vergennes, 1 mile south and 2 miles west of, 27 feet north by 14 feet west is corner of secs. 8, 9, 16, and 17, T. 7 N., R. 9 W., center of T road north; iron post stamped "Prim. Trav. Sta. No. 25, Mich. 1915".....	43 00 06.8	85 23 29.5	.....
T. 7 N., R. 9 W., corner of secs. 7, 8, 17, and 18, center of cross-roads.....	43 00 06.1	85 24 40.1	5,346
T. 7 N., R. 10 W., quarter corner between secs. 12 and 13, center of crossroads.....	43 00 06.2	85 26 28.7	8,072

Magnetic declination near west border of quadrangle,  $0^{\circ} 30' W.$ ; near east border,  $0^{\circ} 30' W.$ ; near south border,  $0^{\circ} 30' W.$ .

**Clare, Edmore, Fenwick, Howard City, Ionia, Ithaca, Lowell, Mount Pleasant, Remus, Sears, and Vestaburg quadrangles.**

**BARRY, CLINTON, EATON, GRATIOT, IONIA, ISABELLA, KENT, AND MONTGOMERY COUNTIES.**

The following geographic positions were determined by primary traverse in 1915, by Oscar Jones, and are based on primary traverse positions determined by J. R. Ellis in 1912, and J. H. Wilson in 1913, on approximate North American datum.

**CLARE QUADRANGLE.**

Near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 16 N., R. 4 W., corner of secs. 19, 20, 29, and 30, center of T road west.....	° ' "	° ' "	Feet.
T. 16 N., Rs. 4 and 5 W., corner of secs. 19, 24, 25, and 30, center of crossroads.....	43 45 22.7	84 49 39.3	.....
T. 16 N., R. 5 W., corner of secs. 23, 24, 25, and 26, center of T road south.....	43 45 21.8	84 50 55.5	5,589
Gilmore, 35 feet north by 27 feet east, of corner of secs. 22, 23, 26, and 27, T. 16 N., R. 5 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 4, Mich. 1915.".....	43 45 20.7	84 52 06.0	5,179
T. 16 N., R. 5 W., corner of secs. 21, 22, 27, and 28, center of crossroads.....	43 45 20.6	84 53 17.5	5,248
T. 16 N., R. 5 W., corner of secs. 20, 21, 28, and 29, center of crossroads.....	43 45 20.3	84 54 29.9	5,317
T. 16 N., Rs. 5 and 6 W., corner of secs. 19, 24, 25, and 30, center of crossroads.....	43 45 20.2	84 55 41.7	5,270
T. 16 N., R. 6 W., corner of secs. 23, 24, 25, and 26, center of crossroads.....	43 45 19.8	84 58 06.1	10,598
	43 45 19.7	84 59 18.0	5,280

Magnetic declination for south border of quadrangle,  $1^{\circ} 30' W.$

**EDMORE QUADRANGLE.**

Near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 10 N., R. 6 W., corner of secs. 8, 9, 16, and 17, center of crossroads.....	° ' "	° ' "	Feet.
T. 10 N., R. 6 W., corner of sec. 4, 5, 8, and 9, center of crossroads.....	43 15 50.6	85 02 00.9	.....
T. 10 N., R. 6 W., corner of secs. 4 and 5, center of T road south.....	43 16 42.7	85 02 01.1	5,278
T. 11 N., R. 6 W., corner of secs. 33 and 34, center of T road north.....	43 17 32.9	85 02 03.0	5,080
T. 11 N., R. 6 W., corner of secs. 27, 28, 33, and 34, center of crossroads.....	43 17 32.8	85 01 29.7	2,460
T. 11 N., R. 6 W., corner of secs. 21, 22, 27, and 28, center of crossroads.....	43 18 24.9	85 01 28.5	5,270
T. 11 N., R. 6 W., corner of secs. 15, 16, 21, and 22, center of crossroads.....	43 19 16.7	85 01 28.3	5,250
T. 11 N., R. 6 W., corner of secs. 9, 10, 15, and 16, center of crossroads.....	43 20 08.8	85 01 28.0	5,270
T. 11 N., R. 6 W., corner of secs. 3, 4, 9, and 10, center of T road east.....	43 21 01.0	85 01 27.8	5,290
Edmore, 2 miles south by 1 mile east of, 31 feet south by 33 feet west of corner of secs. 3 and 4, T. 11 N., R. 6 W., 31 feet south by 49 feet west of corner of secs. 33 and 34, T. 12 N., R. 6 W., crossroads; iron post stamped "Prim. Trav. Sta. No. 12, Mich. 1915.".....	43 21 52.8	85 01 27.8	5,240
T. 12 N., R. 6 W., corner of secs. 34 and 35, center of T road north.....	43 22 44.6	85 01 28.3	5,245
T. 12 N., R. 6 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	43 22 44.9	85 00 16.5	.....
T. 12 N., R. 6 W., corner of secs. 22, 23, 26, and 27, center of crossroads.....	43 23 36.9	85 00 16.4	5,278
T. 12 N., R. 6 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	43 24 28.8	85 00 17.3	5,258
T. 12 N., R. 6 W., corner of secs. 10, 11, 14, and 15, center of T road east.....	43 25 20.8	85 00 18.1	5,260
T. 12 N., R. 6 W., corner of secs. 2, 3, 10, and 11, center of crossroads.....	43 26 12.7	85 00 18.2	5,260
T. 13 N., R. 6 W., corner of secs. 34 and 35, center of crossroads.....	43 27 04.7	85 00 18.7	5,260
T. 13 N., R. 6 W., corner of secs. 26, 27, 34, and 35, center of T road east.....	43 27 57.7	85 00 18.2	5,370
T. 13 N., R. 6 W., corner of secs. 22, 23, 26, and 27, center of T road east.....	43 28 49.8	85 00 19.1	5,279
	43 29 42.0	85 00 20.0	5,280

**EDMORE QUADRANGLE—Continued.****Near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 10 N., R. 7 W., corner of secs. 17, 18, 19, and 20, center of T road south.....	43 15 00.3	85 10 26.1	Feet.
T. 10 N., Rs. 7 and 8 W., corner of secs. 13, 18, 19, and 24, center of T road north.....	43 15 00.9	85 11 33.8	5,009
T. 10 N., R. 8 W., corner of secs. 13, 14, 23, and 24, center of T road north.....	43 15 00.5	85 12 45.0	5,267

Magnetic declination for east border of quadrangle,  $0^{\circ} 45'$  W.; for south border,  $0^{\circ} 45'$  W.

**FENWICK QUADRANGLE.****Near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 10 N., R. 6 W., corner of secs. 15, 16, 21, and 22, center of cross-roads.....	43 14 58.8	85 00 49.5	Feet.
T. 10 N., R. 6 W., corner of secs. 16, 17, 20, and 21, center of cross-roads.....	43 14 58.8	85 02 00.9	5,280
T. 10 N., R. 6 W., corner of secs. 17, 18, 19, and 20, center of cross-roads.....	43 14 58.8	85 03 12.4	5,290
T. 10 N., R. 7 W., corner of secs. 13 and 24, center of T road west.....	43 14 59.5	85 04 25.5	5,407
T. 10 N., R. 7 W., corner of secs. 13, 14, 23, and 24, center of T road north.....	43 14 59.9	85 05 37.5	5,329
Sidney, 1 mile east of, 28 feet south by 17 feet west, is corner of secs. 14, 15, 22, and 23, T. 10 N., R. 7 W., center of T road north; iron post stamped "Prim. Trav. Sta. No. 15, Mich. 1915".....	43 14 59.9	85 06 49.5	5,324
Pere Marquette R. R. crossing.....	43 15 00.0	85 07 36.6	3,489
Sidney, crossroads at corner of secs. 15, 16, 21, and 22, T. 10 N., R. 7 W.....	43 15 00.0	85 08 00.4	1,760
T. 10 N., R. 7 W., corner of secs. 16, 17, 20, and 21, center of cross-roads.....	43 14 58.5	85 09 12.5	5,340
T. 10 N., R. 8 W., corner of secs. 14, 15, 22, and 23.....	43 14 59.2	85 13 58.3	.....

**Near west border of quadrangle.**

Crossroads at schoolhouse.....	43 01 50.5	85 14 54.0	.....
Crossroads.....	43 02 16.5	85 14 54.0	2,626
Crossroads.....	43 03 08.3	85 14 53.7	5,246

**Near south border of quadrangle.**

T. 7 N., R. 6 W., corner of secs. 9, 10, 15, and 16, center of road fork.....	43 00 06.7	85 00 54.5	.....
T. 7 N., R. 6 W., corner of secs. 7, 8, 17, and 18, fence line.....	43 00 07.2	85 03 16.9	.....
T. 7 N., R. 6 W., quarter corner between secs. 7 and 8, center of crossroads.....	43 00 33.4	85 03 17.3	2,655
T. 7 N., R. 6 W., quarter corner west side of sec. 7, 25 feet south is quarter corner east side sec. 12, T. 7 N., R. 7 W., crossroads.....	43 00 33.4	85 04 30.6	5,449
T. 7 N., R. 7 W., center of sec. 12, center of T road north.....	43 00 33.2	85 05 05.9	2,618
T. 7 N., R. 7 W., center of sec. 12, center of T road north.....	43 00 33.2	85 06 16.8	5,265
Ionia, 3 miles west and 2 miles north of, 18 feet south by 32 feet east is quarter corner between secs. 10 and 11, T. 7 N., R. 7 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 23, Mich. 1915".....	43 00 32.7	85 06 51.8	2,603
T. 7 N., R. 7 W., quarter corner between secs. 9 and 10, center of crossroads.....	43 00 33.5	85 08 03.6	5,332
T. 7 N., R. 7 W., corner of secs. 9, 10, 15, and 16, center of T road east.....	43 00 07.5	85 08 03.7	2,630
T. 7 N., R. 7 W., quarter corner between secs. 7 and 18, center of T road north.....	43 00 07.3	85 09 50.6	.....
T. 7 N., R. 7 W., corner of secs. 7, 8, 17, and 18, center of crossroads.....	43 00 07.3	85 10 26.3	2,648
T. 7 N., R. 7 W., corner of secs. 7 and 18, 25 feet south is corner of secs. 12 and 13, T. 7 N., R. 8 W., fence line.....	43 00 07.4	85 11 37.8	5,312
T. 7 N., R. 8 W., corner of secs. 11, 12, 13, and 14, center of T road east.....	43 00 07.3	85 12 48.9	5,279
T. 7 N., R. 8 W., quarter corner between secs. 11 and 12, center of T road west.....	43 00 33.5	85 12 48.7	2,650

**FENWICK QUADRANGLE—Continued.**  
**Near south border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 8 W., center of sec. 11, center of T road north.....	43 00 33.7	85 13 24.4	Feet. 2,648
T. 7 N., R. 8 W., quarter corner between secs. 10 and 11, center of T road south.....	43 00 33.8	85 13 59.6	2,612
T road east.....	43 00 39.2	85 14 53.5	4,044
Saranac, 5 miles north by 2 miles west of; 17 feet north by 22 feet west is center of T road north; iron post stamped "Prim. Trav. Sta. No. 24, Mich. 1915".....	43 00 37.0	85 14 53.4	3,263

**Through center of quadrangle.**

Crossroads.....	43 07 10.0	85 14 54.0	.....
East end of iron bridge over White River.....	43 07 11.0	85 13 26.3	6,506
T. 9 N., R. 8 W., corner of secs. 35 and 36, center of T road north.....	43 07 11.1	85 12 48.6	2,745
Pere Marquette R. R. crossing.....	43 07 37.5	85 12 48.6	2,680
T. 9 N., R. 8 W., corner of secs. 25, 26, 35, and 36, center of T road east.....	43 08 03.2	85 12 48.7	2,600
T. 9 N., Rs. 7 and 8 W., corner of secs. 25, 30, 31, and 36, center of T road south.....	43 08 03.0	85 11 37.3	5,295
T. 9 N., E. 7 W., corner of secs. 29, 30, 31, and 32, center of T road east.....	43 08 02.4	85 10 24.5	5,393
T. 9 N., R. 7 W., corner of secs. 28, 29, 32, and 33, center of crossroads.....	43 08 03.0	85 09 13.9	5,231
T. 8 N., R. 7 W., corner of secs. 4 and 5, center of T road east.....	43 07 11.2	85 09 18.4	5,253
Tps. 8 and 9 N., R. 7 W., corner of secs. 3, 4, 33, and 34, center of crossroads.....	43 07 11.5	85 08 06.0	5,355
Shiloh, 2 miles west and 1 mile north of, T road south; iron post stamped "Prim. Trav. Sta. No. 18, Mich. 1915".....	43 07 11.7	85 07 19.5	3,449
T. 9 N., R. 7 W., quarter corner between secs. 34 and 35, center of T road north.....	43 07 39.2	85 06 52.6	3,422
T. 9 N., R. 7 W., quarter corner between secs. 35 and 36, center of crossroads.....	43 07 38.6	85 05 41.5	5,206
Pere Marquette R. R. crossing.....	43 07 38.7	85 05 19.4	1,640
Tps. 8 and 9 N., Rs. 6 and 7 W., corner of secs. 1, 6, 31, and 36, center of T road north.....	43 07 12.7	85 04 30.3	3,734
Tps. 8 and 9 N., R. 6 W., corner of secs. 5, 6, 31, and 32, fence line.....	43 07 12.5	85 03 17.6	5,390
Tps. 8 and 9 N., R. 6 W., corner of secs. 4, 5, 32, and 33, center of T road west.....	43 07 11.9	85 02 06.5	5,270
T. 8 N., R. 6 W., quarter corner between secs. 3 and 4, center of crossroads.....	43 06 44.5	85 00 55.2	5,972

Magnetic declination near north border of quadrangle,  $0^{\circ} 45' W.$ ; near west border,  $0^{\circ} 30' W.$ ; near south border,  $0^{\circ} 30' W.$ ; through center,  $0^{\circ} 30' W.$

**HOWARD CITY QUADRANGLE.****Near southeast corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Greenville, 5 miles north of, 25 feet north by 29 feet west of, corner of secs. 15, 16, 21, and 22, T. 10 N., R. 8 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 16, Mich. 1915".....	43 15 01.1	85 15 09.0	Feet. ....

**IONIA QUADRANGLE.****Near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T road north.....	42 59 32.0	85 01 37.6	.....
T road north.....	42 59 07.3	85 01 48.9	2,637
T road south.....	42 58 58.4	85 02 48.5	4,523
T. 7 N., R. 6 W., quarter corner between secs. 17 and 18, center of T road east.....	42 59 40.9	85 03 16.8	4,785
Crossroads.....	42 59 54.2	85 08 37.2	.....

## IONIA QUADRANGLE—Continued.

## Near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 8 W., quarter corner between secs. 15 and 22, center of crossroads.....	* * "	* * "	Fed.
T. 7 N., R. 8 W., corner of secs. 14, 15, 22, and 23, center of T road west.....	42 59 14.8	85 14 35.1	.....
T. 7 N., R. 8 W., quarter corner between secs. 22 and 23, center of crossroads.....	42 59 14.9	85 14 00.0	2,610
T. 7 N., R. 8 W., quarter corner between secs. 26 and 27, center of crossroads.....	42 58 48.8	85 14 00.4	2,646
T. 7 N., R. 8 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	42 57 56.8	85 13 59.7	5,260
T. 7 N., R. 8 W., corner of secs. 34 and 35, 30 feet west is corner of secs. 2 and 3, T. 6 N., R. 8 W., crossroads.....	42 57 30.6	85 13 59.7	2,645
T. 7 N., R. 8 W., corner of secs. 35 and 36, center of T road north.....	42 56 38.7	85 13 59.3	5,250
Crossroads.....	42 56 38.6	85 12 48.2	5,250
T. 6 N., R. 8 W., corner of secs. 1, 2, 11, and 12, street crossing Saranac.....	42 56 18.2	85 12 49.1	2,062
T. 6 N., R. 8 W., corner of secs. 10, 11, 14, and 15, center of road fork.....	42 55 46.4	85 12 48.2	3,200
T. 6 N., R. 8 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	42 54 54.8	85 13 58.9	7,412
T. 6 N., R. 8 W., corner of secs. 22, 23, 26, and 27, center of crossroads.....	42 54 02.5	85 13 59.0	5,295
T. 6 N., R. 8 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	42 53 10.3	85 13 59.0	5,282
T. 5 N., R. 8 W., corner of secs. 2 and 3, 25 feet west is corner of secs. 34 and 35, T. 6 N., R. 8 W., center of T road west.....	42 52 18.0	85 13 59.0	5,290
T. 5 N., R. 8 W., corner of secs. 2, 3, 10, and 11, center of crossroads.....	42 51 25.6	85 13 58.7	5,304
Pere Marquette R. R. crossing.....	42 50 31.6	85 13 57.9	5,466
T. 5 N., R. 8 W., corner of secs. 10, 11, 14, and 15.....	42 49 51.9	85 13 57.0	4,007
T. 5 N., R. 8 W., quarter corner between secs. 22 and 23, center of crossroads.....	42 49 39.1	85 13 56.8	1,393
T. 5 N., R. 8 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	42 48 20.8	85 13 55.9	7,924
T. 4 N., R. 8 W., corner of secs. 2 and 3, 30 feet west, corner of secs. 34 and 35, T. 5 N., R. 8 E., center of crossroads.....	42 47 02.6	85 13 55.6	7,915
T. 4 N., R. 8 W., corner of secs. 2, 3, 10, and 11, center of T road north.....	42 46 10.7	85 13 54.9	5,256
	42 45 19.4	85 13 54.0	5,188

## Through center of quadrangle.

T. 6 N., R. 8 W., corner of secs. 25, 26, 35, and 36, center of crossroads.....	42 52 17.8	85 12 48.2	.....
T. 6 N., Rs. 7 and 8 W., corner of secs. 25, 30, 31, and 36, center of crossroads.....	42 52 18.0	85 11 37.0	5,296
T. 6 N., R. 7 W., corner of secs. 29, 30, 31, and 32, center of crossroads.....	42 52 17.9	85 10 25.6	5,316
T. 6 N., R. 7 W., corner of secs. 28, 29, 32, and 33, center of crossroads.....	42 52 17.8	85 09 14.1	5,319
Clarksville, 2 miles north and 5.5 miles east of, 25 feet south by 32 feet west, corner of secs. 27, 28, 33, and 34, T. 6 N., R. 7 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 28, Mich. 1915".....	42 52 17.6	85 08 03.6	5,247
T. 6 N., R. 7 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	42 52 17.6	85 06 52.1	5,322
T. 6 N., R. 7 W., corner of secs. 25, 26, 35, and 36, center of crossroads.....	42 52 17.6	85 05 41.2	5,370
T. 6 N., Rs. 6 and 7 W., corner of secs. 25, 30, 31, and 36, center of crossroads.....	42 52 17.5	85 04 30.2	5,299
T. 6 N., R. 6 W., corner of secs. 29, 30, 31, and 32, center of crossroads.....	42 52 17.2	85 03 14.8	5,011
T. 6 N., R. 6 W., quarter corner between secs. 28 and 33, center of T road south.....	42 52 17.0	85 01 28.6	7,902
T. 6 N., R. 6 W., corner of secs. 27, 28, 33, and 34, center of crossroads.....	42 52 17.0	85 00 53.1	2,640

## Near east border of quadrangle.

T. 7 N., R. 6 W., corner of secs. 27, 28, 33, and 34, fence line.....	42 57 29.8	85 00 54.6	.....
T. 7 N., R. 6 W., quarter corner between secs. 28 and 33, center of T road south.....	42 57 29.9	85 01 30.0	2,630
T. 7 N., R. 6 W., corner of secs. 28, 29, 32, and 33, center of T road north.....	42 57 30.0	85 02 05.3	2,627
T. 7 N., R. 6 W., quarter corner between secs. 29 and 32, center of T road east.....	42 57 30.2	85 02 40.7	2,633
Crossroads.....	42 58 19.7	85 02 48.3	5,044

Magnetic declination near north border of quadrangle,  $0^{\circ} 30' W.$ ; near west border  $0^{\circ} 30' W.$ ; near east border,  $0^{\circ} 30' W.$ ; through center,  $0^{\circ} 30' W.$ .

## ITHACA QUADRANGLE.

Near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 11 N., R. 4 W., corner of secs. 23, 24, 25, and 26, center of T road north.....	43 19 15.8	84 44 46.5	.....
T. 11 N., R. 4 W., corner of secs. 25, 26, 35, and 36, center of T road north.....	43 18 23.6	84 44 46.6	5,283
T. 10 N., R. 4 W., corner of secs. 1 and 2, center of T road south.....	43 17 31.4	84 44 15.9	5,752
Crossroads.....	43 16 51.4	84 44 16.1	4,050
T. 10 N., R. 4 W., corner of secs. 11, 12, 13, and 14, center of cross-roads.....	43 15 46.0	84 44 16.2	6,620

Magnetic declination for west border of quadrangle,  $1^{\circ} 15' W.$ 

## LOWELL QUADRANGLE.

Near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
.....	.....	.....	Feet.
T. 7 N., R. 8 W., quarter corner between secs. 21 and 22, fence line.....	42 58 48.7	85 15 11.3	.....
T. 7 N., R. 8 W., quarter corner between secs. 20 and 21, center of crossroads.....	42 58 49.2	85 16 21.7	5,232
T. 7 N., R. 8 W., quarter corner between secs. 19 and 20, center of crossroads.....	42 58 49.4	85 17 33.3	5,318
T road north.....	42 59 01.3	85 18 44.2	5,403
Flat River, east end of covered bridge over.....	42 58 50.2	85 19 36.2	4,030
T road east.....	42 58 36.0	85 20 57.8	6,231
T. 7 N., R. 9 W., quarter corner between secs. 22 and 23, center of crossroads.....	42 58 49.2	85 21 06.8	1,494
T. 7 N., R. 9 W., corner of secs. 14, 15, 22, and 23, center of T road west.....	42 59 15.2	85 21 06.6	2,626
T. 7 N., R. 9 W., quarter corner between secs. 14 and 15, center of T road west.....	42 59 41.5	85 21 06.8	2,665
Pere Marquette R. R. crossing.....	42 59 41.3	85 21 33.6	1,950
T. 7 N., R. 9 W., quarter corner between secs. 15 and 16, center of crossroads.....	42 59 41.1	85 22 18.1	3,310

## Through center of quadrangle.

Whitneyville, crossing Pere Marquette R. R.....	42 52 14.1	85 27 28.8	.....
T. 6 N., R. 10 W., corner of secs. 25, 26, 35, and 36, center of T road north.....	42 52 14.5	85 26 57.4	2,330
T. 6 N., Rs. 9 and 10 W., corner of secs. 25, 30, 31, and 36, center of crossroads.....	42 52 15.2	85 25 46.6	5,270
T. 6 N., R. 9 W., corner of secs. 29, 30, 31, and 32, center of crossroads.....	42 52 15.5	85 24 37.4	5,153
T. 6 N., R. 9 W., corner of secs. 28, 29, 32, and 33, center of crossroads.....	42 52 15.7	85 23 26.7	5,265
Alto, 1 mile north, by 0.5 mile east of, 41 feet west is corner of secs. 27, 28, 33, and 34, T. 6 N., R. 9 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 26, Mich. 1915".....	42 52 15.7	85 22 16.4	5,223
Crossroads.....	42 52 16.5	85 20 46.8	6,669
T. 6 N., R. 9 W., corner of secs. 25, 26, 35, and 36, center of T road south.....	42 52 16.8	85 19 53.7	3,952
T. 6 N., R. 9 W., corner of secs. 25 and 30, center of T road north.....	42 52 17.3	85 18 42.1	5,325
T. 6 N., R. 8 W., corner of secs. 29, 30, 31, and 32, center of crossroads.....	42 52 17.0	85 17 31.9	5,227
T. 6 N., R. 8 W., corner of secs. 28, 29, 32, and 33, center of crossroads.....	42 52 17.5	85 16 21.3	5,254
T. 6 N., R. 8 W., quarter corner between secs. 28 and 33, center of T road south.....	42 52 17.7	85 15 45.9	2,636
Clarksville, 2 miles north and 0.5 miles west of, 24 feet south by 20 feet west is corner of secs. 27, 28, 33, and 34, T. 6 N., R. 8 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 27, Mich. 1915".....	42 52 17.6	85 15 10.6	2,624

Magnetic declination near north border of quadrangle,  $0^{\circ} 15' W.$ ; through center,  $0^{\circ} 15' W.$

## MOUNT PLEASANT QUADRANGLE.

## Near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Mount Pleasant, 6 miles south of, 22 feet south by 20 feet west of corner of secs. 14, 15, 22, and 23; T. 13 N., R. 4 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 1, Mich. 1915".	* * *	* * *	Feet.
T. 13 N., R. 4 W., corner of secs. 2, 3, 10, and 11, center of crossroads.	43 31 26.2	84 46 02.5	.....
T. 13 N., R. 4 W., corner of secs. 2, 3, 34, and 35, center of crossroads.	43 32 18.4	84 46 03.1	5,280
T. 14 N., R. 4 W., corner of secs. 26, 27, 34, and 35, center of T road west.	43 33 12.0	84 46 02.1	5,428
Depuy station, Ann Arbor R. R. crossing	43 34 04.6	84 46 02.2	5,330
T. 14 N., R. 4 W., corner of secs. 22, 23, 26, and 27, center of crossroads.	43 34 11.0	84 46 02.3	640
T. 14 N., R. 4 W., corner of secs. 14, 15, 22, and 23, center of crossroads.	43 34 57.0	84 46 02.7	4,660
Mount Pleasant, intersection of Main Street and State road.	43 35 49.5	84 46 03.1	5,320
T. 14 N., R. 4 W., corner of secs. 10, 11, 14, and 15, center of crossroads.	43 36 15.8	84 46 03.4	2,659
Mount Pleasant, 1 mile north of, crossing Pere Marquette R. R.	43 36 42.1	84 46 03.7	2,660
Mount Pleasant, 1.5 miles north of, 1,100 feet north of bridge over Chippewa River; iron post stamped "Prim. Trav. Sta. No. 2, Mich. 1915".	43 37 10.1	84 46 04.4	2,440
Tps. 14 and 15 N., R. 4 W., corner of secs. 2, 3, 34, and 35, center of crossroads.	43 37 39.0	84 46 08.5	2,943
T. 15 N., R. 4 W., corner of secs. 26, 27, 34, and 35, center of crossroads.	43 38 25.7	84 46 05.0	4,728
T. 15 N., R. 4 W., corner of secs. 22, 23, 26, and 27, center of crossroads.	43 39 16.8	84 46 04.8	5,180
T. 15 N., R. 4 W., corner of secs. 14, 15, 22, and 23, center of crossroads.	43 40 08.8	84 46 04.0	5,260
Rosebush, at corner of secs. 10, 11, 14, and 15, T. 15 N., R. 4 W., center of crossroads.	43 41 00.6	84 46 03.4	5,250
T. 15 N., R. 4 W., corner of secs. 2, 3, 10, and 11, center of crossroads.	43 41 54.1	84 46 04.1	5,410
Tps. 15 and 16 N., R. 4 W., corner of secs. 2, 3, 34, and 35, center of crossroads.	43 42 45.3	84 46 03.6	5,190
Mount Pleasant, 9 miles north of, 22 feet south by 20 feet east of corner of secs. 26, 27, 34, and 35, T. 16 N., R. 4 W., center of T road east; iron post stamped "Prim. Trav. Sta. No. 3, Mich. 1915".	43 43 40.0	84 46 03.8	5,540
	43 44 31.9	84 46 02.1	5,254

## Near north border of quadrangle.

T. 16 N., R. 4 W., quarter corner between secs. 26 and 27, center of T road west.	43 44 58.3	84 46 02.9	.....
Doherty station, Ann Arbor R. R. crossing.	43 44 57.8	84 46 38.7	2,630
T. 16 N., R. 4 W., quarter corner between secs. 27 and 28, center of crossroads.	43 44 57.3	84 47 14.9	2,660
T. 16 N., R. 4 W., quarter corner between secs. 28 and 29, center of T road south.	43 44 56.9	84 48 26.3	5,240
T. 16 N., R. 4 W., quarter corner between secs. 29 and 30, center of T road east.	43 44 56.6	84 49 37.7	5,240

## Near west border of quadrangle.

T. 15 N., R. 6 W., center of sec. 13, center of T road south.	43 41 21.7	84 58 40.9	7,871
T. 15 N., R. 6 W., quarter corner between secs. 13 and 24, center of crossroads.	43 40 58.5	84 58 40.4	2,630
Pere Marquette R. R. crossing.	43 40 05.7	84 58 39.8	5,340
T. 15 N., R. 6 W., center of sec. 25, T road west.	43 39 40.6	84 58 39.9	2,540
T. 15 N., R. 6 W., quarter corner between secs. 25 and 26, center of T road south.	43 39 40.6	84 59 15.3	2,610
T. 15 N., R. 6 W., corner of secs. 25, 26, 35, and 36, center of T road east.	43 39 14.7	84 59 15.2	2,620
T. 15 N., R. 6 W., corner of secs. 35 and 36, 20 feet west is corner of secs. 1 and 2, T. 14 N., R. 6 W., center of crossroads.	43 38 22.7	84 59 15.2	5,270
Caldwell, 2 miles west of, 31 feet south by 24 feet east of corner of secs. 1, 2, 11, and 12, T. 14 N., R. 6 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 6, Mich. 1915".	43 37 30.1	84 59 14.6	5,322
T. 14 N., R. 6 W., corner of secs. 11, 12, 13 and 14, center of crossroads.	43 36 38.5	84 59 14.3	5,230

## MOUNT PLEASANT QUADRANGLE—Continued.

Near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 13 N., R. 6 W., corner of secs. 13, 14, 23, and 24, center of T road north.....	• ' "	• ' "	Feet.
T. 13 N., R. 6 W., corner of secs. 13 and 24, 30 feet north is corner of secs. 18 and 19, T. 13 N., R. 5 W., center of crossroads.....	43 30 34.5	84 50 09.2	.....
T. 13 N., R. 5 W., corner of secs. 17, 18, 19, and 20, center of crossroads.....	43 30 34.3	84 57 56.8	5,340
T. 13 N., R. 5 W., corner of secs. 16, 17, 20, and 21, center of crossroads.....	43 30 37.0	84 56 46.3	5,193
T. 13 N., R. 5 W., corner of secs. 8, 9, 16, and 17, center of crossroads.....	43 30 37.3	84 55 32.9	5,410
T. 13 N., R. 5 W., quarter corner between secs. 9 and 16, center of crossroads.....	43 31 30.2	84 55 33.7	5,360
T. 13 N., R. 5 W., quarter corner between secs. 10 and 15, center of T road south.....	43 31 30.4	84 54 57.6	2,660
Winn, 1 mile south of, 32 feet north by 28 feet west, of corner of secs. 15 and 22, T. 13 N., R. 5 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 9, Mich. 1915.".....	43 31 30.5	84 53 45.2	5,341
T. 13 N., R. 5 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	43 30 37.7	84 53 45.0	5,348
T. 13 N., R. 5 W., corner of secs. 13, 14, 23, and 24, center of crossroads.....	43 30 37.6	84 53 08.6	2,678
T. 13 N., Rs. 4 and 5 W., corner of secs. 13, 18, 19, and 24, center of crossroads.....	43 30 37.6	84 51 55.8	5,370
T. 13 N., R. 4 W., corner of secs. 17, 18, 19, and 20, center of crossroads.....	43 30 33.9	84 50 48.7	4,955
T. 13 N., R. 4 W., corner of secs. 16, 17, 20, and 21, center of crossroads.....	43 30 33.9	84 49 37.5	5,250
T. 13 N., R. 4 W., corner of secs. 15, 16, 21, and 22, center of crossroads.....	43 30 33.4	84 48 28.0	5,269
	43 30 33.9	84 47 14.0	5,310

Through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 14 N., Rs. 5 and 6 W., corner of secs. 1, 6, 7, and 12, center of T road south.....	43 37 30.3	84 58 02.8	.....
T. 14 N., R. 5 W., corner of secs. 5, 6, 7, and 8, center of crossroads.....	43 37 30.3	84 56 53.0	5,137
Crossroad.....	43 37 35.8	84 55 41.0	5,326
Crossroad.....	43 37 36.0	84 54 28.7	5,320
Caldwell, 3 miles east of, 20 feet south by 25 feet west of, center of crossroad; iron post stamped "Prim. Trav. Sta. No. 7, Mich. 1915.".....	43 37 36.4	84 53 17.2	5,258
T. 14 N., R. 5 W., corner of secs. 1, 2, 11, and 12, center of T road south.....	43 37 31.7	84 52 03.1	5,469
T. 14 N., Rs. 4 and 5 W., corner of secs. 1, 6, 7, and 12, center of crossroads.....	43 37 31.8	84 50 54.0	5,090
T. 14 N., R. 4 W., corner of secs. 5, 6, 7, and 8, center of crossroads.....	43 37 32.8	84 49 40.9	5,375
T. 14 N., R. 4 W., corner of secs. 4, 5, 8, and 9, center of crossroads.....	43 37 33.2	84 48 28.5	5,329
T. 14 N., R. 4 W., corner of secs. 3, 4, 9, and 10, center of crossroads.....	43 37 34.0	84 47 16.6	5,289

Magnetic declination for east border of quadrangle,  $1^{\circ} 30' W.$ ; for north border,  $1^{\circ} 30' W.$ ; for west border,  $1^{\circ} 30' W.$ ; for south border,  $1^{\circ} 00' W.$ ; through center,  $1^{\circ} 15' W.$

## REMUS QUADRANGLE.

Near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 16 N., R. 6 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	• ' "	• ' "	Feet.
Tps. 15 and 16 N., R. 6 W., corner of secs. 2, 3, 34, and 35, center of crossroads.....	43 44 27.5	85 00 24.2	.....
T. 15 N., R. 6 W., corner of secs. 10, 11, 14, and 15, center of crossroads.....	43 43 35.4	85 00 28.1	5,280
T. 15 N., R. 6 W., quarter corner between secs. 14 and 15, center of crossroads.....	43 41 50.9	85 00 28.5	10,574
T. 14 N., R. 6 W., corner of secs. 10, 11, 14, and 15, center of crossroads.....	43 41 24.9	85 00 28.0	2,639
T. 14 N., R. 6 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	43 36 38.2	85 00 25.0	.....
	43 35 46.4	85 00 24.2	5,239

## REMUS QUADRANGLE—Continued.

## Near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 14 N., R. 6 W., corner of secs. 22, 23, 26, and 27, center of crossroads.....	* * "	* * "	Feet.
T. 14 N., R. 6 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	43 34 54.4	85 00 23.5	5,270
Tps. 13 and 14 N., R. 6 W., corner of secs. 2, 3, 34, and 35, center of T road north.....	43 34 02.2	85 00 22.8	5,280
T. 13 N., R. 6 W., corner of secs. 3 and 4, center of T road south.....	43 33 10.1	85 00 22.1	5,278
T. 13 N., R. 6 W., corner of secs. 3, 4, 9 and 10, center of crossroads.....	43 33 09.8	85 01 35.0	5,370
T. 13 N., R. 6 W., corner of secs. 9, 10, 15, and 16, center of crossroads.....	43 32 17.1	85 01 33.9	5,330
Blanchard, 3 miles east of 32 feet south by 26 feet west of corner of secs. 15, 16, 21, and 22, T. 13 N., R. 6 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 8, Mich. 1915".....	43 31 25.5	85 01 32.8	5,230
T. 13 N., R. 6 W., corner of secs. 14, 15, 22, and 23, center of T road west.....	43 30 33.4	85 01 32.4	5,273
	43 30 33.9	85 00 20.9	5,266

Magnetic declination for east border of quadrangle,  $1^{\circ} 30' W.$ 

## SEARS QUADRANGLE.

## Near southeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Brinton, 1 mile south of, 26 feet south by 26 feet east of corner of secs. 22, 23, 26, and 27, T. 16 N., R. 6 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 5, Mich. 1915".....	* * "	* * "	Feet.
	43 45 19.3	85 00 29.6	.....

## VESTABURG QUADRANGLE.

## Near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 10 N., R. 5 W., quarter corner, east side sec. 13, 25 feet north is quarter corner, west side of sec. 18.....	* * "	* * "	Feet.
T. 10 N., R. 5 W., center of sec. 13, center of T road south.....	43 15 23.1	84 50 08.3	.....
T. 10 N., R. 5 W., quarter corner between secs. 13 and 14, center of crossroads.....	43 15 23.0	84 50 44.2	2,650
Crystal, 2 miles east of, 17 feet north by 30 feet east of quarter corner between secs. 14 and 15, center of T road south; iron post stamped "Prim. Trav. Sta. No. 13, Mich. 1915".....	43 15 23.1	84 51 20.0	2,650
T. 10 N., R. 5 W., quarter corner between secs. 15 and 16, center of crossroads.....	43 15 23.5	84 52 31.5	5,290
T. 10 N., R. 5 W., quarter corner between secs. 16 and 17, center of crossroads.....	43 15 24.2	84 53 42.7	5,270
Crystal, center of crossroads at.....	43 15 24.6	84 54 54.2	5,290
T. 10 N., R. 5 W., corner of secs. 7 and 18, center of T road east.....	43 15 47.3	84 54 53.9	2,300
T. 10 N., R. 6 W., corner of secs. 12, 13, 14, and 15, center of crossroads.....	43 15 51.1	84 57 17.3	10,615
	43 15 51.6	84 58 28.0	5,231

## Near east border of quadrangle.

T. 13 N., R. 4 W., corner of secs. 22, 23, 26, and 27, center of T road west.....	43 29 42.1	84 46 01.9	.....
T. 13 N., R. 4 W., corner of secs. 26, 27, 34, and 35, center of T road west.....	43 28 50.4	84 46 01.5	5,236
T. 13 N., R. 4 W., corner of secs. 34 and 35, 30 feet east is corner secs. 2 and 3, T. 12 N., R. 4 W., center of crossroads.....	43 27 58.2	84 46 00.3	5,290
T. 12 N., R. 4 W., corner of secs. 2, 3, 10, and 11, center of crossroads.....	43 27 06.1	84 45 59.6	5,278
T. 12 N., R. 4 W., corner of secs. 10, 11, 14, and 15, center of crossroads.....	43 26 13.8	84 45 59.7	5,290

## VESTABURG QUADRANGLE—Continued.

Near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 12 N., R. 4 W., corner of secs. 14, 15, 22, and 23, center of cross-roads.....	• • "	• • "	
T. 12 N., R. 4 W., corner of secs. 22, 23, 26, and 27, center of cross-roads.....	43 25 21.6	84 46 00.0	Freel. 5,280
T. 12 N., R. 4 W., corner of secs. 26, 27, 34, and 35.....	43 24 29.4	84 45 59.9	5,290
Pere Marquette R. crossing.....	43 23 37.1	84 45 59.6	5,290
Elwell, 1 mile west of, 27 feet north by 25 feet east of corner of secs. 34 and 35, 27 feet north by 15 feet east of corner of secs. 2 and 3, T. 11 N., R. 4 W., crossroads; iron post stamped "Prim. Trav. Sta. No. 10, Mich. 1915.".....	43 23 11.0	84 45 59.5	2,650
T. 11 N., R. 4 W., corner of secs. 2, 3, 10, and 11, center of crossroads.....	43 22 45.2	84 45 59.0	2,610
T. 11 N., R. 4 W., corner of secs. 10, 11, 14, and 15, center of cross-roads.....	43 21 52.2	84 45 59.0	5,370
T. 11 N., R. 4 W., corner of secs. 14, 15, 22, and 23, center of cross-roads.....	43 21 00.0	84 45 58.8	5,280
T. 11 N., R. 4 W., corner of secs. 22, 23, 26, and 27, center of T road north.....	43 20 08.0	84 45 58.7	5,270
	43 19 15.7	84 45 58.8	5,290

## Through center of quadrangle.

T. 11 N., R. 4 W., corner of secs. 3 and 4, 30 feet west, corner of secs. 33 and 34, T. 12 N., R. 4 W., crossroads.....	43 22 45.0	84 47 10.5	
T. 11 N., R. 4 W., corner of secs. 4 and 5, 20 feet west, corner of secs. 32 and 33, T. 12 N., R. 4 W., crossroads.....	43 22 44.9	84 48 22.2	5,300
T. 12 N., R. 4 W., corner of secs. 31 and 32, center of T road north.....	43 22 44.8	84 49 34.3	5,320
Riverdale, 0.5 mile south of, center of crossroads.....	43 22 44.7	84 50 00.1	2,570
Tps. 11 and 12 N., Rs. 4 and 5 W., corner of secs. 1, 6, 31, and 36, center of road south.....	43 22 44.7	84 50 42.1	2,440
T. 11 N., R. 5 W., corner of secs. 1 and 2, center of T road south.....	43 22 44.5	84 51 57.4	5,560
Vestaburg, 1 mile south by 1 mile west of, 25 feet south by 26 feet east of corner of secs. 2 and 3, T. 11 N., R. 5 W., center of T road south; iron post stamped "Prim. Trav. Sta. No. 11, Mich. 1915.".....	43 22 44.2	84 53 00.3	5,315
T. 12 N., R. 5 W., corner of secs. 33 and 34, center of T road north.....	43 22 44.6	84 54 17.3	5,016
T. 11 N., R. 5 W., corner of secs. 3 and 4, center of T road south.....	43 22 44.6	84 54 21.6	320
T. 12 N., R. 5 W., quarter corner, south side of sec. 33, center of T road north.....	43 22 44.6	84 54 53.1	2,330
T. 11 N., R. 5 W., quarter corner, north side of sec. 4, center of T road south.....	43 22 44.6	84 54 56.8	270
T. 11 N., R. 5 W., corner of secs. 5 and 6, center of T road south.....	43 22 44.9	84 56 43.6	7,890
Tps. 11 and 12 N., Rs. 5 and 6 W., corner of secs. 1, 6, 31, and 36, center of T road north.....	43 22 45.0	84 57 53.4	5,150
T. 11 N., R. 6 W., corner of secs. 1 and 2, center of T road south.....	43 22 45.0	84 59 06.3	5,390

Magnetic declination for south border of quadrangle,  $1^{\circ} 00' W.$ ; for east border,  $1^{\circ} 15' W.$ ; through center,  $1^{\circ} 15' W.$ .

**Bay City, Burt, Carson City, Chesaning, Corunna, De Witt, Durand, Elsie, Fowlerville, Freland, Laingsburg, Merrill, Muir, Perrinton, St. Charles, Saginaw, and Vassar quadrangles.**

**CLINTON, EATON, GRATIOT, LIVINGSTON, MIDLAND, SAGINAW, AND SHIAWASSEE COUNTIES.**

The following geographic positions were determined by primary traverse in 1913 and 1915 by J. H. Wilson, and are based on traverse positions determined in 1908 and 1909, described in Bulletins 440 and 496, on approximate North American datum.

Additional control for Muir, Bay City, Saginaw, and Vassar quadrangles was done by Oscar Jones in 1915.

## BAY CITY QUADRANGLE.

Along highways near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Saginaw, 4.5 miles north of, 20 feet north by 20 feet east of corner of secs. 22, 23, 26, and 27, T. 13 N., R. 4 E., in northeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 12 Michigan 1913".	* * "	* * "	
T. 13 N., R. 4 E., corner of secs. 21, 22, 27, and 28; crossroads.	43 30 31.8 43 30 30.4	83 58 24.3 83 59 40.1	5,390 Feet.

Magnetic declination near southwest corner of quadrangle,  $1^{\circ} 54' W.$ 

## Near south border of quadrangle.

T. 13 N., R. 4 E., corner of secs. 14, 15, 22, and 23, center of crossroads.	43 31 23.8	83 58 29.4	
T. 13 N., R. 4 E., corner of secs. 13, 14, 23, and 24, center of crossroads.	43 31 22.8	83 57 21.2	5,030
T. 13 N., Rs. 4 and 5 E., corner of secs. 13, 18, 19, and 24, center of roads.	43 31 21.8	83 56 06.6	5,490

## North through center of quadrangle west of Saginaw River.

T. 13 N., Rs. 4 and 5 E., corner of secs. 7, 12, 13, and 18, center of T road west.	43 32 11.1	83 56 06.0	4,990
T. 13 N., Rs. 4 and 5 E., corner of secs. 1, 6, 7, and 12, center of T road west.	43 33 04.8 43 33 48.1	83 56 04.8 83 56 35.3	5,440 4,929
Road fork at brick church.			
Tps. 13 and 14 N., Rs. 4 and 5 E., corner of secs. 1, 6, 31, and 36, center of T road north.	43 33 57.6	83 56 02.9	2,563
Tps. 13 and 14 N., R. 5 E., corner of secs. 31 and 32, center of crossroads.	43 33 57.0	83 54 59.4	4,690
T. 14 N., R. 5 E., corner of secs. 29, 30, 31, and 32, center of crossroads.	43 34 49.1	83 54 58.0	5,280
T. 14 N., R. 5 E., corner of secs. 19, 20, 25, and 30, center of crossroads.	43 35 41.2	83 54 56.8	5,280
Bay City, west side, intersection of West Midland Street and South Euclid Avenue.	43 36 07.1	83 54 56.0	2,694
Bay City, west side, intersection, southwest curb line of South Walnut and East Midland streets.	43 36 06.5	83 53 55.2	4,472
Bay City, west side, railroad crossing corner of State and Hart streets.	43 36 45.8 43 37 26.9	83 53 43.1 83 53 59.3	4,086 4,330
Puddy's corners, center of crossroads.	43 38 17.6	83 53 56.0	5,141
Crossroads.	43 39 09.2	83 53 53.2	5,233
T road west.			
Tps. 14 and 15 N., R. 5 E., corner of secs. 5, 6, 31, and 32, center of crossroads.	43 39 09.8	83 54 47.0	3,955
Tps. 14 and 15 N., Rs. 4 and 5 E., corner of secs. 1, 6, 31, and 36, center of crossroads.	43 39 10.3 43 39 55.9	83 55 45.4 83 56 54.7	4,295 6,870
Michigan Central R. R. crossing.	43 40 55.3 Do. Do. Do. Do.	83 57 04.0 83 57 45.3 83 57 35.3 83 57 26.8	6,038 5,089 5,100 5,250
Linwood, Michigan Central R. R. crossing, 420 feet north of station.	43 44 18.8	83 57 35.7	5,293
Tps. 15 and 16 N., R. 4 E., corner of secs. 2, 3, 34, and 35, center of T road north.	43 44 19.1	83 58 07.7	2,349
Crossroads.	43 44 19.3	83 58 37.1	2,100

## Near west border of quadrangle.

Linwood, 2 miles west of, 27 feet south by 26 feet east of corner of secs. 3, 4, 33, and 34, T. 15 N., R. 4 E., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 20, Mich. 1913".	43 44 19.3	83 59 18.4	3,029
T. 15 N., R. 4 E., corner of secs. 3, 4, 9, and 10, center of crossroads.	43 43 27.9	83 59 18.8	5,200
T. 15 N., R. 4 E., corner of secs. 9, 10, 15, and 16, center of crossroads.	43 42 36.5	83 59 19.6	5,210
T. 15 N., R. 4 E., corner of secs. 15, 16, 21, and 22, center of T road west.	43 41 45.2	83 59 21.0	5,190
T. 15 N., R. 4 E., corner of secs. 21, 22, 27, and 28, center of crossroads.	43 40 53.9	83 59 22.0	5,195
T. 15 N., R. 4 E., corner of secs. 27, 28, 33, and 34, center of crossroads.	43 40 02.3	83 59 23.1	5,230

## BAY CITY QUADRANGLE—Continued.

## Near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
	° ° "	° ° "	Feet.
T. 15 N., R. 4 E., corner of secs. 33 and 34, center of T road north.....	43 39 11.2	83 59 24.4	5,170
T. 14 N., R. 4 E., corner of secs. 3, 4, 9, and 10, center of crossroads.....	43 38 19.6	83 59 28.6	5,231
Kawaklin, 2 miles south and 2 miles west of, 20 feet south by 23 feet west of corner of secs. 9, 10, 15, and 16, T. 14 N., R. 4 E., center of T road west; iron post stamped "Prim. Trav. Sta. No. 21, Mich. 1915".....	43 37 27.6	83 59 30.2	5,275
T. 14 N., R. 4 E., corner of secs. 15, 16, 21, and 22, center of T road west.....	43 36 36.6	83 59 31.9	5,168
T. 14 N., R. 4 E., quarter corner between secs. 21 and 22, center of crossroads.....	43 36 10.3	83 59 33.0	2,660
T. 14 N., R. 4 E., corner of secs. 27, 28, 33, and 34, center of crossroads.....	43 34 52.5	83 59 36.0	7,880
Tps. 13 and 14 N., R. 4 E., corner of secs. 3, 4, 33, and 34, center of T road north.....	43 34 00.5	83 59 38.8	5,28
T. 13 N., R. 4 E., corner of secs. 3, 4, 9, and 10, center of cross- roads.....	43 33 08.3	83 59 41.8	5,296
T. 13 N., R. 4 E., corner of secs. 9, 10, 15, and 16, center of cross- roads.....	43 32 15.5	83 59 42.9	5,340
T. 13 N., R. 4 E., corner of secs. 15, 16, 21, and 22, center of cross- roads.....	43 31 23.8	83 59 41.7	5,240
T. 13 N., R. 4 E., corner of secs. 21, 22, 27, and 28, center of cross- roads.....	43 30 30.6	83 59 40.2	5,390

## North through center of quadrangle east of Saginaw River.

T. 13 N., R. 5 E., corner of secs. 23, 24, 25, and 26, center of cross- roads.....	43 30 28.1	83 50 10.8	.....
T. 13 N., R. 5 E., corner of secs. 13, 14, 23, and 24, center of cross- roads.....	43 31 19.9	83 50 12.4	5,250
T. 13 N., R. 5 E., corner of secs. 14, 15, 22, and 23, center of T road east.....	43 31 20.4	83 51 26.1	5,430
T. 13 N., R. 5 E., corner of secs. 10, 11, 14, and 15, center of cross- roads.....	43 32 12.2	83 51 26.3	5,237
Michigan Ry. Co. electric line crossing.....	43 32 13.4	83 52 19.5	3,918
T. 13 N., R. 5 E., corner of secs. 9, 10, 15, and 16, center of T road east.....	43 32 13.4	83 52 36.1	1,220
T. 13 N., R. 5 E., corner of secs. 3, 4, 9, and 10, center of crossroads.....	43 33 05.3	83 52 34.4	5,260
T. 14 N., R. 5 E., corner of secs. 33 and 34, center of crossroads.....	43 33 56.5	83 52 35.8	5,182
Bay City, T. 14 N., R. 5 E., corner of secs. 27, 28, 33, and 34, corner of Lincoln street and Kosciuszko Avenue.....	43 34 48.3	83 52 37.2	5,240
Bay City, southwest corner, curb line, Third and North Lincoln streets.....	43 36 00.1	83 52 33.7	7,276
Bay City, southeast corner, curb line, Third and Washington streets, U. S. post office.....	43 36 03.4	83 53 15.6	3,094

## Near north border of quadrangle.

Bay City, northeast corner, curb line, Central and Park avenues.....	43 35 45.8	83 51 45.6	.....
Hotel Holland, crossroad at.....	43 35 41.0	83 50 51.5	4,008
T. 14 N., R. 5 E., quarter corner between secs. 14 and 23, center of crossroads.....	43 36 12.7	83 50 31.6	3,530
T. 14 N., R. 5 E., corner of secs. 14, 15, 23, and 24, center of cross- roads.....	43 36 31.0	83 50 15.1	2,212
Essexville, quarter corner between secs. 14 and 15, T. 14 N., R. 5 E., center of crossroads.....	43 36 57.1	83 50 14.8	2,640
T. 14 N., R. 5 E., quarter corner between secs. 15 and 18, center of crossroads.....	43 36 56.2	83 49 01.0	5,429
T. 14 N., R. 6 E., quarter corner between secs. 17 and 18, center of crossroads.....	43 36 56.9	83 48 00.0	4,489
T. 14 N., R. 6 E., quarter corner between secs. 16 and 17, center of crossroads.....	43 36 56.9	83 46 48.6	5,250
Essexville, 4 miles east of, 29 feet north by 11 feet east of quarter corner between secs. 15 and 16, T. 14 N., R. 6 E., center of cross- roads; iron post stamped "Prim. Trav. Sta. No. 22, Mich. 1915".....	43 36 57.8	83 45 36.9	5,270

## Near east border of quadrangle.

T. 14 N., R. 6 E., corner of secs. 15, 16, 21, and 22, center of cross- roads.....	43 36 31.5	83 45 36.8	2,670
Farleigh station, railroad crossing.....	43 35 26.3	83 45 35.9	6,400
T. 14 N., R. 6 E., corner of secs. 27, 28, 33, and 34, center of cross- roads.....	43 34 47.3	83 45 35.5	3,950
T. 14 N., R. 6 E., corner of secs. 33 and 34, center of T road north.....	43 33 55.0	83 45 35.2	5,300

**BAY CITY QUADRANGLE—Continued.****Near east border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 13 N., R. 6 E., corner of secs. 3, 4, 9, and 10, center of crossroads.....	43 33 03.0	83 45 33.2	5,250
T. 13 N., R. 6 E., corner of secs. 9, 10, 15, and 16, center of crossroads.....	43 32 11.0	83 45 33.1	5,270
T. 13 N., R. 6 E., corner of secs. 15, 16, 21, and 22, center of crossroads.....	43 31 18.8	83 45 32.3	5,280
T. 13 N., R. 6 E., corner of secs. 21, 22, 27, and 28, center of crossroads.....	43 30 27.0	83 45 32.3	5,250

Magnetic declination near south border of quadrangle,  $2^{\circ} 00' W.$ ; through center (west side of Saginaw River),  $2^{\circ} 00' W.$ ; through center (east side of Saginaw River),  $2^{\circ} 00' W.$ ; near north border,  $2^{\circ} 00' W.$ ; near west border,  $2^{\circ} 15' W.$ ; near east border,  $2^{\circ} 15' W.$ .

**BURT QUADRANGLE.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 10 N., R. 4 E., 1 mile east of corner of secs. 28, 29, 32, and 33; west end of bridge over creek.....	43 14 04.3	83 59 32.1	Feet.....
T. 10 N., R. 4 E., corner of secs. 26, 27, 34, and 35; crossroads at District No. 2 schoolhouse.....	43 14 04.6	83 58 18.2	5,472
T. 10 N., R. 4 E., 35 feet south by 25 feet east of corner of secs. 22, 23, 26, and 27, in southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 10 Michigan 1913".....	43 14 56.4	83 58 18.2	5,244
T. 9 N., R. 4 E., north corner of secs. 3 and 4; just west of bridge.....	43 13 11.9	83 59 27.7	.....
T. 9 N., R. 4 E., corner of secs. 3, 4, 9, and 10; stone in crossroads at schoolhouse.....	43 12 16.2	83 59 24.4	5,641
T. 9 N., R. 4 E., corner of secs. 9, 10, 15, and 16; crossroads.....	43 11 24.3	83 59 22.6	5,259
T. 9 N., R. 4 E., corner of secs. 15, 16, 21, and 22; crossroads at Layton Corners.....	43 10 32.2	83 59 21.2	5,270
T. 9 N., R. 4 E., corner of secs. 21, 22, 27, and 28; crossroads at St. Michaels Church and school.....	43 09 40.1	83 59 20.3	5,280
T. 9 N., R. 4 E., corner of secs. 27, 28, 33, and 34; crossroads at schoolhouse.....	43 08 48.0	83 59 18.6	5,270
T. 9 N., R. 4 E., south corner of secs. 33 and 34; stone, 10 feet west of center of crossroads.....	43 07 55.9	83 59 17.8	5,280
(30 feet east of above position is T. 8 N., R. 4 E., north corner of secs. 3 and 4, Saginaw-Shiawassee county line.)			
New Lothrop, 1 mile west of, 30 feet south by 25 feet west of corner of secs. 3, 4, 9, and 10, T. 8 N., R. 4 E., at schoolhouse in southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 10 Michigan 1913".....	43 06 59.9	83 59 17.4	5,669
T. 8 N., R. 4 E., stone at corner of secs. 9, 10, 15, and 16; crossroads.....	43 06 07.6	83 59 15.9	5,285
T. 8 N., R. 4 E., corner of secs. 15, 16, 21, and 22; crossroads at schoolhouse.....	43 05 15.5	83 59 16.4	5,290
T. 8 N., R. 4 E., corner of secs. 21, 22, 27, and 28; center of crossroads.....	43 04 23.2	83 59 15.9	5,290
T. 8 N., R. 4 E., corner of secs. 27, 28, 33, and 34; crossroads at Judville.....	43 03 31.1	83 59 15.6	5,290
Tps. 7 and 8 N., R. 4 E., corner of secs. 3, 4, 33, and 34; T road west.....	43 02 39.0	83 59 14.8	5,270
T. 7 N., R. 4 E., corner of secs. 3, 4, 9, and 10; T road east of District No. 8 schoolhouse.....	43 01 41.8	83 59 14.3	5,790
T. 7 N., R. 4 E., corner of secs. 9, 10, 15, and 16; T road east.....	43 00 50.2	83 59 14.2	5,230

**Along highways near north border of quadrangle.**

T. 10 N., R. 4 E., corner of secs. 23, 24, 25, and 26; crossroads.....	43 14 56.8	83 57 09.3	5,104
T. 10 N., R. 4 E., east corner of secs. 24 and 25; T road west.....	43 14 56.8	83 55 57.3	5,322
(450 feet north of above corner is west corner of secs. 19 and 30, T road east.)			
T. 10 N., R. 5 E., corner of secs. 20, 21, 28, and 29; crossroads.....	43 14 58.9	83 53 40.0	.....
T. 10 N., R. 5 E., stone at corner of secs. 21, 22, 27, and 28; T road west.....	43 14 59.2	83 52 28.5	5,295
T. 10 N., R. 5 E., 20 feet south and 25 feet west of corner of secs. 22, 23, 26, and 27; iron post set at southwest corner of crossroads, stamped "Prim. Trav. Sta. No. 11, 1915, Mich.".....	43 14 59.7	83 51 16.3	5,346
T. 10 N., R. 6 E., corner of secs. 19, 20, 29, and 30, just west of railroad crossing at Birch Run; T road south.....	43 15 00.1	83 47 40.1	.....

Magnetic declination for north border of quadrangle,  $2^{\circ} 10' W.$ ; for west border,  $2^{\circ} 14' W.$

## CARSON CITY QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	°   '   "	°   '   "	Feet.
T. 8 N., R. 4 W., corner of secs. 22, 23, 26, and 27; crossroads.....	43 03 41.0	84 45 33.7	.....
T. 8 N., R. 4 W., corner of secs. 14, 15, 22, and 23; stone.....	43 04 33.4	84 45 33.3	5,300
Maple River, south end of bridge over, T. 8 N., R. 4 W., 470 feet southwest of corner of secs. 10, 11, 14, and 15.....	43 05 21.5	84 45 35.1	4,988
T. 8 N., R. 4 W., corner of secs. 10, 11, 14, and 15.....	43 05 25.7	84 45 32.3	479

Magnetic declination near east border of quadrangle,  $0^{\circ} 54' W.$ 

## Near north border of quadrangle.

T. 10 N., R. 4 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	43 14 54.5	84 45 27.7	.....
T. 10 N., R. 4 W., corner of secs. 15, 16, 21, and 22, center of crossroads.....	43 14 55.1	84 46 39.3	5,300
T. 10 N., R. 4 W., corner of secs. 16, 17, 20, and 21, center of crossroads.....	43 14 55.9	84 47 50.1	5,240
T. 10 N., R. 4 W., corner of secs. 17, 18, 19, and 20, center of crossroads.....	43 14 56.2	84 49 01.2	5,260
T. 10 N., R. 4 W., corner of secs. 18 and 19, center of T road east.....	43 14 57.5	84 50 08.6	4,989
T. 10 N., R. 6 W., corner of secs. 13, 14, 23, and 24, center of T road north.....	43 14 59.5	84 58 28.3	.....
Crystal, 3.5 miles west by 1 mile south of, 16 feet south by 21 feet west of quarter corner between secs. 14 and 23, T. 10 N., R. 6 W., center of crossroad; iron post stamped "Prim. Trav. Sta. No. 14, Mich. 1915.".....	43 14 59.0	84 59 04.0	2,644

## Near west border of quadrangle.

T. 7 N., R. 6 W., corner of secs. 2, 3, 10, and 11, center of crossroads.....	43 00 59.0	84 59 43.5	.....
T. 7 N., R. 6 W., corner of secs. 2 and 3, 100 feet west is corner of secs. 34 and 35, T. 8 N., R. 6 W., center of crossroads.....	43 01 57.4	84 59 43.5	5,917
T. 8 N., R. 6 W., corner of secs. 22, 23, 26, and 27, center of crossroads.....	43 03 41.8	84 59 44.5	10,570
Crossroads.....	43 04 44.9	84 59 43.7	6,382
T. 8 N., R. 6 W., quarter corner between secs. 11 and 14, center of T road west.....	43 05 26.5	84 59 07.6	4,995
Tps. 8 and 9 N., R. 6 W., quarter corner between secs. 2 and 35, center of T road west.....	43 07 11.3	84 59 08.0	.....
T road east.....	43 07 50.3	84 59 07.9	3,950
T. 9 N., R. 6 W., quarter corner between secs. 26 and 35, center of T road west.....	43 08 03.3	84 59 08.0	1,320
T road south.....	43 08 54.7	84 59 08.9	5,207
T. 9 N., R. 6 W., quarter corner between secs. 24 and 25, center of crossroads.....	43 08 55.5	84 57 57.9	5,266
T. 9 N., R. 6 W., quarter corner between secs. 13 and 24, center of crossroads.....	43 09 47.5	84 57 57.5	5,270
T. 9 N., R. 6 W., quarter corner between secs. 12 and 13.....	43 10 39.5	84 57 56.0	5,259
Vicksburg crossing Grand Trunk R. R.....	43 11 05.5	84 57 55.7	2,634
T. 9 N., R. 6 W., quarter corner between secs. 1 and 2.....	43 11 31.5	84 57 55.3	2,636
T. 9 N., R. 6 W., corner of secs. 1, 2, 11, and 12, center of T road north.....	43 11 31.4	84 58 31.3	2,600
T. 9 N., R. 6 W., center of sec. 2, center of T road west.....	43 11 57.1	84 59 07.1	3,710
Tps. 9 and 10 N., R. 6 W., quarter corner between secs. 2 and 35, center of crossroads.....	43 12 22.8	84 59 06.6	2,610
T. 10 N., R. 6 W., quarter corner between secs. 26 and 35; center of T road west.....	43 13 14.8	84 59 04.8	5,204
T. 10 N., R. 6 W., quarter corner between secs. 23 and 26, center of crossroads.....	43 14 07.4	84 59 04.0	5,321

## Near south border of quadrangle.

T. 7 N., R. 4 W., corner of secs. 10, 11, 14, and 15, center of crossroads.....	43 00 06.4	84 45 34.1	.....
T. 7 N., R. 4 W., corner of secs. 9, 10, 15, and 16, center of crossroads.....	43 00 06.7	84 46 45.3	5,290
T. 7 N., R. 4 W., corner of secs. 8, 9, 16, and 17, center of crossroads.....	43 00 06.8	84 47 56.6	5,300
T. 7 N., R. 4 W., corner of secs. 7, 8, 17, and 18, center of crossroads.....	43 00 06.8	84 49 07.7	5,280
T. 7 N., R. 4 W., corner of secs. 7 and 18.....	43 00 05.7	84 50 15.0	5,000
Pewamo, crossroads at.....	43 00 04.1	84 50 50.6	2,645
T. 7 N., R. 5 W., corner of secs. 11, 12, 13, and 14, center of crossroads.....	43 00 06.2	84 51 26.2	2,650

**CARSON CITY QUADRANGLE—Continued.****Near south border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Pewamo, 1 mile west of, 27 feet north by 22 feet west of quarter corner between secs. 11 and 14, T. 7 N., R. 5 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 21, Mich. 1915".....	43 00 06.7	84 52 01.9	2.652
T. 7 N., R. 5 W., corner of secs. 10, 11, 14, and 15, fence line.....	43 00 06.5	84 52 37.0	2.608
Grand Trunk R. R. crossing.....	43 00 01.6	84 53 50.5	5.480
T. 7 N., R. 5 W., corner of secs. 7 and 18, 90 feet north is corner of secs. 12 and 13, T. 7 N., R. 6 W., center of T road west.....	43 00 05.6	84 57 22.5	15.758
T. 7 N., R. 6 W., corner of secs. 11, 12, 13, and 14, center of crossroads.....	43 00 06.4	84 58 32.8	5.221
Ionia, 3 miles east by 1 mile north of, 30 feet south by 32 feet east of corner of secs. 10, 11, 14, and 15, T. 7 N., R. 6 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 22, Mich. 1915".....	43 00 06.3	84 59 43.1	5.221

**Through center of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Palo, 25 feet north by 32 feet east, center of sec. 2, T. 8 N., R. 6 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 19, Mich. 1915".....	43 06 44.9	84 59 07.1	.....
T. 8 N., R. 6 W., center of sec. 1, center of T road north.....	43 06 44.6	84 57 56.5	5.238
Tps. 8 and 9 N., Rs. 5 and 6 W., corner of secs. 1, 6, 31, and 36, center of T road east.....	43 07 10.5	84 57 20.8	3.724
T. 9 N., R. 5 W., corner of secs. 31 and 32, 50 feet east, corner of secs. 5 and 6, T. 8 N., R. 5 W., center of crossroads.....	43 07 10.0	84 56 09.1	5.320
T. 9 N., R. 5 W., corner of secs. 32 and 33, center of T road north.....	43 07 09.6	84 54 57.9	5.280
T. 9 N., R. 5 W., corner of secs. 33 and 34, center of crossroads.....	43 07 09.1	84 53 46.7	5.280
Hubbardston, 2 miles north by 2 miles east of, 25 feet south, is corner of secs. 33 and 35, T. 9 N., R. 5 W., center of T road west, 25 feet south by 40 feet west, is corner of secs. 2 and 3, T. 8 N., R. 5 W.; iron post stamped "Prim. Trav. Sta. No. 20, Mich. 1915".....	43 07 08.5	84 52 35.5	5.276
Tps. 8 and 9 N., Rs. 4 and 5 W., corner of secs. 1, 6, 31, and 36, center of crossroads.....	43 07 07.7	84 50 13.0	10.565
T. 9 N., R. 4 W., corner of secs. 31 and 32, center of T road north.....	43 07 07.3	84 49 06.4	4.940
T. 9 N., R. 4 W., corner of secs. 32 and 33, center of T road north.....	43 07 06.8	84 47 54.9	5.300
T. 8 N., R. 4 W., corner of secs. 3 and 4, center of T road south.....	43 07 06.4	84 46 44.5	5.220
T. 9 N., R. 4 W., corner of secs. 33 and 34, center of T road north.....	43 07 06.4	84 46 43.5	70
Tps. 8 and 9 N., R. 4 W., corner of secs. 2, 3, 34, and 35, center of crossroads.....	43 07 06.0	84 45 32.2	5.290

Magnetic declination near north border of quadrangle,  $1^{\circ} 00' W.$ ; near west border,  $0^{\circ} 30' W.$ ; near south border,  $0^{\circ} 30' W.$ ; through center,  $0^{\circ} 15' W.$ ; near east border,  $0^{\circ} 54' W.$

**CHESANING QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Brant, 1 mile south by 1 mile west of, 100 feet north by 30 feet west of bridge over Bad River, in northwest corner of road forks; iron post stamped "Prim. Trav. Sta. No. 8 Michigan, 1913".....	43 14 42.5	84 14 56.3	.....
T. 10 N., R. 2 E., corner of secs. 20, 21, 28, and 29.....	43 14 39.6	84 14 55.9	302
Brant, 1 mile south of, corner of secs. 21, 22, 27, and 28, T. 10 N., R. 2 E.; crossroads at schoolhouse.....	43 14 40.3	84 13 44.8	5.262
T. 10 N., R. 2 E., corner of secs. 22, 23, 26, and 27; crossroads.....	43 14 40.7	84 12 34.0	5.240
T. 10 N., R. 2 E., corner of secs. 23, 24, 25, and 26.....	43 14 39.3	84 11 23.0	5.260
T. 10 N., R. 2 E., east corner of secs. 21 and 25; T road west (110 feet north of above position is T. 10 N., R. 3 E., west corner of secs. 19 and 30; T road east).....	43 14 39.0	84 10 10.5	5.365
T. 10 N., R. 3 E., corner of secs. 19, 20, 29, and 30; T road south.....	43 14 47.0	84 08 56.8	5.519
Fergus, 0.5 mile south of, 150 feet west of railroad crossing, 20 feet south by 15 feet east of corner of secs. 20, 21, 28, and 29, T. 10 N., R. 3 W., at southeast corner of T road south; iron post stamped "Prim. Trav. Sta. No. 9 Michigan, 1913".....	43 14 48.1	84 07 46.0	5.241
T. 10 N., R. 3 E., corner of secs. 28, 29, 32, and 33; crossroads.....	43 13 52.8	84 07 44.8	5.600
Chesaning, 2 miles north of, at District No. 4 schoolhouse; T road east.....	43 13 02.2	84 06 56.9	6.227
T. 9 N., R. 3 E., north corner of secs. 3 and 4 (140 feet east of above position is south corner of secs. 33 and 34, T road north).....	43 13 02.9	84 06 37.6	1.439

## CHESANING QUADRANGLE—Continued.

## Along highways near north border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Shiawassee River, west end of bridge over.....	* * "	* * "	Fect.
T. 10 N., R. 3 E., south corner of secs. 34 and 35; T road north..... (75 feet west of above position is north corner of secs. 2 and 3, T. 9 N., R. 3 E.; T road south.)	14 13 03.5 43 13 65.4	84 06 19.1 84 05 25.7	1,370 3,900
T. 10 N., R. 3 E., corner of secs. 26, 27, 34, and 35.....	43 13 59.0	84 05 27.4	5,430
T. 10 N., R. 3 E., corner of secs. 25, 26, 35, and 36; crossroads at schoolhouse.....	43 14 02.5	84 04 13.1	5,511
T. 10 N., R. 3 E., east corner of secs. 25 and 36; T road west at Luce post office..... (60 feet north is west corner of secs. 30 and 31; T road east.)	43 14 02.0	84 03 04.1	5,110
T. 10 N., R. 4 E., corner of secs. 29, 30, 31, and 32; crossroads.....	43 14 02.7	84 01 52.3	5,319
T. 10 N., R. 4 E., corner of secs. 28, 29, 32, and 33; T road south.....	43 14 03.3	84 00 40.9	5,280
T. 10 N., R. 2 E., corner of secs. 28, 29, 32, and 33; crossroads.....	43 13 47.6	84 14 55.2	.....

## Along highways near west border of quadrangle.

T. 7 N., R. 2 E., corner of secs. 9, 10, 15, and 16; crossroads.....	43 00 44.5	84 13 33.1	.....
T. 7 N., R. 2 E., corner of secs. 8, 9, 16, and 17; crossroads.....	43 00 50.8	84 14 41.6	5,124
T. 7 N., R. 2 E., corner of secs. 4, 5, 8, and 9; crossroads.....	43 01 43.2	84 14 41.9	5,305
T. 7 N., R. 2 E., north corner of secs. 4 and 5..... (180 feet west of above corner is south corner of secs. 32 and 33, T. 8 N., R. 2 E., T road north)	43 02 32.9	84 14 41.5	5,030
T. 8 N., R. 2 E., corner of secs. 28, 29, 32, and 33; crossroads.....	43 03 24.9	84 14 46.1	5,290
T. 8 N., R. 2 E., corner of secs. 20, 21, 28, and 29; crossroads.....	43 04 17.7	84 14 45.4	5,330
T. 8 N., R. 2 E., corner of secs. 16, 17, 20, and 21; crossroads.....	43 05 10.1	84 14 44.8	5,310
T. 8 N., R. 2 E., corner of secs. 8, 9, 16, and 17; crossroads.....	43 06 03.0	84 14 44.4	5,300
T. 8 N., R. 2 E., 25 feet south and 15 feet west of corner of secs. 4, 5, 8, and 9, at southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. 8, 1915, Mich.".....	43 06 55.2	84 14 45.5	5,284
T. 8 N., R. 2 E., north corner of secs. 4 and 5, T road south, on Saginaw-Shiawassee county line..... (150 feet west of above corner is south corner of secs. 32 and 33, T. 9 N., R. 2 E., T road north.)	43 07 43.5	84 14 46.3	4,890
T. 9 N., R. 2 E., corner of secs. 28, 29, 32, and 33; T road east.....	43 08 35.8	84 14 48.9	5,297
T. 9 N., R. 2 E., corner of secs. 20, 21, 28, and 29; crossroads.....	43 09 28.0	84 14 50.5	5,291
T. 9 N., R. 2 E., corner of secs. 16, 17, 20, and 21; crossroads.....	43 10 17.5	84 14 51.3	5,010
T. 9 N., R. 2 E., corner of secs. 8, 9, 16, and 17; crossroads.....	43 11 12.6	84 14 52.0	5,500
T. 9 N., R. 2 E., corner of secs. 4, 5, 8, and 9; crossroads.....	43 12 04.9	84 14 52.8	5,300
T. 9 N., R. 2 E., north corner of secs. 4 and 5..... (40 feet west of above corner is south corner of secs. 32 and 33, T. 10 N., R. 2 E., crossroads)	43 12 54.3	84 14 53.6	4,998
T. 10 N., R. 2 E., corner of secs. 28, 29, 32, and 33; crossroads..... Brant, 1 mile south and 1 mile west of, 100 feet north and 30 feet west of bridge over Bad River, in northwest corner of road forks; iron post stamped "Prim. Trav. Sta. No. 8, 1913, Mich.".....	43 13 47.6 43 14 42.50	84 14 55.2 84 14 56.30	5,400 5,558

## Along highways through center of quadrangle.

T. 9 N., R. 2 E., south corner of secs. 33 and 34; T road north..... (120 feet east of above corner is north corner of secs. 3 and 4, T. 8 N., R. 2 E., T road south on Saginaw-Shiawassee county line.)	43 07 43.2	84 13 37.8	.....
T. 9 N., R. 2 E., south corner of secs. 34 and 35; T road north..... (140 feet east of above corner is north corner of secs. 2 and 3, T. 8 N., R. 2 E., at T road south.)	43 07 42.9	84 12 27.2	5,230
T. 8 N., R. 2 E., north corner of secs. 1 and 2; T road south..... (210 feet east of above corner is south corner of secs. 35 and 36, T. 9 N., R. 2 E., T road north.)	43 07 42.9	84 11 19.3	5,040
Oakley, 1 mile south of, corner of Tps. 8 and 9 N., Rs. 2 and 3 E.; crossroads.....	43 07 42.7	84 10 05.7	5,400
T. 8 N., R. 3 E., stone at corner of secs. 5 and 6; T road south..... (150 feet east of above corner is south corner of secs. 31 and 32, T road north.)	43 07 44.5	84 08 55.4	5,211
T. 9 N., R. 3 E., south corner of secs. 32 and 33; center of east-west road.....	43 07 46.2	84 07 44.6	5,201
T. 8 N., R. 3 E., 15 feet south and 25 feet east of north corner of secs. 3 and 4, 15 feet south and 230 feet east of south corner of secs. 33 and 34, T. 9 N., R. 3 E., at southeast corner of T road south; iron post stamped "Prim. Trav. Sta. No. 10, 1915, Mich." Is on the Saginaw-Shiawassee county line road.....	43 07 48.0 43 07 49.9	84 06 30.8 84 05 21.7	5,470 5,130
T. 8 N., R. 3 E., north corner of secs. 2 and 3..... (110 feet west of above corner is south corner of secs. 34 and 35, T. 9 N., R. 3 E., T road north at Saginaw-Shiawassee county line.)			

## CHESANING QUADRANGLE—Continued.

Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 8 N., R. 3 E., quarter corner between secs. 2 and 3; crossroads.....	* * "	* * "	Fed. 2,820
T. 8 N., R. 3 E., corner of secs. 2, 3, 10, and 11, 690 feet north of crossroads.....	43 07 22.1	84 05 21.5	2,640
T. 8 N., R. 3 E., 310 feet south of apparent corner of secs. 1, 2, 11, and 12; crossroads.....	43 06 56.1	84 06 18.9	5,169
T. 8 N., Rs. 3 and 4 E., between secs. 7 and 12; T road north.....	43 06 53.7	84 04 09.2	5,030
T. 8 N., R. 4 E., corner of secs. 5, 6, 7, and 8, crossroads at school-house.....	43 06 51.1	84 03 01.7	6,125
T. 8 N., R. 4 E., corner of secs. 4, 5, 8, and 9; crossroads.....	43 06 50.3	84 01 39.9	5,370
	43 06 50.5	84 00 27.5	

Magnetic declination for north border of quadrangle,  $1^{\circ} 22' W.$ ; for south border,  $1^{\circ} 55' W.$ ; for east border,  $2^{\circ} 14' W.$ ; for west border,  $2^{\circ} 05' W.$ ; through center,  $2^{\circ} 15' W.$

## CORUNNA QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Bancroft, 3 miles east of, in T. 6 N., R. 4 E., 30 feet south by 25 feet west of corner of secs. 28, 29, 32, and 33, in southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 19 Michigan 1913".....	* * "	* * "	Fed.
T. 6 N., R. 4 E., south corner of secs. 32 and 33, T road north.....	42 52 52.8	84 00 24.8	5,270
(35 feet east of above position is north corner of secs. 4 and 5, T. 5 N., R. 4 E.)	42 52 00.7	84 00 23.0	
T. 6 N., R. 4 E., south corner of secs. 32 and 33, 0.8 mile west of; T road east.....	42 52 00.0	84 01 16.4	3,981
Shiawassee River, north end of bridge over.....	42 50 57.9	84 01 25.8	6,318
Shiawassee River bridge, 0.8 mile southeast of; on quarter section line; T road south.....	42 50 28.0	84 00 50.7	4,009
Union Plains District No. 7 schoolhouse; T road north.....	42 49 47.3	84 00 48.9	4,120
T. 5 N., R. 4 E., corner of secs. 17, 18, 19, and 20; crossroads.....	42 49 20.6	84 01 23.2	3,722
T. 5 N., R. 4 E., corner of secs. 19, 20, 29, and 30; crossroads at schoolhouse.....	42 48 28.2	84 01 21.0	5,300
T. 5 N., R. 4 E., corner of secs. 29, 30, 31, and 32; crossroads.....	42 47 35.8	84 01 18.8	5,311
T. 5 N., R. 4 E., south corner of secs. 31 and 32; T road north (Shiawassee-Livingston county line).....	42 46 43.5	84 01 16.9	5,301
(26 feet east of above corner is north corner of secs. 5 and 6, T. 4 N., R. 4 E., T road south.)			
Tps. 4 and 5 N., Rs. 3 and 4 E., corner of; T road south, county line.....	42 46 42.4	84 02 22.8	4,911
T. 4 N., R. 4 E., west corner of secs. 6 and 7.....	42 45 28.3	84 02 19.2	7,500

Magnetic declination near east border of quadrangle,  $1^{\circ} 58' W.$

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 2 E., 20 feet north and 10 feet west of corner of secs. 16, 17, 20, and 21, on north side of east and west road at T road south; iron post stamped "Prim. Trav. Sta. No. 6, 1915, Mich.".....	* * "	* * "	Fed.
Five Corners, T. 7 N., R. 2 E., corner of secs. 15, 16, 21, and 22; at schoolhouse.....	42 59 58.6	84 14 42.0	5,163
T. 7 N., R. 2 E., corner of secs. 14, 15, 22, and 23; crossroads at schoolhouse.....	42 59 51.8	84 13 33.1	5,194
Owosso, T. 7 N., R. 2 E., corner of secs. 13, 14, 23, and 24, intersection of Chipman and Main streets.....	42 59 51.2	84 12 23.2	5,320
Owosso, intersection of Main and North Hickory streets, at corner of secs. 13, 24, 18, and 19, T. 7 N., Rs. 2 and 3 W.....	42 59 51.7	84 11 11.7	5,230
T. 7 N., R. 3 E., corner of secs. 17, 18, 19, and 20; T road north.....	42 59 50.8	84 10 01.3	5,050
T. 7 N., R. 3 E., corner of secs. 16, 17, 20, and 21; center of east and west road.....	42 59 51.7	84 08 53.4	5,120
T. 7 N., R. 3 E., 20 feet north and 45 feet east of quarter corner between secs. 16 and 21, at northeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 7, 1915, Mich.".....	42 59 54.5	84 07 08.0	2,770
T. 7 N., R. 3 E., corner of secs. 15, 16, 21, and 22; center of east and west road.....	42 59 55.1	84 06 33.2	2,590

## CORUNNA QUADRANGLE—Continued.

## Along highways near north border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 3 E., corner of secs. 14, 15, 22, and 23; center of east and west road.....	42 59 55.8	84 05 22.8	Feet. 5,230
T. 7 N., R. 3 E., corner of secs. 13, 14, 23, and 24; crossroads at schoolhouse.....	42 59 57.4	84 04 09.9	5,421
T lane (unimproved) west, north and south township line.....	42 59 45.1	84 03 00.4	5,318
T. 7 N., R. 4 E., corner of secs. 17, 18, 19, and 20; crossroads just east of Venice school.....	42 59 57.2	84 01 37.5	6,279
T. 7 N., R. 4 E., corner of secs. 16, 17, 20, and 21; crossroads.....	42 59 56.9	84 00 25.4	5,360

Magnetic declination for north border of quadrangle,  $1^{\circ} 55' W.$ ; near east border,  $1^{\circ} 58' W.$

## DE WITT QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 5 N., R. 4 W., corner of secs. 25, 26, 35, and 36; T road west.....	42 47 04.9	84 44 22.2	Feet.
T. 5 N., R. 4 W., corner of secs. 23, 24, 25, and 26; 510 feet north of crossroads.....	42 47 57.2	84 44 21.6	5,290
T. 5 N., R. 4 W., corner of secs. 13, 14, 23, and 24; crossroads.....	42 48 49.4	84 44 21.5	5,290
Lookingglass River, north end of bridge over.....	42 49 15.0	84 44 22.0	2,595
T. 5 N., R. 4 W., corner of secs. 11, 12, 13, and 14; crossroads.....	42 49 41.8	84 44 22.3	2,705
T. 5 N., R. 4 W., corner of secs. 1, 2, 11, and 12; stone in crossroads.....	42 50 34.2	84 44 22.5	5,310
T. 5 N., R. 4 W., north corner of secs. 1 and 2; T road south.....	42 51 25.2	84 44 22.8	5,160
(50 feet east of above corner is south corner of secs. 35 and 36, T. 6 N., R. 4 W., T road north.)			
Westphalia District No. 3 schoolhouse, 35 feet south by 20 feet west of corner of secs. 25, 26, 35, and 36, T. 6 N., R. 4 W., in southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 1, 1913, Mich.".....	42 52 17.0	84 44 22.5	5,242
Westphalia schoolhouse, about 1-mile north of; crossroads.....	42 53 06.4	84 44 22.7	4,999
T. 6 N., R. 4 W., corner of secs. 13, 14, 23, and 24; stone in crossroads.....	42 54 01.7	84 44 22.7	5,105
T. 6 N., R. 4 W., corner of secs. 11, 12, 13, and 14; crossroads.....	42 54 53.9	84 44 22.8	5,285
T. 6 N., R. 4 W., corner of secs. 1, 2, 11, and 12, at Westphalia schoolhouse (District No. 1); crossroads.....	42 55 46.1	84 44 23.0	5,240
Tps. 6 and 7 N., R. 4 W., corner of secs. 1, 2, 35, and 36; crossroads.....	42 56 37.7	84 44 23.1	5,225
T. 7 N., R. 4 W., corner of secs. 25, 26, 35, and 36; T road west at schoolhouse.....	42 57 28.6	84 44 22.4	5,160
Stony Creek, north end of bridge over.....	42 57 47.9	84 44 22.6	1,945
T. 7 N., R. 4 W., corner of secs. 23, 24, 25, and 26; stone in crossroads.....	42 58 21.3	84 44 22.3	3,380
T. 7 N., R. 4 W., corner of secs. 13, 14, 23, and 24; crossroads.....	42 59 14.0	84 44 22.6	5,340

Magnetic declination near west border of quadrangle,  $0^{\circ} 50' W.$

## DURAND QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 4 E., 15 feet south by 30 feet west of corner of secs. 15, 16, 21, and 22, at southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 18, Michigan 1913".....	42 59 58.0	83 59 13.2	Feet.
T. 7 N., R. 4 E., corner of secs. 21, 22, 27, and 28; crossroads.....	42 59 06.0	83 59 12.8	5,260
T. 7 N., R. 4 E., corner of secs. 27, 28, 33, and 34; crossroads.....	42 58 14.0	83 59 12.9	5,270
T. 7 N., R. 4 E., south corner of secs. 33 and 34.....	42 57 20.4	83 59 14.4	5,120
T. 6 N., R. 4 E., north corner of secs. 3 and 4.....	42 57 20.3	83 59 21.4	520
T. 6 N., R. 4 E., corner of secs. 3, 4, 9, and 10; crossroads.....	42 56 22.9	83 59 19.7	5,810
Durand, intersection of Main and Oak streets; corner of secs. 15, 16, 21, and 22; T. 6 N., R. 4 E.....	42 54 38.6	83 59 16.2	10,570
T. 6 N., R. 4 E., corner of secs. 21, 22, 27, and 28; crossroads.....	42 53 46.3	83 59 14.8	5,291
T. 6 N., R. 4 E., corner of secs. 27, 28, 33, and 34; crossroads at schoolhouse.....	42 52 54.2	83 59 13.2	5,280

Magnetic declination near west border of quadrangle,  $1^{\circ} 58' W.$

62510°—Bull. 644—17—22

## ELSIE QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
North Star, 3 miles east of, 30 feet north by 30 feet east of west corner of secs. 18 and 19, T. 10 N., R. 1 W.; 30 feet E. by 180 feet north of east corner of secs. 13 and 24, T. 10 N., R. 2 W., in northeast corner of T road east; iron post stamped "Prim. Trav. Sta. No. 6 Michigan 1913".	43 14 54.8	84 29 01.8	Feet.
T. 10 N., R. 1 W., corner of secs. 17, 18, 19, and 20; crossroads.	43 14 54.6	84 28 07.5	4,120
T. 10 N., R. 1 W., corner of secs. 16, 17, 20, and 21; crossroads.	43 14 53.9	84 26 55.6	5,320
T. 10 N., R. 1 W., corner of secs. 15, 16, 21, and 22; crossroads.	43 14 54.3	84 25 43.7	5,320
T. 10 N., R. 1 W., corner of secs. 14, 15, 22, and 23; crossroads.	43 14 54.7	84 24 32.6	5,230
T. 10 N., R. 1 W., 10 feet east of east corner of secs. 13 and 24, 10 feet east of center of T road west, on county line road; iron post stamped "Prim. Trav. Sta. No. 7 Michigan 1913".	43 14 54.6	84 22 08.5	10,671
T. 10 N., R. 1 E., west corner of secs. 20 and 29; Gratiot-Saginaw county line; T road east.	43 14 37.5	84 22 08.4	1,730
T. 10 N., R. 1 E., corner of secs. 21, 22, 27, and 28; crossroads.	43 14 37.7	84 20 52.4	5,630
Marion Springs, corner of secs. 22, 23, 26, and 27, T. 10 N., R. 1 E.; crossroads.	43 14 38.0	84 19 40.8	5,300
T. 10 N., R. 1 E., corner of secs. 23, 24, 25, and 26; crossroads.	43 14 38.2	84 18 29.2	5,300
T. 10 N., R. 1 E., east corner of secs. 21 and 25. (90 feet north of the above position is west corner of secs. 30 and 19, T. 10 N., R. 2 E.).	43 14 37.6	84 17 17.8	5,230
T. 10 N., R. 2 E., corner of secs. 19, 20, 29, and 30; crossroads.	43 14 39.1	84 16 06.9	5,235

## Along highways near west border of quadrangle.

T. 8 N., R. 2 W., quarter corner between secs. 25 and 36, at T road north.	43 02 43.2	84 29 38.7	.....
T. 8 N., R. 2 W., quarter corner between secs. 24 and 25, at crossroads.	43 03 35.1	84 29 38.4	5,260
T. 8 N., R. 2 W., quarter corner in center of sec. 24, at crossroads.	43 04 01.3	84 29 38.3	2,650
T. 8 N., R. 2 W., quarter corner in center of sec. 13, at T road south.	43 04 53.6	84 29 38.4	5,300

## Along highways near south border of quadrangle.

T. 7 N., R. 2 W., east corner of secs. 12 and 13, at T road west. (95 feet south of above corner is west corner of secs. 7 and 18, 100 feet south of above corner is east corner of secs. 1 and 12).	43 00 03.3	84 29 02.5	.....
T. 7 N., R. 1 W., at T road east.	43 00 02.5	84 27 53.0	5,166
T. 7 N., R. 1 W., corner of secs. 8, 9, 16, and 17, at T road.	43 00 02.5	84 26 42.4	5,245
T. 7 N., R. 1 W., corner of secs. 9, 10, 15, and 16, at T road.	43 00 03.5	84 25 32.4	5,203
T. 7 N., R. 1 W., corner of secs. 10, 11, 14, and 15. Ovid, 0.75 mile west of and 0.25 mile south of, on east side of north and south road at T road west, 5 feet south and 25 feet east of corner of secs. 11, 12, 13, and 14, T. 7 N., R. 1 W.; iron post stamped "Prim. Trav. Sta. No. 5, 1915, Mich.".	43 00 04.0	84 24 20.8	5,320
vid, crossing of Main and Front streets.	43 00 04.7	84 23 10.7	5,214
vid, 180 feet east of intersection of Elm and Oak streets; center of Elm Street at crossing of principal meridian.	43 00 18.9	84 22 18.2	4,153
Ovid, about 0.15 mile east of: center of road at crossing of line between sec. 16 and fractional sec. 17, T. 7 N., R. 1 E.	43 00 10.1	84 22 00.1	1,620
	43 00 08.3	84 21 50.1	767

## Along highways through center of quadrangle.

T. 8 N., R. 2 E., corner of secs. 5, 6, 7, and 8; crossroads at school-house.	43 06 53.3	84 15 56.8	.....
T. 8 N., R. 2 E., west corner of secs. 6 and 7. (45 feet south of above at crossroads is east corner of secs. 1 and 12, T. 8 N., R. 1 E.).	43 06 52.6	84 17 07.1	5,216
T. 8 N., R. 1 E., corner of secs. 1, 2, 11, and 12; crossroads.	43 06 52.8	84 18 18.5	5,295
T. 8 N., R. 1 E., corner of secs. 2, 3, 10, and 11; crossroads.	43 06 52.6	84 19 31.0	5,380
T. 8 N., R. 1 E., corner of secs. 3, 4, 9, and 10; T road south.	43 06 51.4	84 20 40.1	5,130
T. 8 N., R. 1 E., corner of secs. 4, 5, 8, and 9; center of east and west road.	43 06 50.5	84 21 52.5	5,370
T. 8 N., R. 1 E., west corner of fractional secs. 8 and 9; T road east on Shiawassee-Gratiot county line.	43 06 50.4	84 22 04.2	870
Clinton-Gratiot County line, about 0.5 mile north of, at southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 9, 1915, Mich."	43 07 28.2	84 22 05.2	3,827

## ELSIE QUADRANGLE—Continued.

## Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 8 N., R. 1 W., north corner of secs. 1 and 2..... (10 feet east of above corner is south corner of secs. 35 and 36; T. 9 N., R. 1 W.; crossroads on Clinton-Gratiot county line.)	* * * 43 07 04.0	* * * 84 23 15.7	Feet. 5,776
Tps. 8 and 9 N., R. 1 W., corner of secs. 2, 3, 34, and 35; crossroads..	43 07 03.8	84 24 27.2	5,300
T 8 N., R. 1 W., north corner of secs. 3 and 4; T road south..... (75 feet west of above corner is south corner of secs. 33 and 34, T. 9 N., R. 1 W., at T road north.)	43 07 03.6	84 25 37.4	5,210
T. 8 N., R. 1 W., north corner of secs. 4 and 5; T road south..... (75 feet west of above is south corner of secs. 32 and 33. T. 9 N., R. 1 W., T road north.)	43 07 03.4	84 26 48.6	5,280
T. 8 N., R. 1 W., north corner of secs. 5 and 6; T road south..... (70 feet west of above corner is south corner of secs. 31 and 32, T. 9 N., R. 1 W., T road north.)	43 07 03.2	84 28 00.2	5,310
Tps. 8 and 9 N., Rs. 1 and 2 W., crossroads at corner of.....	43 07 03.2	84 29 01.7	4,560

Magnetic declination for north border of quadrangle,  $1^{\circ} 39' W.$ ; for south border,  $1^{\circ} 33' W.$ ; for east border,  $2^{\circ} 05' W.$ ; for west border,  $1^{\circ} 20' W.$ ; through center,  $1^{\circ} 32' W.$

## FOWLERVILLE QUADRANGLE.

## Along highways near northeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 4 N., R. 4 E., west corner of secs. 7 and 18; T road east.....	* * * 42 44 36.2	* * * 84 02 16.8	Feet.....
T. 4 N., R. 3 E., quarter corner between secs. 13 and 14; iron post stamped "Prim. Trav. Sta. No. 1, Mich., 1908".....	42 44 09.9	84 03 26.9	5,870

## FREELAND QUADRANGLE.

## Along highways near south border of quadrangle.

T.13 N., R. 4 E., corner of secs. 20, 21, 28, and 29; stone in crossroads.	43 30 33.5	84 00 52.7	.....
T.13 N., R. 4 E., corner of secs. 19, 20, 29, and 30; stone in crossroads.	43 30 34.4	84 02 04.0	5,261
T.13 N., R. 4 E., west corner of secs. 19 and 30; T road east..... (80 feet south of above position is east corner of secs. 24 and 25, T. 13 N., R. 3 E., T road west.)	43 30 35.0	84 03 05.8	4,556
T. 13 N., R. 3 E., corner of secs. 23, 24, 25, and 26; crossroads.....	43 30 35.5	84 04 17.2	5,250
T. 13 N., R. 3 E., corner of secs. 22, 23, 26, and 27, 720 feet west of railroad crossing and 520 feet north of another railroad crossing; crossroads.....	43 30 36.1	84 05 28.6	5,270
T. 13 N., R. 3 E., corner of secs. 14, 15, 22, and 23; crossroads.....	43 31 28.3	84 05 27.6	5,290
Freeland, east edge of town, 30 feet north by 25 feet west of corner of secs. 15, 16, 21, and 22, at northwest corner of T road north; from post stamped "Prim. Trav. Sta. No. 13 Mich., 1913.".....	43 31 29.0	84 06 38.6	5,231
Freeland, east end of bridge over Titabawasse River.....	43 31 29.5	84 07 30.7	3,844
T. 13 N., R. 3 E., corner of secs. 16, 17, 20, and 21.....	43 31 29.7	84 07 49.0	1,350
T. 13 N., R. 3 E., quarter corner between secs. 20 and 29; crossroads (this quarter corner computes 2,720 feet west of above corner; topographer should look for 100-foot error).....	43 30 37.7	84 08 25.9	5,923
T. 13 N., R. 3 E., corner of secs. 19, 20, 29, and 30; crossroads.....	43 30 38.0	84 09 01.7	2,640
T. 13 N., Rs. 2 and 3 E., corner of secs. 19, 30, 24, and 25; crossroads (Midland-Saginaw county line). .....	43 30 38.7	84 10 12.6	5,230
T. 13 N., R. 2 E., corner of secs. 23, 24, 25, and 26; crossroads.....	43 30 38.8	84 11 24.2	5,280
T. 13 N., R. 2 E., corner of secs. 22, 23, 26, and 27; crossroads.....	43 30 38.2	84 12 35.8	5,280
T. 13 N., R. 2 E., corner of secs. 21, 22, 27, and 28; crossroads.....	43 30 38.0	84 13 47.6	5,290
T. 13 N., R. 2 E., 20 feet north by 20 feet west of corner of secs. 20, 21, 28, and 29, in northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 14, Mich., 1913.".....	43 30 37.8	84 14 59.1	5,275

Magnetic declination for south border of quadrangle,  $1^{\circ} 31' W.$

## LAINGSBURG QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 7 N., R. 1 E., corner of secs. 15, 16, 21, and 22; T road north.....	42 50 55.8	84 20 39.4	.....
T road west.....	42 59 46.1	84 19 10.4	6,687
T. 7 N., R. 1 E., corner of secs. 13, 14, 23, and 24; T road north.....	42 59 57.2	84 18 17.4	4,096
T. 7 N., R. 1 E., east corner of secs. 13 and 24.....	42 59 57.1	84 17 04.7	5,400
(140 feet north of above corner is west corner of secs. 18 and 19, T. 7 N., R. 2 E.)			
Center of road at north and south section line crossing.....	42 59 39.2	84 15 55.6	5,446

Magnetic declination for north border of quadrangle, 1° 33' W.

## MERRILL QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 13 N., R. 2 E., south corner of secs. 32 and 33; crossroads (Midland-Saginaw county line).....	43 28 53.4	84 15 00.6	.....
(30 feet east of above position is north corner of secs. 4 and 5, T. 12 N., R. 2 E.)			
T. 12 N., R. 2 E., corner of secs. 4, 5, 8, and 9; crossroads.....	43 27 51.1	84 15 00.5	6,310

Magnetic declination for east border of quadrangle, 1° 48' W.

## MUIR QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Grand Ledge, 3 miles west of, at northeast corner of church, 25 feet north by 25 feet east to stone at corner of secs. 5, 6, 7, and 8, T. 4 N., R. 4 W., at crossroads; iron post stamped "Prim. Trav. Sta. No. 2 Michigan 1909".....	42 45 19.4	84 49 06.0	.....
T. 4 N., R. 4 W., north corner of secs. 5 and 6.....	42 46 13.1	84 49 05.6	5,437
(15 feet east of above position is south corner of secs. 31 and 32, T. 5 N., R. 4 W., crossroads.)			
T. 5 N., R. 4 W., corner of secs. 29, 30, 31, and 32; crossroads.....	42 47 05.4	84 49 05.4	5,290
Grand River, near east end of bridge over, T. 5 N., R. 4 W.; corner of secs. 28, 29, 32, and 33.....	42 47 05.3	84 47 56.8	5,115
T. 5 N., R. 4 W., corner of secs. 27, 28, 33, and 34; T road north.....	42 47 04.9	84 46 43.4	5,475
T. 5 N., R. 4 W., corner of secs. 26, 27, 34, and 35; crossroads.....	42 47 05.0	84 45 32.6	5,275

Near west border of quadrangle.

Sunfield, Pere Marquette R. R. crossing.....	42 45 46.7	84 59 42.3	.....
T. 5 N., R. 6 W., corner of secs. 34 and 35, 15 feet west of corner of secs. 2 and 3, T. 4 N., R. 6 W., crossroads.....	42 46 13.9	84 59 42.3	2,757
T. 5 N., R. 6 W., corner of secs. 26, 27, 34, and 35, center of crossroads.....	42 47 06.0	84 59 42.2	5,272
T. 5 N., R. 6 W., corner of secs. 22, 23, 26, and 27, center of crossroads.....	42 47 58.1	84 59 42.1	5,271
T. 5 N., R. 6 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	42 48 50.1	84 59 42.2	5,262
T. 5 N., R. 6 W., corner of secs. 10, 11, 14, and 15, fence line.....	42 49 42.1	84 59 22.5	5,265
T. 5 N., R. 6 W., corner of secs. 2, 3, 10, and 11, center of crossroads.....	42 50 34.3	84 59 42.6	5,290
Tps 5 and 6 N., R. 6 W., corner of secs. 2, 3, 34, and 35, center of T road east.....	42 51 24.9	84 59 42.7	5,118
T. 6 N., R. 6 W., corner of secs. 22, 23, 26, and 27.....	42 53 08.9	84 59 42.3	.....
T. 6 N., R. 6 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	42 54 01.0	84 59 42.6	5,267

## MUIR QUADRANGLE—Continued.

## Near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 6 N., R. 6 W., corner of secs. 10, 11, 14, and 15, center of crossroads.	* * "	* * "	
T. 6 N., R. 6 W., corner of secs. 2, 3, 10, and 11, center of crossroads.	42 54 53.2	84 59 43.0	5,280
T. 6 N., R. 6 W., corner of secs. 2 and 3, 30 feet west, corner of secs. 34 and 35.	42 55 45.2	84 59 42.9	5,267
T. 7 N., R. 6 W., T road east.	42 56 37.4	84 59 43.5	5,281
T. 7 N., R. 6 W., corner of secs. 26, 27, 34, and 35, center of T road south.	42 57 29.8	84 59 43.8	5,300

## Through center of quadrangle.

Portland, 4.5 miles west of, 27 feet south by 23 feet east is corner of secs. 26, 27, 34, and 35, T. 6 N., R. 6 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 29, Mich. 1915".	42 52 16.5	84 59 42.3	.....
T. 6 N., Rs. 5 and 6 W., corner of secs. 25, 30, 31, and 36, center of crossroads.	42 52 17.0	84 57 21.7	10,469
T. 6 N., R. 5 W., quarter corner between secs. 30 and 31, center of T road north.	42 52 17.1	84 56 44.5	2,770
T. 6 N., R. 5 W., corner of secs. 28, 29, 32, and 33, fence line.	42 52 17.3	84 54 58.1	7,915
Portland, west abutment, lower iron bridge over Grand River.	42 52 15.0	84 54 12.1	3,433
Portland, 2.5 miles east of, 39 feet north by 18 feet east is corner of secs. 25, 26, 35, and 36, T. 6 N., R. 5 W., center of T road north; iron post stamped "Prim. Trav. Sta. No. 30, Mich. 1915".	42 52 18.2	84 51 24.9	12,455
T. 6 N., Rs. 4 and 5 W., corner of secs. 25, 30, 31, and 36, center of crossroads.	42 52 17.5	84 50 14.1	5,264
T. 6 N., R. 4 W., corner of secs. 29, 30, 31, and 32, center of crossroads.	42 52 17.3	84 49 05.2	5,134
T. 6 N., R. 4 W., corner of secs. 28, 29, 32, and 33, center of T road west.	42 52 17.4	84 47 54.6	5,254
Tps. 5 and 6 N., R. 4 W., corner of secs. 4, 5, 32, and 33, center of crossroads.	42 51 25.4	84 47 54.6	5,270
T. 5 N., R. 4 W., corner of secs. 3 and 4, center of T road south, 42 feet east is corner of secs. 33 and 34, T. 6 N., R. 4 W., center of T road north.	42 51 25.2	84 46 44.3	5,230
T. 6 N., R. 4 W., corner of secs. 34 and 35, 25 feet west, corner of secs. 2 and 3, T. 5 N., R. 4 W., crossroads.	42 51 25.3	84 45 33.0	5,310
T. 6 N., R. 4 W., corner of secs. 26, 27, 34, and 35, center of T road east.	42 52 17.3	84 45 32.6	5,270

Magnetic declination near west border of quadrangle,  $0^{\circ} 30' W.$ ; near east border,  $0^{\circ} 50' W.$ ; through center,  $0^{\circ} 30' W.$ .

## PERRINTON QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Fowler, cross streets in, 1 block south of railroad, at corner of secs. 11, 12, 13, and 14, T. 7 N., R. 4 W.	* * "	* * "	Feet.
Fowler, at southwest corner of first cross street north of railroad; iron post stamped "Prim. Trav. Sta. No. 2, Michigan, 1913".	43 00 06.4	84 44 22.8	.....
T. 7 N., R. 4 W., corner of secs. 1, 2, 11, and 12; crossroads at schoolhouse.	43 00 12.1	84 44 23.3	572
T. 7 N., R. 4 W., north corner of secs. 1 and 2; stone in crossroads. (30 feet east of above corner is south corner of secs. 35 and 36, T. 8 N., R. 4 W., crossroads.)	43 00 58.8	84 44 22.7	4,726
T. 8 N., R. 4 W., corner of secs. 25, 26, 35, and 36; crossroads at Lebanon schoolhouse.	43 01 50.0	84 44 22.7	5,790
T. 8 N., R. 4 W., corner of secs. 23, 24, 25, and 26; T road west.	43 02 48.4	84 44 22.0	5,305
T. 8 N., R. 4 W., corner of secs. 1, 2, 11, and 12; stone at schoolhouse Tps. 8 and 9 N., 33 feet south by 25 feet east of corner of secs. 1, 2, 35, and 36, at southeast corner of crossroads, on Clinton-Gratiot county line; iron post stamped "Prim. Trav. Sta. No. 3, 1913, Mich."	43 03 40.6	84 44 21.8	5,290
North Shady schoolhouse, T. 9 N., R. 4 W., corner of secs. 25, 26, 35, and 36; crossroads at.	43 06 17.4	84 44 20.8	.....
T. 9 N., R. 4 W., corner of secs. 23, 24, 25, and 26, at U. B. Church; stone in crossroads.	43 07 05.2	84 44 20.9	4,842
North Shady, T. 9 N., R. 4 W., corner of secs. 13, 14, 23, and 24, at District No. 3 schoolhouse; stone in crossroads.	43 07 57.6	84 44 20.9	5,300
	43 08 49.8	84 44 20.4	5,280
	43 09 42.0	84 44 19.9	5,290

## PERRINTON QUADRANGLE—Continued.

## Along highways near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 9 N., R. 4 W., corner of secs. 11, 12, 13, and 14; crossroads.....	* * "	* * "	Fed.
North Shade District No. 6 schoolhouse, T. 9 N., R. 4 W., corner of secs. 1, 2, 11, and 12; crossroads.....	43 10 34.1	84 44 19.4	5,270
T. 9 N., R. 4 W., north corner of secs. 1 and 2, stone at T road south (40 feet east of above corner is south corner of secs. 35 and 36, T. 10 N., R. 4 W., stone in T road north.)	43 11 26.3	84 44 19.0	5,290
New Haven District No. 8 schoolhouse, T. 10 N., R. 4 W., corner of secs. 25, 26, 35, and 36; crossroads.....	43 12 17.4	84 44 18.5	5,169
T. 10 N., R. 4 W., corner of secs. 23, 24, 25, and 26; crossroads.....	43 13 09.5	84 44 17.3	5,280
New Haven District No. 3 schoolhouse, T. 10 N., R. 4 W., 25 feet south by 23 feet east of corner of secs. 13, 14, 23, and 24, southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 4, Mich. 1913".....	43 14 01.7	84 44 16.8	5,280
T. 10 N., R. 4 W., east corner of secs. 13 and 24; stone (75 feet north of preceding position is west corner of secs. 18 and 19, T. 10 N., R. 3 W.).....	43 14 53.7	84 44 16.4	5,268
T. 10 N., R. 4 W., corner of secs. 13, 14, 23, and 24; stone.....	43 14 53.5	84 43 05.6	5,239
T. 10 N., R. 3 W., corner of secs. 17, 18, 19, and 20.....	43 14 54.0	84 41 59.0	4,929
T. 10 N., R. 3 W., corner of secs. 16, 17, 20, and 21; stone.....	43 14 53.8	84 40 48.1	5,250
T. 10 N., R. 3 W., corner of secs. 15, 16, 21, and 22; crossroads.....	43 14 53.6	84 39 36.6	5,290
T. 10 N., R. 3 W., corner of secs. 14, 15, 22, and 23; crossroads.....	43 14 53.1	84 38 25.7	5,250
T. 10 N., R. 3 W., corner of secs. 13, 14, 23, and 24; crossroads.....	43 14 53.0	84 37 14.9	5,240
T. 10 N., R. 3 W., 10 feet south by 30 feet east of east corner of secs. 13 and 24, 30 feet south by 30 feet east of west corner of secs. 18 and 19, T. 10 N., R. 2 W., at south corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 5 Michigan 1913".....	43 14 52.8	84 36 02.6	5,347
North Star District No. 4 schoolhouse, T. 10 N., R. 2 W., corner of secs. 17, 18, 19, and 20; crossroads.....	43 14 52.9	84 34 59.0	4,710
T. 10 N., R. 2 W., corner of secs. 16, 17, 20, and 21; crossroads.....	43 14 52.9	84 33 47.3	5,306
North Star, corner of secs. 15, 16, 21, and 22, T. 10 N., R. 2 W.; crossroads.....	43 14 52.8	84 32 36.5	5,245
T. 10 N., R. 2 W., corner of secs. 14, 15, 22, and 23; crossroads.....	43 14 53.0	84 31 25.0	5,260
T. 10 N., R. 2 W., corner of secs. 13, 14, 23, and 24; crossroads at schoolhouse.....	43 14 52.9	84 30 14.3	5,230

## Along highways near south border of quadrangle.

T. 7 N., R. 4 W., east corner of secs. 12 and 13.....	43 00 06.6	84 43 11.2	.....
(50 feet south of above corner is west corner of secs. 7 and 18, T. 7 N., R. 3 W.).....	43 00 05.9	84 41 59.7	5,318
T. 7 N., R. 3 W., corner of secs. 7, 8, 17, and 18, at crossroads.....	43 00 06.1	84 40 48.5	5,290
T. 7 N., R. 3 W., corner of secs. 8, 9, 16, and 17, at T road north.....	43 00 05.5	84 39 37.7	5,260
T. 7 N., R. 4 W., corner of secs. 9, 10, 15, and 16, at crossroads.....	43 00 05.4	84 38 27.6	5,216
T. 7 N., R. 4 W., 20 feet south and 30 feet west of corner of secs. 10, 11, 14, and 15, at southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	43 00 04.9	84 36 05.7	10,540
T. 7 N., R. 2 W. and 13 W., corner of secs. 12, 13, 7, and 18, at crossroads.....	43 00 05.1	84 34 56.4	5,150
T. 7 N., R. 2 W., corner of secs. 7, 8, 17, and 18, at crossroads.....	43 00 05.3	84 33 45.3	5,290
T. 7 N., R. 2 W., corner of secs. 8, 9, 16, and 17, at cross streets in St. John.....	43 00 04.8	84 32 33.8	5,308
T. 7 N., R. 2 W., corner of secs. 9, 10, 15, and 16, at T road east (50 feet south of above corner is T road west.).....	43 00 04.8	84 31 23.5	5,238
T. 7 N., R. 2 W., corner of secs. 10, 11, 14, and 15).....	43 00 04.8	84 31 23.5	5,238
T. 7 N., R. 2 W., 15 feet north and 20 feet east of corner of secs. 11, 12, 13, and 14, in northeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 2, 1915".....	43 00 04.6	84 30 12.7	5,267

## Along highways near east border of quadrangle.

T. 7 N., R. 2 W., corner of secs. 1, 2, 11, and 12, at crossroads near schoolhouse.....	43 00 57.1	84 30 13.2	5,319
T. 7 N., R. 2 W., north corner of secs. 1 and 2 (80 feet west of above corner is south corner of secs. 35 and 36, T. 8 N., R. 2 W.).....	43 01 51.0	84 30 13.6	5,160
T. 8 N., R. 2 W., corner of secs. 25, 26, 35, and 36, at T road south.....	43 02 43.3	84 30 14.4	5,295
T. 8 N., R. 2 W., quarter corner between secs. 13 and 14, at T road north.....	43 04 53.8	84 30 14.1	.....
T. 8 N., R. 2 W., quarter corner between secs. 11 and 12, at crossroads near schoolhouse.....	43 05 46.3	84 30 13.7	5,320
T. 8 N., R. 2 W., corner of secs. 1, 2, 11, and 12, at crossroads.....	43 06 12.4	84 30 13.6	2,640
Tps. 8 and 9 N., R. 2 W., 15 feet south and 20 feet west of corner of secs. 1, 2, 35, and 36, in southwest corner of crossroads on Clinton-Gratiot county line; iron post stamped "Prim. Trav. Sta. No. 3, 1915".....	43 07 03.1	84 30 13.3	5,136
T. 9 N., R. 2 W., corner of secs. 25, 26, 35, and 36, at crossroads.....	43 07 55.8	84 30 12.8	5,340
T. 9 N., R. 2 W., corner of secs. 23, 24, 25, and 26, 400 feet north of bridge over Maple River.....	43 08 47.6	84 30 13.2	5,240

**PERRINTON QUADRANGLE—Continued.****Along highways near east border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 9 N., R. 2 W., corner of secs. 13, 14, 23, and 24, at crossroads.....	* * "	* * "	<i>Fect.</i>
T. 9 N., R. 2 W., corner of secs. 11, 12, 13, and 14, at crossroads.....	43 09 40.0	84 30 13.0	5,310
T. 9 N., R. 2 W., corner of secs. 1, 2, 11, and 12, at crossroads.....	43 10 32.6	84 30 13.1	5,320
Tps. 9 and 10 N., R. 2 W., corner of secs. 1, 2, 35, and 36, at crossroads.....	43 11 25.0	84 30 13.1	5,310
T. 10 N., R. 2 W., corner of secs. 25, 26, 35, and 36, at crossroads near schoolhouse.....	43 12 16.2	84 30 13.4	5,190
T. 10 N., R. 2 W., corner of secs. 23, 24, 25, and 26, at crossroads.....	43 13 08.5	84 30 13.7	5,290
T. 10 N., R. 2 W., corner of secs. 13, 14, 23, and 24, at crossroads near schoolhouse.....	43 14 00.6	84 30 14.1	5,280
	43 14 52.9	84 30 14.3	5,285

**Along highways through middle of quadrangle.**

Tps. 8 and 9 N., R. 2 W., corner of secs. 2, 3, 34, and 35, at crossroads on county line.....	43 07 03.4	84 31 24.5	.....
Tps. 8 and 9 N., R. 2 W., corner of secs. 3, 4, 33, and 34, at crossroads on county line.....	43 07 03.5	84 32 35.7	5,290
Tps. 8 and 9 N., R. 2 W., corner of secs. 4, 5, 32, and 33, at crossroads on county line near church.....	43 07 03.4	84 33 47.0	5,290
Tps. 8 and 9 N., R. 2 W., corner of secs. 5, 6, 31, and 32.....	43 07 03.5	84 31 58.2	5,280
Tps. 8 and 9 N., Rs. 2 and 3 W., corner of secs. 1, 6, 31, and 36.....	43 07 03.5	84 36 02.3	4,760
T. 8 N., R. 3 W., 20 feet south and 40 feet west of corner of secs. 1 and 2, at southwest corner of T road south; iron post stamped "Prim. Trav. Sta. No. 4, 1915".....	43 07 03.6	84 37 14.0	5,317
Tps. 8 and 9 N., R. 3 W., corner of secs. 2, 3, 34, and 35.....	43 07 03.8	84 38 24.9	5,260
T. 8 N., R. 3 W., corner of secs. 2, 3, 10, and 11, at crossroads.....	43 06 15.1	84 38 25.0	4,929
T. 8 N., R. 3 W., corner of secs. 3, 4, 9, and 10, at T road south.....	43 06 15.7	84 39 36.4	5,300
T. 8 N., R. 3 W., corner of secs. 4, 5, 8, and 9, near speed limit sign.....	43 06 16.4	84 40 47.7	5,290
Maple Rapids, 0.5 mile southwest of T road south, on section line.....	43 06 10.2	84 41 59.0	5,334
Maple River, south end of bridge over.....	43 06 33.9	84 42 43.3	4,070
Iron post No. 31, 1913.....	43 07 05.2	84 44 20.9	7,905

Magnetic declination for north border of quadrangle,  $1^{\circ} 18' W.$ ; for south border,  $0^{\circ} 50' W.$ ; for east border,  $1^{\circ} 20' W.$ ; for west border,  $0^{\circ} 54' W.$ ; through center,  $0^{\circ} 54' W.$

**SAGINAW QUADRANGLE.****Near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 11 N., R. 6 E., corner of secs. 3 and 4, center of T road south.....	* * "	* * "	<i>Fect.</i>
T. 12 N., R. 6 E., corner of secs. 27, 28, 33, and 34, center of crossroads.....	43 23 33.6	83 45 32.2	.....
T. 12 N., R. 6 E., corner of secs. 21, 22, 27, and 28, Pere Marquette R. R. crossing.....	43 24 25.6	83 45 28.9	5,275
T. 12 N., R. 6 E., corner of secs. 15, 16, 21, and 22, center of T road south.....	43 25 17.4	83 45 29.1	5,240
Crossroads.....	43 26 00.7	83 45 29.5	5,290
Crossroads.....	43 27 01.7	83 45 18.3	.....
	43 27 53.8	83 45 42.5	5,571

**Near north border of quadrangle.**

Arn, 1 mile west of, 23 feet north, 21 feet west, corner of secs. 27, 28, 33, and 34, T. 13 N., R. 6 E., center of T road north; iron post stamped "Prim. Trav. Sta. No. 23, Mich. 1915".....	43 29 35.1	83 45 32.3	.....
T. 13 N., R. 6 E., corner of secs. 28, 29, 32, and 33, center of T road north.....	43 29 34.9	83 46 42.7	5,189
T. 13 N., R. 6 E., corner of secs. 29, 30, 31, and 32, center of crossroads.....	43 29 35.7	83 47 53.6	5,230
T. 13 N., Rs. 5 and 6 E., corner of secs. 31 and 36, center of T road south.....	43 29 34.9	83 49 04.7	5,235
South Bay City, 3 miles south and 2 miles east of, 15 feet north by 23 feet east, corner of secs. 25, 26, 35, and 36, T. 13 N.; R. 5 E., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 24, Mich. 1915".....	43 29 36.5	83 50 14.0	5,130

Magnetic declination near east border of quadrangle,  $1^{\circ} 45' W.$ ; near north border,  $1^{\circ} 45' W.$

## SAGINAW QUADRANGLE—Continued.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	*	"	Ft.
T. 10 N., R. 4 E., corner of secs. 14, 15, 22, and 23; crossroads.....	43 15 48.8	83 58 19.0	.....
T. 10 N., R. 4 E., corner of secs. 13, 14, 23, and 24; crossroads.....	43 15 49.0	83 57 10.4	5,080
T. 10 N., R. 4 E., corner of secs. 11, 12, 13, and 14; crossroads.....	43 16 40.8	83 57 10.8	5,240
T. 10 N., R. 4 E., corner of secs. 1, 2, 11, and 12; crossroads.....	43 17 33.5	83 57 11.1	5,340
T. 10 N., R. 4 E., north corner of secs. 1 and 2.....	43 18 27.8	83 57 11.9	5,480
(60 feet west of above position and 190 feet south of south end of bridge over Flint River is south corner of secs. 35 and 36, T. 11 N., R. 4 E.)			
T. 11 N., R. 4 E., corner of secs. 25, 26, 35, and 36; crossroads.....	43 19 19.5	83 57 14.1	5,240
T. 11 N., R. 4 E., corner of secs. 23, 24, 25, and 26; crossroads.....	43 20 11.2	83 57 14.8	5,230
Youngs Corners, corner of secs. 13, 14, 23, and 24, T. 11 N., R. 4 E.; crossroads.....	43 21 03.2	83 57 17.0	5,271
Youngs Corners, 0.9 mile north of; south end of bridge over Cass River.....	43 21 52.4	83 57 18.5	4,980
T. 11 N., R. 4 E., corner of secs. 1, 2, 11, and 12.....	43 22 46.4	83 57 20.0	5,461
Saginaw, intersection of East and Youman streets (probably north corner of secs. 1 and 2, T. 11 N., R. 4 E.).....	43 23 39.9	83 57 21.1	5,420
Saginaw, intersection of Center Street and Fordney Avenue.....	43 24 08.8	83 57 35.6	3,112
Saginaw, east end of Mackinaw Street bridge over Saginaw River.....	43 24 43.7	83 57 49.0	3,670
Saginaw, east side of north basement steps on east side of county courthouse, in top of stone facing; bronze tablet stamped "Prim. Trav. Sta. No. 11 Michigan 1913".....	43 25 03.4	83 57 55.2	2,046
Saginaw, intersection of Court, Bay, and Alexander streets; water trough.....	43 25 33.2	83 58 32.6	4,085
Saginaw, intersection of Bay and State streets, corner of secs. 14, 15, 22, and 23, T. 12 N., R. 4 E.....	43 26 11.8	83 58 32.5	3,910
T. 12 N., R. 4 E., corner of secs. 10, 11, 14, and 15; crossroads at schoolhouse.....	43 27 03.5	83 58 33.3	5,240
T. 12 N., R. 4 E., corner of secs. 2, 3, 10, and 11; crossroads.....	43 27 55.3	83 58 33.3	5,250
Eisenhauer Corners, corner of secs. 2, 3, 34, and 35, Tps. 12 and 13 N., R. 4 E.; crossroads.....	43 28 48.1	83 58 33.1	5,340
Deutsche B. M. Kirche, corner of secs. 26, 27, 34, and 35, T. 13 N., R. 4 E.; crossroads.....	43 29 39.8	83 58 25.8	5,260
Saginaw, intersection of Michigan Avenue and Wheeler Street.....	43 24 02.6	83 59 30.3	.....
Saginaw, 25 feet southwest of intersection of Florence Street and Michigan Avenue; intersection of railroad and street-car line.....	43 24 17.8	83 58 48.2	3,477

## Along highways near south border of quadrangle.

T. 10 N., R. 5 E., corner of secs. 19, 20, 29, and 30; crossroads.....	43 15 01.6	83 54 51.1	.....
T. 10 N., R. 5 E., corner of secs. 23, 24, 25, and 26; crossroads.....	43 15 02.9	83 50 05.1	.....
T. 10 N., R. 5 and 6 E., corner of secs. 24, 25, 19, and 30; crossroads.....	43 15 00.4	83 48 53.4	5,320
Birch Run, 1.3 miles east of; crossroads.....	43 15 00.5	83 48 10.3	.....
T. 10 N., R. 6 E., 25 feet north and 25 feet west of corner of secs. 21, 22, 27, and 28, at northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 12, 1915, Mich.".....	43 15 00.4	83 45 17.7	3,889
T. 10 N., R. 6 E., corner of secs. 15, 16, 21, and 22; crossroads at Town Hall.....	43 15 51.9	83 45 17.9	5,210
T. 10 N., R. 6 E., corner of secs. 9, 10, 15, and 16; T road east.....	43 16 43.5	83 45 19.4	5,230
T. 10 N., R. 6 E., corner of secs. 3, 4, 9, and 10; crossroads.....	43 17 36.0	83 45 17.6	5,312
Tps. 10 and 11 N., R. 6 E., corner of secs. 3, 4, 33, and 34; crossroads.....	43 18 25.2	83 45 17.3	4,980
T. 11 N., R. 6 E., corner of secs. 27, 28, 33, and 34; T road south.....	43 19 18.3	83 45 18.1	5,380
Frankenmuth, at extreme west edge of; crossroads, probably corner of secs. 21, 22, 27, and 28, T. 11 N., R. 6 E.....	43 20 09.0	83 45 31.7	5,230
T. 11 N., R. 6 E., corner of secs. 15, 16, 21, and 22; crossroads.....	43 21 01.0	83 45 31.5	5,270
T. 11 N., R. 6 E., corner of secs. 9, 10, 15, and 16; crossroads.....	43 21 53.2	83 45 32.5	5,281
T. 11 N., R. 6 E., 30 feet south and 20 feet west of corner of secs. 3, 4, 9, and 10, at southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 13, 1915, Mich.".....	43 22 45.8	83 45 32.4	5,326
NOTE.—Post is set 1.5 feet north of above position.			

## Along highways through middle of quadrangle.

T. 11 N., R. 6 E., corner of secs. 4, 5, 8, and 9; crossroads.....	43 22 45.9	83 46 44.6	5,300
T. 11 N., R. 6 E., corner of secs. 5, 6, 7, and 8; crossroads.....	43 22 46.1	83 47 56.9	5,240
T. 11 N., R. 6 E., west corner of secs. 6 and 7; T road east.....	43 22 46.4	83 49 03.9	4,950
T. 11 N., R. 5 E., east corner of secs. 1 and 12; T road west.....	43 22 40.4	83 49 03.8	600
T. 11 N., R. 5 E., corner of secs. 1, 2, 11, and 12; crossroads at church.....	43 22 44.5	83 50 15.0	5,278
T. 11 N., R. 5 E., corner of secs. 2, 3, 10, and 11; crossroads.....	43 22 44.4	83 51 25.7	5,219
T. 11 N., R. 5 E., 30 feet south and 25 feet west of corner of secs. 3, 4, 9, and 10; iron post set at southwest corner of T road south stamped "Prim. Trav. Sta. No. 14, 1915, Mich.".....	43 22 44.8	83 52 36.2	5,210

## SAGINAW QUADRANGLE—Continued.

## Along highways through middle of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 11 N., R. 5 E., apparent corner of secs. 4, 5, 8, and 9; center of east and west road.....	* * "	* * "	Feet.
T. 11 N., R. 5 E., corner of secs. 5, 6, 7, and 8; right angle turn in road just north of crossroad.....	43 22 45.5	83 53 45.9	5,149
T. 11 N., R. 5 E., corner of secs. 7, 8, 17, and 18; T road west.....	43 22 45.7	83 54 58.0	5,320
T. 11 N., R. 5 E., west corner of secs. 7 and 18; T road east.....	43 21 53.7	83 54 58.9	5,271
(120 feet north of above corner is apparently the east corner of secs. 12 and 13, T. 11 N., R. 4 E.)	43 21 54.2	83 56 06.8	5,165
T. 11 N., R. 4 E., east corner of secs. 13 and 24; T road west.....	43 21 03.7	83 56 06.5	5,120
(20 feet south of above corner is west corner of secs. 18 and 19, T. 11 N., R. 5 E.)			
Youngs Corners, T. 11 N., R. 4 E., corner of secs. 13, 14, 23, and 24; crossroads.....	43 21 03.20	83 57 17.0	5,284

Magnetic declination for south border of quadrangle,  $2^{\circ} 10' W.$ ; for east border of south half,  $1^{\circ} 38' W.$ ; for west border,  $2^{\circ} 00' W.$ ; through center,  $2^{\circ} 15' W.$ ; near east border,  $1^{\circ} 45' W.$ ; near north border,  $1^{\circ} 45' W.$ .

## ST. CHARLES QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 13 N., R. 2 E., corner of secs. 28, 29, 32, and 33; crossroads.....	* * "	* * "	Feet.
T. 12 N., R. 2 E., corner of secs. 8, 9, 16, and 17; crossroads.....	43 29 45.7	84 14 59.7	-----
T. 12 N., R. 2 E., corner of secs. 16, 17, 20, and 21; stone at T road east.....	43 26 59.1	84 14 59.9	-----
T. 12 N., R. 2 E., corner of secs. 20, 21, 28, and 29; stone at T road west.....	43 26 07.1	84 14 59.5	5,270
Hemlock, 1 mile west of, quarter corner between secs. 28 and 29, T. 12 N., R. 2 E.; crossroads.....	43 25 15.1	84 14 58.9	5,260
T. 12 N., R. 2 E., south corner of secs. 32 and 33; T road north.....	43 24 49.1	84 14 58.5	2,637
(130 feet west of preceding position is north corner of secs. 4 and 5, T. 11 N., R. 2 E., T road south.)	43 24 23.1	84 14 58.2	2,630
T. 11 N., R. 2 E., 20 feet north by 20 feet west of corner of secs. 4, 5, 8, and 9, in northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 15, Mich. 1913".....	43 23 30.9	84 14 57.2	5,280
T. 11 N., R. 2 E., corner of secs. 8, 9, 16, and 17; crossroads.....	43 22 36.6	84 14 57.6	5,495
T. 11 N., R. 2 E., corner of secs. 16, 17, 20, and 21; crossroads.....	43 21 44.4	84 14 56.0	5,290
T. 11 N., R. 2 E., corner of secs. 20, 21, 28, and 29; crossroads at church and schoolhouse.....	43 20 52.4	84 14 56.0	5,270
T. 11 N., R. 2 E., corner of secs. 28, 29, 32, and 33; crossroads.....	43 20 00.3	84 14 56.0	5,280
T. 11 N., R. 2 E., south corner of secs. 32 and 33; T road north.....	43 19 08.1	84 14 56.1	5,280
(285 feet west of preceding position is north corner of secs. 4 and 5, T. 10 N., R. 2 E., T road south.)	43 18 14.4	84 14 54.2	5,441
Bad River bridge, just south of; cross roads.....	43 17 39.7	84 14 58.0	3,526
T. 10 N., R. 2 E., corner of secs. 4, 5, 8, and 9; crossroads.....	43 17 16.1	84 14 57.8	2,390
T. 10 N., R. 2 E., corner of secs. 8, 9, 16, and 17; crossroads.....	43 16 24.0	84 14 57.2	5,280
T. 10 N., R. 2 E., corner of secs. 16, 17, 20, and 21; crossroads.....	43 15 31.8	84 14 56.6	5,280

## Along highways through center of quadrangle.

T. 11 N., R. 2 E., corner of secs. 3, 4, 9, and 10; crossroads at school-house.....	43 22 38.6	84 13 47.1	-----
T. 11 N., R. 2 E., corner of secs. 2, 3, 10, and 11; T road south.....	43 22 38.7	84 12 38.7	5,050
T. 11 N., R. 2 E., corner of secs. 1, 2, 11, and 12; stone in crossroads.....	43 22 40.4	84 11 25.4	5,420
T. 11 N., R. 2 E., corner of secs. 1, 12, 6, and 7; stone at cross-roads.....	43 22 47.2	84 10 14.3	5,291
T. 11 N., R. 3 E., corner of secs. 5, 6, 7, and 8; crossroads.....	43 22 46.8	84 09 03.3	5,249
T. 11 N., R. 3 E., corner of secs. 4, 5, 8, and 9; crossroads.....	43 22 46.9	84 07 52.2	5,250
Swan Creek, 1 mile west of, 30 feet north by 25 feet west of corner of secs. 3, 4, 9, and 10, T. 11 N., R. 3 E.; iron post stamped "Prim. Trav. Sta. No. 16 Michigan 1913".....	43 22 47.1	84 06 41.5	5,218
Swan Creek, south end of wagon bridge over.....	43 22 43.6	84 05 57.3	3,286
Swan Creek, east-west road at railroad crossing, just southwest of station.....	43 22 46.2	84 05 38.4	1,427
Swan Creek, corner of secs. 2, 3, 10, and 11, T. 11 N., R. 3 E.; cross-roads.....	43 22 46.1	84 05 30.4	590

## ST. CHARLES QUADRANGLE—Continued.

Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 11 N., R. 3 E., corner of secs. 1, 2, 11, and 12; crossroads.....	* * "	* * "	
T. 11 N., R. 3 E., east corner of secs. 1 and 12; T road west.....	43 22 45.7	84 04 19.7	5.220
T. 11 N., R. 4 E., west corner of secs. 6 and 7; T road east.....	43 22 44.6	84 03 08.0	5.300
T. 11 N., R. 4 E., corner of secs. 5, 6, 7, and 8; at District No. 1 schoolhouse; crossroads.....	43 22 47.4	84 03 08.0	2.80
District No. 1 schoolhouse; 0.5 mile east of center of east-west road at railroad crossing.....	43 22 47.1	84 02 04.3	4.700
Lincoln Corners, T. 11 N., R. 4 E., corner of secs. 4, 5, 8, and 9.....	43 22 46.6	84 01 28.6	2.640
Lincoln Corners, 0.8 mile north of, on north-south section line; T road south.....	43 22 46.2	84 00 53.6	2.580
Lincoln Corners, 1 mile northeast of, 0.6 mile south of Vogt Corners, 0.6 mile southwest of extreme south end of bridge over Tittabawasee River.....	43 23 25.1	84 00 54.4	3.940
Vogt Corners; T road south.....	43 23 34.1	84 00 39.5	1.432
	43 24 03.0	84 00 39.5	2.930

Magnetic declination for north border of quadrangle,  $1^{\circ} 31' W.$ ; for south border,  $1^{\circ} 22' W.$ ; for east border,  $2^{\circ} 09' W.$ ; for west border,  $1^{\circ} 48' W.$ ; for center,  $1^{\circ} 59' W.$

## VASSAR QUADRANGLE.

Near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Crossroads.....	* * "	* * "	
T. 12 N., R. 6 E., center of sec. 3, center of T road north.....	43 26 19.4	83 44 58.5	
Tps. 12 and 13 N., R. 6 E., quarter corner between secs. 3 and 34, center of crossroads.....	43 28 20.0	83 44 54.8	
T. 13 N., R. 6 E., center of sec. 34, center of T road south.....	43 28 43.2	83 44 54.9	2.340
T. 13 N., R. 6 E., quarter corner between secs. 34 and 35, center of crossroads.....	43 29 09.2	83 44 55.4	2.640
T. 13 N., R. 6 E., corner of secs. 26, 27, 34, and 35, center of T road north, 100 feet west is Michigan Central R. R. crossing at Arn station.....	43 29 09.4	83 44 19.8	2.630
	43 29 35.4	83 44 19.9	2.629

Magnetic declination near west border of quadrangle,  $1^{\circ} 30' W.$

Benzonia, Elk Rapids, Empire, Kingsley, Maple City, Thompsonville, and Traverse City quadrangles.

## ANTRIM, BENZIE, GRAND TRAVERSE, KALKASKA, AND LEELANAU COUNTIES.

The following geographic positions were determined by primary traverse in 1915 by Oscar Jones, on North American datum, and are based on Sleeping Bear and Pyramid triangulation stations of the United States Lake Survey.

## BENZONIA QUADRANGLE.

Near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Empire, 4 miles south of, 25 feet south by 20 feet west from quarter corner between secs. 7 and 18, center of T road east; is iron post stamped "Prim. Trav. Sta. No. 9, Mich. 1915".....	* * "	* * "	
T. 27 N., R. 14 W., corner of secs. 7, 8, 17, and 18, center of crossroads.....	44 44 51.0	86 02 57.1	
T. 27 N., R. 14 W., corner of secs. 8, 9, 16, and 17, center of crossroads.....	44 44 51.3	86 02 20.2	2.662
	44 44 51.1	86 01 06.8	5.300

Magnetic declination for north border of quadrangle,  $2^{\circ} 00' W.$

## ELK RAPIDS QUADRANGLE.

Along east shore of east arm of Grand Traverse Bay.

Station.	Latitude.	Longitude.	Distance between stations.
			Fect.
Crossroads.....	44 47 14.0	85 29 23.7	
Crossroads, section line east and west.....	44 48 07.5	85 28 53.2	5,846
Yuba, road forks at.....	44 49 23.9	85 27 31.7	9,719
Road forks.....	44 50 45.3	85 26 10.6	10,170
T road east, Grand Traverse-Antrim county line.....	44 51 35.1	85 25 42.7	5,428
Pere Marquette R. R. crossing.....	44 53 17.0	85 25 19.8	10,450
Elk Rapids, west end of Ottawa Street; iron post stamped "Prim. Trav. Sta. No. 14, Mich. 1915".....	44 53 40.0	85 25 40.2	2,333
Elk Rapids, corner of Ottawa and Bridge streets.....	44 53 47.5	85 24 41.4	2,890
T road east.....	44 54 25.8	85 23 19.2	7,075
Kewadin Junction, west Michigan Pike and Kalkaska Road.....	44 55 46.2	85 21 57.3	10,054
Tps. 29 and 30 N., R. 9 W., corner of secs. 1, 2, 35, and 36, center of crossroads.....	44 56 46.5	85 21 09.8	6,994
T. 30 N., R. 9 W., corner of secs. 25, 26, 35, and 36, center of crossroads.....	44 57 39.3	85 21 11.0	5,350
T road west.....	44 58 32.4	85 21 20.2	5,417
T road east.....	44 58 58.8	85 21 18.4	2,080
Kewadin, 4 miles north by 1 mile east of; 25 feet south by 25 feet east of corner of secs. 13, 14, 23, and 24, center of crossroad; is iron post stamped "Prim. Trav. Sta. No. 15, Mich., 1915".....	44 59 25.0	85 21 10.4	2,703

## Through center of quadrangle from west to east.

T road east.....	44 55 29.4	85 21 17.3	
T road east.....	44 54 24.2	85 21 00.1	6,725
T. 29 N., R. 9 W., corner of secs. 23, 24, 25, and 26, center of T road west.....	44 53 18.8	85 21 09.8	6,664
T. 29 N., R. 9 W., corner of secs. 25, 26, 35, and 36, center of crossroads.....	44 52 26.5	85 21 10.4	5,290
Tps. 28 and 29 N., R. 9 W., corner of secs. 1, 2, 35, and 36, center of crossroads.....	44 51 34.5	85 21 10.6	5,270
T road east.....	44 51 34.4	85 20 22.6	3,460
Pearson's Harbor, road fork 470 feet west of drawbridge.....	44 51 00.8	85 19 45.7	4,327
Road fork.....	44 51 07.5	85 18 59.0	3,434
Alden, 1 mile south of Pere Marquette R. R. crossing.....	44 51 34.3	85 17 02.6	8,814

## Near east border of quadrangle.

Alden, center of track opposite station, Pere Marquette R. R.....	44 52 42.8	85 16 37.9	7,165
Pere Marquette R. R. crossing.....	44 53 18.5	85 16 26.0	3,711
Pere Marquette R. R. crossing.....	44 55 09.0	85 17 10.7	11,644
Pere Marquette R. R. crossing, section line east and west.....	44 55 55.6	85 17 12.7	4,720
Clam River, south end of iron bridge over.....	44 56 32.3	85 17 01.0	3,817
Road fork, section line east and west.....	44 56 47.2	85 16 46.4	1,838
T. 30 N., R. 8 W., quarter corner between secs. 33 and 34, center of T road north.....	44 57 13.4	85 16 18.9	3,308
T. 30 N., R. 8 W., corner of secs. 27, 28, 33, and 34, center of T road west.....	44 57 39.7	85 16 18.7	2,665
Bellaire, 3 miles west by 1 mile north of, 35 feet north by 25 feet west of corner of secs. 21, 22, 27, and 28, T. 30 N., R. 8 W., center of crossroads; is iron post stamped "Prim. Trav. Sta. No. 16, Mich. 1915".....	44 58 32.8	85 16 18.8	5,374
T road south.....	44 55 59.4	85 16 19.1	
T. 29 N., R. 8 W., corner of secs. 9, 10, 15, and 16, center of crossroads.....	44 55 03.4	85 16 19.5	5,670
T. 29 N., R. 8 W., corner of secs. 10, 11, 14, and 15, center of crossroads.....	44 55 03.3	85 15 05.9	5,300
T. 29 N., R. 8 W., corner of secs. 14, 15, 22, and 23, center of crossroads.....	44 54 10.9	85 15 06.4	5,306
T. 29 N., R. 8 W., corner of secs. 22, 23, 26, and 27, center of crossroads.....	44 53 18.4	85 15 06.3	5,314
Alden, 1 mile east of, 25 feet east by 25 feet south of quarter corner between secs. 26 and 27, T. 29 N., R. 8 W., center of crossroads; is iron post stamped "Prim. Trav. Sta. No. 17, Mich. 1915".....	44 52 52.0	85 15 06.1	2,677
Pere Marquette R. R. crossing.....	44 50 42.6	85 17 04.8	
Rapid City, center of track opposite station Pere Marquette R. R.....	44 50 01.2	85 17 04.6	4,240
T. 28 N., R. 8 W., quarter corner between secs. 9 and 16, center of T road east.....	44 49 50.4	85 16 58.1	1,192
T road east.....	44 49 24.1	85 16 58.2	2,656
T. 28 N., R. 8 W., quarter corner between secs. 16 and 21, center of crossroads.....	44 48 58.0	85 16 58.1	2,670
T. 28 N., R. 8 W., center of secs. 21, center of T road east.....	44 48 32.0	85 16 58.1	2,630

## ELK RAPIDS QUADRANGLE—Continued.

## Near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 28 N., R. 8 W., corner of secs. 21, 22, 27, and 28, fence line.....	44 48 05.7	85 16 21.3	3,756
T road west.....	44 47 24.8	85 16 39.9	4,359
Rapid City, 4 miles south by 0.5 mile east of, 15 feet south by 20 feet west of center of crossroads; iron post stamped "Prim. Trav. Sta. No. 18, Mich. 1915" .....	44 46 50.9	85 16 22.6	3,647

## Near south border of quadrangle.

Barker Creek, Pere Marquette R. R. crossing, 480 feet south of station.....	46 46 47.9	85 18 55.4	.....
T. 28 N., Rs. 8 and 9 W., quarter corner between secs. 31 and 36; center of crossroads.....	44 46 47.7	85 19 57.6	4,484
T. 28 N., R. 9 W., quarter corner between secs. 35 and 36, center of T road east.....	44 46 47.2	85 21 10.2	5,236
T. 28 N., R. 9 W., corner of secs. 1, 2, 35, and 36, center of T road north.....	44 46 22.1	85 21 10.8	2,540
Pere Marquette R. R. road crossing.....	44 46 22.2	85 22 30.0	5,712
Williamsburg, 1 mile east of, 35 feet east by 25 feet north of, quarter corner between secs. 3 and 34, Tps. 27 and 28 N., R. 9 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 19, Mich. 1915" .....	44 46 22.7	85 23 00.3	2,182
Tps. 27 and 28 N., R. 9 W., quarter corner between secs. 4 and 33, center of crossroads.....	44 46 22.5	85 24 13.6	5,284
Williamsburg, Pere Marquette R. R. road crossing, 300 feet west of station.....	44 46 22.4	85 24 36.5	1,666
Tps. 27 and 28 N., R. 9 W., corner of secs. 4, 5, 32, and 33, center of T road south.....	44 46 22.3	85 24 50.0	967
Tps. 27 and 28 N., R. 9 W., corner of secs. 5, 6, 31, and 32, center of crossroads.....	44 46 22.0	85 26 03.3	5,292
Tps. 27 and 28 N., R. 10 W., corner of secs. 1, 2, 35, and 36, center of crossroads.....	44 46 21.5	85 28 31.9	10,719
Tps. 27 and 28 N., R. 10 W., corner of secs. 2, 3, 34, and 35, center of T road north.....	44 46 24.5	85 29 57.4	6,174

Magnetic declination along east shore of east arm of Grand Traverse Bay,  $1^{\circ} 45' W.$ ; through center of quadrangle,  $2^{\circ} 00' W.$ ; near east border,  $1^{\circ} 45' W.$ ; near south border,  $2^{\circ} 00' W.$

## EMPIRE QUADRANGLE.

## Near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Road fork.....	44 52 39.6	86 02 22.8	7,676
Road fork.....	44 51 39.2	86 02 01.8	6,297
T road north junction West Michigan Pike with Maple City road.....	44 50 05.9	86 02 02.4	9,454
Empire, crossroads at high school.....	44 48 40.3	86 03 20.7	10,715
T. 27 N., R. 14 W., quarter corner between secs. 30 and 31, center of crossroads.....	44 47 35.1	86 02 58.6	6,975
T. 27 N., R. 14 W., quarter corner between secs. 6 and 31, center of crossroads.....	44 46 42.7	86 02 57.3	5,305
T. 27 N., R. 14 W., quarter corner between secs. 6 and 7, center of crossroads.....	44 45 43.6	86 02 56.8	5,985
Bennett Corners, 0.5 mile south of Glen Haven, 33 feet east, center of T road east; iron post stamped "Prim. Trav. Sta. No. 8, Mich. 1915" .....	44 53 53.0	86 01 46.0	.....
T road west.....	44 53 25.8	86 02 00.9	2,962
Sleeping Bear triangulation station, situated on the highest point of the hill, about 3 miles south and about 2 miles west of Glen Haven (signal found but no mark, 1915).....	44 52 23.0	86 04 06.8	11,009

Magnetic declination near east border of quadrangle,  $2^{\circ} 0' W.$

## KINGSLEY QUADRANGLE.

Near north border of quadrangle

Station.	Latitude.	Longitude.	Distance between stations.
T road south.....	44 44 56.4	85 33 28.0	Feet.
Pere Marquette R. R. road crossing.....	44 41 47.2	85 31 33.4	8,321
T road west.....	44 44 48.0	85 31 21.0	900

Magnetic declination near north border of quadrangle, 2° 00' W.

## MAPLE CITY QUADRANGLE.

Near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T road south, north-south line between secs. 21 and 22, T. 3 N., R. 12 W.....	44 59 40.2	85 45 15.9	Feet.
Leland, 2 miles south of; junction West Michigan Pike and Provo-mont road; iron post stamped "Prim. Trav. Sta. No. 6, Mich. 1915".....	44 59 40.9	85 46 09.8	3,874
Road fork.....	44 58 48.0	85 46 35.7	5,673
Road fork.....	44 57 02.7	85 47 59.0	12,231
Crossroads.....	44 56 38.7	85 48 08.2	2,514
Road fork, road south on line between secs. 7 and 12, T. 29 N., Rs. 12 and 13 W.....	44 56 13.8	85 48 40.5	3,433
Road fork.....	44 55 23.5	85 49 12.9	5,604
Shetland schoolhouse, crossroads at.....	44 55 00.7	85 49 51.6	3,617
T road south, on line between secs. 14 and 15, T. 29 N., R. 13 W.....	44 54 58.0	85 51 08.5	5,540
T. 29 N., R. 13 W., corner of secs. 9, 10, 15, and 16, center of cross-roads.....	44 55 19.3	85 52 22.0	5,711
Bass Lake, 1 mile north of, 200 feet south of school, south side of road; iron post stamped "Prim. Trav. Sta. No. 7, Mich. 1915".....	44 55 59.3	85 54 28.3	9,945
Road fork.....	44 56 07.9	85 55 14.8	3,459
T. 29 N., Rs. 13 and 14 W., corner of secs. 1, 6, 7, and 12, center of crossroads.....	44 56 16.7	85 56 11.4	4,167
Road fork.....	44 57 17.8	85 56 27.0	6,286
Pyramid triangulation station, situated on Pyramid Point near the lake shore on the highest point of the hill (remains of signal, no mark, 1915).....	44 58 04.7	85 55 26.9	6,426
Road fork.....	44 54 42.7	85 57 27.3	.....
Road fork.....	44 54 21.6	85 58 20.4	4,284
Glenn Arbor, crossroads at.....	44 53 52.3	85 59 19.2	5,289

Near south border of quadrangle.

T. 27 N., R. 13 W., quarter corner between secs. 3 and 10, center of T road east.....	44 45 41.6	85 51 57.9	.....
T. 27 N., R. 13 W., corner of secs. 2, 3, 10, and 11, center of cross-roads.....	44 45 41.5	85 51 20.9	2,665
T. 27 N., Rs. 12 and 13 W., corner of secs. 1, 2, 7, and 12, center of crossroads.....	44 45 41.6	85 50 07.1	5,329
Cedar Run crossing Manistee & Northeastern R. R., 200 feet south of station.....	44 45 46.8	85 48 52.0	5,444
T. 27 N., R. 12 W., corner of secs. 5, 6, 7, and 8, center of T road south.....	44 45 40.6	85 47 46.0	4,798
T. 27 N., R. 12 W., corner of secs. 4, 5, 8, and 9, center of T road north.....	44 45 39.1	85 46 32.9	5,280
Cedar Run, 3.5 miles east of, 35 feet north by 35 feet west from corner of secs. 3, 4, 9, and 10, T. 27 N., R. 12 W.; iron post stamped "Prim. Trav. Sta. No. 11, Mich. 1915".....	44 45 38.4	85 45 20.3	5,238
T road south.....	44 46 27.5	85 45 18.0	4,980

Near east border of quadrangle.

T. 28 N., R. 12 W., corner of secs. 27, 28, 33, and 34, center of T road west.....	44 47 21.6	85 45 18.9	.....
T. 28 N., R. 12 W., corner of secs. 21, 22, 27, and 28, center of T road south.....	44 48 14.5	85 45 19.0	5,364

**MAPLE CITY QUADRANGLE**-Continued.**Along Manistee & Northeastern R. R.**

Station.	Latitude.	Longitude.	Distance between stations.
Solon, road crossing at.....	• • "	• • "	Fret.
Cedar City, 100 feet south of station, west side of railroad; iron post stamped "Prim. Trav. Sta. No. 12, Mich. 1915".....	44 48 35.8	85 45 38.2	2,561
Road crossing.....	44 50 51.0	85 47 34.0	16,030
Isadore, road crossing at.....	44 52 01.1	85 47 49.0	7,149
Bodus, road crossing at.....	44 52 39.1	85 47 36.9	3,946
Road crossing section line north and south.....	44 54 24.2	85 46 58.9	10,996
Schomberg, road crossing at.....	44 55 08.0	85 46 31.9	4,334
Road crossing.....	44 55 16.6	85 46 23.5	1,069
Road crossing.....	44 56 08.6	85 45 33.1	6,393
Road crossing.....	44 57 02.8	85 45 17.6	5,598
Road crossing.....	44 57 58.0	85 45 16.2	5,591

Magnetic declination near north border of quadrangle,  $0^{\circ} 45' W.$ ; near south border,  $0^{\circ} 15' W.$ ; near east border,  $0^{\circ} 30' W.$ .

**THOMPSONVILLE QUADRANGLE.****Near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 27 N., R. 14 W., corner of secs. 10, 11, 14, and 15, center of cross-roads.....	• • "	• • "	Fret.
Empire & Southeastern R. R. road crossing.....	44 44 51.1	85 59 53.7	-----
Crossroads.....	44 44 45.2	85 58 53.5	4,379
T road south.....	44 44 49.7	85 55 29.2	14,756
Almira Corners, corner of secs. 9, 10, 15, and 16, T. 27 N., R. 13 W., center of crossroads.....	44 44 49.9	85 53 48.8	7,244
Almira Corners, 1 mile east of, 30 feet south of quarter corner between secs. 10 and 15, T. 27 N., R. 13 W., center of T road north; iron post stamped "Prim. Trav. Sta. No. 10, Mich. 1915".....	44 44 49.8	85 52 35.8	5,270
	44 44 49.3	85 51 59.2	2,642

Magnetic declination near north border of quadrangle,  $1^{\circ} 00' W.$

**TRAVERSE CITY QUADRANGLE.****East and west sides of the peninsula.**

Station.	Latitude.	Longitude.	Distance between stations.
T road east.....	• • "	• • "	Fret.
T road east.....	44 47 45.4	85 35 06.4	-----
T road east.....	44 48 55.4	85 34 40.7	7,323
T road east.....	44 49 36.0	85 33 57.8	5,107
T road east.....	44 50 11.0	85 33 41.9	3,750
T road east.....	44 51 42.4	85 32 57.0	9,798
Bowers Harbor, 1 mile south of, 10 feet west of center of T road east; iron post stamped "Prim. Trav. Sta. No. 1 Mich. 1915".....	44 52 09.0	85 32 12.7	4,179
Powers Harbor, road fork at.....	44 53 40.0	85 31 29.3	9,740
Road fork.....	44 53 54.8	85 30 54.5	2,916
T. 29 N., R. 10 W., corner of secs. 9, 10, 15, and 16, center of cross-roads.....	44 55 15.9	85 30 55.3	8,120
T. 29 N., R. 10 W., corner of secs. 3, 4, 9, and 10, center of cross-roads.....	44 56 08.5	85 30 55.3	5,424
T. 29 N., R. 10 W., corner of secs. 3, 4, 33, and 34, center of cross-roads.....	44 57 01.6	85 30 55.2	5,373
T. 29 N., R. 10 W., corner of secs. 27, 28, 33, and 34, center of cross-roads.....	44 57 54.5	85 30 54.8	5,363
Old mission, 1 mile west of, 35 feet south by 29 feet east of quarter corner between secs. 27 and 34, T. 29 N., R. 10 W., center of crossroads; iron post stamped "Prim. Trav. Sta. No. 2, Mich. 1915".....	44 57 54.4	85 30 16.3	2,789
T. 29 N., R. 10 W., quarter corner between secs. 3 and 10, center of T road west.....	44 56 08.8	85 30 17.3	10,695

**TRAVERSE CITY QUADRANGLE**—Continued.

East and west sides of the peninsula—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T 29 N., R. 10 W., quarter corner between secs. 10 and 15, center of T road west.....	* * "	* * "	Feet,
T road west.....	44 55 14.9	85 30 17.6	5,460
Mapleton, road fork at.....	44 54 41.6	85 30 12.5	3,384
Road fork at school.....	44 53 32.5	85 30 30.8	7,120
Road fork.....	44 51 16.1	85 31 38.7	.....
Road fork.....	40 50 16.5	85 32 10.0	6,443
Road fork.....	44 49 11.1	85 33 18.0	8,223
McKinley School, road fork at.....	44 47 47.1	85 34 29.3	9,941
Road fork.....	44 46 26.9	85 35 27.5	9,142
Traverse City, east side of road fork Old Mission and Elk Rapids..	44 45 51.5	85 35 04.5	4,133

**Near south border of quadrangle.**

Traverse City, center of south Maple and west Front streets.....	44 45 50.8	85 37 57.8	.....
Traverse City, center State and Park streets at Park Place Hotel.....	44 45 46.9	85 37 04.8	3,443
Crossroads.....	44 45 51.4	85 35 17.0	4,421
T road south.....	44 45 53.7	85 30 24.2	.....
Acme, 31 feet north by 5 feet east of center of T road east; iron post stamped "Prim. Trav. Sta. No. 13, Mich. 1915".....	44 46 24.9	85 30 01.5	3,556
Elwood School, center of crossroads at.....	44 46 32.0	85 41 38.9	.....
Road forks.....	44 46 27.2	85 39 35.4	8,919
Traverse City, 36 feet north of center of West Michigan Pike and Empire Road; iron post stamped "Prim. Trav. Sta. No. 3, Mich. 1915".....	44 46 31.4	85 38 30.2	4,725

**Along west shore of west arm of Grand Traverse Bay.**

T road west.....	44 47 36.7	85 38 11.7	.....
T road west.....	44 50 12.5	85 30 04.0	16,222
T road west.....	44 51 35.0	85 38 58.1	8,367
Traverse City, 9 miles north of, 30 feet east of center of crossroads; iron post stamped "Prim. Trav. Sta. No. 4, Mich. 1915".....	44 52 58.1	85 38 53.6	8,418
T road south.....	44 53 32.6	85 38 30.6	3,944
T road west at school.....	44 54 24.8	85 37 53.5	5,925
Road fork.....	44 55 20.0	85 37 29.5	5,854
T 29 N., R. 11 W., corner of secs. 3, 4, 9, and 10, fence line.....	44 56 09.1	85 38 00.3	5,444
T road east line between Tps. 29 and 30 N., R. 11 W.....	44 57 09.1	85 37 51.4	6,115
T road south, road south on section line.....	44 57 58.5	85 38 00.4	5,036
Sutton Bay, 39 feet north by 16 feet west of center of road fork; iron post stamped "Prim. Trav. Sta. No. 5, Mich. 1915".....	44 58 50.6	85 38 49.2	6,336

**Near north border of quadrangle.**

T road north.....	44 59 21.6	85 39 52.2	5,511
Road fork.....	44 59 51.9	85 40 31.0	4,154
Road fork.....	44 59 20.2	85 41 37.7	5,773
Promont, east side of, center of crossroads.....	44 59 00.0	85 42 30.3	4,297
Promont, 1 mile west of, crossing Manistee & Northeastern R. R. ....	44 58 55.4	85 44 01.7	6,591
Manistee & Northeastern R. R. road crossing.....	44 58 18.3	85 44 41.8	.....

Magnetic declination east and west sides of the peninsula,  $0^{\circ} 45' W.$ ; near south border of quadrangle,  $1^{\circ} 30' W.$ ; along west shore of west arm of Grand Traverse Bay,  $1^{\circ} 00' W.$ ; near north border of quadrangle,  $1^{\circ} 00' W.$ .

## IOWA.

### **PRIMARY TRAVERSE.**

**Albia, Attica, Chariton, Humeston, Melrose, and New Virginia quadrangles.**

**LUCAS, MARION, AND MONROE COUNTIES.**

The following geographic positions on Des Moines astronomic datum were determined by C. B. Kendall in 1913 and by E. L. McNair in 1914 and are based on positions described in Bulletin 440:

#### **ALBIA QUADRANGLE.**

**Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
	°   "	°   "	Feet.
T. 72 N., Rs. 18 and 19 W., quarter corner secs. 25 and 30, 20 feet east of T road west, at north-south fence line, 5 feet north of fence line east.....	41 00 28.6	92 58 54.1	.....
T. 72 N., Rs. 18 and 19 W., about 0.25 mile south of corner secs. 24, 25, 19, and 30, 30 feet north and 15 feet east of T road east, near corner fence post, iron post stamped "Prim. Trav. Sta. No. 8, 1914, Iowa".....	41 00 41.8	92 58 53.9	1,333
T. 72 N., Rs. 18 and 19 W., corner secs. 24, 25, 19, and 30, at T road west and in line with center of roads south and west, 15 feet west of road north.....	41 00 54.9	92 58 54.4	1,329
T. 72 N., Rs. 18 and 19 W., quarter corner secs. 24 and 19, center of north-south road.....	41 01 20.8	92 58 54.4	2,620
T. 72 N., Rs. 18 and 19 W., corner secs. 13, 24, 18 and 19, center of north-south road at east-west fence line (road is not used).....	41 01 46.9	92 58 54.5	2,632
T. 72 N., Rs. 18 and 19 W., quarter corner secs. 13 and 18, center of old abandoned road at east-west fence line.....	41 02 12.8	92 58 54.8	2,625
T. 72 N., Rs. 18 and 19 W., corner secs. 12, 13, 7, and 18, in field and in line with east-west fence, and road south.....	41 02 38.8	92 58 54.9	2,634
T. 72 N., Rs. 18 and 19 W., approximately on range line and a few hundred feet north of quarter corner on east side sec. 12, east end of small wooden bridge over Whippoorwill Creek.....	41 03 12.3	92 58 54.8	3,385
T. 72 N., Rs. 18 and 19 W., in southeast quarter of sec. 1, and about 730 feet south of schoolhouse.....	41 03 47.6	92 59 23.5	4,190
T. 72 N., Rs. 18 and 19 W., in southeast quarter of sec. 1, and about 730 feet south of schoolhouse.....	41 04 09.6	92 59 22.0	2,228
T. 72 and 73 N., Rs. 18 and 19 W., corner secs. 1, 6, 31, and 36, in field at intersection of fences about 1,250 feet east of public road.....	41 04 26.3	92 58 55.2	2,670
T. 73 N., R. 19 W., in southeast quarter of sec. 25, public road crossing coal mine branch.....	41 05 33.7	92 59 13.7	6,966
T. 73 N., R. 19 W., in south half of sec. 25, about 60 feet north of T road east, center of small wooden bridge.....	41 05 38.5	92 59 29.7	1,319
T. 73 N., R. 19 W., at quarter corner secs. 24 and 25, center of north-south road at fence line east.....	41 06 10.5	92 59 30.0	3,240
T. 73 N., R. 19 W., in center of sec. 24, crossroads.....	41 06 36.4	92 59 30.1	2,620
T. 73 N., R. 19 W., quarter corner secs. 13 and 24, crossroads.....	41 07 02.7	92 59 30.2	2,660

Magnetic declination near west border of quadrangle,  $7^{\circ} 47'$  E.

62510°—Bull. 644—17—23

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## ATTICA QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Dallas, 1 mile north of, at northwest corner of William Clark's lot, 25 feet northwest to T road east, in top of sandstone 26 by 10 by 8 inches, 24 inches in ground; aluminum tablet stamped "Prim. Trav. Sta. No. 4, 1917, Iowa".	41 14 52.6	93 14 07.2	Feet.
Dallas, "Rock Island Ry." track under highway bridge at Melcher station, east-west road crossing 0.25 mile north of.....	41 13 58.8	93 14 28.7	5,689
T. 74 N., R. 21 W., corner of secs. 10, 11, 14, and 15, in north-south road at hedge east.....	41 13 34.0	93 14 21.9	2,560
T. 74 N., R. 21 W., quarter corner between secs. 14 and 15, at crossroads.....	41 13 07.9	93 14 59.4	3,898
T. 74 N., R. 21 W., corner of secs. 14, 15, 22, and 23, 15 feet south to T road west.....	41 12 41.5	93 14 59.0	2,670
T. 74 N., R. 21 W., corner of secs. 22, 23, 26, and 27, at T road west.....	41 12 15.3	93 14 58.8	2,650
T. 74 N., R. 21 W., corner of secs. 26, 27, 34, and 35, at crossroads.....	41 11 22.8	93 14 58.6	5,320
Tps. 73 and 74 N., R. 21 W., corner of secs. 2, 3, 34, and 35, at crossroads, 30 feet northeast to corner of wire fence, 40 feet northwest to double elm.....	41 10 30.5	93 14 58.1	5,200
T. 73 N., R. 21 W., corner of secs. 2, 3, 10, and 11, at crossroads.....	41 09 38.0	93 14 57.7	5,320
	41 08 45.1	93 14 57.3	5,350

## Along highways near east border of quadrangle.

T. 73 N., R. 19 W., corner secs. 13, 14, 23, and 24, 15 feet south of T road north, on bank 2 feet from fence; iron post stamped "Prim. Trav. Sta. No. 9, 1914, Iowa".	41 07 02.5	93 00 04.3	-----
T. 73 N., R. 19 W., corner secs. 11, 12, 13, and 14, stone at corner of public crossroads.....	41 07 54.9	93 00 05.0	5,298
T. 73 N., R. 19 W., corner secs. 1, 2, 11, and 12, 600 feet south of schoolhouse, center of north-south road at fence line east.....	41 08 47.0	93 00 05.7	5,280
T. 73 N., R. 19 W., at quarter corner secs. 1 and 2, T road south.....	41 09 13.1	93 00 06.1	2,640
T. 73 N., R. 19 W., near center of sec. 2, at Eldorado Church, 15 feet south of T road north, 15 feet east of fence line south, close to east-west fence; iron post stamped "Prim. Trav. Sta. No. 10, 1914, Iowa, elevation 915".	41 09 12.8	93 00 40.5	2,634
Tps. 73 and 74 N., R. 19 W., quarter corner secs. 2 and 35, on line between Marion and Monroe counties, fences east-west.....	41 09 38.2	93 00 41.1	2,578
North Cedar Creek, center of covered wooden bridge over.....	41 10 39.2	93 00 43.1	6,174
T. 74 N., R. 19 W., about 0.25 mile south of corner secs. 22, 23, 25, and 27, 20 feet north and 20 feet west of T road north, inside corner of fence; iron post stamped "Prim. Trav. Sta. No. 11, 1914, Iowa, elevation 863".	41 11 09.9	93 01 13.0	3,854
T. 74 N., R. 19 W., corner secs. 22, 23, 26, and 27, stone at right angle in road, 20 feet east of center of road north, and in line with fence line north.....	41 11 22.8	93 01 15.4	1,315
T. 74 N., R. 19 W., stone at corner secs. 14, 15, 22, and 23, in "Indian Cemetery" in line with roads north, south, and west, 15 feet north of "Monroe monument".	41 12 15.1	93 01 15.4	5,287
Attica, center of public crossroads at.....	41 13 45.3	93 00 59.4	9,266
T. 74 N., R. 19 W., east of corner secs. 2, 3, 10, and 11, T road west.....	41 13 59.8	93 01 09.6	1,616
Prim. Trav. Sta. No. 2, 1908, Iowa (Bull. 440, p. 257). .	41 14 53.3	93 01 16.9	5,442

## Along highways through center of quadrangle.

T. 73 N., R. 19 W., corner secs. 14, 15, 22, and 23, center of east-west road at north-south fence.....	41 07 02.3	93 01 13.4	-----
T. 73 N., R. 19 W., quarter corner secs. 15 and 22, T road south.....	41 07 02.7	93 01 47.9	2,640
T. 73 N., R. 19 W., near corner secs. 15, 16, 21, and 22, 30 feet south and 25 feet east of stone corner at T road north, 1 foot from wire fence, 25 feet east of fence line south; iron post stamped "Prim. Trav. Sta. No. 12, 1914, Iowa, elevation 943".	41 07 03.0	93 02 21.6	2,581
T. 73 N., R. 19 W., quarter corner secs. 16 and 21, T road south.....	41 07 03.1	93 02 56.4	2,660
T. 73 N., R. 19 W., stone at corner secs. 16, 17, 20, and 21, T road north.....	41 07 02.8	93 03 30.9	2,645
T. 73 N., R. 19 W., quarter corner secs. 17 and 20, T road south.....	41 07 02.8	93 04 05.5	2,644
T. 73 N., R. 19 W., stone at corner secs. 17, 18, 19, and 20.....	41 07 02.3	93 04 39.5	2,603
T. 73 N., R. 19 W., quarter corner secs. 18 and 19, center of road west at north-south fences.....	41 07 03.1	93 05 13.8	2,625
T. 73 N., R. 19 and 20 W., approximately corner secs. 18, 19, 13, and 24, 20 feet east of level bench-mark post, near wire fence, at Monroe-Lucas county line.....	41 07 03.4	93 05 48.1	2,628
T. 73 N., R. 20 W., quarter corner secs. 23 and 24, T road east.....	41 06 37.1	93 06 56.5	5,874
T. 73 N., R. 20 W., in north half of sec. 23, road crossing.....	41 06 50.1	93 07 31.7	3,000
T. 73 N., R. 20 W., at crossing of line between secs. 22 and 23, center of east-west road.....	41 06 50.0	93 08 06.3	2,650

## ATTICA QUADRANGLE—Continued.

## Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 73 N., R. 20 W., 15 feet south and 40 feet west of T road south, in northeast quarter of sec. 22, 5 feet west of telephone pole with painted elevation, iron post stamped "Prim. Trav. Sta. No. 13, Iowa, elevation 996"	° ° "	° ° "	Fect.
T. 73 N., R. 20 W., on sec. line between secs. 21 and 22, crossroads.	41 06 49.6	93 08 24.0	1,354
T. 73 N., R. 20 W., in northeast quarter of sec. 21, T road south.	41 06 49.5	93 09 14.9	3,808
T. 73 N., R. 20 W., in northeast quarter of sec. 20, public crossroads.	41 06 49.3	93 09 41.0	1,900
T. 73 N., R. 20 W., 0.25 mile south of corner secs. 17, 18, 19, and 20, public crossroads.	41 06 49.1	93 10 13.5	2,484
T. 73 N., R. 20 W., at quarter secs. 18 and 19, T road west.	41 06 48.9	93 11 33.0	6,085
T. 73 N., Rs. 20 and 21 W., corner secs. 18, 19, 13, and 24, crossroads.	41 07 01.6	93 12 08.2	2,983
T. 73 N., R. 21 W., corner secs. 13, 14, 23, and 24, just west of schoolhouse in hollow, at fence line north, at east-west road.	41 07 01.4	93 12 39.6	2,410
T. 73 N., R. 21 W., quarter corner secs. 14 and 23, angle in road, south and east.	41 07 01.3	93 13 47.9	5,228
T. 73 N., R. 21 W., center sec. 23, T road west.	41 07 01.0	93 14 22.2	2,625
T. 73 N., R. 21 W., quarter corner secs. 22 and 23, T road north.	41 06 34.6	93 14 22.1	2,665
	41 06 34.5	93 14 56.3	2,615

## Along highways near south border of quadrangle.

T. 72 N., Rs. 20 and 21 W., 30 feet south and 20 feet east of center of road crossing at corner secs. 25, 30, 36, and 31, 3 feet north of corner fence post; iron post stamped "Prim. Trav. Sta. No. 4, Iowa 1914, elevation 1036"			
T. 72 N., R. 20 W., quarter corner secs. 30 and 31, T road north.	41 00 00.5	93 12 37.9	
T. 72 N., R. 20 W., at corner secs. 29, 30, 31, and 32, public road crossing.	41 00 01.2	93 12 04.5	2,560
T. 72 N., R. 20 W., at corner secs. 28, 29, 32, and 33, T road north.	41 00 01.7	93 11 29.7	2,670
T. 72 N., R. 20 W., 30 feet east and 20 feet north of T road north, at corner secs. 27, 28, 33 and 34, 3 feet south of east-west hedge line; iron post stamped "Prim. Trav. Sta. No. 5, Iowa, 1914, elevation 1023"	41 00 02.2	93 10 20.8	5,280
T. 72 N., R. 20 W., corner secs. 26, 27, 34 and 35, center crossroads.	41 00 02.7	93 09 11.8	5,290
T. 72 N., R. 20 W., corner secs. 25, 26, 35 and 36, crossroads.	41 00 02.7	93 08 03.8	5,215
T. 72 N., R. 20 W., 0.25 mile west of line between Rs. 19 and 20, 30 feet south and 30 feet east of T road corners on line between secs. 25 and 36, 5 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 6, Iowa, 1914, elevation 1012"	41 00 02.8	93 06 55.3	5,255
T. 72 N., Rs. 19 and 20 west, corner secs. 25, 30, 36 and 31, at Lucas-Monroe county line, in line with road north across small ravine, T road south.	41 00 02.7	93 06 04.2	3,920
T. 72 N., R. 19 W., corner secs. 29, 30, 31 and 32, at fence line north-south, center of east-west road.	41 00 03.0	93 05 46.9	1,325
T. 72 N., R. 19 W., quarter corner secs. 29 and 32, T road north.	41 00 03.1	93 04 38.1	5,215
T. 72 N., R. 19 W., corner secs. 28, 29, 32 and 33, stone in center of east-west road at fence line south.	41 00 03.0	93 04 04.5	2,635
T. 72 N., R. 19 W., 40 feet north and 25 feet west of T road north, at quarter corner secs. 28 and 33, 4 feet north of corner fence post; iron post stamped "Prim. Trav. Sta. No. 7, 1914, Iowa, elevation 994"	41 00 02.9	93 03 30.0	2,645
T. 72 N., R. 19 W., corner secs. 27, 28, 33 and 34 east-west, road to north-south fence line.	41 00 03.2	93 02 55.8	2,623
T. 72 N., R. 19 W., quarter corner secs. 27 and 34, T road south.	41 00 02.8	93 02 21.0	2,670
T. 72 N., R. 19 W., corner secs. 26, 27, 34 and 35, east-west road at hedge line north and fence line south.	41 00 02.6	93 01 46.4	2,650
T. 72 N., R. 19 W., quarter corner secs. 26 and 35, angle of road north and west, in line with fence south, at schoolhouse.	41 00 02.6	93 01 12.0	2,645
T. 72 N., R. 19 W., at crossing of line between secs. 25 and 26, T road south.	41 00 02.8	93 00 37.6	2,635
	41 00 15.5	93 00 03.2	2,929

## Along highways near west border of quadrangle.

T. 73 N., R. 21 W., at corner secs. 26, 27, 34 and 35, at hedge south and fence north, center of east-west road.	41 05 16.8	93 14 56.7	
T. 73 N., R. 21 W., in northwest quarter of sec. 35, T road north.	41 05 16.9	93 14 39.6	1,310
Tps. 72 and 73 N., R. 21 W., corner secs. 2, 3, 34 and 35, in line with fence north, T road south.	41 04 21.9	93 14 56.9	5,426
T. 72 N., R. 21 W., at corner secs. 2, 3, 10 and 11, public crossroads.	41 03 27.6	93 14 55.3	5,798
T. 72 N., R. 21 W., corner secs. 10, 11, 14 and 15, north-south road at fence line east and hedge line west.	41 02 35.6	93 14 55.6	5,270
T. 72 N., R. 21 W., 0.25 mile south of corner secs. 10, 11, 14 and 15, center of public road crossing.	41 02 22.6	93 14 55.6	1,320
T. 72 N., R. 21 W., corner secs. 14, 15, 22 and 23, at fence line east-west, of north-south road.	41 01 43.6	93 14 55.5	3,950
T. 72 N., R. 21 W., about 0.25 mile north of corner secs. 22, 23, 26 and 27, T road north.	41 01 04.6	93 14 55.7	3,947
T. 72 N., R. 21 W., in south half sec. 23, T road south.	41 01 05.0	93 14 21.4	2,628

Magnetic declination near north border of quadrangle,  $7^{\circ} 31' E.$ ; near south border,  $7^{\circ} 45' E.$ ; near east border,  $7^{\circ} 47' E.$ ; near west border,  $7^{\circ} 42' E.$ ; near center,  $7^{\circ} 55' E.$

## CHARITON QUADRANGLE.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 73 N., R. 21 W., secs. 15, 16, 21, and 22, stone, corner of, 12 feet north and 25 feet west of, 50 feet east of the southeast corner of Renfrow schoolhouse; iron bench mark post stamped "Prim. Trav. Sta. No. 1, 1913, Iowa, elevation 993".	* * "	* * "	Fct.
T. 73 N., R. 21 W., near quarter corner secs. 21 and 22, at road forks, center of small bridge.	41 06 34.8	93 16 04.0	2,690
T. 73 N., R. 21 W., center of sec. 22, T road forks.	41 06 34.6	93 15 30.6	2,559
T. 73 N., R. 21 W., quarter corner secs. 22 and 27, north-south road at east-west fence line.	41 06 08.8	93 15 30.7	2,615
T. 73 N., R. 21 W., quarter corner secs. 27 and 34, at "Central Church," T road north.	41 05 16.6	93 15 30.8	5,275
Williamson station, about 400 feet south of, public road crossing at center of main track of Chicago, Rock Island & Pacific R. R.	41 05 16.8	93 15 10.7	1,540

## Along highways east-west through center of quadrangle.

T. 73 N., R. 21 W., corner of secs. 2, 3, 10, and 11, at crossroads (duplicate).	41 08 45.1	93 14 57.3	.....
T. 73 N., R. 21 W., corner of secs. 3, 4, 9, and 10, at crossroads, near church and schoolhouse.	41 08 45.4	93 16 06.2	5,267
T. 73 N., R. 21 W., stone corner of secs. 9, 10, 15, and 16, at crossroads.	41 07 53.1	93 16 05.5	5,288
T. 73 N., R. 21 W., stone corner of secs. 15, 16, 21, and 22, 12 feet north and 25 feet west of, 50 feet east of the southeast corner of Renfrow schoolhouse; iron bench mark post stamped "Prim. Trav. Sta. No. 1, 1913, Iowa, elevation 993".	41 07 01.1	93 16 05.6	5,288
T. 73 N., R. 21 W., corner of secs. 16, 17, 20, and 21, in east-west road at wire fence north, 770 feet east of crossroads.	41 07 01.2	93 17 15.4	5,240
T. 73 N., R. 21 W., corner of secs. 16, 17, 20, and 21, 770 feet west of; four corners.	41 07 00.9	93 17 25.4	769
Schoolhouse, T road south at .	41 07 00.3	93 18 06.0	3,111
T. 73 N., R. 21 W., corner of secs. 17, 18, 19, and 20, at fences north and south, 0.25 mile west of T road south.	41 07 00.2	93 18 23.3	1,320
T. 73 N., R. 21 W., quarter corner between secs. 18 and 19, at crossroads opposite mail box and 50 feet northwest of culvert.	41 07 00.2	93 18 58.0	2,660
T. 73 N., Rs. 21 and 22 W., corner of secs. 13, 18, 19, and 24, at north-south fences and 0.25 mile east of T road north.	41 07 00.2	93 19 33.3	2,700
T. 73 N., R. 22 W., quarter corner between secs. 13 and 24, 15 feet south and 20 feet east of, in southeast corner of T road south; iron post stamped "Prim. Trav. Sta. No. 2, 1913, Iowa".	41 06 59.6	93 20 07.6	2,625
T. 73 N., R. 22 W., quarter corner between secs. 14 and 23, at T road east, 1.25 miles north of Oakley.	41 06 59.6	93 21 17.0	5,310
Oakley, 1.2 miles north of; iron bridge over White Breast Creek.	41 07 06.7	93 21 45.7	2,316
T. 73 N., R. 22 W., 40-acre corner of secs. 14, 15, 22, and 23, 0.25 mile north of, at T road west, 750 feet northwest of bridge.	41 07 12.1	93 21 51.8	716
T. 73 N., R. 22 W., corner of 40-acre corner of secs. 15, 16, 21, and 22, 0.25 mile north of, at crossroads.	41 07 11.8	93 23 00.3	5,245
T. 73 N., R. 22 W., quarter corner between secs. 16 and 17, 15 feet south and 15 feet west of, inside of wire fence, in southwest corner of a 90° bend in road from north to west; iron post stamped "Prim. Trav. Sta. No. 3, 1913, Iowa, elevation 993".	41 07 23.8	93 24 00.3	5,421
T. 73 N., R. 22 W., quarter corner stone between secs. 17 and 18, at crossroads.	41 07 25.8	93 25 17.6	5,230
T. 73 N., Rs. 22 and 23 W., quarter corner between secs. 13 and 18, at crossroads.	41 07 25.8	93 26 24.6	5,130
T. 73 N., R. 23 W., secs. 13, 14, 23, and 24, corner of T road west at.	41 07 00.1	93 27 33.8	5,904
T. 73 N., R. 23 W., quarter corner between secs. 14 and 23, 30 feet north of, on north edge of east and west road, on line with center of T road south and at southeast corner of schoolhouse yard; iron post stamped "Prim. Trav. Sta. No. 4, 1913, Iowa, elevation 1037".	41 07 00.5	93 28 08.4	2,655
T. 73 N., R. 23 W., corner of secs. 14, 15, 22, and 23, at T road north at Norwood, 50 feet northwest to store.	41 07 00.1	93 28 43.1	2,650

**CHARITON QUADRANGLE—Continued.**  
**Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 73 N., R. 23 W., corner of secs. 10, 11, 14, and 15, at crossroads north of church, 1 mile north of Norwood.....	41 07 52.2	93 28 43.6	5,270
T. 73 N., R. 23 W., 30 feet south and 30 feet west of corner of secs. 2, 3, 10, and 11, in southwest corner of crossroads 2 miles north of Norwood; iron post stamped "Prim. Trav. Sta. No. 6, 1913, Iowa, elevation 1023".....	41 08 44.0	93 28 44.2	5,235
T. 73 N., R. 23 W., quarter corner between secs. 3 and 4, at crossroads.....	41 09 10.9	93 29 53.5	5,960
T. 74 N., R. 23 W., corner of secs. 3, 4, 33, and 34, at T road west, also line between Lucas and Warren counties.....	41 09 28.7	93 29 53.8	2,809
T. 74 N., R. 23 W., corner of secs. 33, 34, 27, and 28, at crossroads, near schoolhouse.....	41 10 31.2	93 29 54.2	5,320
T. 74 N., R. 23 W., corner of secs. 21, 22, 27, and 28, at hedges east and west.....	41 11 23.6	93 29 54.3	5,300
Liberty Center, T. 73 N., R. 23 W., corner of secs. 15, 16, 21, and 22, 40 feet north and 25 feet west of, in northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 6, 1913, Iowa".....	41 12 16.8	93 29 54.9	5,370
T. 74 N., R. 23 W., corner stone of secs. 9, 10, 15, and 16, at crossroads.....	41 13 08.9	93 29 55.3	5,290
T. 74 N., R. 23 W., corner of secs. 3, 4, 9, and 10, at crossroads, near schoolhouse.....	41 14 01.5	93 29 55.8	5,320
Tps. 74 and 75 N., R. 23 W., corner of secs. 3, 4, 33, and 34, 25 feet south and 60 feet east of, in the northwest corner of sec. 3, in the southeast corner of public crossroads; aluminum tablet stamped "Prim. Trav. Sta. No. 6, 1907, Iowa, elevation 937".....	41 14 52.5	93 29 54.8	5,151

**Along highways near south border of quadrangle.**

T. 72 N., R. 21 W., on line between secs. 27 and 28, at fence lines north-south, center of public road.....	41 00 06.5	93 16 04.2	.....
T. 72 N., R. 21 W., approximately quarter corner secs. 28 and 29, about 5 feet north of center of public road.....	41 00 25.1	93 17 13.3	5,616
Chariton, crossing of South Avenue and Fourth Street, near middle of sec. 29.....	41 00 26.6	93 17 48.2	2,680
T. 72 N., R. 21 W., corner secs. 19, 20, 29, and 30, at intersection of Main Street and Court Avenue, at southwest corner of public square. (Corner is said to be at intersection of property line on east side of Main Street and north side of Court Avenue).....	41 00 51.4	93 18 22.6	3,641
Chariton, 130 feet southwest of southwest corner of courthouse, 33 feet east of curbing on Main Street, and 12 feet north of curbing on Court Avenue; iron post stamped "Prim. Trav. Sta. No. 1, 1914, Iowa".....	41 00 51.8	93 18 21.9	66

**On highway near southwest corner of quadrangle.**

White Breast Creek, center of iron bridge over.....	41 00 11.7	93 29 58.5	.....
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**Along highways near west border of quadrangle.**

[Circuit closed in 1914 by E. L. McNair.]

T. b. m. No. 4, 1913, Iowa (duplicate).....	41 07 00.5	93 28 08.4	.....
Norwood, $\frac{1}{4}$ mile west of, T road south.....	41 06 57.2	93 29 35.1	6,646
Otter Creek, iron bridge over.....	41 06 16.5	93 29 37.4	4,125
T. 73 N., R. 23 W., secs. 27, 28, 33, and 34, corner of, at crossroads.....	41 05 16.4	93 29 52.4	6,198
Tps. 72 and 73 N., R. 23 W., secs. 3, 4, 33, and 34, corner of; corner is near scrub-oak 10 feet east of road at top of hill, at wire fence east.....	41 04 24.0	93 29 52.2	5,298
Iron bridge over Otter Creek, T road north 450 feet west of.....	41 04 09.7	93 30 44.3	4,250

Magnetic declination near east border of quadrangle,  $7^{\circ} 42'$  E.; near west border,  $8^{\circ} 19'$  E.; near center,  $7^{\circ} 53'$  E.; near south border,  $7^{\circ} 32'$  E.; near north border,  $7^{\circ} 49'$  E.

## HUMESTON QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 72 N., Rs. 21 and 22 W., corner secs. 25, 30, 31, and 36, at east-west fence line, center of north-south road.....	* * *	* * *	Feet.
Tps. 71 and 72 N., R. 22 W., at quarter corner between secs. 1 and 36, T road west.....	40 59 58.9	93 19 32.9	5,886
Tps. 71 and 72 N., R. 22 W., corner secs. 1, 2, 35, and 36, at fence line south, center of east-west road.....	40 59 06.8	93 20 06.9	2,630
Chariton River, center of iron bridge over.....	40 59 06.6	93 20 41.3	2,290
Tps. 71 and 72 N., R. 22 W., corner secs. 2, 3, 34, and 35, 60 feet east and 20 feet north of T road corners, 30 feet east of fence corner on bank close to wire fence; iron post stamped "Prim. Trav. Sta. No. 2, 1914, Iowa".....	40 59 06.6	93 21 10.8	2,950
Tps. 71 and 72 N., R. 22 W., quarter corner secs. 3 and 34; T road south.....	40 59 06.6	93 21 49.3	2,709
Tps. 71 and 72 N., R. 22 W., at corner secs. 3, 4, 33, and 34; crossroads. (A stone, apparently section corner, is about 20 feet north on line of east-west fence).....	40 59 05.9	93 22 58.9	2,625
Tps. 71 and 72 N., R. 22 W., corner secs. 32, 33, 4, and 5; T road east.....	40 59 05.7	93 24 07.4	5,250
Tps. 71 and 72 N., R. 22 W., about 0.25 mile south of corner secs. 31, 32, 5, and 6; T road east.....	40 58 49.0	93 25 16.1	5,329
T. 71 N., R. 22 W., at corner secs. 5, 6, 7, and 8; crossroads.....	40 58 09.6	93 25 15.4	3,985
T. 71 N., Rs. 22 and 23 W., at corner secs. 6, 7, 1, and 12; T road south.....	40 58 09.7	93 26 25.6	5,380
T. 71 N., R. 23 W., at corner secs. 1, 2, 11, and 12; T road south.....	40 58 11.1	93 27 34.4	5,280
T. 71 N., R. 23 W., 50 feet west and 35 feet south of crossroads at quarter corner secs. 2 and 11, on top of bank, no fence; iron post stamped "Prim. Trav. Sta. No. 3, 1914, Iowa".....	40 58 10.7	93 28 09.3	2,668
Tps. 71 and 72 N., R. 23 W., at apparent quarter corner secs. 2 and 35; T road west.....	40 59 04.9	93 28 08.8	5,480
T. 72 N., R. 23 W., in north half sec. 35; T road south.....	40 59 45.7	93 28 08.5	4,132
T. 72 N., R. 23 W., in northeast quarter sec. 34; T road north.....	40 59 45.8	93 29 00.5	3,980
T. 72 N., R. 23 W., near quarter corner on west side sec. 34, at schoolhouse; T road north.....	40 59 46.0	93 29 52.6	3,983
T. 72 N., R. 23 W., approximately corner secs. 27, 28, 33, and 34, opposite fence line east; center of north-south road.....	40 59 59.7	93 29 52.7	1,390

Magnetic declination near north border of quadrangle, 7° 32' E.

## MELROSE QUADRANGLE.

Along highways near northwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 72 N., R. 21 W.; about 360 feet west of quarter corner secs. 26 and 35, about 100 feet east of road bridge, about 10 feet south of center of east-west road, T road south.....	* * *	* * *	Feet.
T. 72 N., R. 21 W., at corner secs. 26, 27, 34, and 35, T road corners east-west-south.....	40 59 59.7	93 14 26.0	2,250
	40 59 59.6	93 14 55.4	

Magnetic declination near north border of quadrangle, 7° 45' E.

## NEW VIRGINIA QUADRANGLE.

Along highways near east border of southeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 72 N., R. 23 W., on line between secs. 21 and 28; T road west.....	* * *	* * *	Feet.
Chicago, Burlington & Quincy R. R., public crossroads; 100 feet south of crossing.....	41 00 50.9	93 30 08.5	
T. 72 N., R. 23 W., corner secs. 16, 17, 20, and 21; stone at crossroads.....	41 01 17.1	93 30 08.6	2,633
T. 72 N., R. 23 W., corner secs. 8, 9, 16, and 17; stone at T road south.....	41 01 43.4	93 31 00.2	4,761
T. 72 N., R. 23 W., near center northwest quarter sec. 9, 25 feet south and 12 feet west of center of east-west road, at T road south, 200 feet northeast of Palestine public school; iron post stamped "Prim. Trav. Sta. No. 7, 1913, Iowa" (tie with McNair's 1914 line).....	41 02 35.4	93 30 59.4	5,270
T. 72 N., R. 23 W., corner secs. 4, 5, 8, and 9; at cross hedges.....	41 03 13.9	93 30 43.6	4,082
Otter Creek, 450 feet west of iron bridge over.....	41 03 27.5	93 31 00.1	1,868
	41 04 09.7	93 30 44.3	4,488

Magnetic declination near east border of quadrangle, 8° 19' E.

# MISSOURI

## PRIMARY TRAVERSE.

**Crystal City quadrangle.**

**JEFFERSON COUNTY.**

The geographic positions in the following list were determined by J. H. Wilson in 1913 and are based on primary traverse run in 1903, described in Bulletin 245, and Mississippi River Commission triangulation stations Joachim and Simpson 55, on approximate North American datum.

### CRYSTAL CITY QUADRANGLE.

**Along highways near northwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Joachim Bluff, on first prominent rock point below, 1,000 meters below town of Herculaneum, 20 feet outside of east rail of Mississippi River and Bonne Terre Ry., 36.5 feet from cross cut on rock about 10 feet south of normal from pipe to rail, 15 feet west of rail, 64.9 feet from cross in rock upstream (distance between crosses is 62 feet); iron pipe (Mississippi River Commission triangulation station Joachim).....	38 15 11.0 38 14 03.7	90 22 12.5 90 22 13.7	6,811
Road crossing.....	38 13 25.4	90 23 37.4	7,722
Festus, 300 feet west of station, north-south road crossing St. Louis & San Francisco R. R.	38 13 49.1	90 25 03.7	7,292
Silica Junction, 1,000 feet northwest of; road crossing St. Louis & San Francisco R. R.	38 14 05.5	90 25 33.6	2,909
Silica, road crossing St. Louis, Iron Mountain & Southern Ry.....	38 14 12.9	90 26 29.3	4,508
Forks of road.....	38 14 13.5	90 28 04.2	7,576
T road south of section line.....	38 14 21.4	90 28 18.9	1,419
Road forks almost in front of house.....	38 14 43.3	90 28 43.6	2,971
T road east.....			

**Along highways near west border of quadrangle.**

T. 41 N., R. 5 E., corner of secs. 28, 29, 32, and 33; southwest corner of cemetery.....	38 14 56.3	90 28 53.2	1,523
Zion schoolhouse, southeast corner of yard; iron post stamped "Prim. Trav. Sta. No. 1, 1913".....	38 14 56.2	90 29 00.6	596
T. 41 N., R. 5 E., south corner of secs. 32 and 33.....	38 14 02.9	90 28 54.0	5,417
Center of road at top of ridge, gate on west side of road, 500 feet north of second-class road fork.....	38 13 15.1	90 29 12.6.	5,063
Hematite, at station, road crossing St. Louis, Iron Mountain & Southern Ry.....	38 12 10.1	90 28 42.6	6,992
Hematite, near, wagon road at east edge of ford over Swashon Creek.....	38 11 51.5	90 28 51.1	2,009
Swashon Creek, 900 feet east of; road forks.....	38 11 34.4	90 28 56.4	1,787
Beckler's house, 600 feet northwest of; road forks in creek bottom.....	38 10 44.1	90 28 20.9	5,823
T. 40 N., R. 5 E., 0.25 mile west of quarter corner between secs. 27 and 28; T road east on quarter section line.....	38 10 02.7	90 28 07.4	4,322
Center of crossroads.....	38 09 48.8	90 28 04.0	1,410
T. 40 N., R. 5 E., corner of secs. 27, 28, 33, and 34.....	38 09 36.3	90 27 51.7	1,817
T. 39 N., R. 5 E., north corner of secs. 3 and 4 (570 feet east of preceding position is stone at south corner of secs. 33 and 34, T. 40 N., R. 5 E., 280 feet west of road forks).....	38 08 43.4	90 28 01.3	5,402
Plattin, 4 miles from, 25 feet south by 20 feet west of intersection of crossroads, at southwest corner of crossroads, near signpost "De Soto 6 mi., Plattin 4 mi., Crystal City 8 mi"; iron post stamped "Prim. Trav. Sta. No. 2, 1913".....	38 07 38.5	90 28 22.9	6,792
Lutheran Church, just west of; road forks.....	38 06 20.0	90 29 03.2	8,580
T. 39 N., R. 5 E., corner of secs. 16, 17, 20, and 21; (corner not found and position is only approximate).....	38 05 11.5	90 29 19.8	7,049

## CRYSTAL CITY QUADRANGLE—Continued.

## Along highways near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T road west just south of creek.....	* * "	* * "	Feet.
T. 39 N., R. 5 E., corner of secs. 20, 21, 28, and 29, 10 feet north of small wooden bridge; center of north-south road.....	38 05 02.8	90 29 20.0	890
Valles Mines, 1.5 miles north of, in front of small house on top of ridge; T road south.....	38 04 19.1	90 29 22.3	4,423
Mile post 20, just northeast of, road crossing Mississippi River & Bonne Terre Ry.....	38 03 48.0	90 29 35.6	3,328
Valles Mines, east-west road crossing Mississippi River & Bonne Terre Ry. (old position).....	38 03 02.6	90 29 29.4	4,618
Valles Mines, 50 feet west of Mississippi River & Bonne Terre Ry. at east-west road crossing; iron post stamped "Prim. Trav. Sta. No. 3, 1913, elev. 745".....	38 02 29.3	90 29 51.3	3,804
	38 02 29.6	90 29 51.9	55

## Along highways east-west through center of east half of quadrangle.

Plattin, 50 feet north of station; road crossing Mississippi River & Bonne Terre Ry. (old position).....	38 07 52.9	90 24 38.6	.....
Forks of road 60 feet east of B. W. McCormack's mail box.....	38 07 41.2	90 24 04.0	3,016
T road south, 240 feet west of where road crosses top of ridge, in front of small house.....	38 07 27.2	90 23 10.5	4,511
Forks of road, near J. N. Sherman's mail box.....	38 07 30.0	90 22 09.4	4,897
Road forks, south end of cut-off.....	38 07 40.1	90 21 31.0	3,244
T road east at G. Holzhausen's stock farm.....	38 08 47.2	90 21 42.8	6,839
T. 40 N., R. 6 E., south corner of secs. 33 and 34.....	38 08 35.5	90 21 10.8	2,820
Forks of road, 110 feet west of J. T. Becker's mail box.....	38 08 43.4	90 20 39.0	2,671
South end of bridge over Muddy Creek.....	38 08 33.8	90 20 11.4	2,418
T. 39 N., R. 6 E., north corner of secs. 2 and 3.....	38 08 34.4	90 20 05.1	508
T. 39 N., R. 6 E., north corner of secs. 1 and 2.....	38 08 34.0	90 19 16.6	3,883
West end of bridge over Muddy Creek just west of road forks at Church.....	38 08 18.8	90 19 00.9	1,993
Rush Tower, 0.8 mile west of; T road northwest.....	38 08 40.5	90 18 14.3	4,328
Rush Tower, on bluff north of, 20 feet northwest of old location of shot tower, 275 meters northwest of railroad trestle over Muddy Creek, in Missouri Bluffs; iron pin leaded into rock (Mississippi River Commission triangulation station Simpson 55).....	38 08 59.06	90 17 33.21	3,785

Magnetic declination for northwest corner of quadrangle,  $6^{\circ} 54' E.$ ; for west border,  $7^{\circ} 09' E.$ ; for center line east-west through east half,  $6^{\circ} 18' E.$

## De Soto, Kimmswick, and St. Louis quadrangles.

## JEFFERSON COUNTY.

The geographic positions in the following list were determined by J. H. Wilson in 1913 and are based on primary traverse position at Fenton, determined in 1903, and primary traverse station No. 1, the position of which was determined by Wilson in 1913, on approximate North American datum.

## DE SOTO QUADRANGLE.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Goldman, 1.8 miles northeast of, on top of Sandy Ridge; T road east.....	* * "	* * "	Feet.
Antonia, 2 miles west of, 1,050 feet north of St. Paul's Church, 15 feet north by 30 feet west of center of triangle at road forks, just inside of fence; iron post stamped "Prim. Trav. Sta. No. 5, 1913, elev. 881".....	38 18 45.8	90 30 06.2	.....
	38 22 20.8	90 30 02.7	.....

## KIMMSEWICK QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 41 N., R. 5 E., corner of secs. 20, 21, 28, and 29.....	38 15 49.5	90 28 51.4	<i>Feet.</i> .....
T road north, 140 feet west of, 30 feet north by 15 feet east of mail box; T road south.....	38 16 02.1	90 29 06.8	1,772
Sandy Church, 600 feet northwest of; fork in road.....	38 17 01.9	90 29 07.6	6,060
John Dittner's mail box, 20 feet west of; T road north.....	38 17 05.7	90 29 52.0	3,563
Sandy Ridge, 0.6 mile southwest of, 140 feet south of small wooden bridge, near corner of wire fence; road forks.....	38 18 05.7	90 29 39.8	6,150
Sandy Ridge, southeast corner of field, large stump used as a corner fence post.....	38 18 37.0	90 29 32.4	3,223
Road forks, 60 feet northeast of, wheel holding 7 mail boxes.....	38 19 46.2	90 29 45.1	.....
Antonia school, 0.5 mile southwest of, near F. Ulrich's and four other mail boxes; road forks.....	38 20 24.6	90 29 08.2	4,869
Antonia school; road forks at.....	38 20 47.2	90 28 55.4	2,508
Antonia, northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 4, 1913".....	38 21 46.5	90 27 56.8	7,601
T. 42 N., R. 5 E., corner of secs. 16, 17, 20, and 21.....	38 22 06.6	90 28 35.4	3,692
Antonia, 2 miles west of, 1,050 feet north of St. Paul's Church, 15 feet north by 30 feet west of center of triangle at road forks; just inside of fence; iron post stamped "Prim. Trav. Sta. No. 5, 1913, elev. 881".....	38 22 20.8	90 30 02.7	7,100
Top of ridge, 250 feet southwest of house; fork in road.....	38 23 09.2	90 29 56.0	4,925
Road forks, on tree in center of triangle Nessel's mail box.....	38 23 34.7	90 29 47.0	2,677
Rock Creek Ford, road at.....	38 24 49.4	90 29 22.8	7,807
Leicht schoothouse, 500 feet southwest of, 100 feet west of small house, 50 feet east of six mail boxes, center of triangle at road forks; top of hill.....	38 26 15.7	90 29 23.5	8,734
Mr. M. Werner's mail box, 70 feet southwest of, road forks.....	38 27 26.6	90 29 18.8	7,183
Four mail boxes, 40 feet northeast of; center of triangle at road forks.....	38 28 16.9	90 28 32.6	6,281
T. 43 N., R. 5 E., quarter corner in center of sec. 8, 30 feet south of T road (west) at Bowles schoolhouse.....	38 28 45.6	90 29 00.6	3,664
Murphy, road forks at.....	38 29 24.6	90 29 13.2	4,080
Fenton, 2 miles southwest of, about 300 feet northeast of T road southeast; main road at road forks.....	38 29 58.5	90 27 56.9	6,967

Magnetic declination for west border of quadrangle  $5^{\circ} 18' E.$ ; for west half of south border of quadrangle  $6^{\circ} 54' E.$

## ST. LOUIS QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Fenton, 1 mile southwest of; T road southeast.....	38 30 29.4	90 27 07.9	<i>Feet.</i> 5,000
Fenton, four corners at (old position).....	38 30 47.2	90 26 08.6	5,043

Boynton, Braymer, Chillicothe, Chula, Dawn, Gallatin, Galt, Gower, Green City, Hale, Lucerne, Maysville, Milan, Plattsburg, Polo, Winigan, and Winston quadrangles.

## CALDWELL, CLINTON, DAVIESS, DEKALB, GRUNDY, AND SULLIVAN COUNTIES.

The geographic positions on approximate North American datum in the following list were determined by E. L. McNair in 1913.

The line starts at primary traverse station No. 5 located in 1911, at the southwest corner of the Plattsburg quadrangle, described in Bulletin 551, and runs north and east near borders of quadrangles and is tied to primary traverse station No. 9, 1910, near the northwest

corner of the Winigan quadrangle, described in Bulletin 496. The line was double chained and the closure error at primary traverse station No. 9 was plus 29 feet in latitude and minus 12 feet in longitude. This error was distributed along the line through 158 computed positions.

From this double-chained line, single lines were run by McNair in the Braymer, Chillicothe, Chula, Dawn, Gallatin, and Hale quadrangles.

#### BOYNTON QUADRANGLE.

##### Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	* * "	* * "	Feet.
T. 63 N., R. 21 W., stone at quarter corner between secs. 15 and 22.	40 15 14.18	93 14 37.99	-----
T. 63 N., R. 21 W., corner of secs. 14, 15, 22, and 23, 10 feet north by 20 feet east of center of road north, 3 feet south of corner fence post; iron post stamped "Prim. Trav. Sta. No. 16 Mo. 1913".	40 15 14.32	93 14 03.71	2,658
T. 63 N., R. 20 W., corner of secs. 16, 17, 20, and 21, road is 1,335 feet east of corner.....	40 15 18.11	93 09 37.33	-----
T road east.....	40 15 27.58	93 09 55.16	1,683
Milan, 4 miles north of, in northeast quarter of sec. 21, T. 63 N., R. 20 W., at forks of road, on west side of road, 1 foot from telephone pole at fence corner; iron post stamped "Prim. Trav. Sta. No. 17 Mo." (From bench-mark post Milan water tower is in azimuth 340° 28' 46") .....	40 15 04.35	93 08 45.85	5,866
T. 63 N., R. 20 W., corner of secs. 15, 16, 21, and 22; center of east-west road.....	40 15 18.45	93 08 28.17	1,980
T. 63 N., R. 20 W., stone at corner of secs. 14, 15, 22, and 23; cross-roads.....	40 15 19.32	93 07 19.76	5,305
T. 63 N., R. 20 W., corner of secs. 13, 14, 23, and 24 (1,495 feet west of preceding position) is T road north; T road south is 215 feet east.....	40 15 19.80	93 06 10.82	5,346
T. 63 N., R. 20 W., sec. 13; public road crossing Chicago, Burlington & Quincy R. R.....	40 15 33.62	93 05 11.17	4,832
T. 63 N., R. 19 W., corner of secs. 17, 18, 19, and 20; T road north.....	40 15 18.91	93 03 50.94	6,397
T. 63 N., R. 19 W., corner of secs. 16, 17, 20, and 21; T road west.....	40 15 18.40	93 02 42.80	5,294
T. 63 N., R. 19 W., in north quarter of sec. 22; T road east.....	40 15 00.58	93 00 45.03	-----

Magnetic declination for south border of quadrangle, 7° 38' E.

#### BRAYMER QUADRANGLE.

##### Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	* * "	* * "	Feet.
T. 57 N., R. 25 W., west corner of secs. 18 and 19; T road east.....	39 44 33.8	93 45 32.8	-----
T. 57 N., R. 25 W., apparent east corner of secs. 13 and 24; stone; T road west.....	39 44 30.1	93 45 32.8	370
T. 57 N., R. 26 W., corner of secs. 13, 14, 23, and 24; T road east....	39 44 31.6	93 46 39.2	5,195
T road east, stone on north-south line between secs. 14 and 15.....	39 44 45.8	93 47 47.0	5,457
T. 57 N., R. 27 W., stone at quarter corner between secs. 14 and 23; T. 57 N., R. 27 W., stone at corner of secs. 14, 15, 22, and 23; cross-roads.....	39 44 36.4	93 53 54.0	-----
T. 57 N., R. 27 W., corner of secs. 15, 16, 21, and 22; crossroads....	39 44 36.7	93 54 27.7	2,635
T. 57 N., R. 27 W., corner of secs. 16, 17, 20, and 21; T road south.....	39 44 35.6	93 55 35.9	5,330
T. 57 N., R. 27 W., corner of secs. 17, 18, 19, and 20; crossroads....	39 44 35.0	93 56 42.9	5,230
T. 57 N., R. 27 W., apparent east corner of secs. 13 and 24 (the apparent west corner of secs. 18 and 19, T. 57 N., R. 27 W., is 40 feet south of preceding position).....	39 44 34.3	93 57 50.8	5,311
	39 44 33.8	93 59 02.0	5,549

Magnetic declination of north border of quadrangle, 8° 25' E.

## CHILlicothe Quadrangle.

Along highways and Chicago, Rock Island &amp; Pacific Ry. near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Feet.
T. 60 N., R. 25 W., 1.5 feet north of quarter corner between secs. 19 and 20; iron post stamped "Prim. Trav. Sta. No. 10 Mo., 1913".	39 59 40.24	93 44 41.44	.....
T. 60 N., R. 25 W., quarter corner between secs. 20 and 21; T road south.	39 59 47.45	93 43 34.99	5,174
Center of Chicago, Rock Island & Pacific Ry. track.	39 59 42.67	93 42 57.40	2,965
Public road crossing Chicago, Rock Island & Pacific Ry.	39 59 54.92	93 41 53.01	5,012
Hickory Creek station, center of Chicago, Rock Island & Pacific Ry. track opposite semaphore.	39 59 59.56	93 40 00.82	8,899
Public road crossing Chicago, Rock Island & Pacific Ry.	39 59 52.53	93 38 46.26	5,847
T. 60 N., R. 24 W., quarter corner between secs. 19 and 20; T road north.	39 59 56.72	93 38 12.16	2,688
Iron bridge over Grand River; center.	39 59 45.81	93 36 48.05	6,593
T. 60 N., R. 24 W., in southeast quarter of sec. 21, opposite road north and on south side of east-west road, 1 foot from wire fence, 3 feet west of gatepost, at T road north; iron post stamped "Prim. Trav. Sta. No. 11 Mo., 1913".	39 59 46.30	93 36 11.53	2,890
T. 60 N., R. 24 W., stone at corner of secs. 22, 23, 26, and 27; T road east.	39 59 35.07	93 34 46.10	6,746
T. 60 N., R. 24 W., corner of secs. 23, 24, 25, and 26.	39 59 36.71	93 33 38.37	5,275
T. 60 N., R. 24 W., east corner of secs. 24 and 25; T road west (the west corner of secs. 19 and 30). T. 60 N., R. 23 W. is 90 feet north of preceding position.	39 59 37.65	93 32 29.94	5,328
T. 60 N., R. 23 W., corner of secs. 20, 21, 28, and 29; crossroads.	39 59 40.29	93 30 08.11	11,044

Magnetic declination for north border of quadrangle, 6° 56' E.

Along highways near west border of quadrangle.

T. 57 N., R. 25 W., corner of secs. 7, 8, 17, and 18.	39 45 27.9	93 44 29.2	.....
T. 57 N., R. 25 W., apparent quarter corner between secs. 8 and 17; T road west, the quarter corner stone is 20 feet west by 5 feet north of the T road.	39 45 27.3	93 43 54.7	2,686
T. 57 N., R. 25 W., quarter corner between secs. 5 and 8; crossroads.	39 46 19.5	93 43 54.6	5,284
T. 57 N., R. 25 W., corner of secs. 4, 5, 8, and 9; T road south.	39 46 19.2	93 43 20.7	2,640
Grand River, iron span bridge over; center.	39 46 37.6	93 42 48.9	3,105
Tps. 57 and 58 N., R. 25 W., stone at corner of secs. 3, 4, 33, and 34; T road north. (There is a long section in next 2 miles).	39 47 11.1	93 42 21.6	4,000
Sampsel station, 600 feet east of, center of track—azimuth of tangent at this point 121° 13'—(1.510 feet south of preceding position is T road east at quarter corner between secs. 27 and 28).	39 48 49.0	93 42 20.1	9,910
T. 58 N., R. 25 W., corner of secs. 21, 22, 27, and 28; T road east.	39 49 00.2	93 42 20.0	1,135
T. 58 N., R. 25 W., T road west.	39 49 46.1	93 42 19.6	4,640
T. 58 N., R. 25 W., corner of secs. 15, 16, 21, and 22.	39 49 52.5	93 42 19.5	650
T. 58 N., R. 25 W., quarter corner between secs. 15 and 16; T road south.	39 50 18.6	93 42 19.4	2,640
T. 58 N., R. 25 W., quarter corner between secs. 16 and 17; crossroads.	39 50 18.8	93 43 27.2	5,290
T. 58 N., R. 25 W., stone at corner of secs. 8, 9, 16, and 17; in fence corner.	39 50 44.8	93 43 26.8	2,634
T. 58 N., R. 25 W., quarter corner between secs. 8 and 9; crossroads.	39 51 11.0	93 43 26.6	2,647
T. 58 N., R. 25 W., corner of secs. 4, 5, 8, and 9; crossroads.	39 51 36.9	93 43 26.4	2,625
Tps. 58 and 59 N., R. 25 W., corner of secs. 4, 5, 32, and 33.	39 52 23.7	93 43 26.2	4,730
Tps. 58 and 59 N., R. 25 W., corner of secs. 5, 6, 31, and 32; T road south.	39 52 22.2	93 44 36.2	.....
T. 59 N., R. 25 W., corner of secs. 28, 29, 32, and 33.	39 53 16.3	93 43 26.4	7,728
T. 59 N., R. 25 W., quarter corner between secs. 28 and 29; T road west.	39 53 42.1	93 43 26.4	2,610
T. 59 N., R. 25 W., corner of secs. 20, 21, 28, and 29; T road south.	39 54 05.5	93 43 26.4	2,670
T. 59 N., R. 25 W., corner of secs. 16, 17, 20, and 21.	39 55 01.3	93 43 26.8	5,340
T. 59 N., R. 25 W., corner of secs. 8, 9, 16, and 17; right angle in road.	39 55 53.2	93 43 27.6	5,251
T. 59 N., R. 25 W., quarter corner between secs. 8 and 9; T road north.	39 56 19.5	93 43 28.2	2,661
T. 59 N., R. 25 W., corner of secs. 4, 5, 8, and 9; T road west.	39 56 45.7	93 43 28.7	2,650
T. 59 N., R. 25 W., 0.25 mile east of corner of secs. 5, 6, 7, and 8; right angle in road.	39 56 41.3	93 44 19.2	3,935
T. 59 N., R. 25 W., 0.25 mile east of northwest corner of sec. 5; T road south, Grundy-Livingston county line.	39 57 36.0	93 44 19.8	5,230
T. 60 N., R. 25 W., south corner of secs. 31 and 32; T road north, county line.	39 57 35.8	93 44 41.0	1,650
T. 60 N., R. 25 W., stone at quarter corner between secs. 31 and 32.	39 58 01.6	93 44 41.0	2,613
T. 60 N., R. 25 W., corner of secs. 29, 30, 31, and 32; crossroads.	39 58 27.7	93 44 40.9	2,637
Chicago, Rock Island & Pacific Ry.	39 58 59.4	93 44 41.3	3,213
T. 60 N., R. 25 W., corner of secs. 19, 20, 29, and 30; crossroads.	39 59 19.9	93 44 41.4	2,073

## CHILlicothe QUADRANGLE—Continued.

Along highways east-west through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 58 and 59 N., R. 25 W., 300 feet east of corner of secs. 4, 5, 32, and 33, 80 feet northeast of northeast corner of Central M. E. Chapel, 20 feet south of center of road at end of north-south fence; from post stamped "Prim. Trav. Sta. No. 24 Mo., 1913".	* * "	* * "	Ft.
T road south.....	39 52 23.6	93 43 22.1	3,834
T road north.....	39 52 12.3	93 42 35.2	3,835
T, 58 N., R. 25 W., apparent north corner between secs. 2 and 3. (The south corner of secs. 34 and 35, T. 59 N., R. 25 W., as indicated by road north, is 30 feet east of preceding position). ....	39 52 15.5	93 41 44.9	3,835
T road south.....	39 52 26.6	93 41 11.1	2,864
T, 59 N., R. 25 W., line through center of sec. 36; T road west.....	39 52 38.9	93 40 19.7	4,198
T road south (420 feet south of preceding position is corner of Tps. 58 and 59 N., Rs. 24 and 25 W.). ....	39 52 41.6	93 39 29.0	3,969
T, 59 N., R. 24 W., apparent quarter corner on south side of sec. 32; T road north.....	39 52 34.0	93 38 54.8	2,773
T road north, 300 feet east of church.....	39 52 32.6	93 37 34.0	6,300
T, 58 N., R. 24 W., north quarter corner of sec. 4; T road south.....	39 52 34.0	93 36 36.8	4,469
T, 59 N., R. 24 W., south corner of secs. 33 and 34; T road north.....	39 52 34.4	93 36 23.2	1,065
T, 58 N., R. 24 W., north corner of secs. 3 and 4, 20 feet south by 20 feet east of T road corners, 1.5 feet from corner fence post; from post stamped "Prim. Trav. Sta. No. 25 Mo., 1913". ....	39 52 35.2	93 35 52.6	2,383
T, 59 N., R. 24 W., south corner of secs. 34 and 35; fence north (200 feet east of preceding position) is north corner of secs. 2 and 3, T. 58 N., R. 24 W.). ....	39 52 35.0	93 35 48.5	319
T, 59 N., R. 24 W., south corner of secs. 35 and 36; T road north (110 feet west of preceding position is north corner of secs. 1 and 2, T. 58 N., R. 24 W.; T road south). ....	39 52 37.1	93 34 44.8	4,979
T, 59 N., R. 24 W., south quarter corner of sec. 36; T road north .....	39 52 38.2	93 33 36.1	5,360
Tps. 58 and 59 N., Rs. 23 and 24 W.; crossroads.....	39 52 38.5	93 33 01.9	2,065
T road north.....	39 52 38.9	93 32 28.2	2,630
Sturges, crossroads at, south corner of secs. 32 and 33, T. 59 N., R. 23 W.....	39 52 39.8	93 31 47.8	3,155
	39 52 41.5	93 30 04.9	8,030

Magnetic declination for east border of quadrangle,  $7^{\circ} 09' E.$ ; for south border,  $7^{\circ} 53' E.$ ; for east-west line through middle,  $7^{\circ} 16' E.$ ; for west border,  $7^{\circ} 47' E.$

## CHULA QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Prim. Trav. Sta. No. 12, 1913.....	* * "	* * "	Ft.
T, 60 N., R. 23 W., quarter corner between secs. 22 and 27; T road south.....	39 59 41.18	93 29 00.25	
T, 60 N., R. 23 W., quarter corner between secs. 27 and 34; crossroads.....	39 59 41.9	93 28 26.3	2,645
T, 60 N., R. 23 W., south quarter corner of sec. 34, line between Livingston and Grundy counties; T road north.....	39 58 49.5	93 28 25.7	5,305
T, 59 N., R. 23 W., north corner between secs. 3 and 4.....	39 57 57.0	93 28 25.3	5,305
T, 59 N., R. 23 W., corner of secs. 3, 4, 9, and 10; crossroads.....	39 57 56.4	93 29 01.3	2,806
T, 59 N., R. 23 W., corner of secs. 9, 10, 15, and 16; crossroads.....	39 57 05.0	93 29 01.2	5,210
T, 59 N., R. 23 W., corner of secs. 15, 16, 21, and 22; crossroads.....	39 56 12.5	93 29 00.6	5,310
T, 59 N., R. 23 W., corner of secs. 21, 22, 27, and 28; T road west (335 feet south is crossing of Chicago, Milwaukee & St. Paul Ry.).	39 55 20.1	93 28 59.8	5,300
T, 59 N., R. 23 W., corner of secs. 27, 28, 33, and 34; crossroads.....	39 54 27.7	93 28 59.1	5,300
T, 59 N., R. 23 W., south corner of secs. 33 and 34; T road north.....	39 53 35.1	93 28 58.0	5,320
T, 58 N., R. 23 W., north corner of secs. 3 and 4, 25 feet east by 25 feet south of, 3 feet east of corner fence post at T road corners, 1 mile east of Sturges; iron post stamped "Prim. Trav. Sta. No. 18 Mo., 1913". ....	39 52 42.6	93 28 50.9	5,319
T, 58 N., R. 23 W., corner of secs. 3, 4, 9, and 10; T road corners.....	39 51 51.0	93 29 00.5	5,187
T, 58 N., R. 23 W., quarter corner between secs. 15 and 16; T road east.....	39 50 32.2	93 28 59.2	7,971
T, 58 N., R. 23 W., corner of secs. 15, 16, 21, and 22; T road west, about 940 feet south is T road east.....	39 50 06.0	93 28 58.8	2,650
T, 58 N., R. 23 W., corner of secs. 21, 22, 27, and 28; crossroads.....	39 49 13.5	93 28 58.1	5,310
T, 58 N., R. 23 W., corner of secs. 27, 28, 33, and 34; crossroads.....	39 48 21.0	93 28 57.3	5,315
T, 58 N., R. 23 W., quarter corner between secs. 33 and 34.....	39 47 54.5	93 28 56.9	2,675

## CHULA QUADRANGLE—Continued.

## Along highways near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 57 and 58 N., R. 23 W., corner of secs. 3, 4, 33, and 34; T road east (1,335 feet south of this position is crossing of Chicago, Burlington & Quincy R. R.).....	° ' "	° ' "	Feet.
T. 57 N., R. 23 W., corner of secs. 3, 4, 9, and 10; crossroads.....	39 47 28.0	93 28 56.7	2,615
T. 57 N., R. 23 W., quarter corner between secs. 9 and 10; crossroads.....	39 46 35.9	93 28 55.8	5,270
T. 57 N., R. 23 W., corner of secs. 9, 10, 15, and 16 (20 feet south is T road west and 20 feet north is a T road east).....	39 46 08.9	93 28 55.6	2,733
	39 45 41.8	93 28 55.3	2,745

Magnetic declination for west border of quadrangle, 7° 09' E.

## Along highways in northwest corner of quadrangle.

T. 60 N., R. 23 W., corner of secs. 21, 22, 27, and 28, 16 feet south of center of east-west road, opposite road north and 4 feet from wire fence line and fence running north; iron post stamped "Prim. Trav. Sta. No. 12, Mo., 1913".....	•	39 59 41.18	93 29 00.25	.....
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Magnetic declination, 7° 13' E.

## DAWN QUADRANGLE.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 57 N., R. 23 W., quarter corner between secs. 17 and 20; crossroads.....	° ' "	° ' "	Feet.
T. 57 N., R. 23 W., corner of secs. 17, 18, 19, and 20.....	39 44 47.0	93 30 36.6	.....
T road east.....	39 44 45.6	93 31 11.2	2,704
Three-span bridge over Grand River; center of middle span.....	39 44 45.4	93 31 58.3	3,680
T. 57 N., R. 24 W., corner of secs. 23, 24, 25, and 26; T road east.....	39 44 29.9	93 32 04.5	1,644
Iron span bridge over creek; center.....	39 43 51.2	93 33 20.4	7,103
Chicago, Milwaukee & St. Paul Ry. crossing.....	39 43 58.5	93 33 20.5	840
Trestle No. 708 (Chicago, Milwaukee & St. Paul Ry.), south end of; center of track.....	39 44 51.6	93 33 21.8	5,269
T. 57 N., R. 24 W., quarter corner between secs. 21 and 22.....	39 43 54.6	93 34 46.9	8,803
T. 57 N., R. 24 W., quarter corner between secs. 20 and 21; stone.....	39 44 14.6	93 35 41.4	4,710
T. 57 N., R. 24 W., center of sec. 20; crossroads (1,305 feet west of preceding position is T road east).....	39 44 14.1	93 36 48.6	5,250
Utica station, 115 feet N. 67° 50' E. (true) from road crossing, 2.5 feet north of corner of right of way fence, 40 feet north of center of road; iron post stamped "Prim. Trav. Sta. No. 20 Mo., 1913".....	39 44 13.6	93 37 22.7	2,666
T. 57 N., Rs. 24 and 25 W., apparent corner of secs. 13, 18, 19, and 24, or east corner of secs. 13 and 14; a fence runs west and at a point 213 feet north a fence runs east, which may be the corner of secs. 18 and 19 if there is a jog in section line (could not be ascertained).....	39 44 27.9	93 38 05.5	3,645
T road north.....	39 44 37.0	93 38 53.5	3,864
T. 57 N., R. 25 W., corner of secs. 14, 15, 22, and 23; T road west.....	39 44 21.3	93 39 59.7	5,411
T. 57 N., R. 25 W., quarter corner between secs. 15 and 22.....	39 44 33.3	93 41 06.7	5,373
Crossroads.....	39 44 33.8	93 41 40.7	2,655
T. 57 N., R. 25 W., corner of secs. 16, 17, 20, and 21; T road south.....	39 44 34.0	93 42 31.6	3,975
T. 57 N., R. 25 W., corner of secs. 17, 18, 19, and 20, 25 feet south by 20 feet west of, 1.5 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 21 Mo., 1913".....	39 44 34.4	93 44 29.5	5,334

Magnetic declination for north border of quadrangle, 7° 53' E.

## GALLATIN QUADRANGLE.

Along highways near north border and in northwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.	
	°	'	"	Fect.
Gallatin, 2 miles west of, in sec. 13, T. 59 N., R. 28 W.; T road north.	39 55 26.69	93 59 28.03		
T. 59 N., R. 28 W., line between secs. 1 and 12; crossroads.....	39 56 45.13	93 59 29.66	7,940	
T. 59 N., Rs. 27 and 28 W., quarter corner between secs. 1 and 6....	39 57 11.79	93 59 12.99	2,995	
Tps. 59 and 60 N., Rs. 27 and 28 W., township corner, 30 feet west of road marked by a stone.....	39 57 37.86	93 59 13.71	2,638	
T. 60 N., R. 28 W., stone at quarter corner between secs. 30 and 31.....	39 58 30.44	93 58 32.42	6,217	
T. 60 N., R. 28 W., near middle of sec. 30, 15 feet east of north-south road and 35 feet south of center of road, 2 feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 8, 1913".....	39 59 02.74	93 58 33.41	3,270	
T road north.....	39 58 57.36	93 57 25.38	5,324	
Public road crossing Wabash R. R.....	39 58 44.18	93 57 06.70	1,973	
T. 60 N., R. 27 W., north part of sec. 33; T road west.....	39 58 23.03	93 56 16.49	4,457	
T. 60 N., R. 27 W., quarter corner between secs. 27 and 34.....	39 58 32.89	93 55 08.58	5,381	
Crossroads.....	39 58 33.38	93 54 17.33	3,991	
T. 60 N., R. 27 W., corner of secs. 25, 26, 35, and 36; crossroads.....	39 58 33.80	93 53 26.27	3,976	
T. 60 N., R. 26 W., 15 feet west by 5 feet north of west corner between secs. 30 and 31, in line with road east, 1.5 feet from wire fence, 50 feet south of iron bridge; iron post.....	39 58 33.63	93 52 18.24	5,296	
T. 60 N., R. 26 W., corner of secs. 29, 30, 31, and 32; T road south.....	39 58 33.82	93 51 22.90	4,308	
T. 60 N., R. 26 W., corner of secs. 28, 29, 32, and 33; T road north.....	39 58 33.01	93 50 14.44	5,342	
T. 60 N., R. 26 W., quarter corner between secs. 28 and 33; T road west.....	39 58 32.21	93 49 40.41	2,651	
Jamesport, 100 feet west of station, at street crossing; semaphore post; center of main track.....	39 58 26.46	93 48 03.50	7,568	
T. 60 N., R. 26 W., quarter corner between secs. 25 and 26.....	39 58 54.62	93 46 51.36	6,249	
T. 60 N., R. 26 W., corner of secs. 23, 24, 25, and 26; T road east.....	39 59 20.61	93 46 51.40	2,630	
Line between Grundy and Davies counties; center of road.....	39 59 46.28	93 45 44.65	5,809	

Magnetic declination for north border of quadrangle,  $7^{\circ} 51' E.$ 

## Along highways near south border of quadrangle.

T. 57 N., R. 26 W., stone at corner of secs. 10, 11, 14, and 15.....	39 45 24.9	93 47 47.2	
T. 57 N., R. 26 W., stone at quarter corner between secs. 10 and 15.....	39 45 25.5	93 48 21.1	2,646
T. 57 N., R. 26 W., corner of secs. 9, 10, 15, and 16; crossroads.....	39 45 26.2	93 48 54.7	2,630
T. 57 N., R. 26 W., corner of secs. 8, 9, 16, and 17; crossroads.....	39 45 27.3	93 50 02.2	5,276
T. 57 N., R. 26 W., quarter corner between secs. 8 and 17.....	39 45 27.7	93 50 35.5	2,600
T. 57 N., R. 26 W., corner of secs. 7, 8, 17, and 18; crossroads.....	39 45 27.8	93 51 09.0	2,610
T. 57 N., R. 26 W., west corner of secs. 7, 18, T road east.....	39 45 27.8	93 52 13.7	5,055
T. 57 N., R. 26 W., T road corners, apparent east corner of secs. 12 and 13, 22 feet north by 22 feet west of; 1 foot south of corner fence post; iron post stamped "Prim. Trav. Sta. No. 22 Mo., 1913".....	39 45 29.2	93 52 14.0	140
T. 57 N., R. 27 W., corner of secs. 11, 12, 13, and 14; crossroads.....	39 45 28.4	93 53 20.6	5,205
T. 57 N., R. 27 W., quarter corner between secs. 11 and 14.....	39 45 28.5	93 53 55.0	2,085
T. 58 N., R. 28 W., approximate east corner of secs. 1 and 2. (The east corner of secs. 6 and 7, R. 27 W., is about 85 feet north of this position.).....	39 51 31.2	93 59 06.8	
T. 58 N., R. 27 W., corner of secs. 5, 6, 7, and 8; crossroads.....	39 51 33.0	93 57 56.5	5,492
T. 58 N., R. 27 W., quarter corner between secs. 5 and 8; T road south. (580 feet east of preceding position is T road north).....	39 51 33.3	93 57 21.8	2,701
T. 58 N., R. 27 W., corner of secs. 4, 5, 8, and 9; T road north.....	39 51 33.4	93 56 47.7	2,664
T road west.....	39 51 33.9	93 55 57.7	3,900
T. 58 N., R. 27 W., center of sec. 3; lane north.....	39 51 59.7	93 55 04.4	4,083
T. 58 N., R. 27 W., quarter corner between secs. 2 and 3 (apparent); T road west.....	39 51 59.8	93 54 30.4	2,655
Grand River, ford.....	39 52 21.2	93 53 44.2	4,198
Carlow, west of, 55 feet S. $47^{\circ} 50' W.$ (true) from center of track at road crossing, 1 foot east of right of way corner fence post, west of Magill flag station signpost; iron post stamped "Prim. Trav. Sta. No. 23 Mo., 1913".....	39 52 43.2	93 53 42.3	2,235
Road crossing.....	39 52 39.8	93 52 49.2	4,154
Road crossing.....	39 52 36.4	93 51 50.7	4,575
Carlow station, road crossing at Wabash R. R.....	39 52 30.5	93 50 08.5	7,990
Carlow Station, crossroads at, near church and store.....	39 53 02.1	93 50 08.9	3,200
T. 59 N., R. 26 W., stone in center of sec. 33.....	39 52 49.6	93 49 34.8	2,930
T. 59 N., R. 26 W., quarter corner between secs. 33 and 34; crossroads.....	39 52 49.1	93 49 00.9	2,640
Crossroads.....	39 52 48.4	93 48 10.3	3,950
T. 59 N., R. 26 W., quarter corner between secs. 34 and 35; fence south.....	39 52 48.4	93 47 53.1	1,338
T. 59 N., R. 26 W., quarter corner between secs. 35 and 36; T road west.....	39 52 47.8	93 46 44.8	5,325
Tps. 58 and 59 N., Rs. 25 and 26 W., stone at corner, line between Livingston and Davies counties.....	39 52 20.8	93 45 36.3	6,004

Magnetic declination for south border of quadrangle,  $8^{\circ} 25' E.$ ; east border,  $7^{\circ} 47' E.$ ; east-west line through center  $8^{\circ} 00' E.$

## GALT QUADRANGLE.

Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 60 N., R. 23 W., corner of secs. 15, 16, 21, and 22; right angle in road.....	40 00 33.8	93 29 00.5	Feet.
T road corners, roads north, south, and west.....	40 01 13.5	93 28 43.9	4,223
T. 61 N., R. 23 W., south corner of secs. 33 and 34; T road north.....	40 01 57.2	93 28 48.6	4,436
T. 61 N., R. 23 W., corner of secs. 27, 28, 33, and 34; T road west.....	40 02 49.8	93 28 48.8	5,320
T road, roads north, south, and west.....	40 03 55.4	93 28 32.2	6,767
T. 61 N., R. 23 W., quarter corner between secs. 15 and 16.....	40 05 01.4	93 28 49.0	6,799
T. 61 N., R. 23 W., corner of secs. 3, 4, 9, and 10; T road north.....	40 06 20.1	93 28 49.0	7,963
Dunlap, 475 feet east of station, 22 feet north of center of Quincy, Omaha & Kansas City R. R. track, 15 feet east of center of public road, 5 feet from crossing signpost; iron post stamped "Prim. Trav. Sta. No. 13 Mo., 1913".....	40 06 35.6	93 28 49.0	1,570
T. 61 N., R. 23 W., north corner of secs. 3 and 4; T road south.....	40 07 11.2	93 28 49.3	3,006
T. 62 N., R. 23 W., 0.25 mile west of corner of secs. 26, 27, 34, and 35; T road north.....	40 08 03.9	93 27 58.3	6,644
T. 62 N., R. 23 W., quarter corner between secs. 22 and 23.....	40 09 22.6	93 27 41.0	8,072
T. 62 N., R. 23 W., line between secs. 21 and 22; T road north.....	40 09 35.6	93 28 49.4	5,476
T. 62 N., R. 23 W., quarter corner between secs. 15 and 16; T road east.....	40 10 15.2	93 28 40.3	4,000
T. 62 N., R. 23 W., corner of secs. 9, 10, 15, and 16; T road west.....	40 10 41.4	93 28 49.3	2,660
T. 62 N., R. 23 W., corner of secs. 3, 4, 9, and 10.....	40 11 34.0	93 28 49.1	5,320
T. 63 N., R. 23 W., south corner of secs. 33 and 34; crossroads. (The north corner of secs. 3 and 4, T. 62 N., R. 23 W., is about 75 feet east of this position, but there is nothing to indicate the line).....	40 12 25.4	93 28 49.8	5,200
T. 63 N., R. 23 W., corner of secs. 27, 28, 33, and 34.....	40 13 18.2	93 28 49.3	5,346
T. 63 N., R. 23 W., near center of sec. 22, on east side of road, 900 feet south of crossroads, opposite house of James Batson; iron post stamped "Prim. Trav. Sta. No. 14 Mo., 1913".....	40 14 28.2	93 28 14.8	7,568
T. 63 N., R. 23 W., quarter corner between secs. 22 and 23; T road west.....	40 14 37.1	93 27 41.2	2,761

Magnetic declination for west border of quadrangle, 7° 41' E.

## GOWER QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 55 N., R. 32 W., corner of secs. 20, 21, 28, and 29; T road east, west and north roads.....	39 33 30.0	94 30 33.0	Feet.
T. 55 N., R. 32 W., corner of secs. 16, 17, 20, and 21.....	39 34 22.3	94 30 31.9	5,291
Atchison, Topeka & Santa Fe Ry. crossing.....	39 34 54.8	94 30 31.4	3,286
T. 55 N., R. 32 W., 0.25 mile north of corner of secs. 8, 9, 10, and 17; T road corner, east, west, and south roads.....	39 35 28.2	94 30 30.7	3,381
T. 55 N., R. 32 W., 27 feet west of corner of secs. 28, 29, 32, and 33, in ground at T road west, 15 feet east of fence corner; iron post.....	39 37 52.0	94 30 28.8	.....
T. 56 N., R. 32 W., quarter corner between secs. 28 and 29; T roads east, west, and south.....	39 38 18.0	94 30 28.6	2,627
Tps. 56 and 57 N., R. 32 W., corner of secs. 4, 5, 32, and 33; T road corner, roads east, west, and north.....	39 42 13.6	94 30 26.3	.....
T. 57 N., R. 32 W., corner of secs. 28, 29, 32, and 33; T road corners, roads east, west, and south.....	39 43 06.6	94 30 27.5	5,372
T road east.....	39 43 31.8	94 30 10.9	2,860
Stewartsville, 0.25 mile west of, 45 feet south of center of Chicago, Burlington & Quincy R. R., 65 feet southwest of public road crossing, 18 inches from corner post in wire fence; iron post stamped "Prim. Trav. Sta. No. 2, Mo., 1913".....	39 44 59.8	94 30 04.0	8,920

Magnetic declination for east border of quadrangle, 8° 35' E.

**GREEN CITY QUADRANGLE.****Along highways in southwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Small truss bridge over creek.....	40 15 07.09	92 59 58.87	Feet.....

Magnetic declination for southwest corner of quadrangle,  $7^{\circ} 47' E.$ **HALE QUADRANGLE.****Along highways near northwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 57 N., R. 23 W., 25 feet west by 15 feet south of corner of secs. 15, 16, 21, and 22, 2 feet from fence corner at crossroads; iron post stamped "Prim. Trav. Sta. No. 19, Mo., 1913"..... T road south.....	39 44 47.9 39 44 48.4	93 28 54.6 93 29 45.0	Feet..... 3,932

Magnetic declination for northwest corner of quadrangle,  $8^{\circ} 00' E.$ **LUCERNE QUADRANGLE.****Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 63 N., R. 23 W., corner secs. 14, 15, 22, and 23; T road east.....	40 15 03.48	93 27 41.15	Feet.....
T. 63 N., R. 23 W., quarter corner between secs. 14 and 23.....	40 15 03.93	93 27 07.12	2,640
T. 63 N., Rs. 22 and 23 W., corner of secs. 18, 19, 23, and 24; crossroads.....	40 15 04.25	93 25 24.15	7,984
T. 63 N., Rs. 22 and 23 W., quarter corner between secs. 13 and 18.....	40 15 30.44	93 25 24.28	2,530
T. 63 N., R. 22 W., quarter corner between secs. 17 and 18.....	40 15 30.71	93 24 18.57	5,095
T. 63 N., R. 22 W., quarter corner between secs. 16 and 17.....	40 15 31.93	93 23 10.67	5,267
Iron bridge, center of.....	40 15 45.68	93 22 38.86	2,831
County line, approximately, between Grundy and Sullivan counties; no fence line.....	40 15 46.07	93 22 01.67	2,884
T. 63 N., R. 22 W., in northwest quarter of sec. 15; T road corners, roads north, south, and west, about 0.25 mile east of county line.....	40 15 46.36	93 21 44.52	1,331
T. 63 N., R. 22 W., in southwest quarter of sec. 10, T road east, 15 feet west of center of road, in line with road; iron post stamped "Prim. Trav. Sta. No. 15 Mo., 1913".....	40 16 12.85	93 21 44.86	2,682
Chicago, Milwaukee & St. Paul Ry. crossing; T road south on line between secs. 10 and 11 is 1.335 feet west of this position.....	40 16 14.14	93 20 36.21	5,325
T. 63 N., R. 22 W., corner of secs. 11, 12, 13, and 14.....	40 16 01.70	93 19 45.08	4,160
T. 63 N., R. 22 W., quarter corner between secs. 12 and 13; crossroads.....	40 16 02.14	93 19 10.90	2,651
T. 63 N., Rs. 21 and 22 W., corner of secs. 7, 18, 12, and 13.....	40 16 02.58	93 18 36.52	2,666
Crossroads.....	40 16 03.60	93 18 20.07	1,278
T. 63 N., R. 21 W., corner of secs. 7, 8, 17, and 18; T road south.....	40 16 03.58	93 17 29.37	3,930
T. 63 N., R. 21 W., corner of secs. 17, 18, 19, and 20; crossroads.....	40 15 11.20	93 17 29.20	5,300
T. 63 N., R. 21 W., corner of secs. 16, 17, 20, and 21; crossroads.....	40 15 12.67	93 16 20.79	5,308

Magnetic declination for south border of quadrangle,  $7^{\circ} 34' E.$

**MAYSVILLE QUADRANGLE.****Along highways in southwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Feet.
Stewartsville, 200 feet east of station; street crossing.....	39 45 02.0	94 29 46.6	.....

Magnetic declination for south border of quadrangle,  $8^{\circ} 24'$  E.**MILAN QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Feet.
T. 63 N., R. 21 W., quarter corner between secs. 23 and 24; T road north.....	40 14 49.6	93 12 55.7	.....
T. 63 N., R. 20 W., apparent west corner of secs. 19 and 30, right angle in road, fence north-south.....	40 14 24.9	93 11 46.9	5,890
T road north.....	40 14 25.0	93 11 36.0	850
T. 63 N., R. 19 W., quarter corner between secs. 20 and 21; T road east.....	40 14 52.3	93 02 42.7	.....
T. 63 N., R. 19 W., quarter corner between secs. 21 and 22; T road north.....	40 14 51.4	93 01 34.3	5,307
T. 63 N., R. 19 W., center of sec. 22; T road south.....	40 14 50.9	93 01 00.4	2,630

Magnetic declination for north border of quadrangle,  $7^{\circ} 38'$  E.**PLATTSBURG QUADRANGLE.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Feet.
Primary traverse station No. 5, 1911.....	39 30 10.4	94 29 27.3	.....
T. 54 N., R. 32 W., apparent corner secs. 3, 4, 9, and 10, intersection of fences in field.....	39 30 49.3	94 29 26.8	3,941
T road corner, roads east, west, and south.....	39 31 58.0	94 29 25.9	6,954
T. 55 N., R. 32 W., corner of secs. 27, 28, 33, and 34; crossroads.....	39 32 37.5	94 29 26.0	3,996
T. 55 N., R. 32 W., corner of secs. 21, 22, 27, and 28.....	39 33 30.0	94 29 25.8	5,315
T. 55 N., R. 32 W., northeast quarter of sec. 9; T road corners, roads east, west, and north.....	39 35 54.2	94 29 39.0	.....
T road corners, roads east, west, and south.....	39 36 59.8	94 29 57.2	6,789
T road corners, roads northwest and southeast.....	39 38 19.0	94 29 20.9	.....
T. 56 N., R. 32 W., apparent corner secs. 21, 22, 27, and 28; T roads north, south, and east.....	39 38 44.0	94 29 21.0	2,524
T. 56 N., R. 32 W., stone at quarter corner between secs. 21 and 22; crossroads.....	39 39 10.1	94 29 21.0	2,643
T. 56 N., R. 32 W., corner secs. 15, 16, 21, and 22; crossroads.....	39 39 36.3	94 29 20.9	2,650
T. 56 N., R. 32 W., corner secs. 9, 10, 15, and 16.....	39 40 28.8	94 29 21.0	5,311
T. 56 N., R. 32 W., quarter corner between secs. 9 and 10.....	30 40 54.8	94 29 21.0	2,640
T. 56 N., R. 32 W., corner secs. 3, 4, 9, and 10; T road corners, roads north, south, and east, and lane west.....	39 41 21.0	94 29 20.9	2,649
T road corners, roads east, west, and south.....	39 42 00.4	94 29 29.6	4,039

## PLATTSBURG QUADRANGLE—Continued.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T road corner, roads east, west, and north.....	• • "	• • "	Fed.
T. 57 N., R. 32 W., corner of secs. 13, 14, 23, and 24, east-west road, county line between Clinton and DeKalb counties.....	39 44 52.9	94 28 30.0	.....
Township line between Rs. 31 and 32 W., intersection of roads, jog of 35 feet, road east is 15 feet south, and road west is 20 feet north.....	39 44 52.9	94 27 05.2	6,625
T. 57 N., R. 31 W., corner of secs. 16, 17, 20, and 21; T road corner, roads east, west, and north.....	39 44 52.0	94 25 56.8	5,344
T. 57 N., R. 31 W., corner of secs. 15, 16, 21, and 22; T road south Osborn, 1,000 feet west of station, 60 feet south by 25 feet east to center of Burlington Ry. track at public road crossing, 2 feet west by 5 feet south of wire fence; iron post stamped "Prim. Trav. Sta. No. 3, Mo., 1913".....	39 44 51.1	94 23 36.8	10,935
T. 57 N., R. 31 W., corner of secs. 14, 15, 22, and 23.....	39 44 51.68	94 22 28.95	5,300
T. 57 N., R. 31 W., stone at quarter corner between secs. 14 and 23, 465 feet north is T road west.....	39 44 52.8	94 21 38.7	3,227
T. 57 N., R. 31 W., stone at corner of secs. 13, 14, 23, and 24; T road, roads east, west, and north.....	39 44 50.9	94 21 23.5	1,205
T. 57 N., R. 30 W., stone at quarter corner between secs. 18 and 19; township line.....	39 44 51.1	94 20 49.6	2,648
T. 57 N., R. 30 W., corner of secs. 17, 18, 19, and 20; T road south.....	39 44 50.7	94 20 26.0	2,624
T. 57 N., R. 30 W., stone at corner of secs. 16, 17, 20, and 21; T roads north, south, and west.....	39 44 52.1	94 19 07.9	5,323
T. 57 N., R. 30 W., line between secs. 15 and 16; T road north.....	39 44 51.2	94 18 00.5	5,262
T. 57 N., R. 30 W., line between secs. 15 and 16; T road north.....	39 44 49.9	94 16 52.7	5,296
T. 57 N., R. 30 W., line between secs. 15 and 16; T road north.....	39 44 35.2	94 15 44.8	5,511

Magnetic declination for north border of quadrangle  $8^{\circ} 24' E.$ ; west border,  $8^{\circ} 35' E.$ 

## POLO QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Cameron, opposite northwest corner of public park, 252 feet east of center of Chicago, Rock Island & Pacific Ry. track, 3.4 feet south of sidewalk, 17.5 feet east of bell signal post at crossing, top of post 3 inches below level of sidewalk; iron post stamped "Prim. Trav. Sta. No. 4, Mo., 1913".....	• • "	• • "	Fed.
T roads east, west, and south.....	39 44 34.0	94 14 22.4	.....
T. 57 N., R. 29 W., west corner of secs. 18 and 19; approximate corner of Clinton, DeKalb, and Caldwell counties.....	39 44 33.6	94 13 37.6	3,500
T road south.....	39 44 44.7	94 12 20.8	6,101
T. 57 N., R. 29 W., corner of secs. 17, 18, 19, and 20; crossroads.....	39 44 41.2	94 10 04.0	5,185
T. 57 N., R. 29 W., corner of secs. 16, 17, 20, and 21; T road corner, roads east, west, and north.....	39 44 43.8	94 11 10.3	5,511
T. 57 N., R. 29 W., corner of secs. 15, 16, 21, and 22.....	39 44 39.47	94 09 12.06	4,057
T. 57 N., R. 29 W., corner of secs. 14, 15, 22, and 23.....	39 44 38.8	94 08 54.7	1,359
T. 57 N., R. 29 W., corner of secs. 13, 14, 23, and 24, 28 feet south by 24 feet west of center of crossroads; iron post stamped "Prim. Trav. Sta. No. 5, Mo., 1913".....	39 44 35.8	94 07 46.8	5,309
T. 57 N., R. 29 W., east corner of secs. 13 and 24 (the west corner of secs. 18 and 19, T. 57 N., R. 29 W. is 100 feet south of this position).....	39 44 33.8	94 06 42.0	5,070
T. 57 N., R. 28 E., corner of secs. 17, 18, 19, and 20; crossroads.....	39 44 34.0	94 05 35.0	5,235
T. 57 N., R. 28 E., corner of secs. 16, 17, 20, and 21; center of road, cross fence.....	39 44 33.1	94 04 36.7	4,554
T. 57 N., R. 28 W., quarter corner between secs. 16 and 21.....	39 44 33.0	94 03 29.4	5,255
T. 57 N., R. 28 W., corner of secs. 14, 15, 22, and 23; hedge row on north-south line.....	39 44 32.7	94 02 56.6	2,580
Hamilton, west part of, 2 feet south by 1 foot west of northwest corner of brick school building on West Mill Street; iron post stamped "Prim. Trav. Sta. No. 6, Mo., 1913" (the approximate corner of secs. 13, 14, 23, and 24. T. 57 N., R. 28 W. is 178 feet west of above permanent station mark).....	39 44 32.4	94 01 16.7	7,806
	39 44 32.6	94 00 08.2	5,356

Magnetic declination for north border of quadrangle,  $8^{\circ} 46' E.$

## WINIGAN QUADRANGLE.

Station.	Latitude.	Longitude.	Distance between stations.
Yellow Creek Baptist Church, 1,100 feet west of, in southeast corner of sec. 23, T. 63 N., R. 19 W., inside wire fence corner in northwest corner of crossroads, 30 feet northwest of intersection of roads; iron post stamped "Prim. Trav. Sta. No. 9, 1910, Mo." (tie point, 1913 work).....	• ′ ″ 40 14 23.6	• ′ ″ 92 59 18.5	Feet.
T. 63 N., R. 19 W., corner of secs. 23, 24, 25, and 26.....	40 14 23.3	92 59 18.2	30

## WINSTON QUADRANGLE.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 57 N., R. 28 W., approximate corner secs. 11, 12, 13, and 14.....	• ′ ″ 39 45 24.99	• ′ ″ 94 00 10.30	.....
T. 57 N., R. 28 W., corner of secs. 1, 2, 11, and 12; T road east (T road west is 90 feet south of this position).....	39 46 17.21	94 00 10.63	5,285
T. 57 N., R. 28 W., approximate north corner of secs. 1 and 2 (the south corner of secs. 35 and 36, T. 58 N., R. 28 W., is about 85 feet east of this position).....	39 47 02.42	94 00 11.08	4,576
T. 58 N., R. 28 W., corner of secs. 25, 26, 35, and 36; crossroads.....	39 48 02.29	94 00 10.84	6,058
T. 58 N., R. 28 W., corner of secs. 23, 24, 25, and 26; crossroads.....	39 48 54.57	94 00 11.70	5,291
T. 58 N., R. 28 W., corner of secs. 13, 14, 23, and 24; crossroads.....	39 49 46.84	94 00 12.87	5,291
T road east (on section line ?), near end of iron bridge.....	39 50 39.12	94 00 12.74	5,291
T. 58 N., R. 28 W., corner of secs. 1, 2, 11, and 12, 20 feet south of crossroads, 2 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 7, Mo., 1913".....	39 51 31.14	94 00 14.93	5,267
T road south, on north-south section line.....	39 52 10.48	94 00 15.87	3,983
Tps. 58 and 59 N., line between, about 0.25 mile west of southeast corner of sec. 36.....	39 52 22.66	94 00 32.71	1,800
T. 59 N., R. 28 W., in southeast quarter of sec. 26, T road south.....	39 53 17.65	94 00 33.49	5,565
T. 59 N., R. 28 W., corner of secs. 23, 24, 25, and 26; center of east-west road.....	39 54 07.35	94 00 17.91	5,174
T. 59 N., R. 28 W., corner of secs. 23, 24, 13, and 14; crossroads.....	39 54 59.66	94 00 19.00	5,294
T. 59 N., R. 28 W., quarter corner between secs. 13 and 14.....	39 55 25.85	94 00 19.42	2,651

Magnetic declination for east border of quadrangle,  $8^{\circ} 10' E.$

## Joplin district, Neosho, Noel, Bitchey, and Wyandotte quadrangles.

## McDONALD AND NEWTON COUNTIES.

The following geographic positions were determined by primary traverse and are based upon positions in Wyandotte quadrangle located in 1908, approximate North American datum. A tie was also made with primary traverse station No. 8, 1909, both described in Bulletin 440.

The work was done by E. L. McNair in April, 1914.

## JOPLIN DISTRICT.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 26 and 27 N., Rs. 30 and 31 W., 45 feet south and 25 feet west of, at crossroads, close to hedge fence, iron bench mark post stamped "Prim. Trav. Sta. No. 3, 1914, Mo.".....	37 00 33.9	94 15 37.8	Feet.
Tps. 26 and 27 N., R. 31 W., corner secs. 1, 2, 35, and 36, crossroads at.....	37 00 35.0	94 16 42.7	5,268
T. 26 N., R. 31 W., north corner between secs. 2 and 3, T road south.....	37 00 35.6	94 17 48.2	5,310
T. 27 N., R. 31 W., 195 feet east of south corner secs. 33 and 34, is T road south at north corner secs. 3 and 4, T. 26 N., R. 31 W.....	37 00 36.1	94 18 50.6	5,060
Tps. 26 and 27 N., 0.25 mile north of line between, on line between secs. 34 and 35; stake.....	37 00 56.5	94 30 57.8	.....
Shoal Creek, north end of bridge over.....	37 01 15.4	94 30 44.2	2,204
T. 27 N., Rs. 32 and 33 W., quarter corner between secs. 31 and 36, stone.....	37 01 08.1	94 28 45.3	9,666
Milepost "K. C. 162" center of track of Kansas City Southern Ry. at.....	37 00 28.1	94 27 55.1	5,738

Magnetic declination for south border of quadrangle,  $8^{\circ} 26' E.$ 

## NEOSHO QUADRANGLE.

## Along highways through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Racine station, about 1.20 miles east of, public road crossing.....	36 53 27.2	94 29 57.7	Feet.
T. 25 N., R. 32 W., quarter corner between secs. 17 and 18, crossroads at.....	36 53 18.0	94 27 46.1	6,209
T. 25 N., R. 32 W., quarter corner between secs. 18 and 17, T road west.....	36 53 17.5	94 26 40.7	10,730
T. 25 N., R. 32 W., corner secs. 16, 17, 20, and 21, crossroads.....	36 52 51.3	94 28 41.4	5,310
T. 25 N., R. 32 W., corner secs. 15, 16, 21, and 22, crossroads.....	36 52 50.6	94 25 36.2	5,290
T. 25 N., R. 32 W., corner secs. 14, 15, 22, and 23, crossroads.....	36 52 49.6	94 24 31.1	5,294
T. 25 N., R. 32 W., corner secs. 13, 14, 23, and 24, crossroads.....	36 52 48.7	94 23 26.9	5,215
Neosho, T. 25 N., Rs. 31 and 32 W., approximate corner secs. 18, 19, 13, and 24 (this corner is at north end of High Street).....	36 52 47.9	94 22 21.9	5,280
Neosho, 0.61 mile north of Kansas City Southern Ry. station, 180 feet east of above-described section corner, 26 feet west of track on wire fence line; iron bench-mark post stamped "Prim. Trav. Sta. No. 1, 1914, Mo.".....	36 52 47.9	94 22 19.5	195
T. 25 N., R. 31 W., corner secs. 17, 18, 19, and 20, fences east, west, and north.....	36 52 40.2	94 21 17.2	5,126
T. 25 N., R. 31 W., corner secs. 16, 17, 20, and 21, center of east and west road.....	36 52 45.8	94 20 08.4	5,615
T. 25 N., R. 31 W., corner secs. 15, 16, 21, and 22, T road west.....	36 52 44.6	94 19 03.4	5,290
T road north.....	36 52 30.5	94 18 16.0	4,106
T. 25 N., R. 31 W., on line between secs. 22 and 23, T road south.....	36 52 30.1	94 17 59.8	3,315
Crossroads.....	36 52 29.7	94 17 27.6	2,616
T. 25 N., R. 31 W., quarter corner between secs. 14 and 23.....	36 52 42.7	94 17 27.4	1,315
T. 25 N., R. 31 W., corner secs. 13, 14, and 23 and 24.....	36 52 42.2	94 16 55.3	2,606
T. 25 N., Rs. 30 and 31 W., 35 feet north and 20 feet east of crossroads at corner of secs. 13, 18, 19, 24, 2 feet from wire fence line; from bench-mark post stamped "Prim. Trav. Sta. No. 2, 1914".....	36 52 42.0	94 15 50.6	5,263
T. 25 N., Rs. 30 and 31 W., corner secs. 7, 12, 13, and 18, T road east, fence line west.....	36 53 33.9	94 15 49.2	5,250
T. 25 N., Rs. 30 and 31 W., corner secs. 1, 6, 7, and 12, road north and south, fence line east and west.....	36 54 28.0	94 15 47.7	5,270
Granby station (Missouri Pacific Ry.) street crossing at.....	36 55 09.9	94 15 22.6	4,886
Tps. 25 and 26 N., Rs. 30 and 31 W., corner of, rock in east and west road.....	36 55 19.9	94 15 46.5	2,183
T. 26 N., Rs. 30 and 31 W., corner secs. 25, 30, 31, and 36.....	36 56 12.4	94 15 45.3	5,314
Granby station (Frisco Ry.) about 400 feet east of, public road crossing.....	36 56 34.3	94 15 57.5	2,420

## NEOSHO QUADRANGLE—Continued.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 26 N., Rs. 30 and 31 W., corner secs. 19, 30, 24, and 25.....	36 57 04.6	94 15 43.2	Fret.
T. 26 N., Rs. 30 and 31 W., corner secs. 13, 18, 19, and 24; crossroads.....	36 57 57.1	94 15 42.0	3,277
T. 26 N., Rs. 30 and 31 W., quarter corner between secs. 13 and 18; T road west.....	36 58 22.9	94 15 41.4	5,310
T. 26 N., Rs. 30 and 31 W., corner secs. 7, 12, 13, and 18; crossroads.....	36 58 49.3	94 15 40.6	2,615
T. 26 N., Rs. 30 and 31 W., corner secs. 1, 6, 7, 12; crossroads.....	36 59 41.9	94 15 39.2	2,165
			5,320

## Along highways near north border of quadrangle.

Diamond Village, T. 26 N., R. 31 W., corner secs. 3, 4, 9, and 10; main crossroads at.....	36 59 42.6	94 18 52.4	.....
T. 26 N., R. 31 W., corner secs. 4, 5, 8, and 9; crossroads.....	36 59 43.6	94 19 57.1	5,250
T. 26 N., R. 31 W., corner secs. 5, 6, 7, and 8; road crossing, center of.....	36 59 44.4	94 21 01.3	5,204
T. 26 N., R. 31 W., 15 feet south and 20 feet west of west corner secs. 6 and 7 and 15 feet north and 20 feet west of east corner secs. 1 and 2; T. 26 N., R. 32 W., inside of fence corner; iron post stamped "Prim. Trav. Sta. No. 4, 1914, Mo.".....	36 59 46.1	94 22 15.8	6,045
T. 26 N., R. 32 W., corner secs. 1, 2, 11, and 12; crossroads.....	36 59 46.6	94 23 20.8	5,275
T. 26 N., R. 32 W., corner secs. 2, 3, 10, and 11.....	36 59 47.2	94 24 25.8	5,275
T. 26 N., R. 32 W., corner secs. 3, 4, 9, and 10; rock at fence line north.....	36 59 48.2	94 25 31.5	5,324
T. 26 N., R. 32 W., stone, corner secs. 4, 5, 8, and 9; at intersection fence lines north, east, and west.....	36 59 49.1	94 26 37.2	5,330

## Along east border of quadrangle.

T. 25 N., Rs. 30 and 31 W., corner secs. 19, 24, 25, and 30; crossroads at Aroma.....	36 51 49.5	94 15 52.2	.....
T. 25 N., Rs. 30 and 34 W., quarter corner between secs. 23 and 30; road at fences east and west.....	36 51 23.4	94 15 53.0	2,640
T. 25 N., Rs. 30 and 31 W., corner secs. 25, 30, 31, and 36; stone near center of road crossing.....	36 50 57.4	94 15 53.8	2,636
T. 25 N., Rs. 30 and 31 W., quarter corner between secs. 36 and 31, at second-class T road west.....	36 50 31.1	94 15 54.4	2,655
Tps. 24 and 25 N., Rs. 30 and 31 W., at south corner of secs. 31 and 36; center of east and west road at.....	36 50 05.2	94 15 55.2	2,626
Sweetwater, T road north at, 25 feet northeast to telephone pole at corner roads; 30 feet northwest to corner of stone.....	36 49 37.7	94 15 55.8	2,775
T. 24 N., R. 31 W., corner secs. 2, 3, 10, and 11; T road south.....	36 49 36.0	94 15 07.6	3,920
T. 24 N., R. 31 W., quarter corner between secs. 10 and 11; road at fence line west.....	36 49 09.9	94 15 08.8	2,640
T. 24 N., R. 31 W., corner secs. 10, 11, 14, and 15; center of north and south road near fence line east.....	36 48 41.7	94 15 10.0	2,856

## Along highways near south border of quadrangle.

T. 24 N., R. 31 W., stone corner secs. 27, 28, 33, and 34, about 250 feet north of ford across Indian Creek.....	36 46 09.6	94 16 22.2	.....
T. 24 N., R. 31 W., 2,045 feet south of corner secs. 27, 28, 33, and 34, on south side of east and west road and in line with road north; iron bench mark post stamped "Prim. Trav. Sta. No. 5, 1914, Mo.".....	36 45 49.3	94 16 23.2	2,046
Tps. 23 and 24 N., R. 31 W., on line between secs. 4 and 33; center of road at Newton-McDonald county line crossing.....	36 45 18.6	94 16 51.7	3,877
Tps. 23 and 24 N., Rs. 32 and 33 W., corner of; also on McDonald-Newton county line.....	36 45 37.4	94 26 01.0	.....
Forks of road, 0.66 mile west of above township corner.....	36 45 26.5	94 26 41.6	3,484
T road north; center of east and west road at.....	36 45 27.1	94 27 05.8	1,970
T. 23 N., R. 33 W., quarter corner between secs. 2 and 3.....	36 45 16.5	94 28 10.8	5,398
T. 23 N., R. 33 W.; in middle of sec. 3.....	36 45 12.3	94 28 42.5	2,618

Magnetic declination for north border of quadrangle,  $8^{\circ} 26' E.$ ; for south border,  $8^{\circ} 32' E.$ ; for east border,  $8^{\circ} 03' E.$ ; for center,  $8^{\circ} 15' E.$

## NOEL QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T road north.....	° ' "	° ' "	Feet.
T road southeast at north side of northeast and southwest road.....	36 44 59.4	94 17 11.1	
McNatt, west corner of south abutment of iron truss bridge over Indian Creek.....	36 44 49.0	94 17 26.8	1,659
T. 23 N., Rs. 31 and 32 W., at corner secs. 7, 12, 13, and 18; cross-roads.....	36 43 54.8	94 18 42.1	8,217
T. 23 N., R. 32 W., stone quarter corner between secs. 11 and 14; Erie, 75 feet northwest of August Frost's store, 20 feet north and 35 feet west of T road corners, 12 feet northeast of corner of blacksmith shop; iron post stamped "Prim. Trav. Sta. No. 6, 1914, Mo.".....	36 43 40.0	94 19 40.3	4,970
T. 23 N., R. 32 W., corner secs. 10, 11, 14, and 15; iron bolt.....	36 43 42.6	94 21 18.0	7,957
Goodman station, 100 feet southwest of; public road crossing.....			
T. 23 N., R. 32 W., corner secs. 5, 6, 7, and 8; T roads east, west, and north.....	36 44 43.1	94 24 59.1	3,240
T road corners, roads east, west, and north.....	36 44 44.8	94 25 47.4	3,940

Magnetic declination along north border of quadrangle,  $8^{\circ} 32'$  E.

## RITCHIEY QUADRANGLE.

Spur line to connect with traverse run in 1909. Along St. Louis &amp; San Francisco R. R. from west border to point 2 miles east of Ritchey.

Station.	Latitude.	Longitude.	Distance between stations.
Granby station, about 1.50 miles east of; public road crossing.....	° ' "	° ' "	Feet.
Granby station, 2.20 miles east of; west end of bridge No. 2909 over Shoal Creek (wagon road passes under end of bridge).....	36 56 42.7	94 14 22.8	
Shoal Creek, abutment west end of Bridge No. 298.5.....	36 56 35.6	94 13 36.3	3,844
Ritchey station, 100 feet west of; railroad crossing.....	36 56 42.4	94 12 09.0	7,116
Ritchey station, 0.81 mile east of; public road crossing.....	36 56 32.8	94 11 08.4	5,017
T. 26 N., Rs. 29 and 30 W., line between secs. 25 and 30; center of track at.....	36 56 22.2	94 10 17.4	4,279
Ritchey, about 2.25 miles east of, on south of road crossing St. Louis & San Francisco R. R., 50 feet west and 60 feet north to crossing; iron bench mark post, stamped "Prim. Trav. Sta. No. 8, 1909, Mo.".....	36 56 11.3	94 09 12.4	5,391
Astronomic value obtained in 1909.....	36 56 08.48	94 08 45.44	
	36 56 11.70	94 08 46.90	2,203

## On highway near southwest corner of quadrangle.

T road corners, roads north, east, and west, about 150 feet east of small stream.....	36 47 38.2	94 14 56.7	
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Magnetic declination along west border of quadrangle,  $8^{\circ} 03'$  E.

## WYANDOTTE QUADRANGLE.

Along highways near northeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 26 N., R. 33 W., 35 feet southeast of corner secs. 4, 5, 8, and 9, beside wire fence; iron post stamped "Prim. Trav. Sta. No. 9, 1906".....	° ' "	° ' "	Feet.
T. 23 N., R. 33 W., corner secs. 5, 6, 7, and 8, 500 feet south of forks of road at large oak tree near east bank of Buffalo Creek, just west of May's store, 25 feet east of a walnut tree, near bank of creek; stone just above surface of ground.....	36 59 52.34	94 33 05.00	
Tps. 23 and 24 N., R. 33 W., corner secs. 5, 6, 31, and 32; stone on county line between Newton and McDonald counties.....	36 44 57.1	94 31 25.9	
T. 24 N., R. 33 W., corner secs. 29, 30, 31, and 32; road north and west.....	36 45 49.0	94 31 24.6	5,252
T. 24 N., R. 33 W., 200 yards northwest of southeast corner of sec. 19, 6 feet northwest corner of fence near northwest corner of T road west; iron bench-mark post stamped "Prim. Trav. Sta. No. 7, 1906".....	36 46 41.3	94 31 22.1	5,252
Prim. Trav. Sta. No. 8, 1906 (see Bull. 440, p. 489).....	36 47 34.14	94 31 28.2	5,368
T. 25 N., R. 33 W., quarter corner between secs. 10 and 15, 125 feet east of bridge; center of east and west road at north and south fence.....	36 53 52.14	94 31 36.40	
Racine station, center of St. Louis & San Francisco R. R. track at.....	36 53 45.8	94 31 23.5	682
	36 53 40.8	94 31 12.3	1,800

**Bandyville, Cabool, Cedar Gap, Clear Springs, Eminence, Exchange, Fordland, Lebanon, Long Lane, Macomb, Monteer, Niangua, Passover, Redford, Ruble, Sinkin, Sleeper, Summersville, and Willow Springs quadrangles.**

**CAMDEN, HOWELL, LACLEDE, REYNOLDS, SHANNON, TEXAS, WEBSTER, AND WRIGHT COUNTIES.**

The following geographic positions on North American datum were determined by primary traverse run in the fall of 1913 by E. L. McNair. The line is based upon a traverse position at Linn Creek, Camden County, established in 1902, described in Bulletin 216, and based upon triangulation of the Coast and Geodetic Survey. The line runs south to the main line of the St. Louis & San Francisco Railroad, which it follows southwest to Marshfield, thence goes south across country to Fordland, on the Springfield-Memphis branch of the Frisco Railroad, thence east along this line and the Current River branch to Low Wossie, Shannon County, thence north and east by road via Ellington and Centerville, Reynolds County, to a tie on primary traverse position about 5 miles north of Centerville, established in 1907, described in Bulletin 440.

This line is about 250 miles in length and the error of closure is  $-1.65''$  in latitude and  $-1.35''$  in longitude.

In the spring of 1914 lines were run by McNair to complete the control of the Eminence quadrangle.

**BANDYVILLE QUADRANGLE.**

**Along St. Louis & San Francisco R. R. Current River branch, from Birch Tree to Low Wossie.**

Station.	Latitude.	Longitude.	Distance between stations.
Birch Tree station, 610 feet west of, 48 feet south of center of track in rear of M. L. Lee's blacksmith and wagon shop, 2 feet from fence corner; iron post stamped "Prim. Trav. Sta. No. 50, 1913, Mo."	36 59 23.0	91 29 42.2	2,217
Road crossing.....	36 59 36.0	91 29 18.8	2,308
T. 27 N., R. 5 W., quarter corner between secs. 22 and 23, as indicated by fence corner 544 feet north of railroad.....	36 59 41.7	91 28 20.6	4,027
Road crossing.....	36 59 25.2	91 28 51.6	2,128
T. 27 N., Rs. 4 and 5 west; center of track at range line.....	36 59 42.7	91 26 19.0	3,180
T. 27 N., R. 4 W., center of track at line between secs. 19 and 20.....	36 59 53.5	91 25 19.8	4,925
Bartlett flag station, 350 feet north 25° east from station signpost, 325 feet northeast from store building and post office, 85 feet from center of track and 2½ feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 51, 1913, Mo.".....	37 00 12.5	91 24 54.0	2,839
T. 27 N., R. 3 W., quarter corner between secs. 18 and 19; corner about 320 feet south of railroad.....	37 00 07.3	91 19 10.3	.....
T. 27 N., R. 3 W., corner of secs. 20, 21, 28, and 29.....	36 59 12.9	91 17 33.9	9,570
Road crossing under railway.....	36 59 31.1	91 16 13.9	6,741
Low Wossie flag station, 300 feet west of, 190 feet north of track on east side of road leading north, 2 feet from fence line; iron post stamped "Prim. Trav. Sta. No. 52, 1913, Mo.".....	36 59 18.7	91 15 29.4	3,826
T. 27 N., R. W., corner of secs. 22, 23, 26, and 27; a lane north and south and fence east.....	36 59 10.3	91 15 23.0	994

Magnetic declination for north border of quadrangle,  $6^{\circ} 10' E.$

## CABOOL QUADRANGLE.

Along St. Louis &amp; San Francisco R. R. from Mountain Grove to Sterling flag station.

Station.	Latitude.	Longitude.	Distance between stations.
T. 28 N., R. 12 W., center of track at line between secs. 8 and 9. This is also county line between Wright and Texas counties.	37 07 45.9	92 14 57.0	2,733
T. 28 N., R. 12 W., center of track at line between secs. 10 and 11.	37 07 47.6	92 13 53.1	5,175
Road crossing.....	37 07 56.2	92 13 20.0	2,821
Road crossing.....	37 08 17.6	92 12 07.3	6,275
T. 28 N., Rs. 11 and 12 W.; center of track at line between.....	37 08 23.1	92 11 41.7	2,143
Road crossing.....	37 08 24.8	92 11 08.6	2,687
T. 28 N., R. 11 W., stone in east and west public road on line between secs. 5 and 6 and which is 820 feet north of railroad track.	37 08 41.0	92 10 37.5	3,002
Road crossing under railroad.....	37 08 18.3	92 10 01.8	3,695
Hank's spur, switch stand at.....	37 07 45.4	92 08 41.7	7,292
T. 28 N., R. 11 W., crossing of line between secs. 9 and 10; center of track at.....	37 07 45.2	92 08 29.3	999
T. 28 N., R. 11 W., crossing of line between secs. 10 and 11; center of track at.....	37 07 39.5	92 07 25.4	5,212
Road crossing.....	37 07 20.6	92 06 46.0	3,720
Cabool station, 700 feet west of, 90 feet north of track, 12 feet west of fence corner; iron post stamped "Prim. Trav. Sta. No. 43, 1913, Mo.".....	37 07 13.7	92 06 14.8	2,627
Road crossing.....	37 07 25.4	92 05 39.5	3,095
Road crossing.....	37 07 41.0	92 05 20.9	2,190
Iron girder bridge No. 280.8; east end abutment of.....	37 08 17.2	92 04 43.2	4,758
T. 28 N., R. 10 W., stone and iron rod at fence corner on section line between secs. 5 and 6, and approximately quarter mile north of corner of secs. 5, 6, 7, and 8. This point is 370 feet west of railroad.	37 07 55.2	92 04 14.6	3,213
T. 28 N., R. 10 W., road crossing in line between secs. 5 and 8.....	37 07 39.0	92 03 52.4	2,428
T. 28 N., R. 10 W., fence corner 75 feet west of railroad, which is on line between secs. 8 and 9, and approximately quarter mile north of corner of secs. 8, 9, 16, and 17.....	37 07 02.4	92 03 10.3	5,037
Sax's spur, switch stand at.....	37 06 43.4	92 02 58.4	2,151
T. 28 N., R. 10 W., quarter mile north of line between secs. 16 and 21; center of track at crossing of east and west fence line.....	37 06 09.6	92 02 31.0	4,082
Sargent flag station, 300 feet south of, 90 feet south 27° west from road crossing, 50 feet south of public road beside corner fence post; iron post stamped "Prim. Trav. Sta. No. 44, 1913, Mo.".....	37 05 09.0	92 01 36.6	7,548
T. 28 N., R. 10 W., quarter mile north of line between secs. 27 and 34; center of track at east and west fence line.....	37 04 24.1	92 01 16.7	4,813
T. 27 N., R. 10 W., north corner for secs. 2 and 3. A road east and south. This is county line between Texas and Howell counties.	37 03 18.2	92 01 02.7	6,764
Sterling flag station; road crossing at.....	37 02 31.8	92 00 26.9	5,513

Magnetic declination for center of quadrangle, 6° 50' E.; for southeast quarter, 6° 40' E.

## CEDAR GAP QUADRANGLE.

Along St. Louis &amp; San Francisco R. R. from Seymour to Macomb.

Station.	Latitude.	Longitude.	Distance between stations.
T. 28 N., R. 17 W., quarter corner between secs. 1 and 12. This corner is 610 feet north of railroad.....	37 08 23.8	92 44 43.6	3,202
Road crossing.....	37 07 47.7	92 43 11.1	8,332
T. 28 N., R. 16 W., corner of secs. 7, 8, 17, and 18; road north and south, fence line east and west.....	37 07 31.9	92 43 11.7	1,595
Road crossing, near center of sec. 16.....	37 07 05.0	92 41 39.9	7,922
NOTE.—County line between Webster and Wright counties could not be located.			
Cedar Gap station, 85 feet east from southeast corner of, 60 feet east of center of track on top of bank, 2 feet from corner post of yard fence; iron post stamped "Prim. Trav. Sta. No. 38, 1913, Mo.".....	37 06 16.8	92 40 16.1	8,359
T. 28 N., R. 16 W., crossing of line between secs. 22 and 23; center of track.....	37 06 01.7	92 39 57.3	2,157
Road crossing.....	37 05 46.3	92 37 53.1	10,185
T. 28 N., Rs. 15 and 16 west, corner of secs. 19, 30, 24, and 25, approximately within 50 feet; 450 feet south of railroad and 35 feet southwest of fence corner.....	37 05 42.9	92 37 48.1	529
Road crossing under railroad.....	37 06 15.0	92 36 44.2	6,110
T. 28 N., R. 15 W., corner of secs. 16, 17, 20, and 21; corner is nearly 500 feet north of railroad.....	37 06 33.1	92 35 36.6	5,773
Mansfield station, 200 feet south 72° west from semaphore post, 80 feet north 43° west from northwest corner of Mansfield hotel, 3 feet from concrete sidewalk and 3 feet from fence corner; iron post stamped "Prim. Trav. Sta. No. 39, 1913, Mo.".....	37 06 18.7	92 34 58.2	3,457
T. 28 N., R. 15 W., crossing of line between secs. 26 and 27.....	37 05 25.2	92 33 27.5	9,129
T. 28 N., Rs. 14 and 15 west; crossing of range line.....	37 05 07.3	92 31 17.9	10,659
Road crossing, private.....	37 05 21.8	92 30 15.0	5,299

Magnetic declination along east-west line through center of quadrangle, 7° 10' E.

## CLEAR SPRINGS QUADRANGLE.

Along St. Louis &amp; San Francisco R. R. from Sterling flag station to Willow Springs.

Station.	Latitude.	Longitude.	Distance between stations.
Road crossing.....	° ' "	° ' "	
T. 27 N., R. 10 W.; crossing of line through middle of sec. 13.....	37 01 55.9	91 59 52.1	4,603
Road crossing.....	37 01 05.9	91 59 34.6	5,256
T. 27 N., R. 10 W., quarter corner on east side sec. 24; fence north, south, and west.....	37 00 26.4	91 59 08.5	4,520
	37 00 13.3	91 58 54.2	1,761

## EMINENCE QUADRANGLE.

Along St. Louis &amp; San Francisco R. R., Current River branch.

Station.	Latitude.	Longitude.	Distance between stations.
Bartlett flag station, 350 feet N. 25° E. from station sign post, 325 feet northeast from store building and post office, 85 feet from center of track, and 2.5 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 51, 1913, Mo.".....	° ' "	° ' "	
T. 27 N., R. 4 W., quarter corner between secs. 17 and 20.....	37 00 12.5	91 24 54.0	
Road crossing.....	37 00 06.8	91 24 46.5	840
T. 27 N., R. 4 W., center of track at line between secs. 16 and 17.....	37 00 08.5	91 23 54.8	4,201
Eminence turnout; head block at.....	37 00 21.0	91 23 07.7	4,022
Road crossing.....	37 00 36.4	91 22 12.4	4,752
T. 27 N., R. 4 W., quarter corner between secs. 13 and 14; corner is in east and west road 550 feet south of railroad.....	37 00 39.7	91 21 53.5	1,566
T. 27 N., R. 4 W., quarter corner in east side sec. 13.....	37 00 32.2	91 20 55.9	4,735
Road crossing.....	37 00 33.8	91 19 50.8	5,296
T. 27 N., R. 3 W.; quarter corner between secs. 18 and 19 corner is 320 feet south of track.....	37 00 10.6	91 19 10.6	4,018
	37 00 07.3	91 19 10.3	329

## Near east border of quadrangle along and near public roads.

T. 27 N., R. 3 W., corner of secs. 14, 15, 22, and 23; at fence corner.....	37 00 02.6	91 15 21.2	
T. 27 N., R. 3 W., quarter corner between secs. 14 and 15.....	37 00 28.7	91 15 20.4	2,639
T. 27 N., R. 3 W., quarter corner between secs. 2 and 3.....	37 02 13.6	91 15 17.4	10,610
T. 28 N., R. 3 W., south corner between secs. 34 and 35. The north corner for secs. 2 and 3 is 16 feet east of above.....	37 02 37.1	91 15 17.3	2,384
T. 28 N., R. 3 W., in northwest quarter of sec. 38, nail in top of small stump 15 inches high and 4 inches in diameter, 10 feet west of road on top of divide just before descending into Rocky Creek.....	37 03 27.2	91 14 51.3	5,484
T. 28 N., R. 3 W., corner of secs. 22, 23, 26, and 27.....	37 04 21.8	91 15 14.3	5,228
T road west.....	37 05 02.8	91 14 57.0	4,373
T land west.....	37 06 32.6	91 14 55.1	9,042
T. 28 N., R. 3 W., corner of secs. 2, 3, 10, and 11.....	37 06 59.2	91 15 10.6	2,965
Shawnee post office, private house and store, 72 feet west, across road and just west of wire fence. In southeast quarter of sec. 3; iron post stamped "Prim. Trav. Sta. No. 53, 1913, Mo.".....	37 07 15.4	91 15 39.3	2,852
T. 28 N., R. 3 W., north corner for secs. 3 and 4; corner is 900 feet north of road.....	37 07 51.8	91 16 15.7	4,707
T. 29 N., R. 3 W., corner of secs. 28, 29, 32, and 33.....	37 08 46.3	91 17 20.6	7,616
T. 29 N., R. 3 W., quarter corner between secs. 20 and 29.....	37 09 39.4	91 17 51.5	5,923
Sec. 20, northeast quarter of, at junction of road west to Eminence and road east down Jacks Fork; nail in root of water-oak tree, blazed on two sides and marked "U. S. P. T.".....	37 10 18.6	91 17 59.6	4,018
T. 29 N., R. 3 W., quarter corner between secs. 17 and 20; pile of stones in line with fence west, but 20 feet west of fence south.....	37 10 31.6	91 17 50.4	1,509
Jacks Fork, center of ford at, not far from quarter corner between secs. 9 and 16, but neither corner or line could be found.....	37 10 59.4	91 17 18.0	3,851
T. 29 N., R. 3 W., in northwest quarter sec. 15, 100 feet north of bank of Current River at ford, 10 feet south of rod; nail in root of elm tree, blazed on two sides and marked "U. S. P. T.".....	37 11 09.6	91 15 45.8	7,529
Forks of road, in sec. 14, 33 feet east to signboard "Eminence 8 miles," and 33 feet north to signboard "Centerville 28 miles".....	37 10 50.0	91 14 37.7	5,856

Magnetic declination for south border of quadrangle, 6° 10' E.; for east border, 6° 15' E.

## EMINENCE QUADRANGLE—Continued.

Along highways through center of quadrangle.

Station	Latitude	Longitude	Distance between stations.
T. 29 N., R. 3 W., sec. 20, northeast quarter of at junction road west to Eminence and road east down James Fork; in root of water-oak tree, blazed on two sides and marked "U. S. F. T." James Fork, at west side of first ford above Shawnee Creek, forks of road.....	37 10 18.56	91 17 59.61	Ped.
Point roads N. 18° W., S. 28° W., and S. 58° E.....	37 10 26.9	91 18 31.7	2,731
James Fork, on west side at second crossing below Eminence, in root of large elm tree; nail.....	37 09 58.6	91 19 51.8	7,082
Eminence, in northeast corner of courthouse yard, 12 feet south and 6 feet west of corner of stone wall, iron bench mark post stamped "Prim. Trav. Sta. No. 6, 1914, Mo.".....	37 09 41.5	91 20 28.4	3,426
Eminence, T. 29 N., R. 4 W., corner secs. 26, 27, 34, and 35, about 1,500 feet west of Riverside Hotel.....	37 08 53.8	91 21 28.8	6,870
West Eminence station, about 300 feet north of crossing of Salem-Winnona & Southern Ry. and road.....	37 08 49.8	91 21 47.3	1,549
T. 29 N., R. 4 W., stone at corner secs. 27, 28, 33, and 34.....	37 08 36.3	91 22 49.7	5,237
James Fork, 250 feet west of railroad trestle over road crossing.....	37 08 49.4	91 22 52.6	1,339
James Fork, on north side of, near switch at loading spur, railroad crossing.....	37 09 10.8	91 22 40.5	2,377
Milepost No. 16; center track opposite railroad crossing, near small frame house on north side of tracks and 70 feet east of trestle (line leaves railroad about 1,000 feet west of this crossing).....	37 09 31.6	91 23 28.9	4,446
T road corner; roads west and north, lane south.....	37 09 38.1	91 24 02.2	2,771
Signboard "Eminence 5 miles"; road east at.....			
T. 29 N., R.s. 4 and 5 W., corner secs. 25, 36, 30, and 31, in field southeast of road at fence corner, buckeye witness tree.....	37 08 50.5	91 26 07.2	5,445
Forks, road southwest to Birch Hill, road north to Alley and Summersville; road east to Eminence.....	37 08 56.4	91 26 28.4	1,817
Alley, on cupola of concrete-block schoolhouse; flagpole.....	37 09 12.4	91 26 39.6	1,863
West one of three forks at triangle of roads, triangle is about 100 feet on each side; road east to Alley, road west to Summersville, road north to Ink.....	37 09 36.0	91 28 04.1	7,242
T road corners; road to Black Pond up hollow road west to Summersville.....	37 09 37.8	91 28 41.0	2,994
Forks at top of ridge, trail east, in notched root of black-oak tree; nail.....	37 09 02.1	91 29 55.3	7,024

## Along highways between east border and north border of quadrangle.

T. 29 N., R. 4 W., about $\frac{1}{4}$ mile east of quarter corner secs. 12 and 14, 500 feet northeast of a house just southeast of road, in root of oak tree; nail.....	37 10 59.7	91 20 17.9	.....
Top of hill on divide, road at.....	37 11 08.0	91 20 17.1	840
T. 29 N., R. 4 W., crossing of line between secs. 12 and 13, 29 feet west to black oak tree, 11 feet east to white oak; line tree.....	37 11 26.9	91 19 57.3	2,494
T. 29 N., R.s. 3 and 4 W., corner secs. 1, 6, 7, and 12, at north and south fence, about 900 feet west of Edson Green's house.....	37 12 19.7	91 19 32.1	5,714
Current River, on east side of, just above Ford, in sec. 6, in notched root of black-oak tree; nail.....	37 13 05.0	91 19 19.8	4,694
T. b. m., just north of wagon track, in notched root of blazed white-oak tree.....	37 13 26.3	91 19 57.2	3,709
Old Stave Mill, near site or, about 170 feet east of ford, 15 feet south of township line, on top of bank, in notched root of rock-maple tree; nail.....	37 14 35.1	91 20 17.7	7,159
Grassy Creek, near mouth of, at junction of roads up Grassy Creek and Current River, 40 feet north of site of old water mill, Iron B. M. post stamped "Prim. Trav. Sta. No. 8, 1914, Mo.".....	37 14 45.0	91 21 13.4	4,610

## Along highways near north border of quadrangle.

Ridge south, about 100 feet west of, and a little north or road turning down ridge to west, In notched root of pine tree; nail.....	37 14 40.2	91 24 12.3	.....
Township line, Government corner on, old stump of witness tree to White-oak tree with blaze on north and south sides, apparently a "line tree," is just north of top of ridge and 3 feet east of north and south wire fence.....	37 14 37.8	91 24 57.2	3,640
T. 30 N., R. 5 W., south corner secs. 33 and 34; pile of rocks.....	37 14 54.4	91 25 17.9	2,371
	37 14 41.8	91 29 05.2	.....

**EMINENCE QUADRANGLE—Continued.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Forks of road, 20 feet south of, 20 feet east of mail box, in notched root of white-oak tree; nail.....	° ' "	° ' "	Feet.
Spur No. 3, crossing of Lumber Co.'s railway track and road at T. 29 N., R. 5 W., corner secs. 2, 3, 10, and 11; at northeast corner of field.....	37 13 32.3	91 28 40.1	7,320
Black-oak tree, 150 feet south of foot of hill, on south side of road; nail in notched root of.....	37 13 13.4	91 28 38.0	1,918
Branson's place, about 1 mile north of, west of wagon track; nail in notched root of white-oak tree.....	37 12 23.8	91 28 13.1	5,401
Red-oak tree, 3 feet east of wagon track; nail in notched root of.....	37 11 19.2	91 28 29.3	6,664
T. 28 N., R. 5 W., corner secs. 15, 16, 21, and 22; stake in fence corner.....	37 10 14.0	91 28 22.0	6,620
T. 28 N., R. 5 W., corner secs. 21, 22, 27, and 28, 250 feet north of bottom of ravine, 12 feet east of wire fence; pile of stone.....	37 06 30.2	91 29 44.3	.....
T. 28 N., R. 5 W., corner secs. 27, 28, 33, and 34, in northwest corner of La Rue's field, near wire fence east, and under north and south wire fence; pile of stone.....	37 05 23.6	91 29 27.4	6,871
T. 27 N., R. 5 W., corner secs. 3 and 4, 58 feet east of, is south corner secs. 33 and 34, T. 28 N., R. 5 W.....	37 04 31.5	91 29 28.9	5,272
T. 27 N., R. 5 W., corner secs. 3, 4, 9, and 10.....	37 03 38.8	91 29 29.4	5,322
T. 27 N., R. 5 W., corner secs. 9, 10, 15, and 16; stone at T road west.....	37 02 46.4	91 29 29.3	5,300
T. 27 N., R. 5 W., corner secs. 15, 16, 21, and 22; crossroads; Birch tree, iron bench-mark post No. 50, 1913 (see Buxton quadrangle).....	37 01 52.6	91 29 32.6	5,445
Buckhart spur, 1.20 miles south of, at "3" milepost.....	37 01 00.4	91 29 33.3	5,279
Buckhart spur, 1.60 miles south of, second-class road crossing.....	37 00 08.5	91 29 34.3	5,250
Buckhart spur, 2.20 miles south of, over small dry creek north; small trestle bridge.....	36 59 23.03	91 29 42.15	4,641

**Along Salem, Winona & Southern Ry.**

West Eminence, about 2 miles south of; road crossing.....	37 07 04.7	91 23 18.3	.....
Delaware spur, about 1.20 miles north of; road crossing.....	37 06 55.7	91 23 32.3	1,460
Delaware spur, about 0.50 mile north of; public road crossing.....	37 06 25.0	91 24 00.2	3,843
Delaware spur, public road crossing at.....	37 06 17.2	91 24 25.7	2,218
Delaware spur, 1.20 miles south of, at "3" milepost.....	37 05 18.9	91 24 02.8	6,180
Delaware spur, 1.60 miles south of, second-class road crossing.....	37 04 59.0	91 23 58.0	2,042
Delaware spur, 2.20 miles south of, over small dry creek north; small trestle bridge.....	37 04 28.2	91 24 03.0	3,148
Buckhart siding, 1.20 miles north of, second-class road crossing at east and west road.....	37 04 01.6	91 23 56.6	2,739
Buckhart siding, 0.63 mile north of; public road crossing.....	37 03 35.5	91 23 40.5	2,929
Buckhart siding; road crossing at.....	37 03 19.0	91 23 04.8	3,339
Buckhart siding, 0.65 mile south of; center of track at "4" milepost, on east side of track.....	37 02 45.4	91 23 07.6	3,410
Buckhart siding, 1.40 miles southwest of; opposite "3" milepost, center of track.....	37 02 13.4	91 23 35.2	3,931
"3" milepost, 0.50 mile southwest of; second-class road crossing.....	37 01 49.1	91 23 48.4	2,683
Eminence turnout, 1 mile northwest of; second-class road crossing.....	37 01 17.6	91 22 57.0	5,239
Eminence turnout; head block at.....	37 00 36.35	91 22 12.38	.....

Magnetic declination for north border of quadrangle,  $6^{\circ} 30' E.$ ; for west border  $6^{\circ} 30' E.$ ; for through center,  $6^{\circ} 30' E.$

**EXCHANGE QUADRANGLE.****Near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 28 N., R. 3 W., south corner for secs. 34 and 35. The north corner for secs. 2 and 3 is 16 feet east of above.....	° ' "	° ' "	Feet.
T. 28 N., R. 3 W., in northwest quarter of sec. 35; nail in top of small stump, 15 inches high and 4 inches in diameter, 10 feet west of road in top of divide just before descending into Rocky Creek.....	37 02 37.1	91 15 17.3	.....
T. 28 N., R. 3 W., corner of secs. 22, 23, 26, and 27.....	37 03 27.2	91 14 51.3	5,484
T road W.....	37 04 21.8	91 15 14.3	5,828
Forks of road, in southwest quarter of sec. 14.....	37 05 02.8	91 14 57.0	4,373
T. 28 N., R. 3 W., center of road at line between secs. 11 and 14; fence line west.....	37 05 26.7	91 14 33.7	3,070
T lane west.....	37 06 05.8	91 14 48.0	4,118
T. 28 N., R. 3 W., corner of secs. 2, 3, 10, and 11.....	37 06 32.6	91 14 55.1	2,767
	37 06 59.2	91 15 10.6	2,965

## EXCHANGE QUADRANGLE—Continued.

## Near northwest quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Forks of road in sec. 14, 33 feet east to sign board "Eminence 8 miles" and 33 feet north to sign board "Centerville 28 miles". T. 29 N., R. 3 W., in southeast quarter of sec. 11, 150 feet south of summit of hill in road from Current River to Blair Creek; nail in root of oak tree.....	37 10 50.0	91 14 37.7	.....
T. 29 N., R. 3 W., corner of secs. 1, 2, 11, and 12.....	37 11 35.9	91 14 17.5	4,917
Blair Creek schoolhouse, 62 feet south 52° west from southwest corner of; nail in root of blazed oak tree.....	37 12 08.6	91 13 58.8	3,638
T. 29 N., R. 3 W., corner on line between secs. 1 and 2, 11 and 12 on east bank of Blair Creek, about 300 feet below house of T. M. Mooney.....	37 12 27.6	91 14 03.1	1,955
Tps. 29 and 30 N., Rs. 2 and 3 W., 1,630 feet south and 90 feet west of, 500 feet north, 40° east of J. P. Knuckle's house, 8 feet west of road and 1 foot west of wire fence; iron post stamped "Prim. Trav. Sta. No. 54, 1913, Mo.".....	37 13 15.1	91 13 58.0	4,822
Tps. 29 and 30 N., Rs. 2 and 3 W., approximate corner of, location by two residents who say it is within 20 or 30 feet of corner as located by county surveyor.....	37 14 10.8	91 12 52.9	7,711
	37 14 27.0	91 12 51.8	1,635

## Near north border of quadrangle from Blair Creek to Ellington.

White-oak tree, 2 feet in diameter, on top of ridge 25 feet south of old little-used road; nail in root of tree blazed in 2 sides and marked "U. S. P. T.".....	37 14 07.0	91 11 39.4	6,196
Oak tree, 1 foot in diameter, 10 feet south of old roadway and 60 feet west of dim forks of road; tree blazed and marked "U. S. P. T.".....	37 14 21.4	91 10 26.8	6,043
Oak tree, 1 foot in diameter, 40 feet north of old dim roadway, tree blazed on two sides and marked "U. S. P. T."; nail in root of.....	37 14 12.5	91 09 43.6	3,613
White-oak tree, in hollow just east of and draining into Carr Creek, 1 foot south of old roadway; nail in root of tree blazed on two sides and marked "U. S. P. T.".....	37 14 02.6	91 08 44.5	4,879
Oak tree, 1 foot in diameter, 20 feet east of old road; nail in root of tree blazed on two sides and marked "U. S. P. T.".....	37 14 11.3	91 08 12.0	2,779
Oak tree, 14 inches in diameter, 10 feet south of road; nail in root of tree blazed on two sides and marked "U. S. P. T.".....	37 14 24.0	91 07 23.6	4,116
T. 30 N., R. 2 W., 1,220 feet west of, 490 feet north of, southeast corner, 44 feet north 35° east from northeast corner of Mr. George's house at corner of yard fence; iron post stamped "Prim. Trav. Sta. No. 55, 1913, Mo.".....	37 14 27.5	91 06 34.0	4,025
T. 30 N., R. 2 W., southeast corner of sec. 36. The northeast corner of sec. 1, T. 20 N., R. 2 W., should be about 390 feet east, but was not found.....	37 14 22.7	91 06 18.9	1,317
T. 29 N., R. 1 W., in sec. 5, 75 feet north 25° west from northwest corner of church building; nail in root of oak tree 15 inches in diameter.....	37 13 54.6	91 04 56.5	7,240
T. 29 N., R. 1 W., in sec. 4, at angle of road, 600 feet south of house; nail in root of hickory tree.....	37 13 41.7	91 03 16.5	8,194
Exchange post office and store building, 70 feet west of, in front of frame dwelling house; nail in root of walnut tree.....	37 13 37.0	91 01 59.2	6,276
Oak tree, 20 inches in diameter, 5 feet south of center of road; tree blazed on two sides and marked "U. S. P. T.".....	37 13 52.7	91 00 38.9	6,684
Tps. 29 and 30 N., Rs. 1 E. and 1 W., on fifth principal meridian township corner.....	37 14 18.3	90 59 48.4	4,834

Magnetic declination for west border of quadrangle, 6° 15' E.; for north border, 5° 48' E.

## FORDLAND QUADRANGLE.

## Along highways.

Station.	Latitude.	Longitude.	Distance between stations.
T. 29 N., R. 18 W., forks of road in sec. 4.....	37 14 55.0	92 54 32.7	5,624
T. 29 N., R. 18 W., corner of secs. 4, 5, 8, and 9.....	37 13 51.4	92 55 01.3	6,820
T. 29 N., R. 18 W., in east part of sec. 8, 5 miles north of Fordland, east side of road, 69 feet south 67° west from southwest corner of church; iron post stamped "Prim. Trav. Sta. No. 34, 1913, MO.".....	37 13 19.5	92 55 07.9	3,274
T. 29 N., R. 18 W., crossing of line between secs. 8 and 17.....	37 12 59.7	92 55 14.8	2,083
Crossroads near center of sec. 17.....	37 12 34.0	92 55 27.1	2,780
T. 29 N., R. 18 W., corner of secs. 19, 20, 29, and 30; fence corner about 400 feet east of church building.....	37 11 17.2	92 56 11.5	8,555
T. 29 N., R. 18 W., corner of secs. 29, 30, 31, and 32; at T road east.....	37 10 25.0	92 56 13.0	5,281
T. 28 N., R. 18 W., north corner for secs. 5 and 6; the south corner for secs. 31 and 32 is 184 feet west of above.....	37 09 32.7	92 56 12.1	5,300

## Along St. Louis &amp; San Francisco R. R. from Fordland to Seymour.

Fordland station, 1,100 feet east of, 250 feet north of track, at corner of road north to Marshfield, 4 feet north of concrete walk and 37 feet north 78° east from southeast corner of church building; iron post stamped "Prim. Trav. Sta. No. 35, 1913, Mo.".....	37 09 27.2	92 56 12.5	555
T. 28 N., R. 18 W., north corner for secs. 4 and 5, corner is 65 feet north of railroad track. The south corner for secs. 32 and 33 is 130 feet west of above.....	37 09 30.8	92 55 07.3	5,287
Road crossing in southwest quarter of sec. 34.....	37 09 33.7	92 53 52.4	6,070
T. 29 N., R. 18 W., apparent corner of secs. 25, 26, 35, and 36, which is 64 feet north of center of track.....	37 10 15.1	92 51 50.7	10,709
Digging station, 150 feet west of, 24 feet north of track, 15 feet west of roadway; iron post stamped "Prim. Trav. Sta. No. 36, 1913, Mo.".....	37 10 19.1	92 51 15.1	2,908
T. 29 N., Rs. 17 and 18 W., crossing of range line. (The southeast corner of sec. 25 should be near railroad; but could not be found)......	37 10 14.9	92 50 45.1	2,471
T. 29 N., R. 17 W., corner of secs. 29, 30, 31, and 32; corner is 700 feet north of railroad.....	37 10 13.0	92 49 37.2	5,500
Road crossing.....	37 10 05.3	92 48 48.0	4,054
Road crossing.....	37 09 42.5	92 47 50.8	5,174
T. 29 N., R. 17 W., south corner for secs. 33 and 34. This corner is 876 feet south of railroad and the north corner for secs. 3 and 4 is 286 feet east of above.....	37 09 18.8	92 47 27.0	3,081
T. 28 N., R. 17 W., quarter corner between secs. 2 and 3. This corner is 615 feet south of railroad.....	37 08 50.1	92 46 18.6	6,246
Seymour station, 175 feet west of, 35 feet north of track, 5 feet west of concrete sidewalk and 3 feet from telephone pole; iron post stamped "Prim. Trav. Sta. No. 37, 1913, Mo.".....	37 08 52.9	92 46 10.2	744
T. 28 N., R. 17 W., crossing of line between secs. 1 and 2.....	37 08 43.2	92 45 14.8	4,589

Magnetic declination for northwest quarter of quadrangle, 7° 07' E.; for east-central part, 6° 55' E.

## LEBANON QUADRANGLE.

Station.	Latitude.	Longitude.	Distance between stations.
T. 35 N., R. 16 W., corner of secs. 19, 20, 29, and 30; crossroads.....	37 44 50.7	92 43 46.6	2,655
T. 35 N., R. 16 W., T road east at quarter corner between secs. 29 and 30.....	37 44 24.5	92 43 47.3	2,650
T. 35 N., R. 16 W., stone at corner of secs. 29, 30, 31, and 32; T road west.....	37 43 58.2	92 43 48.0	2,660
T. 35 N., R. 16 W., stone at south corner of secs. 31 and 32; T roads east, west, and north.....	37 43 05.8	92 43 48.9	5,302
T. 35 N., R. 16 W., 440 feet east of south corner for sections 31 and 32, on south side of township line and public road, at edge of wood and in line with posts on telephone line; iron post stamped "Prim. Trav. Sta. No. 29, 1913, Mo.".....	37 43 05.5	92 43 43.4	441
T. 34 N., R. 16 W., northwest corner of township; T road south.....	37 43 06.8	92 44 43.3	4,815
T road west, 90 feet north of T road east.....	37 42 37.6	92 44 41.4	2,965
T road west, 55 feet north of T road east.....	37 41 58.3	92 44 40.6	3,970
T road east, 90 feet south of a second-class T road west.....	37 41 31.4	92 44 40.0	2,726
T. 34 N., R. 17 W., southeast corner of sec. 1. (The southwest corner of sec. 6, R. 16 W., is 75 feet south and marked by stone). .....	37 41 05.9	92 44 40.0	2,580

## LEBANON QUADRANGLE—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 34 N., R. 17 W., quarter corner on east side sec. 12. (The quarter corner west side of sec. 7 is 70 feet south of above).....	° ' "	° ' "	Fed. 2,670
T. 34 N., R. 17 W., stone corner at southeast corner of sec. 12; T road west at High Prairie schoolhouse. The stone corner at southwest corner of sec. 7 is 85 feet south of above at T road east..	37 40 39.5	92 44 39.6	2,630
T. 34 N., R. 17 W., T road west at quarter corner on east side sec. 13; the quarter corner on west side of sec. 18 as indicated by fence line east is 115 feet south of above.....	37 40 13.5	92 44 39.2	2,640
T. 34 N., R. 17 W., T road west at southeast corner of sec. 13. The southwest corner of sec. 18 is 90 feet south of above at T road east..	37 39 47.4	92 44 38.7	2,650
T. 34 N., R. 16 W., southwest corner of sec. 19. This corner is 310 feet north of crossroads.....	37 39 21.2	92 44 38.4	5,411
T. 34 N., R. 17 W., quarter corner on east side sec. 25. The quarter corner on west side of sec. 30 is 100 feet south of above.....	37 38 02.6	92 44 36.9	2,540
T. 34 N., R. 17 W., T road east at southeast corner of sec. 25. The southwest corner of sec. 30 is 100 feet south of above.....	37 37 36.6	92 44 36.3	2,635
T. 34 N., R. 16 W., quarter corner of west side of sec. 31.....	37 37 10.6	92 44 35.7	2,633
Tps. 33 and 34 N., Rs. 16 and 17 W.; corner of townships at fence west.....	37 36 44.2	92 44 35.2	2,670
T. 33 N., R. 17 W.; stone quarter corner of east side of sec. 1.....	37 36 18.1	92 44 34.7	2,640
T. 33 N., R. 17 W.; southeast corner of sec. 1.....	37 35 52.0	92 44 34.6	2,635

Magnetic declination for northwest quarter of quadrangle,  $7^{\circ} 10'$  E.

## LONG LANE QUADRANGLE.

Along St. Louis &amp; San Francisco R. R. from Huben Spur to Conway.

Station.	Latitude.	Longitude.	Distance between stations.
Huben spur, 18 feet north of center of track, 15 feet west of road crossing, 5 feet east of cattle-guard fence, 45 feet south $54^{\circ}$ west from switch stand; iron post stamped "Prim. Trav. Sta. No. 30, 1913, Mo.".....	° ' "	° ' "	Fed. 4,733
T. 33 N., R. 17 W., approximate corner of secs. 11, 12, 13, and 14; location is 300 feet west of road crossing and 50 feet south of center of track.....	37 35 12.23	92 45 05.47	2,976
T. 33 N., R. 17 W., corner of secs. 14, 15, 22, and 23.....	37 35 00.4	92 45 39.3	7,298
Same position, Springfield astronomic value <sup>a</sup> .....	37 34 09.5	92 46 43.5	.....
Philipsburg station, center of track.....	37 34 14.0	92 46 48.5	6,200
Same position, Springfield astronomic value <sup>a</sup> .....	37 33 10.7	92 47 05.2	.....
Road crossing, in sec. 33.....	37 33 15.2	92 47 10.6	.....
Road crossing, in sec. 5.....	37 32 09.0	92 47 59.6	7,619
Road crossing, in sec. 5.....	37 31 10.8	92 49 09.8	8,165
T. 32 N., R. 17 W., corner of secs. 4, 5, 8, and 9; corner is 1,215 feet east of railroad.....	37 30 43.0	92 48 53.2	3,112
Conway station; center of track opposite semaphore.....	37 30 02.8	92 49 14.1	4,396
Same position, Springfield astronomic value <sup>a</sup> .....	37 30 07.3	92 49 19.8	.....

<sup>a</sup> U. S. Geol. Survey Nineteenth Ann. Rept., pt. 1, p. 160, 1898.Magnetic declination for northeast quarter of quadrangle,  $7^{\circ} 10'$  E.; for southeast quarter,  $7^{\circ} 15'$  E.

## MACOMB QUADRANGLE.

Along St. Louis &amp; San Francisco R. R. from Macomb to Mountain Grove.

Station.	Latitude.	Longitude.	Distance between stations.
Macomb flag station, 350 feet northeast of, 70 feet southeast of center of track, 2 feet from fence corner; iron post stamped "Prim. Trav. Sta. No. 40, 1913, Mo.".....	° ' "	° ' "	Fed. 4,095
Crossing of north and south fence line in northwest quarter of sec. 21.....	37 05 38.2	92 29 28.8	5,692
Center of track on north and south line in northeast quarter of sec. 21. A road runs north and one east and west along track.....	37 06 23.4	92 28 47.0	2,570
Road crossing, on line between secs. 22 and 23.....	37 06 33.8	92 28 18.1	6,726
T. 28 N., R. 11 W., corner of secs. 14, 15, 22, and 23; at T road north.....	37 06 19.4	92 26 57.3	1,654
T. 28 N., R. 14 W., corner of secs. 13, 14, 23, and 24.....	37 06 35.8	92 26 56.3	5,338
Norwood station, 66 feet N. $58^{\circ}$ W. from northwest corner of; iron post stamped "Prim. Trav. Sta. No. 41, 1913, Mo.".....	37 06 35.0	92 25 50.4	4,216
	37 06 28.0	92 24 59.3	

## MACOMB QUADRANGLE—Continued.

Along St. Louis &amp; San Francisco R. R. from Macomb to Mountain Grove—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 28 N., R. 13 W., west corner for secs. 18 and 19. A road east on section line, road west on a jog south corner, is 327 feet south of railroad.....	37 06 21.7	92 24 45.0	Frct. 1,304
T. 28 N., R. 13 W., corner of secs. 17, 18, 19, and 20; corner stone 593 feet north of railroad.....	37 06 20.5	92 23 41.2	5,171
Road crossing.....	37 06 39.4	92 22 47.6	4,748
T. 28 N., R. 13 W., quarter corner between secs. 16 and 17, about 50 feet southeast of railroad track.....	37 06 45.5	92 22 35.1	1,180
T. 28 N., R. 13 W., corner of secs. 9 and 10, 15 and 16; fence south and east at point 320 feet south of railroad.....	37 07 10.9	92 21 28.8	5,951
T. 28 N., R. 13 W., quarter corner between secs. 10 and 11; corner is 540 feet north of railroad.....	37 07 36.3	92 20 23.8	5,863
Milepost 266, center of track.....	37 07 22.2	92 19 15.5	5,710
Road crossing in range line between Rs. 12 and 13 west.....	37 07 41.1	92 18 14.2	5,322
T. 28 N., R. 12 W., center of track at line between secs. 7 and 8.....	37 07 30.0	92 17 08.7	5,422
Road crossing.....	37 07 34.1	92 16 20.0	3,962
Mountain Grove station, 1,260 feet east of, 50 feet south and 25 feet east of street crossing, 4 feet from corner of right-of-way fence; iron post stamped "Prim. Trav. Sta. No. 42, 1913, Mo." .....	37 07 40.8	92 15 30.1	4,098

Magnetic declination along east-west line through center of quadrangle,  $7^{\circ} 15' E.$ 

## MONTEER QUADRANGLE.

Along Current River Branch St. Louis &amp; San Francisco R. R. near Mountain View to Birch Tree.

Station.	Latitude.	Longitude.	Distance between stations.
Road crossing.....	36 59 27.4	91 44 19.5	Feet. 5,490
T. 27 N., R. 7 W., quarter corner between secs. 20 and 23; corner is 130 feet south of railroad.....	36 59 26.8	91 44 13.9	452
Mountain View station, 760 feet west of, 57 feet north of center of track and about 6 feet higher, 200 feet west of public road, 2 feet from wire fence line; iron post stamped "Prim. Trav. Sta. No. 48, 1913, Mo." .....	36 59 37.1	91 42 16.6	9,575
Road crossing (the quarter corner between secs. 22 and 23 is 437 feet north of crossing).....	36 59 44.7	91 41 30.8	3,794
Road crossing.....	36 59 49.2	91 40 42.7	3,932
T. 27 N., R. 7 W.; crossing of line between secs. 23 and 24.....	36 59 50.1	91 40 24.6	1,472
Road crossing.....	36 59 43.2	91 39 51.4	2,785
Howell-Shannon county line, and line between ranges 6 and 7 W.; center of track at. (The east corner for secs. 24 and 25, T. 27 N., R. 7 W., is 1,420 feet south of track and marked by rock at road west. The west corner for secs. 19 and 30, T. 27 N., R. 6 W., is 1,274 feet south of track at road east).....	36 59 36.5	91 39 22.2	2,460
T. 27 N., R. 6 E., quarter corner between secs. 19 and 30. This corner is 20 feet east of road crossing.....	36 59 23.2	91 38 50.4	2,915
T. 27 N., R. 6 E.; crossing of line between secs. 29 and 30.....	36 59 06.8	91 38 17.7	3,126
Teresita spur; road crossing at.....	36 59 01.9	91 37 45.6	2,650
Center of track at line between secs. 28 and 29, quarter corner near but could not be found.....	36 58 55.0	91 37 13.6	2,684
Center of track at line between secs. 27 and 28.....	36 58 44.6	91 36 07.7	5,454
T. 27 N., R. 6 W.; apparent quarter corner between secs. 26 and 27. This corner is about center of track at point 95 feet west of road crossing.....	36 58 54.3	91 35 02.6	5,370
Monteer station, 190 feet west of, 15 feet north of track and 80 feet east of section house, 18 inches from corner of fence; iron post stamped "Prim. Trav. Sta. No. 49, 1913, Mo." .....	36 58 53.0	91 34 39.7	1,865
Road crossing from which the corner of secs. 25, 26, 35, 36, T. 27 N., R. 6 W., is 750 feet south at T road east.....	36 58 33.8	91 33 57.9	3,912
T. 27 N., Rs. 5 and 6 W.; center of track at range line. (The west corner near for secs. 30 and 31 as pointed out by near-by resident is 1,346 feet south of track).....	36 58 39.2	91 32 52.5	5,335
T. 27 N., R. 5 W.; center of track at line between secs. 29 and 30, (quarter corner could not be found).....	36 58 53.7	91 31 44.9	5,681
Road crossing.....	36 59 04.4	91 30 56.4	4,081
T. 27 N., R. 5 W.; center of track at line between secs. 28 and 29. The corner of secs. 20, 21, 28, and 29 is 935 feet north of track.....	36 59 07.3	91 30 39.4	1,410
Road crossing. The quarter corner between secs. 21 and 28 is 380 feet north.....	36 59 12.5	91 30 06.1	2,751

Magnetic declination for north border of quadrangle,  $6^{\circ} 10' E.$

## NIANGUA QUADRANGLE.

Along St. Louis &amp; San Francisco R. R. from Conway to Marshfield.

Station.	Latitude.	Longitude.	Distance between stations.
Conway station, 1,000 feet southwest of, 110 feet northwest of Frisco track, in rear of section house, 2 feet east of northeast corner of board fence surrounding Catholic church grounds. Cypola of two-story brick school building bears south $82^{\circ} 30'$ west and is distant about 250 feet; iron post stamped "Prim. Trav. Sta. No. 31, 1913, M.O." . . . . .	37 29 53.6	92 49 18.4	Feet. 1,002
T 32 N., R. 17 W., corner of secs. 17, 18, 19, and 20, at T road west; corner is 75 feet west of railroad.....	37 28 59.4	92 50 00.9	6,459
Same position, Springfield astronomic value <sup>a</sup> .....	37 29 03.4	92 50 06.4	-----
T. 32 N., R. 17 W., corner of secs. 19, 20, 29, and 30; corner is 200 feet west of railroad.....	37 28 06.6	92 50 02.2	5,339
Road crossing in sec. 30.....	37 27 43.1	92 50 03.5	2,382
Sampson flag station; road crossing at.....	37 26 27.6	92 50 30.3	7,940
Tps. 31 and 32 N., center of track at crossing of township line, between secs. 31 and 6.....	37 26 22.5	92 50 27.2	573
Road crossing in sec. 6.....	37 26 01.0	92 50 21.8	2,219
T. 31 N., R. 17 W., crossing of sec. line between secs. 6 and 7, at point about 150 feet south of road crossing.....	37 25 30.2	92 50 20.2	3,117
Road crossing, about 40 feet east of line between secs. 17 and 18.....	37 24 11.9	92 50 07.9	7,979
T. 31 N., R. 17 W., corner of secs. 17, 18, 19, and 20, 540 feet west of railroad.....	37 23 45.4	92 50 09.2	2,686
Same position, Springfield astronomic value <sup>a</sup> .....	37 23 23.6	92 50 15.9	-----
Niangua station, center of track at semaphore.....	37 23 14.9	92 49 56.2	3,260
Same position, Springfield astronomic value <sup>a</sup> .....	37 23 20.1	92 50 02.4	-----
Niangua station, 830 feet south of, 60 feet west of center of track, 3 feet north of fence line; iron post stamped "Prim. Trav. Sta. No. 32, 1913, M.O." . . . . .	37 23 06.8	92 49 54.1	\$30
T. 31 N., R. 17 W.; iron pin on line between secs. 31 and 32 and one-fourth mile south of corner of secs. 29, 30, 31, and 32. Point is 285 feet north of center of track.....	37 21 47.9	92 50 12.4	8,120
Tps. 30 and 31 N., Rs. 17 and 18, W.; crossroads one-fourth mile south of township corner; crossroads are 835 feet north of railroad track.....	37 20 56.6	92 51 22.9	7,695
Tp. 30 N., R. 18; road crossing on line between secs. 1 and 12.....	37 20 18.0	92 51 57.0	4,784
T. 30 N., R. 18 W., corner secs. 2, 3, 10, and 11. This corner is 1,460 feet north of railroad track.....	37 20 20.2	92 53 36.3	8,021
Same position, Springfield astronomic value <sup>a</sup> .....	37 20 24.3	92 53 42.6	-----
Marshfield station, center of track at semaphore.....	37 20 10.2	92 54 14.6	3,254
Same position, Springfield astronomic value <sup>a</sup> .....	37 20 14.3	92 54 23.0	-----
Marshfield station, 450 feet east and 500 feet south of, 40 feet west of center of north and south street on lot belonging to T. B. Pamp-Hin; iron post (north meridian post) marked "Prim. Trav. Sta. No. 33, 1913, M.O." . . . . .	37 20 05.1	92 54 09.1	677

<sup>a</sup> U. S. Geol. Survey Nineteenth Ann. Rept., pt. 1, p. 160, 1898.

## Along highways from Marshfield south 5 miles.

Station.	Latitude.	Longitude.	Distance between stations.
Marshfield station, one-half mile south and one-half mile east of, 600 feet west of north and south road, cut-stone U. S. Coast Survey meridian monument .....	37 19 41.8	92 53 43.8	3,121
T. 30 N., R. 18 W., corner of secs. 10, 11, 14, and 15 at lane west.....	37 19 27.9	92 53 36.4	1,533
T. 30 N., R. 18 W., corner of secs. 14, 15, 22, and 23, second-class crossroad.....	37 18 35.4	92 53 36.9	5,310
T. 30 N., R. 18 W., corner of secs. 22, 23, 26, and 27, T road east.....	37 17 42.9	92 53 37.2	5,310
T. 30 N., R. 18 W., corner of secs. 26, 27, 34, and 35; stone corner.....	37 16 50.4	92 53 37.5	5,310
Tps. 29 and 30 N., township line between; center of road at.....	37 15 58.4	92 54 04.7	5,697
Forks of road.....	37 15 49.0	92 54 16.4	1,340

Magnetic declination for center of quadrangle, north and south,  $7^{\circ} 15'$  E.

## PASSEOVER QUADRANGLE.

Along Linn Creek and Lebanon highway.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 38 and 39 N., Rs. 16 and 17 W., corner of; an unmarked stone on bank of Linn Creek at south side of road in eastern edge of village of Linn Creek.....	38 04 05.9	92 44 06.8	Feet.
Forks of road in sec. 7.....	38 03 01.2	92 43 14.1	7,788
T. 38 N., R. 16 W., quarter corner between secs. 7 and 8; fence corner.....	38 02 45.5	92 43 06.4	1,698
T road east at apparent line between secs. 8 and 17.....	38 02 20.2	92 42 45.1	3,078

Magnetic declination for southwest part of quadrangle,  $7^{\circ} 45'$  E.

**REDFORD QUADRANGLE.**  
Along public road from Ellington to Centerville.

Station.	Latitude.	Longitude.	Distance between stations.
White-oak tree, as above.....	° ' "	° ' "	Feet.....
T. 30 N., R. 1 E., apparent line between secs. 20 and 29; oak tree hacked on all sides in center of road; a lane leads west and 305 feet west of tree is a fence line south which may be at quarter corner between secs. 20 and 29.....	37 15 50.3	90 58 20.6	.....
Oak tree 12 inches in diameter, 20 feet south of road, near gate blazed and marked "U. S. P. T.".....	37 16 05.1	90 58 12.0	1,658
T. 30 N., R. 1 E., approximate corner of secs. 17, 18, 19, and 20. No mark, but near-by resident says it is within 15 or 20 feet of corner.....	37 16 53.8	90 57 46.3	5,347
T. 30 N., R. 1 E., northwest corner of sec. 18, in field; a fence runs north and south and one east.....	37 16 48.0	90 58 35.5	4,019
T. 30 N., R. 1 W.; fence east and west line between secs. 1 and 12. T. 30 N., R. 1 W., in northeast quarter of sec. 1; nail in root of oak tree 20 inches in diameter, east side of road opposite church. A schoolhouse near church.....	37 17 42.3	90 59 42.2	7,701
T. 30 N., R. 1 W., point about 700 feet east of road just on east bank of dry run and in east and west fence running west of north. This is close to principal meridian, but Mr. Falkenberg says corner is 30 to 40 yards east of creek bed.....	37 18 35.3	91 00 00.0	5,543
T. 31 N., R. 1 E., approximate quarter corner on west side sec. 31, in Mr. Falkenberg's garden; no mark.....	37 19 08.6	90 59 52.1	3,433
Oak tree, 15 inches in diameter, 15 feet east of road, blazed and marked "U. S. P. T.".....	37 19 21.4	90 59 39.0	1,666
T. 31 N., R. 1 E., near center of sec. 29, 35 feet east from corner of schoolhouse; nail in root of oak tree 12 inches in diameter.....	37 19 48.1	90 59 40.8	2,711
T. 31 N., R. 1 E., approximate corner of secs. 19, 20, 29, and 30; location by Mr. Wilson, who lives close by.....	37 20 38.9	90 58 40.8	7,063
Forks of road, signboard "Ellington 12 miles"; nail in root of oak tree.....	37 21 06.3	90 58 12.0	3,616
T. 31 N., R. 1 E., approximate quarter corner on west side sec. 31, in Mr. Falkenberg's garden; no mark.....	37 21 24.7	90 58 34.0	2,574
Centerville, 2.8 miles south of, 20 feet west of road near top of hill, nail in root of oak tree 8 inches in diameter.....	37 21 43.2	90 58 32.1	1,847
Centerville, 1.8 miles south of, 5 feet west of road; nail in root of oak tree blazed and marked "U. S. P. T.".....	37 22 49.6	90 58 17.2	6,825
T. 32 N., R. 1 E., corner of secs. 28, 29, 32, and 33; corner is 660 feet east of road.....	37 23 55.8	90 57 53.8	6,950
Centerville, public school building, center of cupola.....	37 24 43.3	90 57 47.3	4,835
Centerville, Baptist Church, spire of.....	37 25 45.8	90 57 22.0	6,647
Centerville, Methodist Church, spire of.....	37 25 59.8	90 57 29.5	1,536
T. 32 N., R. 1 E., in sec. 20, white oak tree 2 feet in diameter, 40 feet north of road; nail in root of.....	37 26 00.7	90 57 28.9	100
T. 32 N., R. 1 E., in sec. 20, forks of road.....	37 26 01.8	90 57 30.0	141
Maple tree at forks of road, blazed and marked "U. S. P. T."; nail in root of.....	37 27 12.8	90 58 06.2	7,753
Forks of road, old timber road northwest near cabin and site of old sawmill.....	37 27 15.3	90 58 06.4	313
T. 32 N., R. 1 E., in sec. 6, about 0.8 mile east of fifth principal meridian, 4.4 miles north and 1.2 miles west of Centerville on high ridge between Brushy Creek and west fork of Black River; aluminum tablet in boulder marked "Prim. Trav. Sta. No. 13, 1907"; 480 feet distant is nail in root of blazed tree to which the observed azimuth is $100^{\circ} 28' 30''$ .....	37 28 17.2	90 57 36.6	6,769
	37 28 33.9	90 57 36.1	1,687
	37 29 52.0	90 58 47.7	9,784

Magnetic declination for west border of quadrangle,  $6^{\circ} 18' E.$

**RUBLE QUADRANGLE.**

Along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 29 and 30 N., R. 1 E. and 1 W., township corner on fifth principal meridian.....	° ' "	° ' "	Feet.....
Ellington station, 210 feet south and 600 feet west of, 20 feet south of public road; iron post stamped "Prim. Trav. Sta. No. 58, 1913, Mo.".....	37 14 18.3	90 59 48.4	.....
T. 29 N., R. 1 E., quarter corner on north side of sec. 5. The quarter corner on south side of sec. 32 is 50 feet east of above; corners are directly east of railroad water tank.....	37 14 29.1	90 58 20.0	7,232
White-oak tree on east side of road in fence line, nail in root of; tree blazed and marked "U. S. P. T.".....	37 14 08.2	90 58 08.9	2,295
	37 15 50.3	90 58 20.6	10,363

## SINKIN QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 30 N., R. 4 W., approximate corner secs. 27, 28, 33, and 34; red-oak tree on side of steep bluff.....	37 15 28.4	91 21 29.5	Feet.
Randolph's residence, 100 feet west of, in notched root of white-oak tree; 20d. spike (bent over).....	37 15 45.9	91 21 47.4	2,287
Randolph's residence, 0.90 mile southwest of, on top of ridge, 15 feet northeast of pine tree, just east of road track; black-oak tree, in notched root of, nail.....	37 15 30.0	91 22 40.6	4,586
Randolph's residence, about 1.90 miles southwest of, 20 feet west of pine tree, just north of wagon track; black-oak tree, in notched root, nail.....	37 15 07.9	91 23 45.7	5,716
On ridge, old gateway, no fence.....	37 15 05.8	91 26 06.7	-----
Forks of road, on top of ridge, road south leads to Mr. Rinehart's house; center of grass triangle.....	37 15 10.1	91 26 44.0	3,048
T. 30 N., R. 5 W., 0.25 mile west of south corner of secs. 35 and 36 (this corner is in field and not marked); 20 rods west of north corner secs. 1 and 2, T. 29 N., R. 5 W. (not marked); pile of stone. Old church building, 30 feet south of southwest corner of, at summit of hill; center of road at.....	37 15 59.7	91 26 32.6	5,009
T. 30 N., R. 5 W., corner secs. 27, 28, 33, and 34 (the location of above corner is according to description given by Mr. Marion Shedd, who says corner should be about 20 feet west of pine witness tree just east of road).....	37 15 41.4	91 28 44.8	10,845
Ink post office, and store about 650 feet south of, 500 feet north of Mr. Marion Shedd's house, on west side of public road, close to wire fence; iron bench-mark post stamped "Prim. Trav. Sta. No. 9, 1914, Mo.".....	37 15 33.8	91 29 03.0	1,664
	37 15 21.5	91 29 04.8	1,253

Magnetic declination south border of triangle, 6° 30' E.

## SLEEPER QUADRANGLE.

Along public road between Linn Creek and Decaturville.

Station.	Latitude.	Longitude.	Distance between stations.
T road west in section 32.....	37 50 23.2	92 42 32.7	Feet.
T. 38 N., R. 16 W., quarter corner between secs. 32 and 33 (about 650 feet north of public road).....	37 50 16.3	92 42 09.5	1,983
Tps. 37 and 38 N., T road east on line between at point about 1,100 feet east of southwest corner of sec. 33 (not found).....	37 58 50.0	92 41 55.5	2,392
T. 37 N., R. 16 W., crossing of line between secs. 4 and 9.....	37 57 57.8	92 41 46.6	5,319
Decaturville, 4.2 miles north of, in northwest quarter of sec. 9, on east side Decaturville and Linn Creek road, 79 feet north from northwest corner of church building; iron post stamped "Prim. Trav. Sta. No. 28, 1913, Mo.".....	37 57 39.9	92 42 03.6	2,268
T. 37 N., R. 16 W., crossroads on line between secs. 8 and 17.....	37 57 06.3	92 42 31.3	4,064
T. 37 N., R. 16 W., T road south on line between secs. 20 and 21.....	37 55 29.7	92 42 15.8	9,550
Secs. 28 and 33, crossing of line between.....	37 54 28.1	92 42 01.4	6,340
Decaturville, 450 feet south of store, road west.....	37 54 21.4	92 41 58.4	712
Decaturville, about 1 mile south of, at line between Tps. 36 and 37 N., and line between Camden and Laclede counties, on westside of road, 2 feet from fence; iron post stamped "Prim. Trav. Sta. No. 27, 1913, Mo.".....	37 53 35.7	92 41 57.9	4,633
Bidwell, oak tree with signboards in center of road, and about 20 feet south of road west.....	37 53 12.4	92 42 28.2	8,764

## Between Bidwell and Eldridge.

T road north, south, and west, in south half sec. 8 .....	37 52 08.8	92 42 38.8	1,213
T road north.....	37 51 51.6	92 43 46.0	5,328
T. 36 N., R. 16 W., quarter corner on west side sec. 18.....	37 51 26.4	92 44 40.0	5,022
T. 36 N., R. 16 W., west corner of secs. 18 and 19.....	37 51 00.2	92 44 41.0	2,658
T. 36 N., R. 16 W., quarter corner on west side sec. 19.....	37 50 33.9	92 44 41.9	2,657
T. 36 N., R. 16 and 17 W., crossroads at corner of secs. 24, 25, 19, and 30.....	37 50 07.7	92 44 42.9	2,650
Eldridge, 0.12 mile east of store and post office, 15 feet southeast of crossroads, 225 feet north and 10 feet east of quarter corner stone between secs. 25 and 30, T. 36 N., Rs. 16 and 17 W., 2 feet from fence corner; iron post stamped "Prim. Trav. Sta. No 28, 1913, Mo.".....	37 49 43.6	92 44 43.8	2,641

## SLEEPER QUADRANGLE—Continued.

Geographic positions between Eldridge and St. Louis &amp; San Francisco R. R.

Station.	Latitude.	Longitude.	Distance between stations.
T. 36 N., Rs. 16 and 17 west, T road east at corner of secs. 30 and 31, 25 and 36.	37 49 15.2	92 44 44.8	Feet, 2,881
T. 36 N., R. 16 W., T roads east, west, and south at quarter corner between secs. 30 and 31.	37 49 14.1	92 44 07.8	2,974
T. 36 N., R. 16 W., stone quarter corner on south side sec. 31 (the stone quarter corner on north side sec. 6, T. 35 N., is 318 feet west of above).	37 48 21.9	92 44 09.7	5,285
T road east, in southeast quarter of sec. 7.	37 46 48.2	92 43 56.3	9,539
T road west and lane east on line between secs. 17 and 18.	37 46 22.3	92 43 45.6	2,814
T. 35 N., R. 16 W., crossroads at corner of secs. 17, 18, 19, and 20.	37 45 43.1	92 43 45.0	3,962
T. 35 N., R. 16 W., quarter corner between secs. 19 and 20, T road east.	37 45 16.9	92 43 45.8	2,656

Magnetic declination for northwest quarter of quadrangle,  $7^{\circ} 53'$  E.; for southwest quarter,  $7^{\circ} 23'$  E.

## SUMMERSVILLE QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 29 N., R. 5 W., corner secs. 28, 29, 32, and 33, crossroads.	37 08 52.4	91 30 31.8	Feet, .....
T. 29 N., R. 5 W., 150 feet west of schoolhouse; iron bench mark post stamped "Prim. Trav. Sta. No. 10, 1913, Mo."	37 08 50.9	91 30 31.6	153
T. b. m. nail in root of white-oak tree.	37 07 40.2	91 30 31.7	7,153
Jacks Fork, south side of, forks of road, road down river and road south to birch tree.	37 07 07.6	91 30 05.6	3,911

## WILLOW SPRINGS QUADRANGLE.

Along Current River branch St. Louis &amp; San Francisco R. R. from Willow Springs to Mountain View.

Station.	Latitude.	Longitude.	Distance between stations.
Willow Springs station, 300 feet south of, 25 feet east of yard track and 25 feet north of overhead bridge crossing tracks; iron post stamped "Prim. Trav. Sta. No. 45, 1913, Mo."	36 59 26.5	91 58 12.8	Feet, 5,810
T. 27 N., R. 9 West, quarter corner between secs. 29 and 32, at road corners north, south, and east. Corner is 540 feet north of railroad.	36 58 50.9	91 57 22.2	5,458
Road crossing.	36 58 23.8	91 56 54.4	3,550
Road crossing; the township line between secs. 4 and 33 is about 175 feet south.	36 58 01.6	91 56 01.1	4,879
T. 27 N., R. 9 W.; crossing of line between secs. 33 and 34, T line between secs. 3 and 4, T. 26 N., is 95 feet east of above.	36 57 58.1	91 55 45.2	1,335
Road crossing on line between secs. 2 and 3.	36 57 47.7	91 54 38.8	5,490
T. 27 N., R. 9 W., center of track at line between secs. 35 and 36. The south corner of township line appears to be under railway embankment. Line south between secs. 1 and 2, is 50 feet east.	36 57 49.6	91 53 33.7	5,290
Hutton Valley station, 103 feet west of west end of, 35 feet south of center of track, 18 inches from corner fence post; iron post stamped "Prim. Trav. Sta. No. 46, 1913, Mo."	36 57 45.2	91 53 04.4	2,423
Tps. 26 and 27 N., Rs. 8 and 9 W., corner of, location said to be about 15 feet south of railway track, in line with a north and south fence.	36 57 49.5	91 52 22.5	3,425
Road crossing near line between secs. 31 and 32.	36 58 22.2	91 51 15.5	6,368
T. 27 N., R. 8 W., stone corner of secs. 28, 29, 32, and 33; corner is 400 feet north of track.	36 58 39.0	91 50 15.2	5,182
Road crossing.	36 58 47.0	91 49 58.5	1,573
Road crossing.	36 58 43.7	91 48 40.0	6,375
Trask flag station, 200 feet west of, 60 feet south and 35 feet west of corner of secs. 26, 27, 34, and 35, T. 27 N., R. 8 W. (which corner is said to be between main track and siding at road crossing), 2 feet from corner fence post and about 8 feet below track; iron post stamped "Prim. Trav. Sta. No. 47, 1913, Mo."	36 58 37.3	91 48 06.2	2,826
Road crossing.	36 58 48.0	91 47 16.3	4,185
T. 27 N., Rs. 7 and 8 W., center of track at line between.	36 58 47.2	91 45 54.6	6,639
Road crossing near middle of sec. 30.	36 58 59.7	91 45 17.7	3,254

Magnetic declination for north border of quadrangle,  $6^{\circ} 20'$  E.

**Altenburg, Campbell Hill, Chester, and Perryville quadrangles.****PERRY COUNTY.**

The following geographic positions on approximate North American datum were determined by J. H. Wilson in 1913 and are based on primary traverse run in 1907, described in Bulletin 440, Mississippi River Commission p. b. m. 42 and triangulation station Brick House.

The closure on p. b. m. 42 is fair, but on distributing that closure error through the line it is found that the computed position for the chimney of brick house on bluff at Grand Eddy differs from the position given by the Mississippi River Commission by  $-0.58''$  in latitude and  $-1.94''$  in longitude. The brick-house chimney sighted by Mr. Wilson may not be the same as the Mississippi River Commission station, or if the same the house may have been moved.

**ALTENBURG QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 35 N., R. 12 E., corner in center of southwest quarter of sec. 8. Crosstown, in west wall at northwest corner of foundation of Jas. Griman's store, just inside the fence; bronze tablet stamped "Prim. Trav. Sta. No. 7, 1913".	37 44 57.9	89 44 11.7	.....
T. 35 N., R. 12 E., corner of secs. 8, 9, 16, and 17, 0.2 mile east of Crosstown.	37 44 44.2	89 43 38.6	3,000
	37 44 45.3	89 43 22.2	1,316

Magnetic declination for northwest quarter of quadrangle  $4^{\circ} 27' E.$

**CAMPBELL HILL QUADRANGLE.****Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Turn in road, small road leading to house, 200 feet north of main road.	37 45 08.6	89 41 47.2	.....
Grand Eddy, St. Louis & San Francisco R. R. crossing.	37 45 21.3	89 41 06.8	3,459
Grand Eddy, in north gable of brick house on bluffs; chimney (Mississippi River Commission triangulation station Brick House).	37 45 19.78	89 41 08.34	220
Grand Eddy, 640 meters below, at upper extremity of Missouri bluff, 14 meters below extreme upper point of bluff rocks, in vertical face of natural rock; center of copper bolt, letters "U. S. P. B. M." cut in rock near bolt (Mississippi River Commission P. B. M. 42).	37 45 09.74	89 40 45.33	1,945

Magnetic declination for southwest corner of quadrangle,  $4^{\circ} 27' E.$

**CHESTER QUADRANGLE.****Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Prim. Trav. Sta. No. 2, 1907, Bulletin 440.	37 45 08.7	89 58 18.4	.....
Perryville, 4 miles northeast of, road forks; 35 feet north of J. Colin's mail box.	37 45 02.8	89 48 30.7	.....

**PERRYVILLE QUADRANGLE.**

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Perryville, 6 miles west of, T road, Farmington-Perryville road, 450 feet southeast of house and 40 feet east of mail box.....	37 44 29.8	89 57 38.2	<i>Feet.</i>
T road south, 50 feet west of J. Tucker's mail box.....	37 44 21.7	89 56 56.9	3,421
T road north, 150 feet west of mail boxes.....	37 44 22.3	89 56 12.7	3,549
Perryville, 3.5 miles west of, north end of bridge over Saline Creek; Farmington-Perryville road.....	37 44 17.2	89 55 21.4	4,146
Perryville, 2.5 miles west of, T road south; Farmington-Perryville road.....	37 43 47.4	89 54 44.5	4,232
Perryville, 1.2 miles west of; water tank of Catholic Seminary.....	37 43 33.8	89 53 31.7	6,011
Perryville, west edge of; Farmington-Perryville road crossing railroad.....	37 43 35.0	89 53 01.7	2,413
Perryville, in south end of lower step at east entrance to court-house; bronze tablet stamped "Prim. Trav. Sta. No. 6, 1913".....	37 43 29.9	89 51 44.7	6,205
Perryville, 0.5 mile east of; road forks.....	37 43 32.2	89 51 06.7	3,060
Perryville, 2 miles northeast of; T road north.....	37 44 12.2	89 49 47.6	7,526
Ford, west bank of Cape Cinque Hommes Creek.....	37 44 51.9	89 47 47.6	
T road south.....	37 44 41.2	89 47 01.1	3,892
Crosstown, 2.8 miles west of, center of road, on hill, in front of large white house.....	37 44 24.0	89 46 13.8	4,180
Crosstown, 2 miles west of, west edge of ford of creek, Perryville-Crosstown road.....	37 44 26.0	89 45 18.2	4,474

Magnetic declination for north border of quadrangle,  $4^{\circ} 27' E.$ **HARRISONVILLE, Lexington, Sedalia, and Warrensburg quadrangles.****JOHNSON AND LAFAYETTE COUNTIES.**

The following geographic positions on North American datum were determined by primary traverse and are based upon the positions of Baker, Chapel Hill, Cooks Knob, Normal, and Knobnoster triangulation stations (U. S. C. & G. S.). The work was done in 1914 by E. L. McNair.

**HARRISONVILLE QUADRANGLE.**

Along highways near south border of northeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Baker triangulation station, about 1 mile north of Kingsville, in S. $\frac{1}{2}$ E. $\frac{1}{2}$ SE. $\frac{1}{4}$ sec. 25, T. 46 N., R. 29, on land belonging to Mr. Edward Baker and close to his home (house gone in 1914; only excavation to show where it stood). Permanent mark: An ale bottle filled with ashes, 2 $\frac{1}{2}$ feet below surface. Surface mark: A marble post set flush with surface, with the letters U. S. C. S. cut on top. Two witness posts are set 5 feet north and south of the center of the surface mark.....			
T roads north, south, and east.....	38 45 37.03	94 04 13.09	<i>Feet.</i>
T roads north, east, and west.....	38 45 39.0	94 03 08.4	5,129
T road north, center of east and west road at.....	38 45 37.0	94 02 17.8	4,009
T. 46 N., R. 28 W., corner secs. 27, 28, 33, and 34, center of east-west road at, fence line south.....	38 45 29.5	94 01 44.5	2,720
T. 46 N., R. 28 W., quarter corner between secs. 27 and 34.....	38 45 20.1	94 00 37.0	5,461
	38 45 18.9	94 00 02.9	2,700

Magnetic declination,  $8^{\circ} 15' E.$

**HARRISONVILLE QUADRANGLE—Continued.****Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 48 N., R. 28 W., 15 feet south of east-west road, on line between secs. 4 and 9, 125 feet east of road north, 15 feet west of road south, 6 feet from telephone pole; iron bench-mark post stamped "Prim. Trav. Sta. No. 22, 1914, MO."	38 59 13.1 38 58 47.6	94 00 30.1 94 00 33.9	Feet. 2,600
T. 47 N., R. 28 W., center of sec. 9, T roads east, west, and north.	38 58 21.3	94 00 43.3	2,755
T. 47 N., R. 28 W., on line between secs. 9 and 16, center of east and west road at road north.	38 57 29.4	94 01 00.0	5,413
T road forks, roads east, west, and north, center of.	38 56 37.0	94 00 56.6	5,309
T roads forks, roads east, west, and north, center of.	38 56 36.2	94 00 06.5	3,940
T. 48 N., R. 28 W., corner secs. 21, 22, 27, and 28, road crossing.	38 55 43.4	94 00 09.2	5,349
T. 48 N., R. 28 W., approximate corner secs. 27, 28, 33, and 34.	38 55 16.4	94 00 10.1	-----
T road forks, roads east, west, and south.	38 55 18.9	94 01 17.4	5,326
T road corners, roads east, west, and south.	38 55 07.0	94 02 07.8	4,152
Chapel Hill triangulation station (U. S. C. & G. S.), about 0.25 mile south-southwest of the village of Chapel Hill, in NE. $\frac{1}{4}$ SE. $\frac{1}{4}$ of sec. 1, T. 47 N., R. 29 W., about 6 feet south of middle of line bounding the 40-acre division that contains it. Station mark: A bottle filled with ashes 3 feet below surface, with a marble post 2 feet long and 6 inches square above it, with intersecting grooves and letters U. S. C. S. on face. Reference marks: Two sandstone posts, one 1.9 feet long, the other 2 feet long, 5 feet, respectively, north and south of center of surface mark, with groove and arrow pointing to center of surface mark.	38 54 47.2	94 03 28.58	6,708
Johnson-Lafayette county line crossing, fence line east and west, center of road.	38 54 51.0	94 00 11.9	-----
T. 47 N., R. 28 W., quarter corner secs. 3 and 4, center of public road.	38 54 23.2	94 00 04.5	2,876

Magnetic declination,  $8^{\circ} 04' E.$ **LEXINGTON QUADRANGLE.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 48 and 49 N., Rs. 27 and 28 W., approximate corner secs. 31, 36, 1 and 6, 200 feet north of, center of Main Street and north and south road crossing, about 3,100 feet east of Second Street, Odessa.	39 00 02.2 39 00 02.9	93 56 32.9 93 57 56.8	Feet. -----
T road forks, roads east, west, and north.	39 00 05.5	93 59 20.4	6,599
T. 48 N., R. 28 W., apparent quarter corner north side sec. 3, T road forks, roads east, west, and north.	39 00 05.7	93 59 29.0	680
Odessa, west of, center of tracks, at Chicago & Alton R. R. crossing.			

Magnetic declination near west border of quadrangle,  $8^{\circ} 38' E.$ **SEDALIA QUADRANGLE.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 46 N., R. 24 W., east corner secs. 12 and 13, center of east and west road, on Johnson-Pettis county line.	38 46 52.5	93 29 59.0	-----
T. 46 N., R. 24 W., east corner secs. 1 and 12, on north and south fence line at Johnson-Pettis county line.	38 47 44.7	93 29 56.2	5,281
Tps. 46 and 47 N., Rs. 23 and 24 W., corner secs. 36, 1, 6, and 31, on Johnson-Pettis county line, center of north-south road.	38 48 40.4	93 29 53.1	5,631
T. 47 N., Rs. 23 and 24 W., quarter corner secs. 36 and 31, center of north-south road at road west.	38 49 06.7	93 29 51.8	2,659
T. 47 N., Rs. 23 and 24 W., corner secs. 25, 30, 31, and 36, center of north-south road, at T road west, on Johnson-Pettis county line.	38 49 33.0	93 29 50.3	2,659

## SEDALIA QUADRANGLE—Continued.

## Along highways near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 47 N., Rs. 23 and 24 W., corner secs. 24, 25, 19, and 30, center of north-south road, at hedge line west.....	* ' "	* ' "	Feet.
T. 47 N., Rs. 23 and 24 W., corner secs. 13, 24, 18, and 19, center of north-south road at T road west.....	38 50 25.9	93 29 47.6	5,350
T. 47 N., R. 24 W., east corner secs. 12 and 13, at road south and west (30 feet south of above corner is west corner secs. 7 and 8, T. 47 N., R. 23 W.).....	38 51 18.0	93 29 44.6	5,270
T. 47 N., R. 24 W., southwest quarter of sec. 12, in line with center of road south, 20 feet north of center of east-west road, 4 feet south of east-west wire fence, S. 55° E. and distant 250 feet from Mr. R. S. Tyler's house, iron bench-mark post stamped "Prim. Trav. Sta. No. 16, 1914, Mo.".....	38 52 10.4	93 29 41.5	5,305
Public crossroads, center of.....	38 52 24.2	93 29 57.5	1,879
Dunksburg, 250 feet east of southeast corner of T. 48 N., R. 24 W., in center of east-west road, at crossroads on township line, granite post.....	38 53 16.5	93 29 53.5	5,297
T. 48 N., Rs. 23 and 24 W., corner secs. 24, 25, 19, and 30, at intersection of Pettis County line with corner of Lafayette and Johnson counties, roads north, south, and west.....	38 53 58.0	93 29 51.5	4,210
T. 48 N., Rs. 23 and 24 W., corner secs. 13, 24, 18, and 19, intersection of corner of Saline and Pettis counties with Lafayette County line, center of north-south road.....	38 55 42.3	93 29 49.4	.....
T. 48 N., Rs. 23 and 24 W., corner of secs. 12, 13, 7, and 18, on Lafayette-Saline county line, center of road north and south at road east.....	38 56 34.5	93 29 46.5	5,295
T. 48 N., Rs. 23 and 24 W., east corner secs. 1 and 12, on Lafayette-Saline county line, center of north-south road, 334 feet south of railroad crossing, at Emma flag station, 30 feet south to T road east.....	38 57 26.9	93 29 43.5	5,299
Tps. 48 and 49 N., Rs. 23 and 24 W., 16.5 feet north of stone corner in east-west road, about 10 feet west of center of road, 4 feet south of hedge north, iron bench mark post stamped "Prim. Trav. Sta. No. 17, 1914, Mo.".....	38 58 19.4	93 29 40.8	5,325
	38 59 12.0	93 29 38.2	5,319

Magnetic declination near west border of quadrangle, 8° 00' E.

WARRENSBURG QUADRANGLE<sup>1</sup>

## Along highways near west border of northeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 47 N., R. 26 W., corner secs. 25, 26, 35, and 36, east and west crossing at goe in north-south road.....	* ' "	* ' "	Feet.
T. 47 N., R. 26 W., corner secs. 23, 24, 25, and 26, north-south road at T road east and fence line west.....	38 50 03.4	93 44 27.1	.....
T. 47 N., R. 26 W., corner secs. 13, 14, 23, and 24, center of crossroads.....	38 50 55.7	93 44 24.8	5,294
T. 48 N., R. 26 W., south corner secs. 35 and 36, at crossroads north, south, and west.....	38 51 48.6	93 44 22.2	5,346
T. 48 N., R. 26 W., quarter corner secs. 35 and 36, center of crossroads.....	38 54 21.7	93 44 34.9	.....
T. 48 N., R. 26 W., corner secs. 25, 26, 35, and 36, center of north-south road at hedge line east and west.....	38 54 47.7	93 44 33.9	2,630
T. 48 N., R. 26 W., quarter corner secs. 25 and 26, in line with center of roads north and east.....	38 55 13.8	93 44 32.9	2,640
T. 48 N., R. 26 W., corner secs. 23, 24, 25, and 26, T road forks, east, west, and south, on Johnson-Lafayette county line.....	38 55 40.1	93 44 32.0	2,658
	38 56 06.2	93 44 31.2	2,644

## Along highways near north border of quadrangle.

T. 48 N., R. 24 W., north corner secs. 1 and 2, east-west road at T road south.....	38 59 14.5	93 30 46.0	.....
T. 48 N., R. 24 W., north corner secs. 2 and 3, east-west road on township line, at road south.....	38 59 17.4	93 31 53.7	5,354
T. 48 N., R. 24 W., north corner secs. 4 and 5, at east-west road on township line, at road south.....	38 59 20.1	93 33 01.1	5,331
T. 49 N., R. 24 W., quarter corner south side sec. 33, center of east-west road, in line with T road north.....	38 59 21.7	93 33 38.8	2,990

<sup>1</sup> The northeast quarter of this quadrangle is the Knob Noster 15' quadrangle.

## WARRENSBURG QUADRANGLE—Continued.

## Along highways near north border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Concordia, T. 48 N., R. 24 W., 300 feet east of apparent corner of secs. 32 and 33, intersection of east-west road with center of Street S.....	38 59 22.6	93 34 03.8	1,977
Concordia, about 0.50 mile west of, T road corners, roads north, south, and east.....	38 59 23.8	93 34 46.6	3,379
Concordia, about 0.50 mile west of, north rail of track at public road crossing.....	38 58 59.9	93 34 48.2	2,423
Intersection public road and Missouri Pacific Railway tracks.....	38 59 00.0	93 35 39.6	4,062
Do.....	38 59 00.3	93 36 22.6	3,399
Do.....	38 58 50.0	93 36 49.8	2,383
Mulkey station, public road crossing at.....	38 58 56.2	93 37 57.2	5,338
T. 48 N., R. 25 W., in north part of sec. 2, 50 feet east and 15 feet north of road crossing Missouri Railway, 3 feet south of wire fence, 5 feet north of telephone pole, iron bench-mark post stamped "Prim. Trav. Sta. No. 18, 1914, Mo.".....	38 59 15.8	93 38 13.9	2,390
T road corners, center east-west road, at road north.....	38 59 16.1	93 38 40.7	2,115
T. 48 N., R. 25 W., at center of sec. 4, roads north, south, and west.....	38 59 04.7	93 40 28.8	8,612
T. 48 N., R. 25 W., quarter corner secs. 4 and 5, T road north.....	38 59 05.7	93 41 03.0	2,700
T. 48 N., R. 25 W., quarter corner secs. 5 and 6, east-west road at hedge north.....	38 59 06.4	93 42 09.7	5,268
T. 48 N., R. 25 W., middle of sec. 6, crossroads.....	38 59 07.1	93 42 43.2	2,650
T. 48 N., R. 25 W., quarter corner west side sec. 6.....	38 59 07.9	93 43 17.9	2,743
Davis Creek, center of wooden bridge over.....	38 59 09.0	93 44 07.4	3,912
T. 48 and 49 N., R. 26 W., is corner secs. 35 and 36.....	38 59 36.6	93 44 24.3	3,092

## Along highways and Missouri Pacific Ry. near south border of northeast quarter of quadrangle.

Normal triangulation station (C. & G. S.).....	38 45 32.997	93 44 16.442	.....
T. 46 N., R. 25 W., corner secs. 22, 23, 26, and 27, T road corners, roads east, west, and north.....	38 45 26.8	93 39 01.4	.....
Intersection Missouri Pacific Railway track and public road.....	38 46 30.6	93 38 05.8	7,814
Montserrat station, 125 feet east of public road crossing.....	38 46 34.7	93 37 16.2	3,956
Rs. 24 and 25 W., center of track at north and south fence.....	38 46 28.9	93 36 43.1	2,682
Clear Fork Creek, center of trestle over.....	38 46 16.3	93 35 30.8	5,869
Public road crossing, center of track at.....	38 46 00.4	93 34 12.3	6,420
Knobnoster station, 265 feet west of, main public road crossing.....	38 46 01.7	93 33 22.2	3,909
Knobnoster triangulation station, on an eminence called Knob Noster, $\frac{1}{4}$ mile from village of same name, in SW. $\frac{1}{4}$ NW. $\frac{1}{4}$ sec. 15, T. 46 N., R. 24 W. Station mark: A bottle of ashes underground and 3 stone posts for surface marks; stone over center of station is 6 inches square at top, with letters U. S. C. S. on it. The two other stones 5 inches square are 4 feet, respectively, north and south of station mark, with arrows pointing to station.....	38 46 35.46	93 33 07.09	3,614
T road south, center of east-west road at.....	38 45 51.2	93 32 00.1	6,944
T road north, center of east-west road at.....	38 45 49.9	93 31 26.7	2,650
T. 46 N., R. 24 W., about $\frac{1}{4}$ mile south of east corner of secs. 13 and 14, 55 feet north and 15 feet east of intersection of roads, 37 feet north of corner fence post, 1 foot east of wire fence, 25 feet east of Johnson-Pettis county line, iron bench-mark post stamped "Prim. Trav. Sta. No. 15, 1914, Mo.".....	38 45 47.6	93 30 02.9	6,648
T. 46 N., R. 24 W., east corner secs. 13 and 24.....	38 46 00.1	93 30 02.2	1,260
Intersection Missouri Pacific Railroad and Johnson-Pettis county line, center of track.....	38 46 22.0	93 30 00.9	2,214

## Along highways near east border of quadrangle.

Blackwater Creek, center of iron truss bridge over.....	38 54 38.4	93 30 26.4	.....
T. 48 N., R. 24 W., $\frac{1}{4}$ corner secs. 25 and 36, center of north-south road at.....	38 54 51.8	93 30 26.1	1,361
T. 48 N., R. 24 W., $\frac{1}{4}$ corner secs. 24 and 25, center of T road south at east-west road on Johnson-Lafayette county line.....	38 55 44.2	93 30 23.7	5,309
T road forks, center of east-west road at road north.....	38 59 13.2	93 30 12.4	.....

## Along highways through center of northeast quarter of quadrangle.

T. 47 N., R. 26 E., east corner secs. 13 and 24, on range line, T road forks north, south, and west.....	38 51 47.1	93 48 13.4	.....
T road forks, roads north, south, and east.....	38 52 10.9	93 43 11.7	2,411
T. 47 N., R. 25 W., $\frac{1}{4}$ mile east of corner of secs. 7, 8, 17, and 18, roads north, south, and east.....	38 52 34.7	93 41 45.5	7,232

## WARRENSBURG QUADRANGLE—Continued.

## Along highways through center of northern quarter of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 47 N., R. 25 W., corner secs. 8, 9, 16, and 17, east-west road at line south.....	* * *	* * *	
Crossroads.....	38 52 33.3	93 40 55.7	3,938
T. 47 N., R. 25 W., at approximate quarter corner secs. 10 and 15, right angle in road.....	38 52 45.5	93 40 20.0	2,062
T. 47 N., R. 25 W., secs. 10, 11, 14, and 15 crossroads.....	38 52 30.2	93 39 11.9	5,605
T. 47 N., R. 25 W., quarter corner secs. 11 and 14, roads east, west, and north.....	38 52 28.6	93 38 38.0	2,686
T. 47 N., R. 25 W., in NE. $\frac{1}{4}$ sec. 14, 7 feet north of telephone post, 20 feet west of center of north-south road, close to wire fence; iron post stamped "Prim. Trav. Sta. No. 25, 1914, Mo.".....	38 52 27.0	93 38 04.7	2,644
Blackwater Creek, center of truss bridge over.....	38 52 13.2	93 37 49.0	1,871
T. 47 N., R. 27 W., west corner of secs. 7 and 18 (45 feet south of this corner is east corner secs. 12 and 13, T. 47 N., R. 25 W., indi- cated by road east and fence line west).....	38 52 12.0	93 37 19.2	2,367
T. 47 N., R. 24 W., corner secs. 7, 8, 17, and 18, fence north, hedge south, center east and west road at.....	38 52 22.9	93 36 23.8	4,517
T. 47 N., R. 24 W., quarter corner secs. 8 and 17, crossroads at.....	38 52 20.7	93 35 15.1	5,442
T. 47 N., R. 24 W., corner secs. 8, 9, 16, and 17, 50 feet west of iron bridge, stone in center east and west road.....	38 52 19.8	93 34 41.9	2,627
T. 47 N., R. 24 W., quarter corner secs. 9 and 16, T road corners, roads north, east, and west.....	38 52 18.6	93 34 09.2	2,594
T. 47 N., R. 24 W., $\frac{1}{4}$ mile east of corner of secs. 9, 10, 15, and 16, on line between secs. 10 and 15, T road corners, roads north, south, and east.....	38 52 17.7	93 33 35.6	2,655
T. 47 N., R. 24 W., apparent corner secs. 10, 11, 14, and 15, east- west road at private road north to house.....	38 52 16.4	93 32 45.5	3,970
Cook's Knob triangulation station, a pole on the ridge of Mr. E. Cook's ice house, on the south side of the ventilator. The pole was braced firmly against the south face of the ventilator and the center of the pole is on the ridge 9 inches from the south face of the ventilator. The knob on which are Mr. Cook's house and the signal is about 7 miles distant and north from Knob Noster. It is the left-hand eminence of a range that is noticeable from Knob Noster and is in the northwest corner of the S.E. $\frac{1}{4}$ sec. 14, T. 47 N., R. 24 W. (U. S. C. & G. S. station).....	38 52 14.6	93 31 55.4	3,964
T road corners, roads north, south, and east.....	38 51 57.15	93 31 31.86	2,569
T. 47 N., R. 24 W., on line between secs. 11 and 12, T road forks near schoolhouse, roads north, south, and east.....	38 52 20.5	93 31 38.1	2,417
	38 52 25.2	93 30 45.2	4,212

Magnetic declination along north border of northeast quarter of quadrangle,  $7^{\circ} 46' E.$ ; along south border,  $8^{\circ} 00' E.$ ; along east border,  $8^{\circ} 00' E.$ ; along west border,  $7^{\circ} 35' E.$ ; along center,  $7^{\circ} 43' E.$

## Along highways near south border of northwest quarter of quadrangle.

T. 46 N., R. 28 W., $\frac{1}{4}$ mile south of corner of secs. 26, 27, 34, and 35, 45 feet north and 25 feet east of T road west and lane east, 5 feet east of corner of fence post, just inside fence, iron bench-mark post stamped "Prim. Trav. Sta. No. 11, 1914, Mo.".....	38 45 04.9	93 59 29.2	.....
T road corners, roads north, south, and east.....	38 45 30.8	93 59 28.0	2,618
T. 46 N., R. 28 W., in southern part sec. 26, crossroads.....	38 45 29.3	93 58 54.3	2,670
T road corners, roads north, south, and west, north-south road on section line.....	38 45 25.6	93 58 20.5	2,706
T road forks, roads north, east, and west.....	38 45 26.5	93 57 29.0	4,084
T. 46 N., R. 27 and 28 W., on range line between Rs. 27 and 28, and section line secs. 25 and 34, T road forks at roads east, west, and south.....	38 45 25.9	93 57 11.7	1,370
T. 46 N., R. 27 W., quarter corner between secs. 29 and 32, T road forks, roads north, south, and east.....	38 45 11.0	93 56 20.8	4,307
T road corners, roads east, west, and north.....	38 45 09.0	93 55 29.9	4,036
T. 46 N. R. 27 W., on line between secs. 27 and 34, in line with center of roads south and west, 20 feet north of center of road east, 4 feet north and 2 feet west of corner fence post, iron bench mark post stamped "Prim. Trav. Sta. No. 12, 1914, Mo.".....	38 45 06.3	93 53 56.3	7,422
T. 46 N., R. 27 W., corner secs. 26, 27, 34, and 35, center of crossroads.....	38 45 05.6	93 53 30.7	2,029
T. 46 N., R. 27 W., corner secs. 26, 25, 35, and 36, T road forks, roads east, west, and north.....	38 45 03.7	93 52 39.7	4,045
	38 45 01.5	93 51 32.3	5,340

Magnetic declination near south border of northwest quarter of quadrangle,  $8^{\circ} 19' E.$

## WARRENSBURG QUADRANGLE—Continued.

Along highways near east border of northwest quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 46 N., R. 26 W., quarter corner secs. 26 and 27, north-south road at T road east.....	* * "	* * "	Fed.
Postoak Creek, center of iron truss bridge over.....	38 45 14.2	93 45 51.2	.....
T. 46 N., R. 26 W., quarter corner between secs. 15 and 22, center of east-west road, at T road south.....	38 45 39.0	93 46 07.0	2,907
T. 46 N., R. 26 W., 0.25 mile west of corner of secs. 10, 11, 14, and 15, on section line between secs. 10 and 15, T road west.....	38 46 33.9	93 46 21.3	5,650
Blackwater Creek, center of iron truss bridge over.....	38 48 06.4	93 46 03.0	4,174
Tps. 46 and 47 N., at quarter corner on north side sec. 3, R. 26 W., in line with roads east, west, and south.....	38 49 15.5	93 46 13.5	7,036
T. 47 N., R. 26 W., about 0.75 mile west of corner of secs. 13, 14, 23, and 24, center of north-south road, in line with center of road east, at crossroads.....	38 51 51.1	93 45 13.6	.....
T road east.....	38 52 38.4	93 45 10.6	4,789
Fayetteville, 295 feet north of main crossroads at, 25 feet east of center of road, 6 feet west of picket fence, 8 feet south of telephone post, directly opposite church, iron bench mark post stamped "Prim. Trav. Sta. No. 20, 1914, Mo.".....	38 52 55.5	93 45 21.6	1,936
Fayetteville, 0.54 mile north of T road south.....	38 53 23.4	93 45 26.4	2,550
Fayetteville, 0.87 mile north of, center east-west road, at road south.....	38 53 36.8	93 45 34.1	1,487
T. 47 N., R. 26 W., north corner secs. 2 and 3, in line with center of road south and road east on township line.....	38 54 22.9	93 45 21.0	4,778
T. 48 N., R. 26 W., quarter corner between secs. 14 and 23, center of roads, east, west, and south, and lane north.....	38 56 59.6	93 45 02.6	.....
T. 48 N., R. 26 W., corner secs. 14, 15, 22, and 23, T road north.....	38 57 00.2	93 45 35.8	2,624
T. 48 N., R. 26 W., corner secs. 10, 11, 14, and 15, center of.....	38 57 52.6	93 45 34.1	5,316
Davis Creek, center of wooden bridge over.....	38 58 34.7	93 45 33.2	4,258
T. 48 N., R. 26 W., quarter corner secs. 2 and 3, center north and south road at T road east.....	38 59 11.2	93 45 32.2	3,696

Magnetic declination near east border of northwest quarter of quadrangle, 7° 35' E.

Along highways near north border of quadrangle.

Tps. 48 and 49 N., R. 26 W., 15 feet north and 15 feet east of corner of secs. 34, 35, 2, and 3, at T road corners, roads east, west, and south, iron bench mark post stamped "Prim. Trav. Sta. No. 19, 1914, Mo.".....	38 59 38.6	93 45 31.3	.....
Tps. 48 and 49 N., R. 26 W., apparent quarter corner secs. 3 and 34, crossroads.....	38 59 39.3	93 46 04.7	2,639
T. 48 N., R. 26 W., north corner secs. 3 and 4, T road south.....	38 59 40.2	93 46 38.7	2,684
T road corners, roads, east, west, and north.....	38 59 41.7	93 47 28.7	3,955
Tps. 48 and 49 N., R. 26 W., corner secs. 5, 6, 31, and 32, T road south.....	38 59 44.1	93 48 52.6	6,630
Tps. 48 and 49 N., R. 26 and 27 W., T road east.....	38 59 46.1	93 49 55.9	4,999
T road corners, roads north, south, and east.....	38 59 34.5	93 50 59.9	5,189
T road corners, roads east, west, and south.....	38 59 21.6	93 51 02.4	1,319
T. 48 N., R. 27 W., in west part of sec. 2, small iron bridge over creek.....	38 59 22.4	93 51 30.2	2,199
T. 48 N., R. 27 W., in west half of sec. 3, in line with T road south, 15 feet north of center of east-west road, 3 feet south of water oak tree and wire fence, iron bench mark post stamped "Prim. Trav. Sta. No. 21, 1914, Mo.".....	38 59 24.8	93 52 26.6	4,460
T road corners, roads north, south, and east, center of.....	38 59 24.8	93 53 13.5	3,706
T road corners, roads north, south, and west, center of.....	38 59 39.5	93 53 16.9	1,540
Davis Creek, center of small wooden bridge over main branch of.....	38 59 42.4	93 54 39.0	6,489
Davis Creek bridge, 0.70 mile west of, T road south.....	38 59 44.5	93 55 26.0	3,716
Odessa Cemetery, T road west at.....	38 59 57.8	93 55 31.9	1,421
Odessa railroad station, about 900 feet southwest of street crossing.....	38 59 57.4	93 57 20.9	.....
T. 47 N., R. 28 W., apparent quarter corner secs. 3 and 4, right angle turn in road at.....	38 59 38.7	93 59 57.0	.....

Magnetic declination for north border of quadrangle, 7° 55' E.

**WARRENSBURG QUADRANGLE—Continued.**  
**Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations. <i>Feet.</i>
T road forks, roads north, south, and east, about 130 feet north of bridge over small stream and near church.....	38 55 19.8	93 59 53.8	.....
Pittsville, 2.60 miles north of, crossroads.....	38 53 16.5	93 59 51.3	.....
T. 47 N., R. 28 W., 0.25 mile east of corner of secs. 15, 16, 21, and 22, 15 feet south of east and west road at T road north, 5 feet north of east and west hedge line, iron bench mark post stamped "Prim. Trav. Sta. No. 23, 1914, Mo.".....	38 52 23.4	93 59 54.5	5,382
Pittsville, 35 feet south of center of road west, 35 feet west of center of road south, and in line with roads north and east, crossroads.....	38 51 02.7	93 59 24.9	8,485
T. 47 N., R. 28 W., at section line between secs. 27 and 34, roads north, south, and west.....	38 50 36.6	93 59 26.6	2,649
T road corners, roads north, south, and west .....	38 49 57.0	93 59 28.9	4,009
Tps. 46 and 47 N., crossing of north-south road at line between.....	38 49 43.6	93 59 29.6	1,350
T road corners, roads north, south, and east .....	38 49 06.1	93 59 33.0	3,808
T. 46 N., R. 28 W., on line between secs. 10 and 15, crossroads.....	38 47 56.6	93 59 26.7	7,034
T road corners, roads north, south, and east.....	38 47 30.1	93 59 38.3	2,679
T. 46 N., R. 28 W., on line between secs. 15 and 22, roads north, south, and west.....	38 47 03.5	93 59 40.0	2,689

Magnetic declination near west border of quadrangle,  $8^{\circ} 24' E.$

**Along highways through center of northwest quarter of quadrangle.**

T. 47 N., R. 28 W., quarter corner between secs. 26 and 27, fence line north and south, center of east-west roads .....	38 51 02.3	93 59 08.2	.....
T. 47 N., R. 28 W., quarter corner between secs. 25 and 26, roads north, south, and west, stone 15 feet south of center of road west.....	38 51 00.0	93 58 58.0	5,379
T. 47 N., R. 28 W., corner secs. 23, 24, 25 and 26, stone.....	38 51 26.4	93 57 58.9	2,674
T. 47 N., R. 28 W., west corner of secs. 19 and 30, in line with road east (30 feet north of the above) and in line with road west is apparent corner of secs. 24 and 25, T. 46 N., R. 28 W.).....	38 51 25.1	93 56 50.1	5,440
T. 47 N., R. 27 W., corner secs. 19, 20, 29, and 30, center of crossroads.....	38 51 22.5	93 55 43.9	5,244
T road corners, roads east, west, and south.....	38 51 19.8	93 54 53.0	4,040
Blackwater Creek, center of iron truss bridge over north fork of.....	38 51 17.4	93 53 58.5	4,317
Columbus, T road corners, roads north, south, and west.....	38 51 23.9	93 53 27.5	2,540
T. 47 N., R. 27 W., corner secs. 15, 16, 21, and 22, roads north, south, and east.....	38 52 10.0	93 53 24.2	4,670
T. 47 N., R. 27 W., corner secs. 14, 15, 22, and 23, roads east, west, and north.....	38 52 07.7	93 52 15.5	5,435
T. 47 N., R. 27 W. near quarter corner secs. 14 and 23, 20 feet south and 20 feet east of intersection of crossroads, 6 feet east and 2 feet north of corner fence post, iron bench-mark post stamped "Prim. Trav. Sta. No. 24, 1914, Mo.".....	38 52 07.3	93 51 41.6	2,681
T. 47 N., R. 27 W., apparent corner of secs. 13, 14, 23, and 24, at angle in road near church and schoolhouse.....	38 52 05.9	93 51 08.3	2,635
T. 47 N., R. 27 W., east corner secs. 13 and 24, roads north, south, and west.....	38 52 06.5	93 49 59.3	5,461
T. 47 N., R. 28 W., corner secs. 17, 18, 19, and 20, center of, east and west road, old unused road south.....	38 52 00.3	93 48 53.7	5,224
T. 47 N., R. 26 W., corner secs. 16, 17, 20, and 21.....	38 51 57.7	93 47 45.9	5,373
T. 47 N., R. 26 W., corner secs. 15, 16, 21, and 22, roads east, west, and north.....	38 51 54.7	93 46 38.1	5,371
T. 47 N., R. 26 W., apparent corner secs. 14, 15, 22, and 23, near turn in roads north and east.....	38 51 51.6	93 45 30.3	5,368

Magnetic declination through center of northwest quarter of quadrangle,  $7^{\circ} 53' E.$

## WARRENSBURG QUADRANGLE—Continued.

## Along highways near north border of southeast quarter of quadrangle

Station.	Latitude.	Longitude.	Distance between stations.
Intersection of highway and "Short Line" Railroad from Warrensburg to Perle Springs.....	° ' "	° ' "	Feet.
T. 46 N., R. 26 W., corner secs. 25, 26, 35, and 36, center of east-west road at hedge north, and fence south.....	38 44 45.8	93 44 58.8	.....
T. 46 N., R. 26 W., quarter corner secs. 25 and 36, roads east, west, and north.....	38 44 45.2	93 44 45.0	1,094
T. 46 N., R. 25 W., west corner secs. 30 and 31 (40 feet north of above is east corner secs. 25 and 26, T. 46 N., R. 26 W., roads east, west, and north; jog at range line).....	38 44 44.1	93 44 10.6	.....
T. 46 N., R. 25 W., corner secs. 29, 30, 31, and 32, center of east and west road at T road south.....	38 44 42.6	93 43 37.0	2,659
T. 46 N., R. 25 W., corner secs. 28, 29, 32, and 33, center of east-west road at north-south wire fence.....	38 44 40.1	93 42 25.2	5,698
Sign post reading "Warrensburg 4 miles," at crossroads.....	38 44 38.0	93 41 22.0	5,007
T. 46 N., R. 25 W., corner secs. 27, 28, 33, and 34, center of east-west road at T road south, fence north, also line between civil townships of Warrensburg and Montserrat.....	38 44 37.5	93 41 04.3	1,402
T. 46 N., R. 25 W., 15 feet south and 30 feet west of corner of secs. 26, 27, 34, and 35, at T road corner, roads east, west, and north; 4 feet north of fence line, iron bench mark post stamped "Prim. Trav. Sta. No. 14, 1914, Mo.".....	38 44 36.3	93 40 11.1	4,220
	38 44 34.4	93 39 04.8	5,258

Magnetic declination near north border of southeast quarter of quadrangle, 8° 00' E.

## Along highways near north border of southwest quarter of quadrangle.

T. 46 N., R. 27 W., east corner secs. 25 and 36, roads north, south, and west (115 feet south of above corner is west corner secs. 30 and 31, T. 46 N., R. 26 W., at turn of road north and east).....	38 44 59.8	93 50 23.7	.....
T. 46 N., R. 26 W., corner of secs. 29, 30, 31, and 32, center of cross-roads.....	38 44 56.1	93 49 15.8	5,390
T. 46 N., R. 26 W., corner secs. 28, 29, 32, and 33, center of cross-roads.....	38 44 53.3	93 48 07.7	5,409
T. 46 N., R. 26 W., corner secs. 27, 28, 33, and 34, center of east-west road at fence north and south.....	38 44 51.0	93 47 01.1	5,280
T. 46 N., R. 26 W., corner secs. 26, 27, 34, and 35, 20 feet north and 25 feet east of intersection of crossroads at, 5 feet east of corner fence post; iron bench mark post stamped "Prim. Trav. Sta. No. 13, 1914, Mo.".....	38 44 48.3	93 45 52.5	5,446

Magnetic declination near north border of southwest quarter of quadrangle, 7° 50' E.

## KENTUCKY.

### PRIMARY TRAVERSE.

**Fords Ferry, Golconda, Kuttawa, Providence, and Smithland quadrangles.**

#### CRITTENDEN AND LIVINGSTON COUNTIES.

The following geographic positions on Henderson astronomic datum were determined by J. H. Wilson in 1915, and are based upon United States Army Engineers' positions at Bay City and Elizabethtown, and United States Geological Survey positions previously determined by primary traverse, described in Bulletins 310 and 440.

#### FORDS FERRY QUADRANGLE.

##### Along highways through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T road south, 25 feet southwest to two mail boxes.....	°   '   "	°   '   "	<i>Feet.</i>
Repton, 2 miles southwest of, 30 feet from road forks, railroad crossing.....	37 22 25.9	88 00 11.2	2,086
Repton, 3 miles southwest of, railroad crossing.....	37 22 15.6	88 02 00.0	8,843
Marion, 2 miles northeast of, at bridge "J. E. 72-5", railroad crossing.....	37 21 34.3	88 02 44.3	5,505
Marion, 2 miles northeast of railroad crossing.....	37 21 18.9	88 03 11.2	2,663
Marion, 4 miles northeast of railroad crossing.....	37 20 21.8	88 04 04.3	7,197
Marion, in northeast corner of Crittenden County courthouse yard; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	37 20 04.2	88 04 49.4	4,055
Marion, 1.40 miles west of, 25 feet northeast of wire fence, T road.....	37 19 48.2	88 06 21.2	7,587
Marion, 2.10 miles west of, 45 feet northwest of mail box No. 2, road forks.....	37 19 47.7	88 07 06.5	3,655
Marion, 3.80 miles west of, 50 feet southeast of telephone pole No. 60, road forks.....	37 20 51.5	88 08 22.8	8,920
Marion, 4.70 miles west of, 18 feet west of west end of bridge over Hurricane Creek, at road leading up to Mary Bell mine; road forks.....	37 20 48.9	88 09 19.3	4,573
Hurricane Creek, 0.87 mile west of, at top of ridge, road forks.....	37 20 45.6	88 10 15.8	4,575
Hurricane Creek, 1.90 miles west of, at white house, road forks.....	37 21 10.2	88 11 16.0	5,454
Sheridan, road forks at store.....	37 21 13.1	88 11 57.9	3,400
Sheridan, 1 mile northwest of, just east of Deer Creek church, at G. D. Humphrey's mail box, road forks.....	37 21 51.3	88 12 44.8	5,410
Sheridan, 1.50 miles northwest of, at sign, "Posted by R. L. Williams," on tree road forks.....	37 22 00.0	88 13 16.9	2,737
Sullingers schoolhouse, about 900 feet north of, 45 feet north of T road east, 20 feet east of intersection of Salem-Tolu and Lolo-Tolu roads; iron post stamped "Prim. Trav. Sta. No. 2, 1915".....	37 22 08.7	88 14 23.0	5,404

##### Along highways near Ohio River.

Wooden bridge over creek, 100 feet south of, road north.....	37 26 29.7	88 13 34.7	.....
Elm tree, at fence corner, 15 feet north of, center of road at gate in fence.....	37 26 29.7	88 12 29.7	5,247
Sycamore tree, on south side of road, 25 feet east of, at crossing of small creek, center of road.....	37 26 36.7	88 11 18.3	5,803
John Shaffer's residence, about 300 feet west of, 45 feet east of locust tree with board showing high-water mark of Apr. 5, 1913, road forks.....	37 26 41.9	88 10 32.1	3,817
Second-class crossroads at top of hill, oak tree in center of triangle.....	37 26 43.1	88 09 49.4	3,444
Casad post office, northeast corner of porch of J. E. Phillips & Co.'s store.....	37 26 48.4	88 09 04.0	3,707
Casad post office, 0.80 mile east of, T road west.....	37 26 57.4	88 08 14.0	4,128
Casad post office, 1.40 miles northeast of, 20 feet north of crooked walnut tree on east side of road, T road west.....	37 27 20.4	88 07 47.2	3,186
Fords Ferry, 70 feet south of T road east, on east side of north and south road, 2 feet west of northwest corner of post-office yard; iron post stamped "Prim. Trav. Sta. No. 8, 1915".....	37 28 01.6	88 06 34.5	7,192

**FORDS FERRY QUADRANGLE—Continued.****Along highways near Ohio River—Continued.**

Station.	Latitude.	Longitude	Distance between stations.
Fords Ferry, 0.80 mile east of, 700 feet northwest of W. L. Clements residence, 50 feet south of river bank and on the west side of a small creek, large sweet-gum tree; nail in blaze on west side and 3 feet above ground.....	• ' "	• ' "	
Weston, 0.40 mile west of, prominent pointed rock, on rocky point, rock is black around base and has a scratch mark on river side.....	37 28 05.0	88 05 40.9	4,331
Weston, locust tree at center of cross streets (described before as an elm tree, but there is no question but that the locust tree was located).....	37 28 18.2	88 04 43.8	4,797
	37 28 27.7	88 04 18.9	2,229

**Along highways near west border of quadrangle.**

Tolu, on north side of east and west street, 7 feet north and 12 feet west of northwest corner of Southern Methodist Church, Farmers & Merchants Bank on northeast corner; iron post stamped "Prim. Trav. Sta. No. 7, 1915".....	37 26 08.8	88 14 42.6	
Tolu, 0.90 mile south of, center of triangle at road forks.....	37 25 22.6	88 14 42.1	4,653
Tolu, 3.40 miles south of, road forks at cemetery.....	37 23 28.1	88 14 58.9	
Liberty Grove Church, about 300 feet southwest of, just north of house, road forks.....	37 21 18.9	88 14 14.8	
Liberty Grove Church, 1.20 miles south of, at A. L. Cooper's mail box, road forks.....	37 20 15.7	88 14 14.5	6,390
Pleasant Grove schoolhouse, 400 feet north of, 700 feet south of crossroads at foot of hill, on hillside, crossroads.....	37 19 47.6	88 14 01.2	3,040
Pleasant Grove schoolhouse, 1.70 miles south of, five mail boxes on wheel, center of crossroads.....	37 18 21.6	88 13 54.7	8,714
Salem, 1 mile northeast of, 20 feet southeast of "American Lady Shoe" sign on oak tree, road forks.....	37 16 45.0	88 14 13.7	9,887
Salem, at northwest corner of crossroads, on bank; iron post stamped "Prim. Trav. Sta. No. 3, 1915".....	37 15 57.8	88 14 35.6	5,093
Salem, 0.86 mile south of, 20 feet southwest to telephone pole, road forks.....	37 15 32.1	88 13 49.8	4,532

**Along highways near south border of quadrangle.**

J. I. Clements residence, Just south of T road forks.....	37 15 04.2	88 07 33.4	
Enon, 2 miles west of, four mail boxes on revolving frame at southwest corner of crossroads; center of crossroads.....	37 15 01.1	88 01 02.9	

Magnetic declination on north border of quadrangle  $4^{\circ} 20'$  E.; on south border,  $4^{\circ} 26'$  E.; on east border,  $4^{\circ} 27'$  E.; on west border,  $4^{\circ} 42'$  E.; in center,  $4^{\circ} 35'$  E.

**GOLCONDA QUADRANGLE.****Along highways through center of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Golconda (in Illinois), in northwest corner of courthouse yard, and 71 feet northwest of U. S. A. Engineers' bench mark, in center of triangle formed by supports of city fire bell; iron post stamped "Prim. Trav. Sta. No. 10, 1913 Illinois".....	• ' "	• ' "	
Comptons Landing, in fence line, on north side of road, and at edge of river bank; flagstaff.....	37 22 05.0	88 29 02.8	
Comptons Landing, 0.68 mile east of, crossroads.....	37 21 19.0	88 28 21.6	5,729
Comptons Landing, 1.40 miles northeast of, at road leading to Middle Landing, road forks.....	37 21 14.1	88 27 37.5	3,600
Berry Ferry, 60 feet south of southeast corner of post-office porch, center of road forks.....	37 21 49.5	88 27 31.4	3,610
Berry Ferry, 0.90 mile northeast of, 180 feet south of small iron bridge, 25 feet north and 15 feet east of mail box, road forks.....	37 22 20.4	88 27 32.0	3,110
Berry Ferry, 1.45 miles northeast of, center of road at second-class crossroads between house and barn.....	37 23 02.7	88 27 06.5	4,737
Berry Ferry, 2.70 miles northeast of, 180 feet southeast of right-angle turn in road, at road leading through gate to edge of river, just west of house, T road southwest.....	37 23 31.5	88 27 08.4	2,914
	37 24 27.4	88 26 23.1	6,724

## GOLCONDA QUADRANGLE—Continued.

## Along highways through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
McElroy Landing, 1.30 miles southwest of, 180 feet east of second-class road at gate, just east of small pond, west end of small iron bridge.	37 24 48.5	88 25 00.4	7,002
McElroy Landing, about 200 feet south of, center of road at gate (there is no road to landing, only a path through cornfield).	37 24 58.3	88 23 38.8	6,653
McElroy Landing, 0.50 mile southeast of, center of iron bridge over small creek.	37 24 44.3	88 23 11.5	2,632
Carrsville, at southeast corner of crossroads at Albert Boyd's store, first cross streets south of river and post office; iron post stamped "Prim. Trav. Sta. No. 6, 1915".	37 23 58.1	88 22 20.5	6,227
Carrsville, 0.70 mile southeast of, 270 feet west of house on hillside on north side of road, at second-class road, gate.	37 23 39.4	88 21 39.5	3,814
Carrsville, 1.30 miles southeast of, just west of creek, road forks.	37 23 26.3	88 21 02.5	3,265
Carrsville, 2.14 miles southeast of, about 600 feet west of old mine at top of ridge, between white oak tree on north side and gate on south side of road, center of road.	37 23 18.8	88 20 11.1	4,202
Carrsville, 2.90 miles southeast of, 25 feet northeast of corner of picket fence, 30 feet northwest of intersection of wire fence and rail fence, T road south.	37 23 13.4	88 19 21.0	4,095
Crawford schoolhouse, opposite front door, center of road.	37 22 51.6	88 19 08.2	2,443
Crawford schoolhouse, 0.90 mile southeast of, 100 feet east of road south, 10 feet east of intersection of wire and picket fences, second-class road east, road forks.	37 22 10.2	88 18 37.9	4,859
Deer Creek, center of ford at Livingston-Crittenden county line.	37 21 59.8	88 18 06.2	2,770
Deer Creek, 0.68 mile southeast of ford at, in front of W. H. Clark's residence, telephone pole.	37 21 42.4	88 17 29.0	3,480
Deer Creek, 1.50 miles southeast of ford at, center of bridge.	37 21 33.5	88 16 33.3	4,585
Sullingers schoolhouse, 1.10 miles west of, in front of mail box No. 51, road forks.	37 22 16.7	88 15 43.3	5,940

## Along highways near west border of quadrangle.

Bay City (in Illinois), 70 feet north of Glass's store, 30 feet west of center of north and south road, U. S. Army Engineers' benchmark post.	37 15 03.1	88 29 47.6	.....
Bay City, 0.75 mile northeast of, lane southwest to cornfield, in river bottom at Threlkeld's residence.	37 15 21.6	88 29 03.3	3,982
Bay City, 2.16 miles northeast of, second-class road through gate to river bottom, road forks.	37 16 30.9	88 29 34.6	7,465
Bay City, 2.70 miles north of, 100 feet east of house with white-washed front, road forks at road east.	37 16 35.2	88 29 03.1	2,575
Bay City, 3.60 miles north of, on east bank of bayou, forked cypress tree.	37 17 13.2	88 29 35.1	4,639
Comptons Landing, 3.90 miles south of, right-angle turn in road, at road west to river bottom, 25 feet north of "No Hunting" sign by O. Kuebler.	37 18 09.3	88 28 53.3	6,610
Comptons Landing, 2.90 miles south of, about 300 feet southwest of a house and 150 feet west of another house, at road west through gate to river bottom, crossroads.	37 18 58.9	88 28 33.5	5,278
Comptons Landing, 0.90 mile southeast of, 60 feet east of gate, 10 feet south of oak tree, near bend in road, road forks.	37 20 40.6	88 27 49.7	10,886

## Along highways near south border of quadrangle.

Sandy Creek, south end of bridge over.	37 15 53.2	88 16 12.3	.....
Center of crossroads, 15 feet west of wooden culvert.	37 15 53.6	88 16 45.7	2,698
Old Salem schoolhouse and church, wooden culvert at road forks between.	37 15 58.7	88 17 24.0	3,135
O. T. English's and C. C. Alsobrook's mail boxes.	37 15 24.9	88 18 42.5	7,202
G. W. Riddle's mail box, 230 feet west of, 20 feet north of telephone pole No 2560, T road north.	37 15 15.3	88 19 50.4	5,567
T road southeast, just west of three mail boxes.	37 15 02.0	88 20 22.3	2,902
Road forks, T road north.	37 15 10.0	88 25 37.2	.....
Culbert schoolhouse, at northeast corner of yard, road forks.	37 15 09.2	88 26 13.7	2,948
McCormay's chapel, 700 feet northeast of, T road south west.	37 15 33.5	88 26 57.3	4,294
McCormay's chapel, 0.90 mile southwest of, T road east.	37 15 00.4	88 27 39.1	4,743
L. Highfill's mail box (No. 68), 25 feet south of, at top of rise, road forks.	37 24 05.7	88 15 24.5	.....
Mail box No. 68, near second-class road forks.	37 24 47.8	88 15 20.9	4,280
Tolu, 1 mile southwest of, 1/4 mile northeast of J. L. Franklin's brick residence, road forks.	37 25 48.0	88 15 04.7	.....

## GOLCONDA QUADRANGLE—Continued.

Along highways in northeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
J. A. Worley's mail box (No. 3), 25 feet east and 25 feet north of, at top of ridge, oak tree at second-class road fork.....	• • "	• • "	
Fred Hill's residence, about 400 feet south of, at forks of road, C. E. Donahey's mail box.....	37 25 47.0	88 16 24.8	6,463
Concrete bridge, in Ohio River bottom.....	37 25 20.7	88 17 07.3	4,328
Elizabethtown, at landing opposite, pole with ferry bell and flag.....	37 25 52.6	88 17 25.8	3,565
Elizabethtown (in Illinois), on limestone point on bank of river, directly in front of Rose House, 5 feet west of summer house; a triangle and letters "U. S." cut in solid rock, U. S. Engineers' base-line triangulation station .....	37 26 05.1	88 18 21.9	4,704
	37 26 46.2	88 18 11.8	4,240

Magnetic declination along north border of quadrangle,  $4^{\circ} 32'$  E.; along south border,  $4^{\circ} 25'$  E.; along east border,  $4^{\circ} 42'$  E.; along west border,  $4^{\circ} 25'$  E.; in center,  $4^{\circ} 34'$  E.

## KUTTAWA QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Dry Creek, center of bridge over.....	• • "	• • "	
S. L. Shelby's store, 40 feet southeast of corner of store porch.....	37 14 50.0	88 12 51.4	
J. C. Kinsolving's house, 250 feet south of, T road west.....	37 14 19.7	88 12 38.8	3,225
Emmaus Church, about 800 feet northeast of, 100 feet west of covered bridge over Clay Lick Creek, road forks.....	37 14 12.6	88 11 55.5	3,575
Emmaus Church, 1.20 miles east of, 20 feet east of mail box No. 35 A., road forks.....	37 14 51.2	88 10 37.9	7,397
J. A. Patton's mail box, at road southwest, about 500 feet east of road, northeast.....	37 14 55.8	88 08 55.4	8,303
Mexico, about 0.30 mile north of depot, 150 feet east of J. T. Nelson's store, 60 feet west of T road south, center of east and west road, at railroad crossing.....	37 14 16.8	88 06 27.5	
Fredonia, about 1.50 miles northwest of, 25 feet south and 30 feet west of T. W. Young's mail box (No. 13), in triangle formed by intersection of Marion-Fredonia State road and Salem-Fredonia road; iron post stamped "Prim. Trav. Sta. No. 4, 1915".....	37 14 11.8	88 05 35.3	4,253
Fredonia, about 1.50 miles northeast of, opposite front gate of residence of Joe Guess, center of Enon-Fredonia road.....	37 13 56.4	88 04 48.4	4,100
	37 14 06.6	88 02 09.5	12,910

Magnetic declination along north border of quadrangle  $4^{\circ} 26'$  E.

## PROVIDENCE QUADRANGLE.

Along highway near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Repton and Tribune, crossroads halfway between, in northwest corner of R. Newcomb's farm; nail in blaze on walnut tree bears S. $81^{\circ} 45'$ E., 112.9 feet, nail in blaze on small oak bears S. $89^{\circ}$ W., 34 feet; iron post stamped "Prim. Trav. Sta. No. 15, 1906".....	• • "	• • "	
Enon, at northeast corner of church, just south of T road east.....	37 22 35.1	87 59 48.1	
Enon, Walnut Grove church, at corner of old Polk farm, at T lane northeast, about $\frac{1}{4}$ mile northeast of Enon; nail in small black oak bears S. $79^{\circ} 25'$ E., 13.3 feet, T road northeast bears S. $28^{\circ} 30'$ E., 35 feet; iron post stamped "Prim. Trav. Sta. No. 16, 1906".....	37 15 15.7	87 59 21.8	
	37 15 34.1	87 58 43.9	3,585

## SMITHLAND QUADRANGLE.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Burna, 160 feet northeast of post office, T road southwest.....	• ' "	• ' "	Feet.
Burna, 0.58 mile southwest of, on east side of north and south road at T road west; iron post stamped "Prim. Trav. Sta. No. 5, 1915".....	37 14 48.2	88 21 33.0	.....
Burna, 2 miles west of, 110 feet east of bridge over small creek, T road north.....	37 14 22.2	88 21 52.5	3,063
Burna, about 2.50 miles west of, at Midway schoolhouse, center of road forks.....	37 14 43.5	88 23 24.1	7,712
Midway schoolhouse, about 0.40 mile west of, 75 feet north of road forks at road leading up creek, road forks at road leading down creek.....	37 14 42.7	88 23 54.6	2,463
Bayou, 115 feet northeast of post office, T road forks.....	37 14 44.7	88 24 22.2	2,234
	37 14 47.5	88 28 31.4	.....

Magnetic declination along north border of quadrangle  $4^{\circ} 25' E.$ 

## TRIANGULATION STATIONS.

Goodloe, Inez, and Paintsville quadrangles.

FLOYD, JOHNSON, MAGOFFIN, AND MORGAN COUNTIES.

In the summer of 1915 C. L. Nelson extended triangulation over the above-named quadrangles, starting from Collins Rock, Porter, and Standifer stations, on North American datum.

In addition to reoccupying these three stations, Mr. Nelson occupied five stations and located four points by intersections.

## BRUSH CREEK, FLOYD COUNTY, KY. (Not occupied.)

Flag in top of oak tree, at head of Grassy Creek. Station was not occupied, but it is fairly open and can be occupied by topographer.

Station mark: Oak signal tree.

[Latitude  $37^{\circ} 30' 55.95''$ . Longitude  $82^{\circ} 53' 25.04''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Quicksand.....	• ' "	• ' "	Log. meters.	Miles.
Hicks.....	6 36 27.40		3.6900906	3.044
Collins Rock.....	91 17 15.90		3.5735542	2.328

## COE FLAG, MAGOFFIN COUNTY, KY. (Not occupied.)

Flag in 8-inch black oak on top of knob on property of Albert Coe at head of Puncheon Creek, Gun Creek, and Big Ditch Fork of Middle Creek. Flag is about  $1\frac{1}{2}$  miles south of Ivyton.

Station mark: Center of oak signal tree.

[Latitude  $37^{\circ} 40' 53.57''$ . Longitude  $82^{\circ} 58' 09.39''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Preston.....	200 57 57.88	20 59 45.84	Log. meters.	Miles.
Webb.....	254 37 00.05	74 40 53.82	4.0815157	3.9874018

## COLLINS ROCK, FLOYD COUNTY, KY.

On a high cleared knob between the forks of Beaver Creek and about 4 miles above their junction. It is at head of Turkey Branch and Henry Branch of Right Fork of Beaver Creek, and may be reached from either fork.

Signal: Quadripod of usual form set on center.

Station mark: Aluminum-bronze tablet set flush in solid rock.

Reference marks: (1) Chisel mark (+) on rock; distance 8.28 feet, true azimuth  $188^{\circ} 29'$ . (2) Chisel mark (+) on rock; distance 7.20 feet, true azimuth  $285^{\circ} 04'$ . (3) Chestnut oak 20 inches in diameter; distance 24.74 feet, true azimuth  $32^{\circ} 28'$ .

Aluminum tablet had been destroyed. It was replaced by bronze tablet.

[Latitude  $37^{\circ} 30' 48.63''$ . Longitude  $82^{\circ} 46' 24.59''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Quicksand.....	* * "	* * "		
Hueysville.....	76 59 28.24	256 53 45.71	Log. meters.	Miles.
Brushey Creek.....	83 35 00.41	263 32 55.69	4.1519405	8.817
Hicks.....	91 17 15.90		3.7043490	3.146
Preston.....	111 47 04.01	291 42 58.59	4.0140178	6.418
Webb.....	156 38 01.26	336 32 38.57	4.0273465	6.618
Porter.....	159 35 23.88	339 32 07.02	4.5131857	20.255
Ivy.....	190 47 10.23	10 49 01.29	4.3550107	14.072
Stratton.....	238 52 40.17	58 58 25.18	4.2101409	10.081
	276 33 27.16	96 45 00.29	4.4496061	17.497

## HUEYSVILLE, FLOYD COUNTY, KY. (Not occupied.)

Flag set on rock and braced by branches of tree on knob, about 1 mile east of Hueysville and 1 mile southeast of junction of Brush Creek and Right Fork of Beaver. Station can be occupied.

Station mark: Old bolt was found set in rock at foot of flag.

[Latitude  $37^{\circ} 30' 30.23''$ . Longitude  $82^{\circ} 49' 49.41''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Hicks.....	* * "	* * "		
Collins Rock.....	132 52 57.38	312 50 57.49	Log. meters.	Miles.
	263 32 55.69	83 35 00.41	3.8218690	4.123
			3.7043490	3.146

## MILLERS FLAG, MAGOFFIN COUNTY, KY. (Not occupied.)

Station mark: Flag in oak tree on top of knob, about 1 mile east of Millersville, on Mine Fork.

[Latitude  $37^{\circ} 48' 20.84''$ . Longitude  $82^{\circ} 50' 40.09''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Peach Orchard.....	* * "	* * "		
Preston.....			354 07 81.97	Log. meters.
			111 08 17.19	Miles.
			4.2731041	11.651
			3.8454842	4.353

## NELSON, LAWRENCE COUNTY, KY.

On a cleared knob between the right and left forks of George Creek, about 2 miles northeast of Lowmansville. It can be reached from Jim Bryant's place on Nelson Branch of Left Fork.

Station mark: Bronze triangulation tablet countersunk and cemented in rock.

Reference marks: (1) Chisel mark (+) on rock, distance 16.90 feet, true azimuth  $155^{\circ} 26'$ ; (2) chestnut tree 18 inches in diameter, distance 23.20 feet, true azimuth  $150^{\circ} 38'$ .

Signal: Quadripod of usual form set on center.

[Latitude  $37^{\circ} 57' 16.485''$ . Longitude  $82^{\circ} 43' 56.125''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	"	Log. meters.	Miles.
Preston.....	41 02 33.497	220 55 38.039	4.4017842	15.672
Peach Orchard.....	94 59 20.446	274 48 51.496	4.3987861	15.565
Anthony.....	282 53 32	193 08 52	4.57015	23.094
Hurricane.....	311 34 37.004	131 43 24.455	4.4487441	17.462
Standifer.....	346 34 12.267	166 35 52.653	4.2360553	10.701

#### PEACH ORCHARD, MORGAN COUNTY, KY.

On partly cleared knob at head of Fife Branch of Blain Creek, on the property of Leo Skags. Reached via Big John Ferguson's place on Open Fork of Paint Creek.

Signal: Quadripod of usual form set over center.

Station mark: Bronze tablet in rock set in ground.

Reference marks: (1) White-oak stump of old signal tree 36 inches in diameter, 107 feet distant, true azimuth  $2^{\circ} 50'$ ; (2) oak tree, 14 inches in diameter, leaning toward north, 186 feet distant, true azimuth  $45^{\circ} 49'$ ; (3) peach tree 8 inches in diameter, 19 feet distant, true azimuth  $93^{\circ} 33'$ .

[Latitude  $37^{\circ} 58' 25.91''$ . Longitude  $83^{\circ} 00' 58.52''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	"	Log. meters.	Miles.
Nelson.....	274 48 51.496	94 59 20.446	4.3987861	15.565
Standifer.....	303 00 00.177	123 12 08.423	4.5389719	21.494
Preston.....	338 13 47.576	158 17 19.771	4.3579744	14.169
Millers Flag.....	354 07 31.966	.... ... .....	4.2731041	11.654

#### PORTER, FLOYD COUNTY, KY.

On an east-west ridge on the north side of Johns Creek about 2.5 miles (air line) above the mouth, between the properties of Lee Hall and John Porter. Station is best reached by following ridge to east from residence of William Nesbit.

Signal: Quadripod of usual form set over center.

Station mark: Aluminum triangulation tablet countersunk and cemented in solid rock.

Reference marks: (1) Chisel mark (+) on rock, distance 7.95 feet, true azimuth  $304^{\circ} 47'$ ; (2) chisel mark (+) on rock, distance 10.65 feet, true azimuth  $59^{\circ} 10'$ .

[Latitude  $37^{\circ} 43' 27.06''$ . Longitude  $82^{\circ} 43' 22.69''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	"	Log. meters.	Miles.
Collins Rock.....	10 49 01.29	100 47 10.23	4.3766449	14.791
Hicks.....	36 27 58.29	216 22 01.20	4.3829495	15.007
Webb.....	80 07 17.98	260 02 09.48	4.0982839	7.792
Preston.....	110 39 05.94	290 31 51.08	4.2688442	11.541
Standifer.....	199 49 57.77	19 51 17.42	3.9721035	6.827
Flag.....	289 42 03.91	109 50 31.89	4.3350551	13.440
Brandy Keg.....	327 25 39.25	147 27 08.20	3.8209275	4.114
Ivy.....	327 51 40.30	147 55 34.98	4.2484148	11.009

## PRESTON, JOHNSON COUNTY.

On cleared knob at head of Barnett Creek, about 7 miles southwest of Painteville. It can be reached by way of Will Blair's residence on Barnett Creek.

Signal: Chestnut-oak tree 10 inches in diameter which forms southern support for observing structure 20 feet high. Tree is 7.8 feet distant; true azimuth  $0^\circ 55'$ .

Station mark: Bronze tablet in rock set in ground.

Reference marks: Fence corner between properties of Blair, Blanton, and Salyers, distance 30.8 feet, true azimuth  $110^\circ 55'$ ; black-oak tree, 1 foot in diameter, on fence line between Salyers's and Blairs's properties, distance 167 feet, true azimuth  $177^\circ 10'$ ; stump of old signal tree; large chestnut tree 4 feet in diameter, distance 44.6 feet, true azimuth  $319^\circ 35'$ .

[Latitude  $37^\circ 46' 58.93''$ . Longitude  $82^\circ 55' 12.93''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   °   "	°   °   "		
Quicksand.....	1 27 44.74	181 27 23.73	Log. meters.	Miles.
Coe Flak.....	20 59 45.84	200 57 57.88	4.5202281	20.586
Millers Flag.....	111 08 19.77		4.0615157	7.497
Peach Orchard.....	158 17 19.77	338 13 47.57	3.8454842	4.353
Nelson.....	220 55 38.04	41 02 33.49	4.4017842	15.672
Standifer.....	263 34 32.86	83 43 07.80	4.3156842	12.854
Porter.....	290 31 51.08	110 39 05.94	4.2688842	11.541
Webb.....	320 52 09.76	149 54 15.80	4.0021168	6.244
Collins Rock.....	336 32 38.57	156 38 01.26	4.5131857	20.255
Hicks.....	353 14 10.58	173 15 27.24	4.4174560	16.248

## QUICKSAND, FLOYD COUNTY.

On a high ridge separating the headwaters of Quicksand Creek from Salt Lick Creek, 3 miles northwest of Hippo post office.

Station mark: Boulder in ground, in top of which is cemented a bronze triangulation tablet.

Reference marks: (1) Chestnut-oak tree 2 feet in diameter; distance 6.6 feet, true azimuth  $165^\circ 04'$ ; (2) position of former signal tree and station mark (recently blown down); distance 13 feet, azimuth  $16^\circ 00'$ .

Old stone with tablet had been removed; replaced by bronze tablet in stone set in ground in same position.

Latitude  $37^\circ 29' 04.65''$ ; longitude  $82^\circ 55' 47.34''$  from north. Latitude  $37^\circ 29' 04.52''$ ; longitude  $82^\circ 55' 47.19''$  from south.]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   °   "	°   °   "		
From north:				
Preston.....	181 27 23.727	1 27 44.742	Log. meters.	Miles.
Collins Rock.....	256 53 45.712	76 59 28.238	4.1519805	8.817
From south:				
Lost.....	50 37 18.14	230 28 01.35	4.4653955	18.145
Frazier.....	291 47 34.35	111 57 06.21	4.3984679	15.482
Beaver.....	323 30 08.82	143 37 19.47	4.4681256	18.239
Walnut.....	350 29 56.16	170 31 19.40	4.3106744	12.706

## STANDIFER, JOHNSON COUNTY.

On a high cleared knob between main Greasy Creek and Pigeon Roost Fork, at head of Buffalo Creek. It can be reached from Greasy Creek or from Pigeon Roost Fork.

Signal: 26-inch chestnut, oak tree; distance 7.8 feet, true azimuth  $127^{\circ} 13'$ .

Station mark: Aluminum tablet countersunk and cemented in sandstone 28 by 20 by 14 inches.

[Latitude  $37^{\circ} 48' 13.17''$ . Longitude  $82^{\circ} 41' 12.63''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Porter.....	19 51 17.37	199 49 57.72	3.9721055	5.827
Webb.....	54 47 16.462	234 40 48.050	4.2792061	11.818
Preston.....	83 43 07.803	203 34 32.858	4.3156842	12.854
Peach Orchard.....	123 12 08.423	303 00 00.177	4.5389719	21.494
Nelson.....	166 35 52.653	346 34 12.267	4.2360553	10.701
Hurricane.....	276 23 42.60	96 30 48.92	4.2337179	10.643
Brandy Keg.....	358 29 57.29	178 30 06.71	4.1585556	8.952

## WEBB, FLOYD AND JOHNSON COUNTIES.

Cleared hill about 1 mile north of Bonanza on Abbott Creek. Best reached by going up Conley Branch about half a mile and climbing spur. Properties of Dutch Webb, B. A. Conley, and Thomas Stanley join on the hill.

Signal: Hickory tree, 14 inches in diameter, distance 5.8 feet, true azimuth  $190^{\circ} 48'$ . Tree leans so that flag in tree is directly over station. (All angles were read to flag.)

Station mark: Bronze tablet in stone 6 by 8 by 14 inches, set in ground.

Reference marks: (1) Property corner between B. A. Conley, Dutch Webb, and Thomas Stanley, distance 207 feet, true azimuth  $328^{\circ} 44'$ ; (2) black-gum tree, 10 inches in diameter, distance 102 feet, true azimuth  $35^{\circ} 59'$ .

[Latitude  $37^{\circ} 42' 16.98''$ . Longitude  $82^{\circ} 51' 47.00''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Hicks.....	6 31 20.98	186 30 31.86	4.2402324	10.804
Coe Flag.....	74 40 53.82	254 37 00.049	3.9874018	6.036
Preston.....	149 54 15.80	329 52 09.76	4.0021168	6.244
Standifer.....	234 40 48.050	54 47 16.462	4.2792061	11.818
Porter.....	260 02 09.480	80 07 17.983	4.0982839	7.792
Collins Rock.....	339 32 07.126	159 35 23.885	4.3550107	14.072

**HICKS, FLOYD-MAGOFFIN COUNTIES, KY.**

Cleared knob at head of Left Fork of Middle Creek and Brushy Fork of Licking River. Station is near north edge of large flat sandstone rock, on highest part of knob, where properties of James Allen, John M. Hale, and Smith Hicks corner.

Signal: Tall pine 18 inches in diameter, distant 28.1 feet, true azimuth  $168^{\circ} 35'$ .

Station mark: Aluminum tablet set in rock in place.

Reference marks: (1) Chestnut-oak tree, 2 feet in diameter, separating into two trunks 6 feet from ground, distant 47.7 feet, true azimuth  $351^{\circ} 12'$ ; (2) cross chiseled in rock, distant 7.5 feet, azimuth  $355^{\circ} 22'$ ; (3) cross chiseled in rock, distant 12.5 feet, azimuth  $48^{\circ} 35'$ .

[Latitude  $37^{\circ} 32' 56.64''$ . Longitude  $82^{\circ} 53' 07.46''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Preston.....	• • "	• • "		
Webb.....	173 15 27.24	353 14 10.58	Log. meters.	Miles.
Porter.....	186 30 31.86	6 31 20.98	4.4174560	16.24
Collins Rock.....	216 22 01.20	36 27 58.30	4.2402324	10.44
Hueysville.....	291 42 58.59	111 47 04.02	4.3829495	15.00
Brush Creek.....	312 50 57.49	132 52 57.38	4.0273465	6.61
			3.8214990	4.12
			3.5735542	2.32

## TENNESSEE AND ARKANSAS.

### PRIMARY TRAVERSE.

**SHELBY COUNTY, TENN.; CRITTENDEN COUNTY, ARK.**

**Bartlett and Memphis quadrangles.**

The following geographic positions were determined by F. W. Crisp in 1915, and are based upon United States Coast and Geodetic Survey triangulation stations, Exchange, Hopefield, South Base, and Weaver, North American datum:

#### MEMPHIS QUADRANGLE.

**Along highways and Yazoo & Mississippi Valley Railroad**

Station.	Latitude.	Longitude.	Distance between stations.
<b>TENNESSEE.</b>			
Exchange triangulation station, a Coast and Geodetic Survey station in the city of Memphis, on the top of the Cotton Exchange Building on the corner of Second and Madison streets. A standard station mark was set flush with the surface of the concrete roof in the southeast corner of the building, 1.38 meters from the inside of the cornice on the Second Street side and 1.48 meters from the inside of the cornice on the Madison Street side, and 3.08 meters from the center of the iron flagpole.....	35 08 42.05	90 03 04.85	Feet.
Memphis, Third and Union avenues, intersection of.....	35 08 33.1	90 03 02.8	919
Memphis, Third and Linden avenues, intersection of.....	35 08 14.6	90 03 03.8	1,875
Memphis, South Third Street and East Georgia Avenue, intersection of.....	35 07 44.9	90 03 06.5	3,017
Memphis, intersection of southbound main track of Yazoo & Mississippi Valley R. R. and northbound main track of Chicago, Rock Island & Pacific Ry.....	35 07 36.9	90 03 34.4	2,456
Memphis, center of southbound Illinois Central R. R. track and center of Iowa Avenue where it crosses under railroad.....	35 07 28.6	90 03 34.4	840
Memphis, intersection of southbound track Illinois Central R. R. and McMore Avenue.....	35 06 57.9	90 03 26.7	3,172
Memphis, center of main track Yazoo & Mississippi Valley R. R. under center of viaduct on speedway.....	35 06 27.6	90 03 27.3	3,070
Memphis, Rayburn Street, center of main track Illinois Central R. R. and electric railway.....	35 05 51.2	90 03 44.9	3,955
Horn Lake Road, center of track at intersection with, 35 feet southeast to milepost, "Memphis, 3 miles".....	35 05 33.2	90 04 01.3	2,276
McLean lumberyard, 635 feet south of, under Yazoo & Mississippi Valley R. R. crossing.....	35 05 07.6	90 04 24.5	3,225
Noncanah Creek, iron bridge over, center of track.....	35 04 48.2	90 04 42.1	2,452
West Junction station, 20 feet southeast of, 15 feet west of center of main track, 35 feet north of tall switchstand at north end of Yazoo R. R. loop; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	35 04 03.4	90 05 23.8	5,701
Milepost, "Memphis 6 miles," center of track at.....	35 04 02.8	90 06 20.5	4,703
Easley, flag station, center of track at road crossing.....	35 04 06.8	90 07 35.2	6,221
Easley, flag station, 0.90 mile southwest of, center of track at second-class road crossing.....	35 03 20.1	90 07 49.8	4,876
Easley station, 2.24 miles south of, center of second-class road crossing at west loop of Yazoo & Mississippi Valley R. R.....	35 02 11.5	90 07 46.7	6,938
Weaver triangulation station, a Coast and Geodetic Survey station about 8½ miles south of west from Court Square, Memphis, 4 miles west of south from West Junction, and 2 miles north from Darwin railroad station, on the highest knoll on the Weaver farm, in a cultivated field, near the bluff overlooking the Mississippi River bottom, about ¼ mile east from the west line of the loop of the Yazoo & Mississippi Valley R. R. The ends of the loop are at West Junction and Darwin, 1 mile west from the east line of this railroad, about 40 meters west from the "Bluff Road," which runs north and south near the bluffs through the Weaver plantation. Mark: Standard disc.....	35 02 24.82	90 07 35.61	1,631

## MEMPHIS QUADRANGLE—Continued.

## Along highways and Yazoo &amp; Mississippi Valley Railroad—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Fields Avenue at intersection with T road north.....	* * "	* * "	Feet.
Fields Avenue, center of track at railroad crossing.....	35 02 58.4	90 06 49.3	5,133
Mount Pisgah Baptist Church, T road west at.....	35 02 58.7	90 06 11.6	3,130
Mount Pisgah Baptist Church, 0.50 mile south of T road east.....	35 02 58.8	90 05 46.9	2,050
Levi Avenue, center of intersection with T road south.....	35 02 32.8	90 05 46.6	2,634
Horn Lake road, intersection with T road west.....	35 02 34.2	90 04 40.7	5,478
Horn Lake road, intersection with T road east.....	35 02 34.3	90 04 09.6	2,583
Horn Lake road, intersection with Lake View road.....	35 02 07.3	90 04 10.8	2,728
Horn Lake road, intersection with crossroad at mail box No. 109, belonging to J. B. Bulford.....	35 01 56.2	90 04 11.2	1,127
Whitehaven, 0.20 mile north of station, 60 feet east of center of Illinois Central R. R. track, 5 feet south of intersection with T road north, 270 feet southeast of milepost "N. O. 386"; iron post stamped "Prim. Trav. Sta. No. 2, 1915".....	35 01 15.5	90 04 04.3	4,152
	35 01 15.4	90 02 18.3	8,816

## Along Illinois Central Railroad.

Whitehaven, 1 mile north of, center of main track at public road crossing.....	35 02 07.3	90 02 29.5	5,324
Whitehaven, 1.50 miles north of, crossing of Lake View Electric Ry. and Illinois Central R. R., center of Illinois Central R. R. track under electric railway.....	35 02 30.8	90 02 34.3	2,411
Whitehaven, 2.30 miles north of, center of track at second-class road crossing.....	35 03 14.4	90 02 48.2	4,559
Whitehaven, 2.96 miles north of, center of track at east and west public road crossing.....	35 03 46.6	90 02 57.3	3,333
Noncannah Creek, center of track at center of iron bridge over.....	35 04 17.6	90 03 03.2	3,175
Noncannah Creek, 0.30 mile north of, center of track at east and west public road crossing.....	35 04 32.8	90 03 06.0	1,556
Noncannah Creek, 0.75 mile north of, center of southbound track, at road crossing.....	35 04 56.6	90 03 10.5	2,441
Noncannah Creek, 1 mile north of, center of southbound track at east and west public road under railroad.....	35 05 11.4	90 03 13.3	1,510
Noncannah Creek, 2.50 miles north of, center of northbound track, "Speedway" crossing.....	35 06 27.4	90 03 11.1	7,679

## Along highways and Illinois Central Railroad (checked spur line).

Washington and Third streets, intersection of.....	35 08 54.6	90 02 54.3	.....
Jackson Avenue and Third Street, intersection of.....	35 09 12.5	90 02 47.2	1,903
Sullivan Avenue and Third Street, intersection of.....	35 09 37.7	90 02 37.1	2,687
Keel Avenue and Illinois Central R. R., intersection of.....	35 09 49.3	90 02 50.5	1,612
Second Street and main track Illinois Central R. R., intersection of.....	35 10 29.9	90 02 37.4	4,244
Plum Street and main track Illinois Central R. R., intersection of.....	35 10 51.2	90 02 25.4	2,371
Wolf Creek, center of Illinois Central R. R. track at center of iron bridge over.....	35 11 22.6	90 02 13.5	3,324
Wolf Creek, 1.10 miles northeast of, second-class road crossing.....	35 12 18.2	90 02 03.0	8,697
Fraser, overhead crossing of public road, center of track at.....	35 12 38.2	90 01 41.4	2,700
Fraser, 0.47 mile northeast of, second-class crossing, center of track at.....	35 12 58.5	90 01 24.7	2,470
Felts station, second-class crossing, center of track at.....	35 13 37.8	90 00 52.4	4,799
Felts station, 0.40 mile northeast of, center of track at public road crossing.....	35 13 56.9	90 00 36.6	2,330
Felts station, about 1.40 miles northeast of, 0.50 mile north of Douglas Felts store, at T road east, 21 feet west from fence corner in yard of cabin, and in line with east and west fence running from corner to railroad tracks; iron post stamped "Prim. Trav. Sta. No. 4, 1915".....	35 14 40.4	90 00 13.0	4,812

## Along Yazoo &amp; Mississippi Valley Railroad.

Memphis bridge, center of track at east end of.....	35 07 33.9	90 04 21.6	.....
ARKANSAS.			
Memphis bridge, center of track at west end of.....	35 08 08.2	90 05 05.4	5,917
Hopefield, south base triangulation station.....	35 07 51.69	90 04 54.85	1,881

**MEMPHIS QUADRANGLE—Continued.****Along Union Belt Line Railway and highways.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>TENNESSEE.</b>			
Common Street crossing, center of track at.....	35 10 25.0	90 02 08.4	.....
Morehead Avenue crossing, center of track at.....	35 10 23.8	90 01 29.1	3,269
Jones Avenue crossing, center of track at.....	35 10 22.8	90 01 02.7	2,189
Raleigh Springs Road crossing, center of track at.....	35 10 22.1	90 00 41.6	1,750
South-bound Parkway Drive at crossing of St. Louis & San Francisco R. R.....	35 06 33.8	90 00 35.3	.....
Parkway at intersection with South Bellevue Boulevard.....	35 06 34.7	90 01 17.8	3,538
Westbound driveway at Parkway at intersection with Gaither Parkway.....	35 06 35.9	90 01 51.7	2,815
Parkway at intersection with Mississippi Boulevard.....	35 06 30.4	90 02 01.7	1,008
Parkway at intersection with Kerr Avenue.....	35 06 26.2	90 02 14.1	1,109
Parkway at intersection with Lauderdale Street.....	35 06 26.7	90 02 36.5	1,869
Memphis, intersection of Union Street and Belvidere Boulevard.....	35 08 08.7	90 00 18.0	.....
Memphis, intersection of Union and South Cleveland streets.....	35 08 12.7	90 00 59.0	3,438
Memphis, intersection of Union and South Somerville streets.....	35 08 16.1	90 01 33.3	2,872
Memphis, intersection of Union and Walnut streets.....	35 08 19.2	90 02 04.4	2,600
Memphis, intersection of Union Street and Southern Ry. tracks.....	35 08 23.1	90 02 25.3	1,783
Memphis, intersection of Union and Wellington streets.....	35 08 27.6	90 02 42.0	1,460
Exchange triangulation station.....	35 08 42.05	90 03 04.85	2,396

**Along Iron Mountain Railway.**

ARKANSAS.			
Hopefield south base triangulation station, a Coast and Geodetic Survey station in the village of West Memphis, about 300 meters west from the Mississippi River, 170 meters south from the railroad bridge approach, 50 meters north from the road leading west from the ferry landing, 47 meters east from the store belonging to Mr. J. A. Templin, in the rear of the house on the lot belonging to Mr. Douglas Owens and 28 meters east from his west property line and 12 meters south from his north line. The stone projects 14 inches and is marked on the south, "U. S. Coast Survey" on the west, "S. Base," and on the east, "1879"	35 07 51.60	90 04 54.85	.....
Intersection of Chicago, Rock Island & Pacific Ry. and Iron Mountain R. R.....	35 08 43.9	90 06 04.3	7,822
Intersection of Chicago, Rock Island & Pacific Ry. and levee in Arkansas.....	35 08 33.8	90 07 30.6	7,242
Chicago, Rock Island & Pacific Ry. at point where it leaves levee, center of track at.....	35 08 10.2	90 09 31.8	10,340
Hulbert, 1 mile east of intersection of tangents of Iron Mountain and Rock Island & Pacific railroads.....	35 08 00.4	90 10 21.8	4,270
Hulbert station, center of track opposite.....	35 07 45.9	90 11 36.6	6,390
Riceville, public road crossing under track at.....	35 07 24.5	90 13 27.4	9,450
Riceville, 0.80 mile southwest of, center of track, at second-class road crossing.....	35 07 15.2	90 14 15.2	4,080
Mounds Arkansas, at southeast corner of post office and general store of Mounds Lumber Co., 47 feet north of main track of Chicago, Rock Island & Pacific Ry., 1 foot south of southeast corner of porch; iron post stamped "Prim. Trav. Sta. No. 5, 1915".....	35 06 54.9	90 16 03.6	9,235

**Along St. Louis & San Francisco Railroad.**

Frisco, at crossing of levee, center of tracks at.....	35 09 44.8	90 06 58.0	.....
Creek crossing under trestle, center of track at.....	35 10 33.1	90 08 22.4	8,539
Trestle No. 4760, second-class road crossing under center of track at.....	35 11 01.5	90 09 12.0	5,021
Second-class road crossing, center of track at.....	35 11 21.9	90 09 47.6	3,601
Road crossing, center of track at.....	35 11 35.7	90 10 11.7	2,441
Do.....	35 11 51.3	90 10 39.1	2,770
Public road crossing, center of track at.....	35 12 21.2	90 11 30.2	5,205
Marion station, 150 feet north of, center of main track at public road crossing.....	35 12 51.8	90 11 47.9	3,422
Harvard station, 420 feet west of, 600 feet south of Frisco ice plant, on west side of road, 30 feet east and 16.0 feet north of front gate at house of superintendent of ice plant; iron post stamped "Prim. Trav. Sta. No. 6, 1915".....	35 14 22.3	90 12 32.7	9,877

Magnetic declination near east border of quadrangle,  $54^{\circ}$  E.; in northwest quarter, from  $34^{\circ}$  to  $64^{\circ}$  E.; near south border of southeast quarter,  $5^{\circ} 26'$  E.

**BARTLETT QUADRANGLE.**  
**Along Union Belt Line Railway and highways.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>TENNESSEE.</b>			
Evergreen Avenue crossing, center of track at.....	35 10 20.7	89 59 59.8	
McLean Avenue crossing, center of track at.....	35 10 20.2	89 59 43.0	1,390
Patterson Transfer Co.'s farm, on the Raleigh Springs Road, $\frac{1}{4}$ mile south of, in northwest corner of Springdale Avenue crossing of Belt Line, iron post stamped "Prim. Trav. Sta. No. 3, 1913".....	35 10 18.9	89 59 00.4	3,541
Springdale Avenue crossing of Louisville & Nashville R. R., center of track at.....	35 09 42.5	89 59 01.9	3,633
Jackson Boulevard and Parkway Drive, intersection of.....	35 09 29.1	89 58 47.8	1,789
Overton Park, northeast corner of, intersection of Parkway and Speedway.....	35 09 03.6	89 58 51.5	2,590
East Parkway and Poplar Avenue, intersection of.....	35 08 25.8	89 58 57.2	3,884
Parkway and East Madison Avenue, intersection of.....	35 08 09.6	89 59 00.7	1,663
Parkway, under center of concrete railway bridge.....	35 07 45.8	89 59 01.5	2,413
Intersection of southbound drive of Parkway and Central Avenue, also of iron railroad bridge overhead.....	35 07 33.5	89 59 02.4	1,250
Intersection of southbound drive of Parkway and Nelson Avenue, opposite Agricultural Building of Tri-State Fair Grounds.....	35 07 18.5	89 59 03.0	1,510
Tri-State Fair Grounds, at southwest corner of, intersection of southbound drive of Parkway and Southern Ry. tracks.....	35 06 57.1	89 59 03.6	2,170
Spotswood Avenue and South Trezevant Avenue, intersection of Parkway, intersection of southbound driveway of, with Carnes Avenue.....	35 06 52.1	89 59 03.8	510
Parkway Drive and South Barkdale Street, intersection of.....	35 06 47.7	89 59 20.5	2,196
Intersection of South Cooper and Union streets.....	35 06 32.3	89 59 57.0	2,762
Intersection of Cooper Street and McLean Boulevard.....	35 08 03.2	89 59 24.5	
	35 08 06.9	89 59 59.4	2,933

## LOUISIANA.

### PRIMARY TRAVERSE.

**Blanchard, Bossier, Hosston, Keithville, and Plain Dealing quadrangles.**

#### BOSSIER AND CADDO PARISHES.

The following geographic positions on approximate North American datum were determined in 1915 by F. W. Crisp, jr., topographer, and are based upon United States Army Corps of Engineers permanent bench mark 45, near Bossier, and a Coast and Geodetic Survey bench mark 600 feet east of station at Greenwood.

Positions located in 1905 by Sledge Tatum, topographer, in the Blanchard quadrangle, published in Bulletin 310, have been readjusted and are included.

#### BLANCHARD QUADRANGLE.

**North along highways and Texas & Pacific Railway from Shreveport to Belcher.**

Station.	Latitude.	Longitude.	Distance between stations.
Shreveport, Market Street; center of bridge over bayou (outlet of Cross Lake).....	° ' "	° ' "	<i>Feet.</i> .....
Shreveport, intersection of La Salle and Arkansas avenues; center of streets.....	32 31 09.3	93 45 05.9	.....
Shreveport, 2 miles north of, T road south; center of asphalt road.....	32 31 32.4	93 45 15.0	2,462
Shreveport, 3 miles north of; crossing of Shreveport-Belcher asphalt road with railroad.....	32 32 03.4	93 45 45.9	4,104
Shreveport, 3.8 miles north of, asphalt road crossing; center of track.....	32 32 49.6	93 46 17.5	5,396
T road east, center of asphalt road at.....	32 33 18.7	93 46 11.8	.....
T road 70 feet east of railroad.....	32 34 00.0	93 46 03.9	4,224
Cash Point, 1 mile south of, road crossing; center of track.....	32 34 56.2	93 46 19.5	5,833
Cash Point, crossing of road and railroad at.....	32 35 57.5	93 46 14.1	6,216
Cash Point, 1.1 miles north of, road crossing; center of track.....	32 36 44.0	93 46 08.8	4,726
Pickett, 0.8 mile south of; crossing of asphalt road.....	32 37 35.6	93 46 37.8	5,778
Pickett crossing, 170 feet southeast of north cattle guard, 25 feet southwest of south cattle guard, 20 feet northeast of fence corner on right of way of Texas & Pacific Ry., and 120 feet southeast of sharp turn in levee on west bank of Red River; iron post stamped "Prim. Trav. Sta. No. 8, 1915".....	32 38 01.2	93 46 57.0	3,060
T road east on asphalt road.....	32 38 32.2	93 47 20.6	3,723
Cattle guard on railroad, T road east at.....	32 38 54.9	93 47 50.2	3,422
Dixie, 2 miles south of, concrete culvert on Shreveport-Belcher road, top of east end; bronze tablet stamped "Prim. Trav. Sta. No. 9, 1915".....	32 39 23.7	93 48 34.2	4,750
Dixie, 0.25 mile south of, 60 feet west of railroad; crossroads.....	32 39 53.5	93 49 19.3	4,895
Dixie station, 100 feet north of, road crossing; center of main track.....	32 41 18.6	93 50 02.7	9,362
Hayti crossing, 60 feet west of track; crossroads.....	32 41 40.1	93 50 02.1	2,180
Unl., 50 feet north of station, 60 feet west of track; T roads.....	32 42 46.1	93 50 02.6	6,665
Public road crossing, center of track at.....	32 44 07.3	93 50 02.4	8,206
	32 44 49.3	93 50 01.6	4,254

## BLANCHARD QUADRANGLE—Continued.

Along highways near north border of quadrangle from Belcher to Oil City.

Station.	Latitude.	Longitude.	Distance between stations.
Horseshoe Bayou, center of iron bridge over.....	32 44 47.0	93 50 46.4	3,832
Dooley Bayou, wooden bridge; T road north at west end of.....	32 44 47.4	93 51 50.4	5,467
T road north; center of intersection.....	32 44 47.1	93 52 06.1	1,347
Fence corner, center of road at.....	32 44 46.0	93 53 10.5	5,499
Crossroads, center of.....	32 44 45.4	93 53 32.2	1,850
Wooden bridge over bayou, 90 feet west of center of; T road north.....	32 44 45.0	93 53 48.6	1,410
Crossroads, center of.....	32 44 45.0	93 54 29.7	3,510
Stumpy Bayou, T roads in east side of; center of triangle at intersection.....	32 43 52.0	93 54 35.2	5,368
Black Bayou; east ferry landing.....	32 43 30.6	93 54 26.8	2,280
Crossroads, in woods northeast of oil well.....	32 43 25.9	93 55 41.0	6,361
Oil well, 150 feet southeast of, crossroads and telephoneline; center of crossing.....	32 43 28.5	93 56 09.9	2,182
Pipeline, second-class road crossing at.....	32 43 41.1	93 56 29.0	2,070
Railroad spur track to Arkansas Gas Co.'s plant, center of road crossing on.....	32 44 01.6	93 57 22.2	4,992
Oil City station, 0.5 mile south of, crossing of highway and Kansas City Southern Ry.; center of main track.....	32 44 11.8	93 58 04.2	3,731

Along Kansas City Southern Railway and highways in western part of quadrangle from Oil City via Morningsport to Greenwood.

Milepost 538, 180 feet north of, road crossing; center of track at.....	32 42 47.8	93 57 36.2	8,819
Road crossing, center of track at.....	32 42 34.4	93 57 31.7	1,410
Ferry Lake, north side of, Southwestern Gas & Electric Co.'s power station; road crossing.....	32 42 21.7	93 57 30.3	1,279
Mooringsport, 100 feet north of station; road crossing.....	32 41 38.8	93 57 27.0	4,345
Mooringsport, 0.4 mile south of, road crossing at section house; center of main track.....	32 41 16.1	93 57 27.0	2,297
Old St. Lee Church, 100 feet southeast of, at crossroads, General Land Office, section corner on township line between Tps. 19 and 20 N., R. 18 W., probably secs. 1, 2, 35, and 36; iron post stamped "Prim. Trav. Sta. No. 4, 1915".	32 40 37.1	93 57 53.3	4,539
T road east; center of intersection.....	32 40 06.0	93 58 24.9	4,143
Wooden bridge over bayou, center of.....	32 39 52.2	93 58 49.4	2,526
Wooden bridge; center of.....	32 39 21.2	93 59 18.7	4,009
T road south, center of intersection.....	32 39 19.0	93 59 31.1	1,084
Road forks in pine woods.....	32 38 44.1	93 58 52.8	4,816
Road forks in pine woods.....	32 38 38.6	93 58 49.1	634
T road east; center of intersection.....	32 38 14.5	93 58 50.5	2,442
T road southwest, center of main road at.....	32 38 02.5	93 58 51.2	1,216
Crossroads, second-class road east-west.....	32 37 06.8	93 58 58.3	5,658
T road west to Robert Cushman's place, in triangle at intersection of; iron post stamped "Prim. Trav. Sta. No. 5, 1915".	32 36 30.8	93 58 54.5	3,657
Mount Zion Church, 150 feet north of; T road east.....	32 35 50.9	93 58 48.4	4,066
Mount Zion Church, 0.5 mile south of; crossroads.....	32 35 21.4	93 58 58.8	3,110
T road east.....	32 34 54.8	93 58 54.0	2,716
Road forks to west.....	32 34 40.6	93 58 51.9	1,450
T road east.....	32 34 28.2	93 58 39.6	1,638
Private road east.....	32 34 05.0	93 58 36.0	2,356
Longwood schoolhouse, 0.5 mile south of, in southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 6, 1915".	32 33 35.2	93 58 37.8	3,018
Sojourner post office, 200 feet south of; center of crossroads.....	32 32 44.0	93 58 20.9	5,366
T road east.....	32 32 16.2	93 58 21.0	2,815
Crossroads, center of.....	32 31 50.2	93 58 22.9	2,638
T road east.....	32 31 30.2	93 58 25.1	2,025
Wooden bridge 200 feet southeast of sawmill, center of.....	32 31 10.8	93 58 24.7	1,964
Star Light Church, center of road opposite.....	32 30 38.2	93 58 14.9	3,403

Magnetic declination near north border of quadrangle, 7° 34' E.; near west border, 8° 12' E.; along Texas &amp; Pacific Ry., in eastern part, 7° 21' E.

The following geographic positions in the Blanchard quadrangle, originally published in Bulletin 310, were determined in 1905 by Sledge Tatum. They have been readjusted to fit lines run by F. W. Crisp in 1915.

**Along Kansas & Texas Railway near Shreveport.**

Station.	Latitude.	Longitude.	Distance between stations. <i>Feet.</i>
Shreveport, near Kansas City Southern Ry. crossing.....	32 29 34.9	93 45 36.2	.....
Cattle guard, Kansas City Southern Ry., 40 feet east of track; iron post stamped "Prim. Trav. Sta. No. 153," station mark.....	32 29 57.6	93 47 16.6	.....

**Along Kansas City Southern Railway near Ananias.**

Road crossing.....	32 31 22.8	93 49 04.6	.....
Milepost 552, road crossing.....	32 32 35.8	93 50 43.6	.....
Milepost 550.....	32 33 46.7	93 52 11.6	.....
Milepost 549, road crossing 500 feet north of.....	32 34 25.0	93 52 59.1	.....
Blanchard, 1,900 feet north of, 35 feet west of track, at south side of wagon-road crossing; iron post stamped "Prim. Trav. Sta. No. 184," station mark.....	32 35 13.0	93 53 42.8	.....
Road crossing.....	32 37 04.7	93 54 45.8	.....
Milepost 544, road crossing.....	32 38 06.2	93 55 31.9	.....
Milepost 542.....	32 39 22.3	93 56 54.1	.....
Mooringsport, 1 mile south of, 36 feet east of track, 340 feet north of road crossing; iron post stamped "Prim. Trav. Sta. No. 213," station mark.....	32 40 40.4	93 57 14.7	.....
Mooringsport, 100 feet north of station, road crossing.....	32 41 38.8	93 57 27.0	.....
Caddo flag station, road crossing, 30 feet west of track, south of road; iron post stamped "Prim. Trav. Sta. No. 259," station mark.....	32 45 28.0	93 58 25.3	.....
Ananias flag station, road crossing.....	32 44 39.1	93 58 14.3	.....

Positions of the following triangulation stations were taken from blue prints furnished October 20, 1914, by the office of the United States Army Corps of Engineers at Dallas, Tex. They were given on an assumed position for Shreveport courthouse, but from connection made by United States Geological Survey primary traverse in 1915 from bench mark 45, near Shreveport, with Shreveport courthouse a correction of 45.73" has been added to latitudes and 56.92" added to longitudes to reduce them to approximate North American datum. No descriptions of triangulation points are available, but each is marked by a 3-inch galvanized-iron post set in concrete.

	Latitude.	Longitude.	Elevation. <i>Feet.</i>
Shreveport courthouse.....	32 30 45.73	93 44 56.92	.....
East base.....	32 32 23.67	93 44 22.52	173.752
West base.....	32 32 07.23	93 45 39.35	174.253
Noel.....	32 33 44.66	93 46 14.32	210.818
New Mouth.....	32 33 53.82	93 45 41.10	176.537
T. S. & N.....	32 35 18.11	93 46 14.95	177.650
Grindstone.....	32 35 55.85	93 48 06.91	212.680
Albany Point.....	32 36 45.89	93 49 49.81	225.230
Albany Flats.....	32 38 07.25	93 50 25.04	167.887
Howell.....	32 37 27.24	93 50 40.85	221.858
Gum Springs.....	32 38 24.97	93 52 04.54	172.875
Cottonwood.....	32 40 01.46	93 51 58.84	170.162

## BOSSIER QUADRANGLE.

From bench mark 45 along Vicksburg, Shreveport & Pacific and St. Louis Southwestern railways to Alden Bridge.

Station.	Latitude.	Longitude.	Distance between stations.
P. b. m. 45, northwest base of 1892, on west side of levee about 15 feet south of northeast and southwest wagon road on south side of track, b. m. is 840 feet east of Bossier end Vicksburg, Shreveport & Pacific Ry. bridge and 113 feet southeast from railroad; a cottonwood tree in front of W. H. Barbour's house bears S. 32° W. 126 feet, the northeast corner of garden lot of W. H. Barbour's house bears S. 53° E. 45 feet.....	32 30 59.4	93 44 17.7	Feet.
T road north, center of.....	32 31 05.4	93 43 46.9	2,710
Road and railroad crossing, center of track at.....	32 31 05.4	93 43 31.1	1,347
Shreveport, 1 mile east of, 120 feet southwest of railroad crossing; forks of macadamized roads.....	32 30 58.6	93 43 10.5	1,900
St. Louis Southwestern and Vicksburg, Shreveport & Pacific railways; center of crossing of.....	32 31 24.3	93 43 06.2	2,627
East-west road crossing; center of main track at.....	32 31 57.4	93 43 19.5	3,531
Road crossing; center of track at.....	32 32 16.9	93 43 30.7	2,196
Honore, road crossing at; center of track.....	32 33 26.4	93 43 49.6	7,207
Brownlee station, road crossing at; center of track.....	32 34 20.3	93 43 51.1	5,452
Plantation road crossing, center of track at.....	32 35 39.3	93 43 54.2	7,957
Vanceville, 200 feet northwest of station, 85 feet west of center of track, 53 feet east of northeast corner of base of brick chimney in the northeast corner of yard of J. P. McCain; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	32 36 12.3	93 44 06.0	3,484
Macadam road; center of crossroads on.....	32 36 57.8	93 44 19.1	4,728
Trestle No. 79, 80 feet northeast of; center of crossroads.....	32 37 41.4	93 44 33.6	4,580
Willow Chute station, 0.8 mile south of, crossroads; center of macadam road at.....	32 39 12.1	93 44 54.7	9,341
Willow Chute station, 600 feet north of crossroads; center of macadam road.....	32 39 58.6	93 44 49.1	4,720
Benton station, 1 mile south of, 100 feet east of railroad; center of crossroads.....	32 41 02.0	93 44 41.3	6,442
Benton station, 100 feet south of; road crossing center of main track.....	32 41 55.1	93 44 26.9	5,511
Benton station, 2.5 miles north of; center of track opposite gate.....	32 44 16.4	93 43 43.2	14,760

## Along streets in Shreveport.

Marshall and Crockett streets, center of intersection of.....	32 30 42.1	93 44 50.6	.....
Shreveport, courthouse; dome of.....	32 30 45.7	93 44 56.9	660
Shreveport, post office, in northeast corner of yard of; iron post U. S. C. E. b. m.....	32 30 49.7	93 44 57.7	411

Magnetic declination along railroad near west border of quadrangle, 8° 15' E.

## HOSSTON QUADRANGLE.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Swans Ferry, 1 mile east of; center of crossroads.....	32 47 28.7	93 45 39.8	Feet.
T roads; center of intersection of.....	32 47 39.3	93 46 10.0	2,786
Swans Ferry, at west side of Red River, at crossing of levee; center of road.....	32 47 30.3	93 47 16.4	5,746
Telephone line, east side of bayou; center of road at crossing.....	32 46 40.7	93 49 34.1	12,778
Belcher station, 40 feet south of, 47 feet east of main track of railroad, in southeast corner of station yard; iron post stamped "Prim. Trav. Sta. No. 3, 1915".....	32 45 10.8	93 50 02.1	9,391

## KEITHVILLE QUADRANGLE.

Along highways near northwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Lanes east and west, center of main road at.....	° ' "	° ' "	Feet.
Greenwood, 3 miles north of, T road north, 15 feet south of, intersection; iron post stamped "Prim. Trav. Sta. No. 7, 1915".....	32 29 56.3	93 58 13.5	.....
T road east, center of intersection of.....	32 29 12.7	93 58 13.0	4,405
T road west, center of intersection of.....	32 28 38.7	93 58 42.8	4,232
Cross Creek, center of wooden bridge over.....	32 28 18.8	93 58 52.2	2,168
Greenwood, 600 feet east of station, in concrete abutment; C. & G. S. bench-mark tablet.....	32 28 07.9	93 58 55.9	1,148
	32 26 54.0	93 58 18.2	8,316

## PLAIN DEALING QUADRANGLE.

Along St. Louis Southwestern Railway and highways near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Crossing of abandoned railroad, center of St. Louis Southwestern track at.....	° ' "	° ' "	Feet.
Alden Bridge, about 400 feet northwest of station, in yard of abandoned house, on east-west fence line 90 feet from corner; U.S.C.E. bench-mark post.....	32 45 40.2	93 43 17.4	.....
Alden Bridge, 1,000 feet northwest of station, 155 feet southwest of railroad crossing opposite sawmill, in northeast corner of yard of vacant house; iron post stamped "Prim. Trav. Sta. No. 2, 1914".....	32 46 26.5	93 43 06.2	4,782
Alden Bridge, 1 mile northwest of, T roads on east-west road; center of intersection.....	32 46 32.9	93 43 02.8	704
T road north; center of intersection.....	32 47 25.4	93 43 11.1	5,354
White church, three corners at.....	32 47 24.9	93 44 21.4	6,000
	32 47 24.4	93 44 50.1	2,448

## MISSISSIPPI.

### PRIMARY TRAVERSE.

**Bovina, Vicksburg, Yokena, and Milliken Bend quadrangles.**

#### WARREN COUNTY.

The following geographic positions were determined by primary traverse and are based on United States Army Corps of Engineers position of courthouse at Vicksburg and bench mark  $\frac{102}{9}$  and on United States Geological Survey position of Bovina station and an overhead crossing 3 miles west of same determined in 1902-3, published in Bulletin 216. All positions are on approximate North American datum. This work was done by J. R. Ellis in 1914.

#### BOVINA QUADRANGLE.

**Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Bovina, 3 miles north and 1 mile west of center of crossroads.....	° ' "	° ' "	<i>Feet.</i>
Bovina, about 2 miles northwest of, opposite front-yard gate at white house; center of road.....	32 23 31.3	90 45 00.0	.....
Bovina, 0.80 mile north of, in forks of road near center of triangle; iron bench-mark post stamped "Prim. Trav. Sta. No. 5, 1914".....	32 22 27.2	90 44 26.0	7,099
Bovina station, center of track opposite.....	32 21 44.0	90 43 44.7	5,628
	32 21 06.0	90 44 04.0	4,179

#### VICKSBURG QUADRANGLE.

**Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Redwood, 15 feet north and 15 feet west of center of crossroads, at southeast corner of blacksmith shop; iron bench mark post stamped "Prim. Trav. Sta. No. 4, 1914".....	° ' "	° ' "	<i>Feet.</i>
Redwood, about 1 mile east of, center of bridge over Skilleteliah Creek, near old sawmill.....	32 28 40.0	90 48 20.6	.....
Redwood, 1 mile south and $1\frac{1}{2}$ miles east of, forks of road, about 40 feet south to hackberry tree.....	32 28 31.7	90 47 18.6	5,381
Redwood, 2 miles south and 1.6 miles east of, dim road to northeast.....	32 27 52.3	90 46 50.8	4,639
Villa Nova post office, center of T road northeast, 25 feet south-east to guide board.....	32 26 56.5	90 46 41.6	5,703
Villa Nova post office, about 0.8 mile southwest of, just south of old church, center of forks of road.....	32 26 02.2	90 46 36.0	5,511
Villa Nova post office, about 1.4 miles southwest of, at forks of road at Mr. Tucker's residence, 30 feet north to "V" point in angle of forks.....	32 25 23.4	90 46 50.2	4,101
Villa Nova post office, $1\frac{1}{2}$ miles south and $1\frac{1}{4}$ miles east of, center of T road south, 10 feet west to center of $\Delta$ .....	32 24 50.8	90 46 54.2	3,317
Newman triangulation station, 1.50 miles west of, overhead road crossing of Alabama & Vicksburg R. R.....	32 24 30.1	90 45 20.4	8,305
Overhead road crossing Alabama & Vicksburg R. R., center of.....	32 20 14.4	90 40 35.6	.....
Forks of road, center of small bridge at.....	32 20 12.7	90 47 18.1	1,511
T road north, center of.....	32 19 05.5	90 46 53.8	7,106
T road east in cut.....	32 18 18.0	90 46 58.8	4,824
T road west, center of.....	32 18 14.8	90 48 09.6	6,084
Forks of road, center of triangle at.....	32 17 33.5	90 47 55.0	4,357
	32 16 51.8	90 47 50.6	4,237

## VICKSBURG QUADRANGLE—Continued.

## Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Asbury Church, about 1.5 miles north of, center of forks of road.....	32 16 13.7	90 48 50.5	Ft.
Asbury Church, 0.50 mile north of, 10 feet north and 10 feet east of center of T road west; iron bench mark post stamped "Prim. Trav. Sta. No. 2, 1914".	32 15 12.0	90 48 37.7	6,337
T. 15 N., R. 6 W., corner secs. 20, 21, 28, and 29; iron gas pipe.....	32 15 02.4	90 49 24.5	4,159
Antioch Church, 1 mile northeast of, T road north.....	32 15 08.7	90 49 58.3	2,973
Grange Hall, forks of road at guide post on south side of triangle.....	32 15 25.8	90 52 18.0	-----
Intersection of Vicksburg, Fishers Ferry, and Warrenton roads, center of triangle at T road north.....	32 15 34.3	90 53 07.6	4,338
Mail box 39, center of T road south at.....	32 15 25.6	90 53 42.1	3,064
Cedar station, east and west road crossing at.....	32 15 20.5	90 55 30.9	-----

## From Vicksburg to Redwood along Yazoo &amp; Mississippi Valley Railroad.

Milepost 229, just south of, road crossing east and west.....	32 16 18.7	90 55 11.9	6,102
Milepost 230, 0.5 mile south of, road crossing.....	32 16 49.9	90 55 03.1	3,240
Stout station, road crossing at.....	32 18 01.7	90 53 56.3	9,243
Trestle No. L 222-77, creek southwest.....	32 18 41.2	90 53 41.2	4,199
Water works, overhead crossing near.....	32 19 22.6	90 53 41.4	4,179
Overhead crossing of Queen & Crescent Route R. R. at Yazoo & Mississippi Valley R. R.....	32 20 07.0	90 53 27.9	4,636
Vicksburg, cupola of Warren County courthouse, U. S. Corps of Engineers triangulation point.....	32 21 07.21	90 52 42.66	7,212
Vicksburg station, 1 mile north of, road crossing.....	32 21 54.6	90 52 31.1	4,887
Vicksburg station, 2 miles north of, 25 feet north of wagon road, 20 feet west of railroad track, at Anderson & Tully Co.'s mill; iron bench mark post stamped "Prim. Trav. Sta. No. 3, 1914".	32 22 50.8	90 52 04.1	6,142
Vicksburg, 3 miles north of, private road crossing.....	32 23 29.6	90 51 36.6	4,566
Kings station (signal post office), road crossing at.....	32 24 03.1	90 51 12.7	3,956
Kings station, 1.25 miles northeast of, private road crossing at section house.....	32 24 50.6	90 50 21.2	6,519
Milepost 241, 660 feet north of, private road crossing.....	32 25 29.0	90 49 39.4	5,279
Blakely station, 0.60 mile southwest of, private road crossing.....	32 26 26.0	90 49 14.4	6,147
Blakely station, private road crossing at.....	32 26 50.8	90 49 07.6	3,159
Blakely station, 1 mile northeast of, road crossing .....	32 27 48.1	90 48 51.3	5,367

## Along highways to point near northwest corner of quadrangle.

Guide posts at forks of road.....	32 23 12.9	90 52 24.3	-----
Chickasaw Bayou, north end of bridge over, at forks of road.....	32 24 07.0	90 53 00.1	6,276
Sweets Ferry, 2 miles south and 0.30 mile east of, center of cross roads.....	32 24 50.3	90 53 15.2	4,557
Sweets Ferry, about 1 mile southwest of, T road northeast.....	32 25 53.7	90 53 43.8	6,881
Sweets Ferry, 500 feet east of south landing at, and 10 feet north of road, U. S. Corps of Engineers bench mark.....	32 26 46.7	90 53 32.1	5,451
Sweets Ferry, 220 feet north of north landing at, on north bank of Yazoo River; iron bench-mark post stamped "Prim. Trav. Sta. No. 6, 1914".	32 26 58.9	90 53 39.3	1,378
Sweets Ferry, 1.2 miles southwest of, on south side of road, in north side of elm tree; cross cut.....	32 26 45.0	90 54 48.5	6,094
Sweets Ferry, about 2 miles west of, 150 feet west of slough, on south side of road, in north face of poplar tree; cross cut.....	32 27 10.8	90 55 39.7	5,100
Sweets Ferry, about 3 miles west of, on south side of road, just east of turn in road, in north face of large cottonwood tree; cross cut.....	32 27 06.4	90 56 36.4	4,876
White oak tree, south side of road; cross cut.....	32 27 08.0	90 57 43.7	5,768
At east end of graded road, 35 feet south and 20 feet east to hickory snag (Issaquena-Warren county line). . . . .	32 27 11.2	90 57 52.2	792
West end of gate at south side of timber.....	32 26 57.8	90 58 24.9	3,113
Holpina Landing, 4 miles northwest of Sam Brown's cotton gin at, at forks of road, 25 feet north and 15 feet east of 30-inch pecan tree; iron bench-mark post stamped "Prim. Trav. Sta. No. 7, 1914".	32 27 44.3	90 59 52.9	8,884

Magnetic declination for south border of quadrangle,  $5^{\circ} 57' E.$ ; east border,  $6^{\circ} 02' E.$ ; north border,  $6^{\circ} 12' E.$ ; center,  $6^{\circ} 10' E.$

**MILLIKEN BEND QUADRANGLE.**

Station.	Latitude.	Longitude.	Distance between stations.
Mississippi River Commission bench mark $\frac{102}{9}$ .....	° ' "	° ' "	<i>Feet.</i> 9,581

**YOKENA QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Cedars station, 0.5 mile south of, 20 feet north to center of T road north; iron bench-mark post stamped "Prim. Trav. Sta. No. 1, 1914".....	° ' "	° ' "	<i>Feet.</i> .....
Antioch Church, forks of road at .....	32 14 48.6 32 14 46.7	90 55 35.3 90 50 56.5	.....

Magnetic declination for north border of quadrangle,  $5^{\circ} 57' E.$ **Doloroso, McNair, and Natchez quadrangles.****ADAMS AND JEFFERSON COUNTIES.**

The following geographic positions, on approximate North American datum, were determined in 1914 by J. R. Ellis. Two circuits were run based on position of Catholic Church spire at Natchez, a Mississippi River Commission triangulation station.

**DOLOROSO QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Road forks, center of .....	° ' "	° ' "	<i>Feet.</i> .....
Natchez, about 6 miles southeast of; 20 feet north and 20 feet east of center of forks, on east side of the Natchez-Kinston road near second-class road east at Alexander Turner's mail box; iron post stamped "Prim. Trav. Sta. No. 9, 1914".....	31 29 42.8 31 29 19.7	91 21 37.1 91 21 57.0	2,905

Magnetic declination near north border of quadrangle,  $6^{\circ} 21' E.$ **McNAIR QUADRANGLE.****Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T road west, center of .....	° ' "	° ' "	<i>Feet.</i> .....
Church Hill post office, 40 feet north and 15 feet west of center of forks, at north end of old store; iron post stamped "Prim. Trav. Sta. No. 12, 1914".....	31 42 09.1	91 14 59.4	.....
Church Hill post office, about 1.5 miles southeast of, at old building; center of T road southwest.....	31 42 56.9	91 14 17.0	6,014
Church Hill post office, about 2 miles southeast of; T road east.....	31 41 43.9	91 13 39.4	8,054
Church Hill post office, about 3 miles southeast of; center of road at driveway to white frame church.....	31 41 20.0	91 13 23.1	2,796
Stanton, 2.9 miles northeast of; center of forks.....	31 40 43.4	91 14 00.4	4,906
Stanton, 1.1 miles northeast of; Jefferson-Adams county line; wagon axle on west side of road.....	31 39 24.2	91 13 44.8	8,122
Stanton, 0.87 mile northeast of; fork in road, at center of grass triangle.....	31 37 51.9	91 14 05.4	9,492
Stanton station, 35 feet north and 35 feet west of private road crossing at; and at northeast corner of J. N. (Carpenter's barn; iron post stamped "Prim. Trav. Sta. No. 13, 1914".....	31 37 40.0	91 14 08.0	1,224
	31 36 56.7	91 14 24.2	4,597

Magnetic declination for west border of quadrangle,  $6^{\circ} 28' E.$

## NATCHEZ QUADRANGLE.

Along Yazoo &amp; Mississippi Valley Railroad.

Station.	Latitude.	Longitude.	Distance between stations
Natchez, Catholic Church spire, cross on.....	* * *	* * *	Fed.
Natchez, 0.9 mile east of; road crossing east of Standard Oil Co.'s plant.....	31 33 30.5	91 24 04.25	.....
Mississippi Packing Plant, north-south road crossing at.....	31 33 28.6	91 23 06.4	4,536
Mississippi Packing Plant, 1.2 miles northeast of; about 0.6 mile north of M. P. 95 J.; private road crossing.....	31 33 55.4	91 22 13.7	5,450
Private road crossing.....	31 34 49.8	91 21 34.2	6,470
M. P. 93 J., 0.25 mile east of; road crossing.....	31 35 26.8	91 21 07.4	4,396
Foster station, north-south road crossing at.....	31 35 47.5	91 20 25.8	4,147
M. P. J. 91, 530 feet east of; trestle over creek south.....	31 36 03.3	91 19 43.8	3,911
M. P. J. 90, 305 feet east of; bridge over branch south.....	31 36 14.4	91 18 39.0	5,710
Selma station, road crossing at.....	31 36 09.9	91 17 41.8	4,970
Selma station, 1.2 miles northeast of; 0.23 mile east of M. P. J. 88; private road crossing.....	31 36 03.6	91 16 42.8	5,141
	31 36 23.8	91 15 33.9	6,29

## Along highways.

Selma station, 1.30 miles south of; T road east.....	31 34 59.6	91 17 06.1	11,62
Washington, center of road forks at; 30 feet north to chinaberry tree.....	31 34 44.2	91 17 52.9	4,333
Washington, 0.4 mile south of; road southwest to poor farm.....	31 34 23.0	91 17 52.5	2,149
Washington, 0.85 mile south of; center of steel bridge over creek west.....	31 34 02.3	91 18 04.4	2,337
Washington, 1.8 miles southeast of, and about 0.7 mile east of Washington station; road crossing Mississippi Central R. R.....	31 33 16.5	91 17 45.1	4,918
Washington, about 3.10 miles southeast of; center of forks.....	31 32 33.1	91 16 46.9	6,676
Washington, about 4 miles south of; road north; 10 feet west to sumac sapling.....	31 31 49.5	91 17 05.0	4,677
Jeanette, about 3 miles northwest of, and about 1 mile east of Zion Watch Church, in triangle at road fork; iron post stamped "Prim. Trav. Sta. No. 8, 1914".....	31 30 36.8	91 16 56.3	7,335
Zion Watch Church, center of cross roads at.....	31 30 45.4	91 17 43.7	4,195
Zion Watch Church, 1.2 miles northwest of; T road south.....	31 30 56.8	91 18 54.8	6,263
Zion Watch Church, 1.8 miles northwest of; fork in road just north of gate.....	31 30 29.8	91 19 19.8	3,476
Highland Negro Church, 0.25 mile northeast of; center of triangle at fork in roads.....	31 30 12.1	91 20 19.1	5,442
St. Catherines Creek bridge, 1.60 miles southeast of; road south.....	31 30 03.2	91 22 12.5	.....
St. Catherines Creek, just southeast of steel bridge over; 15 feet north of west end of small bridge; T road south.....	31 30 59.9	91 23 27.1	8,636
Mississippi Central R. R. crossing of Natchez; Kingston road under T road east, center of.....	31 32 25.3	91 23 47.2	8,807
Jenkins's store, 150 feet south of; 20 feet southwest of south end of grassy triangle at fork in road.....	31 35 02.9	91 21 59.1	.....
Jenkins's store, 150 feet south of; 20 feet southwest of south end of grassy triangle at fork in road.....	31 36 07.0	91 21 57.4	6,477
Jenkins's store, 1.3 miles north of; T road west.....	31 37 13.1	91 21 53.6	6,692
Pine Ridge schoolhouse, in northwest corner of grounds of; iron post stamped "Prim. Trav. Sta. No. 10, 1914".....	31 37 48.5	91 20 53.2	6,337
Pine Ridge schoolhouse, 1.1 miles northeast of; 20 feet north and 35 feet east of northeast corner of store porch; forks.....	31 38 44.0	91 20 39.5	5,730
Pine Ridge schoolhouse, 2 miles north of center of gate.....	31 39 07.9	91 21 29.1	4,918
Jenkins's plantation, 0.3 mile north of residence; T road west.....	31 40 31.8	91 22 13.2	9,23
Anna post office, south side of crossroads at; iron post stamped "Prim. Trav. Sta. No. 11, 1914".....	31 41 48.8	91 21 06.2	9,706
Anna post office, about 1 mile southeast of; dim road southwest.....	31 41 14.1	91 20 22.3	5,162
Anna post office, about 1.85 miles southeast of; 30 feet north and 20 feet east of mail box near schoolhouse; crossroads.....	31 40 50.9	91 19 38.3	4,470
Anna post office, about 2.85 miles southeast of; center of triangle of road just south of gate.....	31 41 33.5	91 19 04.0	5,227
Fairchild Creek, southeast corner of approach to south end of bridge over.....	31 41 28.9	91 17 30.3	8,114
Mr. Minjee's residence, 0.25 mile southeast of; 45 feet north of small bridge; forks of road.....	31 41 17.9	91 15 48.8	8,140

Magnetic declination for north part of north half of quadrangle,  $6^{\circ} 24' E.$ ; for center, north and south,  $6^{\circ} 19' E.$ ; for east border,  $6^{\circ} 28' E.$ ; for south border,  $6^{\circ} 21' E.$

## MAINE.

### PRIMARY TRAVERSE.

#### Portland quadrangle.

##### CUMBERLAND COUNTY .

The following geographic positions were determined in 1914 by R. C. Seitz. The line starts from Orthodox Church, United States Coast and Geodetic Survey triangulation point, in Saco, follows highways northward near west border of quadrangle, and is tied to United States Geological Survey triangulation station Gorham, described in Bulletin 122.

#### PORTLAND QUADRANGLE.

**Along highways near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Saco Orthodox Church spire (Coast and Geodetic Survey triangulation point).....	°   °   "	°   °   "	<i>Feet.</i>
Saco railway station, North Street crossing Boston & Maine R. R.	43 30 02.95	70 26 35.05	.....
Jenkin, road forks northeast.....	43 30 28.5	70 26 54.5	2,960
Saco station, 3.2 miles northwest of, about 200 feet west of T roads, north of road, west end of stone arch under highway; tablet stamped "Me. 134, 1914, S., Prim. Trav. Sta. No. 1".....	43 31 30.4	70 27 46.8	7,350
Junction of Heath road with Saco road.....	43 32 41.5	70 29 11.3	9,520
Heath meeting house, crossroads at.....	43 33 18.4	70 29 48.1	4,613
Forks of Buxton road with Heath road.....	43 34 11.4	70 28 52.0	6,770
Heath meeting house, 0.75 mile north of, about 1,000 feet west of road forks, in north end of stone arch; tablet stamped "Me. 93, 1914, S., Prim. Trav. Sta. No. 2".....	43 34 42.7	70 28 25.0	3,750
Crossroads, Buxton road with Westbrook road.....	43 35 21.2	70 29 11.6	4,210
Cumberland-York county line, road forks northwest on.....	43 35 56.3	70 28 34.2	4,497
Dunston, 5 miles northwest of, Buxton station, 3.5 miles southeast of; stone property corner in southeast angle of crossroads; tablet stamped "Me. 147, 1914, S., Prim. Trav. Sta. No. 3".....	43 36 29.8	70 27 40.0	5,240
South Buxton, four corners in front of store.....	43 37 15.4	70 28 46.5	6,722
Buxton road, Gorham road, intersection of (Buxton quadrangle)	43 37 57.2	70 30 15.5	7,790
Gorham, 3.6 miles south of, west end small drain under railway at south side of highway; tablet stamped "Me. 181, 1914, S., Prim. Trav. Sta. No. 4".....	43 38 35.9	70 29 37.9	4,800
York-Cumberland county line, road crossing.....	43 39 19.3	70 28 28.1	6,763
Milepost "W 135 P. 12".....	43 39 49.6	70 27 46.8	4,315
Gorham Normal School, spire of, by U. S. Geological Survey tri- angulation, 1888.....	43 40 50.60	70 26 49.96	7,460

Magnetic declination for west border of quadrangle,  $15^{\circ} 14' W.$

## VERMONT.

### TRIANGULATION STATIONS.

#### Rochester quadrangle.

##### ADDISON, RUTLAND AND WINDSOR COUNTIES.

In 1915 D. H. Baldwin located several secondary points for control of the Rochester 15-minute quadrangle based on Goshen and Killington stations of United States Coast and Geodetic Survey, North American datum.

Seven stations were occupied and seven points were located by intersections. No least-square figure adjustment was made.

##### AUSTIN HILL, WINDSOR COUNTY, VT. (Not occupied.)

On bare south part of summit of Austin Hill, about 2 miles west of the village of Rochester.

Signal: Temporary signal pole.

Station mark: No mark established.

[Latitude 43° 52' 14.40". Longitude 72° 49' 40.29".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Jones.....	• / "	• / "	3,87001	4.606
Cushman barn.....	246 50 49	66 30 25	3.76127	3.586
Rochester.....	246 27 41	66 30 25	3.80471	3.963
	273 37 26	... ... ..		

##### BRAINTREE GAP, VT. (Not occupied.)

On the summit of a mountain south of Braintree Gap, probably in Addison County, near corner of Orange and Windsor counties.

Signal: A signal pole set in the top of a tall pine tree.

Station mark: Tall pine tree.

[Latitude 43° 57' 56.48". Longitude 72° 47' 42.90".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Rochester.....	• / "	• / "	4,06300	7.200
Hancock tunnel.....	341 08 17	161 10 13	3.99770	6.181
Braintree road.....	37 56 18	217 53 08	3.20570	9.973
	112 18 36	292 17 50		

##### BRAINTREE ROAD, ADDISON COUNTY, VT.

Just a few hundred feet north of the junction of the main road with a road northeast to Braintree Gap and about 2 miles east of Granville village. It is about 50 feet northwest of north fence line of the Gap road and about 800 feet (true azimuth 93°) to the chimney on the house on the opposite side of main road.

Signal: A temporary flagpole 3 feet southwest of the signal.

Station mark: A small drill hole in small surface rock outcrop.

**Reference mark:** A shallow drill hole in the top of a large rock on the northeast side of a springlike basin in water course through field; distant 156.2 feet, true azimuth  $195^{\circ} 06.4'$  from station.

[Latitude  $43^{\circ} 58' 16.25''$ . Longitude  $72^{\circ} 48' 49.54''$ .]

To station -	Azimuth.	Back azimuth.	Distance.	
Little Wilcox.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Hancock tunnel.....	4 12 59	208 39 14	4.22706	10.481
Philadelphia.....	28 41 38	.... . .	3.98410	5.999
Gillespie.....	36 41 24	.... . .	3.99255	6.108
Granville.....	71 38 49	.... . .	3.97240	3.296
Braintree Gap.....	114 20 46	294 16 15	3.97940	5.926
Rochester.....	292 17 50	112 18 36	3.20570	9.978
	335 38 48	155 42 37	4.10380	7.891

#### CUSHMAN BARN, WINDSOR COUNTY, VT.

On Cushman range east of the village of Rochester, on the south bare slope of wooded knob and about 0.6 mile northwest of gap crossed by road from Rochester to West Randolph. In plain view from Rochester.

**Station mark:** The southwest corner of an old barn, 45.5 feet long by 25.5 feet wide.

**Reference mark:** A drill hole in surface outcrop, 581.8 feet distant,  $337^{\circ} 52.9'$  true azimuth from station, from which points to the northwest may be seen.

[Latitude  $43^{\circ} 53' 29.02''$ . Longitude  $72^{\circ} 45' 43.24''$ .]

To station -	Azimuth.	Back azimuth.	Distance.	
Killington.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Wilcox.....	8 27 25	188 24 59	4.50763	19.998
Mount Carmel.....	28 13 37	.... . .		
Austin.....	44 30 46	224 24 10	4.20096	11.332
Rochester postmaster's house.....	66 30 25	246 27 41	3.76127	3.586
Goshen.....	65 39 30	245 37 40	3.58942	2.414
Jones.....	67 53 44	247 45 02	4.25947	11.293
Hancock tunnl.....	79 08 50	259 02 16	4.11179	8.038
Philadelphia.....	92 41 14	272 36 41	3.94431	5.406
Gillespie.....	95 37 47	.... . .	4.00353	6.294
Granville.....	128 04 52	308 00 06	4.06712	7.252
Rochester.....	134 49 25	134 56 05	4.25850	11.288
	338 23 15	158 23 48	3.46460	1.811

#### GILLESPIE, ADDISON COUNTY, VT. (Not occupied.)

Just west of the village of Granville, on the summit of a timbered mountain by that name.

**Signal:** Flagpole in the top of a balsam fir tree.

**Station mark:** Flagpole in the top of a balsam fir tree.

**Reference mark:** Blazed base of tree, 3 feet south by 3 feet west of point below flagpole.

[Latitude  $43^{\circ} 57' 22.05''$ . Longitude  $72^{\circ} 52' 35.27''$ .]

To station -	Azimuth.	Back azimuth.	Distance.	
Braintree road.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Cushman barn.....	251 36 18	128 04 52	3.72461	3.296
Rochester.....	308 00 06	.... . .	4.06712	7.252
Rochester postmaster's house.....	313 53 52	.... . .	4.15422	8.962
Hancock tunnl.....	327 13 53	147 16 49	4.01939	6.397
	356 32 42	176 32 53	3.83238	4.224

**GOSHEN, ADDISON COUNTY, VT. (Not occupied in 1915.)**

Coast and Geodetic Survey, 1880-1885.

On the Green Mountains, in the southeast part of the town of Goshen and about 1.5 miles to the southwest of (Goshen Gap) summit of highway leading from Brandon to Rochester. The mountain is wooded.

Station mark: An iron bolt in rock.

Signal: Target and flag in pine tree; distant 12.5 feet true azimuth  $27^{\circ}$  from station.

[Latitude  $43^{\circ} 49' 46.72''$ . Longitude  $72^{\circ} 58' 16.87''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Jones.....	• 7 "	• 7 "	<i>Log. meters.</i>	<i>Miles.</i>
	223 03 04	43 05 12	3.78107	3.753
Hancock tunnel.....	227 51 15	47 55 10	4.03509	6.736
Cushman barn.....	217 45 02	67 53 44	4.25947	11.293
Rochester.....	256 52 23	77 01 38	4.26138	11.422
Killington (C. & G. S.).....	331 00 45	154 07 00	4.4436010	17.256
Herrick (C. & G. S.).....	....	....	4.4970290	19.515

**GRANVILLE, ADDISON COUNTY, VT. (Not occupied.)**

"The tallest tree on obtuse-angled summit of ridge in west extremity of town of Granville.

[Latitude  $44^{\circ} 00' 23.46''$ . Longitude  $72^{\circ} 55' 19.56''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Braintree road.....	• 7 "	• 7 "	<i>Log. meters.</i>	<i>Miles.</i>
Cushman barn.....	294 16 15	114 20 46	3.97940	5.928
Hancock tunnel.....	314 49 25	134 56 05	4.25850	11.268

**HANCOCK TUNNEL, ADDISON COUNTY, VT.**

Reached from Rochester via road to Robinson Mill, thence north to the summit of the gap by that name. It is on the west side of the gap, on a grassy slope.

Signal: A temporary flagpole well braced.

Station mark: A temporary flagpole well braced.

Reference mark: A drill hole in rock 142.7 feet distant, true azimuth  $150^{\circ} 26'$  and about 50 feet north of indefinite center of ridge.

[Latitude  $43^{\circ} 53' 42.19''$ . Longitude  $72^{\circ} 52' 16.93''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Mount Carmel.....	• 7 "	• 7 "	<i>Log. meters.</i>	<i>Miles.</i>
Goshen.....	16 31 43	....	4.14627	8.702
Jones.....	47 55 10	....	4.03509	6.735
Granville.....	153 54 25	....	3.68515	3.010
Gillespie.....	161 48 46	341 46 39	4.11520	8.101
Braintree road.....	176 32 55	356 32 42	3.83238	4.224
Braintree road.....	205 39 14	28 41 38	3.98410	5.990
Braintree Gap.....	217 53 08	37 56 18	3.99770	6.181
Cushman barn.....	272 36 41	92 41 14	3.94431	5.446
Little Wilcox.....	337 54 40	....	3.95549	5.608

## JONES MOUNTAIN, WINDSOR COUNTY, VT.

On grassy summit northwest of Little Pike Mountain, surrounded by taller mountains. It is about 800 feet uphill from Green's house, north of J. Smith's house. True azimuth to Green's chimney,  $26^{\circ} 04'$ .

Signal and station mark: A flagpole.

Reference mark: A drill hole in small surface rock; 38.7 feet distant, true azimuth  $156^{\circ} 44'$ .

[Latitude  $43^{\circ} 52' 09.70''$ . Longitude  $72^{\circ} 55' 12.20''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			<i>Log. meters.</i>	<i>Miles.</i>
Goshen.....	43 05 12	223 03 04	3.78107	3.753
Hancock.....	233 52 24	53 54 26	3.68515	3.010
Cushman barn.....	259 02 16	79 08 50	4.11179	8.035
Austin.....	268 50 49	88 54 39	3.87001	4.606
Rochester.....	271 01 31	91 08 39	4.13930	8.564

## LITTLE WILCOX, RUTLAND COUNTY, VT. (Not occupied.)

Summit of mountain.

Signal and station mark: Highest tree top.

[Latitude  $43^{\circ} 49' 11.20''$ . Longitude  $72^{\circ} 49' 45.04''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			<i>Log. meters.</i>	<i>Miles.</i>
Hancock.....	337 54 40	337 54 40	3.95549	5.609
Braintree road.....	4 12 59	4 12 59	4.22706	10.487
Killington.....	178 19 41	178 19 41	4.37818	14.843

## MOUNT CARMEL, RUTLAND COUNTY, VT. (Not occupied.)

A rounded conical summit in Green Mountain Range.

Station mark: Pole on rough tower, erected by fire warden, in center of summit.

[Latitude  $43^{\circ} 46' 27.24''$ . Longitude  $72^{\circ} 55' 14.94''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			<i>Log. meters.</i>	<i>Miles.</i>
Hancock tunnel.....	106 30 33	106 30 33	4.14641	8.701
Cushman barn.....	224 24 10	44 30 46	4.26096	11.332
Killington.....	336 44 04	156 48 13	4.31129	12.724

## PHILADELPHIA, ADDISON COUNTY, VT. (Not occupied.)

On the north part of summit level of Philadelphia Mountain, about 2 miles northwest of Hancock tunnel.

Station mark: A tall dead tree in a burning.

[Latitude  $43^{\circ} 54' 00.78''$ . Longitude  $72^{\circ} 53' 12.76''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			<i>Log. meters.</i>	<i>Miles.</i>
Braintree road.....	36 41 24	36 41 24	3.99235	6.108
Cushman barn.....	95 37 47	4 00353	6.264	
Rochester.....	108 25 28	4.06841		7.274

**ROCHESTER, WINDSOR COUNTY, VT.**

On a mountain on the east boundary of the town of Rochester and about 0.8 mile south of the summit of the highway leading from West Randolph to Rochester Village. The mountain is timbered, but several sights were cut. The United States Coast and Geodetic Survey bolt could not be found.

Station mark: A bronze tablet in surface outcrop in the center of an area in which old signal boards were found and at about the highest point of the mountain.

Signal: Flagpole in tree 18.5 feet distant; true azimuth  $3^\circ$  from station.

[Latitude  $43^\circ 52' 01.22''$ . Longitude  $72^\circ 44' 55.17''$  U. S. C. & G. S station. Latitude  $43^\circ 52' 01.31''$ ; longitude  $72^\circ 44' 55.15''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Killington.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Goshen.....	11 17 07	... .. .	4.47271	18.453
Austin.....	77 01 38	... .. .	4.26438	11.422
Jones.....	93 40 43	... .. .	3.80471	3.963
Gillespie.....	91 08 39	271 01 31	4.13930	8.563
Braintree road.....	134 00 19	... .. .	4.15424	8.863
Cushman barn.....	155 42 37	335 38 48	3.99255	6.108
Braintree Gap.....	158 23 48	338 23 15	3.46460	1.811
	161 10 13	341 08 17	4.06390	7.198

**ROCHESTER, POSTMASTER'S HOUSE, WINDSOR COUNTY, VT.**

On bluff back of Rochester Inn, overlooking town

Station mark: Center of chimney.

[Latitude  $43^\circ 52' 37.10''$ . Longitude  $72^\circ 48' 21.78''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Gillespie.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Cushman.....	147 16 49	327 13 53	4.01939	6.497
	245 37 40	65 39 30	3.58942	2.414

## MARYLAND AND THE DISTRICT OF COLUMBIA.

### PRIMARY TRAVERSE.

**Washington quadrangle (embracing portions of Laurel, Rockville, East Washington, and West Washington quadrangles).**

#### DISTRICT OF COLUMBIA; MONTGOMERY AND PRINCE GEORGES COUNTIES, MD.

The following geographic positions were determined by C. B. Kendall in 1903, 1904, 1912, and 1915, and by J. R. Ellis in 1910 and 1912.

The work of 1904, 1910, and 1912, published in Bulletins 245, 276, 496, and 551, has been readjusted to agree with lines run in 1915 by C. B. Kendall and tied to Soper, Cissel, north and east corners of the District of Columbia, Beal, Maryland Agricultural College, Stabler, and Rockville triangulation stations of the United States Coast and Geodetic Survey.

#### WASHINGTON QUADRANGLE.

##### MARYLAND.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Soper triangulation station, 6 miles northwest of Beltsville, on land of Bank. Downes, about 92 feet east of old Columbia turnpike, Washington to Baltimore; station mark earthen cone 2 feet below surface. Reference marks: No. 1, copper nail and washer in apple tree, 53.9 feet east; No. 2, copper nail and washer in cedar tree, 61 feet south; No. 3, copper nail and washer in cedar tree, 79.4 feet west; No. 4, copper nail and washer in apple tree, 63.8 feet west.....	° ' "	° ' "	Feet.
Three corners, 5 feet to corner rail fence, 20 feet south to post.....	39 05 11.84	76 57 00.72	911
Fairland, center of public crossroads at.....	39 05 03.4	76 57 04.7	
Fairland, in west face of south corner of stone foundation of old Soper dwelling, in northeast corner of crossroads, 120 feet north of center of crossroads; aluminum tablet stamped "Prim. Trav. Sta. No. 2, Maryland, 414, 1912".....	39 04 33.6	76 57 28.8	3,562
Paint Branch, center of wooden bridge over.....	39 04 31.7	76 57 28.9	115
T road north, 25 feet northwest to mail box, 18 feet northeast to corner of wire fence.....	39 04 38.2	76 58 35.4	5,261
Colesville, in south wall of foundation of F. M. Hobb's residence, which is in northeast corner of crossroads; aluminum tablet stamped "Prim. Trav. Sta. No. 3, 1912".....	39 04 40.6	76 59 12.3	2,921
Colesville, about 0.3 mile southwest of, 700 feet south of cemetery, 500 feet south of public road; center of white house.....	39 04 33.2	77 00 07.1	4,382
Colesville, about 1.1 miles southwest of, 300 feet south of road; house.....	39 04 21.7	77 00 26.3	1,913
Three corners, 500 feet south of the northwest mill, 100 feet southwest of iron bridge over northwest branch, 10 feet north to Bliss and Sommers's mail box, 35 feet southwest to center of plank bridge; public T road south.....	39 03 55.4	77 01 16.8	4,789
Second-class road north, at bend of main road to southwest, 25 feet north to gate, 18 feet west to maple tree.....	39 03 52.2	77 01 44.0	2,163
Glenmont, intersection of Union pike and public road northeast to Colesville, 40 feet northeast to corner wire fence post, 35 feet southeast to telephone pole, 35 feet southwest to telephone pole No. 110.....	39 03 03.4	77 02 23.6	3,127
Three corners, public T road east, center of Union pike at.....	39 03 28.8	77 03 01.0	3,868
Wheaton, on south side of store kept by J. C. Cissel; aluminum tablet stamped "Prim. Trav. Sta. No. 1, 1915, elev. 459".....	39 03 10.6	77 03 04.6	1,857
Wheaton, 0.25 mile southwest of; public road crossing.....	39 02 29.6	77 03 06.5	4,154
Kensington, forks at north edge of, pike north and public road northeast, 20 feet south to large elm.....	39 02 24.0	77 03 20.7	1,257
Kensington, intersection of St. Paul Street and Baltimore & Ohio R. R., 250 feet west of station; center between tracks.....	39 02 00.5	77 04 11.1	4,632
	39 01 38.1	77 04 22.2	2,429

## WASHINGTON QUADRANGLE AND VICINITY—Continued.

Along the Chesapeake &amp; Ohio Canal between Georgetown, D. C., and Great Falls, Md.—Continued.

Station.	Latitude.	Longitude.
<b>MARYLAND—continued.</b>		
Davis triangulation station on ledge of rock, west side of towpath; elevation 119 feet.....	38 59 00.46	77 14 13.20
Lock No. 15, 380 feet south of, square cut in rock on west side of towpath; marked "120".....	38 59 17.64	77 14 40.55
Lock No. 15, cross cut on southwest wing; elevation 126 feet.....	38 59 21.32	77 14 39.65
Lock No. 16, cross cut on south end of west wall; elevation 134 feet.....	38 59 30.50	77 14 40.62
Cross cut on top of west wall of gateway between locks 16 and 17; elevation 135 feet.....	38 59 35.83	77 14 43.37
Lock No. 17, □ cut on southwest corner of, south end of west wall; elevation 142 feet.....	38 58 45.90	77 14 52.92
Lock No. 18, top of bolt in south wall; elevation 150 feet.....	38 58 50.61	77 14 55.35
Great Falls, in southeast corner of stone gatehouse; bronze tablet stamped "Prim. Trav. Sta. No. 1".....	39 00 01.86	77 14 53.10
L cut in stone wall at gate of dam.....	39 00 03.29	77 14 55.93
Towpath at branch.....	39 00 46.15	77 14 28.41
Towpath at branch.....	39 01 15.78	77 14 15.61
Grimes Lock (No. 21), at southwest part of, in top of stone wing; aluminum tablet stamped "Prim. Trav. Sta. No. 179 1907".....	39 01 51.96	77 14 36.82

**LAUREL QUADRANGLE.**

From Arundel to Bowie.

Station.	Latitude.	Longitude.
Arundel station, west track 100 feet north of.....	39 01 57.9	76 45 12.7
Road crossing (east track).....	39 01 03.7	76 45 54.5
Bowie, east edge of road 25 feet north of north end of bridge over Philadelphia, Baltimore & Washington R. R.....	39 00 29.4	76 46 44.5

**Along highways.**

Bowie, three corners near stone residence in northwest part of.....	39 00 38.7	76 46 55.7
White house, three corners, 300 feet east of.....	39 00 34.7	76 48 05.5
Three corners, telegraph road, 45 feet south to oak tree, 55 feet northwest to wild cherry tree.....	39 00 25.2	76 48 35.0
Forks of road to west at row of cedars.....	39 00 46.0	76 49 14.4
Three corners, 22 feet south to fence post, 40 feet north to pear tree.....	39 00 56.8	76 50 53.4
Four corners, 40 feet southeast to oak tree, 43 feet southwest to corner of dwelling.....	39 01 10.6	76 51 30.1
Forks of road, 15 feet east to forks of oak, 30 feet northwest to forks of oak.....	39 00 40.7	76 52 45.7
Forks of road to east, 200 feet east of stream.....	39 00 19.9	76 53 40.4
Four corners, 35 feet southeast to pine tree, 18 feet northwest to old stump.....	38 59 46.5	76 54 06.3
Branchville, road crossing.....	38 59 55.5	76 55 13.4
Blacksmith shop, three corners at.....	38 59 54.1	76 55 54.4
Forks, 15 feet south to oak tree, 40 feet northwest to gatepost.....	39 00 08.6	76 57 57.4
Avenel post office, three corners.....	39 00 14.7	76 58 51.9
Avenel post office, four corners, 1 mile southwest of, 31 feet northwest to nail in telephone pole, 30 feet to nail in cedar tree.....	38 59 58.1	76 59 44.2
Four corners, 30 feet east to north stone gatepost, 23 feet west to corner of Labyrinth's real estate office.....	39 01 12.5	77 00 46.8
Burnt Mills post office, forks of road, 300 feet south.....	39 01 50.1	77 00 19.0
Junction of Columbia pike and Bladensburg road at No. 2 tollgate.....	39 02 25.7	76 59 28.5
Three corners, 15 feet west to oak tree, 40 feet east to mail box.....	39 03 18.0	76 59 44.2
Colesville, four corners.....	39 04 32.8	77 00 07.8
Blacksmith shop, forks of road, 25 feet southeast to telephone pole, 35 feet southwest to telephone pole.....	39 05 20.8	77 00 00.4
Cloverly post office, three corners, 53 feet west to corner of dwelling, 60 feet south to cherry tree.....	39 06 42.6	76 59 42.8
Stabler triangulation station, U. S. Coast and Geodetic Survey.....	39 07 17.7	76 59 06.5

## ROCKVILLE QUADRANGLE.

Along highways.

Station.	Latitude.	Longitude.
Brink post office, three corners, 1 mile south of, at Neelsville Presbyterian Church, 50 feet east to wire fence, 40 feet northwest to yard corner.....	39 11 43.6	77 14 39.4
Middlebrook, four corners, 60 feet northwest to store corner, 45 feet southwest to stone fence corner.....	39 10 42.4	77 14 18.8
Seneca Creek, center of bridge over.....	39 10 00.9	77 13 37.4
Three corners, 40 feet east to tree at fence corner, 45 feet northeast to fence corner.....	39 09 27.7	77 13 04.7
Gaithersburg, cemented in north wall at northwest corner of brick store of Mr. R. A. Young at junction of Frederick Avenue and Chestnut Street, aluminum tablet stamped "Prim. Trav. Sta. No. 24".....	39 08 37.6	77 12 06.2
Gaithersburg, Frederick Avenue crossing Baltimore & Ohio R. R., 55 feet east to telegraph office, 40 feet northwest to crossing sign.....	39 08 29.2	77 11 55.4
Three corners.....	39 07 29.6	77 12 48.9
Three corners, 30 feet northeast to cedar tree, 35 feet southeast to fence corner.....	39 06 54.9	77 12 58.9
Three corners, at signboard, 35 feet north to signboard, 15 feet south to telephone pole.....	39 06 11.4	77 13 26.1
Three corners, 40 feet north to fence corner, 40 feet southwest to fence painted.....	39 05 00.9	77 14 55.0
Grimes Lock (No. 2), 3 corners, ½ mile north of, 29 feet southeast to nail in fence post, 36 feet southwest to nail in fence post.....	39 02 06.5	77 14 26.3
Grimes Lock (No. 21), cemented in coping stone of west wing wall to south end of, aluminum tablet stamped "Prim. Trav. Sta. No. 179".....	39 01 52.0	77 14 36.8
Forks of road, 25 feet south to mark on fence.....	39 01 53.0	77 13 59.5
Three corners, 35 feet south to corner fence, 30 feet east to fence.....	39 01 36.8	77 13 13.6
Potomac, four corners, 75 feet northeast to southwest corner post office, 50 feet east to corner John Stone's store.....	39 01 05.0	77 12 33.1
Three corners, 30 feet south to wire fence, 30 feet northwest to fence corner.....	39 00 07.37	77 10 51.78
Cabin John Creek, crossroads 125 feet west of.....	38 59 48.49	77 10 11.26
Emery crossroads, 40 feet southeast to corner small dwelling, 25 feet south to stable corner.....	38 59 32.59	77 09 41.24
Cabin John Bridge, forks of road 1 mile northeast of, 25 feet east to wire fence corner, 50 feet north to telephone pole.....	38 59 00.18	77 08 15.22
Forks of road, 25 feet southeast to telephone pole, 25 feet north to forked cherry tree.....	38 59 23.98	77 07 17.70
Bethesda street-car station, three corners, ½ mile south of, 25 feet east to car track, 50 feet southwest to store corner.....	39 00 00.38	77 06 35.48
Georgetown pike, three corners at.....	39 00 23.28	77 05 51.85
Bethesda street-car station, cemented in middle stone of west wall of culvert near Rock Creek on Georgetown pike, 0.8 mile east of, aluminum tablet stamped "Prim. Trav. Sta. No. 302".....	39 00 21.57	77 05 51.93
Forks of road, 60 feet northeast to telephone pole, 50 feet east to telephone pole.....	38 59 46.06	77 05 48.51
Forest Glen, street-car crossing, 1 mile south of.....	38 59 59.76	77 04 37.59
Overhead bridge.....	38 59 52.06	77 03 25.67
Triangle, junction Brookville pike and road to Forest Glen, 45 feet southwest to cedar tree at gate, 25 feet northwest to telephone pole.....	39 00 34.55	77 02 27.25
Burnt Mills, four corners, 1 mile west of, junction Coleville pike and Blanchard and Wheaton road, 33 feet west to real estate office.....	39 01 12.5	77 00 46.8
Burnt Mills, four corners, 1 mile west of, cemented in north stone of gatepost to entrance to farm of Mr. Kolk; aluminum tablet stamped "Prim. Trav. Sta. No. 361".....	39 01 12.6	77 00 46.0

## WASHINGTON QUADRANGLE.

MARYLAND.

Along City &amp; Suburban Electric Railway and highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Branchville, 0.5 mile west of; three corners at blacksmith shop.....	38 59 54.1	76 55 54.4	.....
Branchville, road crossing on City & Suburban Electric Ry.....	38 59 56.7	76 55 32.3	1,761
Hollywood, Richmond Avenue crossing on City & Suburban Electric Ry.....	39 00 37.5	76 55 21.3	4,220
Englewood, Beech Street crossing on City & Suburban Electric Ry.....	39 00 57.8	76 55 15.8	2,100
City & Suburban Electric Ry. and Washington-Baltimore road; center of crossing.....	39 01 45.3	76 54 56.7	5,041
Beltsville, Baltimore & Ohio R. R. at road crossing; center of main track.....	39 02 09.3	76 54 21.7	3,682
Four corners at top of hill, 55 feet southeast to cedar tree, 35 feet northeast to corner of fence.....	39 02 35.0	76 53 45.0	3,886
Muirkirk, 0.25 mile east of, 35 feet southeast to oak tree, 35 feet southwest to telephone pole; four corners.....	39 03 35.6	76 52 53.4	7,358
Contee, in west face of north brick gatepost at entrance to residence of Chas. R. Hoff, 80 feet east of east track of Baltimore & Ohio Ry. at road crossing, 125 feet south of station; aluminum tablet stamped "Prim. Trav. Sta. No. 1, 1912".....	39 04 32.0	76 51 55.5	7,312

## WASHINGTON QUADRANGLE—Continued.

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Contee, road crossing at station; center of track of City & Suburban Electric Ry.....	* * "	* * "	Feet.
Contee, 1 mile northwest of, 10 feet north to mail box; 18 feet south to cedar tree, 20 feet southeast to mail box; T road southwest.....	39 04 38.5	76 52 20.6	2,086
T road west, 35 feet northwest to corner of plank and wire fence.....	39 05 00.4	76 53 02.4	3,972
T road east, 40 feet south to oak tree, 30 feet northeast to mail box.....	39 05 04.1	76 53 44.8	3,363
T road west, 40 feet south to mail box.....	39 04 50.3	76 55 10.0	6,968
Soper triangulation station, 1,500 feet southwest of, 10 feet northeast to corner of rail fence, 20 feet south to post painted "U. S. 157"; T road southeast.....	39 04 31.9	76 55 16.5	1,928
Beltsville, 6 miles northwest of, on land of Benj. F. Miles, 92 feet east of old Columbia turnpike (Washington to Baltimore); center of granite pillar 2 feet 10 inches long with top 5 inches square (C. & G. S. triang. sta. Soper).....	39 05 03.4	76 57 04.9	9,125
Fairland, in west face of south corner of stone foundation of old Soper dwelling, which is in northeast corner of crossroads, 120 feet north of center of crossroads; aluminum tablet stamped "Prim. Trav. Sta. No. 2, Maryland, 414, 1912".....	39 05 11.84	76 57 00.72	915
Paint Branch, center of wooden bridge over.....	39 04 34.7	76 57 28.9	4,370
T road north, 25 feet northwest to mail box 81, 18 feet northeast to corner of wire fence.....	39 04 38.2	76 58 35.4	5,251
Colesville, four corners at.....	39 04 40.6	76 59 12.3	2,941
Colesville, in south wall of foundation of F. M. Hobb's residence, which is in northeast corner of crossroads; aluminum tablet stamped "Prim. Trav. Sta. No. 3, 1912".....	39 04 32.8	77 00 07.8	4,433
	39 04 33.2	77 00 07.1	68

The following geographic positions were established in 1912 by J. R. Ellis. The line starts from an adjusted position 1 mile east of Branchville and follows highways to Lanham, thence along the Pennsylvania Railroad to Ardwick station, thence by highway to Ardmore station, Brightseat, Seat Pleasant, and connects with the east District of Columbia monument. A line starts from an adjusted position 1 mile east of Seat Pleasant, follows public highways through Richie, Forestville, Camp Springs, and Friendly, and connects with the District of Columbia monument at Fox Ferry.

## WASHINGTON QUADRANGLE.

## MARYLAND.

Along highways and Pennsylvania Railroad near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Branchville, 1 mile east of; four corners.....	* * "	* * "	Feet.
Branchville, 2.5 miles east of; double pine tree at T road south.....	38 59 46.5	76 54 06.3	.....
Branchville, 3 miles east of, at west point of triangle in forks; cross cut in blaze on white-oak tree.....	38 59 39.9	76 52 32.8	7,410
Lanham, 1.8 miles north of, on north side of field; east point of triangle at forks.....	38 59 30.5	76 51 57.8	2,930
Lanham, 1.2 miles north of, at lot house, 22 feet west to blaze on small pine tree; center of crossroads.....	38 59 05.3	76 51 45.6	2,731
Lanham, 0.3 mile northeast of, in south end of retaining wall of west end of bridge over Pennsylvania R. R.; aluminum tablet stamped "Prim. Trav. Sta. No. 1, 1912".....	38 58 40.5	76 51 19.3	3,253
Lanham, east track of Pennsylvania R. R. at road crossing.....	38 57 50.7	76 51 30.9	5,137
Ardwick station, middle track of Pennsylvania R. R. at road crossing.....	38 57 34.0	76 51 47.6	2,137
Ardmore station, crossing of pike under Washington, Baltimore & Annapolis R. R. (electric).....	38 56 40.8	76 52 35.4	6,576
	38 56 19.0	76 51 26.6	5,858

## WASHINGTON QUADRANGLE—Continued.

Along highways and Pennsylvania Railroad near east border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Junction of Ardwick Avenue north-south and Lincoln Avenue east.....	38 55 48.5	76 51 35.4	3,162
Brightseat, 0.3 mile northwest of, on south side of T road northeast; red oak tree.....	38 55 07.4	76 51 41.4	4,189
Brightseat, center of T road northeast.....	38 55 00.3	76 51 20.2	1,820
Brightseat, 1 mile south of; cross on top of stone monument in gateway.....	38 54 25.7	76 51 11.2	3,569
Brightseat, 1.5 miles east of; center of intersection of Central Avenue and T road north.....	38 53 28.5	76 51 02.5	5,825
Brightseat, 1.2 miles east of; Central Avenue at private road south.....	38 53 25.2	76 51 24.0	1,737
Brightseat, just east of blacksmith shop; center of T road north.....	38 53 18.6	76 52 40.6	6,091
District station, 0.8 mile southeast of; center of crossroads at store.....	38 53 12.5	76 53 54.3	5,860
East corner monument of District of Columbia.....	38 53 34.23	76 54 33.94	3,828
Richie station, 0.8 mile northwest of; road crossing under Chesapeake Beach R. R. ....	38 52 42.7	76 51 46.1	.....
Richie station, just west of; road crossing on Chesapeake Beach R. R. ....	38 52 11.2	76 51 21.1	3,764
Richie station, in concrete floor at entrance to store; aluminum tablet stamped "Prim. Trav. Sta. No. 2, 165, 1912".....	38 52 07.5	76 51 20.3	372
Richie station, 1 mile southwest of; center of Richie-Forestville pike at T road east.....	38 51 36.9	76 52 18.0	5,511
Forestville, 20 feet west to "Ele. 280.1" on telephone pole, 36 feet north to corner post; crossing of Marlboro turnpike and north-south turnpike.....	38 50 40.3	76 52 27.2	5,776
Forestville, 2 miles south of; center of crossroads.....	38 49 03.0	76 52 40.4	9,905
Camp Springs, 1 mile northeast of; center of T turnpike northwest.....	38 48 41.5	76 53 44.2	5,491
Camp Springs, in top of concrete retaining wall of south end of culvert, 20 feet east by 5 feet north to center of cross pikes; aluminum tablet stamped "Prim. Trav. Sta. No. 3, 1912".....	38 48 13.5	76 54 25.9	4,357
Pagets Corners, center of cross pikes at.....	38 47 35.2	76 55 44.3	7,314

## Along highway near south border of quadrangle.

Schoolhouse, center of crossroads.....	38 47 15.1	76 56 19.3	3,424
Friendly, 2 miles northeast of; center of T pike southeast.....	38 46 35.2	76 57 07.9	5,583
Friendly, 1.25 miles northeast of, 20 feet south by 15 feet west to Steed's mail box; center of Camp Springs-Friendly road at road east.....	38 45 42.3	76 57 23.6	5,197
Hyland Harmon's mail box on south side of forks.....	38 45 20.4	76 57 53.3	3,232
Friendly, 20 feet south to Geo. M. Boland's mail box; center of T road northeast.....	38 45 06.0	76 58 42.9	4,191
Friendly, 1 mile west by 0.5 mile north of; center of T turnpike west of saloon.....	38 45 30.5	76 59 46.2	5,590
New Glatz, 1 mile south of; forks of road.....	38 45 40.3	77 00 18.7	2,732
New Glatz, 20 feet west by 10 feet south to corner of yard fence; T road west at store.....	38 46 38.2	77 00 22.4	5,866
Fox Ferry, 0.5 mile southeast of; T road east.....	38 47 48.1	77 01 10.9	8,039
Fox Ferry, District of Columbia monument.....	38 48 05.57	77 01 35.39	2,625

## NEBRASKA AND KANSAS.

### PRIMARY TRAVERSE.

**Falls City, Howe, Humboldt, Nemaha, Tecumseh, and Hiawatha quadrangles.**

**NEMAHIA, PAWNEE, AND RICHARDSON COUNTIES, NEBR.; BROWN COUNTY, KANS.**

The following geographic positions on approximate North American datum were determined by J. R. Ellis in 1913 and by F. W. Crisp in 1915 and are based upon primary traverse positions determined in 1905, described in Bulletin 276, and upon Missouri River Commission triangulation station St. Deroin.

#### HIAWATHA QUADRANGLE, KANS.

**Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T road east, center of intersection of Falls City, 4 miles south of, 30 feet south of road, in stone hitching post in front of Mr. Fred. Zorn's residence; aluminum tablet stamped "Prim. Trav. Sta. No. 21 Nebr., 1913, elev. 1027".....	39 59 59.0	95 43 48.3	Feet.....
T. 1 N., Rs. 16 and 17 E., south corner of secs. 31 and 36; center of T road north; Nebraska-Kansas State line.....	39 59 59.8	95 35 56.3	.....
T. 1 S., R. 17 E., north corner of secs. 5 and 6; center of T road south; Nebraska-Kansas State line.....	39 59 59.9	95 33 28.4	.....
T. 1 N., R. 17 E., south corner of secs. 31 and 32; center of T road north; Nebraska-Kansas State line.....	39 59 59.8	95 32 45.9	3,310
T. 1 S., R. 17 E., north corner of secs. 4 and 5, center of T road south; Nebraska-Kansas State line.....	39 59 59.8	95 32 20.2	1,970
T. 1 N., R. 17 E., south corner of secs. 32 and 33; center of T road north; Nebraska-Kansas State line.....	39 59 59.7	95 31 38.6	3,270
	39 59 59.7	95 31 12.6	.....

Magnetic declination of northeast quarter of quadrangle 9.5° E.

#### FALLS CITY QUADRANGLE, NEBR.

**Along Chicago, Burlington & Quincy Railway.**

Station.	Latitude.	Longitude.	Distance between stations.
Verdon, 3.50 miles south of, 25 feet north and 50 feet east of center of road crossing; iron post stamped "Prim. Trav. Sta. No. 17, Nebr., 1913, Elev. 938".....	40 06 06.90	95 43 05.50	.....
Road crossing, center of track at.....	40 05 40.4	95 43 06.3	2,696
Chicago, Burlington & Quincy Ry., center of track at road crossing.....	40 05 14.4	95 43 06.8	2,629
Creek crossing under concrete culvert "26.93," center of track at.....	40 05 27.9	95 43 20.2	1,718
Wooden trestle "27.88" over creek, center of track at.....	40 05 49.9	95 44 17.0	4,939
Tps. 1 N. and 1 S., R. 15 E., $\frac{1}{4}$ corner secs. 4 and 33, T road south on State line.....	40 00 01.1	95 44 55.3	.....
T road north on State line, center of.....	40 00 01.1	95 44 47.1	640
T road north, center of intersection at.....	40 00 01.4	95 43 39.6	.....
T road south, on State line, center of intersection at.....	40 00 01.1	95 42 39.3	4,700
T road north, on State line, center of intersection at.....	40 00 01.1	95 42 31.7	590
Salem, 5 miles south and 0.50 mile east of, 200 feet north of State line, in west face of stone foundation of barn owned by Amos Thompson; aluminum tablet stamped "Prim. Trav. Sta. No. 19, Nebr., 1913".....	40 00 03.00	95 42 18.10	1,077

## FALLS CITY QUADRANGLE, NEBR.—Continued.

Along Missouri Pacific Railway to Verdon, thence south along Chicago, Burlington & Quincy Railroad to Salem, thence south along highways to State line (near west border of quadrangle).

Station.	Latitude.	Longitude.	Distance between stations.
	* ° ′ ″	* ° ′ ″	Feet.
Stella, 3 miles southeast of, southeast corner of road crossing, 30 feet north by 70 feet west to center of east-west road crossing; iron post stamped "Prim. Trav. Sta. No. 15, Nebr., 1913, elev. 967".	40 11 46.8	95 44 48.8	
East-west road crossing, 150 feet east of this position is south corner of secs. 33 and 34, T. 3 N., R. 14 E., T road north.	40 10 28.6	95 43 42.8	9,429
East-west road crossing, 1,020 feet to trestle over creek southwest Verdon, 0.25 mile northwest of; west side of road crossing Missouri Pacific Ry., 130 feet east by 10 feet north to center of road crossing; iron post stamped "Prim. Trav. Sta. No. 16, Nebr., 1913, elev. 935".	40 09 36.4	95 43 14.8	5,710
East-west road crossing under bridge.	40 09 01.1	95 42 58.9	3,779
Verdon, 2.5 miles south of, east-west road crossing.	40 07 51.4	95 42 51.9	7,071
Verdon, 3.5 miles south of; northeast corner of crossroads, 25 feet south by 50 feet west to center of road crossing; iron post stamped "Prim. Trav. Sta. No. 17, Nebr., 1913, elev. 938".	40 06 58.9	95 43 01.3	5,361
Salem, track opposite semaphore.	40 06 06.9	95 43 05.5	5,274
Salem, center of steel bridge over Great Nemaha River.	40 04 46.8	95 42 37.6	8,389
Salem, 0.5 mile south of; in northwest corner of stone abutment of bridge over South Fork of Great Nemaha River; iron post stamped "915 Prim. Trav. Sta. No. 18, Nebr., 1913".	40 04 32.6	95 43 02.5	2,418
Center of steel bridge over large ditch east.	40 04 08.2	95 43 05.5	2,478
T. 1 N., R. 15 E., corner of secs. 14, 15, 22, and 23; center of T road east.	40 03 43.7	95 42 31.9	3,998
T. 1 N., R. 15 E., stone at corner of secs. 22, 23, 26, and 27; center of crossroads.	40 02 37.7	95 42 31.5	6,679
T. 1 N., R. 15 E., corner of secs. 26, 27, 34, and 35; center of crossroads.	40 01 45.5	95 42 31.5	3,280
	40 00 53.1	95 42 31.7	5,300

## Along highways near south border of quadrangle.

T. 1 N., R. 15 E., south corner of secs. 34 and 35; Kansas-Nebraska State line.	40 00 01.0	95 42 31.8	
Salem, 5 miles south by 0.5 mile east of, just north of Nebraska-Kansas State line, in west face of barn owned by Amos Thompson; aluminum tablet stamped "1102 Prim. Trav. Sta. No. 19, Nebr., 1913".	40 00 03.0	95 42 18.1	1,065
T. 1 S., R. 15 E., north corner of secs. 1 and 2, center of T road south, Kansas-Nebraska State line.	40 00 00.7	95 41 31.0	3,616
T. 1 S., Rs. 15 and 16 E., north corner of secs. 1 and 6, center of T road south; Nebraska-Kansas State line.	40 00 00.6	95 40 22.1	5,360
T. 1 S., Rs. 15 and 16 E., south corner of secs. 31 and 36; center of T road north; Nebraska-Kansas State line.	40 00 00.6	95 40 16.0	490
T. 1 S., R. 16 E., corner of secs. 5 and 6; center of T road south; Nebraska-Kansas State line.	40 00 00.5	95 39 30.6	3,530
Falls City, 4 miles south by 4 miles west of, on State line road; stone gatepost to entrance of Wm. Booth's farm; aluminum tablet stamped "999 Prim. Trav. Sta. No. 20, Nebr., 1913".	40 00 00.8	95 39 14.5	1,255
T. 1 N., R. 16 E., stone at south corner of secs. 31 and 32; center of T road north; Nebraska-Kansas State line.	40 00 00.5	95 39 08.1	496
T. 1 S., R. 16 E., north corner of secs. 4 and 5; center of T road south; Nebraska-Kansas State line.	40 00 00.4	95 38 22.5	3,550
T. 1 N., R. 16 E., south corner of secs. 32 and 33; center of T road north; Nebraska-Kansas State line.	40 00 00.4	95 38 00.3	1,730
T. 1 S., R. 16 E., north corner of secs. 3 and 4; center of T road south; Nebraska-Kansas State line.	40 00 00.2	95 37 14.5	3,560
T. 1 N., R. 16 E., stone south corner secs. 33 and 34, T road north; Nebraska-Kansas State line.	40 00 00.2	95 36 52.3	1,730
T. 1 S., R. 16 E., corner of secs. 2 and 3, center of T road south; Nebraska-Kansas State line.	40 00 00.1	95 36 06.4	3,570
T. 1 S., R. 16 E., south corner of secs. 34 and 35; center of T road north; Nebraska-Kansas State line.	40 00 00.0	95 35 44.3	
T. 1 S., R. 16 E., north corner of secs. 1 and 2; center of T road south; Nebraska-Kansas State line.	40 00 00.0	95 34 58.2	3,390
Preston, 2 miles south by 0.3 mile west of, 280 feet east of north corner of secs. 4 and 5, T. 1 S., R. 17 E., in south foundation wall of barn on north side of State line road; aluminum tablet stamped "1028 Prim. Trav. Sta. No. 22 Nebr., 1913".	40 00 02.4	95 31 35.1	
T. 1 N., R. 17 E., corner of secs. 28, 29, 32, and 33; center of crossroads.	40 00 51.9	95 31 12.6	
T. 1 N., R. 17 E., corner of secs. 20, 21, 28, and 29; center of crossroads.	40 01 44.2	95 31 12.7	5,290
Preston, 0.25 mile east of, at northwest corner of road crossing, 30 feet east by 60 feet south to center of road crossing Chicago, Burlington & Quincy R. R.; iron post stamped "881 Prim. Trav. Sta. No. 23 Nebr., 1913".	40 02 12.2	95 30 55.7	3,129

**FALLS CITY QUADRANGLE, NEBR.**—Continued.  
Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Great Nemaha River, center of steel bridge over.....	40 03 19.8	95 30 55.0	Feet. ....
Preston, 2.5 miles north of; northeast corner of crossroads, 35 feet south by 30 feet west to corner of secs. 4, 5, 8, and 9, T. 1 N., R. 17 E.; iron post stamped "Prim. Trav. Sta. No. 24, Nebr., 1913, elev. 976".....	40 04 20.8	95 31 12.1	6,312
Tps. 1 and 2 N., R. 17 E., stone at corner of secs. 4, 5, 32, and 33; center of crossroads.....	40 05 12.8	95 31 12.6	5,260
T. 2 N., R. 17 E., corner of secs. 28, 29, 32, and 33; center of crossroads.....	40 06 05.0	95 31 12.9	5,290
Preston, 5.5 miles north of; at northwest corner of crossroads, 30 feet south by 30 feet east of corner of secs. 20, 21, 28, and 29, T. 2 N., R. 17 E.; iron post stamped "Prim. Trav. Sta. No. 25, Nebr., 1913, elev. 981".....	40 06 57.7	95 31 13.5	5,335
T. 2 N., R. 17 E., corner of secs. 16, 17, 20, and 21; center of crossroads.....	40 07 49.5	95 31 13.4	5,245
Arago, corner of secs. 8, 9, 16, and 17, T. 2 N., R. 17 E., center of crossroads.....	40 08 41.8	95 31 12.2	5,391
T. 2 N., R. 17 E., corner of secs. 4, 5, 8, and 9; center of crossroads.....	40 09 34.0	95 31 11.2	5,255
T. 2 N., R. 17 E., corner of secs. 5, 6, 7, and 8; center of crossroads.....	40 09 34.3	95 32 19.2	5,280
T. 2 N., Rs. 16 and 17 E., corner of secs. 1, 6, 7, and 12; center of crossroads.....	40 09 34.4	95 33 31.0	5,570
Tps. 2 and 3 N., Rs. 16 and 17 E., stone at corner of secs. 1, 6, 31, and 36; center of crossroads.....	40 10 30.0	95 33 31.3	5,628
T. 3 N., Rs. 16 and 17 E., corner of secs. 25, 30, 31, and 36; center of crossroads.....	40 11 21.9	95 33 31.8	5,246
T. 3 N., Rs. 16 and 17 E., corner of secs. 19, 24, 25, and 30; center of crossroads.....	40 12 14.0	95 33 32.2	5,280
T. 3 N., Rs. 16 and 17 E., corner of secs. 13, 18, 19, and 24; center of crossroads.....	40 13 06.0	95 33 33.6	5,259
T. 3 N., Rs. 16 and 17 E., corner of secs. 7, 12, 13, and 18; center of crossroads.....	40 13 58.1	95 33 34.2	5,279

Magnetic declination for south border of quadrangle  $9.5^{\circ}$  E.; for east border,  $9.7^{\circ}$  E.

**HOWE QUADRANGLE, NEBR.**

From Julian south along Missouri Pacific Railway to Richardson-Nemaha county line.

Station.	Latitude.	Longitude.	Distance between stations.
Primary traverse station No. 4, 1905.....	• ' "	• ' "	Feet. ....
Julian, 2 miles south of; east-west road crossing.....	40 30 31.5	95 52 38.7	.....
Julian, 3 miles south of; on east side of track at road crossing; iron post stamped "Prim. Trav. Sta. No. 1, Nebr., 1913, elev. 975".....	40 29 39.0	95 51 45.1	6,732
East-west road crossing.....	40 28 47.2	95 51 54.6	5,302
North Auburn, east-west road crossing.....	40 27 28.5	95 51 49.9	7,966
Nebraska Junction, 1 mile north of; on west side of Missouri Pacific Ry. track at township line crossing, 30 feet south by 60 feet east to center of railroad crossing; iron post stamped "Prim. Trav. Sta. No. 2, Nebr., 1913, elev. 928," 30 feet south by 570 feet west of this position is quarter corner south side of sec. 32, T. 6 N., R. 14 E.....	40 26 35.9	95 51 48.0	5,330
Nebraska Junction, switch block.....	40 26 10.6	95 51 48.0	2,552
East-west road crossing section line.....	40 25 15.9	95 51 38.5	5,591
Auburn, 0.5 mile northwest of; on east side of north-south road and just north of tracks, 25 feet west by 80 feet south to center of road crossing; iron post stamped "Prim. Trav. Sta. No. 3, Nebr., 1913".....	40 24 26.4	95 50 43.2	6,588
Auburn station, 0.25 mile southeast of, east-west road crossing section line.....	40 24 07.2	95 50 18.2	2,742
North-south road crossing, just north of tile works.....	40 23 34.1	95 49 38.6	4,543
T. 5 N., R. 14 E., corner of secs. 22, 23, 26, and 27.....	40 23 11.1	95 49 10.2	3,197
Crossing of Missouri Pacific and of Chicago, Burlington & Quincy railroads.....	40 22 42.1	95 49 09.7	2,938
Milepost 410, just south of; east-west section line road crossing.....	40 21 43.0	95 48 36.5	6,507
Howe, 1 mile north of; east-west section line road crossing.....	40 20 57.9	95 48 41.7	4,587
Howe, 430 feet south of station; east-west road crossing.....	40 20 02.9	95 48 54.8	5,652
East-west road crossing, 240 feet east of this crossing is corner of secs. 14, 15, 22, and 23, T. 4 N., R. 14 E.....	40 19 10.8	95 49 14.9	5,494
Howe, 2 miles south of; at southeast corner of road crossing, 30 feet north by 43 feet west to center of road crossing Missouri Pacific Ry.; iron post stamped "Prim. Trav. Sta. No. 4, 1913, elev. 1056".....	40 18 18.4	95 49 22.1	5,340
	40 17 25.9	95 49 27.3	5,325

## HOWE QUADRANGLE, NEBR.—Continued.

From Julian south along Missouri Pacific Railway to Richardson-Nemaha county line—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. 4 N., R. 14 E., corner of secs. 26, 27, 34, and 35, 25 feet west to crossroads.....	40 16 34.0	95 49 19.3	5,290
Nemaha-Richardson county line; east-west road crossing.....	40 15 41.9	95 48 40.8	6,059
Stella, 2 miles northwest of, on west side of wagon road just south of road crossing, 35 feet east by 75 feet north to center of road crossing; iron post stamped "Prim. Trav. Sta. No. 13, Nebr., 1913, elev. 1082".....	40 15 18.0	95 48 11.7	3,303

## Along highways near south border of quadrangle.

T. 4 N., R. 14 E., corner of secs. 27, 28, 33, and 34; center of crossroads.....	40 16 33.8	95 50 27.1	.....
T. 4 N., R. 14 E., center of T road west, at south corner of secs. 33 and 34; Nemaha-Richardson county line.....	40 15 41.5	95 50 27.3	5,286
Tps. 3 and 4 N., R. 14 E., stone at corner of secs. 4, 5, 32, and 33; Nemaha-Richardson county line; center of crossroads.....	40 15 41.1	95 51 35.8	5,310
Howe, 4 miles south by 3 miles west of, at northeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 5, Nebr., 1913, 1082," (20 feet south from 3 feet west of this position is stone at secs. 5, 6, 31, and 32, Tps. 3 and 4 N., R. 14 E., Nemaha-Richardson county line).....	40 15 40.8	95 52 43.8	5,277
Tps. 3 and 4 N., Rs. 13 and 14 E., corner of secs. 1, 6, 31, and 36, center of T road north on Nemaha-Richardson county line.....	40 15 40.3	95 53 52.2	5,300
Tps. 3 and 4 N., R. 13 E., corner of secs. 1, 2, 35, and 36; center of crossroads on Nemaha-Richardson county line.....	40 15 40.4	95 54 59.8	5,246
Pleasant View M. E. Church, at northwest corner of crossroads, 30 feet south by 30 feet east to stone at corner of secs. 2, 3, 34, and 35, Tps. 3 and 4 N., R. 13 E., near Nemaha-Richardson county line; iron post stamped "Prim. Trav. Sta. No. 6, Nebr., 1913, 1162".....	40 15 40.9	95 56 40.9	5,320
Tps. 3 and 4 N., R. 13 E., corner of secs. 3, 4, 33, and 34, center of crossroads on Nemaha-Richardson county line.....	40 15 40.8	95 57 16.2	5,250
Tps. 3 and 4 N., R. 13 E., corner of secs. 4, 5, 32, and 33, center of crossroads on Nemaha-Richardson county line.....	40 15 40.9	95 58 24.0	5,260
Tps. 3 and 4 N., R. 13 E., 20 feet south by 30 feet east to corner of secs. 5, 6, 31, and 32, northwest corner of crossroads, Nemaha-Richardson county line; iron post stamped "Prim. Trav. Sta. No. 7, Nebr., 1913, 1125".....	40 15 40.9	95 59 32.1	5,282
T. 4 N., R. 13 E., corner of secs. 29, 30, 31, and 32; center of crossroads.....	40 16 32.8	95 59 31.7	5,254
T. 4 N., R. 13 E., corner of secs. 19, 20, 29, and 30, center of crossroads.....	40 17 24.8	95 59 32.2	5,270

## Along highways near west border of quadrangle.

Johnson, 7 miles south by 0.5 mile east of, 25 feet north by 35 feet east to stone at corner of secs. 17, 18, 19, and 20, T. 4 N., R. 13 E., at southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 8, Nebr., 1913, 1190".....	40 18 16.4	95 59 32.5	5,225
T. 4 N., R. 13 E., corner of secs. 7, 8, 17, and 18; center of crossroads.....	40 19 08.9	95 59 31.9	5,310
Timber Creek Lutheran Church spire.....	40 19 50.0	95 59 46.8	5,015
T. 4 N., R. 13 E., corner of secs. 5, 6, 7, and 8, 20 feet west to box culvert.....	40 20 01.0	95 59 31.8	5,280
Johnson, 4 miles south by 0.5 mile east of; northeast corner of T road north, 30 feet south by 30 feet west to south corner of secs. 31 and 32, T. 5 N., R. 13 E.; iron post stamped "Prim. Trav. Sta. No. 9, Nebr., 1913, 1116".....	40 20 57.4	95 59 23.5	5,749
T. 5 N., R. 13 E., corner of secs. 29, 30, 31, and 32; center of crossroads.....	40 21 49.3	95 59 24.3	5,249
Center of crossroads; 15 feet south by 10 feet west to mail box.....	40 22 40.8	95 59 24.8	5,220
Johnson, 1 mile south by 0.5 mile east of; southeast corner of crossroads, 30 feet north by 30 feet west to corner of secs. 17, 18, 19, and 20, T. 5 N., R. 13 E.; iron post stamped "Prim. Trav. Sta. No. 10, Nebr., 1913, 1168".....	40 23 33.3	95 59 24.3	5,314
T. 5 N., R. 13 E., corner of secs. 7, 8, 17, and 18; center of crossroads.....	40 24 25.8	95 59 24.9	5,308
T. 5 N., R. 13 E., corner of secs. 5, 6, 7, and 8; center of crossroads.....	40 25 18.0	95 59 25.1	5,290
Tps. 5 and 6 N., R. 13 E., corner of secs. 5, 6, 31, and 32; center of crossroads.....	40 26 10.0	95 59 24.6	5,260
Johnson, 3 miles north by 0.5 mile east of; southeast corner of crossroads, 35 feet north by 30 feet west to corner of secs. 29, 30, 31, and 32, T. 6 N., R. 13 E.; iron post stamped "Prim. Trav. Sta. No. 11, Nebr., 1913, 1049".....	40 27 02.0	95 59 25.5	5,260
T. 6 N., R. 13 E., corner of secs. 19, 20, 29, and 30; center of crossroads.....	40 27 54.6	95 59 27.3	5,330

## HOWE QUADRANGLE, NEBR.—Continued.

Along highways near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Johnson, 5 miles north by 0.5 mile east of: 25 feet west by 35 feet north to corner of secs. 17, 18, 19, and 20, T. 6 N., R. 13 E., at southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 12, Nebr., 1913, 1044".....	° ' "	° ' "	
T. 6 N., R. 13 E., stone at corner of secs. 7, 8, 17, and 18; center of T road west.....	40 28 46.5	95 59 28.2	Feet. 5,259
T. 6 N., R. 13 E., corner of secs. 5, 6, 7, and 8; center of crossroads. Primary traverse station No. 5, 1905, 968.....	40 29 39.2 40 30 31.3 40 31 23.2	95 59 29.3 95 59 30.0 96 00 28.1	5.330 5,280 6,908

Magnetic declination for south border of quadrangle, 10.2° E.; west border, 8.8° E.

## NEMAHY QUADRANGLE, NEBR.

Station.	Latitude.	Longitude.	Distance between stations.
St. Dercin, 0.8 mile above, on narrow ridge, in southwest quarter of sec. 25, T. 4 N., R. 16 E.; iron post (Missouri River Commission triangulation station St. Dercin).....	° ' " 40 16 46.45	° ' " 95 34 17.22	Feet. .....

Magnetic declination for south border of quadrangle, 9.7° E.

## HUMBOLDT QUADRANGLE, NEBR.

Along Missouri Pacific Railway near northeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
East-west road crossing (150 feet east of this position is quarter corner).....	° ' "	° ' "	Feet. .....
East-west road crossing (1,500 feet west of this position is corner of secs. 1, 12, 13, and 18, T. 3 N., R. 14 E., T road south).....	40 14 50.1	95 47 39.2	.....
Stella, in the northwest part of: on east side of track, at road crossing, 30 feet north by 100 feet west to center of road crossing; iron post stamped "Prim. Trav. Sta. No. 14, Nebr., 1913, elev. 974".....	40 13 57.8	95 46 43.1	6,844
East-west road crossing (280 feet west of this position is corner of secs. 17, 18, 19, and 20, T. 3 N., R. 14 E.) .....	40 13 57.6	95 46 41.8	103
	40 13 06.2	95 45 54.3	6,377

Magnetic declination for north border of quadrangle, 10.2° E.; southeast corner, 9.7° E.

T road north, center of intersection at.....	40 00 53.6	95 53 34.2	3,910
T. 1 N., R. 14 E., $\frac{1}{2}$ corner secs. 30 and 31, center of triangle at T road south.....	40 00 53.6	95 53 16.5	1,390
T. 1 N., R. 13 E., near southwest corner sec. 29, 200 feet west of John Burgett's residence, 10 feet west of windmill, in top of cement cover of well; bronze tablet stamped "Prim. Trav. Sta. No. 13, Nebr., 1915, elev. 1212".....	40 00 54.3	95 52 27.5	8,810
T. 1 N., R. 14 E., corner secs. 28, 29, 32, and 33, T road north at.....	40 00 53.6	95 51 35.3	4,066
T road south, center of intersection at.....	40 00 53.6	95 51 06.9	2,210
Spring Creek, center of iron bridge over east fork of.....	40 00 16.2	95 50 54.7	3,899
T. 1 N., R. 14 E., in southeast corner of T road north, 15 feet south and 50 feet east of $\frac{1}{2}$ corner secs. 3 and 34, T. 1 S., R. 14 E., on Kansas-Nebraska State line; iron post stamped "Prim. Trav. Sta. No. 14, Nebr., 1915".....	40 00 01.1	95 49 52.2	5,102
T road south, center of intersection at.....	40 00 01.3	95 49 32.4	1,537
T road south, center of intersection at.....	40 00 01.1	95 48 24.6	5,280
Tps. 1 N. and 1 S., R. 14 E., corner secs. 1, 2, 35, and 36, on Kansas-Nebraska State line, T road north.....	40 00 01.0	95 48 11.1	1,050
T road north, on Kansas-Nebraska State line.....	40 00 01.0	95 47 03.4	5,277
T road south, on Kansas-Nebraska State line.....	40 00 01.0	95 46 04.6	4,570
Tps. 1 N. and 1 S., R. 15 E., in northeast corner of T road north on State line, 30 feet north and 25 feet east of intersection of roads; iron post stamped "Prim. Trav. Sta. No. 15, Nebr., 1915, elev. 1188".....	40 00 01.1	95 45 36.8	2,168

Magnetic declination for north border of quadrangle, 10° 15' E.; for south border, 9° 25' E.; for west border, 9° 25' E.; for center border, 10° 30' E.

## HUMBOLDT QUADRANGLE, NEBR.—Continued.

## Along highways.

Station.	Latitude.	Longitude.	Distance between stations.	
	°	'	"	Feet.
Long Branch, 200 feet east of bridge over public T road north.....	40 14 23.0	95 59 32.1		

## Along Chicago, Burlington &amp; Quincy Railroad.

Second-class road crossing, center of track at.....	40 05 56.6	95 45 21.9	
Dawson, 3 miles east of, center of track at.....	40 06 03.8	95 46 29.9	5,331
Dawson, 2.50 miles east of, in sec. 30, T. 2 N., R. 15 E., south side of west end of concrete culvert; bronze tablet stamped "Prim. Trav. Sta. No. 1, Nebr., 1915".....	40 06 13.1	95 47 02.7	2,720
Dawson, 1.50 miles east of; center of track at second-class road crossing.....	40 06 51.5	95 47 59.0	5,851
Dawson, 1 mile east of; center of track at second-class road crossing.....	40 07 05.2	95 48 28.1	2,652
Dawson, 0.50 mile east of, 100 feet east of concrete culvert "32.80"; center of track at road crossing.....	40 07 23.0	95 49 15.7	4,110
Dawson, 300 feet east of station, 24 feet east of water tank, 8 feet north of main track, in southwest corner of square concrete well, 5 feet south of northwest corner and 3.95 feet west of southeast corner of rim; bronze tablet stamped "Prim. Trav. Sta. No. 2, Nebr., 1915".....	40 07 34.7	95 49 47.1	2,717
Dawson, 1.36 miles west of; center of track at public road crossing.....	40 07 44.6	95 51 18.7	7,183
Dawson, 2.25 miles west of; center of track at second-class road crossing.....	40 08 02.2	95 52 15.1	4,720
Dawson, 2.70 miles west of; in T. 2 N., R. 14 E., near southwest corner sec. 17, 82 feet north of track, 25 feet east of road, 1 foot north of fence corner; iron post stamped "Prim. Trav. Sta. No. 3, Nebr., 1915".....	40 08 09.7	95 52 42.9	2,291
Humboldt, 2.90 miles east of; center of track at second-class road crossing.....	40 08 41.7	95 53 43.6	5,717
Humboldt, 2.30 miles east of; center of track at public road crossing.....	40 08 49.6	95 54 23.7	3,212
Humboldt, 1.50 miles east of; center of track at second-class road crossing.....	40 09 05.7	95 55 16.3	4,308
Humboldt, 0.80 mile east of; center of track at second-class road crossing.....	40 09 33.0	95 55 49.0	3,750
Humboldt, 1.50 feet east of station; center of main track at Main Street crossing of Chicago, Burlington & Quincy Ry.....	40 09 29.2	95 56 40.5	4,015
Humboldt, 925 feet southwest of, at east end of iron bridge over Long Branch Creek, in top of north end of center concrete pile; bronze tablet stamped "Prim. Trav. Sta. No. 4, Nebr., 1915".....	40 09 26.6	95 56 51.9	925
Humboldt, 1.25 miles west of Main Street crossing, center of track at public road crossing.....	40 09 28.3	95 58 05.6	5,724
Humboldt, 2.35 miles west of, T road north.....	40 09 36.2	95 59 18.7	5,733

## Along highways near west border of quadrangle.

Nemaha River, center of iron bridge over.....	40 09 00.7	95 56 37.0	
Humboldt, 0.90 mile south of; T road west.....	40 08 47.5	95 58 43.1	1,411
T. 2 N., R. 13 E., corner secs. 9, 10, 15, and 16, T road south.....	40 08 44.0	95 57 15.0	2,504
T road north.....	40 08 44.1	95 58 02.8	3,710
T. 2 N., R. 13 E., corner secs. 8, 9, 16, and 17, turn in road to south.....	40 08 44.0	95 58 22.9	1,580
T. 2 N., R. 13 E., 40 feet south and 30 feet west of corner of secs. 16, 17, 20, and 21, in southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 8, Nebr., 1915".....	40 07 51.6	95 58 22.9	5,300
T. 2 N., R. 13 E., corner secs. 20, 21, 28, and 29, crossroads.....	40 06 59.6	95 58 22.1	5,250
T. 2 N., R. 13 E., 60 feet north and 20 feet east of corner secs. 28, 29, 32, and 33, in northeast corner of crossroads, 5 feet north of fence corner; iron post stamped "Prim. Trav. Sta. No. 9, Nebr., 1915".....	40 06 07.8	95 58 21.7	5,340
T road west.....	40 05 28.0	95 58 22.1	4,030
T. 1 N., R. 13 E., corner secs. 4, 5, 8, and 9, T road west.....	40 04 23.3	95 58 26.0	6,553
South Fork, 420 feet south of iron bridge over; T road east.....	40 04 15.1	95 58 24.8	337
T. 1 N., R. 13 E., corner secs. 8, 9, 16 and 17, T road east.....	40 03 31.0	95 58 24.2	4,461
T. 1 N., R. 13 E., 50 feet south and 10 feet west of corner of secs. 16, 17, 20, and 21, in southwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 10, Nebr., 1915".....	40 02 38.5	95 58 23.9	5,310
T. 1 N., R. 13 E., corner secs. 20, 21, 28, and 29, crossroads.....	40 01 46.5	95 58 23.5	5,260
T. 1 N., R. 13 E., 55 feet south and 35 feet east of ½ corner secs. 28 and 29, in southeast corner of T road north; iron post stamped "Prim. Trav. Sta. No. 11, Nebr., 1915".....	40 01 19.9	95 58 22.4	2,608

**HUMBOLDT QUADRANGLE, NEBR.**—Continued.**Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T road west, center of intersection at.....	° ' "	° ' "	
T road east, center of intersection at.....	40 01 19.6	95 57 15.6	Feet. 5,200
T. 1 N., R. 13 E., 10 feet west of SE. corner of SW. $\frac{1}{4}$ of NW. $\frac{1}{4}$ sec. 26, in northwest corner of crossroads, in east side of concrete culvert; bronze tablet stamped "Prim. Trav. Sta. No. 12, Nebr., 1915, elev. 1168".....	40 01 27.3	95 57 15.6	778
Easley Creek, center of iron bridge over.....	40 01 20.2	95 55 49.8	6,716
T. 1 N., R. 13 E., in sec. 25, T road west.....	40 01 24.0	95 54 58.8	3,981
T. 1 N., R. 13 E., $\frac{1}{4}$ corner secs. 25 and 36, T road north.....	40 01 33.1	95 54 24.7	2,409
	40 00 03.9	95 54 24.4	3,970

**TECUMSEH QUADRANGLE, NEBR.****Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Humboldt, 3 miles west of, T road south.....	° ' "	° ' "	
Humboldt, 3.50 miles west of, T. 2 N., Rs. 12 and 13 E., corner secs. 1, 6, 7, and 12, 35 feet northwest of, 25 feet west of north and south road; iron post stamped "Prim. Trav. Sta. No. 5, Nebr., 1915".....	40 09 36.3	96 00 04.2	.....
Tps. 2 and 3 N., Rs. 12 and 13 E., crossroads at.....	40 09 36.5	96 00 36.4	2,506
T. 3 N., Rs. 12 and 13 E., corner secs. 25, 30, 31, and 36, crossroads.....	40 10 28.2	96 00 36.1	5,230
T. 3 N., Rs. 12 and 13 E., 30 feet north and 20 feet east of T road east at secs. 24 and 25, 3 feet north of fence corner; iron post stamped "Prim. Trav. Sta. No. 6, Nebr., 1915".....	40 11 20.4	96 00, 35.9	5,280
T. 3 N., Rs. 12 and 13 E., corner secs. 13, 24, 18, and 19, is intersection of crossroads on Pawnee-Richardson county line.....	40 12 15.2	96 00 35.3	5,552
T. 3 N., Rs. 12 and 13 E., $\frac{1}{4}$ corner secs. 7 and 12, on Pawnee-Richardson county line, 17 feet west of telephone pole, 46 feet south of fence corner; iron post stamped "Prim. Trav. Sta. No. 7, Nebr., 1915".....	40 13 04.6	96 00 35.6	4,998
	40 14 22.6	96 00 35.0	7,892

Magnetic declination for east border of south half of quadrangle, 9° 15' E.

# OKLAHOMA.

## PRIMARY TRAVERSE.

**Foraker quadrangle.**

### OSAGE COUNTY.

The following geographic positions were determined from primary traverse by E. L. McNair, topographer, in 1914, and are based upon triangulation station Flint, established in 1897 by C. F. Urquhart. The position of this station on approximate North American datum is latitude  $36^{\circ} 44' 05.85''$ ; longitude  $96^{\circ} 33' 17.45''$ . (For description see Bulletin 175.)

#### FORAKER QUADRANGLE.

**Along section lines from Flint triangulation station north and east to point near southeast corner of quadrangle, thence north along east border to center of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 26 N., R. 7 E., corner of secs. 3, 4, 9, and 10, U. S. Land Survey; iron rod and cap.....	° ' "	° ' "	<i>Feet.</i>
T. 26 N., R. 7 E., $\frac{1}{4}$ corner between secs. 3 and 10, U. S. Land Survey; iron rod and cap.....	36 45 12.2	96 32 46.3	.....
T. 26 N., R. 7 E., corner secs. 2, 3, 10, and 11, U. S. Land Survey; iron rod and cap.....	36 45 12.0	96 32 13.9	2,638
T. 26 N., R. 7 E., $\frac{1}{4}$ corner between secs. 1 and 2, U. S. Land Survey; iron rod and cap.....	36 45 11.7	96 31 41.4	2,642
T. 26 N., R. 7 E., $\frac{1}{4}$ corner between secs. 2 and 3, U. S. Land Survey; iron rod and cap.....	36 45 11.4	96 31 09.0	2,635
T. 26 N., R. 7 E., corner secs. 1, 2, 11, and 12.....	36 45 11.7	96 30 36.8	2,625
T. 26 N., R. 7 E., $\frac{1}{4}$ corner between secs. 1 and 2.....	36 45 37.4	96 30 36.9	2,600
Tps. 26 and 27, N., R. 7 E., corner secs. 1, 2, 35, and 36, U. S. Land Survey; iron rod and cap.....	36 46 04.7	96 30 36.7	2,760
T. 27 N., R. 7 E., corner secs. 25, 26, 35, and 36, U. S. Land Survey; iron rod and cap.....	36 46 58.0	96 30 27.3	5,394
T. 27 N., R. 7 E., $\frac{1}{4}$ corner secs. 25 and 26.....	36 47 22.2	96 30 27.2	2,439
T. 27 N., R. 7 E., corner secs. 23, 24, 25, and 26, U. S. Land Survey; iron rod and cap.....	36 47 48.0	96 30 37.4	2,615
T. 27 N., R. 7 E., corner secs. 13, 14, 23, and 24, U. S. Land Survey; iron rod and cap.....	36 48 39.8	96 30 37.7	5,230
T. 27 N., R. 7 E., $\frac{1}{4}$ corner between secs. 13 and 14; iron rod and cap.....	36 49 05.9	96 30 37.9	2,640
T. 27 N., R. 7 E., corner secs. 11, 12, 13, and 14, U. S. Land Survey; iron rod and cap.....	36 49 31.9	96 30 38.0	2,635
T. 27 N., R. 7 E., corner secs. 1, 2, 11, and 12, U. S. Land Survey; iron rod and cap.....	36 50 23.9	96 30 38.2	5,257
T. 27 N., R. 7 E., $\frac{1}{4}$ corner secs. 1 and 2, U. S. Land Survey; iron rod and cap.....	36 50 50.2	96 30 38.3	2,659
Tps. 27 and 28 N., R. 7 E., corner secs. 1, 2, 35, and 36, near creek and road east and west, 60 feet south of fence (no post found).....	36 51 17.8	96 30 38.3	2,790
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 35 and 36.....	36 51 43.9	96 30 38.2	2,640
T. 28 N., R. 7 E., corner secs. 25, 26, 35, and 36, U. S. Land Survey; iron rod and cap.....	36 52 09.8	96 30 38.5	2,613

#### **Along section lines through center of quadrangle.**

Foraker, 3 miles east of 168 feet north by 106 feet west of corner of secs. 25, 26, 35, and 36, T. 28 N., R. 7 E., 20 feet north of center of road, 4 feet north of wire fence; iron post stamped "Prim. Trav. Sta. No. 1, 1914, elev. 1,218".....	36 52 10.8	96 30 40.5	100
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 26 and 35, center of road at north and south fence (no rod).....	36 52 09.5	96 31 10.8	2,461
T. 28 N., R. 7 E., corner secs. 26, 27, 34, and 35, in center of east and west road, at north and south fence line (no iron rod found).....	36 52 09.3	96 31 43.1	2,624
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 27 and 34 (no mark).....	36 52 09.4	96 32 15.3	2,615

## FORAKER QUADRANGLE—Continued.

## Along section lines through center of quadrangle—Continued

Station.	Latitude.	Longitude.	Distance between stations.
T. 28 N., R. 7 E., corner secs. 27, 28, 33, and 34, at T road south, U. S. Land Survey; iron rod and cap.....	36 52 09.6	96 32 47.8	2,640
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 28 and 33.....	36 52 09.3	96 33 20.4	2,650
T. 28 N., R. 7 E., corner secs. 28, 29, 32, and 33, 4 feet south of Foraker railway station at roads north, south, and west, U. S. Land Survey; iron rod and cap.....	36 52 07.8	96 33 53.0	2,650
T. 28 N., R. 7 E., corner secs. 29, 30, 31, and 32, (no mark found), fence and road south apparently not on the line.....	36 52 07.8	96 34 58.0	5,279
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 30 and 31.....	36 52 07.5	96 35 30.5	2,640
T. 28 N., Rs. 6 and 7 E., corner secs. 30, 31, 25, and 36, U. S. Land Survey; iron rod and cap.....	36 52 07.4	96 35 57.0	2,150
T. 28 N., R. 6 E., $\frac{1}{4}$ corner between secs. 25 and 36.....	36 52 07.5	96 36 29.5	2,645
T. 28 N., R. 6 E., corner secs. 35, 36, 25, and 26, U. S. Land Survey; iron rod and cap.....	36 52 07.6	96 37 02.1	2,651
T. 28 N., R. 6 E., $\frac{1}{4}$ corner between secs. 26 and 35.....	36 52 07.6	96 37 34.6	2,634
T. 28 N., R. 6 E., 1,590 feet west of $\frac{1}{4}$ corner between secs. 26 and 35; iron post stamped "elev. 1217".....	36 52 07.6	96 37 54.1	1,590
T. 28 N., R. 6 E., corner secs. 26, 27, 34, and 35.....	36 52 07.6	96 38 07.0	1,044
T. 28 N., R. 6 E., $\frac{1}{4}$ corner between secs. 27 and 34.....	36 52 07.7	96 38 39.5	2,643
T. 28 N., R. 6 E., corner secs. 27, 28, 33, and 34, U. S. Land Survey; iron rod and cap.....	36 52 07.8	96 39 12.1	2,645
T. 28 N., R. 6 E., corner secs. 28, 29, 32, and 33.....	36 52 07.8	96 40 16.9	5,270
(There is a U. S. A. S. bench mark at northeast corner of crossroads.)			
T. 28 N., R. 6 E., $\frac{1}{4}$ corner secs. 29 and 32, U. S. Land Survey; iron rod.....	36 52 07.8	96 40 49.4	2,643
T. 28 N., R. 6 E., corner secs. 29, 30, 31, and 32, U. S. Land Survey; iron rod and cap.....	36 52 07.8	96 41 22.0	2,645
T. 28 N., R. 6 E., $\frac{1}{4}$ corner between secs. 30 and 31.....	36 52 07.8	96 41 54.3	2,629
T. 28 N., Rs. 5 and 6 E., at T road south, corner secs. 25, 36, 30, and 31, U. S. Land Survey; iron rod.....	36 52 07.7	96 42 25.1	2,502
T. 28 N., R. 5 E., 1,833 feet west of east corner of secs. 25 and 36; iron post stamped "Elev. 1143".....	36 52 07.6	96 42 47.8	1,837
T. 28 N., R. 5 E., $\frac{1}{4}$ corner between secs. 25 and 36.....	36 52 07.8	96 42 57.7	804
T. 28 N., R. 5 E., corner secs. 25, 26, 35, and 36.....	36 52 07.9	96 43 30.2	2,646

## Along section lines near west border of quadrangle.

T. 28 N., R. 5 E., $\frac{1}{4}$ corner between secs. 35 and 36.....	36 51 41.9	96 43 30.6	2,632
Tps. 27 and 28 N., R. 5 E., corner secs. 35, 36, 1, and 2; iron post and cap.....	36 51 15.7	96 43 30.6	2,630
T. 27 N., R. 5 E., $\frac{1}{4}$ corner between secs. 1 and 2.....	36 50 49.2	96 43 30.7	2,682
T. 27 N., R. 5 E., corner secs. 1, 2, 11, and 12.....	36 50 23.0	96 43 30.9	2,644
T. 27 N., R. 5 E., $\frac{1}{4}$ corner between secs. 11 and 12.....	36 49 56.7	96 43 31.0	2,666
T. 27 N., R. 5 E., corner secs. 11, 12, 13, and 14.....	36 49 30.8	96 43 31.1	2,624
T. 27 N., R. 5 E., $\frac{1}{4}$ corner between secs. 13 and 14.....	36 49 04.7	96 43 31.1	2,637
T. 27 N., R. 5 E., corner secs. 13, 14, 23, and 24.....	36 48 38.6	96 43 31.1	2,638
T. 27 N., R. 5 E., $\frac{1}{4}$ corner between secs. 23 and 24.....	36 48 12.5	96 43 31.2	2,640
T. 27 N., R. 5 E., corner secs. 23, 24, 25, and 26.....	36 47 46.4	96 43 31.2	2,640
T. 27 N., R. 5 E., $\frac{1}{4}$ corner between secs. 25 and 26 (no post); indicated by road and fence.....	36 47 20.4	96 43 31.4	2,635
T. 27 N., R. 5 E., approximate corner between secs. 25, 26, 35, and 36; indicated by road west and fence east and south (no post)....	36 46 54.3	96 43 31.4	2,640
T. 27 N., R. 5 E., $\frac{1}{4}$ corner between secs. 35 and 36.....	36 46 28.2	96 43 31.2	2,640
Tps. 26 and 27 N., R. 5 E., corner secs. 1, 2, 35, and 36, about 33 feet south of fence and 16 feet east of fence, U. S. Land Survey; iron rod and cap.....	36 46 02.1	96 43 31.5	2,638

## Along section lines near south border of quadrangle from southwest corner to Flint triangulation station.

T. 27 N., R. 5 E., $\frac{1}{4}$ corner between secs. 1 and 36.....	36 46 02.1	96 42 59.2	2,630
Tps. 26 and 27 N., Rs. 5 and 6 E., at corner of township, U. S. Land Survey; iron post.....	36 46 02.2	96 42 26.8	2,630
Tps. 26 and 27 N., R. 6 E., $\frac{1}{4}$ corner between secs. 6 and 31.....	36 46 02.0	96 41 53.8	2,657
Tps. 26 and 27 N., R. 6 E., corner of secs. 5, 6, 31, and 32, U. S. Land Survey; iron rod and cap.....	36 46 01.9	96 41 21.6	2,626
Tps. 26 and 27 N., R. 6 E., corner of secs. 4, 5, 32, and 33, U. S. Land Survey; iron rod and cap.....	36 46 02.1	96 40 16.8	5,272
Tps. 26 and 27 N., R. 6 E., $\frac{1}{4}$ corner secs. 4 and 33.....	36 46 02.1	96 39 44.3	2,640
Tps. 26 and 27 N., R. 6 E., corner secs. 3, 4, 33, and 34, U. S. Land Survey; iron rod and cap.....	36 46 02.1	96 39 11.9	2,640

## FORAKER QUADRANGLE—Continued.

Along section lines near south border of quadrangle from southwest corner of Flint triangulation station—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 26 and 27 N., R. 6 E., $\frac{1}{4}$ corner between secs. 2 and 35, U. S. Land Survey; iron rod at fence corner.....	36 46 02.3	96 37 34.6	Ft. 7,913
Tps. 26 and 27 N., R. 6 E., corner of secs. 1, 2, 35, and 36, U. S. Land Survey; iron rod and cap.....	36 46 02.4	96 37 02.2	2,640
Tps. 26 and 27 N., R. 6 E., $\frac{1}{4}$ corner between secs. 1 and 36.....	36 46 02.5	96 36 29.8	2,640
Tps. 26 and 27 N., R. 6 and 7 E., township corner U. S. Land Survey; iron post.....	36 46 02.6	96 35 57.3	2,640
T. 26 N., Rs. 6 and 7 E., $\frac{1}{4}$ corner between secs. 1 and 6.....	36 45 36.5	96 35 57.3	2,644
T. 26 N., Rs. 6 and 7 E., corner secs. 1, 6, 7, and 12, U. S. Land Survey; iron rod and cap.....	36 45 10.5	96 35 57.2	2,628
T. 26 N., R. 7 E., $\frac{1}{4}$ corner between secs. 6 and 7.....	36 45 10.6	96 35 28.2	2,366
T. 26 N., R. 7 E., corner secs. 5, 6, 7, and 8, U. S. Land Survey; iron rod and cap.....	36 45 10.8	96 34 55.6	2,654
T. 26 N., R. 7 E., $\frac{1}{4}$ corner between secs. 5 and 8.....	36 45 10.9	96 34 23.0	2,650
T. 26 N., R. 7 E., corner secs. 4, 5, 8, and 9, U. S. Land Survey; iron rod and cap.....	36 45 11.1	96 33 50.4	2,654

## Along section lines near east border of quadrangle.

T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 25 and 26.....	36 52 35.5	96 30 38.7	2,610
T. 28 N., R. 7 E., corner secs. 23, 24, 25, and 26, U. S. Land Survey; iron rod and cap.....	36 53 01.1	96 30 38.3	2,590
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 23 and 24.....	36 53 27.4	96 30 38.1	2,660
T. 28 N., R. 7 E., corner secs. 13, 14, 23, and 24, U. S. Land Survey; iron rod and cap.....	36 53 53.7	96 30 38.0	2,659
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 13 and 14.....	36 54 19.8	96 30 37.8	2,647
T. 28 N., R. 7 E., corner secs. 11, 12, 13, and 14, U. S. Land Survey; iron rod and cap.....	36 54 46.0	96 30 37.6	2,653
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 11 and 12.....	36 55 12.3	96 30 37.6	2,660
T. 28 N., R. 7 E., corner secs. 1, 2, 11, and 12, U. S. Land Survey; iron rod and cap.....	36 55 38.6	96 30 37.5	2,670
T. 28 N., R. 7 E., $\frac{1}{4}$ corner between secs. 1 and 2.....	36 56 04.6	96 30 37.3	2,630
T. 28 N., R. 7 E., closing corner of secs. 1 and 2, U. S. Land Survey; iron rod and cap.....	36 56 31.2	96 30 37.0	2,685
T. 29 N., R. 7 E., standard corner of secs. 35 and 36, U. S. Land Survey; iron rod and cap.....	36 56 30.8	96 30 25.3	951
T. 29 N., R. 7 E., $\frac{1}{4}$ corner between secs. 35 and 36.....	36 56 56.6	96 30 25.0	2,615
T. 29 N., R. 7 E., corner of secs. 25, 26, 35, and 36.....	36 57 22.7	96 30 24.7	2,640
T. 29 N., R. 7 E., $\frac{1}{4}$ corner secs. 25 and 26.....	36 57 48.6	96 30 24.4	2,625
T. 29 N., R. 7 E., corner secs. 23, 24, 25, and 26.....	36 58 14.6	96 30 24.2	2,635
T. 29 N., R. 7 E., $\frac{1}{4}$ corner between secs. 23 and 24.....	36 58 40.4	96 30 23.9	2,610
T. 29 N., R. 7 E., corner secs. 13, 14, 23, and 24.....	36 59 06.4	96 30 23.6	2,629
T. 29 N., R. 7 E., $\frac{1}{4}$ corner between secs. 13 and 14; pile of stones mark.....	36 59 32.6	96 30 22.6	2,652

## Along Kansas- Oklahoma State line near north border of quadrangle.

T. 29 N., R. 7 E., closing corner north side of secs. 14 and 15, in east and west fence line, east of creek bed, U. S. Land Survey; iron rod and cap.....	36 59 56.7	96 31 28.0	5,843
T. 29 N., R. 7 E., closing corner north side of secs. 15 and 16, U. S. Land Survey; iron rod and cap.....	36 59 56.4	96 32 32.8	5,251
T. 29 N., R. 7 E., closing corner north side of secs. 16 and 17, U. S. Land Survey; iron rod and cap.....	36 59 56.4	96 33 38.0	5,290
T. 29 N., R. 7 E., closing corner north side of secs. 17 and 18, U. S. Land Survey; iron rod and cap.....	36 59 56.4	96 34 43.7	5,334
T. 29 N., Rs. 6 and 7 E., closing corner north side secs. 13 and 18, U. S. Land Survey; iron rod and cap.....	36 59 56.5	96 35 49.2	5,312
T. 29 N., R. 6 E., closing corner north side of secs. 13 and 14, U. S. Land Survey; iron rod and cap.....	36 59 56.4	96 36 53.8	5,242
T. 29 N., R. 6 E., closing corner north side of secs. 14 and 15.....	36 59 56.3	96 37 58.7	5,267
T. 29 N., R. 6 E., closing corner north side secs. 15 and 16.....	36 59 56.4	96 39 04.0	5,299
T. 29 N., R. 6 E., closing corner north side of secs. 16 and 17.....	36 59 56.4	96 40 08.9	5,264
T. 29 N., R. 6 E., closing corner north side secs. 17 and 18.....	36 59 55.7	96 41 13.4	5,232
T. 29 N., Rs. 5 and 6 E., closing corner north side of secs. 13 and 18.....	36 59 56.4	96 42 17.9	5,233
T. 29 N., R. 5 E., closing corner north side of secs. 13 and 14.....	36 59 56.3	96 43 22.6	5,248

**FORAKER QUADRANGLE**—Continued.  
Along section lines near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 29 N., R. 5 E., $\frac{1}{4}$ corner between secs. 13 and 14.....	36 59 30.8	96 43 22.7	2,583
T. 29 N., R. 5 E., corner secs. 13, 14, 23, and 24.....	36 59 04.7	96 43 22.7	2,638
T. 29 N., R. 5 E., $\frac{1}{4}$ corner between secs. 23 and 24.....	36 58 35.6	96 43 22.8	2,639
T. 29 N., R. 5 E., corner secs. 23, 24, 25, and 26.....	36 58 12.4	96 43 22.9	2,640
T. 29 N., R. 5 E., $\frac{1}{4}$ corner between secs. 25 and 26.....	36 57 46.4	96 43 23.0	2,635
T. 29 N., R. 5 E., corner secs. 25, 26, 35, and 36.....	36 57 20.3	96 43 23.0	2,635
T. 29 N., R. 5 E., $\frac{1}{4}$ corner between secs. 35 and 36.....	36 56 54.1	96 43 23.1	2,640
T. 29 N., R. 5 E., standard corner secs. 35 and 36.....	36 56 28.0	96 43 23.2	2,645
T. 29 N., R. 5 E., corner north side of sec. 1 (no iron post).....	36 56 28.0	96 42 56.8	2,147
T. 28 N., R. 5 E., $\frac{1}{4}$ corner between secs. 1 and 12, in east and west road, U. S. Land Survey; iron rod and cap.....	36 55 37.1	96 42 57.0	5,150
T. 28 N., R. 5 E., $\frac{1}{4}$ corner between secs. 12 and 13, U. S. Land Survey; iron rod and cap.....	36 54 44.8	96 42 57.2	5,286
T. 28 N., R. 5 E., corner secs. 13, 14, 23, and 24.....	36 53 52.5	96 43 29.7	5,913
T. 28 N., R. 5 E., $\frac{1}{4}$ corner between secs. 23 and 24 in center of north and south road, U. S. Land Survey; iron rod and cap.....	36 53 26.5	96 43 29.8	2,625
T. 28 N., R. 5 E., corner secs. 23, 24, 25, and 26.....	36 53 00.2	96 43 29.9	2,630
T. 28 N., R. 5 E., $\frac{1}{4}$ corner between secs. 25 and 26 near school-house.....	36 52 34.1	96 43 30.1	2,646
T. 28 N., R. 5 E., corner secs. 25, 26, 35, and 36 at crossroads, U. S. Land Survey; iron rod and cap.....	36 52 07.9	96 43 30.2	2,644

Magnetic declination for north border of quadrangle, 9.9° E.; for south border, 9.7° E.; for east border, 9.6° E.; for west border, 9.9° E.; for center, 9.7° E.

**Bristow, Hominy, Kiefer, Mallon, and Nuyaka quadrangles.**

**CREEK, OKMULGEE, AND TULSA COUNTIES.**

The following geographic positions for the control of the north half of the Nuyaka 30' quadrangle were obtained from primary traverse by C. B. Kendall in 1914. Positions are on approximate North American datum and are tied to Phantom, Philips, and Prairie triangulation stations described in Bulletin 175.

**KIEFER QUADRANGLE.**

Along public road from Philips triangulation station via Tabor and Kellyville to Blue Bell school-house.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 15 and 16 N., R. 10 E., secs. 3, 4, 33, and 34, crossroads at corner of.....	35 48 48.1	96 14 44.3	
T. 16 N., R. 10 E., secs. 27, 28, 33, and 34, crossroads at corner of.....	35 49 40.4	96 14 44.1	5,290
T. 16 N., R. 10 E., secs. 26, 27, 34, and 35, road turns north at corner of.....	35 49 40.3	96 13 40.0	5,280
T. 16 N., R. 10 E., secs. 22, 23, 26, and 27, crossroads at corner of.....	35 50 32.7	96 13 40.1	5,297
T. 16 N., R. 10 E., secs. 14, 15, 22, and 23, corner of.....	35 51 25.2	96 13 40.0	5,308
T. 16 N., R. 10 E., secs. 10, 11, 14, and 15, 20 feet north and 20 feet west of corner of; at corner of wire fence in northwest corner of road intersection; iron post stamped "Prim. Trav. Sta. No. 10, 1914".....	35 52 17.7	96 13 40.0	5,319
T. 16 N., R. 10 E., secs. 2, 3, 10, 11, T road east at corner of.....	35 53 10.0	96 13 39.2	5,288
T. 16 N., R. 10 E., secs. 2, 3, closing corner on north side of.....	35 54 04.4	96 13 38.8	5,501
T. 17 N., R. 10 E., secs. 34, 35, corner on south side of, at T road north.....	35 54 04.4	96 13 33.5	440
T. 17 N., R. 10 E., secs. 26, 27, 34, and 35, T road west at corner of.....	35 54 58.6	96 13 33.4	5,282
Polecat Creek, center of, steel bridge over.....	35 55 18.5	96 13 31.8	2,212
Elevated gas tank, top of.....	35 55 55.0	96 13 52.6	4,073
T. 17 N., R. 10 E., corner of secs. 22, 23, 26, and 27.....	35 55 48.8	96 13 33.3	1,708
St. Louis & San Francisco Ry., at north-south highway crossing.....	35 56 14.4	96 13 33.1	2,554
Kellyville railway station, 20 feet west and 150 feet south of; in sandstone at northwest corner of wire fence, 150 feet south of railway, 50 feet east of highway; bronze tablet stamped "Prim. Trav. Sta. No. 11, 1914".....	35 56 43.7	96 13 00.4	1,006
T. 17 N., R. 10 E., secs. 14, 15, 22, 23, crossroads at corner of.....	35 56 41.3	96 13 33.0	2,688
T. 17 N., R. 10 E., corner of secs. 10, 11, 14, and 15.....	35 57 33.6	96 13 33.4	5,290
T. 17 N., R. 10 E., secs. 2, 3, 10, and 11, crossroads at corner of.....	35 58 20.0	96 13 33.1	5,288

**KIEFER QUADRANGLE**—Continued.

**Along public road from Phillips triangulation station via Tabor and Kellyville to Blue Bell school-house**—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Blue Bell schoolhouse, 3 miles north of Kellyville, in northwest corner of crossroads, 25 feet north and 25 feet west of corner of secs. 2, 3, 31, and 35, T. 17 and 18 N., R. 10 E.; iron post stamped "Prim. Trav. Sta. No. 2, 1914".....	35 59 19.0	96 13 33.4	Feet. 5,362

**Along public highways near north border of quadrangle.**

Tps. 17 and 18 N., R. 10 E., secs. 3, 4, 33, and 34, crossroads at corner of.....	35 59 18.7	96 14 37.4	5,260
Tps. 17 and 18 N., R. 10 E., corner of secs. 1, 2, 35, and 36, near second-class T road north.....	35 59 18.7	96 12 28.2	4,372
Plane-table flag on southeast end of bare hill.....	35 58 56.3	96 11 42.7	
Tps. 17 and 18 N., Rs. 10 and 11 E., secs. 1, 6, 31, and 36, second-class T road south, at corner of.....	35 59 18.6	96 11 24.0	2,734
T. 18 N., R. 11 E., quarter corner between secs. 31 and 32, in east and west road, at wire fence south.....	35 59 44.8	96 10 20.2	5,880
Sapulpa, 3 miles west of, north and south highway crossing St. Louis & San Francisco Ry.....	35 59 37.1	96 09 46.7	2,859
Tps. 17 and 18 N., R. 11 E., corner of secs. 4, 5, 32, and 33, corner of wire fence is 25 feet south.....	35 59 18.7	96 09 16.0	3,142
Tps. 17 and 18 N., R. 11 E., secs. 3, 4, 33, and 34, T road south at corner of.....	35 59 18.7	96 08 11.5	5,300
Rock Creek, center of iron bridge over.....	35 59 17.8	96 07 39.2	2,665
Tps. 17 and 18 N., R. 11 E., secs. 2, 3, 34, and 35, crossroads at corner of.....	35 59 18.6	96 07 07.2	2,630
Sapulpa, at southwest corner Main and Hobson streets, on east side of Ripley Hotel, 4 feet above sidewalk and 4 feet south of northeast corner of building; bench-mark tablet stamped "Prim. Trav. Sta. No. 1, elev. 723".....	35 59 58.6	96 06 51.3	4,255
Sapulpa, in top of east buttressstone between lamp post and face of wall at main entrance to the Creek County courthouse; bench-mark tablet stamped "Prim. Trav. Sta. No. 12, 1914, elev. 712".....	35 59 54.7	96 06 37.2	1,222
Sapulpa, center of street-car track and "Frisco" Ry. crossing on Dewey Avenue.....	35 59 56.2	96 06 16.7	1,606
Tps. 17 and 18 N., Rs. 11 and 12 E., secs. 1, 6, 31, and 36, at corner of and at T road south, 250 feet west of iron bridge over Polecat Creek; iron post stamped "Prim. Trav. Sta. No. 13, 1914," in addition to its land markings.....	35 59 18.6	96 04 58.7	7,448
Tps. 17 and 18 N., R. 12 E., secs. 5, 6, 31, and 32, cross roads at corner of.....	35 59 18.5	96 03 54.5	5,280
Tps. 17 and 18 N., R. 12 E., secs. 4, 5, 32, and 33, crossroads near top of hill about 200 feet east of.....	35 59 18.4	96 02 47.9	5,477
Tps. 17 and 18 N., R. 12 E., secs. 3, 4, 33, and 34, 40 feet north and 20 feet west of approximate corner of, inside corner of wire fence around Prairie Oil & Gas Co.'s pumping plant, in northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 14, 1914".....	35 59 18.8	96 01 45.9	5,095
Prairie triangulation station; Sapulpa, 5 miles east of, on a prairie knob, the corner common to secs. 9, 10, 15, and 16, T. 17 N., R. 12 E.; may be reached from station by going east 28.30 chains to north-south line, thence south 41.54 chains; iron bench mark post.....	35 58 00.4	96 02 08.0	8,132
T. 17 N., R. 12 E., corner of secs. 9, 10, 15, and 16.....	35 57 33.3	96 01 45.2	3,318

Magnetic declination for north border of quadrangle,  $9^{\circ} 23' E.$ ; for west border,  $9^{\circ} 48' E.$

**BRISTOW QUADRANGLE.**

**Along public roads from Phillips triangulation station via Tabor and Kellyville to Blue Bell school-house, near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
T. 15 N., R. 10 E., secs. 17, 18, 19, and 20, crossroads at corner of.....	35 46 10.8	96 16 52.6	
Deep Fork Creek, center of iron bridge over.....	35 46 10.0	96 16 13.9	3,190
T. 15 N., R. 10 E., corner of secs. 8, 9, 16, 17, 35 feet south and 30 feet west at corner of wire fence in southwest corner of intersection of crossroads; iron post stamped "Prim. Trav. Sta. No. 9, 1914".....	35 47 02.9	96 15 48.7	5,737
T. 15 N., R. 10 E., corner secs. 4, 5, 8, and 9.....	35 47 55.6	96 15 48.3	5,334
Tps. 15 and 16, R. 10 E., secs. 4, 5, 32, and 33, crossroads at corner of.....	35 48 48.1	96 15 48.5	5,310

## BRISTOW QUADRANGLE—Continued.

## Near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Tps. 17 and 18 N., R. 10 E., at corner of secs. 4, 5, 32, and 33, second-class T road north.....	35 59 18.8	96 15 41.9	.....
Tps. 17 and 18 N., R. 10 E., corner of secs. 5, 6, 1, and 32, stone is in center of old road 10 feet south of fence corner and about 450 feet east of gate across present road.....	35 59 18.8	96 16 47.3	5,376
Tps. 17 and 18 N., R. 9 E., secs. 1 and 36, 1/4 corner between, at corner T wire fence and 225 feet south of gate.....	35 59 20.7	96 18 23.4	7,900
Tps. 17 and 18, R. 9 E., corner secs. 1, 2, 35, and 36, at wire fence south.....	35 59 19.2	96 18 55.7	2,656
Brown Creek, center of iron bridge over.....	35 59 19.2	96 19 33.0	3,066
Tps. 17 and 18 N., R. 9 E., corner of secs. 2, 3, 34, and 35, 900 feet west of top of hill.....	35 59 19.0	96 19 59.7	2,195
Tps. 17 and 18 N., R. 9 E., corner of secs. 5, 4, 33, and 34, at wire fence north and south.....	35 59 19.1	96 21 04.4	5,320
Tps. 17 and 18 N., R. 9 E., secs. 4, 5, 32, and 33, 20 feet south and 20 feet east of corner of, at corner of wire fence in the southeast corner of T road east; iron post stamped "Prim. Trav. Sta. No. 3, 1914".....	35 59 18.8	96 22 08.4	5,261
T. 18 N., R. 9 E., secs. 32 and 33, second-class T road east at, 1/4 corner between.....	35 59 45.0	96 22 08.8	2,632
Polecat Creek, center of iron bridge over.....	35 59 56.1	96 28 34.9	.....
Tps. 17 and 18 N., R. 8 E., corner secs. 4, 5, 32, and 33, center of second-class road east.....	35 59 18.7	96 28 34.9	3,790
T. 17 N., R. 8 E., corner of secs. 4, 5, 8, and 9, center of crossroads.....	35 58 26.9	96 28 35.4	5,300
T. 17 N., R. 8 E., corner secs. 8, 9, 16, and 17, at second-class T road west.....	35 57 33.9	96 28 35.4	5,319
T. 17 N., R. 8 E., corner of secs. 16, 17, 21, and 21, at crossroads.....	35 56 41.5	96 28 35.4	5,300
T. 17 N., R. 8 E., corner of secs. 20, 21, 21, and 21, is 50 feet east of road and 35 feet southwest of corner of wire fence.....	35 55 49.0	96 28 35.3	5,300
T. 17 N., R. 8 E., corner of secs. 28, 29, 32, and 33, in meadow on top of small hill and 400 feet north of fort's at corner of fence.....	35 54 56.8	96 28 35.4	5,280
T. 16 N., R. 8 E., near north corner of secs. 4 and 5, center of east-west road and 25 feet east of T road north.....	35 54 04.3	96 28 35.3	5,308
(25 feet west of above is south corner secs. 32, and 33, T. 17 N., R. 8 E., at T road north.)			
T. 17 N., R. 8 E., south corner of secs. 31 and 33, stone is 10 feet northwest of corner of wire fence.....	35 54 04.4	96 29 40.1	5,330
(25 feet east of above is north corner of secs. 5 and 6, T. 16 N., R. 8 E.)			

## Near south border of quadrangle.

T. 15 N., R. 8 E., corner of secs. 7, 8, 17, and 18, 15 feet west of cross-roads.....	35 47 03.9	96 29 39.4	.....
T. 15 N., R. 8 E., corner of secs. 8, 9, 16, and 17, at crossroads.....	35 47 03.8	96 28 35.0	5,304
T. 15 N., R. 8 E., corner of secs. 9, 10, 15, and 16, at crossroads.....	35 47 04.2	96 27 30.5	5,310
T. 15 N., R. 8 E., corner of secs. 10, 11, 14, and 15, at second-class T road north.....	35 47 04.4	96 26 26.4	5,285
T. 15 N., R. 8 E., corner of secs. 11, 12, 13, 14, at T road east.....	35 47 05.0	96 25 21.9	5,314
T. 15 N., R. 8 E., corner of secs. 13, 14, 23, and 24, 25 feet south of crossroads.....	35 46 12.7	96 25 22.2	5,293
T. 15 N., R. 8 and 9 E., corner of secs. 13, 18, 19, and 24, at crossroads.....	35 46 12.8	96 24 17.9	5,297
T. 15 N., R. 9 E., corner of secs. 17, 18, 19, 20, 20 feet south and 20 feet east of wire fence in southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 8, 1914".....	35 46 12.0	96 23 12.9	5,300
T. 15 N., R. 9 E., corner of secs. 16, 17, 20, and 21, in east and west road 30 feet north of crossroads.....	35 46 11.8	96 22 09.3	5,240
T. 15 N., R. 9 E., corner of secs. 20, 21, 28, and 29, at crossroads.....	35 45 19.7	96 22 08.2	5,270
T. 15 N., R. 9 E., corner of secs. 21, 22, 27, and 28, 10 feet northeast of crossroads.....	35 45 19.1	96 21 05.3	5,275
T. 15 N., R. 9 E., corner of secs. 22, 23, 26, and 27, at crossroads.....	35 45 18.8	96 20 01.1	5,295
T. 15 N., R. 9 E., corner of secs. 23, 24, 25, and 26, in pasture 25 feet north of road.....	35 45 18.3	96 18 57.1	5,280

Magnetic declination near north border of quadrangle,  $9^{\circ} 43' E.$ ; near east border,  $9^{\circ} 42' E.$ ; near west border,  $9^{\circ} 45' E.$ ; near south border,  $9^{\circ} 34' E.$

**NUYAKA QUADRANGLE.**  
Near Phillips triangulation station.

Station.	Latitude.	Longitude.	Distance between stations.
Phillips triangulation station, on the highest point of a ridge $2\frac{1}{2}$ miles southwest of Phillipsburg; theodolite elevated 35 feet; station mark: Rock marked + . In 1914 Kendall determined G S this station to be 3,134 feet south and 2,472 feet east of corner of secs. 23, 24, 25, and 26, T. 15 N., R. 9 E. Original stone station mark was removed and a standard iron bench-mark post placed with center of same as the original mark .....	35 44 47.3	96 18 27.1	Feet.....
T. 15 N., Rs. 9 and 10 E., corner of secs. 25, 30, 31, and 36. (Re-computed from sta. 339 not 308).....	35 44 25.7	96 17 52.9	3,576
T. 15 N., R. 10 E., corner stone of secs. 29, 30, 31, and 32. ....	35 44 25.7	96 16 52.6	4,978

Magnetic declination near north border of southwest quarter of quadrangle,  $9^{\circ} 34' E.$

**HOMINY QUADRANGLE.**  
Near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 18 N., R. 9 E., corner of secs. 29, 30, 31, 32, 1,150 feet west of top of hill.....	36 00 11.6	96 23 13.1	.....
T. 18 N., Rs. 8 and 9 E., corner of secs. 25, 30, 31, and 36, in northwest corner of T road north.....	36 00 11.4	96 24 17.4	5,281
T. 18 N., R. 8 E., corner of secs. 25, 26, 35, and 36.....	36 00 11.3	96 25 21.8	5,295
T. 18 N., R. 8 E., corner of secs. 26, 27, 34, and 35, at second-class crossroad.....	36 00 11.2	96 26 26.2	5,290
Scholar Creek, center of iron bridge over.....	36 00 11.0	96 26 56.0	2,450
T. 18 N., R. 8 E., corner of secs. 27, 28, 33, and 34, 10 feet northeast of crossroads .....	36 00 10.9	96 27 30.5	2,830
Happy Corner Church, 250 feet west of, in southwest corner of crossroads, 10 feet north and 12 feet west of T. 18 N., R. 8 E., stone corner secs. 28, 29, 32, and 33; iron post stamped "Prim. Trav. Sta. No. 4, 1914" .....	36 00 10.9	96 28 35.0	5,305

Near east border of southwest quadrangle.

T. 18 N., R. 10 E., corner of secs. 16, 17, 20, and 21, at T fence east, 820 feet south of gate across main road .....	36 01 56.2	96 15 41.8	.....
Phantom triangulation station, on the highest part of a timbered ridge 15 miles from Red Fork, 5 miles southwest of Mr. Rock-hammer's house. The corner common to secs. 7, 8, 17, and 18, T. 18 N., R. 10 E., may be reached from station by going west 24.90 chains to north-south line, thence south 2.25 chains. U S Theodolite elevated 40 feet. Station mark: Rock marked + . G S remarked with standard iron post.....	36 02 49.8	96 16 27.2	6,577

Magnetic declination near south border of quadrangle,  $9^{\circ} 43' E.$

Near west border of southeast quarter of quadrangle.

Blue Bell schoolhouse, 1 mile north of double oak tree at crossroads, H. W. Doty and Little's mail boxes.....	36 00 07.6	96 13 33.0	.....
T. 18 N., R. 10 E., corner of secs. 26, 27, 34, and 35, 40 feet east of road, 15 feet south of corner of wire fence, and about 400 feet north of crossroads.....	36 00 11.3	96 13 33.0	370
T. 18 N., R. 10 E., corner of secs. 22, 23, 26, and 27, in center of road between two pipe and telephone lines and 250 feet south of T road east.....	36 01 03.5	96 13 32.9	5,287
T. 18 N., R. 10 E., $\frac{1}{4}$ corner between secs. 22 and 23, 4 corners 480 feet north of.....	36 01 35.5	96 13 32.8	3,230
Sapulpa, 8 miles northwest of, 250 feet north of Sapulpa and Cushing automobile road, chimney of stone house.....	36 01 45.4	96 14 05.9	2,898
T. 18 N., R. 10 E., corner of secs. 15, 16, 22, 21, at second-class road north and bend of main road to west.....	36 01 55.8	96 14 37.3	2,789

Magnetic declination near west border of southeast quarter of quadrangle  $9^{\circ} 41' E.$

## MALLON QUADRANGLE.

Near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
T. 16 N., Rs. 7 and 8 E., secs. 1 and 6, north corner of; iron post stamped with land numbers, also elevation 955, "Prim. Trav. Sta. No. 5, 1914" (112 feet west of this station is standard iron post, stamped with land numbers for T. 17 N., Rs. 7 and 8 E., secs. 31 and 36, north corner).....	•   •   "	•   •   "	Fst.
T. 16 N., Rs. 7 and 8 E., corner of secs. 1, 6, 7, 12.....	35 54 04.4	96 30 43.0	5,472
T. 16 N., Rs. 7 and 8 E., corner of secs. 7, 12, 13, and 18, at second-class T road west, 200 feet north to house.....	35 53 10.3	96 30 43.2	5,300
T. 16 N., Rs. 7 and 8 E., corner of secs. 13, 18, 19, and 24, at north end of bridge over small stream.....	35 52 17.9	96 30 43.1	5,240
T. 16 N., 1-s. 7 and 8 E., near corner of secs. 19, 24, 25, and 30, 10 feet west of east end of bridge over small stream.....	35 51 25.7	96 30 43.4	5,332
T. 16 N., Rs. 7 and 8 E., corner of secs. 29, 30, 31, and 36, at cross-roads 25 feet north to plank bridge.....	35 50 33.0	96 30 43.6	5,270
Tps. 15 and 16 N., Rs. 7 and 8 E., corner of secs. 1, 6, 31, and 36, 500 feet north of bridge over Little Deep Fork Creek and $\frac{1}{4}$ mile northwest of Depew; iron bench-mark post with land marks, also stamped "Prim. Trav. Sta. No. 6, 1914, elev. 815".....	35 49 40.8	96 30 43.7	5,205
Little Deep Fork, center of iron bridge over, near T road west.....	35 48 48.4	96 30 43.8	0.08
T. 15 N., Rs. 7 and 8 E., quarter corner between secs. 1 and 6, at T road north.....	35 48 42.4	96 30 43.7	0.05
Depew, town jump at cross streets.....	35 48 22.2	96 30 43.8	2,043
T. 15 N., Rs. 7 and 8 E., center of secs. 1, 6, 7, 12, bridge over gully near corner of, southwest corner of Depew.....	35 48 10.9	96 30 26.4	1,835
T. 15 N., Rs. 7 and 8 E., 30 feet south and 25 feet east of corner of secs. 7, 12, 13, and 18, at corner of wire fence in southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 7, 1914".....	35 47 55.2	96 30 43.6	2,130
	35 47 03.4	96 30 47.3	5,240

Magnetic declination near east border of quadrangle,  $9^{\circ} 42' E.$

## NEVADA.

### TRIANGULATION STATIONS.

**Wabuska, Wellington, and Yerington quadrangles.**

#### LYON COUNTY.

During the field season of 1913 triangulation was extended over part of Lyon County, Nev., in the Wabuska and Wellington 30' quadrangles for control of the Yerington 7½' quadrangle. The old stations Como and Mount Wilson were occupied and the scheme tied by unclosed triangles to Cleaver Peak and Desert Creek Peak. A least-square adjustment was made including the unoccupied points Cleaver and Desert Creek Peak. Observations and computations were made by R. H. Chapman.

The following positions are computed upon approximate North American datum, accepting the azimuth and distance Como-Mount Wilson given in Bulletin 122, page 336.

#### **BUCKSKIN GALLOWS FRAME, LYON COUNTY, NEV. (Not occupied.)**

Gallows frame of Kennedy Consolidated shaft at town of Buckskin.

Station mark: Middle of frame.

[Latitude, 38° 59' 33.07". Longitude, 119° 21' 05.08".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Wishart.....	249 00 49	69 03 16	3.77862	3.73
Mickey.....	273 44 43	93 48 47	3.97087	5.81
Packhorse.....	314 22 38	134 26 04	4.04277	6.86
Wilson.....	323 51 55	143 56 45	4.28786	12.06

#### **CARSON HILL, LYON COUNTY, NEV.**

On highest of brick-red knolls 6 miles northwest of Yerington and 7 miles southwest of Wabuska. Station is about 0.5 mile north of Yerington-Mason Pass road, 1 mile north of West End mine, and 1 mile east of Ironside shaft.

Signal: Tripod 4.5 feet high, black and white cloth.

Station mark: Neck of bottle on end 10 inches below surface, over which is bronze tablet cemented in rock 18 by 14 by 8 inches.

Reference marks: Tack in peg, 11.2 feet south of center in true azimuth 4° 58'; tack in peg 14.25 feet west of center in true azimuth 100° 01'; wheel on frame of Ironside shaft, about 1 mile west, in true azimuth 100° 14'.

[Latitude, 39° 03' 31.96". Longitude, 119° 14' 12.42".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mickey.....	4 18 15.41	184 17 59.69	3.9033867	4.974
Wishart.....	39 33 07.56	219 36 14.46	3.8307836	4.209
Thompson Smelter.....	193 33 21	13 34 34	4.06590	7.23
Cleaver Peak.....	206 49 13.4	26 53 09.5	4.2989780	12.369
Luhr.....	317 49 37.83	137 53 31.81	4.1247560	8.281
Yerington water tank.....	319 54 55	139 57 51	4.01931	6.50
Yerington courthouse.....	321 29 09	141 31 57	4.01287	6.40

## CLEAVER, LYON COUNTY, NEV. (Not occupied.)

Station is often called Wabuska Hill; a bare, rocky, flat-topped peak, 6 miles east of north of the town of Wabuska, in Lyon County, Nev.

Station mark: A cairn 8 feet high.

[Latitude,  $39^{\circ} 13' 07.85''$ . Longitude,  $119^{\circ} 07' 58.02''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Luhr.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Wilson.....	0 08 06.3	180 08 04.7	4.4415672	17.176
Wilson.....	10 27 47.0	190 24 30.2	4.6179583	25.782
Mickey.....	20 28 44.6	200 24 32.82	4.4388988	17.071
Carson Hill.....	26 53 09.5	206 49 13.4	4.2989780	12.369
Como.....	53 28 44.8	233 15 51.5	4.5645130	22.792
Como a.....	53 29 16	233 16 22	4.5645136	22.796

\* Figures from Bulletin 122.

## COMO, WASHOE COUNTY, NEV.

A station of the Coast and Geodetic Survey, on a high conical peak on Pinenut Mountains, about 20 miles nearly due east from town of Genoa, about 20 miles south-east from Carson City, and about 17 miles southeast from Dayton.

Station mark: Subsurface mark a one-half by 4 inch copper bolt leaded into a large and well-bedded granite rock. The surface mark a half-inch drill hole in center of large flat stone, 19 by 22 inches square and 5 inches thick, firmly cemented to top of stone and brick pier built over and around lower mark.

Reference marks: Two piers, one north and one south; drill holes were made in the rock, one in line to Round Top, distant 6.25 meters; one in line to north pier, distant 10.6 meters; and one in line to south pier, distant 7.24 meters from station.

[Latitude,  $39^{\circ} 01' 18.06''$ . Longitude,  $119^{\circ} 28' 23.621''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Cleaver Peak.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Cleaver Peak a.....	233 15 51.5	53 28 44.8	4.5645130	22.796
Thompson Smelter.....	233 16 22	53 29 16	4.5645136	22.796
Mickey.....	236 15 08	56 25 16	4.44497	17.31
Packhorse.....	280 53 52.9	101 02 32.9	4.3064505	12.583
Mount Wilson a.....	300 39 27.36	120 47 29.10	4.3314232	13.328
Desert Creek Peak.....	310 37 13	130 46 47	4.4625328	18.025
Desert Creek Peak a.....	343 02 19.5	163 08 16.7	4.6744206	29.561
Desert Creek Peak a.....	343 02 38	163 08 36	4.6744512	29.363

\* Figures from Bulletin 122.

## DESERT CREEK PEAK, LYON COUNTY, NEV. (Not occupied.)

A bare peak, the northernmost on the ridge between Desert Creek and the Carson-Aurora road. It is 3 miles south of Hall and Simpson's ranch.

Permanent mark: A rock monument.

[Latitude,  $38^{\circ} 36' 51.98''$  ( $38^{\circ} 36' 51.9''$ a). Longitude,  $119^{\circ} 18' 53.78''$  ( $119^{\circ} 18' 54.1''$ a).]

To station—	Azimuth.	Back azimuth.	Distance.	
Como.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Como a.....	163 08 16.7	343 02 19.5	4.6744206	29.361
Packhorse.....	163 08 36	343 02 38	4.6744512	29.365
Wilson.....	187 51 25	7 53 28	4.5387706	21.44
Wilson a.....	197 28 40.5	17 32 15.3	4.4404205	17.130
	197 28 53	17 32 28	4.4405014	17.134

\* Figures from Bulletin 122.

## LUHR, LYON COUNTY, NEV.

On northern rocky hill, about 3.5 miles northeast of Mason and 2 miles southeast of Yerington. On first bluff east of and 400 feet above Walker River, about 0.8 mile southeast of the Luhr ranch, and 0.5 mile northeast of cemetery at foot of bluff.

Signal: Tripod 4.5 feet high, white cloth, centered over station.

Station mark: Tack in peg under bronze tablet cemented in rock 18 by 18 by 12 inches, set level with surface.

Reference marks: Tack in peg 26.3 feet southwest from center, in true azimuth  $70^{\circ} 51'$ ; tack in peg 53.4 feet east from center, in true azimuth  $277^{\circ} 21'$ .

[Latitude,  $38^{\circ} 58' 11.48''$ . Longitude,  $119^{\circ} 08' 00.73''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mount Wilson.....	29 34 46.31	209 31 31.75	4,1798938	9.403
Red Monument.....	37 15 28	217 12 30	4,05236	7.01
Mason schoolhouse.....	63 50 35	243 48 28	3,73434	3.37
Packhorse.....	64 43 20.24	244 38 32.99	4,0853892	7.564
Mickey.....	101 17 15.20	281 13 05.70	3,9883270	6.049
Yerington courthouse.....	125 43 11	305 42 05	3,49389	1.94
Yerington water tank.....	130 21 19	310 20 11	3,46310	1.80
Carson Hill.....	137 53 31.81	317 49 37.83	4,1247560	8.281
Thompson Smelter.....	163 42 26	343 39 45	4,34410	13.72
Cleaver Peak.....	180 08 04.7	0 08 06.3	4,4415672	17.176

## MASON SCHOOLHOUSE, LYON COUNTY, NEV. (Not occupied.)

Public schoolhouse, east of railroad and south of Bridge Street, in town of Mason. Station mark: Flagstaff on cupola.

[Latitude,  $38^{\circ} 56' 53.88''$ . Longitude,  $119^{\circ} 11' 22.92''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mickey.....	132 31 58	812 29 56	3,80288	3.95
Luhr.....	243 48 28	63 50 35	3,73434	3.37

## MICKEY (SINGATSE PEAK), LYON COUNTY, NEV.

On northern of two tips on highest mountain about 4.5 miles west of town of Yerington, 0.8 mile north of wagon road at Mickey Pass, and about 0.5 mile west of Nevada-Yerington mine.

Signal: Tripod about 8 feet high, black and white cloth, centered over tablet.

Station mark: Bronze tablet cemented in shattered rock of summit, stamped "6364 V. A."

Reference marks: Tack in peg 24.8 feet from and 10 feet below station, true azimuth  $304^{\circ} 19'$ ; tack in peg 25.5 feet from and 10 feet below station, true azimuth  $347^{\circ} 59'$ .

[Latitude,  $38^{\circ} 59' 13.08''$ . Longitude,  $119^{\circ} 14' 37.38''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Packhorse.....	11 33 03.49	191 32 25.50	3,9604516	4.506
Buckskin.....	93 48 47	273 44 43	3,97087	5.81
Como.....	101 02 32.9	280 53 52.9	4,3064505	12.583
Wishart.....	126 38 19.96	306 36 42.66	3,6661333	2.881
Carson Hill.....	184 17 59.69	4 18 15.41	3,9033867	4.974
Thompson smelter.....	189 47 02	9 48 30	4,29185	12.17
Cleaver.....	200 24 32.82	20 28 44.6	4,4388988	17.071
Luhr.....	281 13 05.7	101 17 15.2	3,9883270	6.049
Yerington water tank.....	270 07 11	90 10 23	3,86527	4.56
Yerington courthouse.....	270 37 30	90 40 33	3,81607	4.36
Mason schoolhouse.....	312 29 56	132 31 58	3,80288	3.95
Red Monument.....	315 54 57	165 56 08	4,04993	6.97
Mount Wilson.....	352 04 52.9	172 05 47.4	4,1820635	9.450

## PACKHORSE, LYON COUNTY, NEV.

On highest point north of Hudson Pass, in range between Smith Valley and Mason Valley (Singatse Range). Rocky knoll on ridge about 4.5 miles southeast of Ludwig, about 5 miles southwest of Mason, 4 miles northwest of Hudson Pass, about 2 miles south of Bluestone Pass, and 2 miles east of south of Douglass Hill mines, from which it is visible.

Signal: Tripod about 8 feet high, black and white cloth, centered over tablet.

Station mark: Bronze tablet in boulder 36 by 24 by 14 inches on surface.

Reference marks: Neck of beer bottle set on end, level with surface, 22.82 feet north from center in true azimuth 198° 58'; neck of beer bottle set on end, level with surface, 24.05 feet southeast from center, in true azimuth 307° 52'.

[Latitude, 38° 53' 22.67". Longitude, 119° 15' 37.66".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Desert Creek.....	7 53 28	187 51 25	4.5387706	21.48
Como.....	120 47 29.10	300 39 27.36	4.3314232	13.328
Buckskin gallows frame.....	134 26 04	314 22 38	4.04277	6.86
Wishart.....	167 03 55.34	347 02 06.01	4.0055346	6.294
Mickey.....	191 32 25.59	11 33 03.49	3.8604516	4.506
Yerington courthouse.....	230 17 41	50 21 22	4.04157	6.84
Yerington water tank.....	231 05 07	51 08 56	4.05265	7.01
Luhr.....	244 38 32.9	64 43 20.24	4.0853392	7.564
Red Monument.....	312 04 12	132 06 01	3.75087	3.50
Mount Wilson.....	335 57 50.12	155 59 22.54	3.9401418	5.414

## RED MONUMENT, LYON COUNTY, NEV. (Not occupied.)

High hogback of dark-reddish volcanic rock about 5 miles southwest of Mason and 2 miles southwest of Nordyke, and 1.5 miles southeast of Copperbird claim. There are three large cairns on summit; the western one is pyramidal, and the other two slender conical.

Station mark: Middle cairn of the three as seen from north or south.

[Latitude, 38° 53' 20.20". Longitude, 119° 12' 44.11".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mount Wilson.....	8 39 11	188 38 55	3.62627	2.63
Packhorse.....	132 06 01	312 04 12	3.75087	3.50
Mickey.....	165 56 08	345 54 57	4.04993	6.97
Luhr.....	217 12 30	37 15 28	4.05236	7.01

## THOMPSON SMELTER, LYON COUNTY, NEV. (Not occupied.)

Smelter at Thompson, about 3 miles northwest of Wabuska.

Station mark: Middle of high brick chimney.

[Latitude, 39° 09' 38.84". Longitude, 119° 12' 18.78".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mickey.....	9 48 30	189 47 02	4.29185	12.17
Carson Hill.....	13 34 34	193 33 21	4.06560	7.23
Como.....	56 25 16	236 15 08	4.44497	17.31
Luhr.....	343 39 45	163 42 26	4.34410	13.72

## MOUNT WILSON, LYON COUNTY, NEV.

Highest point of top of hogback, the highest mountain of range between Smith Valley and Mason Valley (Singatse Range). About 2 miles south of Hudson Pass, about 8 miles southwest of Mason post office, 10 miles southwest of Yerington, and 4 miles southwest of Nordyke.

Signal: Cairn 5 feet high and 6-foot base, built by H. E. C. Fensier in 1889.

Station mark: Center of cairn.

Reference marks: Bronze tablet in solid rock 16 feet south of center, true azimuth  $5^{\circ} 07'$ ; cairn, 5-foot base and 7 feet high, on ledge of rock 219.5 feet southeast of center, true azimuth  $285^{\circ} 58'$ .

[Latitude,  $38^{\circ} 51' 04.6''$ . Longitude,  $119^{\circ} 13' 10.5''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Desert Creek Peak.....	17 32 15.3	197 28 40.5	4,440,205	17.130
Desert Creek Peak a.....	17 32 28	197 28 53	4,440,014	17.134
Cono a.....	130 46 47	310 37 13	4,462,328	18.025
Buckskin frame.....	143 56 45	323 51 55	4,28786	12.06
Packhorse.....	155 59 22.54	335 57 50.12	3,940,148	5.414
Mickey.....	172 05 47.4	352 04 52.9	4,182,035	9.450
Red Monument.....	188 38 55	8 39 11	3,62627	2.63
Cleaver.....	190 24 30.2	10 27 47.0	4,617,583	25.782
Luhr.....	209 31 31.75	29 34 46.41	4,179,938	9.403

a Figures from Bulletin 122.

## WISHART, LYON COUNTY, NEV.

On knoll on yellowish ridge about 1 mile west of Mason Pass and 4 miles north of Ludwig. The station is about 1 mile southwest from Martha Washington shaft and 1.5 miles north of Albany claims. The highest point of ridge is about 1,500 feet north of station and about 50 feet above it.

Signal: Tripod 4.5 feet high, black and white cloth, over center of station.

Station mark: Neck of beer bottle on end, 10 inches under surface, over which is bronze tablet cemented in flat stone 18 by 14 by 9 inches, sunk level with surface.

Reference mark: Middle of gallows frame Martha Washington shaft about 1 mile northeast, in true azimuth  $234^{\circ} 44'$ .

[Latitude,  $39^{\circ} 00' 42.77''$ . Longitude,  $119^{\circ} 17' 11.994''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Buckskin, gallows frame.....	69 03 16	219 00 49	3,77862	3.73
Carson Hill.....	219 36 14.46	39 38 07.56	3,8307836	4.209
Mickey.....	306 36 42.68	126 38 19.96	3,6661333	2.881
Packhorse.....	347 02 06.01	167 03 05.34	4,0055546	6.294

## YERINGTON COURTHOUSE, LYON COUNTY, NEV. (Not occupied.)

Lyon County courthouse at Yerington.

Station mark: Flagstaff, east front.

[Latitude,  $38^{\circ} 59' 10.50''$ . Longitude,  $119^{\circ} 09' 45.92''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Packhorse.....	50 21 22	230 17 41	4,04157	6.84
Mickey.....	90 40 33	270 37 30	3,81607	4.36
Carson Hill.....	141 31 57	321 29 09	4,01287	6.40
Luhr.....	305 42 05	125 43 11	3,49389	1.94

**TERINGTON WATER TANK, LYON COUNTY, NEV. (Not occupied.)**

High-pressure water tank of city supply.

Station mark: Center of ball on top of tank.

[Latitude,  $38^{\circ} 59' 12.48''$ . Longitude,  $119^{\circ} 09' 32.71''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Packhorse.....	51 08 56	231 05 07	4.05265	7.01
Mickey.....	90 10 23	270 07 11	3.86527	4.56
Carson Hill.....	139 57 51	319 54 55	4.01931	6.50
Luhr.....	310 20 11	130 21 19	3.46310	1.50

**Manhattan and vicinity quadrangle.****NYE COUNTY.**

The field work was done by A. T. Fowler in September and October, 1914. Eight stations were occupied, two of which, Lone Mountain and Toiyabe Dome, were United States Coast and Geodetic Survey stations, and a third, Toiyabe Dome, Southeast Summit, was supposed to be a secondary point of the same survey, but its computed position did not check with position given by the Coast Survey. Positions are on North American datum.

Five points were occupied and marked.

**BALD MOUNTAIN, NYE COUNTY, NEV.**

Bald Mountain is a prominent bare mountain about 3 miles north of Manhattan. Top of hill is of a light-gray color, and signal is difficult to distinguish unless light is favorable.

Can be reached by driving out the east Manhattan road and taking side road to the north up the Slaughter House Gulch. Wagon can be taken about  $1\frac{1}{2}$  miles up this gulch to the old slaughterhouse. From this point saddle horses can be taken over an easy trail up the gulch to the summit.

Station mark: A bronze triangulation tablet.

Signal: Rock monument 5 feet, with flagpole and flag.

[Latitude,  $38^{\circ} 34' 39.06''$ . Longitude,  $117^{\circ} 02' 41.39''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	
Toiyabe Dome.....	136 45 56.79	316 34 24.42	4.5649388	
Lone Mountain.....	32 45 24.24	212 28 42.48	4.8624770	
Toquima.....	215 24 06.56	35 27 15.27	4.1009223	
Toiyabe Dome, Southeast Summit.....	113 58 42.94	323 50 59.28	4.4834777	
Summit.....	5 59 50.27	185 59 30.58	3.8635228	
Low Flag.....	68 33 18.06	248 30 25.48	3.8574465	
Salisbury.....	354 48 55.78	174 49 05.35	3.6141675	
Friday Flag.....	101 36 51.15	281 34 47.47	3.0900712	

## FRIDAY FLAG, NYE COUNTY, NEV.

Station is on a steep red hill 2 miles west of Bald Mountain and at the edge of the Big Smoky Valley. It is about 4 miles northwest of Manhattan, and rig can be taken to within three-quarters of a mile of the station, along old wood road, leaving town past the War Eagle mill.

Station mark: A bronze triangulation tablet set in ledge.

Signal: Stone windbreak built around west and south sides of station.

[Latitude,  $38^{\circ} 35' 11.00''$ . Longitude,  $117^{\circ} 05' 59.84''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Bald Mountain.....	281 34 47.47	101 36 51.15	3.6900712
Low Flag.....	27 43 33.06	207 42 44.06	3.6117226
Summit.....	334 01 42.09	154 03 25.94	3.9645655
Salisbury.....	314 28 35.60	134 30 48.78	3.8603269

## LOW FLAG, NYE COUNTY, NEV.

On a low hill about 3 miles west of Manhattan. It is one-quarter of a mile west of the Manhattan-Round Manhattan road and three-quarters of a mile north of Central, a camp now nearly deserted. The Manhattan-Round Manhattan road leaves the Manhattan Gulch at Central and turns north.

Wagon can be taken nearly to station.

Signal: Quadripod signal covered with white cloth with flagpole and flag.

Station mark: A bronze triangulation table set in ledge.

[Latitude,  $38^{\circ} 33' 13.58''$ . Longitude,  $117^{\circ} 07' 18.23''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Toiyabe Dome, Southeast Summit.....	157 36 48.08	337 31 57.46	4.4693217
Bald Mountain.....	248 30 25.48	68 33 18.06	3.8574465
Summit.....	308 08 15.40	128 10 48.13	3.8780772
Salisbury.....	281 38 12.48	101 41 14.56	3.8588191
Friday Flag.....	207 42 44.06	27 43 33.06	3.6117226

## SALISBURY, NYE COUNTY, NEV.

Salisbury Peak is the highest summit in a wooded ridge running northeast from Manhattan and is about 2 miles from the town. It is easily reached by following wagon road leading to Hoosier mine to summit of low pass in hills just east of the White Gap mine, leaving road in this pass and going north about one-half mile to the summit.

Station is on site of old location monument on north brow of hill.

Signal: Stone monument, wrapped with white cloth with flagpole and flag.

Station mark: A bronze tablet set in block of cement at bottom of pit 2 feet deep, solid rock not being found.

[Latitude,  $38^{\circ} 32' 26.22''$ . Longitude,  $117^{\circ} 02' 26.05''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Summit.....	19 33 34.65	199 33 05.29	3.5317292
Low Flag.....	101 41 14.56	281 38 12.48	3.8588191
Friday Flag.....	134 30 48.78	314 28 35.60	3.8603269
Bald Mountain.....	174 49 05.35	354 48 55.78	3.6141675

**SUMMIT, NYE COUNTY, NEV.**

On a low hill directly south of the "Summit," so called, where the main road from Manhattan to Tonopah crosses the summit of a low gap in the Toquima Range, about 2 miles south of Manhattan.

Station is about 1,500 feet south of road and wagon can be taken nearly to top of hill. Station is about 20 feet west of true summit of hill, which is covered with juniper trees and about 3 feet lower in elevation.

Signal: Large quadripod signal covered with white cloth with flagpole and flag.

Station mark: A bronze triangulation tablet set in block of cement at bottom of pit 2 feet in depth. No solid rock was found.

[Latitude,  $38^{\circ} 30' 42.252''$ . Longitude,  $117^{\circ} 03' 13.055.''$ ]

To station—	Azimuth.	Back azimuth.	Distance.
Tolyabe Dome, Southeast Summit.....	• 46 08.10	• 38 44.47	4.558905
Toquima.....	204 39 37.31	24 43 05.63	4.2867140
Bald Mountain.....	185 59 30.58	5 59 50.27	3.5658228
Low Flag.....	128 10 48.13	308 08 15.40	3.8740772
Salisbury.....	199 33 05.29	19 33 34.65	3.5317292
Friday Flag.....	154 03 25.91	334 01 42.09	3.9645655

**TOIYABE DOME, SOUTHEAST SUMMIT, NYE COUNTY, NEV.**

On a high rounded summit, near end of ridge running east from Toiyabe Dome, locally known as Arc Dome.

Southeast Dome overlooks the Big Smoky Valley to the north and south and is on a ridge directly above Darroughs Hot Springs. There is a rocky peak a quarter of a mile east of station and nearer the end of the ridge, which is more noticeable in looking at the ridge from the Big Smoky Valley.

Station is most easily reached by trail up South Twin River, at the head of which there are good camp sites. Saddle horses can be taken to the summit.

Signal is a stone wall 6 feet high built around north and west sides of station to serve as windbreak at time station was occupied.

Station mark: A triangulation tablet set in rock.

[Latitude,  $38^{\circ} 47' 56.90''$ . Longitude,  $117^{\circ} 15' 03.28''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Lone Mountain.....	• 56 12.42	• 47 09.17	4.9471774
Toiyabe Dome.....	113 07 46.54	293 03 57.55	3.9814813
Toquima.....	229 29 56.30	119 40 49.67	4.4624175
Bald Mountain.....	323 50 59.28	143 58 42.94	4.4834777
Summit.....	331 38 44.47	151 46 08.10	4.5589055
Low Flag.....	337 31 57.46	157 36 48.08	4.4693217

**Ivanpah and Las Vegas quadrangles and Yellow Pine mining district.****CLARK COUNTY.**

The positions in the following list were determined by L. F. Biggs, in September and October, 1915, on approximate North American datum.

This triangulation is dependent on a weak base (Clark, Olcott, and Kingston) and it should be connected with stations whose coordinates are well determined before the positions can be finally adjusted.

For positions in California in this locality see Bulletin 644-C.

**ARDEN, CLARK COUNTY, NEV. (Not occupied.)**

Center of black water tank at Arden, a station on the San Pedro, Los Angeles & Salt Lake Railroad 12 miles south of Las Vegas.

[Latitude, 36° 00' 49.93". Longitude, 115° 13' 56.74".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Bird.....	43 55 14.03	223 49 49.54	4.3007460	12.419
Olcott.....	77 37 34.37	257 28 06.09	4.3945892	15.415
Mountain Springs.....	96 20 28.91	276 11 40.80	4.3546137	14.059

**BIRD, CLARK COUNTY, NEV.**

On highest point of ridge 5 miles north-northeast of Good Springs and 1½ miles west of Birds Spring.

Signal: A rock cairn 6 feet high.

Station mark: A United States Geological Survey bronze triangulation tablet under center of cairn.

[Latitude, 35° 53' 02.46". Longitude, 115° 23' 09.48".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Diablo Grande.....	16 26 17.76	196 23 55.81	4.3337066	13.399
Shenandoah.....	71 24 29.78	251 20 09.94	4.0697081	7.296
Olcott.....	131 07 27.03	311 03 23.94	4.1393085	8.564
Mountain Springs.....	152 52 10.69	332 48 47.78	4.2780511	11.787
Arden.....	223 49 49.54	43 55 14.03	4.3007460	12.419
Borax.....	347 53 45.75	167 55 19.68	4.2844156	11.961

**BORAX, CLARK COUNTY, NEV. (Not occupied.)**

Center of black water tank at Borax, a station on the San Pedro, Los Angeles & Salt Lake Railroad 24 miles south of Las Vegas.

[Latitude, 35° 42' 51.76". Longitude, 115° 20' 28.91".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Diablo Grande.....	79 37 45.66	259 33 50.30	4.0131508	6.405
Shenandoah.....	134 51 42.96	314 45 49.76	4.3301080	13.288
Bird.....	167 55 19.68	347 53 45.75	4.2844156	11.961

**DIABLO GRANDE (IVANPAH), CLARK COUNTY, NEV.**

On the highest point of hill known as Diablo Grande, about 10 miles south of Good-springs.

Station mark: A chiseled cross under center of cairn.

Signal: A rock cairn.

Reference mark: Aluminum tablet marked "V. A. 1910 5865," 6.2 feet from station. True azimuth, station to reference mark, 66° 40'.

[Latitude, 35° 41' 51.37". Longitude, 115° 27' 12.19".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Clark.....	32 40 54.31	212 36 11.41	4.3554467	14.086
Knights Well.....	87 47 16.50	267 44 32.44	3.8496820	4.396
Kingston.....	94 34 12.06	274 18 01.28	4.6225326	26.055
Corner secs. 1, 2, 35, and 36.....	109 05 33.96	289 02 35.21	3.9109050	5.061
Ripley.....	129 50 06.55	309 44 55.07	4.2413989	10.833
Green Monster.....	145 00 45.43	324 54 36.05	4.4411812	17.161
Shenandoah.....	163 25 55.52	343 23 58.15	4.2471933	10.979
Olcott.....	171 46 22.82	351 44 42.35	4.4775740	18.673
Bird.....	196 23 55.81	16 26 17.76	4.3337066	13.399
Borax.....	259 33 50.30	79 37 45.75	4.0131508	6.405

## GREEN MONSTER, CLARK COUNTY, NEV.

On high hill about 1 mile northeast of Green Monster mine and 7 miles north of Ripley.

Signal: A rock cairn 5 feet high.

Station mark: Chiseled cross under center of cairn.

Reference mark: A United States Geological Survey triangulation tablet 18.3 feet from cairn. True azimuth, station to reference mark,  $120^{\circ} 58'$ .

[Latitude,  $35^{\circ} 54' 05.04''$ . Longitude,  $115^{\circ} 37' 43.67''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Kingston.....	53 17 29.58	233 07 25.91	4.5097518	20.096
Mesa.....	198 43 51.98	18 45 54.58	4.2114361	10.111
Olcott.....	238 13 31.72	58 18 01.58	4.1320639	8.422
Shenandoah.....	297 41 30.73	117 45 43.13	4.0865641	7.554
Diablo Grande.....	324 54 36.05	145 00 45.43	4.4411812	17.161
Corner secs. 1, 2, 35, and 36.....	337 43 00.38	157 46 10.68	4.3335927	13.395
Knights Well.....	338 56 55.93	159 00 20.84	4.3895211	15.236
Ripley.....	347 50 12.84	167 51 10.42	4.0688141	7.251
Clark.....	354 58 17.75	174 59 42.76	4.6218156	26.012

## MESA, CLARK COUNTY, NEV.

On highest point of hill about 3 miles west of Mountain Springs.

Signal: A rock cairn 7 feet high.

Station mark: A chiseled circle under center of cairn.

Reference mark: A United States Geological Survey bronze tablet, 6.8 feet from cairn. True azimuth, station to reference mark,  $160^{\circ} 30'$ .

[Latitude,  $36^{\circ} 02' 24.98''$ . Longitude,  $115^{\circ} 34' 14.93''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Green Monster.....	18 45 54.58	198 43 51.98	4.2114361	10.111
Kingston.....	41 54 59.92	221 42 52.89	4.6689748	28.956
Mountain Springs.....	273 15 15.53	93 18 23.74	3.9042702	4.994
Olcott.....	322 45 21.36	142 47 48.98	4.0169012	6.460

## MOUNTAIN SPRINGS, CLARK COUNTY, NEV.

On peak  $1\frac{1}{2}$  miles east of Mountain Springs.

Signal: A rock cairn 6 feet high with tree in center.

Station mark: Chisel mark (X) under center of cairn.

Reference mark: United States Geological Survey bronze triangulation tablet 7 feet from cairn. True azimuth, station to reference mark,  $203^{\circ} 00'$ .

[Latitude,  $36^{\circ} 02' 10.08''$ . Longitude,  $115^{\circ} 28' 55.02''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Olcott.....	12 25 51.87	192 25 11.44	3.9034861	4.975
Mesa.....	93 18 23.74	273 15 15.53	3.9042702	4.984
Arden.....	276 11 40.60	96 20 28.91	4.3546137	14.059
Rose Tank.....	307 23 06	127 24 44	3.72052	3.265
Bird.....	332 48 47.78	152 52 10.69	4.2780511	11.787

## OLCOTT, CLARK COUNTY, NEV.

Described in Bulletin 496, page 38, as follows:

"Highest point on Mount Olcott. It is about 36 miles southwest of Las Vegas, 40 miles southeast of Manse post office, and 3 miles east of the Potosi mine. The station can be reached from Mountain Spring by going 2.25 miles southeast to forks of road,

thence southwest to Hussey mine, and eastward on south slope of mountain to peak.

"Station mark: Tablet cemented in rock."

[Latitude, 35° 57' 56.37". Longitude, 115° 30' 03.81".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Shenandoah.....	3 16 08.51	183 15 51.41	4.1082033	7.972
Clark.....	9 12 36.11	189 09 32.54	4.6942983	30.736
Kingston.....	54 49 23.12	234 34 49.68	4.6614279	28.498
Green Monster.....	58 18 01.58	238 13 31.72	4.1320639	8.422
Mesa.....	142 47 48.98	322 45 21.36	4.0169012	6.460
Mountain Spring.....	192 25 11.44	12 25 51.87	3.9031861	4.975
Rose Tank.....	231 51 48	51 54 07	3.87497	4.659
Arden.....	257 28 06.00	77 37 34.37	4.3945892	15.415
Bird.....	311 03 23.94	131 07 27.03	4.1393085	8.564
Diablo Grande.....	351 44 42.35	171 46 22.82	4.4778740	18.673

#### RIPLEY, CLARK COUNTY, NEV.

Center of windmill at post office, Ripley, Nev.

[Latitude, 35° 47' 53.40". Longitude, 115° 36' 05.35".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Green Monster.....	167 51 10.42	347 50 12.84	4.0688141	7.281
Diablo Grande.....	309 44 55.07	129 50 06.55	4.2113989	10.833
Clark.....	357 44 35.38	177 45 02.95	4.4810177	18.809

#### ROSE TANK, CLARK COUNTY, NEV.

Center of wooden water tank on the Potosi-Arden road about 6 miles east of Potosi mine and near forks of road to Goodsprings.

[Latitude, 36° 00' 26.54". Longitude, 115° 26' 08.31".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Olcott.....	127 24 44	307 23 06	3.72052	3.265
Mountain Springs.....	51 54 07	231 51 48	3.87497	4.659

#### SHENANDOAH, CLARK COUNTY, NEV.

On the highest hill about 5 miles west-northwest of Goodsprings and about 1 mile west of Yellow Pine mine.

Signal: A rock cairn 7 feet high.

Station mark: A bottle neck cemented in rock under center of cairn.

[Latitude, 35° 51' 00.79". Longitude, 115° 30' 32.96".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Knights Well.....	6 41 54.22	186 41 07.23	4.2387279	10.767
Corner secs. 1, 2, 35, and 36.....	10 31 21.18	190 30 19.51	4.1613474	9.020
Clark.....	11 16 37.81	191 13 51.51	4.5650019	22.822
Kingston.....	69 40 23.08	219 26 07.91	4.5932003	24.353
Green Monster.....	117 45 43.13	207 41 30.73	4.0865641	7.584
Olcott.....	183 15 51.41	3 16 08.51	4.1082033	7.972
Bird.....	251 20 09.94	71 24 29.78	4.0697081	7.296
Borax.....	314 45 49.76	134 51 42.96	4.3301080	13.288
Diablo Grande.....	313 23 58.15	163 25 55.52	4.2471933	10.979

**Bristol Range, Delamar, Newland, and Panaca quadrangles.****LINCOLN COUNTY.**

In the summer of 1915 H. H. Hodgeson extended triangulation from U. S. Coast and Geodetic Survey primary station Pioche and supplementary station White Rock over the above-named quadrangles.

Ten primary stations and seven 3-point stations were occupied and 25 points were located by intersections, all on North American datum.

**BAILEY, LINCOLN COUNTY, NEV.**

A three-point station on a red brushy summit about 4 miles northwest of Bristol well, on east side of Bristol-Ely road and 2 miles northwest of the Horn Silver mine. Can be reached easily with animals from Bristol Well.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Cedar tree, brushy top, cairn around base and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 18.1 feet and in true azimuth  $66^{\circ} 36'$ ; (B) chiseled cross in rock distant from station mark 14.8 feet and in true azimuth  $229^{\circ} 53'$ .

[Latitude  $38^{\circ} 10' 04.24''$ . Longitude  $114^{\circ} 42' 38.75''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
West Lava.....	35 38 33	215 30 39	4.45144	17.570
Lava Tit.....	61 15 49	241 11 34	4.05903	7.124
Black Cliff.....	71 36 12	251 21 45	4.55728	22.420
Sharks Tooth.....	90 19 21	270 11 49	4.25125	11.082
Black Cone.....	107 49 25	287 42 30	4.21297	10.146
Wilson.....	253 21 42.98	73 33 26.35	4.4603818	17.936
Parsnip.....	273 54 17.00	94 08 34.86	4.5300638	21.058
Jackrabbit.....	313 37 41.40	133 41 30.43	4.0965135	7.760
Bristol.....	329 48 26.40	149 52 23.19	4.2698328	11.566
Highland.....	338 59 53.22	159 04 47.31	4.5124557	20.221
Charcoal.....	346 23 57.72	166 24 41.84	3.8693523	4.599
White Cliff.....	351 59 59	172 00 43	4.09935	7.811

**BENNETT, LINCOLN COUNTY, NEV. (Not occupied.)**

The rocky south point of a double summit on the north side of Bennett Pass in the Highland Range. It is 6 miles south from Highland Peak.

Signal and station mark: Apparent highest point.

[Latitude  $37^{\circ} 50' 09.5''$ . Longitude  $114^{\circ} 33' 32.4''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Ely.....	212 01 31	32 04 24	4.10744	7.958
Spring Valley.....	229 44 03	49 55 27	4.55089	22.092
Red Hill.....	236 38 26	56 43 18	4.14281	8.633
Pioche.....	219 20 36	69 39 19	4.67818	29.616

**BLACK CONE, LINCOLN COUNTY, NEV. (Not occupied.)**

A high dark cone summit about 15 miles northwest from Bristol Well; on same ridge with and about 3 miles northeast of Sharks Tooth. A white rock outcrop (on the east slope) dipping south about 300 feet below the summit gives prominence to the dark upper part of the cone.

Signal and station mark: Apparent highest point.

[Latitude 38° 12' 45.8". Longitude 114° 53' 18.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wilson.....	265 33 50	85 52 09	4.63681	26.925
Bailey.....	287 42 30	107 49 25	4.21297	10.146
Bristol.....	310 08 00	130 18 32	4.51374	20.282
Highland.....	322 19 10	142 30 39	4.64967	27.735

**BLACK CLIFF, NYE COUNTY, NEV. (Not occupied.)**

A high rocky cliff point on a dark summit, sometimes called Indian Peak, at the north end of the Seaman Range, which breaks off abruptly at this cliff, while to the south it extends for 20 miles with higher summits than the one sighted.

Signal and station mark: Apparent highest point.

[Latitude 38° 03' 52.6". Longitude 115° 06' 03.2".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Bailey.....	251 21 45	71 36 12	4.55728	22.420
Wilson.....	252 08 39	72 34 48	4.81251	40.352
Jackrabbit.....	266 05 49	86 24 04	4.63714	26.946
Highland.....	292 14 22	112 33 41	4.69614	30.867

**BRISTOL, LINCOLN COUNTY, NEV.**

On a high rocky summit of the Bristol Range, 12 miles northwest from the town of Pioche and 3 miles north along the ridge from Stampede Gap.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 17.2 feet and in true azimuth 171° 16'; (B) chiseled cross in rock distant from station mark 19.4 feet and in true azimuth 333° 21'.

[Latitude 38° 01' 22.25". Longitude 114° 36' 14.96".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
West Lava.....	75 07 09	254 56 19	4.42712	16.614
White Cliff.....	115 37 37	295 34 25	3.92620	5.253
Lava Tit.....	118 39 58	298 31 46	4.31145	13.734
Sharks Tooth.....	120 49 51	300 33 22	4.50036	19.666
Black Cone.....	130 18 32	310 08 00	4.51374	20.281
Charcoal.....	138 28 33.47	319 25 20.90	4.0686365	7.277
Bailey.....	149 52 21.19	329 48 26.40	4.2988328	11.566
Wilson.....	216 58 57.18	37 06 42.46	4.4857365	18.927
Page.....	221 43 06.21	41 50 13.58	4.4035069	15.734
Parsnip.....	240 39 31.76	60 49 51.51	4.4181793	17.439
White Rock No. 1.....	246 41 38	66 52 50	4.46075	17.951
South Parsnip.....	254 10 02	74 20 36	4.45521	17.724
Low Cone.....	257 21 32	77 29 52	4.30670	12.591
Danton.....	259 31 07	79 43 59	4.49220	19.300
Eight Mile.....	264 28 48.51	84 33 38.57	4.0620584	7.168
Quarter Corner.....	262 39 21.67	82 48 34.48	4.3435141	13.706
Spring Valley.....	265 51 29.70	86 04 35.30	4.4857948	19.371
Section Corner.....	269 05 20.73	89 16 35.13	4.4267963	16.602
Pioche.....	274 35 51.64	94 56 17.02	4.6877241	30.271
Red Butte.....	275 02 28.59	95 13 13.23	4.4086835	15.923
Trestle.....	292 49 17.22	112 56 21.81	4.2617251	11.352
Tank.....	300 40 29.6	120 53 36.2	4.227092	10.504
Smeiter.....	300 44 17.77	120 50 11.74	4.2131995	10.152
Pioche School.....	306 00 20.97	126 05 11.62	4.2212745	10.414
Ely.....	312 33 31.29	132 38 02.47	4.1646145	9.008
Stampede.....	338 46 06.98	158 47 00.25	3.7658856	3.624
Gap.....	349 53 12.61	169 53 39.59	3.7817822	3.785
Highland.....	350 54 53.19	170 53 50.75	4.1606689	8.500

**BULLIONVILLE, LINCOLN COUNTY, NEV. (Not occupied.)**

Brick chimney at Bullionville smelter, about 1.5 miles northwest of Panaca.  
Signal and station mark: Center of chimney.

[Latitude  $37^{\circ} 48' 25.47''$ . Longitude  $114^{\circ} 24' 00.26''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters	Miles.
Highland.....	121 40 57.95	301 34 24.54	4.2650302	11.430
Ely.....	152 57 07.01	332 54 06.49	4.1984328	9.813
Red Hill.....	167 38 48.83	347 37 49.21	4.0451501	6.886

**CHARCOAL, LINCOLN COUNTY, NEV. (Not occupied.)**

The middle one of three charcoal ovens, about 1,000 feet southwest from Bristol Well.

Signal and station mark: Center of oven.

[Latitude  $38^{\circ} 06' 10.89''$ . Longitude  $114^{\circ} 41' 27.31''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Balley.....	166 24 41.84	346 23 57.72	3.8693523	4.399
Jackrabbit.....	291 02 20.65	101 05 25.43	3.8713584	4.821
Bristol.....	319 25 20.90	139 28 33.47	4.0686365	7.277

**DANTON, LINCOLN COUNTY, NEV. (Not occupied.)**

A cone summit on the north side of the Spring Valley-Pioche road and in the pass where the road crosses the Wilson Creek Range. It is about 3 miles west of Danton Spring.

Signal and station mark: Apparent highest point.

[Latitude  $38^{\circ} 04' 23.7''$ . Longitude  $114^{\circ} 15' 22.2''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Ely.....	52 04 39	231 56 20	4.40055	15.636
Highland.....	54 59 48	234 47 54	4.53890	21.491
Bristol.....	79 43 59	259 31 07	4.49220	19.300
Jackrabbit.....	93 35 37	273 22 36	4.49007	19.305

**EIGHTMILE, LINCOLN COUNTY, NEV. (Not occupied.)**

A large wooden windmill at the Eightmile Well, located in Patterson, Wash. It is about 8 miles northwest of the town of Pioche and is on the Pioche-Silvers Park road.

Signal and station mark: Center of windmill tower.

[Latitude  $38^{\circ} 01' 57.98''$ . Longitude  $114^{\circ} 28' 24.12''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Ely.....	3 50 20.4	183 50 01.8	4.01943	6.844
Bristol.....	84 33 38.6	264 28 48.5	4.062058	7.108
Wilson.....	196 29 45.8	16 32 40.3	4.383987	15.043
Parsnip.....	225 50 27.5	45 56 04.5	4.258202	11.260

**ELY (PIOCHE PEAK, U. S. COAST AND GEODETIC SURVEY), LINCOLN COUNTY, NEV.**

On the summit of Mount Ely, about 2 miles northwest from town of Pioche. Station is easily reached with animals.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Cedar tree, brushy top, cairn around base and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 31 feet and in true azimuth  $352^{\circ} 31'$ ; (B) chiseled cross in rock distant from station mark 29.6 feet and in true azimuth  $271^{\circ} 46'$ .

NOTE.—This station is a supplementary point of the U. S. Coast and Geodetic Survey, located in 1881 and called "Pioche Peak." The old monument is very small. The bronze triangulation tablet (present station mark) is at the center of old monument, and the Coast Survey position for the same is: Latitude  $37^{\circ} 56' 01.546''$ ; longitude,  $114^{\circ} 28' 54.342''$ .

[Latitude  $37^{\circ} 56' 01.55''$ . Longitude  $114^{\circ} 28' 54.32''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
South Highland.....	15 48 32	195 45 47	4.38344	19.024
Bennett.....	32 04 24	212 01 34	4.10744	7.958
Highland.....	62 33 36.94	242 30 03.67	3.9802544	5.938
Stampede.....	117 16 11.34	297 12 33.56	3.9879050	6.012
Bristol.....	132 38 02.47	312 33 31.29	4.1646115	9.078
Jackrabbit.....	147 31 50.95	327 27 21.67	4.3135223	12.790
Eightmile.....	183 50 01.78	3 50 20.36	4.0419426	6.844
Page.....	192 01 26.32	12 04 01.58	4.4684326	12.280
Wilson.....	192 32 29.43	12 35 42.43	4.5445520	21.772
Parsnip.....	210 11 06.31	30 16 53.92	4.4364710	16.775
White Rock.....	216 34 52	36 41 32	4.42345	16.474
Quarter Corner.....	221 16 06.60	41 20 47.60	4.2273010	10.487
South Parsnip.....	223 24 17	43 32 19	4.34238	14.987
Danton.....	231 56 20	52 04 39	4.40055	15.628
Spring Valley.....	239 15 03.95	59 23 37.53	4.3743199	14.712
Red Butte.....	212 45 12.34	62 51 24.92	4.2206456	10.328
Smelter.....	245 04 58.55	65 06 21.24	3.5588192	2.250
Pioche Tank.....	251 47 23.54	71 48 58.77	3.6000411	2.474
Pioche.....	261 05 38.70	81 21 31.80	4.5829009	23.782
Pioche School.....	269 31 02.93	89 32 13.35	3.4467459	1.739
Rim.....	293 53 50	113 06 57	4.53179	21.141
South Rim.....	296 32 42	116 45 13	4.52183	20.805
Red Hill.....	303 48 45.94	123 50 46.94	3.7626372	3.597
Bullionville.....	332 54 06.49	152 57 07.01	4.1984328	9.813

**FAIRVIEW PEAK, LINCOLN COUNTY, NEV. (Not occupied.)**

The larger of two cone-shaped hills about 6 miles northeast from Bristol Well and 7 miles northwest from Bristol Pass.

NOTE.—South Cone is known locally as Fairview Peak.

Signal and station mark: Approximate highest point.

[Latitude  $38^{\circ} 12' 08.7''$ . Longitude  $114^{\circ} 41' 06.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Parsnip.....	281 02 11	101 15 32	4.50714	19.975
Red Butte.....	304 10 42	124 24 57	4.59506	24.508
Smelter.....	323 11 37	143 21 03	4.54784	21.937
Jackrabbit.....	331 26 14	151 29 06	4.15174	8.812

## FOGLIANI, LINCOLN COUNTY, NEV.

A three-point station on a small summit at point of ridge, 535 feet east of the chimney of Spring Valley ranch house of Louis Fogliani.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Small pole and flag.

Reference marks: Center of large brick chimney on main part of the Fogliani ranch house distant from station mark 535 feet and in true azimuth  $100^{\circ} 17' 42''$ .

[Latitude  $38^{\circ} 04' 39.10''$ . Longitude  $114^{\circ} 09' 51.01''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Spring Valley.....	• ' "	• ' "	Log. meters.	Miles.
Parsnip.....	62 46 52.68	242 43 42.29	3.927189	5.262
Wilson.....	118 30 13.58	298 24 16.10	4.205444	9.972
Pioche.....	132 07 54.19	311 59 21.12	4.4350641	16.921
Fogliani's house chimney.....	315 34 28.40	135 38 38.65	4.1510832	8.799
	100 17 42	.....	2.21224	a 535

a Feet.

## GAP, LINCOLN COUNTY, NEV.

A three-point station about 300 feet west of the wagon road in Stampede Gap and 25 feet above the road, on a blue-limestone point. (This three-point station was made to locate a section corner.)

Station mark: None.

Signal: Pole and flag.

Reference marks: (A) Bronze triangulation tablet cemented in rock by Levelman D. S. Birkett in 1915 and described as follows: "Stampede Pass, 225 feet west of and 6 feet below level of summit of, 20 feet north and 7 feet above wagon road, witnessed by pile of boulders, in limestone outcrop; bronze tablet stamped '7315 1915 29' (should be restamped 30); 7,315.432 feet," distant from instrument station 480 feet and in true azimuth  $211^{\circ} 36' 30''$ . (B) Corner to secs. 4, 5, 8, and 9, T. 1 N., R. 66 E. Mount Diablo meridian. Stone in place at corner (properly marked) and four bearing trees (properly marked) distant from instrument station 350 feet and in true azimuth  $359^{\circ} 03' 00''$ .

[Latitude  $37^{\circ} 58' 07.72''$ . Longitude  $114^{\circ} 35' 31.13''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Lava Tit.....	• ' "	• ' "	Log. meters.	Miles.
White Cliff.....	129 03 48	308 54 42	4.42090	16.374
Bristol.....	138 02 14	317 58 54	4.11311	8.062
Stampede.....	169 53 39.6	349 53 12.6	3.784782	3.785
Bench mark 7315.....	241 44 14.6	61 44 40.9	3.073252	7.357
Section Corner.....	211 36 30	.....	.....	a 480
	359 03 00	.....	.....	a 530

a Feet.

## GRAY CONE, LINCOLN COUNTY, NEV. (Not occupied.)

A gray rocky cone summit about 4 miles southeast from the town of Pioche and on the east side of the Pioche-Panaca road.

Signal and station mark: Apparent highest point.

[Latitude  $37^{\circ} 54' 17.3''$ . Longitude  $114^{\circ} 24' 26.7''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Red Hill.....	• ' "	• ' "	Log. meters.	Miles.
Red Butte.....	89 43 46	269 43 03	3.23688	10.719
Spring Valley.....	217 19 55	37 23 23	4.13354	8.451
Pioche.....	222 05 07	42 10 58	4.31398	12.903
	253 45 39	73 58 47	4.51298	20.245

## HIGHLAND, LINCOLN COUNTY, NEV.

A summit of Highland Ridge about 8 miles west from the town of Pioche. Summit can easily be reached with animals from the ranch of James Wheeler, who lives about 3 miles northeast from the peak. The route lies by road to the forks of Water Canyon, thence up the right fork by trail to saddle in main divide, thence south along ridge to station.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 38.3 feet and in true azimuth  $27^{\circ} 12'$ ; (B) chiseled cross in rock distant from station mark 23.2 feet and in true azimuth  $139^{\circ} 36'$ .

[Latitude  $37^{\circ} 53' 38.59''$ . Longitude  $114^{\circ} 34' 41.40''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
West Lava.....	104 48 39	284 36 51	4.46376	10.076
Black Cliff.....	112 33 41	292 14 22	4.69614	30.867
Sharks Tooth.....	136 01 18	315 48 52	4.62754	26.337
Lava Tit.....	138 58 08	318 48 58	4.51870	20.514
Black Cone.....	142 30 39	322 19 10	4.64967	27.734
White Cliff.....	151 08 48	331 04 39	4.31156	12.732
Bailey.....	159 04 47.31	338 59 53.22	4.5124557	20.221
Bristol.....	170 55 50.75	350 54 53.19	4.1604689	8.996
Stampede.....	178 53 35.39	358 53 31.08	3.9474219	5.505
Wilson.....	202 33 52.16	22 40 39.09	4.6214328	25.989
Page.....	203 42 22.83	23 45 31.85	4.5593252	22.525
Parsnip.....	218 21 09.20	38 30 30.44	4.5333680	22.219
Danton.....	234 47 54	54 59 48	4.53890	21.491
Section Corner.....	238 56 38.75	59 06 54.93	4.4551548	17.721
Ely.....	242 30 03.67	62 33 36.94	3.9802544	5.937
Red Butte.....	242 37 25.21	62 47 11.07	4.4179046	18.265
Smelter.....	243 11 39.18	63 16 35.15	4.1197226	8.186
Pioche.....	257 21 47.89	77 41 13.98	4.6760625	29.472
Red Hill.....	264 51 36.82	84 57 10.98	4.125579	8.291
Little Summit.....	267 33 22	87 49 34	4.58790	24.058
Rim.....	282 26 57	102 43 37	4.61058	25.347
South Rim.....	285 18 17	105 34 21	4.60052	24.767
Bullionville.....	301 34 24.54	121 40 57.95	4.2050302	11.439

## JACKRABBIT, LINCOLN COUNTY, NEV.

A checked three-point station on a dark rocky summit near the north end of the Bristol Range and south from Bristol Pass. It is about half a mile north from the Hillside mine and on the north side of an aerial tram which connects the Hillside and Jackrabbit mines. Can be easily reached by trail with animals from either mine.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 25.1 feet and in true azimuth  $352^{\circ} 40'$ ; (B) chiseled cross in rock distant from station mark 22.8 feet and in true azimuth  $246^{\circ} 16'$ .

[Latitude  $38^{\circ} 05' 24.60''$ . Longitude  $114^{\circ} 36' 27.80''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
West Lava.....	60 40 28	240 29 45	4.40656	18.193
White Cliff.....	62 20 23	212 17 18	3.91569	5.117
Black Cliff.....	86 24 04	268 05 49	4.63714	26.946
Lava Tit.....	99 18 56	279 10 53	4.28037	12.015
Charcoal.....	101 05 25.43	281 02 20.65	3.8713584	4.621
Bailey.....	133 41 30.43	313 37 41.40	4.0965135	7.760
Fairview Peak.....	151 29 06	331 26 14	4.15174	8.812
Wilson.....	227 51 46.67	47 59 40.23	4.4002227	15.616
Parsnip.....	255 46 28.87	75 56 57.01	4.4075926	15.883
Danton.....	273 22 36	93 35 37	4.49007	19.205
Trestle.....	310 19 16.5	130 26 29.3	4.352131	13.979
Smelter.....	317 46 52.68	137 52 54.83	4.3296562	13.275
Ely.....	327 27 21.67	147 31 50.95	4.3135223	12.790

**LAVA TIT, LINCOLN COUNTY, NEV. (Not occupied.)**

A low lava summit at north end of Dry Lake Valley and about 5 miles southeast of Sharks Tooth. It is on the east edge of broad wash which enters Dry Lake Valley from the north.

Signal and station mark: Apparent highest point.

[Latitude  $38^{\circ} 07' 05.4''$ . Longitude  $114^{\circ} 49' 31.1''$ ]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Bailey.....	241 11 34	61 15 49	4.05903	7.118
Jackrabbit.....	279 10 53	99 18 56	4.28637	12.015
Bristol.....	298 31 46	118 39 58	4.34445	13.734
Gap.....	308 54 42	129 03 48	4.42080	16.374
Highland.....	318 48 58	138 58 08	4.51870	20.514

**LITTLE SUMMIT, LINCOLN COUNTY, NEV. (Not occupied.)**

A rocky, sharp point on ridge about 5 miles east of Rose Valley. It is on south side of Modena-Rose Valley road and about 2 miles south from the point on this road locally known as Little Summit.

Signal and station mark: Apparent highest point.

[Latitude  $37^{\circ} 54' 29.2''$ . Longitude  $114^{\circ} 08' 18.0''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Highland.....	87 49 34	267 33 22	4.58790	24.088
Red Hill.....	89 14 32	269 03 53	4.40477	15.780
Red Butte.....	124 12 07	304 05 39	4.26964	11.561
Spring Valley.....	146 43 36	326 38 29	4.25193	11.099

**LOW CONE, LINCOLN COUNTY, NEV. (Not occupied.)**

A low red cone in the valley of Patterson Wash; it is on the east side of wash and about 6 miles northeast from Eightmile well.

Signal and station mark: Apparent highest point.

[Latitude  $38^{\circ} 03' 45.3''$ . Longitude  $114^{\circ} 22' 43.9''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Smelter.....	24 16 31	204 14 06	4.14633	5.704
Bristol.....	77 29 52	257 21 32	4.30670	12.591
Parsnip.....	206 52 31	26 54 31	4.01844	6.483
Spring Valley.....	281 03 06	101 07 53	4.06182	7.164

**NORTH CONE, LINCOLN COUNTY, NEV. (Not occupied.)**

The smaller and sharper of two cone-shaped hills about 7 miles northeast from Bristol Well and 8 miles northwest from Bristol Pass.

Signal and station mark: Apparent highest point.

[Latitude  $38^{\circ} 12' 39.5''$ . Longitude  $114^{\circ} 40' 21.4''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wilson.....	261 53 06	82 03 25	4.39043	15.268
Parsnip.....	283 07 39	103 20 32	4.49544	19.444
Red Butte.....	306 13 28	126 26 45	4.59226	24.300
Smelter.....	325 30 58	145 39 25	4.54957	22.025

## PAGE, LINCOLN COUNTY, NEV.

A three-point station to locate quarter corner.

On a cedar and nut-pine covered hill west of Page Creek and about half a mile north from the ranch of H. I. Olinghouse.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pole and flag.

Reference marks: (A) Chiseled cross in rock distant from station mark 5.8 feet and in true azimuth  $231^{\circ} 10'$ ; (B) chiseled cross in rock distant from station mark 46 feet and in true azimuth  $298^{\circ} 39'$ . Quarter-corner description is as follows: T. 4 N., Rs. 67 and 68 E., Mount Diablo meridian, quarter corner to secs. 19 and 24 is distant from Page triangulation station mark 485 feet and in true azimuth  $272^{\circ} 01' 20''$ .

[Latitude  $38^{\circ} 11' 34.72''$ . Longitude  $114^{\circ} 24' 42.47''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Ely.....	12 04 01.58	192 01 26.32	4.4684326	18.280
Highland.....	23 48 31.85	203 42 22.83	4.5593252	22.525
Bristol.....	41 50 13.58	221 43 06.21	4.4035009	15.734
Wilson.....	195 17 28.58	15 18 06.33	3.7502913	3.496

## PARSNIP, LINCOLN COUNTY, NEV.

On the rocky summit of Parsnip Mountain, Wilson Creek Range, in the northeast corner of T. 3 N., R. 68 E., Mount Diablo meridian. It is south from the head of Hultz Creek, on main divide between Patterson Wash and the Spring Valley drainage basin. It can be reached with animals by trail up the right fork of Hultz Creek (via the old Hultz ranch), then from the head of right fork follow ridge south to station.

Station mark: Bronze triangulation tablet cemented in rock.

Signal (U. S. Coast and Geodetic Survey station White Rock 1881 A): Rock cairn 10 feet high distant from station mark 8.2 feet and in true azimuth  $335^{\circ} 12' 40''$ . (A large shapely mound of stone was found on Parsnip Peak, the upper portion partly destroyed. This was rebuilt and used as the signal for Parsnip station.)

Reference marks: (A) Chiseled cross in rock distant from station mark 13.6 feet; (B) chiseled cross in rock distant from station mark 23 feet.

[Position of U. S. Geological Survey tablet: Latitude  $38^{\circ} 08' 47.11''$ ; longitude  $114^{\circ} 19' 30.21''$ . Position of U. S. Coast and Geodetic Survey cairn: Latitude,  $38^{\circ} 08' 47.03''$ ; longitude  $114^{\circ} 19' 30.17''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Quarter Corner.....	13 29 51.33	193 28 44.97	4.0505959	6.982
Trestle.....	20 16 23.39	200 13 09.23	4.3161609	13.788
Smelter.....	23 25 06 39	205 20 41.62	4.3880550	15.184
Low Cone.....	20 54 31	206 52 31	4.01844	6.483
Ely.....	30 16 53 92	210 11 06.31	4.4364710	16.970
Highland.....	38 30 30 44	218 21 09.20	4.5333680	22.219
Eightmile.....	45 56 04 5	225 50 27.5	4.25202	11.260
Bristol.....	60 49 51 51	240 39 31.76	4.441793	17.439
Jackrabbit.....	75 56 57 01	255 46 28.87	4.4075926	15.883
Bailey.....	94 08 34 86	273 54 17.00	4.5300638	21.078
Fairview Peak.....	101 15 32	281 02 11	4.50714	19.975
North Cone.....	103 20 32	283 07 39	4.49344	19.444
Wilson.....	150 02 16 61	329 59 41.27	4.0875365	7.601
Foglian.....	298 24 16.10	118 30 13.58	4.2054414	9.972
Pioche (1883).....	306 24 08 71	126 34 16.27	4.4733260	18.564
Spring Valley.....	330 13 13.42	150 16 00.22	4.1229931	8.248
White Rock (1883 U. S. Coast and Geodetic Survey).....	335 12 40			8.2
Section Corner.....	350 35 43.97	170 36 39.83	4.1308522	8.398
Red Butte.....	356 22 38.85	176 23 04.47	4.2051928	9.967

• Feet.

**PIOCHE, LINCOLN COUNTY, NEV.**

A station of the U. S. Coast and Geodetic Survey on mountain locally known as Government Peak, about 2 miles southwest of State Line, Utah. About 33 miles by road and 22.5 miles direct in an easterly direction from the town of Pioche. The station is marked by a copper bolt leaded in a drill hole in solid bedrock. The station is nearly surrounded by a ring wall of rocks having an inner diameter of about 11 feet.

Four reference marks, each a drill hole in solid rock, are just outside the wall at the following distances and azimuths from the station: 2.52 meters,  $214^{\circ} 28'$ ; 2.41 meters,  $271^{\circ} 38'$ ; 2.72 meters,  $344^{\circ} 46'$ ; and 2.35 meters,  $92^{\circ} 30'$ . Pioche latitude station, marked by a masonry pin, is 12.10 meters from the station in azimuth  $135^{\circ} 57'$ . The vertical circle station, nearly surrounded by a ring wall of rocks with an inner diameter of 8 feet, is 21.1 meters north-northwest from the station.

Station can easily be reached with animals from State Line, Utah.

[Latitude  $37^{\circ} 59' 10.90''$ . Longitude  $114^{\circ} 03' 04.82.''$ ]

To station—	Azimuth.	Back azimuth.	Distance.
Bennett.....	* * "	* * "	<i>Log. meters.</i> Miles.
Gray Cone.....	69 39 19	249 20 36	4.67818 29.616
Highland (U. S. Geological Survey).....	73 58 47	253 45 39	4.51298 20.245
Ely.....	77 41 13.98	257 21 47.89	4.670025 29.472
Smelter.....	81 21 31.80	261 05 38.70	4.582009 23.782
Red Butte.....	83 00 11.47	262 45 40.96	4.5416715 21.628
Bristol.....	94 26 45.09	274 17 04.07	4.3635618 14.352
South Parsnip.....	94 56 17.02	274 35 51.64	4.6877241 30.274
White Rock (U.S. Coast and Geodetic Survey station).....	119 18 38	299 09 45	4.38286 15.004
Parsnip.....	126 34 07.95	306 24 00.39	4.4752941 18.563
Wilson.....	126 34 16.27	306 24 08.71	4.4753260 18.564
Fogliani.....	133 22 44.10	313 10 00.82	4.6167366 25.709

**PIOCHE SCHOOL, LINCOLN COUNTY, NEV. (Not occupied.)**

Cupola in the concrete school building in the town of Pioche.

Signal and station mark: Center of cupola.

[Latitude  $37^{\circ} 56' 02.30''$ . Longitude  $114^{\circ} 20' 59.78''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Ely.....	* * "	* * "	<i>Log. meters.</i> Miles.
Bristol.....	89 32 23.35	269 31 02.93	3.4467459 1.738
Spring Valley.....	126 05 11.62	306 00 29.97	4.2242785 10.414

**PIOCHE TANK, LINCOLN COUNTY, NEV. (Not occupied.)**

Steel railroad water tank near the station, town of Pioche.

Signal and station mark: Center of tank.

[Latitude  $37^{\circ} 56' 41.88''$ . Longitude  $114^{\circ} 26' 19.42''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Ely.....	* * "	* * "	<i>Log. meters.</i> Miles.
Bristol.....	71 48 58.8	251 47 23.5	3.600041 2.350
Red Hill.....	120 53 36.2	300 40 29.6	4.227982 10.504

## QUARTER CORNER, LINCOLN COUNTY, NEV.

Three-point station (checked).

Station mark: Quarter-section corner stone.

Signal: None.

[Latitude 38° 02' 52.75". Longitude 114° 21' 17.76".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Ely.....	41 20 47.60	221 16 06.60	4.2273010	10.487
Bristol.....	82 48 34.48	262 39 21.67	4.3435441	13.706
Parsnip.....	193 28 44.97	13 29 51.33	4.0505959	6.982
Spring Valley.....	273 40 46.27	93 44 39.17	3.9654022	5.738

## RED BUTTE, LINCOLN COUNTY, NEV.

A three-point station on the west summit of a large red butte (longest axis northeast and southwest) northeast from town of Pioche. It is north of the Eagle Valley-Pioche road and about 1.5 miles south of the Spring Valley-Pioche road.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Cedar tree, brushy top. Cairn around base and set off center 1 foot in the same azimuth as Pioche triangulation station.

Reference marks: (A) Chiseled cross in rock distant from station mark 7.4 feet and in true azimuth 45° 28'; (B) chiseled cross in rock distant from station mark 7.7 feet and in true azimuth 257° 04'.

[Latitude 38° 00' 07.92". Longitude 114° 18' 48.67".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Red Hill.....	42 43 09.90	222 38 58.52	4.1678011	9.144
South Highland.....	34 47 07	214 38 10	4.57454	23.329
Gray Cone.....	37 23 23	217 19 55	4.13354	8.45
Highland.....	62 47 11.07	242 37 25.21	4.4179046	16.265
Ely.....	62 51 24.92	242 45 12.34	4.2206456	10.328
Bristol.....	93 13 13.23	275 02 28.89	4.4086835	15.923
Fairview Peak.....	124 21 57	304 10 42	4.59596	24.508
North Cone.....	126 26 45	306 13 28	4.59226	24.300
Parsnip.....	176 23 04.47	356 22 38.85	4.2051928	9.967
White Rock No. 2.....	184 23 05	4 23 32	4.13731	8.525
South Parsnip.....	190 57 42	10 58 31	4.00955	6.352
Spring Valley.....	231 12 06.58	51 14 28.5	3.8548731	4.448
Pioche.....	274 17 04.07	94 26 45.09	4.3635618	14.352
Little Summit.....	304 05 39	124 12 07	4.26064	11.561

## RED HILL, LINCOLN COUNTY, NEV.

On summit of a red hill at south end of ridge of which Mount Ely is the north end. It is about 3 miles south from the town of Pioche and can be reached easily with animals from the Pioche-Panaca road.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 11.2 feet and in true azimuth 12° 45'; (B) chiseled cross in rock distant from station mark 28.1 feet and in true azimuth 119° 14'.

[Latitude 37° 54' 17.01". Longitude 114° 25' 37.42".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
South Highland.....	29 39 30	209 34 44	4.36240	14.327
Bennett.....	56 43 18	236 38 26	4.14281	8.633
Highland.....	84 57 10.98	264 51 36.82	4.1252379	8.291
Ely.....	123 50 46.94	303 48 45.94	3.7626372	3.597
Smelter.....	162 12 45.66	342 12 07.31	3.6978051	3.099
Tank.....	167 04 06.54	347 03 40.72	3.6611270	2.484
White Rock.....	204 11 01	24 15 39	4.42915	16.602
Red Butte.....	222 38 58.52	42 43 09.90	4.1674011	9.144
Little Summit.....	269 03 53	89 14 32	4.40477	15.790
Gray Cone.....	269 43 03	89 43 46	3.23888	1.072
Bullionville.....	347 37 49.21	167 38 48.83	4.0451501	6.995

**RIM, LINCOLN COUNTY, NEV. (Not occupied.)**

A cone summit on the south end of a dark timbered hill on the rim of Salt Lake basin and about 20 miles southeast from the town of Pioche. It is about 6 miles south along the ridge from the point where the Modena-Rose Valley road crosses the summit.

Signal and station mark: Apparent highest point.

[Latitude 37° 48' 50.2". Longitude 114° 07' 32.9".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Highland.....	102 43 37	282 26 57	4.61058	25.348
Ely.....	113 06 57	292 53 50	4.53179	21.141
Spring Valley.....	156 45 55	336 41 20	4.44131	17.165

**SECTION CORNER, LINCOLN COUNTY, NEV.**

A three-point station, on range line. T. 2 N., Rs. 68 and 69 E. Mount Diablo meridian, corner to sections 13, 18, 19, and 24 (properly marked). From cedar bearing tree in place (and properly marked).

Station mark: Section-corner rock.

Signal: None.

[Latitude 38° 01' 34.61". Longitude 114° 17' 50.66".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Highland.....	59 06 54.03	238 56 38.75	4.4551548	17.721
Bristol.....	89 16 35.43	269 05 20.73	4.4267963	16.602
Parsnip.....	170 36 39.83	350 35 43.97	4.1308522	8.388
Spring Valley.....	247 32 28.76	67 34 17.85	3.6761674	2.948

**SHARKS TOOTH, LINCOLN COUNTY, NEV. (Not occupied.)**

A shark's tooth shaped butte on the Pahroc Range about 15 miles northwest from Bristol Well.

Signal and station mark: Apparent highest point.

[Latitude 38° 10' 06.9". Longitude 114° 54' 51.4".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Wilson.....	259 41 57	80 01 13	4.66481	28.715
Bailey.....	270 11 49	90 19 21	4.25125	11.082
Bristol.....	300 38 22	120 49 51	4.50036	19.660
Highland.....	315 48 52	136 01 18	4.62754	26.357

## SMELTER, LINCOLN COUNTY, NEV.

Brick chimney of Pioche smelter.

Station mark and signal: Center of chimney.

[Latitude 37° 56' 51.01". Longitude 114° 26' 39.82".]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	"	*	"	Log. meters.	Miles.
Highland.....	63 16	35.15	243 11	39.18	4.1197226	8.186
Ely.....	65 06	21.24	245 04	58.55	3.5388452	2.250
Stampede.....	103 49	20.74	283 44	20.19	4.0892316	7.631
Bristol.....	120 50	11.74	300 44	17.77	4.2131998	10.152
Jackrabbit.....	137 52	54.83	317 46	52.68	4.3296862	13.275
Fairview Peak.....	143 21	03	323 11	37	4.54784	21.937
North Cone.....	145 39	25	325 30	58	4.54957	22.025
Low Cone.....	204 14	06	24 16	31	4.14633	8.704
Parsnip.....	235 20	41.62	25 25	06.29	4.3880550	15.184
Spring Valley.....	238 13	26.38	58 20	37.27	4.3027112	12.476
Pioche.....	262 45	40.96	83 00	11.47	4.5416715	21.628
Red Hill.....	342 12	07.31	162 12	45.66	3.6978051	3.099

## SOUTH HIGHLAND, LINCOLN COUNTY, NEV. (Not occupied.)

The north summit of that part of the Highland Range which lies to the south of Bennett Pass.

Signal and station mark: Apparent highest point.

[Latitude 37° 43' 26.9". Longitude 114° 33' 23.4".]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	"	*	"	Log. meters.	Miles.
Ely.....	195 45	47	15 48	32	4.38344	15.024
Red Hill.....	209 34	44	29 39	30	4.36280	14.327
Red Butte.....	214 38	10	34 47	07	4.57454	23.329
Spring Valley.....	217 14	31	37 25	49	4.64800	27.628

## SOUTH PARSNIP, LINCOLN COUNTY, NEV. (Not occupied.)

A summit on the Wilson Creek Range, similar in shape but smaller and lower than Parsnip Peak. It lies to the west of Spring Valley and is 8 miles southeast of Parsnip Peak.

Signal and station mark: Apparent highest point.

[Latitude 38° 05' 33.4". Longitude 114° 17' 28.9".]

To station—	Azimuth.	Back azimuth.	Distance.			
	*	"	*	"	Log. meters.	Miles.
Red Butte.....	10 58	32	190 57	42	4.00955	6.352
Ely.....	43 32	19	223 24	17	4.38238	14.987
Bristol.....	74 20	36	254 10	02	4.45521	17.724
Pioche.....	299 09	45	119 18	38	4.38286	15.017
Spring Valley.....	326 47	05	146 48	37	3.82184	4.123

## SOUTH RIM, LINCOLN COUNTY, NEV. (Not occupied.)

A dark timbered cone summit about 20 miles southeast from town of Pioche and about 7 miles south along ridge from the point where the Modena-Rose Valley road crosses the summit.

Signal and station mark: Apparent highest point.

[Latitude 37° 47' 54.4". Longitude 114° 08' 30.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Highland.....	105 34 21	285 18 17	4.60052	24.767
Ely.....	116 45 13	296 32 42	4.52453	20.845
Spring Valley.....	160 40 17	340 36 18	4.45823	17.848

**SPRING VALLEY, LINCOLN COUNTY, NEV.**

On divide between Spring Valley and Patterson Wash. On the west point of a double summit. A red-rock, cedar-covered hill at the south end of the Wilson Creek Range. It is about 6 miles southwest from the Spring Valley ranch of Louis Fogliani; about 1.5 miles south from the Spring Valley-Pioche road and about 3 miles southwest of Danton Spring, from which it can be easily reached with animals.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pine tree, brushy top, set off center 9.3 feet and in true azimuth 56° 37'.

Reference marks: (A) Chiseled cross in rock distant from station mark 11.3 feet and in true azimuth 155° 26'; (B) chiseled cross in rock distant from station mark 20.4 feet and in true azimuth 278° 41'.

[Latitude 38° 02' 33.26". Longitude 114° 14' 59.85."]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
South Highland.....	37 25 49	217 14 31	4.64900	27.128
Gray Cone.....	42 10 58	222 05 07	4.31398	12.903
Bennett.....	49 55 27	229 44 03	4.53089	22.092
Red Butte.....	51 14 28.53	231 12 06.6	3.8548731	4.449
Pioche School.....	55 35 58.82	235 28 35.71	4.3285283	13.240
Smelter.....	58 20 37.27	238 13 26.38	4.3027112	12.476
Ely.....	59 23 37.53	239 15 03.95	4.3743199	14.712
Section Corner.....	67 34 17.85	247 32 28.76	3.6761674	2.948
Bristol.....	86 04 35.30	265 51 29.70	4.4937948	19.37
Quarter Corner.....	93 44 39.17	273 40 46.27	3.9054022	5.738
Low Cone.....	101 07 53	281 03 06	4.06182	7.164
South Parsnip.....	116 48 37	326 47 05	3.82184	4.123
Parsnip.....	150 16 00.22	330 13 13.42	4.1229931	8.248
White Rock.....	153 48 05	333 46 10	4.01068	6.368
Fogliani.....	242 43 42.29	62 46 52.68	3.9278139	5.262
Pioche.....	289 37 47.02	109 45 07.38	4.2577687	11.511
Little Summit.....	326 38 29	146 43 36	4.25193	11.099
Rim.....	336 41 20	156 45 55	4.44131	17.163
South Rim.....	340 36 17	160 40 17	4.45823	17.848

**STAMPEDE, LINCOLN COUNTY, NEV. (Not occupied.)**

On summit of rocky hill at south end of Bristol Range, about 1 mile northeast of Stampede Gap. Can be reached with animals from the gap.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pine tree, brushy top, cairn around base and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 11.5 feet, bears north; (B) chiseled cross in rock distant from station mark 11 feet, bears southeast.

[Latitude 37° 58' 25.90". Longitude 114° 34' 48.42".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Gap.....	61 44 40.9	241 44 14.6	3.073252	0.736
Bristol.....	158 47 00.25	338 46 06.98	3.7658856	3.624
Smelter.....	283 44 20.19	103 49 20.74	4.0892356	7.631
Ely.....	297 12 33.56	117 16 11.34	3.9878050	6.042
Highland.....	358 53 31.08	178 53 35.39	3.9474219	5.505

**TRESTLE, LINCOLN COUNTY, NEV. (Not occupied.)**

The railroad trestle over Patterson Wash about 3 miles northeast from the town of Pioche.

Signal and station mark: Center of trestle.

[Latitude 37° 57' 31.86". Longitude 114° 24' 45.17".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Bristol.....	112 56 21.8	292 49 17.2	4.261725	11.352
Jackrabbit.....	130 26 29.3	310 19 16.5	4.352131	13.979
Parsnip.....	200 13 09.2	20 16 23.4	4.346161	13.788

**WEST LAVA, LINCOLN COUNTY, NEV. (Not occupied.)**

The summit of a large hill on west side of and about 2,000 feet above Dry Lake Valley. It is about 20 miles west of Stampede Gap and lies south of and on the same ridge as Sharks Tooth.

Signal and station mark: Apparent highest point.

[Latitude 37° 57' 38.2". Longitude 114° 53' 53.5".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Bailey.....	215 30 39	35 37 33	4.45144	17.570
Wilson.....	234 34 53	54 53 31	4.73298	33.599
Jackrabbit.....	240 29 45	60 40 28	4.46656	18.193
Bristol.....	254 56 19	75 07 09	4.42712	16.614
Highland.....	284 38 51	104 48 39	4.46376	18.076

**WHITE CLIFF, LINCOLN COUNTY, NEV. (Not occupied.)**

A light-colored summit on the foothills west of the Bristol Range. It is on west side of road from Bristol Well to Stampede Gap and about 3 miles southwest of Bristol Well. The summit breaks off abruptly on the west side, but on the east the slope is easy climbing for animals.

Signal and station mark: Apparent highest point.

[Latitude 38° 03' 20.5". Longitude 114° 41' 27.0".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• / "	• / "	Log. meters.	Miles.
Bailey.....	172 00 43	351 59 59	4.09935	7.811
Jackrabbit.....	242 17 18	62 20 23	3.91569	5.117
Bristol.....	295 34 25	115 37 37	3.92620	5.242
Gap.....	317 58 34	138 02 14	4.11311	8.062
Highland.....	331 04 39	151 08 48	4.31156	12.732

**WHITE ROCK NO. 2 (U. S. GEOLOGICAL SURVEY), LINCOLN COUNTY, NEV.  
(Not occupied.)**

A sharp rocky summit on the Wilson Creek Range about 2 miles southeast from Parsnip Peak. It has large patches of light-colored rocks exposed on the south, east, and west slopes.

Signal and station mark: Apparent highest point.

[Latitude 38° 07' 31.6". Longitude 114° 18' 05.6".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Red Butte.....	• ′ ″	• ′ ″	4.13731	8.144
Red Hill.....	4 23 32	184 23 06	4.42915	16.892
Ely.....	24 15 39	204 11 01	4.42345	16.474
Bristol.....	36 41 32	218 34 52	4.46075	17.951
Spring Valley.....	66 52 00	246 41 38	4.01068	6.368
	333 46 10	153 48 05		

## WILSON, LINCOLN COUNTY, NEV.

On the west summit of Mount Wilson near north end of Wilson Creek Range, in T. 4 N., R. 68 E. Mount Diablo meridian. It is about 4 miles north from the 7L ranch, owned by H. I. Olinghouse, on Page Creek and can be easily reached with animals from this ranch.

Station mark: Bronze triangulation tablet cemented in rock.

Signal: Pine tree, brushy top, braced with poles and centered over station mark.

Reference marks: (A) Chiseled cross in rock distant from station mark 22 feet and in true azimuth 350° 05'; (B) chiseled cross in rock distant from station mark 16.9 feet and in true azimuth 52° 31'.

[Latitude 38° 14' 30.76". Longitude 114° 23' 41.44".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Ely.....	• ′ ″	• ′ ″	4.5445520	21.772
Page.....	12 35 42.43	192 32 29.43	3.7502913	3.497
Eightmile.....	15 18 06.33	195 17 28.58	4.383987	15.043
Highland.....	16 32 40.30	196 29 45.8	4.6214328	25.989
Bristol.....	22 40 39.09	202 33 52.16	4.4837365	18.927
Jackrabbit.....	37 06 42.46	216 58 57.18	4.4002227	15.616
West Lava.....	47 59 40.23	227 51 46.87	4.73298	33.599
Black Cliff.....	54 53 31	234 34 53	4.81251	40.332
Bailey.....	72 34 48	252 08 39	4.4603818	17.936
Sharks Tooth.....	73 33 26.35	253 21 42.98	4.66481	28.718
North Cone.....	80 01 13	259 41 57	4.39043	13.268
Black Cone.....	82 03 25	261 53 06	4.63681	26.925
Foxlani.....	85 52 09	265 33 50	4.4350641	16.921
Ploche.....	311 59 21.12	132 07 54.19	4.6167366	25.709
Parsnip.....	313 10 00.82	133 22 44.10	4.0875365	7.601
	329 59 41.27	150 02 16.61		

## NEW YORK, NEW JERSEY, AND PENNSYLVANIA.<sup>1</sup>

### TRIANGULATION STATIONS.

#### Milford and White Lake quadrangles.

SULLIVAN COUNTY, N. Y.; SUSSEX COUNTY, N. J.; PIKE AND WAYNE COUNTIES, PA.

Triangulation control for above-named quadrangles was obtained in 1913 by George T. Hawkins. Positions are based upon Coast and Geodetic Survey stations Culvers Gap and High Point, N. J., North American datum.

#### CULVERS GAP, SUSSEX COUNTY, N. J.

A station of the United States Coast and Geodetic Survey on southwest side of Culvers Gap on ridge of Blue Mountains about 200 paces from its abrupt end at gap and 170 paces southwest from spot where recently stood tower, the location of which is well known in that region. The land is owned by estate of Capt. Robt. J. Holman, who lived at New Brunswick, N. J. Culvers Gap is about 3.5 miles from Branchville, on road to Milford, Pa. Branchville is nearest railroad station and can be reached by Sussex Railroad, a branch of the Delaware, Lackawanna & Western Railroad. To reach station proceed from "Mounted House" (a hotel just northwest of gap) toward Branchville, 0.25 mile to wood road near culvert, lead-off to right, and following this wood road around end and up side of mountain to "old tower" and thence along ridge of mountain to station.

Station mark: Copper bolt  $\frac{1}{4}$  inch in diameter driven into rock even with its surface. Just west of bolt about 4 inches is an offset in ledge which rises 6 or 8 inches, upon which there is a cross cut.

Reference marks: Cross mark on ledge south 6 feet 4 inches; loose boulder with cross mark northeast 16 feet 3 inches.

NOTE.—John Stepenfield, who lives on the east side of the mountain and found the bolt for Edwin Smith in 1908, and William V. Sutton, who lives at the Mountain House, and was lamp tender for Mr. Smith, know where the station is.

[Latitude  $41^{\circ} 10' 21.060''$ . Longitude  $74^{\circ} 47' 41.862''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ° "	• ° "	Log. meters.	Miles.
Hamburg.....	276 51 31.19	97 01 57.87	4.3493179	.....
Mount Olive.....	348 41 03.72	168 44 13.74	4.5385140	.....
Montana.....	26 19 47.42	206 09 21.34	4.7032545	.....
Hilliard.....	143 45 29.53	323 39 57.14	4.2971507	12.325
Greening.....	150 10 44.20	330 04 44.78	4.4059640	15.824
Buck.....	172 28 44.24	352 27 12.72	4.3914970	15.305

<sup>1</sup> Additional data for New York are given on pages 479-492; for Pennsylvania on pages 493-496.

## HIGH POINT, SUSSEX COUNTY, N. J.

A station of the United States Coast and Geodetic Survey on prominent projection of Blue Ridge, highest point in State, 4 miles south of Port Jervis, 3.5 miles northwest of Coleville, 1 mile north of (New Jersey) turnpike leading from Coleville to Port Jervis, on land owned by Mrs. C. S. Rutherford. To reach station leave above-mentioned turnpike on crest of mountain and follow well-conditioned road to "Little Pond" or Mascia Lake and thence along an indifferent road by shore of Pond to foot of High Point, and up hill by path to station.

Station mark: Copper bolt in ledge to within  $\frac{1}{2}$  inch of its end.

Reference marks: Cross on large boulder 5 feet 10 $\frac{1}{2}$  inches northeast; north 8 feet to cross mark cut in flat ledge; north 21 feet to south corner of tower.

NOTE.—James E. Fuller and Sheridan Bross, both living on mountain along turnpike, know where station is. Station was recovered in 1908; no reference marks were found, but bolt was in place and there is no doubt of recovery of station. The boulder mentioned is there and not likely to be removed, but cross has been chipped off.

[Latitude 41° 19' 15.223". Longitude 74° 39' 12.833".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Bear Fort.....	311 25 20.30	131 36 00.50	4.4802153	.....
Hamburg.....	330 05 10.77	150 10 22.60	4.3448148	.....
Culver Gap.....	34 08 12.03	214 02 56.17	4.2988189	.....
Hilliard.....	88 51 47.03	268 40 58.47	4.3593260	14. 213
Greening.....	103 20 29.54	283 09 13.10	4.3883974	15. 197
Buckhorn.....	118 59 47.97	298 52 50.76	4.2151097	10. 197
McKinzie.....	144 20 15.12	324 14 21.48	4.3292016	13. 224
Liberty.....	170 09 44	350 05 13	4.72032	32. 624

## LIBERTY, SULLIVAN COUNTY, N. Y. (Not occupied.)

The main tower of hotel on Walnut Hill near the town of Liberty.

[Latitude 41° 47' 10.55". Longitude 74° 46' 11.04".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
McKenzie.....	5 37 00	185 35 43	4.53880	21. 486
Weber.....	34 07 50	213 59 59	4.46610	18. 174
Vine.....	56 38 54	236 22 51	4.60857	25. 230
High Point.....	350 05 13	170 09 44	4.72032	32. 624

## MCKENZIE, SULLIVAN COUNTY, N. Y.

South chimney on Mr. Ed. McKenzie's house, which is on high wooded knoll about 4 miles nearly north from Pondeddy and 12 miles northwest from Port Jervis. A good view in all directions.

Signal and station mark: Center of south chimney.

[Latitude 41° 28' 35.37". Longitude 74° 48' 37.60".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Buckhorn .....	11 40 13.86	191 39 18.91	3.9704034	5. 926
Bald.....	53 45 40.57	233 40 29.67	4.1312400	8. 406
Vine.....	111 35 57.37	291 21 23.50	4.5163034	20. 401
Weber.....	128 04 05	307 57 52	4.21852	10. 27
Liberty.....	185 35 43	5 37 00	4.53880	21. 486
High Point.....	324 14 21.48	144 20 15.12	4.3292016	13. 224

## WEBER, SULLIVAN COUNTY, N.Y.

About 7 miles east of Narrowsburg, 7 miles north of Lackawaxen, and 1.5 miles southwest of Four Corners at Beaver Brook post office on a low bald knob owned by Mr. George Weber and 60 yards west of his house. Good view except southeast.

Station mark: A triangulation tablet in stone in place 4 feet by 4 feet by 6 inches above ground.

Signal: Sawed lumber tripod.

Reference marks: Cross cut on rock in place 30 feet northeast.

[Latitude  $41^{\circ} 34' 05.50''$ . Longitude  $74^{\circ} 57' 59.60''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Vine.....	96 03 06	275 54 44	4.24508	10.940
Liberty.....	213 59 59	34 07 50	4.40610	18.174
McKenzie.....	307 57 52	128 04 05	4.21852	10.277

## BALD, PIKE COUNTY, PA.

On a hill known locally as Bald Hill, about 10 miles southeast from Lackawaxen, and 2 miles northeast of Shohola Falls. Hill is covered with dense growth of scrub oak about 6 feet high and has few scattering dead pines. Good view in all directions except south. Mr. Jerry Greening, who lives near forks of road south of station, knows its location.

Station mark: Aluminum tablet cemented in rock in place 24 by 18 by 12 inches above ground on highest part of hill.

Signal: Targets in dead pine.

[Latitude  $41^{\circ} 24' 15.88''$ . Longitude  $74^{\circ} 56' 27.34''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Greening.....	7 01 08.77	187 00 55.93	3.5680145	2.298
Vine.....	135 35 17.67	315 25 55.74	4.4482038	17.444
McKenzie.....	233 40 29.67	53 45 40.57	4.1312400	8.406
Buckhorn.....	278 24 50.46	98 29 06.19	3.9581785	5.643

## BUCKHORN, PIKE COUNTY, PA.

About 5 miles north of Milford and about 5 miles southeast of Pondeddly on point locally known as Buckhorn on State forest land and about 0.5 mile west of second-class road between Milford and Pondeddly.

Signal: A 12-inch pine trimmed up and white targets fastened about 20 feet from ground.

Station mark: Sandstone post 6 by 8 by 30 inches set 24 inches in ground with tablet cemented in top.

[Latitude  $41^{\circ} 23' 32.62''$ . Longitude  $74^{\circ} 50' 00.63''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Hilliard.....	45 14 55.94	225 10 54.51	4.0780056	7.436
Greening.....	76 08 00.48	256 03 31.98	3.9877724	6.041
Bald.....	98 29 06.19	278 24 50.46	3.9581785	5.643
McKenzie.....	191 39 18.91	11 40 13.86	3.9794034	5.926
High Point.....	298 52 59.76	118 59 47.97	4.2151097	10.197
Culvers Gap.....	352 27 12.72	172 28 44.24	4.3914970	15.305

## GREENING, PIKE COUNTY, PA.

About 10 miles north of west from Milford on land owned by Jerry Greening and 0.5 mile southeast from his house on hill covered with scrub brush 6 feet high. From Milford follow pike leading to Shohola to Jerry Greenings then by old trail to point.

Mr. Greening knows location.

Signal: Sawed lumber tripod with targets.

Station mark: A sandstone block 10 by 12 by 30 inches set 26 inches in ground, cross cut on top.

Reference marks: Three piles of stone, one east 10 feet distant, one southwest 10 feet distant, one northwest 10 feet distant.

[Latitude 41° 22' 16.89". Longitude 74° 56' 46.79".]

To station—	Azimuth.	Back azimuth.	Distance.	
Vine.....	• ' " 18.94	• ' " 320 52 10.06	Log. meters.	Miles.
Bald.....	141 01 18.94	7 01 08.77	4.4845337	18.96
Buckhorn.....	187 00 55.93	256 03 31.98	3.5680145	2.28
High Point.....	256 03 31.98	283 09 13.10	3.987724	6.041
Culvers Gap.....	283 09 13.10	330 04 44.78	4.3883974	15.197
Hilliard.....	330 04 44.78	351 09 30.94	4.4059640	15.824
			3.7901079	3.832

## HILLIARD, PIKE COUNTY, PA.

About 10 miles nearly west from Milford on land owned by Mr. J. G. Hilliard and between the Log Cabin lakes about same distance from each. The point used is in the woods and across the big Log Cabin Lake from Mr. Hilliard's house, and is a lookout tower 40 feet high built of rough timber and has flag pole in center. To reach point from Milford, go 10½ miles on pike to fork of good private road, to Mr. Hilliard's house. From house row across lake about 0.25 mile, then by trail to tower.

Station mark: Sandstone post, 6 by 8 by 30 inches, set 25 inches in ground.

One inch hole 1 inch deep and cross cut across top.

Reference marks: 4 corners of tower 11 feet northwest, northeast, southwest, and southeast.

[Latitude 41° 18' 59.35". Longitude 74° 56' 06.03".]

To station—	Azimuth.	Back azimuth.	Distance.	
Greening.....	• ' " 171 09 57.86	• ' " 351 09 30.94	Log. meters.	Miles.
Buckhorn.....	171 09 57.86	225 10 54.51	3.7901079	3.832
High Point.....	225 10 54.51	268 40 58.47	4.0780056	7.436
Culvers Gap.....	268 40 58.47	323 39 57.14	4.3593266	14.213
			4.2974507	12.325

## VINE, WAYNE COUNTY, PA.

About 7.5 miles southwest from Narrowsburg Mount, and 1.5 miles southwest from Beech Lake on land owned by Mr. Marshall and 0.25 mile southwest from his house, in cleared field on highest hill in neighborhood.

Signal: Sawed lumber tripod with targets.

Station mark: Aluminum Pennsylvania tablet in rock in place 8 by 4 feet, projecting 2.5 feet above ground.

Reference mark: Cross cut in rock in place 24 feet northeast from center. Signal over center.

[Latitude 41° 35' 05.04". Longitude 75° 10' 35.48".]

To station—	Azimuth.	Back azimuth.	Distance.	
Liberty.....	• ' " 236 22 51	• ' " 56 38 54	Log. meters.	Miles.
Weber.....	236 22 51	96 03 06	4.60857	25.230
McKenzie.....	275 54 44	111 35 57.37	4.24568	10.940
Bald.....	291 21 23.59	135 35 17.67	4.5163034	20.401
Greening.....	315 25 55.74	141 01 18.94	4.4482938	17.444
			4.4845337	18.963

**PRIMARY TRAVERSE.****Hawley, Milford, and Wallpack quadrangles.****SUSSEX COUNTY, N. J.; SULLIVAN COUNTY, N. Y.; PIKE COUNTY, PA.**

The following geographic positions on North American datum were determined by G. T. Hawkins in 1913, and are based on Hilliard, Greening, and McKenzie triangulation stations of the United States Geological Survey (see pp. 474, 476) and on triangulation station Culver Gap of the Coast and Geodetic Survey.

**WALLPACK QUADRANGLE.****Along highways through northern part of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>NEW JERSEY.</b>			
Culvers Gap, on southwest side of, on ridge of Blue Mountains, about 200 paces from its abrupt end at gap and 170 paces southwest from spot where recently stood tower, the location being well known in that region; copper bolt in rock with several reference marks near by (Coast and Geodetic Survey triangulation station Culvers Gap).....	° ' "	° ' "	Feet.
Layton, 1 mile southeast of, 30 feet south to signboard; three corners.....	41 10 21.06	74 47 41.86	.....
Layton post office, four corners at.....	41 12 03.5	74 49 11.6	12,435
Dingmans Ferry, 1 mile east of, near east end of iron bridge over Delaware River; three corners.....	41 12 55.3	74 49 39.2	5,653
Dingmans Ferry, four corners at post office.....	41 13 12.5	74 51 25.0	8,274
<b>PENNSYLVANIA.</b>			
Dingmans Ferry, four corners at post office.....	41 13 23.2	74 52 17.2	4,127
Dingmans Ferry, 1.25 miles northwest of, 15 feet northwest to sign "Edgemere 6½ mi.", three corners.....	41 14 02.3	74 53 07.6	5,524
Dingmans Ferry, 2.5 miles northwest of, at white schoolhouse 25 feet northeast to signpost; four corners.....	41 14 10.2	74 54 29.0	6,270
Dingmans Ferry, 3.5 miles northwest of, 30 feet east to pine at corner of fence; second-class fork to north.....	41 14 37.6	74 55 20.9	4,840

Magnetic declination for north border of quadrangle,  $8^{\circ} 58' W.$ **MILFORD QUADRANGLE.****Along highways near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>NEW YORK.</b>			
Lackawaxen, 1.8 miles east of, 1,000 feet northeast to white house and barn; second-class fork north.....	° ' "	° ' "	Feet.
Barryville, 1 mile west of; bridge at mouth of hollow.....	41 28 47.3	74 57 22.3	8,344
Barryville, in west part of; four corners on towpath.....	41 28 58.7	74 55 56.1	6,674
Barryville, in east part of, 300 feet to church on hill; four corners on towpath.....	41 28 42.9	74 55 25.2	2,851
Barryville, 0.5 mile southeast of, at Dr. Ash's office; three corners.....	41 28 41.0	74 54 48.8	2,779
Barryville, 1.5 miles east of, 100 feet southeast to signpost; three corners.....	41 28 25.4	74 54 30.6	2,103
Proctor estate, southeast corner of, T road east at.....	41 28 25.1	74 53 21.8	5,242
Proctor estate, southeast corner of, 20 feet northwest to signpost; three corners at.....	41 29 07.5	74 52 13.8	6,729
Pond Eddy, 4 miles nearly north of, 12 miles northwest of Port Jervis, on high wooded knoll; center of south chimney on Mr. Ed. McKenzie's house (U. S. Geological Survey triangulation station McKenzie).....	41 29 29.0	74 50 28.8	8,290
	41 28 35.4	74 48 37.5	10,060

**MILFORD QUADRANGLE—Continued.****Along highways near southwest corner and west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>PENNSYLVANIA.</b>			
Hunting Tower Hotel, 0.25 mile east of, just east of sawmill; second-class T road north.....	° ' "	° ' "	
Silver Lake, 0.25 mile north of, 20 feet northwest to sign on tree "To Edgemere Club;" three corners.....	41 15 08.6	74 56 53.8	
Silver Lake, 0.8 mile west of, 40 feet north of east-west road, 200 feet east to Ferdinand Frank's house, 160 feet east to Bushkill Creek, in solid rock; aluminum tablet stamped "Prim. Trav. Sta. No. 1, 1913".....	41 15 33.1	74 58 53.0	9,432
Ferdinand Frank's house, 0.5 mile north of; forks in woods, roads north-northeast and south.....	41 15 32.0	74 59 47.4	4,149
Ferdinand Frank's house, 2 miles north of, 10 feet east to fire warning on red oak; forks in woods.....	41 15 53.8	74 59 43.7	2,229
Forks of Milford and Blooming Grove road and Dingman Pike, 200 feet south to signboard.....	41 16 41.8	74 58 24.6	7,753
J. G. Hilliard's house, 2 miles south of, private road at turnpike; three corners.....	41 17 54.5	74 57 44.4	7,974
Milford, 10 miles nearly west of, on land owned by Mr. J. G. Hilliard and between log cabin and lakes, about same distance from both; it is in woods and across Big Log Cabin Lake from Mr. Hilliard's house; cross cut in top of 6 by 8 by 30 inch sandstone post (U. S. Geological Survey triangulation station Hilliard).....	41 18 00.6	74 55 58.7	8,100
Milford, 10 miles north of west from, on land owned by Jerry Greening and 0.5 mile southeast from his house on hill covered with scrub brush 6 feet high; cross cut on top of sandstone post (U. S. Geological Survey triangulation station Greening).....	41 18 59.5	74 56 06.2	5,985
Jerry Greening's house, 100 yards east of; three corners.....	41 22 17.0	74 56 46.9	
Shohola Falls, 250 feet west of bridge at, 50 feet northwest to old house; three corners.....	41 22 43.6	74 57 03.8	2,984
Shohola Falls, 1.5 miles northwest of, road crossing old tramroad. Greely post office, road opposite.....	41 23 21.7	74 58 21.0	7,023
Lackawaxen, in wall east of frame house at south end of bridge over Delaware River, 20 feet southwest to front door of frame house; aluminum tablet stamped "Prim. Trav. Sta. No. 2, 1913".....	41 24 21.8	74 58 53.5	6,568
	41 25 18.0	74 59 44.6	6,886
	41 28 55.0	74 59 11.4	

Magnetic declination for south border of quadrangle,  $8^{\circ} 58' W.$ ; for west border,  $8^{\circ} 49' W.$ ; for north border,  $9^{\circ} 24' W.$

**HAWLEY QUADRANGLE.****Along highways near northeast corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>Greely Meat Market; road opposite.....</b>			
Greely Meat Market, 0.5 mile north of, 10 feet southeast to Kubler's mail box; T lane east.....	41 26 06.1	75 00 10.4	
Lackawaxen, 2 miles southwest of, second-class forks to southeast	41 26 25.4	75 00 16.4	2,007
	41 27 30.2	75 00 00.4	6,673

Magnetic declination for east border of quadrangle,  $8^{\circ} 49' W.$

## NEW YORK.<sup>1</sup>

### TRIANGULATION STATIONS.

Oneonta and Unadilla quadrangles.

#### DELAWARE AND OTSEGO COUNTIES.

Additional triangulation control for the above-named quadrangles was obtained in 1914 by George T. Hawkins. Three new stations were located, based on stations Butternut and Whitcomb (described in Bulletin 181), on North American datum.

#### BUTTERNUT, OTSEGO COUNTY, N. Y.

On a cleared knob in Butternut Township, on land owned by Walter Wood and occupied by Mr. Foote.

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 cemented a bronze triangulation tablet marked "New York 517."

[Latitude 42° 27' 58.70". Longitude 75° 14' 22.18".]

To station—	Azimuth.	Back azimuth.	Distance.	
Sidney.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Palmer.....	6 57 10.96	186 55 49.88	4.3575862	14.156
Persons.....	41 06 10.51	221 02 35.62	4.046156	6.886
Johnson.....	303 59 43.53	124 07 16.70	4.2680693	11.520
Willis.....	340 49 38.44	160 52 57.30	4.3134480	12.788
Bobell.....	18 30 41.8	195 25 48.0	4.4986417	.....
Whitcomb.....	59 42 52.4	237 25 01.1	4.6251388	.....
Shearburne.....	81 29 42.09	261 18 39.06	4.3760078	.....
Teford.....	140 03 35.8	319 55 51.7	4.3866556	.....
Meredith.....	155 38 15.2	15 42 01.0	4.4555214	.....
Andes.....	284 02 38.0	104 16 10.6	4.4531355	.....
	303 06 51.2	123 27 10.9	4.6953369	.....

#### JOHNSON, DELAWARE COUNTY, N. Y.

In Franklin Township, 4 miles south of Franklin and 1.5 miles northeast of Merricksville, on bare hill owned by Mr. Johnson and about 400 feet east of his house.

Station mark: Marble post 6 by 6 by 26 inches set in ground. Tablet in top is 6 feet north of line fence crossing the hill.

Signal: Two-foot oak tree with target.

Reference marks: Fence line 6 feet south; signal tree southwest 28 feet.

Instrument over center, signal off center.

[Latitude 42° 17' 28.60". Longitude 75° 09' 27.16".]

To station—	Azimuth.	Back azimuth.	Distance.	
Sidney.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Palmer.....	71 36 08.04	251 31 28.62	4.0014096	6.234
Butternut.....	128 20 47.52	308 13 54.27	4.2527007	11.119
Persons.....	160 52 57.30	340 49 38.44	4.3134480	12.788
	223 33 47.32	43 38 01.05	4.0972288	7.773

<sup>1</sup> Additional data for New York are given on pp. 473-478.

## PALMER, OTSEGO COUNTY, N. Y.

About 3 miles northeast of Sidney and 1 mile southwest of Unadilla Center, on bare hill owned by Elmer Palmer and 300 yards southwest of his house.

Station mark: Marble post 6 by 6 by 26 inches, 24 inches in ground.

Signal: Sawed lumber tripod over center.

Reference marks: North-south rail fence, 128 feet west; corner of rail fence 155 feet east.

[Latitude 42° 23' 27.94". Longitude 75° 19' 40.69".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Whitecomb.....	108 09 33.36	288 02 05.61	4.2032840	9.923
Butternut.....	221 02 35.62	41 06 10.51	4.0446156	6.586
Johnson.....	308 13 54.27	128 20 47.52	4.2527007	11.119
Sidney.....	342 19 47.53	162 22 00.98	4.1750740	9.299

## PERSONS, DELAWARE COUNTY, N. Y.

On a round bare knoll in Franklin Township, on land owned by A. R. Persons (Treadwell post office).

Station mark: A bronze tablet cemented in solid rock 15 inches below surface of ground and covered with a small pile of flat stones.

[Latitude 42° 22' 22.20". Longitude 75° 03' 10.38".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Johnson.....	43 38 01.05	223 33 47.32	4.0972288	7.773
Sidney.....	56 04 54.25	235 56 00.95	4.3400169	13.585
Butternut.....	124 07 16.70	303 59 43.53	4.2680993	11.520
Butternut a.....	124 07 36	304 00 03	4.26812	

<sup>a</sup> By McNair, 1900.

## SIDNEY, DELAWARE COUNTY, N. Y.

Near north line of town of Masonville, Delaware County, 2 miles nearly south of village of Sidney Center, on land owned by Arthur Rudenbur. On north slope of hill which is timbered on top. Good view in all directions except from southeast to southwest.

Station mark: Marble post 6 by 6 by 26 inches, set 18 inches in ground. New York tablet in top.

Signal: Tripod of poles covered with white cloth.

Reference marks: 90 feet N. 20° (true) W. to edge of solid ledge; 115 feet N. 30° E. to old stump.

Instrument over center and under signal. Solid rock was struck under signal, stone projects 8 inches above ground, pile of stone around mark.

[Latitude 42° 15' 45.77". Longitude 75° 16' 22.51".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Whitecomb.....	134 19 49.26	314 10 08.58	4.4400486	17.116
Palmer.....	162 22 00.98	342 19 47.53	4.1750740	9.299
Butternut.....	186 55 49.88	6 57 10.96	4.3575892	14.156
Persons.....	235 56 00.95	56 04 54.25	4.3400169	13.585
Johnson.....	251 31 28.61	71 36 08.04	4.0014096	6.234

## WHITCOMB, CHENANGO COUNTY, N. Y.

On the south end of a hill in the town of Guilford and on the west side of north pond.  
 Station mark: A cut bluestone post 48 by 6 by 6 inches, set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet marked "New York 518."

[Latitude 42° 26' 08.71". Longitude 75° 30' 44.55".]

To station—	Azimuth.	Back azimuth.	Distance.	
Bobell.....	* ' "	* ' "	Log. meters.	Miles.
	37 45 58.1	217 39 09.0	4.3564016	.....
Berry.....	130 58 19.9	310 49 06.8	4.2869704	.....
Sherburne.....	197 00 17.2	17 03 37.4	4.3629384	.....
Butternut.....	261 18 39.06	81 29 42.09	4.3560978	.....
Palmer.....	288 02 05.61	108 09 33.36	4.2032840	9.923
Sidney.....	314 10 08.58	134 19 49.26	4.4400486	17.118
Willis.....	334 41 21.3	154 47 29.00	4.4669983	.....

## Canaseraga and Hornell quadrangles.

## ALLEGANY AND STEUBEN COUNTIES.

Control for the above-named quadrangles was obtained in 1913 by George T. Hawkins, who extended triangulation from Nunda and Sandhill, described in appendix to Twenty-first Annual Report and in Bulletin 216, by occupying five new stations, all computed on North American datum.

## BIRD, STEUBEN COUNTY, N. Y.

In town of Howard, about 9 miles northeast of Hornell and 3 miles northeast of Big Creek post office, on cleared hill on land owned by Mrs. Bird. There is a good view in nearly all directions except to the south.

Signal: A white target in apple tree.

Station mark: Tablet in top of marble post 6 by 8 by 24 inches set 24 inches in ground.

Reference marks: Apple tree 48 feet north; another apple tree 35 feet north.

[Latitude 42° 22' 26.62". Longitude 77° 32' 33.64".]

To station—	Azimuth.	Back azimuth.	Distance.	
Sherwood.....	* ' "	* ' "	Log. meters.	Miles.
	23 41 40.33	203 40 48.01	3.6457766	2.749
Johnson.....	50 09 00.80	230 02 37.11	4.2306653	10.568
Jersey.....	85 01 50.09	264 48 23.83	4.4391581	17.081

## JERSEY, ALLEGANY COUNTY, N. Y.

In lot 5, town of Birdsall, on land owned by Mr. Young and about 300 yards southeast of his house in old orchard.

Signal: Sawed lumber tripod with targets and platform for instrument 20 feet high.

Station mark: A sandstone block 10 by 14 by 30 inches set 24 inches in ground with New York tablet in top.

Reference marks: Small apple tree near old one 24 feet southeast; apple tree 24 feet southwest.

[Latitude 42° 21' 07.71". Longitude 77° 52' 30.18".]

To station—	Azimuth.	Back azimuth.	Distance.	
Marsh.....	* ' "	* ' "	Log. meters.	Miles.
	167 23 02.80	347 21 40.29	4.1071070	7.952
Nunda.....	179 39 55.67	339 39 51.42	4.3905314	15.272
Sand.....	230 35 05.52	50 45 27.22	4.4350671	16.921
Bird.....	264 48 23.83	85 01 50.09	4.4391581	17.081
Johnson.....	300 30 22.45	120 37 24.34	4.2218890	10.357

## JOHNSON, STEUBEN COUNTY, N. Y.

On land owned by Mr. Johnson, who lives about 5 miles southwest of Hornell, and is 0.25 mile north of his house on east-west fence line between two fields on highest hill in neighborhood. A good view in all directions.

Signal: Sawed lumber tripod with targets.

Station mark: A marble post 4 by 4 by 24 inches set 22 inches in ground with tablet in top.

Reference marks: Small apple tree 25 feet west; corner of north-south and east-west fences 235 feet east.

[Latitude 42° 16' 33.01". Longitude 77° 42' 03.48".]

To station—	Azimuth.	Back azimuth.	Distance.	
Jersey.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Sand.....	120 37 24.34	300 30 22.45	4.2218840	10.357
Bird.....	194 39 12.52	14 42 31.25	4.4249292	16.549
Sherwood.....	230 02 37.11	50 09 00.80	4.2300653	10.598
	237 37 56.94	58 43 28.23	4.1204455	8.200

## MARSH, ALLEGANY COUNTY, N. Y.

In lot No. 28, Grove Township, on land owned by E. N. Marsh, about 3.5 miles southwest of Swain, a station on the Erie Railroad. The station is the well, which is 150 feet southeast of Mr. Marsh's residence. A good view in all directions from windmill tower.

Signal: Windmill tower, 40 feet high.

Station mark: Center of well, 300 feet deep.

[Latitude 42° 27' 52.42". Longitude 77° 54' 32.52".]

To station—	Azimuth.	Back azimuth.	Distance.	
Sand.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Jersey.....	258 35 05.99	78 46 50.99	4.3858191	13.107
	347 21 40.29	167 23 02.80	4.1071070	7.562

## NUNDA, LIVINGSTON COUNTY, N. Y.

Situated in town of Nunda on highest part of what is locally known as East Hill.

Station mark: Bowlder 30 inches in diameter sunk flush with ground, in top of which is cemented a triangulation tablet. Station No. 514.

[Latitude 42° 34' 24.22". Longitude 77° 52' 36.47".]

To station—	Azimuth.	Back azimuth.	Distance.	
Davis.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Carpenter.....	78 25 47.18	258 10 54.79	4.487973	.....
Felch.....	109 34 18.32	289 18 54.91	4.5179208	.....
Perry.....	128 32 12.16	308 26 02.46	4.2013176	.....
Ridge.....	147 23 40.42	327 16 44.05	4.4130080	.....
Scottsville.....	165 22 48.65	345 21 19.84	4.0730332	.....
Cenesus.....	196 00 33.60	16 07 21.29	4.6927834	.....
Springwater.....	228 43 06.21	48 52 44.48	4.4122995	.....
Sand Hill.....	251 22 43.10	71 37 21.95	4.4940585	.....
Jersey a.....	288 58 56.92	109 09 24.17	4.3502399	.....
	359 39 51.42	179 39 55.67	4.3905314	15.272

a By G. T. Hawkins in 1913.

**SAND HILL, STEUBEN COUNTY, N. Y.**

In the corner of field 0.1 mile southwest of farmhouse, on land owned by William Sanders, in town of Wayland, about 2 miles south of village of Perkinsville.

Station mark: A stone post 24 by 8 by 8 inches, set 24 inches in ground, in center of top of which is cemented a bronze tablet. Station number 512.

Mr. Hawkins in 1913 reported that stone mark has been destroyed. The point was identified by men who own the land. A new signal of sawed lumber erected on place identified as original position and marked by stone with New York tablet, 6 by 8 by 26 inches set 26 inches in ground. Reference marks: east-west fence 228 feet south; north-south fence 334 feet west.

[Latitude 42° 30' 27.04". Longitude 77° 37' 08.72".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Johnson a.....	14 42 31.25	194 39 12.52	4.4249292	16.530
Jersey a.....	50 45 27.22	230 35 05.52	4.4350671	16.921
Marsh a.....	78 46 50.99	258 35 05.99	4.3585191	15.107
Nunda.....	109 09 24.17	288 58 56.92	4.3502399	.....
Springwater.....	206 05 08.98	26 09 19.48	4.2827117	.....
Cohocton.....	300 51 30.26	120 54 52.08	3.9004487	.....

a By G. T. Hawkins in 1913.

**SHERWOOD, STEUBEN COUNTY, N. Y.**

In town of Howard, about 6 miles nearly east from Hornell on a cleared hill which gives a good view in all directions except southeast. The station is on fence line on east side of Mr. Sherwood's property and about 300 yards northeast of his farmhouse and 250 yards north of Pike.

Signal: A group of four elm trees that grow so close together that the trunks touch.

Station mark: A marble post 6 by 8 by 24 inches set 20 inches in ground with New York tablet in top.

Reference marks: Cluster of four elm trees which touch each other 4 feet south; large bushy oak 130 feet south; rail fence 1 foot west.

[Latitude 42° 20' 15.33". Longitude 77° 33' 51.29".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Johnson .....	58 43 28.23	238 37 56.94	4.1204455	8.200
Bird .....	203 40 48.01	23 41 40.33	3.6457766	2.749

## Berne quadrangle.

**ALBANY COUNTY.**

In the fall of 1914 George T. Hawkins determined the position of a tablet set in a large boulder in John Boyd Thacher Park. This point was occupied and located from Coast and Geodetic Survey station Helderberg and New York State Survey station Guilderland, on North American datum.

**GUILDERLAND, ALBANY COUNTY, N. Y.**

In Guilderland Township, on land owned by A. Van Hensen. About 200 yards south of four corners at hotel in Guilderland Center, on east side of road, in edge of orchard. Is granite post 8 inches square marked with "X" on top, "11" on south face, and "N. Y." on east face.

Signal: Tripod of sawed lumber with flag and target.

Station mark: Stone monument No. 11.

[Latitude  $42^{\circ} 42' 02.298''$ . Longitude  $73^{\circ} 58' 01.516''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Helderberg.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Winne.....	23 46 08.08	203 44 21.71	3.9481223	5.514
Park.....	118 15 04.32	298 12 00.50	3.849722	4.345
	38 53 04	218 51 03	3.81093	4.020

**HELDERBERG, ALBANY COUNTY, N. Y.**

In New Scotland Township, on the highest part of Helderberg Mountain, in a field belonging to John Hallenbeck who lives at New Salem Village. Best approached from house of Garrett Flansburgh, whose lands adjoin. Eight and one-half miles from New Scotland depot and 5 miles from New Salem. Summit covered with growth of small birch, pine, and basswood.

Underground mark: A stone jug 2 feet below surface.

Station mark: A granite post 6 by 6 by 30 inches set 24 inches in ground.

Reference marks: Granite posts set 7 feet north, south, east, and west of center.

[Latitude  $42^{\circ} 37' 39.072''$ . Longitude  $74^{\circ} 00' 38.487''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Rafinesque.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Greylock.....	240 47 42.718	61 03 45.635	4.5677459	-----
Winne.....	268 49 12.873	89 23 31.424	4.8404909	-----
Sittles Hill.....	107 13 04.85	347 11 47.56	4.0690359	7.284
Guilderland.....	170 10 49.17	350 09 47.57	4.0834815	7.530
Hamiltonville.....	203 44 21.71	23 46 08.08	3.9481223	5.514
Park.....	219 38 52.80	351 01 44	4.0654066	7.224
	171 01 59		3.49452	1.940

**PARK, ALBANY COUNTY, N. Y.**

Park is about 5 miles nearly south from Altamont and is in the John Boyd Thatcher park near edge of cliff at the pincic grounds and 200 feet southeast of where county road comes to top of hill through rock walls.

Station mark: Tablet set in granite boulder about 4 by 3 by 6 feet bedded in ground about 2 feet, marked "John Boyd Thacher Park. Latitude,  $42^{\circ} 39' 19''$ ; longitude,  $74^{\circ} 01' 00''$ . Elevation above sea 1,125.6 feet. Determined by U. S. Geological Survey, 1914."

Signal: Tripod of poles with flag and target.

Reference marks: Edge of bluff 45 feet east; large granite boulder in place 215 feet south.

[Latitude  $42^{\circ} 39' 19.045''$ . Longitude  $74^{\circ} 00' 59.863''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Guilderland.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Helderberg.....	218 51 03	38 53 04	3.81093	4.020
	351 01 44	171 01 59	3.49452	1.940

**PRIMARY TRAVERSE.**

Cranberry Lake, Number Four, Oswegatchie, and Bussell quadrangles.

HERKIMER AND ST. LAWRENCE COUNTIES.

The following geographic positions on North American datum were determined in 1913 by S. S. Gannett and are based on points located by primary traverse at Bacon, Pond Settlement Schoolhouse, and at outlet of Greggs Lake in 1910 and 1911, published in Bulletins 496 and 551.

## CRANBERRY LAKE QUADRANGLE.

[See also p. 487.]

**Along New York Central & Hudson River Railroad near northwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Benson Mines, 0.6 mile northeast of; road crossing.....	* * "	* * "	Feet.
Road crossing, Benson Mines-Newton Falls, milepost No. 74 is 105 feet northwest.....	44 10 33.4	74 59 39.6	.....
Newton Falls, 23 feet south of southeast corner of station, 12 feet north of side track, in granite boulder; bronze tablet stamped "Prim. Trav. Sta. No. 3 1913".....	44 11 33.8	74 59 19.1	6,296
	44 12 43.6	74 59 32.8	7,139

## RUSSELL QUADRANGLE.

[See also pp. 487-488.]

**Along highways near south border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Fine, 1.5 miles northwest of; creek crossing.....	* * "	* * "	Feet.
Forks of road opposite sugar camp.....	44 15 21.1	75 09 52.5	.....
T road northeast.....	44 15 37.9	75 10 58.2	4,939
South Edwards, 0.3 mile northeast of; junction of north-south road.....	44 16 20.3	75 11 52.0	5,911
South Edwards, T road south.....	44 16 17.9	75 12 19.0	1,985
Forks of road northeast and northwest.....	44 16 02.7	75 12 30.4	1,747
Pond Settlement schoolhouse, near, in solid rock in southwest corner of T road south, 30 feet south of center of triangle at three corners and 80 feet south of northeast corner of schoolhouse; aluminum tablet stamped "Prim. Trav. Sta. No. 5 New York 1912".....	44 15 53.0	75 12 33.2	1,001
	44 15 36.7	75 13 22.0	3,915

## OSWEGATCHIE QUADRANGLE.

**Along New York Central & Hudson River Railroad from Kalurah to Benson Mines.**

Station.	Latitude.	Longitude.	Distance between stations.
Road crossing.....	* * "	* * "	Feet.
Kalurah, west of station; road crossing.....	44 09 55.7	75 14 07.3	.....
Long Lake, 300 feet southwest of; road crossing.....	44 09 35.7	75 12 39.2	6,732
Creek crossing.....	44 09 32.1	75 12 21.3	1,350
Jayville station.....	44 09 15.5	75 12 18.9	1,693
Milepost No. 61, center of track opposite.....	44 09 23.3	75 11 20.2	4,353
Bear Lake, 1,000 feet northeast of; road crossing.....	44 09 50.8	75 09 42.6	7,639
Briggs station, track opposite sawmill.....	44 09 43.4	75 09 24.9	1,487
Milepost No. 63, center of track opposite.....	44 09 52.1	75 09 17.1	5,019
Road crossing.....	44 09 24.0	75 08 11.2	2,874
Aldrich, center of track in front of station.....	44 09 30.7	75 07 16.0	4,077
Aldrich, center of track in front of station.....	44 08 57.1	75 06 37.1	4,428
Aldrich, highway bridge over Little River on north side of west abutment; chisel mark.....	44 08 55.2	75 06 21.9	1,123
Aldrich, 0.3 mile east of station, in southwest corner of abutment of railroad bridge over Little River, 1 foot from edge of abutment, 86 feet west of center of bridge; bronze tablet stamped "Prim. Trav. Sta. No. 1 1913".....	44 09 00.2	75 06 24.8	548
Road crossing.....	44 09 37.0	75 06 18.1	3,759
Milepost No. 66, center of track opposite.....	44 09 49.6	75 06 08.1	1,463
Collins Mills, north-south road crossing.....	44 10 20.6	75 05 09.6	5,293
Oswegatchie, 135 feet east of station, north-south road crossing.....	44 10 57.0	75 04 16.3	5,354
Road crossing; road southeast and northwest.....	44 10 48.8	75 02 55.0	5,981
Milepost No. 70, 1,210 feet east of; road crossing.....	44 10 42.0	75 01 59.8	4,084
Milepost No. 71, 150 feet northwest of; road crossing.....	44 10 33.9	75 01 13.5	3,472
Benson Mines, 188 feet northeast of station, in concrete base of water tower; bronze tablet stamped "Prim. Trav. Sta. No. 2 1913".....	44 10 11.6	75 00 09.1	5,202

## OSWEGATCHIE QUADRANGLE—Continued.

## Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.	
	°	'	"	Feet.
Opposite Mr. Schuyler's house.....	44 12 36.1	75 00 24.5		
Opposite Wm. Ferrigo's house.....	44 12 37.6	75 00 39.4		1,094
Creek crossing.....	44 12 27.0	75 00 53.3		1,450
Opposite Louis Costos's house.....	44 12 14.0	75 01 40.3		3,069
F.C. Kilbourne's house, 80 feet northwest of, 50 feet north of road west; road north-south.....	44 11 32.4	75 02 58.5		7,087
Schoolhouse (District No. 10), 370 feet northwest of, junction with main road northeast-southwest.....	44 12 38.4	75 03 11.3		6,748
Oswegatchie River, center of iron bridge over.....	44 12 52.0	75 02 58.8		
Forks of road.....	44 12 54.5	75 03 14.6		1,647
Opposite cemetery.....	44 13 45.6	75 04 31.2		7,935
Creek crossing.....	44 14 14.6	75 05 25.9		4,951
Road forks, southwest, 225 feet northwest of schoolhouse, 300 feet north of iron bridge.....	44 14 21.4	75 05 36.8		1,052
Road forks.....	44 14 30.6	75 07 07.6		6,648
Fine, east end of village, 50 feet east of T road north, on north side of road, in large boulder; bronze tablet stamped "Prim. Trav. Sta. No. 4, 1913".....	44 14 47.6	75 08 02.2		4,359
Fine, center of.....	44 14 52.5	75 08 22.6		1,569

## Along highways near east border of quadrangle from Benson Mines south to Chartrand Camp.

Benson Mines, in front of post office; center of road forks.....	44 10 02.8	75 00 04.6	
Forks of road southwest.....	44 09 49.6	75 00 43.7	3,150
Grove Hotel, forks of road.....	44 09 41.3	75 01 52.6	5,089
Star Lake, 30 feet southeast of post office; triangular plot at road intersection.....	44 09 35.5	75 02 05.0	1,078
Little River, center of bridge over.....	44 08 36.5	75 01 40.8	6,231
Forks of road, Joe Fournier's house is 60 feet northeast.....	44 08 11.5	75 01 38.7	2,530
Tamarack Creek, center of corduroy bridge over.....	44 08 10.7	75 02 10.9	2,534
Decass Old Camp, small creek southeast.....	44 07 38.0	75 02 46.6	4,210
Summit of flat ridge.....	44 07 00.3	75 03 14.3	4,315
Street Lake, bridge over outlet from.....	44 06 52.0	75 03 17.6	873
Balls Camp, forks on left road to, right road to Francis Camp.....	44 06 42.7	75 03 22.7	1,016
Old road west.....	44 06 32.5	75 03 34.7	1,336
Creek crossing.....	44 03 51.0	75 03 44.1	4,258
Middle branch of Oswegatchie River, east bank of bend where tote road runs along river.....	44 05 00.6	75 04 01.4	5,256
Francis Camp, west end of bunk house.....	44 04 39.9	75 04 00.0	2,093
Francis Camp, 650 feet south of, 20 feet east of road, in large granite boulder; bronze tablet stamped "Prim. Trav. Sta. No. 5 1913".....	44 04 34.5	75 03 58.3	558
Stream northwest.....	44 04 09.0	75 03 49.2	2,667
Corduroy bridge (200 feet long) over small creek.....	44 03 18.1	75 03 54.4	5,174
St. Lawrence-Herkimer county line, iron post 300 feet northwest of stone monument, stamped "St. Lawrence County 1903—Macomb Purchase G. T. tract No. 4" on one side and "Herkimer County 1903 T & C. Purchase 0.05 mile" on other.....	44 03 04.0	75 03 51.2	1,443
St. Lawrence-Herkimer county line, angle; granite monument 4 feet high, 12 inches square, marked "St. Lawrence County" on one side and "Herkimer County" on other, northwest corner of Totten and Crossfield purchase.....	44 03 02.5	75 03 47.7	298
Alder Bed Driving Camp, log bridge over Middle Branch of Oswegatchie River.....	44 02 45.8	75 03 49.6	1,699
Alder Bed Driving Camp, opposite bunk house.....	44 02 39.9	75 03 48.6	601
Alder Bed Driving Camp, 0.9 mile southeast of, road opposite old log pile.....	44 02 01.4	75 03 03.4	5,110
North summit of flat ridge.....	44 01 53.0	75 03 04.2	853
Alder Bed Driving Camp, 1.8 miles south of, at summit of ridge, on large flat granite rock at edge of road, maple tree 15 feet south, blazed on three sides, beech tree opposite; bronze tablet stamped "Prim. Trav. Sta. No. 6, 1913".....	44 01 26.5	75 03 14.3	2,779
Corduroy bridge over drain.....	44 00 45.4	75 03 35.5	4,445
Chartrand Camp, bunk house peak northwest corner.....	44 00 38.8	75 03 37.8	679

Magnetic declination for north border of quadrangle,  $11^{\circ} 46' W.$ ; for east border,  $12^{\circ} 40' W.$

## NUMBER FOUR QUADRANGLE.

Along highways near northeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Middle Branch of Oswegatchie River, bank.....	43° 59' " "	75° 03' " "	Feet.
Forks of road southwest.....	43° 59' 33.0	75° 03' 42.1	1,719
Bridge over Greggs Lake outlet (center of creek).....	43° 59' 38.3	75° 03' 34.6	524

Magnetic declination near northeast corner of quadrangle, 12° 40' W.

## Cranberry Lake, Russell, and Stark quadrangles.

## ST. LAWRENCE COUNTY.

The line starts from Hermon street corners established by primary traverse and follows highways eastward near north border of quadrangle and is tied to Stark triangulation station described in Bulletin 201. Thence along highways via Clare, Degrasse, and Russell to starting point. Starting from adjusted position on main circuit at Degrasse, follows highways to New Bridge, thence south along log railroad to Newton Falls, and is tied to primary traverse position at that place, described on page 485, North American datum. This work was done by George T. Hawkins in 1914.

## CRANBERRY LAKE QUADRANGLE.

[See also p. 485.]

Along log railroad near northwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Newton Falls, 3 miles northeast of, railway track where trail starts east through woods.....	44° 14' 48.1	74° 57' 38.2	Feet.
Newton Falls, 1 mile northeast of, switch block at head of blind siding; Newton Falls, 23 feet south of southeast corner of station, 12 feet north of sidetrack, in granite boulder; bronze tablet stamped "Prim. Trav. Sta. No. 3 1913".....	44° 13' 34.3	74° 58' 54.8	9,321
	44° 12' 43.6	74° 59' 32.8	5,822

## RUSSELL QUADRANGLE.

[See also p. 485.]

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Hermon, cross streets at hotel.....	44° 28' 01.1	75° 13' 52.8	Feet.
Hermon, 1.5 miles east of, T road south, 150 feet southwest to small brick house.....	44° 28' 12.0	75° 12' 15.5	7,144
Hermon, 2.5 miles east of, iron bridge over Grasse River, west end of.....	44° 28' 00.1	75° 11' 03.5	5,361
Hermon, 4 miles east of, 4 corners, 120 feet southwest to schoolhouse, 100 feet northeast to house.....	44° 28' 06.2	75° 09' 23.7	7,270
Hermon, 5.5 miles east of, and 3 miles south of North Russell, on south side of east and west road, and 700 feet east of J. C. Smith's house, cemented in large granite boulder in place; bench-mark tablet stamped "Prim. Trav. Sta. No. 5, 1914".....	44° 28' 12.2	75° 07' 39.6	7,572
Three corners, 20 feet southwest to mail box.....	44° 28' 38.0	75° 05' 40.8	9,011
Three corners, 40 feet south to 14-inch elm tree.....	44° 29' 16.3	75° 05' 15.5	4,293
Red schoolhouse, crossroads 120 feet east of.....	44° 28' 41.6	75° 04' 18.4	5,432
West Pierpont, T road east at, 30 feet southeast to cheese factory, 30 feet west to store.....	44° 29' 32.9	75° 03' 37.6	5,976
West Pierpont, 1 mile east of, T road south, 250 feet northwest to barn.....	44° 29' 38.2	75° 02' 22.4	5,481
West Pierpont, 2.5 miles east of, on south side of road, set in south rail of concrete bridge; bench-mark tablet stamped "Prim. Trav. Sta. No. 6, 1914".....	44° 29' 15.6	75° 00' 48.7	7,164

## RUSSELL QUADRANGLE—Continued.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Clare, 2 miles east of, wooden bridge on tote road, notch cut on each side.....	44 26 02.6	75 01 30.8	Fed.
Clare, T road east at, 300 feet southeast to townhouse, 400 feet southwest to schoolhouse.....	44 26 09.0	75 03 23.1	8,180
Clare, 1 mile south of, 30 feet northwest to bars, T road west.....	44 25 21.8	75 03 19.8	4,774
Clare, 2 miles south of, county road opposite creamery door.....	44 24 27.9	75 03 37.5	5,602
Clare, 3 miles south of, second-class road west, 400 feet west to gate.....	44 23 21.7	75 03 56.1	6,341
Clare, 3.5 miles south of, 2.5 miles north of Degrasse, 650 feet north of iron bridge over Grasse River; bench-mark tablet set in north side of concrete bridge, stamped "Prim. Trav. Sta. No. 7, 1914".....	44 22 38.3	75 03 41.4	4,515
Degrasse, 1 mile northeast of, turn in road, 50 feet southwest to windmill, 20 feet south to culvert.....	44 21 42.5	75 03 52.5	5,896
Degrasse, 0.25 mile northeast of, three corners.....	44 21 05.9	75 04 25.0	4,393
Degrasse, 2 miles southeast of, three corners, 300 feet west to bridge over Grasse River.....	44 20 16.9	75 02 39.4	9,132
Rainbow Falls, county road opposite log hotel at.....	44 20 03.6	75 01 35.2	4,532
Rainbow Falls, 1 mile southeast of, concrete bridge with high concrete rails.....	44 19 44.6	75 00 28.6	5,211

## Along highways diagonally northwest through quadrangle.

Degrasse, county road opposite entrance to hotel.....	44 20 58.4	75 04 36.3	.....
Degrasse, 1.5 miles northwest of, T road northeast, 150 feet west to house.....	44 21 27.9	75 06 07.6	7,958
Old mill, three corners at.....	44 21 50.0	75 07 00.2	4,426
Degrasse, 3.5 miles northwest of, large granite boulder in place on south side of road and 30 feet southeast of three corners, and 100 feet northwest of house, 80 feet southwest of house has bench-mark tablet cemented in top and marked "Prim. Trav. Sta. No. 8, 1914".....	44 22 16.3	75 07 38.9	3,865
Chase factory, T road northeast, 500 feet southeast of.....	44 22 54.4	75 08 22.3	4,976
Burnt house, three corners, 200 feet southeast of.....	44 24 12.3	75 09 17.8	8,851
Russell, south end of iron bridge across Grasse River at.....	44 25 38.6	75 08 59.3	8,841
Russell, 1.5 miles northwest of, county road opposite water trough, 50 feet north to barn.....	44 26 21.5	75 10 24.6	7,551
Hermon, 2 miles southeast of, county road between house and barn owned by Mr. Louck.....	44 26 45.4	75 11 34.7	5,627
Hermon, 1.5 miles southeast of, crossroads at schoolhouse.....	44 27 07.5	75 12 12.9	3,550
Hermon, cross streets at hotel.....	44 28 01.1	75 13 52.8	9,048

Magnetic declination for north border of quadrangle,  $11^{\circ} 27' W.$ ; for east border,  $11^{\circ} 48' W.$ ; near center,  $11^{\circ} 27' W.$

## STARK QUADRANGLE.

## Along highways near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Sellecks four corners, 40 feet northeast to store.....	44 29 17.3	74 59 04.5	Fed.
T road west, 400 feet northwest to house.....	44 29 28.5	74 57 57.3	5,609
Three corners, 400 feet northwest to house.....	44 28 00.5	74 57 06.1	9,654
Stark triangulation station, on a timbered ridge in northeast corner of 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; bronze triangulation tablet cemented in solid rock.....	44 27 11.69	74 57 52.9	5,992
Stark triangulation station, 2 miles southwest of, three corners in woods 20 feet west to blazed tree.....	44 26 29.8	74 59 25.1	7,911
Sam Starks cabin, twin maple trees in front of.....	44 26 26.2	74 59 54.9	2,175
Rainbow Falls, 2 miles southeast of, second-class fork to east, 30 feet south to large maple tree.....	44 19 07.6	74 59 56.1	5,048
Rainbow Falls, 3 miles southeast of, concrete bridge at log camp.....	44 18 18.9	74 59 41.1	5,048
New Bridge, 1.25 miles northwest of, county road crossing log railroad.....	44 17 57.3	74 59 19.7	2,676
New Bridge, 0.75 mile northwest of, second-class road east, signboard reads "Spicer's Camp, 3 miles".....	44 17 32.0	74 58 45.8	3,547
New Bridge, west end of iron bridge at.....	44 17 10.3	74 58 35.0	2,337

**STARK QUADRANGLE—Continued.**

Along log railroad near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
New Bridge, 1.75 miles southeast of, small fill on railway, notches cut in stringers on both sides of track .....	• ' "	• ' "	
New Bridge, 2 miles southeast of, railway track opposite north end of old hunting shack.....	44 16 23.0	74 57 28.8	6,782
New Bridge, 3 miles southeast of, railway track crossing creek.....	44 16 02.0 44 15 11.5	74 57 31.2 74 57 46.1	2,125 5,215

Magnetic declination near west border of quadrangle,  $11^{\circ} 48' W.$ .**Chateaugay, Loon Lake, Malone, Moira, Nicholville, and Santa Clara quadrangles.****FRANKLIN AND ST. LAWRENCE COUNTIES.**

The following geographic positions were determined by primary traverse and are upon North American datum. The work was done by George T. Hawkins in 1914. Lines run by E. L. McNair in 1900 in Malone and Moira quadrangles, described in Bulletin 181, have been readjusted and are included.

**CHATEAUGAY QUADRANGLE.**

'On highway near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Salmon River, 1 mile west of, 100 feet east of house, T road southwest....	• ' " 44 45 07.0	• ' " 74 14 09.6	Feet.....

Magnetic declination,  $11^{\circ} 33' W.$ .**LOON LAKE QUADRANGLE.**

Station.	Latitude.	Longitude.	Distance between stations.
Owls Head station, 0.75 mile north of, railroad crossing.....	• ' " 44 44 33.2	• ' " 74 10 32.9	Feet.....

**MALONE QUADRANGLE.**

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Wooden bridge, 80 feet southeast to old house (magnetic declination, $9^{\circ} 20' W.$ ).....	• ' " 44 45 41.9	• ' " 74 17 27.5	Feet..... 7,141
T road west, 40 feet west to iron bridge (magnetic declination, $9^{\circ} 43' W.$ ).....	44 46 47.1	74 18 22.1	7,690
Four corners, 40 feet west to three mail boxes (magnetic declination, $10^{\circ} 10' W.$ ).....	44 46 44.2	74 19 29.8	4,890
T road east, 30 feet northwest to three mail boxes (magnetic declination $11^{\circ} 38' W.$ ).....	44 46 41.7	74 20 25.3	4,010
T road west, 70 feet southwest to log house (magnetic declination, $11^{\circ} 45' W.$ ).....	44 46 09.3	74 20 21.4	3,298
Three corners, 20 feet southwest to maple tree (magnetic declination, $11^{\circ} 55' W.$ ).....	44 45 50.9	74 21 19.0	4,550

**MALONE QUADRANGLE**-Continued.**Along highways near south border of quadrangle**-Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Skerry, 0.20 mile east of, 300 feet south of T road west, on west side north and south road, 15 feet west of road, in large granite boulder; tablet marked "Prim. Trav. Sta. 1914" (magnetic declination, $11^{\circ} 55' W.$ ).....	44 46 00.9	74 22 55.4	7,030
T road south, 150 feet southwest to house.....	44 46 33.9	74 22 59.6	3,359
Four corners, 70 feet northeast to church, 80 feet southwest to church, 100 feet southeast to schoolhouse (magnetic declination, $0^{\circ} 25' W.$ ).....	44 46 27.0	74 24 44.7	7,616
Four corners, 120 feet southwest to red house.....	44 46 23.1	74 25 53.0	4,940
Crossroad, 20 feet southeast to telegraph pole.....	44 46 20.4	74 27 12.1	5,713
T road north, 15 feet north to mail box.....	44 46 14.5	74 28 25.5	5,329
Skerry, about 2.8 miles west of, in south abutment of concrete bridge over small stream; tablet marked "Prim. Trav. Sta. No. 2, 1914".....	44 46 12.9	74 28 46.8	1,546
T road east, 20 feet east to mail box (magnetic declination, $1^{\circ} 10' W.$ ).....	44 46 11.8	74 29 06.9	1,450
T road south, on State road, 400 feet northeast large house.....	44 47 04.8	74 29 14.2	5,340
East Dickinson, T road north at.....	44 46 46.8	74 29 54.9	3,458

**Along highways near west border of quadrangle.**

T road west, 160 feet northwest to schoolhouse.....	44 51 42.4	74 29 59.3	.....
Turn in road, 20 feet east to Mr. Keiter's mail box (magnetic declination, $13^{\circ} 11' W.$ ).....	44 57 30.0	74 29 44.1	.....
Crossroads, 70 feet northwest to brick house.....	44 58 02.4	74 29 36.4	3,324
Fort Covington, in southwest part of, three corners, 70 feet southeast to sign "Brushton 12 miles" (magnetic declination $12^{\circ} 40' W.$ ).....	44 59 11.6	74 29 45.9	7,041
Fort Covington, 900 feet east of Grand Trunk Ry. station, road crossing.....	44 59 52.19	74 29 36.8	4,155

**Along Ogdensburg & Lake Champlain Railway from Brushton to Malone.**

Brushton station, road crossing, 215 feet east of.....	44 49 48.6	74 30 32.9	.....
Road crossing, 110 feet west of milepost 65.....	44 50 24.9	74 27 00.2	.....
Bangor station, road crossing, 100 feet west of.....	44 51 03.2	74 24 11.2	.....
Road crossing, 620 feet west of milepost 60.....	44 51 30.9	74 21 35.8	.....
Overhead road crossing, 1,580 feet east of milepost 58.....	44 51 39.5	74 18 45.3	.....
Malone station, center of.....	44 50 58.3	74 17 34.2	.....
Malone Junction, crossing of Ogdensburg & Lake Champlain and Mo-hawk & Malone railroads.....	44 51 30.4	74 16 30.0	.....
Malone, Franklin County fair grounds, south meridian monument a.....	44 50 48.4	74 16 41.4	.....
Malone, Franklin County fair grounds, north meridian monument a.....	44 50 58.1	74 16 41.4	.....

\* These meridian marks are on a spur of both Kendall's and McNair's traverse. Kendall's values so opted.

**MOIRA QUADRANGLE.****Along Rutland Railroad from milepost 79 to Brushton.**

Station.	Latitude.	Longitude.
Road crossing 1,120 feet east of milepost 79.....	44 47 58.2	74 43 09.8
Road crossing 900 feet east of milepost 77.....	44 48 12.6	74 40 46.6
Road crossing 1,965 feet west of milepost 75.....	44 48 25.1	74 39 02.2
Road crossing 2,070 feet east of milepost 74.....	44 48 49.6	74 36 57.7
Moira station, road crossing 185 feet west of.....	44 49 31.3	74 33 25.3
Moira station, about 1,130 feet east of, in rocky pasture about 95 feet south of the center of railway track; a bronze triangulation tablet set in rock outcrop about 1 foot above surface of ground, 70.5 feet from corner of pasture.....	44 49 33.7	74 33 07.4
Moira station, about 2,100 feet east of, in rocky pasture about 70 feet south of center of railway track; a bronze triangulation tablet set in boulder about 5 feet by 2 feet 6 inches above ground. (Tablets 972.65 feet apart).....	44 49 38.3	74 32 54.7
Brushton station, road crossing, 215 feet east of.....	44 49 48.6	74 30 32.9

**MOIRA QUADRANGLE**—Continued.**Along Grand Trunk Railway from Massena Springs to Bombay.**

Station.	Latitude.	Longitude.
Center of bridge, 330 feet east of milepost 94.....	44 55 22.9	74 50 44.2
Road crossing 2,480 feet east of milepost 92.....	44 55 31.5	74 47 56.3
Road crossing 1,000 feet east of milepost 90.....	44 55 38.5	74 45 49.4
Helena station, New York & Ottawa Ry. crossing.....	44 55 26.9	74 43 02.1
Road crossing 2,045 feet west of milepost 85.....	44 55 35.7	74 40 32.1
Road crossing 1,670 feet west of milepost 83.....	44 55 43.9	74 38 01.1
Road crossing 245 feet west of milepost 82.....	44 55 50.6	74 36 28.5
Bombay station, northwest corner of.....	44 56 19.0	74 34 19.6
Bombay, church steeple.....	44 56 22.5	74 33 56.8

**Along New York Central & Hudson River Railroad from Helena to Moira.**

Ironton flag station, road crossing 380 feet north of.....	44 53 55.6	74 41 07.5
Road crossing 4,125 feet north of milepost 62.....	44 53 13.9	74 39 41.0
Road crossing 370 feet north of milepost 57.....	44 51 12.4	74 36 15.4
Road crossing one-half mile south of milepost 56.....	44 50 14.5	74 34 57.3

**Along highways near east border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Private T road east to large house.....	44 48 19.6	74 30 01.8	Feet.
Brushton, 1 mile south of, T road east (magnetic declination, 12° 06' W.)	44 48 52.4	74 30 05.8	3,329
Brushton station, 245 feet east of.....	44 49 48.6	74 30 33.0	6,012
Brushton, 0.60 mile north of, three corners (magnetic declination 13° 55' W.).....	44 50 15.7	74 30 54.0	3,132
Brushton, about 3.50 miles north of, in northeast corner of abutment of bridge over Little Salmon River; tablet stamped "Prim. Trav. Sta. No. 3, 1914".....	44 52 22.3	74 30 21.3	.....
Brushton, about 5 miles north of, four corners, 40 feet southwest to corner of barn (magnetic declination 11° 38' W.).....	44 53 41.9	74 30 51.2	8,341
Brushton, about 5.60 miles north of, on town line, 160 feet northwest to yellow house, T road north (magnetic declination 11° 32' W.).....	44 53 47.8	74 30 07.0	3,240
Brushton, about 6.20 miles north of, T road east, 400 feet northeast to house.....	44 54 18.3	74 30 11.1	3,098
Brushton, about 6.80 miles north of, three corners, road northwest, 40 feet through gate (magnetic declination 11° 32' W.).....	44 54 48.1	74 30 15.0	3,030
Fort Covington, about 4 miles south of, north and south road at fork southwest, 240 feet northwest to house.....	44 56 07.2	74 30 25.9	8,043
Fort Covington, about 3.40 miles south of, four corners, 100 feet southwest to red schoolhouse.....	44 56 42.7	74 30 31.6	3,611

**Along highways near south border of quadrangle.**

T road south, 50 feet southeast to house, 100 feet southwest to house.....	44 46 23.1	74 30 46.2	.....
Red sch. solhouse, 150 feet southwest of, T road north.....	44 45 48.4	74 32 00.4	6,410
T road south to Dickinson Center, 30 feet southwest to signpost.....	44 45 12.2	74 33 16.8	6,630
Drill hole in stone 10 by 10 feet and 2.50 feet above ground; 15 feet east to a +, 120 feet northwest to log house, 50 feet southeast to bars, at north and south road.....	44 45 17.7	74 36 15.2	.....
T road west, 150 feet southwest to red schoolhouse.....	44 46 12.9	74 36 23.8	5,617
Four corners, 40 feet southeast to two mail boxes.....	44 46 08.7	74 37 45.2	5,895
Lawrenceville, 0.50 mile southeast of, T road north.....	44 46 04.4	74 38 34.7	3,600
Lawrenceville, west part of, 70 feet southwest to brick house, three corners.....	44 46 20.4	74 39 18.8	3,565
Lawrenceville, 0.80 mile southwest of, 30 feet northeast to signpost, crossroads.....	44 46 10.5	74 40 18.3	4,410
Lawrenceville, 1.60 miles southwest of, 30 feet south to bridge, 30 feet west to bridge, crossroads.....	44 45 59.5	74 41 23.7	4,850
Lawrenceville, 2.80 miles southwest of, 80 feet northwest to cheese factory, 80 feet southwest to yellow house, four corners.....	44 45 43.2	74 42 50.9	6,510
Lawrenceville, 2.10 miles southwest of, 40 feet northeast to yellow schoolhouse, T road south.....	44 46 19.4	74 42 59.0	3,700
Lawrenceville, 1.30 miles southwest of, 20 feet northeast to mail box, 40 feet southeast to two mail boxes; four corners.....	44 47 00.6	74 43 02.2	4,176
Lawrenceville, 0.30 mile southwest of, 1,120 feet east of milepost No. 83 (formerly milepost No. 79), road crossing (tie to McNair's traverse line 1900), McNair's position accepted.....	44 47 58.2	74 43 09.8	5,847

Magnetic declination near south border of quadrangle, 12° 36' W.; near west border, 13° 08' W.

**NICHOLVILLE QUADRANGLE.****Along highways near north border of quadrangle.**

Stations.	Latitude.	Longitude.	Distance between stations.
Dickinson Center, 40 feet northwest to store, four corners.....	•   '   "	•   '   "	
Dickinson Center, 1.60 miles southwest of, 20 feet southwest to sign, 20 feet northwest to sign, four corners.....	44 44 55.0	74 33 51.5	Feet.
	44 44 12.2	74 35 31.4	8,419

Magnetic declination near north border of quadrangle,  $12^{\circ} 36' W.$ **SANTA CLARA QUADRANGLE.****On highways near north border of quadrangle.**

Stations.	Latitude.	Longitude.	Distance between stations.
T road north, 30 feet northeast to three mail boxes (magnetic declination, $23^{\circ} 24' W.$ ).....	•   '   "	•   '   "	
Lake Titus, at north end of, 40 feet east to store; three corners (magnetic declination, $10^{\circ} 18' W.$ ).....	44 44 45.4	74 15 20.8	Feet.
	44 44 31.6	74 17 19.0	.....

## PENNSYLVANIA.

### TRIANGULATION STATIONS.

Carnegie quadrangle.

ALLEGHENY COUNTY.

For the purpose of testing the accuracy of distances between triangulation stations in southwestern Pennsylvania established by the United States Geological Survey in 1899 and 1900 (see Bulletin 181), a check base was measured in the spring of 1914 near Carnegie and expanded to stations Hickman, McDonald, and Union Church. All of the observations were made independently by two observers, S. S. Gannett and G. T. Hawkins. The base, 7,000 feet in length, was measured twice along a tangent of the Wabash Railroad southeast of Carnegie using United States Geological Survey invar tape 3 T. The two measurements uncorrected for temperature differed by 0.02 foot, and allowing for difference of temperature the discrepancy was 0.001 foot. Angles at all stations were measured at least 10 times by Mr. Hawkins, using 8-inch theodolite No. 424, reading by micrometers to 2 seconds of arc, and were also measured independently 10 times or more by Mr. Gannett, using 8-inch micrometer theodolite No. 435. In making a final computation all these angles were combined and a least-square figure adjustment made, 7 stations in the scheme forming two figures.

The tape as compared at the Bureau of Standards, Washington, D. C., April 20, 1914, was found to be 299.98 feet in length. After the work was completed it was tested again on May 20, 1914, by the Bureau of Standards and found to be 299.9796 feet in length—that is, practically no change had been made in the length of the tape by use in measurement.

Each end of the base is in a deep cut and in order to expand to the triangulation stations it was necessary to transfer the north end to the embankment 65 feet west of the track and to transfer the south end to the embankment 32 feet east of the track. An iron post  $3\frac{1}{2}$  inches in diameter and 4 feet in length was set as a permanent mark on the bank at each end as thus transferred and a tripod signal erected exactly over center of each post.

The distance measured along the track was then computed, using value of tape 299.98 feet as follows:

	Feet.
23½ tapes $\times$ 299.98 feet.....	6,999.530
Reduction to horizontal.....	-.120
Reduction to sea level.....	-.300
Correction for temperature, reduction to $62^{\circ}$ F.....	+.053
Length of base on track reduced to sea level.....	6,999.163

The distance from signal to signal was then computed allowing for the offset at each end of base, the result obtained being 6,999.824 feet, log. meters = 3.3291030.

Using the latter value in log. meters, distances were computed from the base through 10 triangles to lines of the old triangulation Hickman-McDonald, Hickman-Union United Presbyterian Church and McDonald-Union United Presbyterian Church, the new values for these distances being shorter than the old ones by one part in 16,000, or less than 4 inches in a mile, thus proving the error in the old work smaller than one would expect in triangulation extended for topographic control and not for geodetic purposes.

In 1900 a check on distance derived from the Hillside base was made on the line St. Clair-Morley, near the Pennsylvania-West Virginia State line; the value from Hillside base being long by 1 foot in 9,222. In 1901 another check on distance was made in the line Palmer-McCoy in Indiana County, the value from Hillside base being long by 1 foot in 9,600. In Allegheny County the distances which have been used are therefore much nearer correct than those between stations further removed from the Hillside base.

#### CARNEGIE NORTH BASE, ALLEGHENY COUNTY, PA.

Situated 0.1 mile north of Wabash-Pittsburgh Terminal Station at Carnegie, on bank of cut west of railroad, 65.5 feet west of west rail.

Signal: A lumber tripod over center.

Station mark: An iron bench-mark post set  $3\frac{1}{2}$  feet in ground.

Reference marks: 14.15 feet west to curb inside line on east side of paved street; southeast corner of two-story house 139.8 feet true azimuth  $178^{\circ} 59'$ ; south end of straight curb line 137 feet on west side of paved street, true azimuth  $38^{\circ} 26'$ .

[Latitude  $40^{\circ} 24' 21.58''$ . Longitude  $80^{\circ} 04' 39.48''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters	Feet.
Carnegie South Base.....	21 20 35.37	201 20 14.03	3.3291030	6,999.82
Hickman.....	41 54 42.46	221 52 03.48	3.9380110	28,444.30
Ewing.....	96 17 25.65	276 15 48.83	3.5493665	11,623.87

#### CARNEGIE SOUTH BASE, ALLEGHENY COUNTY, PA.

Situated 1.3 miles south of Carnegie railroad station, Wabash-Pittsburgh Terminal, 31 feet east of track, 5 feet east of edge of steep bank of railroad cut and about 100 feet south of the south end of tangent.

Signal: A tripod over center.

Station mark: An iron bench-mark post set in ground; top projects 6 inches above surface.

Reference marks: Center of oil well, 121.5 feet distant, true azimuth  $8^{\circ} 46'$ ; nail in blaze in maple tree, 102.5 feet distant, azimuth  $250^{\circ} 43'$ .

[Latitude  $40^{\circ} 23' 17.15''$ . Longitude  $80^{\circ} 05' 12.40''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters	Feet.
Hickman.....	48 18 56.53	228 16 38.91	3.8269992	22,028.42
Ewing.....	130 51 52.40	310 50 36.94	3.5599303	11,910.07
Carnegie North Base .....	201 20 14.03	21 20 35.37	3.3291030	6,999.82

## EWING, ALLEGHENY COUNTY, PA.

A station in the base expansion, on a cleared ridge 2 miles west of Carnegie, on land owned by Mr. Ewing, 400 yards southwest of his house, occupied by a renter.

Signal: A lumber tripod over center.

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

Reference marks: (1) Nail in dead cedar tree on southwest side of hill, 45.0 feet distant, true azimuth  $41^{\circ} 13'$ ; (2) nail in cherry tree on northeast side of hill, 163.3 feet distant, true azimuth  $199^{\circ} 59'$ .

[Latitude  $40^{\circ} 24' 34.14''$ . Longitude  $80^{\circ} 07' 08.84''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Hickman.....	* * "	* * "	<i>Log. meters.</i>	<i>Feet.</i>
Oakdale.....	18 19 48.79	198 18 46.57	3.8577430	25,644.34
Union United Presbyterian Church.....	56 51 33.78	236 49 30.47	3.7291087	17,583.00
Carnegie North Base.....	145 28 25.97	325 27 14.09	3.6636188	15,121.78
Carnegie South Base.....	276 15 48.83	96 17 25.65	3.5493665	11,623.87
	310 50 36.94	130 51 52.40	3.5599303	11,910.07

## OAKDALE, ALLEGHENY COUNTY, PA.

In a cultivated field on a cleared ridge 1.5 miles south of Oakdale, and 0.25 mile southeast of house of Mr. Watters. The land is owned by the Boys' Industrial Home.

Signal: A quadrupod of sawed lumber over center of mark.

Station mark: An iron bench-mark post set 3.2 feet in ground.

Reference mark: Nail in tree 63.9 feet distant, true azimuth  $217^{\circ} 37'$ . Wire fence is 7.2 feet northwest.

[Latitude  $40^{\circ} 22' 59.11''$ . Longitude  $80^{\circ} 10' 19.08''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
McDonald.....	* * "	* * "	<i>Log. meters.</i>	<i>Feet.</i>
Union United Presbyterian Church.....	62 59 10.54	242 57 01.99	3.7206852	17,245.25
Ewing.....	195 32 27.66	15 33 19.14	3.8440840	22,912.26
Hickman.....	236 49 30.47	56 51 33.78	3.7291087	17,583.00
	330 22 30.99	150 23 32.00	3.6530044	14,756.67

## HICKMAN, ALLEGHENY COUNTY, PA.

On a bald hill in South Fayette Township,  $2\frac{1}{2}$  miles southwest of Bridgeville, on land belonging to William Hickman, who lives on south side of hill.

Station mark: A sandstone post 30 by 12 by 12 inches, set 28 inches in the ground, in the center of top of which is cemented a bronze tablet marked "U. S. Geological Survey—Pennsylvania."

[Latitude  $40^{\circ} 20' 52.33''$ . Longitude  $80^{\circ} 08' 44.87''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Oakdale.....	* * "	* * "	<i>Log. meters.</i>	<i>Feet.</i>
Ewing.....	150 23 32.00	330 22 30.99	3.6530044	14,736.67
Carnegie North Base.....	198 18 46.57	18 19 48.79	3.8577430	23,644.33
Carnegie South Base.....	221 52 03.48	41 54 42.46	3.9380110	28,444.30
Canonsburg a.....	228 16 38.91	48 18 56.53	3.8269092	22,028.42
McDonald a.....	14 35 39.2	194 34 17.5	4.0737263	
	102 26 54.8	282 23 45.3	3.8495728	23,203.69
Union United Presbyterian Church a.....	178 07 14.0	358 07 04.4	b3.8495456	23,202.24
Shannon a.....	262 57 02.4	85 01 46.0	4.0271348	34,923.60
			b4.0271076	34,021.41
			4.0175377	

a From Hillside base.

b From Carnegie base.

## McDONALD, WASHINGTON COUNTY, PA.

In a field at the highest part of a hill half a mile south of McDonald, on land owned by Mr. William F. Wood, who lives on the southeast side of hill.

Station mark: A sandstone post 31 by 7 by 7 inches, set 55 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet marked "U.S. Geological Survey—Pennsylvania."

Reference marks: A large black-oak line tree at the north boundary fence, 275 feet distant. A large white-oak line tree at the west boundary fence, 303 feet distant.

[Latitude 40° 21' 41.66". Longitude 80° 13' 37.56".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Feet.
Oakdale.....	242 57 01.99	62 50 10.54	3.7200852	17,245.25
Union United Presbyterian Church.....	215 40 45.6	35 43 45.7	4.0303035	36,837.31
Hickman.....	282 23 45.3	102 26 54.8	3.8495729	23,203.69
Garrett a.....	27 46 53.9	207 43 09.8	4.2450048	
Dickson a.....	162 21 09.3	342 18 57.4	4.1985263	
Shannon a.....	270 46 02.6	90 53 55.8	4.2365717	
Canonsburg a.....	343 09 24.7	161 11 12.3	4.1326119	

a From Hillside base.

b From Carnegie base.

## UNION UNITED PRESBYTERIAN CHURCH, ALLEGHENY COUNTY, PA.

A brick church with a square tower on its northeast corner, situated on a hill 1 mile west of Remington, on the Steubenville pike.

Station mark: Center of tower.

[Latitude 40° 26' 37.25". Longitude 80° 08' 59.69".]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Feet.
Oakdale.....	15 33 19.14	195 32 27.66	3.8440840	22,912.26
Ewing.....	325 27 14.09	145 28 25.97	3.6636158	15,121.78
McDonald a.....	35 43 45.7	215 40 45.6	4.0303035	36,837.31
Hickman a.....	358 07 04.4	178 07 14.0	4.0271348	34,923.60
Dickson a.....	117 40 04.8	297 34 52.5	4.1070426	
Weir a.....	173 11 33.3	353 10 40.1	4.2101067	
Greentree a.....	243 05 13.9	63 10 14.2	4.0926886	
Calhoun a.....	294 06 16.4	114 14 59.9	4.3196701	
Shannon a.....	311 13 32.8	131 18 26.3	4.1524041	

a From Hillside base.

b From Carnegie base.

## OREGON.

### TRIANGULATION STATIONS.

**\*Condon, Heppner, Twickenham, Spray, Round Mountain, Paulina, and Crook quadrangles.**

#### **GILLIAM, WHEELER, CROOK, MORROW, AND GRANT COUNTIES.**

The following geodetic positions on approximate North American datum were determined by triangulation in 1913 by J. R. Ellis, topographer. Starting from the base Ione, Toby, John Day, described in Bulletin 551, the scheme was carried southward and connected with stations Snow and Field of Baker City base, described in appendix to Twentieth Annual Report.

#### **BALDY, WHEELER COUNTY, OREG.**

Situated on the highest point of a bluff on the west side of a flat-top mountain locally known as Bald Mountain or Baldy. It is about 12 miles northeast of Mitchell and 4 miles west of Waterman.

Station mark: An aluminum tablet set in solid rock.

Signal: A cairn 5 feet base by 5.5 feet in height centered over tablet.

[Latitude  $44^{\circ} 39' 32.31''$ ; longitude  $119^{\circ} 58' 42.67''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Pisgah.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Black Butte.....	42 24 30.09	222 13 42.63	4.4807326	18.797
Wagner.....	64 44 36.0	244 32 11.3	4.41292	16.080
Craggy.....	114 02 22.01	293 43 33.08	4.5864176	23.977
Rancheria.....	142 07 03.0	321 58 04.0	4.43610	16.961
Juniper.....	154 55 45.04	334 49 04.48	4.4690274	18.296
Spanish.....	304 26 46.97	124 34 19.11	4.2361631	10.703
	329 41 02.60	149 49 39.08	4.5089666	20.059

#### **BLACK BUTTE, WHEELER COUNTY, OREG. (Not occupied.)**

Highest point of a dark-colored butte located about 6 miles west of Mitchell and locally known as Black Butte.

[Latitude  $44^{\circ} 33' 33.3''$ ; longitude  $120^{\circ} 16' 23.1''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Wagner.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Rancheria.....	155 56 04	335 49 42	4.46625	18.180
Baldy.....	195 57 06	16 02 52	4.59398	24.396
	244 32 11	64 44 36	4.41292	16.080

## BUCKHORN, GILLIAM COUNTY, OREG. (Not occupied).

An intersected point situated on a round-topped hill 0.5 mile north of the Gilliam-Wheeler County line and about 2 miles east of John Day River. Station is on the Buckhorn Ranch and about 3 miles southwest of ranch house. Elevation, 3,165 feet.

Signal: A tripod of 2 by 4 inch plank, boarded on three sides and covered with white cloth. Signal is centered over station mark.

Station mark: A stone with cross cut in top, projecting 4 inches above surface of ground.

[Latitude  $45^{\circ} 04' 35.90''$ ; longitude  $120^{\circ} 27' 04.72''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Linville.....	* * "	* * "	
Squaw.....	213 52 44.4	33 59 18.7	4.33758 13.518
Clarno.....	279 41 41.0	99 58 20.1	4.49624 19.480
	329 59 05.7	150 02 24.2	4.08951 7.636

## CLARNO, WHEELER COUNTY, OREG.

Situated on highest point of ridge 9 miles west of Fossil and 5 miles east of John Day River. It is located in center of small natural mound and about 200 feet north of lone juniper bush. Station can be reached by following Fossil-Mitchell wagon road south about 0.5 mile south of Fossil, then turning west on road up grade; at top of divide signal can be seen about 3 miles to the west.

Signal: A tripod of 2 by 4 inch plank, boarded on three sides, and covered with white cloth. Signal is centered over station mark.

Station mark: Iron bench mark post centered over a bottle set 38 inches below surface of ground; post projects 10 inches above surface.

[Latitude  $44^{\circ} 58' 51.07''$ ; longitude  $120^{\circ} 22' 14.16''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Wagner.....	* * "	* * "	
Buckhorn.....	11 13 04.52	191 10 56.22	4.3125903 12.762
Linville.....	150 02 24.2	329 59 05.7	4.08951 7.636
Rock Creek.....	191 49 36.86	11 52 52.04	4.4671498 18.218
Squaw.....	225 08 14.87	45 25 40.12	4.6367299 28.189
Fossil.....	257 50 03.50	78 03 23.32	4.4036166 15.730
Rancheria.....	278 24 06.32	98 32 19.01	4.1887935 9.507
	295 53 31.26	116 03 33.66	4.3180539 12.924

## CRAGGY, WHEELER COUNTY, OREG. (Not occupied.)

Highest point of a rock crag situated on the east side of the Fossil-Mitchell stage road and about 12 miles north of Twickenham post office. It is known locally as Craggy.

Station mark: Center of highest point.

[Latitude  $44^{\circ} 51' 09.51''$ ; longitude  $120^{\circ} 11' 25.99''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Wagner.....	* * "	* * "	
Fossil.....	72 21 03.7	252 11 11.6	4.28720 12.038
Rancheria.....	184 04 40	4 05 08	4.07930 7.460
Baldy.....	219 43 24	39 45 42	3.82491 4.152
	327 58 04	142 07 03	4.43610 16.980

## DEVILS HILL, GILLIAM COUNTY, OREG.

Situated on highest part of short ridge known as Devils Hill. It is in cultivated field owned by Shelby Burris, 10 miles north by 10 miles west of Condon. It is about 0.25 mile east of quarter corner between secs. 23 and 24, T. 2 S., R. 19 E. The Condon-Moro wagon road passes over south end of hill. Elevation, 2,740 feet.

**Signal:** A tripod of 2 by 4 inch plank, boarded on the three sides, and covered with white cloth. Signal is centered over station mark.

**Station mark:** A standard bench-mark post centered over a bottle set 36 inches below the surface of ground; post projects about 12 inches above surface.

**Reference marks:** A stone with cross cut in top, set at corner of fence at elbow in public highway, bears  $254^{\circ} 13' 42''$  true; distance 1,527.9 feet; a cairn of stone built on a small natural mound bears  $359^{\circ} 33' 00''$  true; distance 1,690.3 feet.

[Latitude  $45^{\circ} 22' 52.02''$ ; longitude  $120^{\circ} 23' 35.05''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
John Day.....	° ' "	° ' "	Log. meters.	Miles.
Toby.....	127 27 57.96	307 21 34.26	4,1686539	9.162
Wester Butte.....	231 09 43.27	51 20 24.57	4,3991881	15.579
Rock Creek.....	274 35 05.59	94 43 09.61	4,1716197	9.226
Linville.....	290 18 35.31	110 36 54.59	4,5555116	22.329
	334 25 23.20	154 29 29.45	4,2430380	10.374

## FIELDS, GRANT COUNTY, OREG.

On the highest bald summit at the head of Fields Creek; 8 miles southwest of Mount Vernon post office and 6 miles south of John Day River. Follow trail up Fields Creek 8 miles, thence up steep ridge to left, leading to station. Best approached from the southwest side, as the ridges on the north side are very steep and rocky.

**Station mark:** Copper bolt cemented in solid rock, above it a rock cairn 5 feet in height.

[Approximate North American datum: Latitude  $44^{\circ} 20' 20.95''$ ; longitude  $119^{\circ} 15' 26.27''$ . Baker City astronomic: Latitude  $44^{\circ} 20' 20.60''$ ; longitude  $119^{\circ} 15' 35.18''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Snow a.....	° ' "	° ' "	Log. meters.	Miles.
Snow b.....	25 01 39.82	204 51 43.44	4,6542661	.....
Long b.....	25 01 34.28	201 51 37.89	4,6542932	.....
Greenhorn b.....	204 59 59.38	25 08 58.54	4,6030953	.....
Dixie b.....	232 46 42.57	53 16 01.50	4,8409415	.....
Strawberry b.....	241 24 35.94	61 51 09.39	4,7570859	.....
Soda b.....	273 43 31.37	04 06 15.10	4,6360569	.....
Baldy b.....	318 13 49.6	138 26 36.9	4,5651789	.....
Silvies b.....	322 34 36.70	142 52 42.36	4,7576209	.....
	336 10 56.3	150 20 14.4	4,6450061	.....

a North American datum.

b Baker City astronomic.

## FOSSIL, WHEELER COUNTY, OREG.

Situated on Ball Mountain on the highest point of a rocky ledge, 1 mile south and 2 miles east of Fossil village.

**Signal:** A rock cairn 5 feet base by 5 feet in height centered over tablet.

**Station mark:** An aluminum tablet cemented in solid rock.

[Latitude 44° 57' 37.37"; longitude 120° 10' 47.04".]

To station—	Azimuth.	Back azimuth.	Distance.	
Craggy.....	* * "	* * "		
4 05 08.0	184 04 40.0	4.07930	7.458	
Wagner.....	47 16 16.73	227 05 51.07	4.4199205	16.342
Clarno.....	98 32 19.01	278 24 06.32	4.1887935	9.597
Squaw.....	231 26 24.62	51 31 31.40	4.0844841	7.548
Rancheria.....	333 26 33.13	153 28 23.09	3.8831071	4.747

**HEADLAND, CROOK COUNTY, OREG. (Not occupied.)**

Highest point of a high bluff facing the south, 4 miles northeast of Barnes post office.

[Latitude 43° 59' 11.9"; longitude 120° 13' 38.7".]

To station—	Azimuth.	Back azimuth.	Distance.	
Spanish.....	* * "	* * "		
217 35 34	37 54 32	4.77242	36.792	
Fields.....	242 53 00	63 33 32	4.93902	53.997
Suplee.....	251 56 56	72 22 21	4.70988	31.859

**JUNIPER BUTTE, WHEELER COUNTY, OREG.**

Situated on the highest point of hill locally known as Juniper Butte, and about 6 miles southeast of Waterman.

Signal: A rock cairn 5 feet base by 6 feet in height centered over tablet.

Station mark: An aluminum tablet set in solid rock.

[Latitude 44° 34' 16.16"; longitude 110° 47' 58.91".]

To station—	Azimuth.	Back azimuth.	Distance.	
Pisgah.....	* * "	* * "		
70 07 47.45	249 49 29.16	4.5661538	22.582	
Baldy.....	124 34 19.11	304 26 46.97	4.2361631	10.703
Spanish.....	353 32 47.86	173 33 52.81	4.2611436	11.337

**LINVILLE, GILLIAM COUNTY, OREG.**

Situated on ridge 6.5 miles west of Condon, in field owned by T. J. Linville, and about 700 feet northeast of Linville schoolhouse.

Signal: A tripod of 2 by 4 inch plank, boarded on three sides and covered with white cloth.

Station mark: A standard iron bench-mark post centered over a bottle set 36 inches below surface of ground.

[Latitude 45° 14' 20.56"; longitude 120° 17' 48.66".]

To station—	Azimuth.	Back azimuth.	Distance.	
Clarno.....	* * "	* * "		
11 52 52.04	191 49 36.86	4.4671498	18.218	
Buckhorn.....	33 59 18.7	213 52 44.4	4.33758	13.518
Devils Hill.....	154 29 29.45	334 25 23.20	4.2430360	10.874
Wester Butte.....	206 27 33.52	26 31 30.72	4.2120989	10.126
Rock Creek (observed).....	262 50 59.60	83 05 11.52	4.4208512	16.376
Rock Creek (computed from north).....	262 50 54.17	83 05 06.09		
Squaw.....	321 17 55.39	141 28 01.75	4.4764520	18.612

## MAUPIN BUTTE, CROOK COUNTY, OREG.

Situated on east point of Maupin Butte, a flat-top hill about 4 miles south of Paulina village. Hill is covered with juniper trees and is on Government land, and can be easily reached by horseback on the north and west sides.

Signal: A rock cairn 5 feet base by 6 feet in height covered with white cloth and centered over tablet.

Station mark: An aluminum tablet cemented in solid rock.

[Latitude 44° 04' 04.47"; longitude 119° 56' 20.43".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Pisgah.....	151 29 32.95	331 17 09.61	4.6931505	30.655
Spanish.....	199 10 39.33	19 17 33.87	4.6023220	24.870
Fields.....	240 48 42.36	61 17 13.15	4.7942331	38.690
Suplee.....	255 18 41.40	75 32 04.72	4.4237651	16.486
Snow.....	286 40 22.46	106 58 52.67	4.5702608	23.100

## PISGAH, WHEELER COUNTY, OREG.

Situated on highest part of high ridge, known locally as Pisgah Mountain, about 8 miles southwest of Mitchell, 5 miles north of Big Summit Prairie, and 7 miles northeast of Round Mountain.

A wagon road (sawmill road), southwest from Mitchell, passes over the ridge 1½ miles west of the station.

Signal: A rock cairn, 5 feet base by 6 feet in height, surmounted by a small pine tree and located 5 feet northwest of station mark.

Station mark: An aluminum tablet cemented in solid rock.

[Latitude 44° 27' 27.66"; longitude 120° 14' 05.46".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Wagner.....	158 31 08.81	333 23 10.75	4.6111267	25.380
Rancheria.....	189 00 15.48	9 04 24.47	4.6958656	30.848
Baldy.....	222 13 42.63	42 24 30.09	4.4807326	18.797
Juniper.....	249 49 29.16	70 07 47.45	4.5661538	22.882
Spanish.....	278 23 37.73	98 42 59.31	4.5695024	23.060
Suplee.....	306 27 06.77	126 52 56.66	4.7877728	38.117
Maupin Butte.....	331 17 09.61	151 29 32.95	4.6931505	30.655

## RANCHERIA, WHEELER COUNTY, OREG.

Situated on highest part of high rocky butte, locally known as Rancheria. This butte is about 9 miles southeast of Fossil, on the divide between Butte and Rowe creeks. The Fossil-Rowe Creek wagon road passes within 0.5 mile of the station.

Signal: A rock cairn, 4.5 feet base by 5 feet in height, centered over tablet.

Station mark: An aluminum tablet cemented in solid rock.

[Latitude 44° 53' 55.96"; longitude 120° 08' 11.35".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Pisgah.....	9 04 24.47	189 00 15.48	4.6958656	30.848
Black Butte.....	16 02 51.60	195 57 05.52	4.59398	24.396
Craggy.....	39 45 41.65	219 43 24.33	3.82491	4.152
Wagner.....	64 11 23.72	243 50 14.07	4.4024218	15.695
Clarno.....	116 03 33.66	295 53 31.26	4.3180539	12.923
Fossil.....	153 28 23.09	333 26 33.13	3.8831071	4.747
Squaw.....	202 55 20.18	22 58 36.78	4.1941686	9.717
Baldy.....	334 49 04.48	154 55 45.04	4.4690274	18.296

## ROCK CREEK, MORROW COUNTY, OREG.

Situated on highest part of round hill on property of James Murtha, 10.5 miles east by 1.5 miles north of Condon. It is about 0.25 mile south of corner of secs. 28, 29, 32, and 33, T. 3 S., R. 23 E.

Signal: A tripod of 2 by 4 inch plank boarded on three sides and covered with white cloth. Signal is centered over station mark.

Station mark: A standard iron bench-mark post centered over a bottle set 38 inches below surface of ground.

[Latitude  $45^{\circ} 16' 05.09''$ ; longitude  $119^{\circ} 57' 49.16''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Squaw.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Clarno.....	15 47 31.02	195 43 27.16	4.4420126	17.193
Linville (observed).....	45 25 40.12	225 08 14.87	4.6567299	28.19
Linville (computed from north).....	83 05 11.52	262 50 59.60	4.4208512	16.376
Devils Hill.....	83 05 06.09	262 50 54.17		
Westers Butte.....	110 36 54.59	290 18 35.31	4.5555116	22.329
Ione.....	121 08 47.16	300 58 31.53	4.3427110	13.679
	207 58 00.58	28 04 32.51	4.4067223	15.849

## SECONDARY POINTS.

[Approximate North American datum.]

Station.	Latitude.	Longitude.
T. 2 S., R. 21 E., corner of secs. 20, 21, 28, and 29.....	45 22 26.10	120 12 30.92
T. 2 S., R. 19 E., corner of secs. 23, 24, 25, and 26.....	45 22 29.85	120 23 55.96
T. 3 S., R. 23 E., corner of secs. 28, 29, 32, and 33.....	45 16 19.65	119 57 46.84
T. 4 S., R. 20 E., quarter corner between secs. 10 and 11.....	45 14 09.62	120 17 54.90
T. 6 S., R. 22 E., center of sec. 23.....	45 01 45.72	120 03 26.72

## SNOW, GRANT COUNTY, OREG.

Snow Mountain is in Grant County very near the Harney County line. Station is on the highest point of bald ridge and is well known locally as Snow Mountain, as there is generally a small bank of snow on north side. It is at the source of Emigrant Creek, South Fork of John Day River, Silver Creek, and the waters of Crooked River. It is the highest point for a long distance south of the Strawberry Range. Can be easily ascended from almost any direction on horseback.

Station mark: A bronze triangulation tablet cemented in solid rock under a cairn 7 feet in diameter at base and 9 feet high.

[Approximate North American datum: Latitude  $43^{\circ} 58' 15.79''$ ; longitude  $119^{\circ} 29' 42.79''$ . Baker City astronomic: Latitude  $43^{\circ} 58' 15.34''$ ; longitude,  $119^{\circ} 29' 51.30''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Fields a.....	° ' "	° ' "	<i>Log. meters.</i>	<i>Miles.</i>
Fields b.....	204 51 43.44	25 01 39.82	4.6542661	.....
Strawberry b.....	204 51 37.89	25 01 34.28	4.6542932	.....
Baldy b.....	238 25 45.71	58 58 21.19	4.8635558	.....
Trout b.....	274 41 18.41	95 09 14.64	4.7328401	.....
Burns b.....	299 10 17.11	109 36 22.18	4.7276892	.....
	326 15 04.53	146 30 13.06	4.7246653	.....

a North American datum.

b Baker City astronomic.

**SPANISH PEAK, WHEELER COUNTY, OREG.**

Situated on the highest point of a bald mountain locally known as Spanish Peak or Bald Mountain. Station is about 3.5 miles south and 2 miles east of Antone store and post office. The north end of the mountain breaks off abruptly; the south end is sloping. Station is located at north end. To reach station from Antone follow up Rock Creek to sawmill, about 2 miles, thence east by road and trail to gap, thence south by trail.

Signal: A cairn 5 feet base by 6 feet in height centered over tablet.

Station mark: An aluminum tablet set in top of stone 10 by 8 by 26 inches which projects 8 inches above surface of ground.

[Latitude  $44^{\circ} 24' 28.81''$ ; longitude  $119^{\circ} 46' 26.23''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Maupin Butte.....	19 17 33.87	199 10 39.33	4.6023220	24.870
Headland.....	37 54 33	217 33 35	4.77242	36.792
Pisgah.....	98 42 59.31	278 23 37.73	4.5695024	23.060
Baldy.....	149 49 39.08	329 41 02.60	4.5089666	20.060
Juniper.....	173 33 52.81	353 32 47.86	4.2611436	11.337
Fields.....	280 20 45.83	100 42 26.28	4.6219570	26.020
Snow.....	335 14 50.06	155 26 29.50	4.7277199	33.196
Suplee.....	338 10 33.09	158 17 04.72	4.5250045	20.817

**SQUAW, WHEELER COUNTY, OREG.**

Situated on highest point of high sharp butte locally known as Squaw Butte. It is near center of sec. 23, T. 6 S., R. 22 E., and 8 miles east by 2 miles north of Fossil. The foot of the butte can be reached by wagon road from both Fossil and Mayville.

Signal: Rock cairn 5 feet high located on highest point of Butte. Elevation, 4,579 feet.

Station mark: An aluminum tablet cemented in stone ledge 5.3 feet south of rock cairn.

[Latitude  $45^{\circ} 01' 42.43''$ ; longitude  $120^{\circ} 03' 33.14''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Rancheria .....	22 58 36.78	202 55 20.18	4.1941686	9.717
Fossil.....	51 31 31.40	231 26 24.61	4.0844841	7.548
Clarno.....	78 03 23.32	257 50 03.50	4.4036166	15.739
Buckhorn .....	99 58 20.12	279 41 41.04	4.49624	19.480
Linville.....	141 28 01.75	321 17 55.39	4.4764520	18.612
Rock Creek.....	195 43 27.16	15 47 31.02	4.4420126	17.193

**SUPLEE, GRANT COUNTY, OREG.**

Situated on highest point of wooded hill about 4 miles north and 4 miles east of Suplee post office and  $1\frac{1}{2}$  miles east and  $\frac{1}{2}$  mile north of Bernard's ranch house. To reach station go north from Suplee post office on private road to Bernard's house, thence northeast on private road to divide, thence southeast through wood to station.

Lines to five stations were cut through timber.

Signal: A rock cairn 5 feet base by 7 feet in height covered with white cloth and centered over tablet.

Station mark: An aluminum tablet cemented in solid rock 8 inches below surface of ground, over which a flat circular stone is laid.

[Latitude 44° 07' 40.82"; longitude 119° 37' 06.03".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Headland.....	72 22 21	251 56 56	4.70988	31.858
Maupin Butte.....	75 32 04.72	255 18 41.40	4.4237651	16.486
Pisgah.....	126 52 56.66	306 27 06.77	4.7877728	38.117
Spanish.....	158 17 04.72	338 10 33.69	4.5250645	20.517
Fields.....	230 44 29.83	50 59 36.26	4.5702524	23.100
Snow.....	330 27 19.16	150 32 27.34	4.3018427	12.430

## WAGNER, JEFFERSON COUNTY, OREG.

Situated on highest point of Wagner Butte, a double-topped butte on the west side of the John Day River and about 1.5 miles west of Wagner's ranch house. The Butte is on the divide between the John Day River and Currant Creek. To reach the station from Fossil take the Fossil-Clarno wagon road via Pine Creek. On reaching Pine Creek continue down same about 1.5 miles, leave public road and follow private road southwest over divide, thence down road canyon to John Day River. From this point a trail leads up the river to Wagner's ranch. This route can only be used when the river is low, as it must be forded several times.

Signal: A rock cairn 5 feet base by 6 feet in height centered over tablet and covered with white cloth.

Station mark: An aluminum tablet cemented in solid rock.

[Latitude 44° 47' 58.38"; longitude 120° 25' 25.96".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Clarno.....	191 10 56.22	11 13 04.52	4.3125403	12.762
Fossil.....	227 05 56.55	47 16 16.73	4.4199205	16.341
Rancheria.....	243 58 14.07	64 11 23.72	4.4024218	15.695
Craggy.....	252 11 11.57	72 21 03.69	4.28720	12.338
Baldy.....	293 43 33.68	114 02 22.01	4.5864176	23.977
Pisgah.....	338 23 10.75	158 31 08.81	4.6111267	25.340
Black Butte.....	335 49 41.20	155 56 02.89	4.46624	18.180

## WESTER BUTTE, GILLIAM COUNTY, OREG.

Situated on highest point of sharp hill locally known as Wester Butte. It is 3 miles west by 1.5 miles north of Gwendolen station on land owned by Mr. Wester and is about 0.3'mile southeast of corner of secs. 20, 21, 28, and 29, T. 2 S., R. 21 E. Station can be reached by following main road north from Gwendolen 1 mile, thence turning west through gate and thence west along private road to station. Elevation, 2,729 feet.

Signal: A tripod of 2 by 4 inch plank, boarded on three sides and covered with black cloth. Signal is centered over station mark.

Station mark: Standard iron bench-mark post centered over a bottle set 40 inches below surface of ground; post projects about 8 inches above surface.

[Latitude 45° 22' 13.02"; longitude 120° 12' 14.98".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Linville.....	26 31 30.72	206 27 33.52	4.2120989	10.126
Devils Hill.....	94 43 09.61	274 35 05.59	4.1716197	9.226
John Day.....	111 06 08.02	290 51 40.00	4.4530396	17.636
Toby.....	195 45 45.65	15 48 22.26	4.2445000	10.911
Ione.....	249 56 20.06	70 13 09.05	4.5153273	20.353
Rock Creek.....	300 58 31.53	121 08 47.16	4.3427110	13.679

**PRIMARY TRAVERSE.****Albany and Salem quadrangles.****MARION AND POLK COUNTIES.**

The following geographic positions were determined by primary traverse and are based upon the Coast and Geodetic Survey position for the capitol dome at Salem, and United States Geological Survey primary traverse positions along the north border of the Albany quadrangle described in Bulletins 496 and 551, both on North American datum. The work was done by L. F. Biggs in 1913.

**ALBANY QUADRANGLE.****Near northwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Suver, 1 mile west of; center of T road north.....	44 44 40.4	123 13 38.0	
Prim. Trav. Sta. No. 46, 1911.....	44 44 36.9	123 12 19.1	5,705

**SALEM QUADRANGLE.****Along highways near center of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Orville, 1.6 miles east of, at south edge of road, water trough.....	44 51 56.8	123 07 31.6	
Orville, 1.2 miles east of, center of road at Vite Springs .....	44 51 49.1	123 08 04.1	2,465
Orville, 0.5 mile east of, large boulder at corner of burn.....	44 51 13.8	123 08 17.0	3,685
Orville, center of track at road crossing south of.....	44 51 04.2	123 08 49.2	2,511

**Along highways from Independence to Monmouth.**

Independence, on sidewalk opposite south wall of Isis Theater, 1.6 feet from edge of curb; chiseled cross.....	44 51 05.8	123 11 00.9	
Independence, spire of Presbyterian Church.....	44 51 02.0	123 11 17.9	1,289
Independence, 1.1 miles west of, T road north.....	44 51 06.0	123 12 20.1	4,503
Independence, 1.8 miles west of, railroad crossing.....	44 50 59.6	123 13 07.7	3,489
Independence, 2.7 miles west of, flagpole on normal school at Monmouth.....	44 51 05.0	123 14 12.5	4,702

**Along highways near west border of quadrangle.**

Monmouth, 0.9 mile south of, center of small bridge.....	44 50 16.8	123 14 03.7	4,928
Monmouth, 1.6 miles south of, T road east.....	44 49 44.1	123 14 03.8	3,310
Monmouth, 2 miles south of, T road west at cemetery.....	44 49 22.3	123 14 03.8	2,210
Monmouth, 3 miles south of, west edge of road at T road east, 3 feet north to stone on township line; iron post stamped "Prim. Trav. Sta. No. 4, Oregon 1913".....	44 48 13.4	123 14 04.0	6,975
Monmouth, 4.1 miles south of, at end of long tangent, blazed tree inscribed "U. S.".....	44 47 02.2	123 14 03.8	7,205
Monmouth, 4.9 miles south of, center of T road west; iron stake.....	44 46 17.5	123 14 04.0	4,528
Monmouth, 5.9 miles south of, 200 feet north of summit of wooded hill, east edge of road; iron post stamped "Prim. Trav. Sta. No. 5, Oregon 1913".....	44 45 27.0	123 13 50.3	5,207

**Along highways near west side of Willamette River.**

Independence, 0.2 mile north of; center of bridge.....	44 51 14.3	123 11 01.5	
Independence, 1.2 miles north of; T road east.....	44 52 06.8	123 11 06.5	5,328

## SALEM QUADRANGLE—Continued.

Along Oregon Electric Railway, near east side of Willamette River.

Station.	Latitude.	Longitude.	Distance between stations.
	° ° "	° ° "	Feet.
Halls Ferry station, 1 mile southwest of; bridge over highway.....	44 52 15.1	123 08 36.9	.....
East Independence station, 15 feet east of, on fence line; iron post stamped "Prim. Trav. Sta. No. 11 Oregon 1913".....	44 51 49.7	123 08 43.1	2,606
Orville, center of track at power house.....	44 51 13.5	123 08 49.2	3,601
Orville, center of track at road crossing.....	44 51 04.2	123 08 49.2	935
Orville, 0.8 mile south of; center of bridge 50 4.....	44 50 31.1	123 08 31.4	3,587
Orville, 1.4 miles south of; west edge of right of way, at road crossing under track; iron post stamped "Prim. Trav. Sta. No. 12, Oregon 1913".....	44 50 05.5	123 08 07.8	3,102

## Along highways near south part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	° ° "	° ° "	Feet.
Buena Vista, opposite old store, east side of road; iron post stamped "Prim. Trav. Sta. No. 28 Oregon 1911".....	44 46 07.7	123 08 59.5	.....
Buena Vista, 1 mile north of; mail box at T road east.....	44 46 58.8	123 09 03.7	5,188
Buena Vista, 1.6 miles north of; three mail boxes at T road.....	44 47 33.7	123 09 03.3	3,530
Buena Vista, 2 miles north of; fence post under large tree at L in road north.....	44 47 33.8	123 09 32.4	2,100
Buena Vista, 3.1 miles north of, at T west; signboard reads "Buena Vista 3 miles, Independence 5 miles".....	44 48 28.4	123 09 23.4	5,560
Buena Vista, 3.5 miles north of, on east abutment of culvert; chisel mark.....	44 48 48.9	123 09 28.4	2,111
Independence, 2.9 miles south of; L in road west.....	44 49 18.8	123 09 23.1	3,045
Independence, 1.4 miles south of, at road east; M. P. Leitch's mail box.....	44 49 52.9	123 10 59.0	7,729
Independence, 0.25 mile south of, at south edge of town, 500 feet southeast of station, east edge of road; iron post stamped "Prim. Trav. Sta. No. 14 Oregon 1913".....	44 50 53.0	123 11 01.0	6,085

Magnetic declination near east border of quadrangle,  $22^{\circ} 09' E.$ ; near west border of,  $22^{\circ} 17' E.$

## Along highways in northwest quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	° ° "	° ° "	Feet.
Independence, 2 miles north of; second-class T road east.....	44 52 47.8	123 11 11.5	.....
Independence, 2.3 miles north of, at road west; signboard reads "Independence 2 miles, Salem 9 miles, Dallas 8 miles".....	44 53 01.9	123 11 04.7	1,805
Independence, 3.2 miles north of, at Y road north, east side of road; iron post stamped "Prim. Trav. Sta. No. 7, Oregon 1913".....	44 53 45.8	123 10 28.4	5,163
Independence, 4.1 miles north of; telephone pole 4.7 at angle in road.....	44 54 11.4	123 09 38.8	4,409
Independence, 5 miles north of; T road east.....	44 54 53.9	123 09 12.2	4,709
Independence, 5.8 miles north of, center of railroad crossing at McNary.....	44 55 34.8	123 08 48.4	4,480
McNary, 0.2 mile north of; center of bridge.....	44 55 42.2	123 08 43.8	820
McNary, 0.5 mile north of, north edge of road; iron post stamped "Prim. Trav. Sta. No. 6 Oregon 1913".....	44 56 00.5	123 08 48.6	1,883
McNary, 1.4 miles northeast of; T road south.....	44 55 57.6	123 07 42.4	4,774

## Along Oregon Electric Railway in northwest corner of quadrangle.

Halls Ferry station, 0.7 mile northeast of; center of bridge.....	44 53 32.6	123 07 39.1	.....
Halls Ferry station; center of track opposite.....	44 53 01.7	123 08 02.7	3,565

Magnetic declination on east border of south half of quadrangle,  $22^{\circ} 20' E.$

## SALEM QUADRANGLE—Continued.

Along highways in northeast part of quadrangle.<sup>1</sup>

Station.	Latitude.	Longitude.	Distance between stations.
Eola store, 150 feet west of; large boulder 2½ feet high and 2 feet in diameter.....	• ' "	• ' "	Fect.
Eola store, 0.4 mile east of, opposite signboard marked "Slow," 300 feet east of water trough; center of track.....	44 55 53.5	123 06 55.8	.....
Ferry, 600 feet east of, R. J. Kinney's mail box.....	44 55 55.7	123 06 26.6	2,116
Salem, 3.4 miles west of, opposite signboard marked "Log Dump".....	44 55 59.5	123 05 44.2	3,076
Salem, 3 miles west of, 1,900 feet east of Log Dump station, north edge of road; iron post stamped "Prim. Trav. Sta. No. 8 Oregon 1913".....	44 55 51.0	123 05 15.8	2,217
Salem, 2.3 miles west of; railroad signboard marked "Log Dump 1 mile".....	44 55 46.8	123 04 51.0	1,830
Salem, 2 miles west of; T road west.....	44 56 10.8	123 04 00.9	3,833
Salem, 1.7 miles west of, west edge of Kingwood Street at entrance to Kingwood; brick and concrete column.....	44 56 16.2	123 03 49.4	1,567
Salem, 1 mile west of, at west end of bridge at T road north; hub.....	44 56 25.1	123 03 31.4	1,407
Salem, 0.4 mile west of; statue on courthouse.....	44 56 42.8	123 02 52.7	3,490
Salem, dome of State capitol (Coast and Geodetic Survey triangulation station).....	44 56 25.5	123 02 07.4	3,096
Salem, near south entrance and in south face of capitol building; aluminum tablet, "elevation 171".....	44 56 19.47	123 01 43.5	1,826
	44 56 18.2	123 01 44.0	133

## Along Oregon Electric Railway from Salem to Finzer station.

Station.	Latitude.	Longitude.	Distance between stations.
Salem, 0.8 mile southwest of, west edge of South Commercial Street at intersection with Mission Street.....	44 56 01.4	123 02 35.3	4,060
Salem, 1.2 miles southwest of, east side of track, water tank.....	44 55 47.9	123 02 50.0	2,019
Salem, 2.2 miles southwest of, at northeast end of tangent center of bridge 52-9.....	44 55 05.5	123 03 43.1	5,470
Salem, 2.8 miles southwest of, second-class road crossing.....	44 54 48.6	123 04 13.8	2,790
Salem, 3.6 miles southwest of, center of bridge 54-2.....	44 54 33.6	123 05 06.9	4,111
Salem, 4.4 miles southwest of, 300 feet east of Livesley, west edge of wagon road to T road to Livesley station; iron post stamped "Prim. Trav. Sta. No. 10 Oregon 1913".....	44 54 11.5	123 05 56.4	4,213
Finzer station, 120 feet northeast of; center of bridge.....	44 53 47.1	123 07 10.0	5,336

Magnetic declination near Salem, 22° 21' E.

## Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Prim. Trav. Sta. No. 25, 1911.....	• ' "	• ' "	Fect.
Jefferson, 3 miles north of, 0.2 mile south of bridge; second-class road west.....	44 43 59.1	123 00 34.5	.....
Jefferson, 4.2 miles north of, on Pacific highway at T road west, on west side of road; iron post stamped "Prim. Trav. Sta. No. 1 Oregon 1913".....	44 45 39.2	123 01 24.6	10,768
Jefferson, 5.6 miles north of; center of bridge.....	44 46 39.3	123 01 23.6	6,099
Jefferson, 6.6 miles north of, 725 feet northeast of telephone pole 15-35, opposite abandoned house; center of bridge.....	44 47 47.1	123 02 00.6	7,294
Jefferson, 7.7 miles north of, near pole 17-11; T road east.....	44 48 34.3	123 01 37.2	5,073
Jefferson, 9.5 miles north of, summit of Jackson Hill; center of road.....	44 49 31.1	123 01 47.6	5,813
Jefferson, 9.8 miles north of, at southwest corner of Sunnyside district school No. 96; iron post stamped "Prim. Trav. Sta. No. 2 Oregon 1913".....	44 50 14.5	123 01 47.6	4,398
Jefferson, 10.2 miles north of, 1.1 miles north of Sunnyside School; T road south.....	44 50 43.6	123 01 38.9	3,015
Jefferson, 11.4 miles north of, 2.3 miles north of Sunnyside School, 200 feet northwest of church, east edge of road at T road west; iron post stamped "Prim. Trav. Sta. No. 9 Oregon 1913".....	44 50 49.7	123 03 00.7	5,931
T. 8 S., R. 3 W., 1,320 feet east of west center of sec. 20; 1/16 corner.....	44 51 42.4	123 03 42.4	6,128
T. 8 S., R. 3 W., corner of secs. 17, 18, 19, and 20; stone.....	44 51 42.9	123 05 09.2	6,259
T. 8 S., R. 3 W., corner of secs. 17, 18, 19, and 20, 1.03 miles west of; T road south.....	44 52 09.1	123 05 27.4	2,964
	44 52 02.4	123 06 41.9	5,410

<sup>1</sup> For other positions in Salem quadrangle see pp. 517-518.

**SALEM QUADRANGLE—Continued.****Along Oregon Electric Railway from Orville to Talbot station.**

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Fed.
Orville, 2.3 miles south of; center of bridge 62.....	44 49 40.6	123 07 15.1	
Orville, 3.2 miles south of; center of bridge 62-8.....	44 49 28.0	123 06 11.5	4.701
Sidney, 1.1 miles northwest of, signboard "1 mile to Sidney"; center of track.....	44 49 17.2	123 05 49.0	1,953
Sidney, 375 feet north of station, west edge of right of way, north edge of road, at fence corner; iron post stamped "Prim. Trav. Sta. No. 13 Oregon 1913".....	44 48 22.2	123 05 21.0	5.924
Sidney, 2 miles south of; road crossing.....	44 46 36.7	123 05 28.2	10.690
Sidney, 2.6 miles south of; center of track at milepost 67.....	44 46 07.8	123 05 30.6	2.900
Talbot, road crossing at.....	44 45 39.1	123 05 32.9	2.910
Talbot, 0.6 mile southeast of; P. T. Sta. No. 27, 1911.....	44 45 33.9	123 04 49.2	3,197

Magnetic declination near north border of quadrangle,  $22^{\circ} 46' E.$ ; near east border  $22^{\circ} 26' E.$ ; near west border,  $22^{\circ} 28' E.$

**AUMSVILLE, CORVALLIS, DALLAS, LEBANON, SHERIDAN, MCCOY, MOUNT ANGEL, TUALATIN, SALEM, AND HILLSBORO (15') QUADRANGLES.**

**CLACKAMAS, LINN, MARION, POLK, WASHINGTON, AND YAMHILL COUNTIES.**

The following geographic positions on North American datum were determined by primary traverse and are based upon positions previously located by primary traverse or triangulation stations as herein described, previously published in Bulletins 496 and 551. The work was done in 1913 by L. F. Biggs, in cooperation with the State of Oregon.

**AUMSVILLE QUADRANGLE.****Along Southern Pacific Railroad near west border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Fed.
Road crossing, 714 C .....	44 53 37.8	122 59 34.0	
Road crossing .....	44 52 59.6	122 58 55.9	4.739
State school station, center of track opposite south end station .....	44 52 33.8	122 58 41.4	2.320
State school, chimney on machine building .....	44 52 32.6	122 58 22.2	1.352
Road crossing, 712 C-B .....	44 51 59.7	122 58 17.3	3.353
Turner, 1.4 miles north of, west side of road at fence line, 210 feet north of milepost; iron post stamped "Prim. Trav. No. 29 Ore. 1913-261 B 1913" .....	44 51 36.3	122 57 54.7	2.875
Second-class road crossing at end of tangent .....	44 51 07.4	122 57 25.6	3.600
Turner, center of track opposite semaphore .....	44 50 34.1	122 57 10.0	3.548
Road crossing, 709 A-B .....	44 49 26.0	122 56 54.4	6.990
Marion, 4.9 miles north of, west side of railroad at fence line, 110 feet north of milepost 710; iron post stamped "Prim. Travs. No. 30, Ore. 1913, 308 B 1903" .....	44 49 14.1	122 56 52.1	1.209
Road crossing .....	44 48 39.8	122 56 43.8	3.332
Second-class road crossing, 708 A-B .....	44 48 18.8	122 56 39.0	2.150
Road crossing, 706 B-C .....	44 47 19.7	122 56 25.5	6.060
Marion, 1.8 miles north of, west side of railroad at fence line opposite milepost 706; iron post stamped "Prim. Trav. No. 31, Ore. 1913-327 B 1903" .....	44 46 34.5	122 56 15.6	4.633
Road crossing .....	44 46 07.3	122 56 10.4	2.778
Marion, road crossing, just north of station .....	44 45 00.9	122 56 25.9	6,815

**From point near Salem east to Geer.**

T road north .....	44 55 42.4	122 59 09.9	
Salem, 2 miles east of; center of cross roads .....	44 55 42.4	122 58 57.1	920
Salem, 3 miles east of, 100 feet west of slight jog in road, south edge of road; iron post stamped "Prim. Trav. No. 32 Ore. 1913" .....	44 55 42.7	122 57 29.4	6,310
Center of bridge .....	44 55 42.2	122 56 38.4	3,673
road south .....	44 55 38.8	122 55 57.4	2,973
Schoolhouse flagpole .....	44 55 38.2	122 55 29.3	2,022
T road south .....	44 55 38.3	122 54 59.6	2,140
T road north .....	44 55 48.2	122 54 01.1	4,325

Magnetic declination,  $22^{\circ} 30' E.$

**AUMSVILLE QUADRANGLE—Continued.**  
**Near northwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Center Southern Pacific R. R. at road crossing 722 A-B.....	° ' "	° ' "	Feet.....
	44 59 07.2	122 59 59.1	

**From Turner east to Aumsville.**

Turner, center of track, opposite semaphore.....	44 50 34.1	122 57 10.0	.....
Large oak tree in center of road at T road south.....	44 50 21.6	122 56 11.2	4,355
T road south near bridge.....	44 50 21.5	122 55 02.5	5,020
Turner, 2.4 miles east of, north edge of road at T road, north; iron post stamped "Prim. Trav. No. 40 Ore. 1913".....	44 50 21.3	122 54 21.2	2,977
Center of road at T road north.....	44 50 28.9	122 52 30.5	8,019
Aumsville, 200 feet north of station, northwest intersection of T road, north; iron post stamped "Prim. Trav. No. 39 Ore. 1913".....	44 50 28.6	122 51 55.1	2,552

Magnetic declination, 22° 48' E.

**From point near Shelburn via Stayton to Aumsville.**

Center of track at road crossing.....	44 45 07.2	122 50 45.7	.....
Culvert, 201.....	44 45 29.5	122 50 02.8	3,830
Shelburn, 3 miles northeast of, 500 feet northeast of milepost 100, north edge of right of way, east edge of road at road crossing; iron post stamped "Prim. Trav. No. 36 Ore. 1913".....	44 45 48.9	122 49 26.0	3,304
Telephone pole inscribed "U. S." at angle in road east.....	44 46 18.6	122 49 26.6	3,000
Center of T road west, 100 feet north of railroad crossing.....	44 46 26.3	122 48 13.4	5,335
Angle in road north at second-class road east.....	44 46 41.8	122 47 36.9	3,232
North Santiam River, center of bridge over south pier.....	44 47 29.3	122 47 35.8	4,498
Stayton, northwest corner of Water and First streets; iron post stamped "Prim. Trav. No. 37 Ore. 1913".....	44 47 47.0	122 47 37.3	1,800
T. 9 S., R. 1 W., center sec. 10, T road west.....	44 48 11.3	122 47 36.8	2,460
T. 9 S., R. 1 W., quarter corner between secs. 9 and 10, T road east.....	44 48 11.2	122 48 13.6	2,660
T. 9 S., R. 1 W., corner secs. 3, 4, 9, and 10, T road south.....	44 48 37.2	122 48 13.3	2,630
T road north.....	44 48 37.1	122 48 50.1	2,650
T road south.....	44 48 36.5	122 50 21.5	6,500
T road north, near corner secs. 5, 6, 7, and 8, T. 9 S., R. 1 W.; iron post stamped "Prim. Trav. No. 38 Ore. 1913".....	44 48 36.6	122 50 44.3	1,646
Angle in road west.....	44 49 11.6	122 50 44.0	3,540
Large fence post at angle in road north.....	44 49 16.5	122 51 38.0	3,924
Railroad crossing, 710 F-G.....	44 49 22.5	122 51 53.1	1,217
Aumsville, east rail at railroad water tank.....	44 50 26.8	122 51 52.3	6,505
Aumsville, 200 feet west of station; iron post stamped "Prim. Trav. No. 39 Ore. 1913".....	44 50 28.6	122 51 55.1	275

**From Aumsville north along Southern Pacific Railroad.**

South end of bridge 713 A .....	44 51 21.6	122 52 07.0	5,443
Road crossing, 714 B-C.....	44 52 00.6	122 52 03.6	3,951
Shaw, 100 feet southeast of station, east edge of right of way, north edge of road; iron post stamped "Prim. Trav. No. 41, 1913".....	44 52 24.8	122 52 08.5	2,473
Road crossing at milepost 716 .....	44 53 16.7	122 52 43.0	5,918
Second-class road crossing, 716 C .....	44 53 52.3	122 53 06.7	3,978
Macleay, center of track, opposite station window.....	44 54 22.9	122 53 27.1	3,431
Macleay, 230 feet east of road crossing, in front of town hall; iron post stamped "Prim. Trav. No. 42—Ore. 1913".....	44 54 29.4	122 53 25.1	660
"Macleay One Mile" center of track opposite.....	44 55 11.6	122 53 36.9	4,371
Geer, 600 feet south of station, east side of track at road crossing; iron post stamped "Prim. Trav. No. 33, Ore. 1913".....	44 55 47.5	122 53 33.3	3,641
Road crossing.....	44 56 32.9	122 53 10.7	4,878
Pratum, road crossing, 400 feet south of station.....	44 57 31.8	122 52 40.8	6,340
Pratum, 0.8 mile north of, east side of track at road crossing; iron post stamped "Prim. Trav. No. 43, Ore. 1913".....	44 58 17.0	122 52 17.6	4,868
Switzerland, center of track opposite station.....	44 58 49.6	122 51 42.8	4,146
Selah, center of track at road crossing.....	44 59 14.0	122 50 21.1	6,370
Road crossing, 725 A, south edge right of way, east edge of road; iron post stamped "Prim. Trav. No. 53, Ore. 1913".....	44 59 34.4	122 49 27.2	4,390
Road crossing.....	44 59 47.6	122 48 59.9	2,376

Magnetic declination, 22° 30' E.

**Along highway near Pratum.**

Center of north and south road at road crossing.....	44 59 31.2	122 52 46.0	.....
T road east, rock center road.....	44 58 52.3	122 52 46.6	3,939
T road east.....	44 58 17.1	122 52 35.7	3,653

## CORVALLIS QUADRANGLE.

Along north border of quadrangle near Airlie.

Station.	Latitude.	Longitude.	Distance between stations.
Second-class road south in Albany quadrangle.....	• ′ ″	• ′ ″	Fect.
Angle in road south, end of tangent.....	44 44 40.3	123 14 32.9	.....
Flagpole in front of schoolhouse.....	44 44 40.2	123 15 31.6	4,240
Fir Lawn farm, road opposite entrance to.....	44 44 35.5	123 15 53.7	1,662
Airlie, three mail boxes at Y road 1.5 miles east of.....	44 44 36.3	123 17 07.3	5,110
T road north.....	44 44 08.2	123 18 27.3	6,433
Airlie public school, north edge of road; iron post stamped "Prim. Trav. No. 15, Ore. 1913".....	44 44 48.6	123 19 21.0	5,631
	44 44 58.8	123 19 38.4	1,626

Magnetic declination, 22° 12' E.

## DALLAS QUADRANGLE.

From culvert 78 C north along Southern Pacific Railroad and highways to Dallas.

Station.	Latitude.	Longitude.	Distance between stations.
Culvert 78 C.....	• ′ ″	• ′ ″	Fect.
Road crossing 77 B C.....	44 45 21.8	123 19 37.7	.....
Simpson, 15 feet north of track at road crossing; iron post stamped "Prim. Trav. No. 16, Ore. 1913".....	44 46 25.4	123 19 00.2	6,989
Signboard at T road south, "Airlie 4 miles, Corvallis 20 miles".....	44 46 49.7	123 18 04.1	4,732
T road north, near cemetery.....	44 47 44.0	123 18 03.7	5,504
Telephone pole, north edge of road, opposite wagon shed.....	44 47 44.1	123 18 42.6	2,840
T road north.....	44 48 12.3	123 19 21.6	4,014
T road east, at signboard "Monmouth 6 miles, Calvary Church 6 miles, Dallas 7 miles".....	44 48 43.6	123 19 42.4	3,507
Luckiamute River bridge, 500 feet east of, at crossroads; iron post stamped "Prim. Trav. No. 17, Ore. 1913".....	44 49 48.7	123 20 36.7	7,668
T road west at signboard "Falls City 4 miles, Dallas 5 miles".....	44 50 26.2	123 21 44.2	6,175
T road east.....	44 51 14.3	123 21 23.6	5,088
Schoolhouse, 500 feet northeast of, east edge of road; iron post stamped "Prim. Trav. No. 18, Ore. 1913".....	44 51 39.3	123 21 04.8	2,877
Guthrie's mail box, center of road, opposite.....	44 52 21.5	123 20 10.2	5,812
Summit.....	44 52 57.6	123 19 54.4	3,881
Cemetery gate, east entrance.....	44 53 44.2	123 19 50.7	4,724
Dallas, west end of north curb of Washington Avenue at intersection of Fairview Avenue.....	44 54 32.4	123 19 47.9	4,884
Dallas, in coping of steps at northwest corner of Polk County courthouse; bronze tablet stamped "Prim. Trav. 18, Ore. 1913".....	44 55 11.8	123 19 23.4	4,368
Dallas, railroad crossing.....	44 55 17.6	123 18 54.6	2,156
Summit of hill opposite south end of gate.....	44 55 41.1	123 18 42.6	2,534
T road north.....	44 56 17.9	123 18 37.2	3,744
T road east.....	44 56 53.9	123 18 34.1	3,659
Dallas 3.5 miles north of, at T road south, east side of road at fence corner; iron post stamped "Prim. Trav. No. 19, Ore. 1913".....	44 57 37.3	123 18 03.6	4,907
T road east.....	44 58 10.2	123 17 54.5	3,402
Large cottonwood tree, east side of road.....	44 58 33.7	123 17 36.7	2,092
	44 59 32.1	123 17 11.6	6,184

Along highways east of Dallas.

Bowersville railroad crossing.....	44 54 59.9	123 15 25.2	.....
Chamberlain's mail box.....	44 55 06.5	123 16 23.2	4,223
T road south.....	44 55 05.9	123 17 38.2	5,402
Dallas, east end of north curb on Washington Street.....	44 55 11.8	123 18 30.0	3,777
Dallas, Polk County courthouse; flagpole.....	44 55 17.5	123 18 54.2	1,835

Magnetic declination, 22° 12' E.

**LEBANON QUADRANGLE.**

Near bridge 197.

Station.	Latitude.	Longitude.	Distance between stations.
Center of track at road crossing.....	• ' "	• ' "	
Bridge 197, center of.....	44 44 21.6 44 44 43.3	122 51 54.7 122 51 23.8	Feet. 3,130

**MCCOY QUADRANGLE.**

Near Fairfield.

Station.	Latitude.	Longitude.	Distance between stations.
Center of road at T road east.....	• ' "	• ' "	
Fairfield, 60 feet north of store; iron post stamped "Prim. Trav. No. 83 Ore. 1913".....	45 08 35.7 45 08 10.2	123 00 12.6 123 00 24.9	Feet. 2,721

Magnetic declination, 22° 47' E.

**Along highways near southwest corner of quadrangle.**

T road north.....	45 02 35.3	123 14 18.3	
Center of bridge.....	45 02 35.4	123 13 33.3	3,230
McCoy, north side of road, edge of railroad right of way, 500 feet north of station; iron post stamped "Prim. Trav. No. 21—Ore. 1913".....	45 02 35.5	123 12 56.6	2,640
McCoy, church spire.....	45 02 31.2	123 13 00.7	523
Road crossing.....	45 02 36.7	123 12 22.3	2,814
T road west.....	45 01 49.6	123 12 23.1	4,773
Do.....	45 00 50.9	123 12 25.7	5,950

Magnetic declination, 21° 47' E.

**Along highway near south border of quadrangle.**

White tank house on top of hill, west edge of road.....	45 00 23.7	123 04 40.4	
Salem, 6 miles north of, at northwest corner of school yard; iron post stamped "Prim. Trav. No. 25, 1913. Ore.".....	45 01 11.9	123 05 08.2	5,264
Angle in road, opposite gate leading south to field.....	45 00 55.4	123 06 36.8	6,579
Oak tree, south edge of road at T road north; tree has two sign boards, "Oak Grove, 5 miles"; "McCoy, 4.3 miles," etc.....	45 00 55.4	123 07 37.7	4,375
T road east.....	45 00 32.6	123 07 44.3	2,358
McKinley's orchard, T road south.....	45 00 20.5	123 08 09.8	2,203
Salem, about 8 miles northwest of, 0.3 mile north of John Smith's residence at top of hill, south edge of road; iron post stamped "Prim. Trav. No. 26, Ore. 1913".....	45 00 08.1	123 09 00.9	3,872
Large gate post at south edge of road, northeast corner of field, 60 feet west of small drain.....	45 00 04.6	123 09 47.4	3,362

Magnetic declination, 21° 55' E.

**SHERIDAN QUADRANGLE.**

Along east boarder of quadrangle near Perrydale.

Station.	Latitude.	Longitude.	Distance between stations.
T road east.....	• ' "	• ' "	
T road west.....	45 00 15.8	123 16 46.2	
H. A. Lee's mail box.....	45 00 37.5	123 16 35.7	2,320
T road west.....	45 01 24.9	123 16 09.8	5,145
Perrydale, southeast intersection of crossroads; iron post stamped "Prim. Trav. No. 20, Ore. 1913".....	45 01 42.8	123 15 57.6	2,019
Perrydale, Methodist Church spire.....	45 02 33.9 45 02 36.8	123 15 18.6 123 15 26.9	5,880 605

Magnetic declination, 21° 47' E.

## MOUNT ANGEL QUADRANGLE.

From Chemawa along Southern Pacific Railroad to Aurora, thence north.

Station.	Latitude.	Longitude.	Distance between stations.
	°   °   "	°   °   "	Frac.
Chemawa, mail crane.....	45 00 07.7	122 59 30.1	
Tank, Chemawa, U. S. C. & G. S. station.....	45 00 11.4	122 59 37.0	618
Road crossing.....	45 01 13.5	122 58 59.2	6,336
Do.....	45 01 43.3	122 58 37.3	3,407
Do.....	45 02 07.7	122 58 16.3	2,900
Brooks, 215 feet north of station, 11 feet east of track; iron post stamped "Prim. Trav. No. 35, Ore. 1913-183-13-1903".....	45 02 55.9	122 57 34.6	5,732
Road crossing, 727 E-F.....	45 03 28.6	122 57 06.8	3,863
Road crossing, 728 C-D.....	45 04 24.8	122 56 18.3	6,180
Road crossing at end of tangent.....	45 04 52.6	122 55 54.3	3,305
Milepost 731, second post north of, iron post stamped "Prim. Trav. No. 47—Ore. 1913-182 B 1903".....	45 05 53.6	122 54 39.6	8,176
Gervais, center of track opposite semaphore.....	45 06 33.1	122 53 51.1	5,306
Milepost 733, first post south of; iron post stamped "Prim. Trav. No. 48 1913, Ore. 1903-B".....	45 07 08.4	122 53 06.8	4,779
Road crossing.....	45 08 07.4	122 51 54.1	7,922
Switch head.....	45 08 22.5	122 51 35.5	2,020
Woodburn, 210 feet south of station; iron post stamped "Prim. Trav. No. 49 Ore. 1913-181 B 1903".....	45 08 34.4	122 51 20.0	1,636
Hofer station, switch head.....	45 09 14.0	122 50 31.6	5,302
Culvert, 737 A.....	45 09 50.6	122 49 46.1	4,934
Road crossing, 738 B-C.....	45 10 47.0	122 48 36.0	7,598
Hubbard, 240 feet north of station; iron post stamped "Prim. Trav. No. 58-Ore. 1913, 183-B-1903".....	45 10 58.8	122 48 21.2	1,598
Switch head.....	45 11 12.6	122 48 04.1	1,362
Road crossing.....	45 12 06.6	122 46 57.0	7,270
Switch head.....	45 12 28.8	122 46 29.3	2,999
Hubbard, 3.2 miles northeast of, 15 feet east of track; iron post stamped "Prim. Trav. 57 Ore. 1913".....	45 13 06.0	122 45 56.7	4,424
Track, opposite semaphore No. 7424.....	45 13 29.7	122 45 40.9	2,657
Aurora, water tank.....	45 13 48.2	122 45 16.8	2,537
Aurora, State Bank, in sidewalk near northwest corner; bronze tablet stamped "Prim. Trav. No. 58—Ore. 1913".....	45 13 58.4	122 45 18.2	1,033
Aurora, schoolhouse flagpole.....	45 14 15.6	122 45 30.4	1,950
T road west.....	45 14 31.1	122 45 37.4	1,648

Magnetic declination, 22° 32' E.

From Chemawa east along highways, thence north to Gervais.

Chemawa, 0.8 mile east of, northeast corner road crossing; iron post stamped "Prim. Trav. No. 44—Ore. 1913".....	45 00 18.4	122 58 31.2	
Seven mail boxes at T road, north.....	45 00 19.1	122 58 51.4	7,170
T road, north.....	45 00 36.9	122 55 55.1	4,450
Hazel Green schoolhouse, 200 feet east of, north edge of road; iron post stamped "Prim. Trav. No. 45 Ore. 1913".....	45 00 39.9	122 55 33.6	1,574
T road, south.....	45 00 36.8	122 54 19.0	5,372
Second-class cross roads.....	45 00 41.8	122 53 46.9	2,364
T road, south.....	45 00 38.1	122 52 59.2	3,448
Silverton, 4 miles west of, at southwest corner of crossroads, near church; iron post stamped "Prim. Trav. No. 46, Ore. 1913".....	45 00 34.3	122 52 37.1	1,637
Second-class road west to white house.....	45 01 20.3	122 52 29.1	4,700
Signboard at road crossing, "Salem 12 miles, Mount Angel 4 miles, Selah Springs 4 miles".....	45 01 54.2	122 52 22.6	3,463
Schoolhouse, 200 feet northeast of, north edge of road at T road south; iron post stamped "Prim. Trav. No. 54—Ore. 1913".....	45 02 47.6	122 52 01.9	5,610
T road.....	45 03 03.7	122 51 57.3	1,463
Second-class road east, at top of short grade.....	45 04 05.2	122 51 14.5	6,039
West end of bridge, 500 feet east of old sawmill.....	45 04 17.0	122 51 24.1	1,382
Schoolhouse, 200 feet east of, north edge of road at T road north; iron post stamped "Prim. Trav. 55—Ore. 1913".....	45 04 29.3	122 51 56.9	2,659
Center of road in front of double iron gate.....	45 04 51.0	122 52 59.6	5,010
Crossroads.....	45 04 50.1	122 53 18.3	1,341
Crossroads, Pacific highway, near large fir tree.....	45 05 39.7	122 54 14.8	6,451

Magnetic declination, 22° 30' E.

## MOUNT ANGEL QUADRANGLE—Continued.

From point near St. Paul south along highway to Gervais.

Station.	Latitude.	Longitude.	Distance between stations.
T road north.....	° / " "	° / " "	Feet.
Y road east.....	45 14 43.1	122 56 26.5	.....
T road west.....	45 14 07.2	122 57 40.2	6,399
St. Paul, northeast corner of curb, in front of bank; bronze tablet stamped "Prim. Trav. No. 82—Ore. 1913".....	45 12 53.8	122 58 23.0	7,856
St. Paul Church, cross on.....	45 12 41.8	122 58 33.5	1,598
Center of culvert near T road, east.....	45 12 43.8	122 58 38.6	423
Oak tree, west edge of road at T road, east.....	45 11 52.7	122 59 00.0	5,397
Oak tree, center of road.....	45 11 11.4	122 59 08.8	4,225
Second-class T road west, at slight angle in road.....	45 10 01.4	122 59 37.3	7,372
Mail box at small grove of fir trees.....	45 09 22.0	122 59 57.0	4,233
T road west.....	45 07 40.8	122 58 37.9	.....
T road east.....	45 06 57.8	122 58 11.9	7,543
St. Louis, white church spire, U. S. Coast and Geodetic Survey triangulation station.....	45 07 25.8	122 57 52.6	3,162
St. Louis Church, 100 feet east of iron post stamped "Prim. Trav. No. 84, Ore. 1913".....	45 07 25.83	122 56 31.26	5,836
St. Louis Oregon Electric R. R. crossing at station.....	45 07 25.4	122 56 30.0	106
T road south.....	45 07 17.9	122 55 49.8	2,971
Gervais, center of track opposite semaphor.....	45 07 13.5	122 55 02.4	3,414
	45 06 33.1	122 53 51.1	6,549

Magnetic declination, 22° 36' E.

## Near Champoeg.

Center of road, T road south.....	45 14 48.6	122 52 32.4	.....
Champoeg farm windmill.....	45 14 45.4	122 53 07.6	2,535
Old Champoeg store, at T road east; iron post stamped "Prim. Trav. No. 61 Ore. 1913".....	45 14 57.4	122 53 48.7	3,183

Magnetic declination, 22° 50' E.

## From Woodburn to Silverton via Southern Pacific Railroad.

Woodburn, 210 feet south of station; iron post stamped "Prim. Trav. No. 49—Ore. 1913, 181 B 1903".....	45 08 34.4	122 51 20.0	.....
Woodburn, large steel water tank.....	45 08 29.1	122 51 22.5	562
Road crossing.....	45 08 10.8	122 50 39.6	3,587
Second-class road crossing, end of tangent.....	45 07 57.9	122 50 06.9	2,687
North end of bridge 735 E.....	45 07 37.2	122 49 16.5	4,179
Townsend, 20 feet west of track at station signboard; iron post stamped "Prim. Trav. No. 50, Ore. 1913".....	45 07 15.5	122 48 43.0	3,233
Road crossing.....	45 06 16.7	122 48 28.6	6,040
McKee, road crossing, 70 feet south of station.....	45 06 02.8	122 48 25.2	1,436
Switch head.....	45 05 07.7	122 48 12.1	5,655
Mount Angel, 900 feet north of station, west edge of right of way, at road crossing; iron post stamped "Prim. Trav. No. 51, Ore. 1913".....	45 04 18.5	122 48 00.6	5,047
Mount Angel Church, cross on.....	45 04 04.6	122 47 37.2	2,190
Road crossing, 730 A-B .....	45 02 57.0	122 47 40.6	6,844
Road crossing.....	45 02 33.7	122 47 34.9	2,400
Downs, in north pier of railroad bridge; bronze tablet stamped "Prim. Trav. No. 52, Ore. 1913" .....	45 01 56.1	122 47 25.8	3,860
Road crossing.....	45 01 20.6	122 47 17.3	3,649
Switch head, south end.....	45 00 49.4	122 47 09.8	3,200
Silverton, center of track opposite semaphore.....	45 00 36.0	122 47 09.6	1,365
Road crossing, 726 D-E .....	45 00 16.1	122 47 58.9	4,078

Magnetic declination, 22° 30' E.

## TUALATIN QUADRANGLE.

## Along highway near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Aurora, 2 miles north of northwest intersection of crossroads; iron post stamped "Prim. Trav. No. 11 Ore. 1913, 190".....	* * "	* * "	Fct.
Center of road at crossroads.....	45 15 36.5	122 45 48.9	.....
Geo. Gooding's farmhouse, end cement walk.....	45 15 36.5	122 46 43.8	3,937
Butteville, Oregon Electric Ry. station, 100 feet south of, east edge of right of way, south side of road; iron post stamped "Prim. Trav. No. 59, 1913".....	45 15 36.4	122 47 30.0	3,000
Center of road at crossroads.....	45 15 36.4	122 48 12.5	3,043
Butteville, northeast intersection of street, 15 feet southwest of Masonic Hall; iron post stamped "Prim. Travs. No. 60, Ore. 1913".....	45 15 36.8	122 49 45.8	6,668
Hite & Owens mail box at T road west.....	45 15 46.1	122 50 30.5	3,335
G. W. Stephens mail box.....	45 15 23.0	122 50 29.2	2,338
Telephone pole, at east corner of school yard at Y road south (telephone pole is also t. b. m.).....	45 15 01.7	122 51 34.8	5,167
Culvert at angle in road.....	45 15 03.4	122 54 03.2	.....
T road south.....	45 15 20.5	122 56 13.8	5,344
Newberg, 4 miles south of Champoeg 2.5 miles west of, at T road north to Gearns Ferry; iron post stamped "Prim. Trav. No. 62, Ore. 1913".....	45 15 29.9	122 56 29.5	5,478
	45 15 29.9	122 56 44.6	1,080

Magnetic declination, 22° 50' E.

## Along highway near Newberg.

T road west.....	45 15 57.8	122 56 50.3	.....
Gearns Ferry, stump south edge road, 150 feet south of landing.....	45 16 09.2	122 57 05.8	1,603
Angle in road, northwest at top of hill.....	45 16 28.2	122 56 56.8	2,028
Y road on bridge.....	45 17 06.1	122 57 23.1	4,268
Newberg, intersection of Washington and Seventh streets.....	45 17 43.4	122 57 45.7	4,117
Newberg, intersection of River and First streets.....	45 18 03.2	122 58 04.4	2,401
Newberg, north entrance to city hall; bronze tablet stamped "Prim. Trav. No. 64, Ore. 1913".....	45 18 03.0	122 58 28.6	1,729
Newberg, 150 feet east of station, west edge of sidewalk on Main street; iron post stamped "Prim. Trav. 63, Ore. 1913".....	45 18 12.2	122 58 42.5	1,368

Magnetic declination, 22° 50' E.

## From Newberg via Southern Pacific Railroad to Tualatin.

Road crossing.....	45 18 26.4	122 58 11.3	.....
Road crossing, 24 F-G.....	45 18 56.9	122 57 04.0	5,710
Springbrook, in east foundation of railroad water tank; aluminum tablet stamped "Prim. Travs. 65 Ore. 1913".....	45 19 06.4	122 56 43.3	1,759
Webb, center of track, opposite switch.....	45 19 27.4	122 55 39.8	5,013
West end bridge 22 F.....	45 19 13.7	122 55 18.8	2,038
Rex, northwest corner school yard; iron post stamped "Prim. Trav. No. 66, Ore. 1913".....	45 19 01.2	122 54 29.2	3,766
Washington-Yamhill county line post.....	45 19 05.0	122 54 17.1	946
Chehalem depot, center track.....	45 19 39.2	122 53 19.1	5,396
Road crossing.....	45 20 18.6	122 52 27.0	5,448
Middleton, center of track, opposite station.....	45 20 41.0	122 51 49.2	3,823
Road crossing.....	45 21 01.1	122 51 06.9	3,846
Sherwood, 115 feet west of station at southwest corner of Carlson & Sherks general merchandise store; iron post stamped "Prim. Trav. No. 67, Ore. 1913".....	45 21 22.0	122 50 27.7	3,507
Ford, opposite signboard.....	45 22 09.1	122 49 13.2	7,147
Cipole, road crossing.....	45 22 31.1	122 48 39.3	3,889
Herrman, north edge of right of way at fence corner; iron post stamped "Prim. Trav. No. 68, Ore. 1913".....	45 22 54.7	122 47 40.2	4,850
Galbraith, "One Mile" post, end tangent.....	45 23 13.9	122 46 34.2	5,093
Tualatin, opposite east window.....	45 23 16.1	122 45 53.6	2,903
Tualatin River bridge, east pier.....	45 23 16.4	122 45 40.3	930
Galbraith, road crossing.....	45 23 16.9	122 45 22.1	1,300

Magnetic declination, 22° 50' E.

## TUALATIN QUADRANGLE—Continued.

## Along Southern Pacific Railroad near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.	
	°	'	"	Feet.
Road crossing.....	45 24 22.6	122 44 48.6	.....	.....
Bonita, center of Southern Pacific R. R. track at road crossing ..	45 24 36.6	122 45 04.5	.....	3,634
Trece, center of Southern Pacific R. R. track at road crossing ..	45 25 40.7	122 45 55.0	.....	5,775
Tigard, center of Southern Pacific R. R. track at road crossing ..	45 25 53.0	122 46 11.5	.....	1,715
Tigard, 0.5 mile northwest of; Oregon Electric Ry. and Southern Pacific R. R. crossing.....	45 26 15.8	122 46 47.0	.....	3,430
Robinson, east edge of right of way, north edge of road, 150 feet north of station; iron post stamped "Prim. Trav. No. 69 Ore. 1913".....	45 26 59.6	122 47 09.3	.....	4,710
Road crossing.....	45 28 11.6	122 47 09.5	.....	7,298
Switch head at junction of roads.....	45 29 14.6	122 48 04.6	.....	7,491
Beaverton, 300 feet west of station, west edge of road crossing, 20 feet north of track; iron post stamped "Prim. Trav. No. 70, Ore. 1913".....	45 29 16.4	122 48 19.2	.....	1,061

Magnetic declination, 22° 40' E.

## Along Southern Pacific Railroad near north border of quadrangle.

Road crossing.....	45 29 22.3	122 49 18.0	.....
St. Mary's, center of track.....	45 29 24.6	122 49 40.1	1,585
Huber, road crossing.....	45 29 33.4	122 51 04.1	6,050
Aloha, south edge right of way, west edge of road; iron post stamped "Prim. Trav. No. 71, Ore. 1913".....	45 29 38.9	122 51 59.6	3,991
Road crossing.....	45 29 44.5	122 52 49.5	3,600
Reedville, east of; road crossing, 15 B.....	45 29 48.4	122 53 27.8	2,755
Road crossing.....	45 29 51.7	122 53 59.2	2,261
Do.....	45 29 58.0	122 55 00.0	4,380
Witch Hazel, 150 feet east of station, north edge of right of way; iron post stamped "Prim. Trav. No. 72, Ore. 1913".....	45 30 00.3	122 55 19.2	1,390

## Along highways near west border of quadrangle.

South end of trestle.....	45 29 52.6	122 59 29.0	.....
Hillsboro, 2.5 miles south of, at T road north; iron post stamped "Prim. Trav. 74, Ore. 1913".....	45 29 50.9	122 59 25.1	6,254
Crossroads.....	45 27 56.1	122 59 30.9	5,559
T road west.....	45 26 49.9	122 59 14.6	6,809
Laurel, 2 miles north of, north edge of Y road; iron post stamped "Prim. Trav. No. 75, Ore. 1913".....	45 26 38.3	122 59 00.6	1,540
Tps. 1 and 2 S., Rs. 2 and 3 W., center of road, corner townships, near A. L. Greber residence.....	45 26 01.5	122 59 26.0	4,144
Laurel, 25 feet north and 25 feet east of, corner secs. 6, 7, 1 and 12, T. 28., R. 1 and 2 W.; iron post stamped "Prim. Trav. No. 76, Ore. 1913".....	45 25 09.9	122 59 25.8	5,230
T. 28., R. 2 W., corner secs. 5, 6, 7, and 8, T road south.....	45 25 09.4	122 58 11.5	5,300
T. 28., R. 2 W., quarter corner, north side sec. 8, T road.....	45 25 09.0	122 57 31.8	2,625
Center sec. 8, iron pin.....	45 24 43.1	122 57 31.6	2,631
Telephone pole at angle in road.....	45 24 42.2	122 56 57.4	2,651
Scholl's store, 60 feet south of, east edge of road at T road; iron post stamped "Prim. Trav. 77, Ore. 1913".....	45 24 00.5	122 55 46.3	6,599
Crossroads.....	45 23 36.6	122 56 31.8	4,055
T road west.....	45 23 11.5	122 56 56.3	3,082
Do.....	45 22 26.0	122 57 15.6	4,820
T. 2 S., R. 2 W., stone quarter corner south side sec. 29 (corner is north end of clearing, 40 feet east of road at top of steep grade).....	45 21 40.8	122 57 34.0	4,758
Newberg, 3 miles north of, top of hill at T road north, iron post stamped "Prim. Trav. No. 81, Ore. 1913".....	45 20 59.4	122 58 11.1	4,968
M. M. Down's mail box at T road south.....	45 20 49.7	122 57 43.7	2,213
Large fir tree at center of road.....	45 20 31.0	122 57 59.9	2,240
T road south.....	45 19 50.8	122 58 21.4	4,357
T road east.....	45 18 51.5	122 58 21.4	6,000

Magnetic declination, 22° 40' E.

## TUALATIN QUADRANGLE—Continued.

From Scholls east along highways to Robinson.

Station.	Latitude.	Longitude.	Distance between stations.
T road east at store.....	45 24 31.6	122 55 17.6	
Tualatin River bridge, center.....	45 24 56.4	122 55 12.7	2.536
Fred Groner's mail box at T road south.....	45 25 25.4	122 54 59.7	3.079
Scholls, 2.5 miles northeast of, at T road north; iron post stamped "Prim. Trav. No. 78, Ore. 1913".....	45 25 15.2	122 54 22.0	2.881
T road north.....	45 25 00.4	122 53 15.7	4.765
T road south.....	45 25 26.1	122 52 38.1	3.168
Center of crossroads on north and south township line.....	45 25 35.2	122 52 00.6	2.524
Robinson, 3.5 miles west of, at angle in road, northeast-east side of road; iron post stamped "Prim. Trav. No. 79, Ore. 1913".....	45 25 35.1	122 50 50.3	5.016
Large fir tree at T road north.....	45 26 03.2	122 50 08.5	4.123
Second-class road north on apparent section line, between secs. 32 and 33.....	45 26 19.9	122 49 31.1	3.158
T road south on quarter-section line, in center of sec. 33.....	45 26 31.2	122 48 54.5	2.850
Olson's and G. F. West's mail boxes, on line between secs. 33 and 34.....	45 26 39.1	122 48 17.4	2.762

## From Butteville north along highway to Sherwood.

T road east.....	45 15 57.9	122 50 53.4	
T. 3 S., R. 1 W., stone quarter corner, between secs. 29 and 32, center of road.....	45 16 28.8	122 51 21.3	3.710
Butteville, 2 miles north of, west edge of road, top of hill; iron post stamped "Prim. Trav. No. 85, Ore. 1913".....	45 17 14.4	122 51 14.2	4.648
T road south.....	45 17 38.2	122 51 12.8	2.418
Center of bridge near angle in road, north.....	45 18 13.5	122 50 27.2	4.830
Crossroads, northwest intersection of; iron post stamped "Prim. Trav. No. 87, Ore. 1913" (county line and corner section stone, common to secs. 7, 8, 17, and 18, T. 3 S., R. 1 W., is 15 feet south of and 55 feet east).....	45 19 04.4	122 50 45.4	5.318
T. 3 S., R. 1 W., stone, corner secs. 5, 6, 7, and 8.....	45 19 56.1	122 50 44.6	5.246
T road east.....	45 20 15.0	122 50 33.6	2.068
Crossroads.....	45 21 01.3	122 50 26.2	4.719

Magnetic declination, 22° 53' E.

## HILLSBORO QUADRANGLE.

[See also p. 520.]

## Near Hillsboro.

Station.	Latitude.	Longitude.	Distance between stations.
Witch Hazel, 150 feet east of station, north edge of right of way, south edge of road; iron post stamped "Prim. Trav. No. 72, Ore. 1913".....	45 30 00.3	122 55 19.2	
West end of bridge, near west end of tangent.....	45 30 09.5	122 56 50.6	6.570
Newton, center of track.....	45 30 22.9	122 57 30.2	3.132
Road crossing.....	45 30 37.6	122 58 05.6	2.929
Hillsboro, 400 feet west of station, south edge of right of way, northeast corner of Pacific Coast Condensed Milk Co. tank; iron post stamped "Prim. Trav. No. 73, Ore. 1913".....	45 30 59.2	122 59 21.2	5.811
South end of highway trestle.....	45 30 14.4	122 59 24.8	4.537

## Along highways near southeast corner of quadrangle.

Crossroads.....	45 30 07.1	122 48 18.3	
Gate to field at angle in road north.....	45 30 21.5	122 47 46.0	2.719
Center of road at northwest apex of triangle.....	45 30 58.6	122 47 40.6	3.577
Base line, stake at angle in road, northwest.....	45 31 12.6	122 47 58.9	2.078
Cedar mill, north edge of road at T road, 1 foot east of small gate leading to house; iron post stamped "Prim. Trav. No. 80, Ore. 1913".....	45 31 31.9	122 48 27.7	2.841
Center of bridge.....	45 31 38.2	122 47 52.8	2.567
Multnomah-Washington county line, post.....	45 31 48.5	122 45 49.0	8.873
S. J. Osborn's mail box, at top of hill.....	45 31 57.6	122 45 13.6	2.680
Barnes, U. S. Coast and Geodetic Survey triangulation station....	45 31 36.53	122 45 00.03	2.337

## SALEM QUADRANGLE.

[See also pp. 505-508.]

From Salem southeast via Southern Pacific Railroad.

Station.	Latitude.	Longitude.	Distance between stations.
Salem, dome State capitol.....	44 56 19.5	123 01 43.5	.....
Salem, road crossing 717 I.....	44 55 38.1	123 01 37.5	4,210
Salem, road crossing 717 A.....	44 55 02.1	123 01 33.5	3,658
Salem, second-class road crossing, near Home for Feeble-Minded.....	44 54 21.6	123 00 46.2	5,334
Turner, 4.8 miles north of, 6 feet south of railroad crossing, 17 feet east of rail; iron post stamped "Prim. Trav. No. 28-Ore. 1913-207-1903".....	44 54 02.1	123 00 14.8	3,011

Magnetic declination, 22° 30' E.

From Salem east along highway.

Salem, intersection of State and Twenty-first streets, south center of track.....	44 56 04.8	123 00 55.3	.....
Salem, center of bridge.....	44 55 45.1	123 00 05.6	4,000
Salem, tall steel tank near State prison.....	44 56 21.2	123 00 03.6	3,057

Magnetic declination, 22° 30' E.

From Salem via Southern Pacific Railroad to Chemawa.

Salem, center of track, intersection of Twelfth and Marion streets.....	44 56 30.4	123 01 26.6	.....
Salem, tile works, center of track, opposite signboard.....	44 57 23.4	123 01 55.8	5,807
Road crossing.....	44 57 40.9	123 00 45.7	1,920
Milepost 721, near east side of track; iron post stamped "Prim. Trav. No. 34, Ore., 1913-162 B 1903".....	44 58 14.1	123 00 26.2	3,638

Along highways near northwest corner of quadrangle.

Railroad crossing.....	44 59 58.6	123 12 29.9	.....
Schoolhouse flagpole.....	44 59 24.5	123 12 54.1	3,874
Crowley station, 0.5 mile west of, at T road east, iron post stamped "Prim. Trav. No. 22, Ore., 1913".....	44 58 39.8	123 13 06.4	4,611
T road east.....	44 58 09.2	123 13 14.9	3,159
Angle in road west.....	44 57 16.0	123 13 24.4	5,430
T road east.....	44 57 15.2	123 13 39.4	1,080
Second-class road east.....	44 56 16.0	123 13 39.2	6,000
Rickreall, east edge of road, and T road west; iron post stamped "Prim. Trav. 23, Ore., 1913".....	44 55 49.2	123 13 38.8	2,704

Magnetic declination, 21° 51' E.

Along highways north from Monmouth via Rickreall.

Monmouth Normal School, south side of step at east entrance; bronze tablet stamped "Prim. Trav. A 1913, Ore.".....	44 51 05.0	123 14 12.4	.....
Railroad crossing.....	44 51 56.1	123 14 14.8	5,181
Angle in road east.....	44 52 35.9	123 14 16.3	4,029
Angle in road north.....	44 53 07.2	123 14 11.2	3,186
Monmouth, 3.5 miles north of, at crossroads; iron post stamped "Prim. Trav. No. 3, Ore., 1913".....	44 53 52.4	123 14 03.4	4,616
T road south.....	44 54 39.3	123 14 02.8	4,719
Rickreall station, railroad crossing.....	44 55 07.3	123 13 39.3	3,303
Rickreall, telephone pole 60 feet west of F. H. Begun's store.....	44 55 40.8	123 13 39.8	4,001
Derry, railroad crossing.....	44 55 46.4	123 12 46.2	3,851
T road south.....	44 55 47.9	123 11 46.9	4,269
Signboard at crossroads, "Independence 6 miles, Bethel 8 miles".....	44 55 47.6	123 10 36.8	5,046
Large gate at angle in road north.....	44 55 53.4	123 09 54.1	3,126

Magnetic declination, 21° 57' E.

**SALEM QUADRANGLE**—Continued.  
From Salem along highway on west side of river.

Station.	Latitude.	Longitude.	Distance between stations.
T road west.....	44° 57' 13.5"	123° 03' 06.0"	
T road east.....	44° 58' 06.4"	123° 03' 32.7"	5,691
North side of road at west, one of two patent gates leading to pear orchard; iron post stamped "No. 24, Ore. 1913".....	44° 58' 33.5"	123° 04' 08.5"	3,762
T road west.....	44° 59' 03.6"	123° 04' 34.5"	3,574
Wm. Calder's residence, large oak tree in front of.....	44° 59' 32.2"	123° 04' 38.4"	2,910

**Along highway near Oak Grove Church.**

Station.	Latitude.	Longitude.	Distance between stations.
Oak Grove Church, 1 mile north of, 60 feet east of gate leading to farmhouse, in north abutment of culvert; bronze tablet stamped "Prim. Travs. No. 27, Ore. 1913".....	44° 59' 15.3"	123° 10' 16.5"	
Oak Grove, T road west, 600 feet north of church.....	44° 58' 30.1"	123° 10' 16.5"	4,572
Oak Grove, church spire.....	44° 58' 23.7"	123° 10' 18.3"	664
Summit of hill, center of second-class road.....	44° 58' 33.0"	123° 11' 38.5"	5,836
Iron pin, at angle in road, near old hop drier.....	44° 58' 32.8"	123° 12' 13.8"	2,340
Crowley station, railroad crossing.....	44° 58' 39.9"	123° 12' 26.6"	1,157

Magnetic declination 21° 55' E.

**Hillsboro and St. Helens quadrangles.**

**COLUMBIA, MULTNOMAH, AND WASHINGTON COUNTIES.**

The geographic positions in the following lists were determined by L. F. Biggs in 1914 and are based on the North American datum positions of the United States Coast and Geodetic Survey station Linnton and are also tied to primary traverse stations at Hillsboro and Cedar Mill, described below and on page 520. The State cooperated in the work.

**HILLSBORO QUADRANGLE.**

From Hillsboro north via highways near west edge of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Township corner, Willamette base line and Rs. 2 and 3 W.....	45° 31' 14.0"	122° 59' 24.6"	
Hillsboro, intersection of First and Main streets (small manhole).....	45° 31' 23.8"	122° 59' 20.3"	1,046
Hillsboro, near northeast corner of high-school yard, U. S. Coast and Geodetic Survey azimuth pier.....	45° 31' 43.8"	122° 59' 01.4"	2,325
Hillsboro, 0.7 mile northeast of; oak tree at T road east.....	45° 32' 14.0"	122° 58' 43.5"	3,314
Hillsboro, 1.5 miles northeast of; oak tree at T road north.....	45° 33' 02.4"	122° 58' 21.7"	5,145
Hillsboro, 2.5 miles northeast of; picket gate, leading to house at north end of tangent.....	45° 33' 55.1"	122° 58' 18.5"	5,340
Hillsboro, 3 miles northeast of; west edge of road at T road east; iron bench-mark post stamped "Prim. Trav. No. 1, 1914, Ore.".....	45° 34' 22.0"	122° 58' 10.6"	2,946
Angle in road north.....	45° 34' 56.8"	122° 57' 54.3"	3,708
North Plains, center of crossroads, 1 mile east of.....	45° 35' 44.2"	122° 58' 05.6"	4,872
North Plains, at crossroads at northeast corner of town; iron bench-mark post stamped "Prim. Trav. No. 2, 1914, Ore. B.".....	45° 36' 02.2"	122° 59' 28.3"	6,158
Center of road at range line crossing.....	45° 35' 57.2"	122° 59' 24.0"	392
Geo. Bantz's mail box (No. 65).....	45° 36' 51.9"	122° 58' 49.7"	6,057
McKay Creek, center of bridge near angle in road north.....	45° 37' 32.6"	122° 58' 27.8"	4,415
North Plains, 2.6 miles north of; Shady Brook schoolhouse, 300 feet north of; west edge of road at T road east; iron bench mark post stamped "Prim. Trav. No. 3, 1914, Ore. B.".....	45° 37' 56.3"	122° 58' 10.1"	2,711
T. 2 N., R. 2 W., quarter corner south side sec. 19 (witness tree south edge of road).....	45° 38' 11.2"	122° 58' 46.4"	2,989
Y road at south end of new grade.....	45° 38' 37.5"	122° 59' 04.6"	2,470
Center of bridge.....	45° 39' 16.4"	122° 58' 34.7"	4,475
Fir tree, west edge of road, blazed with triangle.....	45° 39' 18.8"	122° 58' 12.0"	1,024
Water wheel, second-class roads at.....	45° 39' 51.6"	122° 58' 14.3"	3,835
T. 2 N., R. 2 W., in NW. 1 sec. 8, 75 feet south of road leading to John Zimmerman's ranch house, east edge of road; iron bench-mark post stamped "Prim. Trav. No. 18, 1914, Ore. B.".....	45° 40' 27.0"	122° 57' 52.7"	3,897

## HILLSBORO QUADRANGLE—Continued.

From Hillsboro north via highways near west end of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
North end of lane on $\frac{1}{4}$ section line near John Zimmerman's residence.....	45 40 42.6	122 57 50.1	1,590
T. 2 N., R. 2 W., $\frac{1}{4}$ corner on line between secs. 5 and 6, 0.25 mile south of township line near road forks.....	45 41 24.7	122 58 00.0	4,469
Wallace schoolhouse, 50 feet south of, on township line, 670 feet east of corner section north side of secs. 5 and 6, T. 2 N., R. 2 W., west side of road at T road east; iron bench-mark post stamped "Prim. Trav. No. 19, 1914, Ore. B".....	45 41 37.5	122 57 59.6	1,461
Milepost No. 1, north edge of road at small ravine.....	45 42 17.5	122 58 02.1	4,062
Road forks, 20 feet west of; small fir tree blazed triangle.....	45 42 50.9	122 58 09.0	3,418
Summit of hill, north edge of road; fir tree blazed triangle.....	45 43 26.7	122 58 45.3	4,448
Hub tie.....	45 43 40.1	122 59 09.8	2,211
Top of hill at junction of roads to Pumpkin Ridge and North Plains; iron bench-mark post stamped "Prim. Trav. No. 20, 1914, Ore. B".....	45 43 51.3	122 59 31.8	1,929
Y road, down hill.....	45 44 22.4	122 58 43.8	4,634
Road forks.....	45 44 13.9	122 57 49.3	3,957
Nine-foot fir tree, south edge of road, about 500 feet east of road junction, leading up hill; blazed triangle.....	45 44 42.0	122 57 23.4	3,388

Magnetic declination along west border,  $23^{\circ} 40'$  E.

## Along north border of quadrangle.

Scappoose, 1 mile south of, east side of road at Smiths Corners; iron bench-mark post stamped "Prim. Trav. No. 12, 1914, Ore. B".....	45 44 25.1	122 52 42.5	.....
Y road west.....	45 44 35.8	122 54 09.9	6,286
Canyon schoolhouse at southeast corner of yard, north edge of road; iron bench-mark post stamped "Prim. Trav. No. 14, Ore. B".....	45 44 58.1	122 55 44.9	7,108

Magnetic declination along north border,  $23^{\circ} 30'$  E.

## From Cornelius Pass to Shady Brook schoolhouse.

Rail gate, west side of road, 500 feet north of house.....	45 37 00.4	122 52 16.9	.....
Center road, opposite large gate, east edge of road, about 500 feet south of schoolhouse.....	45 37 23.6	122 52 42.5	2,971
Angle in road at northwest corner of young orchard.....	45 37 52.4	122 52 55.2	3,053
Center road, opposite southwest corner of picket fence 200 feet south of house.....	45 38 36.1	122 53 04.6	4,483
Triangle at T road.....	45 38 50.9	122 53 29.8	2,338
T. 2 N., R. 2 W., in NW. $\frac{1}{4}$ of sec. 14, at second-class road to A. Danielson's ranch house, north edge of road; iron bench-mark post stamped "Prim. Trav. No. 16, 1914, Ore. B".....	45 39 28.5	122 54 05.9	4,590
Second-class Y road.....	45 39 15.7	122 54 58.9	3,978
Mason Hill schoolhouse, 350 feet northeast of south edge of road; bench-mark post stamped "Prim. Trav. No. 17, 1914, Ore. B".....	45 38 38.0	122 55 28.9	4,373
T road west at fence corner.....	45 38 20.3	122 56 41.5	5,455

Magnetic declination in hills in center of quadrangle,  $22^{\circ} 51'$  E.

## From Linniton to Scappoose along granite highway.

Warning bell at railroad crossing.....	45 36 39.7	122 47 42.8	.....
Ban station, center of highway opposite.....	45 37 42.1	122 49 10.9	8,808
West end metal culvert, near top of hill.....	45 38 19.7	122 49 55.1	4,935
Burlington, granite highway milepost No. 13.....	45 38 50.9	122 50 33.8	4,189
Holbrook, 150 feet west of south end of switch 70 feet east of center of highway; iron bench mark (post) stamped "Prim. Trav. No. 10, 1914, Ore. B".....	45 39 23.4	122 51 20.3	4,660
Granite highway milepost No. 15.....	45 40 06.6	122 52 02.5	5,309
Granite highway milepost No. 16.....	45 40 56.3	122 52 25.5	5,287
Rocky Point, 500 feet north of water tank, east side of road Y at road west; iron bench-mark post stamped "Prim. Trav. No. 11, Ore. 1914, B" 35-N.....	45 41 52.6	122 52 11.5	5,792
Granite highway milepost No. 18.....	45 42 37.0	122 52 24.1	4,579
Multnomah-Columbia county line, north edge sec. 25.....	45 43 18.2	122 52 28.3	4,183

Magnetic declination on east edge of hills,  $22^{\circ} 50'$  E.

## HILLSBORO QUADRANGLE—Continued.

From point near North Plains east and south via United Railways and highway to Cedar Mill.

Station.	Latitude.	Longitude.	Distance between stations.
Lincoln, center of road crossing.....	* * "	* * "	Ft.
Connell, road crossing, 500 feet west of station.....	45 36 05.1	122 58 01.7	.....
Helvetia, 110 feet north of railroad, 175 feet northwest of station, east edge of wagon road; iron bench-mark post stamped "Prim. Trav. No. 4, 1914, Ore. B".....	45 35 56.3	122 56 52.9	4,970
Bowers Junction, 1,500 feet southwest of, under track crossing.....	45 35 46.7	122 54 57.5	8,296
Road crossing.....	45 35 33.1	122 54 27.3	2,548
Do.....	45 34 50.4	122 53 50.1	3,450
Oreneo, 1 mile north of; west edge of railroad right of way, south side of road at road crossing; iron bench-mark post stamped "Prim. Trav. No. 5, 1914, Ore. B".....	45 33 33.9	122 53 53.9	8,674
Milk rack at Y road east.....	45 32 17.0	122 53 57.0	7,694
T. I N., Rs. 1 and 2 W., stone corner secs. 30, 31, 25 and 36, center of crossroads.....	45 32 04.7	122 52 57.6	4,434
Cedar Mill, 2 miles west of; south edge of road opposite Congregational Church; iron bench-mark post stamped "Prim. Trav. No. 6, 1914, Ore. B".....	45 32 04.6	122 51 59.8	4,111
T road north, second-class road south.....	45 31 58.0	122 50 32.0	6,285
	45 31 51.9	122 49 24.6	4,441

Magnetic declination, 23° 05' E.

## From point near Cedar Mill to Linniton.

T road north.....	45 32 35.2	122 49 39.8	.....
Triangle at Y roads.....	45 33 22.8	122 49 41.7	4,823
Cedar Mill, 3.5 miles northwest of, 100 feet east of church at northwest intersection of crossroads; iron bench-mark post stamped "Prim. Trav. No. 7, 1914, Ore. B".....	45 34 01.5	122 50 06.3	4,298
Washington-Multnomah county line post, north side of sec. 17.....	45 34 40.5	122 50 16.5	4,012
Germantown road at cross roads.....	45 34 53.7	122 50 23.2	1,417
Sharp angle in road at J. E. Sharp's residence.....	45 35 12.1	122 49 36.8	3,792
Water trough, north edge of road.....	45 35 07.4	122 48 41.8	3,949
Cross roads at top of hill; iron bench-mark post stamped "Prim. Trav. No. 8, 1914, Ore. B".....	45 35 00.6	122 47 55.0	3,398
Horseshoe bend, farthest point north.....	45 35 27.2	122 47 24.8	3,437
Water tank at junction of Linniton and Germantown roads at foot of hill.....	45 35 08.9	122 46 12.2	5,489
Linniton, 100 feet south of depot, east edge of railroad right of way; iron post stamped "Prim. Trav. No. 9, 1914, Ore. B".....	45 35 58.2	122 47 02.5	6,140
Linniton, U. S. Coast and Geodetic Survey triangulation station on side of hill, 1,200 feet northwest of depot.....	45 36 02.3	122 47 19.81	1,300

## From Bowers Junction via United Railways and highways to Burlington.

Undertrack crossing.....	45 35 55.4	122 53 26.2	.....
West end of trestle U 17 O over Rock Creek.....	45 36 14.1	122 52 47.3	3,330
Cornelius Pass, summit of hill at Y road north, iron bench-mark post stamped "Prim. Trav. No. 15, 1914, Ore. B".....	45 36 34.4	122 51 44.0	4,952
West end of trestle U 15 7, 1,000 feet north of tunnel.....	45 36 58.9	122 51 31.5	2,833
Falkenburg station, center of track.....	45 37 49.7	122 51 34.9	3,176
West end of trestle, 13-8.....	45 38 48.3	122 51 11.5	6,256
Burlington, granite highway milepost 13.....	45 38 50.9	122 50 33.8	2,690

## ST. HELENS QUADRANGLE.

[See also p. 516.]

Station.	Latitude.	Longitude.	Distance between stations.
Scappoose, east side of track, south of depot; iron bench-mark post stamped "Prim. Trav. No. 12, 1914, Ore. B".....	* * "	* * "	Ft.
	45 45 28.9	122 52 35.5	.....

## TEXAS.

### TRIANGULATION STATIONS.

**Archer City, Eschite, Henrietta, and Walker quadrangles.**

#### ARCHER, CLAY, AND WICHITA COUNTIES.

Late in the season of 1914 J. R. Ellis extended triangulation west from United States Coast and Geodetic Survey stations Cube and Myers on North American datum. Eighteen new stations were occupied and 14 points were located by intersections.

#### ARCHER CITY COURTHOUSE, ARCHER COUNTY, TEX. (Not occupied.)

Sighted from two stations only.

Station mark: Center of cupola.

[Latitude  $33^{\circ} 37' 42.34''$ . Longitude  $98^{\circ} 37' 29.84''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Schrader.....	• ' "	195 06 27	15 08 28	4.33198 13.345
Eskridge.....	210 22 59	30 27 28	4.38947	15.234

#### BLUFF, NEAR ARCHER-WICHITA COUNTY LINE, TEX.

On a prominent hill on land owned by Rosa Nitschke, located about 1.2 miles south of the Wichita Falls-Holiday wagon road and about 9 miles southwest of Wichita Falls.

Signal: A 15-foot upright carrying cross arms to which black cloth targets were attached. Signal is 2.2 feet southwest of station mark.

Station mark: A standard iron post projecting 8 inches above surface of ground, under which a small flat stone, with cross cut on one side, was buried.

[Latitude  $33^{\circ} 50' 24.37''$ . Longitude  $98^{\circ} 38' 23.28''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Holiday, Methodist Episcopal Church spire.....	• ' "	237 32 24	3.75913	3.369
Riggs.....	62 52 40.67	242 48 06.57	4.1502967	8.783
Tree on hill.....	89 22 43	269 19 04	4.00504	6.286
Hamilton.....	96 42 46.37	276 33 49.03	4.3973160	15.512
Fowlkes.....	126 27 45.16	306 20 54.15	4.3714888	14.616
Iowa Park elevator.....	169 53 24	349 52 37	4.09058	7.655
Lindsey.....	185 54 39.24	5 55 22.37	4.2844554	11.962
Wichita.....	245 08 17.79	65 13 21.06	4.1877978	9.575
Schrader.....	312 43 29.48	132 46 00.28	3.9773246	5.598

**BURKBURNETT SCHOOLHOUSE, WICHITA COUNTY, TEX. (Not occupied.)**

Sighted from two points only.

Station mark: Center of cupola.

[Latitude  $34^{\circ} 05' 38.20''$ . Longitude  $98^{\circ} 34' 07.16''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Lindsey.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Friberg.....	27 00 11 315 21 52	206 58 31 135 25 37	4.00468 4.16728	6.281 9.133

**BYERS OIL DERRICK, NORTHEAST OF PEROlia, CLAY COUNTY, TEX. (Not occupied.)**

Sighted from two stations only.

Station mark: Center of derrick.

[Latitude  $34^{\circ} 01' 35.06''$ . Longitude  $98^{\circ} 11' 42.38''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Petrolia.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Lone oil derrick near Petrolia.....	59 27 42 73 40 03	239 26 38 253 38 00	3.53413 3.77803	2.128 3.727

**CUBE, CLAY COUNTY, TEX.**

A station of the Coast and Geodetic Survey 9.5 miles south and 2.5 miles west of Henrietta, 3 miles east and 1.5 miles south of Hernville, near southeast corner of a tract of land designated as "Abstract No. 307, Montague County School Land Survey No. E," on land of M. Cueba, on highest part of hill between house and barn.

Azimuth and distances to points are as follows: To reference mark, in southeast corner of Cueba's land, a tile pipe filled with cement and 60-penny nail in top is  $333^{\circ} 16' 39''$ , 223.174 meters; to east end of ridge of barn  $21^{\circ} 42' 07''$ , 47.66 meters; to southwest corner of stone of chimney of house  $236^{\circ} 21' 30''$ , 52.46 meters.

Station mark is two tile pipes set one above the other, filled with cement and 60-penny nails in tops, top of pipe even with ground..

[Latitude  $33^{\circ} 55' 37.314''$ . Longitude  $98^{\circ} 07' 12.930''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Henrietta.....	• ' "	• ' "	<i>Log. meters.</i>	<i>Miles.</i>
Jolly.....	29 32 12.91	209 29 41.63	4.1510695	8.798
Maupin.....	81 59 13.72	261 51 33.31	4.3306312	13.304
Water tank at pump station.....	84 04 06	264 00 48	3.96248	5.700
Petrolia.....	120 37 28	300 34 07	4.02996	6.657
Monument.....	133 17 28.51	313 13 53.80	4.1318464	8.415
Benton.....	208 35 35.42	28 42 29.71	4.5969291	.....
Blue.....	229 22 00.48	49 29 49.40	4.4520790	.....
	290 58 21.89	111 11 33.48	4.5925657	.....

**DUNDEE, ARCHER COUNTY, TEX.**

On land owned by Mr. E. E. Griffin, on a small red gravel butte about half a mile east of large stone school building at Dundee. Station is a little nearer east end of butte.

Signal: A 15-foot upright, carrying black cloth targets, 2 feet southeast of station mark.

Station mark: A standard iron post projecting 1 foot above surface.

[Latitude 33° 44' 41.71". Longitude 98° 53' 35.02".]

To station—	Azimuth.	Back azimuth.	Distance.	
Hamilton.....	174 13 50.27	354 13 20.87	Log. meters.	Miles.
Fowikes.....	190 22 32.32	10 24 09.74	4.1307126	8.396
Lone oil derrick.....	238 55 17	58 58 18	4.3966652	15.489
Riggs.....	249 17 39.72	69 21 34.67	3.99132	6.091
			4.0655070	7.225

**DUNDEE, LONE TREE ON HILL NORTHEAST OF, WICHITA COUNTY, TEX. (Not occupied.)**

[Latitude 33° 50' 20.64". Longitude 98° 44' 56.72".]

To station—	Azimuth.	Back azimuth.	Distance.	
Riggs.....	21 12 02	201 11 09	Log. meters.	Miles.
Fowikes.....	147 57 02	327 53 45	3.83231	4.223
Bluff.....	269 19 04	89 22 43	4.22045	10.323
			4.00504	6.286

**ELECTRA, WICHITA COUNTY, TEX.**

Situated on a high knob in the east part of Electra.

Signal: A 16-foot upright, carrying black cloth targets, 2.6 feet west of station mark.

Station mark: A standard iron post projecting 9 inches above surface, under which was buried a square-headed iron bolt  $\frac{1}{4}$  inch in diameter by 9 inches in length.

[Latitude 34° 02' 15.14". Longitude 98° 54' 21.13".]

To station—	Azimuth.	Back azimuth.	Distance.	
Hamilton.....	0 31 19.75	180 31 15.78	Log. meters.	Miles.
Electra elevator.....	58 11 26	238 10 56	4.2790717	11.815
Tank in oil derrick.....	76 33 40	256 32 56	3.20988	1.007
New oil derrick.....	162 30 48	312 30 29	3.31325	1.278
Sunshine.....	255 12 51.48	75 16 31.67	3.4621	1.826
Lone oil derrick.....	268 48 22	88 49 30	4.0182932	6.481
Fowikes.....	324 26 37.03	144 28 40.60	3.49744	1.953
			3.9892544	6.062

**ELECTRA ELEVATOR, WICHITA COUNTY, TEX. (Not occupied.)**

Station mark: Center of elevator.

[Latitude 34° 01' 47.40". Longitude 98° 55' 14.84".]

To station—	Azimuth.	Back azimuth.	Distance.	
Electra.....	238 10 56	58 11 26	Log. meters.	Miles.
Fowikes.....	315 07 06	135 09 40	3.20988	1.007
Hamilton.....	356 11 51	176 12 20	3.99071	6.209
			4.26004	11.308

**ELECTRA, NEW OIL DERRICK NORTHWEST OF, WICHITA COUNTY, TEX. (Not occupied.)**

Sighted from two points only.

Station mark: Center of derrick.

[Latitude 34° 03' 46.12". Longitude 98° 54' 55.57".]

To station—	Azimuth.	Back azimuth.	Distance.	
Electra.....	• / " 342 30 29	• / " 162 30 48	Log. meters. 3.46821	Miles. 1.136

**ELECTRA, TANK IN OIL DERRICK NORTHWEST OF, WICHITA COUNTY, TEX. (Not occupied.)**

Sighted from two stations only

Station mark: Center of tank.

[Latitude 34° 01' 59.62". Longitude 98° 55' 39.12".]

To station—	Azimuth.	Back azimuth.	Distance.	
Electra.....	• / " 256 32 56	• / " 76 33 40	Log. meters. 3.31325	Miles. 1.278

**ELECTRA, LONE OIL DERRICK EAST OF, WICHITA COUNTY, TEX. (Not occupied.)**

Sighted from two points only.

Station mark: Center of derrick.

[Latitude 34° 02' 17.26". Longitude 98° 52' 18.60".]

To station—	Azimuth.	Back azimuth.	Distance.	
Electra.....	• / " 88 49 30	• / " 268 48 22	Log. meters. 3.49744	Miles. 1.953

**ESKRIDGE, ARCHER COUNTY, TEX.**

On farm owned by Mrs. W. M. Fuller, about 8 miles south of Wichita Falls, about 4 miles south and 3.5 miles west of the northeast corner of Archer County. The southeast corner of residence occupied by Mr. Eskridge bears northwest from the station 185.1 feet.

Signal: A 16-foot upright, with black cloth targets tacked to cross-arms. Signal is 2.8 feet south and 10° W. of station mark.

Station mark: A stamped iron post projecting 8 inches above surface of ground, under which a round brown bottle was buried.

[Latitude 33° 47' 08.56". Longitude 98° 29' 27.86".]

To station—	Azimuth.	Back azimuth.	Distance.	
Archer City courthouse.....	• / " 30 27 26	• / " 210 22 59	Log. meters. 4.38947	Miles. 15.234
Schrader.....	86 34 33.54	266 32 06.51	3.8334791	4.235
Wichita.....	181 01 49.72	1 01 54.50	4.0970216	7.76
Jolly.....	225 56 12.58	46 00 56.47	4.2606933	11.325
Edwards.....	235 56 05.19	106 02 14.97	4.2507210	11.068

**FOWLKES, WICHITA COUNTY, TEX.**

On a high ridge about 2.5 miles south of Fowlkes station.

Signal: A 15-foot upright, carrying black cloth targets, 2.9 feet north of station mark.

Station mark: A standard iron post projecting 9 inches above surface,

[Latitude 33° 57' 57.49". Longitude 98° 50' 40.16".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° "	* ° "	Log. meters.	Miles.
Dundee.....	10 24 09.74	190 22 32.32	4.3966652	15.489
Hamilton.....	27 51 33.88	207 49 26.82	4.0977602	7.782
Electra elevator.....	135 09 40	315 07 06	3.99971	6.209
Electra.....	144 28 40.60	324 26 37.03	3.9892544	6.062
Sunshine.....	202 38 07.12	22 39 43.50	4.0599447	7.133
Lindsey.....	255 59 38.00	76 07 13.13	4.330507	13.378
Iowa Park elevator.....	276 11 28	96 17 32	4.22679	10.475
Bluff.....	306 20 54.15	126 27 45.16	4.3714888	14.616
Lone tree on hill.....	327 53 45	147 57 02	4.22045	10.323
Riggs.....	342 38 48.71	162 41 06.87	4.3300916	13.287

**FRIEBERG CHURCH, CLAY COUNTY, TEX.**

About 7 miles northeast of Wichita Falls. Theodolite was mounted in church belfry and observations taken during a high wind.

Signal: Center of Friberg Church spire.

Station mark: Center of Friberg Church spire.

[Latitude 33° 59' 58.55". Longitude 98° 27' 24.74".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° "	* ° "	Log. meters.	Miles.
Wichita.....	14 40 27.32	194 39 23.45	4.0644730	7.208
Lindsey.....	95 37 31.28	275 32 09.18	4.1757277	9.313
Sullivan.....	126 03 03.04	305 57 39.55	4.2628997	11.383
Burkburnett schoolhouse.....	135 25 37	315 21 52	4.16728	9.133
Petrolia.....	266 36 23.80	86 44 06.61	4.3277977	13.217
Jolly.....	318 03 03.24	138 06 39.15	4.1720189	9.234

**GLASS FACTORY, WATER TANK, WICHITA COUNTY, TEX. (Not occupied; position not checked.)**

On high wooden tower at glass factory southwest of Wichita Falls.

Station mark: Center of water tank.

[Latitude 33° 52' 50.62". Longitude 98° 32' 08.37".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° "	* ° "	Log. meters.	Miles.
Schrader.....	13 43 23	193 42 25	4.05191	7.003
Wichita.....	245 42 11	65 43 45	3.67865	2.965

**HAMILTON, WICHITA COUNTY, TEX.**

On a sharp rocky hill on the divide between the forks of Wichita River. On land owned by Mr. Hamilton about half a mile south of his residence.

Signal: A 15-foot upright carrying black cloth targets S. 21° 27' W. of and 2.2 feet distant from station mark.

Station mark: A bronze tablet set in top of a large boulder which projects 8 inches above surface.

[Latitude 33° 51' 44.50". Longitude 98° 54' 25.70".]

To station—	Azimuth.	Back azimuth.	Distance.
White's elevated A.	• * "	* * "	Log. meters. Miles.
White's	176 12 30	356 11 51	4.36114 11.308
Kerrville	146 31 15.96	0 31 19.75	4.274717 11.815
White's	27 49 26.42	27 51 31.96	4.167702 7.782
White's	26 53 49.36	66 42 45.37	4.387314 15.512
White's	36 19 37.66	127 23 55.46	4.187141 9.562
Dripping	354 13 20.57	174 13 50.27	4.1307126 8.386

**HENRIETTA, CLAY COUNTY, TEX.**

Signal and station mark: Center of cupola on courthouse.

[Latitude 33° 48' 57.36". Longitude 98° 11' 44.36".]

To station—	Azimuth.	Back azimuth.	Distance.
• * "	* * "	Log. meters. Miles.	
Myers	12 54 53.86	192 53 10.25	4.3328974 13.374
Edwards	51 09 16.93	231 05 35.59	4.1191566 8.175
Jolly	123 14 27.15	303 09 18.63	4.2307367 10.570
Lone oil derrick	165 14 26	345 12 18	4.35022 13.918
Mauplin	109 17 30	319 16 43	4.06340 7.190
Petrolia	172 22 00.53	357 20 57.57	4.3324627 13.546
Cube	209 29 41.63	29 32 12.91	4.1510695 8.799

**HOLLIDAY M. E. CHURCH SPIRE, ARCHER COUNTY, TEX. (Not occupied.)**

Station mark: Center of church spire.

[Latitude 33° 48' 44.36". Longitude 98° 41' 31.75".]

To station—	Azimuth.	Back azimuth.	Distance.
• * "	* * "	Log. meters. Miles.	
Riggs	66 27 46	246 24 58	3.92595 5.240
Bluff	237 32 24	57 34 09	3.75913 3.569
Behnader	285 50 19	105 54 35	4.08948 7.635

**IOWA PARK ELEVATOR, WICHITA COUNTY, TEX. (Not occupied.)**

[Latitude 33° 56' 58.00". Longitude 98° 39' 47.50".]

To station—	Azimuth.	Back azimuth.	Distance.
• * "	* * "	Log. meters. Miles.	
Fowlkes	96 17 32	276 11 28	4.22679 10.475
Lindsey	210 32 51	30 34 27	3.91122 5.068
Bluff	349 52 37	169 53 24	4.09058 7.635

**JOLLY, CLAY COUNTY, TEX.**

On land owned by J. T. White, 2.2 miles due north of Jolly post office. Mr. White's residence is on a prominent hill, and the station is 10 feet north and 4 feet west of his windmill and just west of the residence. Instrument elevated 20 feet.

Signal: Center of steel windmill tower in garden; 10.4 feet distance from signal to station mark.

Station mark: An iron post set in Mr. White's garden 10 feet north and 4 feet west of windmill and well. A round quart bottle was buried under bench-mark post.

[Latitude  $33^{\circ} 53' 59.67''$ . Longitude  $98^{\circ} 20' 58.12''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Eskridge.....	46 00 56.47	225 56 12.58	4.2606983	11.325
Wichita.....	89 18 11.01	269 13 31.79	4.1096878	7.999
Friberg.....	138 06 39.15	318 03 03.24	4.1720189	9.234
Lone oil derrick.....	214 33 33	34 36 38	4.17585	9.315
Petrolia.....	222 36 35.71	42 40 41.98	4.2230102	10.384
Maupin.....	260 18 07	80 22 29	4.08810	7.611
Cube.....	261 51 33.31	81 59 13.72	4.3306312	13.304
Henrietta.....	303 09 18.63	123 14 27.15	4.2307367	10.570
Edwards.....	347 09 15.62	167 10 42.26	4.2558103	11.199

**DUNDEE OIL DERRICK, ARCHER COUNTY, TEX. (Not occupied.)**

Lone oil derrick 6 miles northeast of Dundee. Sighted from two points only.  
Station mark: Center of derrick.

[Latitude  $33^{\circ} 47' 25.82''$ . Longitude  $98^{\circ} 48' 08.69''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Dundee.....	58 58 18	238 55 17	3.99132	6.091
Riggs.....	290 58 16	110 59 10	3.42439	1.651

**EDWARDS, CLAY COUNTY, TEX.**

On land owned by Dr. A. B. Edwards on the east side of the Henrietta-Halsell wagon road, about 3 miles northeast of Halsell station and three-quarters of a mile southwest of the road crossing of the Southwestern Railway at a spur. Perpendicular distance from center of wagon road southeast to station is 208 feet.

Signal: A 12-foot tripod covered on three sides with white cloth and centered over station mark.

Station mark: A stamped iron post set in center of small mound in pasture, under which a small sandstone, with cross cut on one face, was buried.

[Latitude  $33^{\circ} 44' 29.33''$ . Longitude  $98^{\circ} 18' 22.46''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ′ ″	° ′ ″	Log. meters.	Miles.
Eskridge.....	106 02 14.97	285 56 05.19	4.2507210	11.008
Jolly.....	167 10 42.26	347 09 15.62	4.2558103	11.199
Henrietta.....	231 05 35.59	51 09 16.93	4.1191566	8.175
Myers.....	336 48 19.47	156 50 16.75	4.1410935	8.599

**LINDSEY, WICHITA COUNTY, TEX.**

In Mr. Joseph Lindsey's orchard, 7 miles south and 2 miles west of Burk Burnett station, is about 2 feet west of the east garden fence and due west of the northwest corner of Mr. Lindsey's residence.

Signal: A 15-foot upright carrying black cloth targets, 2.5 feet northwest of station mark.

Station mark: A standard iron post projecting 9 inches above surface.

[Latitude  $34^{\circ} 00' 45.86''$ . Longitude  $98^{\circ} 37' 06.02''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Bluff.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Iowa Park elevator.....	5 55 22.37	185 54 39.24	4.2844554	11.962
Willard oil derrick.....	30 34 34	210 33 08	3.91132	5.066
Fowlkes.....	75 07 01	255 03 36	3.98848	6.051
Sunshine.....	76 07 13.13	255 59 38.00	4.3334507	13.378
Sullivan.....	108 13 47.15	288 07 47.90	4.2387939	10.768
Burkburnett schoolhouse.....	180 33 09.39	0 33 11.35	3.9690418	5.786
Friberg.....	206 58 31	27 00 11	4.00468	6.281
Wichita.....	275 32 09.18	95 37 34.28	4.1757277	9.313
	316 34 09.94	136 38 30.73	4.2418001	10.843

**MAUPIN, CLAY COUNTY, TEX. (Not occupied.)**

Petrolia, 6.5 miles south of, at southeast corner of T road south on Petrolia-Henrietta road.

Signal and station mark: A pole nailed to corner fence post.

[Latitude  $33^{\circ} 55' 06.40''$ . Longitude  $98^{\circ} 13' 08.08''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Jolly.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Petrolia.....	80 22 29	260 18 07	4.088810	7.611
Cube.....	175 49 40	355 49 24	4.01131	6.378
Henrietta.....	264 00 48	84 04 06	3.96248	5.700
	349 16 43	169 17 30	4.06340	7.190

**MYERS, CLAY COUNTY, TEX.**

A Coast Survey station 14 miles S.  $12^{\circ} 30'$  W. of Henrietta, 3.5 miles S.  $8^{\circ}$  W. of Blue Grove, between Henrietta and Antelope road to northwest and Henrietta and Jacksboro road to east, on wooded ridge, S.  $76^{\circ}$  W., 413 meters of W. H. Myers's house, and N.  $7^{\circ} 35'$  E., 185 meters of broken rocky bluff at end of hill, about 140 meters northeast of highest part of hill, on land known as Carleton Thompson survey, owned by W. H. Myers. Azimuths and distances to points are: Reference mark, in center of a rocky break, 28 meters south of north end of central promontory, is a hole  $\frac{1}{2}$  inch in diameter, by 3 inches deep circumscribed by an equilateral triangle (one point directed to station), 10 inches on a side, deeply cut in top surface of a prominent rock and filled with concrete; azimuth,  $8^{\circ} 17' 57.2''$ , 156.174 meters; to west gable of Myers's house,  $256^{\circ} 55'$ , 413 meters.

Station mark: A hole 6 inches deep, 6 inches in diameter, filled with concrete with a spike in it; above this are 2 tile pipes filled with cement, and 6-penny nails in tops, top of top pipe even with ground, and both incased in concrete.

[Latitude  $33^{\circ} 37' 36.423''$ . Longitude  $98^{\circ} 14' 50.995''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Edwards.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Lone oil derrick.....	156 50 16.75	336 48 19.47	4.1410935	8.599
Henrietta.....	178 46 02	358 43 38	4.62990	26.500
Cube.....	192 53 10.25	12 54 53.86	4.3328974	13.374
Blue.....	199 27 15.03	19 31 29.70	4.5480950	-----
	248 10 54.37	68 28 17.12	4.7164528	-----

**PETROLIA, CLAY COUNTY, TEX.**

Flagstaff on center of cupola to Petrolia high school. Instrument was set in schoolhouse belfry.

Signal and station mark: Flagstaff on Petrolia high school.

[Latitude 34° 00' 38.64". Longitude 98° 13' 37.21".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Jolly.....	42 40 41.98	222 36 35.71	4.2230102	10.384
Friberg.....	86 44 06.61	266 38 23.80	4.3277977	13.217
Lone oil derrick.....	91 01 57	271 00 56	3.44875	1.746
Byers oil well.....	239 26 38	59 27 42	3.53413	2.126
Cube.....	313 13 53.80	133 17 28.51	4.131464	8.418
Water tank at pumping station.....	350 26 34	170 26 48	3.58934	2.414
Henrietta.....	352 20 57.57	172 22 00.53	4.3384627	13.546
Maupin.....	355 49 24	175 49 40	4.01131	6.378

**PETROLIA, WATER TANK AT PUMPING STATION NEAR, CLAY COUNTY, TEX. (Not occupied.)**

[Latitude 33° 58' 34.30". Longitude 98° 13' 12.10".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Petrolia.....	170 26 48	350 26 34	3.58938	2.414
Cube.....	300 34 07	120 37 28	4.02996	6.657

**PETROLIA, LONE OIL DERRICK WEST OF, CLAY COUNTY, TEX. (Not occupied.)**

Station mark: Center of derrick.

[Latitude 34° 00' 40.26". Longitude 98° 15' 26.70".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Jolly.....	34 36 38	214 33 33	4.17545	9.315
Byers oil derrick.....	253 38 00	73 40 05	3.77803	3.727
Petrolia.....	271 00 56	91 01 57	3.44875	1.746
Henrietta.....	345 12 18	165 14 26	4.35022	13.918

**RIGGS, ARCHER COUNTY, TEX.**

On the highest part of a ridge of land owned by Mr. H. C. Riggs, about 1 mile east of Mankins station.

Signal: A 15-foot upright carrying black cloth targets, 2.5 feet southeast of station mark.

Station mark: A standard iron post projecting 9 inches above surface, under which a flat conglomerate stone 6 inches in diameter was buried.

[Latitude 33° 46' 54.95". Longitude 98° 46' 32.26".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Dundee.....	69 21 34.67	249 17 39.72	4.0655070	7.225
Lone oil derrick.....	110 59 10	290 58 16	3.42439	1.651
Hamilton.....	127 23 55.40	307 19 30.66	4.1871801	9.562
Fowlkes.....	162 41 06.87	342 38 48.71	4.3300916	13.287
Tree on hill.....	201 11 09	21 12 02	3.83231	4.223
Bluff.....	242 48 08.57	62 52 40.67	4.1502967	8.783
Holliday Methodist Episcopal Church.....	246 24 58	66 27 46	3.92595	5.240
Schrader.....	269 54 42.12	90 01 44.70	4.2912176	12.150

## SCHRADER, ARCHER COUNTY, TEX.

On the highest part of a bare hill on John Schrader's farm, about 1.75 miles northwest of Hoff station and about 0.7 mile north of Schrader's residence.

Signal: A 16-foot upright carrying cross arms, to which black cloth targets were attached. Signal is 2.4 feet southwest of station mark.

Station mark: A standard iron post projecting 9 inches above surface of ground, under which a small bottle was buried.

[Latitude 33° 46' 55.27". Longitude 98° 33' 52.28".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Archer City courthouse.....	15 08 28	195 06 27	4.33196	13.345
Riggs.....	90 01 44.70	269 54 42.12	4.2912176	12.150
Holliday Methodist Episcopal Church.....	105 54 35	285 50 19	4.08948	7.635
Bluff.....	132 46 00.28	312 43 29.48	3.9773246	5.89
Water tank at glass factory.....	193 42 25	13 43 23	4.05191	7.003
Wichita.....	208 31 30.96	28 34 03.06	4.1672407	9.133
Eskridge.....	206 32 06.51	86 34 33.54	3.8334791	4.235

## SULLIVAN, WICHITA COUNTY, TEX.

On Mr. J. Sullivan's farm 2 miles southwest of Burk Burnett and just north of the Burk Burnett-Electra wagon road. Station is about 600 feet west of Mr. Sullivan's residence.

Signal: A 15-foot upright carrying black cloth targets, 2.5 feet southwest of station mark.

Station mark: A standard iron post projecting 9 inches above surface.

[Latitude 34° 05' 48.07". Longitude 98° 37' 02.52".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Lindsey.....	0 33 11.35	180 33 09.39	3.9690418	5.786
Sunshine.....	76 46 21.14	256 40 19.54	4.2304723	10.564
Grandview water tower.....	156 26 35	336 24 19	4.18972	9.618
Devol water tower.....	193 49 03	13 49 59	4.03186	6.687
Friberg.....	305 57 39.55	126 03 03.04	4.2628997	11.383

## SUNSHINE, WICHITA COUNTY, TEX.

At southeast corner of Sunshine school yard, on a prominent hill. Station is just north of the Burk Burnett-Electra wagon road, about 8 miles northeast of Electra and about 12 miles southwest of Burk Burnett, 21 feet east and 18 feet north to corner of school fence.

Signal: A 15-foot upright carrying black cloth targets.

Station mark: A standard iron post projecting 9 inches above surface, under which a brickbat was buried.

[Latitude 34° 03' 41.36". Longitude 98° 47' 47.87".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* * "	* * "	Log. meters.	Miles.
Fowlkes.....	22 39 43.50	202 38 07.12	4.0590447	7.133
Electra.....	75 16 31.67	255 12 51.48	4.0182932	6.481
Grandview water tower.....	209 43 25	29 47 12	4.31886	12.948
Devol water tower.....	233 01 48	53 08 44	4.37840	14.851
Sullivan.....	256 40 19.54	76 46 21.14	4.2304723	10.564
Lindsey.....	288 07 47.90	108 13 47.15	4.2387939	10.768
Willard oil derrick.....	318 14 33	138 17 07	4.02546	6.589

**WICHITA FALLS ELEVATOR, WICHITA COUNTY, TEX.**

Situated in the city of Wichita Falls, on top of the Kemp and Kell concrete grain elevator.

Signal: An upright carrying targets of black cloth, which was centered over the station mark.

Station mark: Center of the iron tubing for supporting flagstaff on top of elevator.

[Latitude  $33^{\circ} 53' 54.31''$ . Longitude  $98^{\circ} 29' 19.11''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Eskridge.....	• ' "	• ' "	4.0970216	7.769
Schrader.....	1 01 54.59	181 01 49.72	4.1672407	9.133
Water tank at glass factory.....	28 34 03.08	208 31 30.96	3.67865	2.965
Bluff.....	65 43 45	245 42 11	4.1877978	9.575
Lindsey.....	65 13 21.06	245 08 17.79	4.2418001	10.413
Friberg.....	136 38 30.73	316 34 09.94	4.0644730	7.208
Jolly.....	194 39 23.45	14 40 27.32	4.1096878	7.999
	269 13 31.59	80 18 11.01		

**WILLARDS OIL DERRICK, WICHITA COUNTY, TEX. (Not occupied.)**

Sighted from two stations only.

Station mark: Center of derrick.

[Latitude  $33^{\circ} 59' 24.53''$ . Longitude  $98^{\circ} 43' 12.72''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Sunshine.....	• ' "	• ' "	4.02546	6.589
Lindsey.....	138 17 07	318 14 33	3.98848	6.051
	255 03 36	75 07 01		

**PRIMARY TRAVERSE.**

Dallas quadrangle.

**DALLAS AND WAXAHATCHIE COUNTIES.**

The following geographic positions on approximate North American datum were determined by primary traverse in 1915 by E. L. McNair. They are based on Trinity River traverse of the United States Corps of Engineers.

**DALLAS QUADRANGLE.**

Along river bottoms on south side of Trinity River.

Station.	Latitude.	Longitude.	Distance between stations.
			Fret.
Crabtree Ferry, about 2 miles below, by road, 500 feet north of a cabin, 10 feet west of river bank and between it and roadway, telephone line passes nearly over bench mark; an iron post 15 inches long set in concrete monument, 4 feet long. It is not as yet marked with elevation or number.....	• ' "	• ' "	.....
Crabtree Ferry, 2.30 miles below, about 400 feet southeast of negro cabin, at right angle in road and telephone line; in concrete monument 4 feet long and 1 foot square, an iron post 15 inches long. No number or elevation marked on post.....	32 32 34.52	96 31 45.13	888
South side of road and telephone line on root of oak tree (tack in) notch. Is station No. 108 of "Trinity River Traverse" of 1912....	32 32 32.15	96 31 50.29	1,552
T road corners, in notch on root of oak tree. Is station No. 107 of "Trinity River Traverse" of 1912.....	32 32 24.40	96 32 05.97	919
	32 32 20.14	96 32 15.49	

## DALLAS QUADRANGLE—Continued.

## Along river bottoms on south side of Trinity River—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
River bank, 70 feet southwest of, 50 feet southwest of level T. B. M. on hackberry tree, near road and telephone line in (tack) a notch cut in root of elm tree. Is station 100 of Trinity River Traverse of 1912.....	* * "	* * "	Fet. 2,200
T. b. m. No. 1 close to edge of woods in wire fence line azimuth of which is 60° and 240°; an elm tree, blazed, scribed, and painted black, "U. S. B. M. No. 1," nail in root of.....	32 32 30.63	96 32 38.00	2,354
T. b. m. No. 2, at corner of clearing and edge of woods in wire fence azimuth of which is 60° and 240°; in root of hackberry tree, blazed, scribed, and painted black, "U. S. B. M. No. 2," nail.....	32 32 37.26	96 33 37.39	2,817
T. b. m. No. 3, 30 feet south of road in edge of timber clearing on west; in root of Bois d'Arc tree blazed, scribed, and painted black "U. S. B. M. No. 3," nail.....	32 32 42.50	96 34 00.57	2,055
T. b. m. No. 4, 300 feet east of bridge across Tenmile Creek, just south of road; in root of elm tree blazed, scribed, and painted black "U. S. B. M. No. 4," nail.....	32 32 30.15	96 34 26.44	2,542
T. b. m. No. 21, 20 feet south of the Ferris and Crabtree Ferry road, near west side of Trinity River bottom land, 15 feet west of a neighborhood road, running south, 8 feet south of corner post of wire fence and 2 feet east of fence; an iron post stamped "Prim. Trav. Sta. No. 21, 1915".	32 32 17.80	96 34 51.85	2,508
T. b. M. No. 5, in edge of woods, 50 feet north of levee which runs 60° and 240° in azimuth, between open field and woods; in root of hackberry tree blazed, scribed, and painted black, "U. S. B. M. No. 5," nail.....	32 32 37.13	96 35 21.82	3,223
P. b. m. No. 22, on straight road leading to river, between the Ferris-Crabtree Ferry road and road to Lock No. 4, at foot of hill near edge of bottom, on north side of road, 1 foot from wire fence and south 54° west and 50 feet distance from a large leaning pecan tree marked with three hack; iron post stamped "Prim. Trav. Sta. No. 22, 1915".	32 32 40.99	96 35 56.22	2,970
T. b. m. No. 6, in open cultivated field 40 feet west of a small house, in root of elm tree, blazed, scribed, and painted black, "U. S. B. M. No. 6".	32 33 07.62	96 36 02.97	2,751
T. b. m. No. 7, 0.25 mile northeast from foot hills, on north side of road leading straight northeast from foot hills to Lock No. 4; in root of pecan tree standing alone; tree is blazed, scribed, and painted black, "U. S. B. M. No. 7," nail.....	32 33 30.01	96 36 20.23	2,702
P. b. m. No. 23, about 0.75 mile below public road bridge over Ten Mile Creek and about 500 feet north of creek, 20 feet west and 10 feet south of corner of house of W. E. Nix, on point of hill between Trinity River and Tenmile Creek bottoms; iron post stamped "Prim. Trav. Sta. No. 23, 1915".	32 33 55.48	96 36 29.03	2,683
T. b. m. No. 8, 1,200 feet northwest of a small graveyard, and at about the edge of foothills and bottom land; in root of large cottonwood tree, scribed, blazed, and painted black, "U. S. B. M. No. 8," nail.....	32 34 20.77	96 36 47.05	2,983
T. n. m. No. 9, about 0.75 mile below Hurley's store at gravel slough, in root of pecan tree at edge of foothills; tree is blazed, scribed, and painted black, "U. S. B. M. No. 9," nail.....	32 34 50.99	96 36 39.98	3,114
P. T. No. 24, 240 feet east of iron bridge over slough 10 feet south and 5 feet west of corner of Hurley's store building at Gravel Slough; iron post stamped "Prim. Trav. Sta. No. 24, 1915".	32 35 20.90	96 36 20.53	3,451
T. b. m. No. 10, about 0.25 mile west of Malloy bridge over Trinity River, 0.25 northwest of Mr. Perry's house, in wire fence line; in root of elm tree, blazed, scribed, and painted black, "U. S. B. M. No. 10," nail.....	32 35 39.59	96 35 40.65	3,900
T. b. m. No. 11, about 600 feet south and west of Mr. Perry's house, near small slough bridge; in root of elm tree; blazed, scribed, and painted black, "U. S. B. M. No. 11," nail.....	32 35 17.79	96 35 28.73	2,427
T. b. m. No. 12, near corner of woods, close to wire fence line bearing northeast and southwest on southeast side of road; in root of elm tree, blazed, scribed, and painted black, "U. S. B. M. No. 12," nail.....	32 35 01.94	96 35 25.29	1,631
T. b. m. No. 13, about 200 feet west of river bank, 50 feet south of cabin belonging to Mr. Carpenter of Ferris; in root of oak tree, blazed, scribed, and painted "U. S. B. M. No. 13," nail.....	32 34 42.20	96 34 56.60	3,158
Lock No. 4, in concrete foundation of corner fence post of Government reservation at cross. About 8 inches south of iron pipe in center of concrete, and is south 37° west and distant 163 feet from southwest corner of lock keeper's house. This point is station No. 89 of U. S. Corps of Engineers, traverse of 1912.....	32 34 20.79	96 34 33.13	2,960
Magnetic declination 9° 08' east. Tie line across circuit.			
Station 30 at t. b. m. ....	32 33 30.06	96 36 20.16	.....
T. b. m. No. 14, 1.14 miles S. 60° W. from Lock No. 4, close to middle of Ferris-Lock No. 4 road; in root of elm tree, blazed and marked in red "U. S. B. M. No. 14," nail.....	32 33 52.51	96 35 34.07	4,551
Station 89 (1912 traverse U. S. Corps of Engineers). ....	32 34 20.79	96 34 33.13	.....

## DALLAS QUADRANGLE—Continued.

Across river bottom from Trinity River to Parsons Slough.

Station.	Latitude.	Longitude.	Distance between stations.
Dallas, Kaufman, and Ellis counties, corner of, on east line of C. W. Harris's land, at corner of wire fence; marked by a Bois d'Arc post about 8 inches square, 30 inches above surface of ground.....	• ' "	• ' "	
T. b. m. No. 19, about 700 feet east of river, in woods; in root of oak tree blazed, scribed, and painted black, "U. S. B. M. 19," nail.....	32 32 36.87	96 31 22.08	Feet.....
T. b. m. No. 20, about 150 feet north of river bank; in root of hickory tree blazed, scribed, and painted black, "U. S. B. M. 20," nail.....	32 32 12.41	96 31 20.20	2,477
T. b. m. No. 21, in thick woods; in root of elm tree blazed, scribed, and painted black "U. S. B. M. 21," nail.....	32 32 11.27	96 30 48.62	2,706
T. b. m. No. 22, 5 feet from west bank of Parsons Slough; at base of dead ash tree blazed, scribed, and painted black, "U. S. B. M. 22," nail.....	32 32 07.88	96 30 25.11	2,042
	32 32 05.61	96 30 07.99	1,484

## At edge of river bottom on east side of Parsons Slough.

P. b. m. No. 25, 250 feet east of bank of Parsons Slough, above thick woods, at lower end of Chester Harlan's field, 2 feet north of wire fence running southwesterly, 10 feet northeast of large oak tree marked with three hacks; iron bench-mark post stamped "Prim. Trav. Sta. No. 25, 1915".....	32 32 34.54	96 30 02.89	2,956
T. b. m. No. 23, about 50 feet north of edge of woods and lowland, and 15 feet west of wire fence line; in root of spotted-oak tree blazed, scribed, and painted black "U. S. B. M. 23," nail.....	32 32 54.88	96 30 17.59	2,410
T. b. m. No. 24, on land of Dr. Glenn at Seagoville, 12 feet north of fence line; in root of dead post-oak tree blazed, scribed, and painted black, "U. S. B. M. 24," nail.....	32 33 20.88	96 30 24.02	2,685
P. b. m. No. 26, on the Ferris-Crabtree-Terry and Seagoville road, about 3 miles north of Parsons Slough Bridge, 50 feet north of flat bottom land, 2.5 feet from wire fence line; iron bench-mark post stamped "Prim. Trav. Sta. No. 26, 1915".....	32 33 38.30	96 30 58.41	3,431
T. b. m. No. 25, at edge of lowland and open ground; in root of small ash tree blazed, scribed, and painted black "U. S. B. M. 25," nail.....	32 34 08.39	96 31 16.39	3,409
Dallas and Kaufman county line, marked by a Bois d'Arc post 8 inches square and 30 inches above ground; post is milepost 28 and is 2 miles north of county corner.....	32 34 22.35	96 31 20.80	1,461
P. b. m. No. 27, on C. W. Hain's land, on west side of lane leading to wooden bottom land, about 700 feet north of edge of timber and 1 foot from fence line; iron bench-mark post stamped "Prim. Trav. Sta. No. 27, 1915".....	32 34 29.79	96 31 34.39	1,386
T. b. m. No. 31, about 400 feet S. 70° west from Mr. Tyler's house; in root of oak tree blazed, scribed, and painted black, "U. S. B. M. 31," nail.....	32 34 57.85	96 31 48.16	3,071
T. b. m. No. 32, near edge of woods and about 30 feet northwest of wire fence; in root of large pecan tree blazed, scribed, and painted black, "U. S. B. M. 32," nail.....	32 35 19.87	96 32 08.82	2,843
T. b. m. No. 33, 150 feet north of woods, in open field, in root of large pecan tree blazed, scribed, and painted black, "U. S. B. M. 33," nail.....	32 35 23.49	96 32 39.25	2,629
P. b. m. No. 28, on road to slough falls crossing, on east side of road, about 60 feet N. 30° W. from Mr. Finley's house, 4 feet from fence line, and at approximately high-water mark of 1904; iron bench-mark post stamped "Prim. Trav. Sta. No. 28, 1915".....	32 35 40.57	96 32 58.60	2,392
T. b. m. No. 34, 350 feet east of levee, north 35° east, 65 feet from house in open field; in root of hickberry tree blazed, scribed, and painted black, "U. S. B. M. No. 34," nail.....	32 36 08.21	96 32 51.55	2,857
T. b. m. No. 35, at edge of lowland in lane running northeast and southwest; in root of pecan tree blazed, scribed, and painted black, "U. S. B. M. 35," nail.....	32 36 33.01	96 32 45.71	2,555
P. b. m. No. 29, about 1 mile east of Parsons Slough Bridge, on the Seagoville-Ferris Road, 150 feet east of levee, 7 feet west of wire fence, on high ground several feet above high-water mark rising to east; iron bench-mark post stamped "Prim. Trav. Sta. No. 29, 1905".....	32 36 57.06	96 32 40.08	2,479
P. b. m. No. 30, on the Seagoville-Ferris road, 67 feet north from corner of wagon bridge across Parsons Slough, on top of levee, at gateway 20 feet east of center of road; iron bench mark post stamped "Prim. Trav. Sta. No. 30, 1915".....	32 37 05.96	96 33 35.72	4,844

## DALLAS QUADRANGLE—Continued.

## Across river bottom to point east of Malloy Bridge.

Station.	Latitude.	Longitude.	Distance between stations.
T. b. m. No. 36, about 0.70 mile southwest of Parsons Slough bridge, 50 feet northeast of center of road; in root of hackberry tree blazed, scribed, and painted black, nail.....	32 36 30.97	96 34 02.01	Fct. 3,458
P. b. m. No. 31, 1 mile east of Malloy Bridge, 210 west of slough bridge on north side of road, 25 feet north of road, 4 feet from wire fence; iron bench-mark post stamped "Prim. Trav. Sta. No. 31".....	32 36 16.92	96 34 23.27	3,255
P. b. m. No. 32, 132 feet east of pier at east end of Malloy Bridge across Trinity River, on grade landing up to bridge and in line with driveway across bridge; iron bench-mark post stamped "Prim. Trav. Sta. No. 32, 1915".....	32 35 50.13	96 35 13.10	4,026

## From Crabtree Ferry east across river bottom to point east of Parsons Slough Bridge.

Crabtree Ferry, 100 feet from, 20 feet south of road, close to telephone pole on small levee, river road makes straight angle turn near bench mark; concrete monument with 15-inch iron post set in it, no number on elevation (Corps of Engineers b. m.).....	32 33 12.40	96 32 59.34	.....
Crabtree Ferry, 902 feet from above-described bench mark at; 15-inch iron post in concrete monument on top of small levee, no number or elevation (U. S. C. E. M.) .....	32 33 04.22	96 32 53.59	962
Station 10 1/2, U. S. Engineer Corps Staff in 101 (1912).....	32 33 12.89	96 32 59.63	.....
T. b. m. No. 15, about 1,200 feet southeast from Crabtree Ferry, near negro cabin on north side of road, in root of spotted-oak tree blazed, scribed, and painted black, "U. S. B. M. 15, nail.....	32 33 10.90	96 32 44.64	1,299
T. b. m. No. 16, 6 feet north of wire fence along road, in root of ash tree blazed, scribed, and painted black, "U. S. B. M. 16," nail.....	32 33 10.35	96 32 14.55	2,577
T. b. m. No. 17, near right angle in road, 6 feet north of wire fence line; in root of elm tree blazed, scribed, and painted black, "U. S. B. M. 17," nail.....	32 33 16.97	96 32 07.81	863
T. b. m. No. 18, about 0.75 mile west of bridge over Parsons Slough, about middle of east and west road line; in root of ash tree blazed, scribed, and painted black, "U. S. B. M. 18," nail.....	32 33 16.78	96 31 38.66	2,495
T. b. m. No. 26, about 400 feet south of bridge over Parsons Slough; in root of large oak tree on east side of road blazed, scribed, and painted black, "U. S. B. M. 26," nail.....	32 33 22.28	96 31 17.90	1,862

## Northwest up Bois d'Arc Island to Malloy Bridge road.

T. b. m. No. 27, in open field; at base of large pecan tree blazed, scribed, and painted black, "U. S. B. M. 27," nail.....	32 33 40.70	96 32 00.10	.....
T. b. m. No. 28, in woods; at base of ash tree blazed, scribed, and painted black, "U. S. B. M. 28," nail.....	32 34 01.75	96 32 23.02	2,893
T. b. m. No. 29, in north and south wire fence line, cleared ground to west, brush and timber to south and east; in root of hackberry tree blazed, scribed, and painted black, "U. S. B. M. 29," nail.....	32 34 18.47	96 32 47.08	2,645
T. b. m. No. 35, about 1.5 miles east of lock No. 4, about 750 feet north of negro cabin, at north end of clearing, close to fence corner north, east, and west, neighborhood road northeast crossing of slough; iron bench-mark post stamped "Prim. Trav. Sta. No. 35, 1915".....	32 34 44.64	96 33 03.65	3,002
T. b. m. No. 30, 18 feet north of east and west farm roadway and fence line, woods north, south, and west; in root of large pecan tree blazed, scribed, and painted black, "U. S. B. M. 30," nail.....	32 34 52.77	96 33 34.42	2,759
T. b. m. No. 39, at edge of small strip of timber, with cleared land on south; in root of persimmon tree blazed, scribed, and painted black, "U. S. B. M. 39," nail.....	32 35 10.26	96 33 44.87	1,982
Iron bench-mark post No. 38.....	32 35 16.99	96 33 42.40	712
T. b. m. No. 38, in thick woods, at base of large dead ash tree blazed, scribed, and painted black, "U. S. B. M. 38," nail.....	32 35 39.79	96 33 47.93	2,352
T. b. m. No. 37, in thick woods; at base of ash tree, blazed, scribed, and painted black, "U. S. B. M. 37," nail.....	32 35 55.74	96 34 11.68	2,594

## From Hurley's store to Wilmer Bridge.

T. b. m. No. 40, on west side of small slough and east side of cultivated field; in root of cottonwood tree blazed, scribed, and painted black, "U. S. B. M. 40".....	32 35 46.53	96 36 26.76	.....
T. b. m. 41, about 1 mile above Hurley's store, 100 feet west of road across Gravel Slough, in root of hackberry tree in fence line; tree is blazed, scribed, and painted black, "U. S. B. M. 41," nail.....	32 36 01.78	96 36 50.27	2,532

## DALLAS QUADRANGLE—Continued.

From Hurley's store to Wilmer Bridge—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. b. m. No. 42, 6 feet north of east end of small bridge across gravel slough; in root of hackberry tree blazed, scribed, and painted black, "U. S. B. M. 42," nail.....	° ' "	° ' "	Fect.
T. b. m. No. 43, in open field with scattering pecan trees; in root of large pecan tree blazed, scribed, and painted black, "U. S. B. M. 43," nail.....	32 35 53.00	96 37 19.89	2,685
T. b. m. No. 44, 75 feet southeast of right angle turn in road in lane bearing south 40° east; in root of pecan tree blazed, scribed, and painted black, "U. S. B. M. 44," nail.....	32 35 56.38	96 37 46.36	2,291
P. b. m. No. 33, about 1.5 miles southwest from river bridge, 70 feet northwest from small bridge, on north side of Wilmer-Lock No. 2 road; iron bench-mark post stamped "Prim. Trav. Sta. No. 33, 1915".....	32 36 13.35	96 38 08.42	2,550
T road north, at center of Wilmer road, at southwest corner of woods.....	32 36 17.86	96 38 55.80	4,079
P. b. m. No. 34, about 700 feet west of west approach to Wilmer Bridge, 3 feet southwest of corner fence post at southeast corner junction of roads; iron bench-mark post stamped "Prim. Trav. Sta. 34, 1915".....	32 36 38.40	96 38 04.58	4,849
T. b. m. No. 46, 30 feet south of southeast corner of woods; in center of road, in top of Bois d'Arc stump, nail.....	32 36 55.04	96 37 26.90	3,636
T. b. m. No. 47, 50 feet west of river bank, 60 feet southeast of concrete well, 150 feet southeast of cabin; in root of pecan tree, nail.....	32 36 26.25	96 37 08.72	3,300
T. b. m. No. 48, 50 feet west of southwest corner of clearing and 15 feet southwest of old tramway trestle; in root of Bois d'Arc tree, nail.....	32 36 34.72	96 36 22.53	4,042
T. b. m. No. 49, open field to south, in wire fence line; in root of hackberry tree, nail.....	32 36 19.60	96 35 57.18	2,651
	32 36 06.18	96 35 37.06	2,193

Magnetic declination for district, 9° 08' east.

## Mineola and Willspoint quadrangles.

## SMITH AND WOOD COUNTIES.

The following geographic positions on approximate North American datum were determined by primary traverse in February, 1915, by E. L. McNair. The line starts at crossing of Texas & Pacific Railway and Cotton Belt Route at Big Sandy, previously located by primary traverse described on page 219, Bulletin 310, and was double chained along Texas & Pacific Railway to Mineola. From Mineola several small circuits were run in the Sabine River bottom lands.

## MINEOLA QUADRANGLE.

Along Texas &amp; Pacific Railway from Big Sandy to Mineola (double chained).

Station.	Latitude.	Longitude.	Distance between stations.
Big Sandy, crossing of Texas & Pacific Ry. and Cotton Belt Route.....	° ' "	° ' "	Fect.
Road crossing under Texas & Pacific Ry., 820 feet east of mile-post 114, at bridge 114 B.....	32 34 53.28	95 06 32.38	.....
Milepost 115, 860 feet east of, 39 feet south of center of track, 30 feet west of gate leading to land south, 300 feet to a cabin; iron post stamped "Prim. Trav. Sta. No. 1, 1915".....	32 34 56.86	95 07 32.76	5,180
Upshur-Wood county line, center of track opposite post.....	32 35 00.13	95 08 35.87	5,409
Second-class road crossing, at Farmers Spur, 110 feet west of head block.....	32 35 02.49	95 09 12.27	3,124
Public road crossing.....	32 35 05.35	95 10 02.46	4,305
Hawkins station, 1,160 feet east of, 200 feet east of road under railway, 37 feet north of center of track, 18 inches south of right of way fence, 8 feet south of telephone pole; iron post stamped "Prim. Trav. Sta. No. 2, 1915".....	32 35 07.75	95 10 41.96	3,646
	32 35 12.71	95 12 05.95	6,948

## MINEOLA QUADRANGLE—Continued.

Along Texas &amp; Pacific Railway from Big Sandy to Mineola (double chained)—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Milepost 119, center of track opposite.....	* * "	* * "	Ft.
Milepost 120, 500 feet east of, center of short trestle.....	32 35 14.74	95 12 48.29	3,629
Milepost 121, 215 feet east of, 43 feet north of center of track; 2 feet south of right of way fence; iron post stamped "Prim. Trav. Sta. No. 3, 1915".....	32 35 18.15	95 13 48.83	5,191
Bryan siding, 0.9 mile southeast of, center of track, opposite water tank.....	32 35 29.67	95 14 49.24	5,298
Bryan siding, head block at west end of.....	32 35 41.91	95 15 22.62	3,113
Milepost 123, center of track opposite.....	32 36 01.28	95 16 13.52	4,774
Fouke Lumber Co.'s spur, 620 feet east of headblock at, nearly opposite small station platform 43 feet south of center of track, at right-of-way fence, 80 feet west of private road crossing; iron post stamped "Prim. Trav. Sta. No. 4, 1915".....	32 36 12.57	95 16 43.15	2,790
Crow station, public road crossing at.....	32 36 37.65	95 17 50.16	6,268
Lake Fork siding, at east end of, switchstand.....	32 26 56.63	95 18 51.62	5,596
Lake Fork siding, 0.6 mile northwest of, 75 feet east of milepost 127, 40 feet south of track, on low ground, 1 foot north of right of way fence; iron post stamped "Prim. Trav. Sta. No. 5, 1915".....	32 37 22.42	95 19 53.53	5,902
Milepost 128, center of track opposite, at west end of long trestle across Lake Fork.....	32 37 34.44	95 20 26.17	3,046
Lake Fork trestle, about 1.2 miles northwest of road crossing.....	32 27 49.33	95 21 29.10	5,588
Hoard siding, 1,100 feet west of road crossing at, 120 feet west of switchstand at west end of siding, 38 feet south of center of track, 1 foot north of right-of-way fence, near milepost 130; iron post stamped "Prim. Trav. Sta. No. 6, 1915".....	32 38 06.58	95 22 36.11	5,990
Milepost 130, 1.75 miles northwest of, road crossing.....	32 38 21.80	95 23 23.08	4,301
Harts spur, 325 feet west of road crossing, 115 feet west of milepost 133, 50 feet south of main track, 1 foot north of right-of-way fence; iron post stamped "Prim. Trav. Sta. No. 7, 1915".....	32 38 51.70	95 25 04.94	9,219
Harts spur, 1.5 miles northwest of; road crossing.....	32 39 03.58	95 26 23.66	6,558
Mineola station, 1,250 feet east of, 45 feet north of center of track, on bank 18 inches south of right-of-way fence; iron post stamped "Prim. Trav. Sta. No. 8, 1915".....	32 39 23.72	95 27 52.02	7,824
Mineola station, 200 feet west of, street crossing.....	32 39 41.18	95 29 07.52	6,692
	32 39 44.46	95 29 24.09	1,436

## WILLSPOINT QUADRANGLE.

Near Mineola.

Station.	Latitude.	Longitude.	Distance between stations.
Mineola, crossing of Texas & Pacific and Missouri, Kansas & Texas railways.....	* * "	* * "	Ft.
Farm crossing, 1,060 feet east of milepost 138.....	32 39 55.32	95 30 12.35	4,270
Macks siding, 190 feet southeast of switchstand at east end of, road crossing under track.....	32 40 08.56	95 31 11.13	5,200
Macks siding, 110 feet west of switchstand at, 20 feet east of milepost 139, 47 feet south of center of track, 18 inches north of right of way fence; iron post stamped "Prim. Trav. Sta. No. 9, 1915".....	32 40 18.45	95 31 55.09	3,890
Macks siding, about 0.8 mile northwest of; center of track at trestle over creek.....	32 40 23.61	95 32 20.07	2,198
Sabine River, west end of bridge over, opposite post between Smith and Wood counties; center of track at.....	32 40 34.35	95 33 05.44	4,027
Milepost 141, 105 feet east of, 870 feet west of Smith and Wood county line post, 45 feet south of track, 23 feet west of fence line southeast; iron post stamped "Prim. Trav. Sta. No. 10, 1915".....	32 40 14.33	95 34 05.78	5,540
	32 40 10.64	95 34 14.92	866

## On south side of Sabine River, in bottom lands.

Sabine River, about 0.50 mile south of Texas & Pacific Ry. bridge over; in root of leaning oak tree, blazed, scribed, and painted black, "T. B. M. No. 1," nail.....	32 39 47.61	95 34 19.87	2,367
Sabine River Bridge, about 1 mile south of, 75 feet west of a creek, on a little higher ground than apparent high water; in root of sweet-gum tree, blazed, scribed, and painted black, "U. S. B. M. No. 2," nail.....	32 39 39.10	95 34 44.55	2,278
Sabine River Bridge, about 0.60 mile south of, nail in root of water oak, blazed, scribed, and painted "U. S. B. M. No. 3".....	32 39 40.35	95 34 16.67	2,387
Sabine River Bridge, about 0.20 mile southeast of, 500 feet south of river, 100 feet east of creek; in root of a post-oak tree, blazed, scribed, and painted black, "U. S. B. M. No. 4," nail.....	32 39 48.15	95 33 50.16	2,388

## WILLSPoint QUADRANGLE—Continued.

## Mineola district.

Station.	Latitude.	Longitude.	Distance between stations.
T. b. m. No. 5, 300 feet south of creek, near edge of lowland, in root of post-oak tree, blazed, and painted black, "U. S. T. B. M. No. 5," nail.....	° ' "	° ' "	Fect.
T. b. m. No. 6, 80 feet east of a lake; in root of post-oak tree 30 inches in diameter, blazed, and painted, "U. S. T. B. M. No. 6," nail.....	32 39 37.42	95 33 49.94	1,084
T. b. m. No. 7, 300 feet south of the Callaway Crossing Road; in root of pin-oak tree, about 18 inches in diameter; nail.....	32 39 31.39	95 33 22.70	2,406
Permanent bench mark.....	32 39 06.67	95 33 15.39	2,575
T. b. m. No. 8, 300 feet south of bridge over slough, on east side of Callaway Crossing Road, near edge of overflow; in root of water-oak tree 18 inches in diameter, blazed, scribed, and painted "U. S. B. M. No. 8".....	32 38 59.55	95 32 50.80	2,223
T. b. m. No. 9, in woods in flat ground, in root of water-oak tree 20 inches in diameter, blazed, scribed, and painted black "U. S. B. M. No. 9," nail.....	32 38 25.68	95 33 11.56	3,856
T. b. m. No. 10, 100 feet north of rising ground, in root of post-oak tree, about 18 inches in diameter, blazed, scribed, and painted black "U. S. B. M. No. 10," nail.....	32 38 04.60	95 32 59.08	2,383
T. b. m. No. 11, in root of water oak, blazed, scribed, and painted black, "U. S. B. M. No. 11," nail.....	32 37 44.27	95 32 40.44	2,600
T. b. m. No. 13, in root of oak tree, blazed but not painted; nail.....	32 37 32.96	95 32 10.80	2,782
Burleson Lake, 0.25 mile southeast of outlet of, about 125 feet south of old ford probably dry at low water, on bank among scrub timber and brush; iron bench-mark post stamped "Prim. Trav. Sta. No. 11, 1915." Reference marks: A 6-inch post-oak tree S. 62° E., distant 17 feet, and an 8-inch red-oak tree, south 10° east, distant 28 feet; both trees blazed and marked with three hacks.....	32 36 59.59	95 31 31.62	4,754
T. b. m. No. 14, 250 feet west of cotton field, 200 feet south of slough, in root of elm tree in wire-fence line; tree is blazed, scribed, and painted black, "U. S. B. M. No. 14," nail.....	32 36 53.36	95 31 16.75	1,420
T. b. m. No. 15, 75 feet north of a roadway, 50 feet west of west edge of an open field; in root of gum tree blazed, scribed, and painted black, "U. S. B. M. No. 15," nail.....	32 36 56.88	95 30 55.66	1,839
T. b. m. No. 16, 50 feet northwest of bottom road, in root of pin oak blazed, scribed, and painted black, "U. S. B. M. No. 16," nail..	32 36 47.00	95 30 29.26	2,466
	32 36 46.85	95 30 06.37	1,957

## MINEOLA QUADRANGLE.

## Mineola district.

Station.	Latitude.	Longitude.	Distance between stations.
P. b. m. No. 12, beside wire fence north of cotton field at approximate right angle in old road, N. 25° E., distant 30 feet to oak tree, and S. 83° W., distant 32 feet to oak tree, south 29° west, 38 feet to oak tree; all blazed and marked with three hacks; iron bench-mark post stamped "Prim. Trav. Sta. No. 12, 1915".....	° ' "	° ' "	Fect.
T. b. m. No. 17, in root of 8-inch elm tree nearly in middle of bottom road, about 0.50 mile west of south end of "Dump Road"; tree is blazed, scribed, and painted black, "U. S. B. M. No. 17," nail.....	32 36 43.61	95 29 51.13	1,345
T. b. m. No. 18, in root of gum tree, about 80 feet east of bridge over slough at south end of "Dump Road," the road leading south from Mineola across the Sabine River bottom; tree is blazed, scribed, and painted black, "U. S. B. M. No. 18," nail.....	32 36 44.44	95 29 21.76	2,513
T. b. m. No. 19, 150 feet north of high-water mark, open field on south, 35 feet east of wire fence; in root of "over cup" oak tree, blazed, scribed, and painted, "U. S. B. M. No. 19," nail.....	32 36 42.46	95 29 07.61	1,225
P. b. m. No. 13, 500 east of creek, 150 feet north of knoll 20 feet high, in forest, S. 52° E., distant 15 feet to oak, S. 60° W., distant 25 feet to oak, N. 48° W., distant 30 feet to gum tree; iron bench-mark post stamped "Prim. Trav. Sta. No. 13, 1915." All trees marked with three hacks.....	32 36 21.29	95 28 55.36	2,383
T. b. m. No. 20, 50 feet north of wire fence at edge of swamp, cotton field on south; tree blazed, scribed, and painted black, "U. S. B. M. No. 20," nail in root of pin-oak tre.....	32 36 10.25	95 28 25.74	2,770
T. b. m. No. 21, in root of pecan tree, 8 feet north of fence close to small creek; tree blazed, scribed, and painted black, "U. S. B. M. No. 21," nail.....	32 36 16.83	95 28 00.19	2,285
	32 36 18.10	95 27 25.87	2,938

## MINEOLA QUADRANGLE—Continued.

## Along International &amp; Great Northern Railway to Mineola.

Station.	Latitude.	Longitude.	Distance between stations.
P. b. m. No. 14, 76 feet east of center of track at Eads flag station, on the International & Great Northern Ry., 15 inches west of wire fence line, 40 feet southeast of corner of cabin, and approximately 200 feet from south end of railroad bridge across Sabine River; iron bench-mark post stamped "Prim. Trav. Sta. No. 14, 1915".....	* * "	* * "	Fed.
Eads flag station, about 0.30 mile northwest of; north end of long trestle.....	32 36 20.74	95 26 53.63	2,770
Eads flag station, about 1.30 miles northwest of; switch stand at spur to sawmill.....	32 36 36.31	95 27 05.00	1,849
Milepost No. 42, 320 feet northwest of; road crossing.....	32 37 13.70	95 27 29.82	4,337
Milepost No. 43, about 0.25 mile southeast of; private road crossing.....	32 38 15.18	95 28 13.08	7,231
Mineola, about 0.75 mile southeast of; switch stand at north end of Y.....	32 38 44.12	95 28 40.34	3,742
	32 39 17.91	95 28 50.78	3,530

## From International &amp; Great Northern Railway up north side of Sabine River.

Station.	Latitude.	Longitude.	Distance between stations.
International & Great Northern milepost No. 42, 2,200 feet southeast of, 37 feet west of center of track, 15 feet east of right of way fence, about 150 feet north of edge of river bottom; iron bench-mark post stamped "Prim. Trav. Sta. No. 15, 1915".....	32 37 54.32	95 27 57.30	.....
T. b. m. No. 22, about 100 feet north of brush and timber line, at edge of lowland, in open field; in root of walnut tree, blazed, scribed, and painted black, "U. S. B. M. No. 22," nail.....	32 38 08.85	95 28 28.68	3,029
T. b. m. No. 23, about 0.50 mile below "Dump Road," 1,000 feet northwest of edge of timber line, near wire-fence line; in base of post-oak tree top broken off; tree is blazed, scribed, and painted black, "U. S. B. M. No. 23," nail.....	32 38 00.22	95 28 46.34	1,744
P. b. m. No. 16, on Mineola-Tyler road, at north edge of Sabine River bottom, in line with "Dump Road" going south, 70 feet southwest to center of road and 2 feet south of wire fence; iron bench-mark post stamped "Prim. Trav. Sta. No. 16, 1915".....	32 37 52.83	95 29 03.13	1,640
T. b. m. No. 26, 40 feet south of fence at edge of field, in root of leaning post-oak tree, 24 inches in diameter; tree is blazed, scribed, and painted black, "U. S. B. M. No. 26," nail.....	32 37 50.38	95 29 27.93	2,130
T. b. m. No. 27, in open field, with few scattering trees near by; in root of 30-inch pin-oak tree, blazed, scribed, and painted black, "U. S. B. M. No. 27".....	32 37 54.22	95 29 58.61	2,653

## WILLSPORT QUADRANGLE.

## Up north side of Sabine River.

Station.	Latitude.	Longitude.	Distance between stations.
P. b. m. No. 17, 150 feet north of level bottom land, at south end of north and south land or private road, 2 feet south of east and west fence line and 3 feet west of corner fence post; iron bench-mark post stamped "Prim. Trav. Sta. No. 17, 1915".....	* * "	* * "	Fed.
T. b. m. No. 28, at edge of woods and overflowed land; in root of gum tree, blazed, scribed, and painted black, "U. S. B. M. No. 28," nail.....	32 38 09.23	95 30 25.89	2,752
T. b. m. No. 29, at edge of timber line and overflowed ground, 6 feet south of east and west wire fence, south of cotton field; in root of elm tree, blazed, scribed, and painted black, "U. S. B. M. No. 29," nail.....	32 38 15.05	95 30 55.51	2,002
T. b. m. No. 30, at edge of timber and lowland, 15 feet south of east and west wire fence; nail in root of post-oak tree blazed, scribed, and painted black, "U. S. B. M. No. 30".....	32 38 41.63	95 31 05.57	2,821
T. b. m. No. 31, about 1,000 feet east of Callaway Road, in woods; in root of oak tree blazed, scribed, and painted black, "U. S. B. M. No. 31," nail.....	32 38 56.03	95 31 29.74	2,528
P. b. m. No. 18, on Callaway Crossing Road, 50 feet northeast of end of bridge over slough, at foot of hill on north side of bottom, 2 feet from wire fence on north side of road; iron bench-mark post stamped "Prim. Trav. Sta. No. 18, 1915".....	32 39 01.06	95 32 09.16	3,409
T. b. m. No. 32, in lowland, field on east; in root of elm tree, blazed, scribed, and painted black, "U. S. B. M. No. 32," nail..	32 39 08.79	95 32 13.80	875
	32 39 36.90	95 32 21.09	2,909

## WILLSPoint QUADRANGLE—Continued.

Up north side of Sabine River—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
T. b. m. No. 33, 150 feet east of slough, 10 feet north of wire fence north and west of open field; in root of elm tree blazed, scribed, and painted, "U. S. B. M. No. 33," nail.....	32 40 01.55	95 32 38.89	Feet. 2,921
T. b. m. No. 34, in forest and overflowed land; in root of pin-oak tree, blazed, scribed, and painted black, "U. S. B. M. No. 34," nail.....	32 40 14.53	95 33 00.03	2,232
P. b. m. No. 20, 1,500 feet southeast of Texas & Pacific Ry. bridge over Butler Lake, on east side of Sabine River bottom, about 450 feet east along fence from Butler Lake, 3 feet south of east and west wire fence, 5 feet from braced fence post in angle at fence line; iron bench-mark post stamped "Prim. Trav. Sta. No. 20, 1915".	32 40 11.84	95 33 27.61	2,373
T. b. m. No. 35, 300 feet east of Silver Lake, 55 feet south of track, in edge of timber; in root of pin-oak tree blazed, scribed, and painted black, "U. S. B. M. No. 35," nail.....	32 40 23.20	95 33 48.03	2,088

## Across Sabine River bottom along Dump road.

T. b. m. No. 24, 20 feet east of public road; in root of post-oak tree, blazed, scribed, and painted black, "U. S. B. M. No. 24," nail.....	32 37 22.51	95 29 03.57	.....
T. b. m. No. 25, 30 feet west of center of road; in root of locust tree blazed, scribed, and painted black, "U. S. B. M. No. 25," nail.....	32 36 58.78	95 29 05.86	2,400

## Cross line near Callaway Bridge.

Sabine River, center of bridge over, at concrete pier at west end. Sabine River Bridge, 1,000 feet west of, 100 feet south of end of small pond, S. $4^{\circ} 30'$ W., distant 45 feet to post-oak tree, north $85^{\circ}$ east, distant 32 feet to post-oak tree, N. $33^{\circ}$ E., distant 26 feet to post-oak tree; all blazed and marked with 3 hacks; iron bench-mark post stamped "Prim. Trav. Sta. No. 19, 1915".....	32 39 00.54	95 32 38.92	.....
	32 38 59.56	95 32 50.81	1,018

Magnetic declination  $8^{\circ} 7' E.$ 

Addicks, Aldine, Alief, Almeda, Ashford, Bellaire, Burnett Bay, Cedar Bayou, Clodine, Crosby, Cypress, Deepwater, Fauna, Harmaston, Hillendahl, Hockley, Holik, Houston Heights, Huffman, Humble, Katy, La Porte, Louetta, Morgans Point, Mykawa, New Caney, Park Place, Pauli, Rosehill, Scott Ranch, Seabrook, Settegast, Spring, Stuebner, Sugarland, Swanson, Waller, Walley, Webster, and Weodon  $7\frac{1}{2}$  quadrangles.

## BRAZORIA, FORT BEND, GALVESTON, HARRIS, AND LIBERTY COUNTIES.

The following geographic positions on North American datum were determined by E. L. McNair in 1915. They are based on positions of stations Thayer, Tory Hill, and Morgans Point of the United States Corps of Engineers as given in Coast and Geodetic Survey Special Publication 17. Starting from these stations in the southeast part of Harris County, lines were run in circuits mostly following public roads and extending over all of Harris County, with a few positions extending over into the adjoining counties mentioned. In all 708 miles of traverse were run and 216 permanent bench marks were established. In addition 22 permanent marks of Coast and Geodetic Survey and United States Corps of Engineers were located.

The elevations were determined by primary leveling and accord with the 1912 adjustment. The leveling was done by R. R. Monbeck in 1915 and by D. S. Birkett in 1916. The work was done in cooperation with Harris County.

## ADDICKS QUADRANGLE.

Along highways near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Addicks station (Missouri, Kansas & Texas R. y.), 200 feet east of 100 feet south and 25 feet east of public-road crossing, on line of right of way, 2 feet northeast of corner fence post; iron post with 3-inch cap. Coast and Geodetic Survey bench-mark C8; "Prim. Trav. Sta. No. 72, 1915," (not stamped), elevation 96.332 feet.....	29 47 04.78	95 38 29.49	Fed.
Private road crossing, top of rail; elevation 90.4 feet.....			
Addicks, 0.8 mile east of, 35 feet north of public road; copper nail in root of lone oak tree, painted "U. S. B. M. 153," elevation 82.19 feet.....	29 47 06.64	95 38 40.00	4,356
Addicks, 1 mile east of, on northwest corner of 200-foot wagon bridge over creek, floor of bridge; elevation 88.62 feet.....			
Addicks, 0.8 mile north of, 480 feet north of bridge, 120 feet south of another bridge across creek, 10 feet east of road; copper nail in root of oak tree painted "U. S. B. M. 164," elevation 90.23 feet.....	29 47 45.78	95 38 42.02	
Addicks, 1.75 miles north of, 1,200 feet south of German Methodist Church, 30 feet east of road, 6 inches from corner post on fence east; copper nail in hub, post painted "U. S. B. M. 165," elevation 98.13 feet.....	29 48 35.47	95 38 41.73	5,020
Addicks, 2.3 miles north of, 2,000 feet north of German Methodist Church, 30 feet west of center of road, 3 feet from corner post on fence line west; iron post stamped "Prim. Trav. Sta. No. 74, 1915," elevation 104.707 feet.....	29 49 06.34	95 38 43.58	3,124
Addicks, 3.15 miles north of, 30 feet south and 25 feet east of T road west, 4 feet from corner fence post at fence line east, 8 inches from telephone pole; copper nail in hub, pole painted "U. S. B. M. 166," elevation 100.96 feet.....	29 49 48.72	95 38 43.38	4,281
Addicks, 4 miles north of, 25 feet east of center of road, 6 inches from telephone pole painted "U. S. B. M. 167"; copper nail in hub, elevation 115.28 feet.....	29 50 35.02	95 38 43.85	4,677
Addicks, 4.6 miles north of, T road south.....	29 51 06.42	95 38 44.48	3,173
Addicks, 4.6 miles north and 0.4 mile east of, about 150 feet south and 200 feet east of Grigsby schoolhouse, 4 feet from corner fence post; iron post stamped "Prim. Trav. Sta. 75, 1915," elevation 119.170 feet.....	29 51 06.75	95 38 23.64	1,815
Grigsby schoolhouse, about 0.6 miles northeast of, 800 feet north of small bridge at bend of road, 20 feet west of center of road; in root of oak tree painted "U. S. B. M. 168"; copper nail, elevation 109.67 feet.....	29 51 30.81	95 37 57.96	3,318
Grigsby schoolhouse, 0.5 mile east and 1.4 mile north of, 25 feet east of center of road, 6 inches from telephone pole, at corner of fence and lane east; t. b. m. 169; copper nail in hub, elevation 124.23 feet.....	29 52 18.11	95 37 57.78	4,779

Along highways north and west in south-central part of quadrangle.

Barker, 2 miles south of, 220 feet south of bridge over Buffalo Bayou, 60 feet west of road; copper nail in root of oak tree painted "U. S. B. M. 91," elevation 85.94 feet.....	29 45 19.35	95 41 05.82	
Barker, 1 mile south of, 25 feet east of center of road, 1 foot from corner post on fence line east at south end of gate; copper nail in hub, post painted "U. S. B. M. 92," elevation 90.11 feet.....	29 46 11.62	95 41 06.73	5,240
Barker, 20 feet east of station on Missouri, Kansas & Texas R. y., 115 feet south of center of track, 35 feet west by 25 feet south of T road south, at corner post of fence; iron post primary traverse station No. 43 (not stamped) U. S. Coast and Geodetic Survey bench-mark B8, elevation 105.476 feet.....	29 47 05.49	95 41 07.90	5,143
Barker, 0.8 mile west of, 250 feet southeast of "Yard Limit" sign-board, about 30 feet south of center of road and about 125 feet south of Missouri, Kansas & Texas R. y., 2 feet north of telephone pole, copper nail in hub, pole painted "U. S. B. M. 93," elevation 111.15 feet.....	29 47 05.71	95 41 59.80	4,375
Barker, 1.7 miles west of, 900 feet east of road crossing, 20 feet north of center of public road, about 60 feet south of Missouri, Kansas & Texas R. y., 1 foot from telephone pole; copper nail in hub, pole painted "U. S. B. M. 94," elevation 115.88 feet.....	29 47 06.48	95 42 55.04	4,570
Road crossing; top of rail 119.0 feet.....			

**ADDICKS QUADRANGLE**—Continued.

Along highway north and west in south-central part of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Barker, 2.5 miles west of, 980 feet east of switch stand, about 60 feet south of Missouri, Kansas & Texas Ry. track, 20 feet north of center of road, 1.5 feet south of wire fence line, 4 feet east of telephone pole; iron post stamped "Prim. Trav. Sta. No. 44, 1915," elevation 124.051 feet.....	29 47 06.75	95 43 40.05	Feet. 3,968
Katy, 4.6 miles east of, 115 feet south of Missouri, Kansas & Texas Ry. track, at a point 50 feet west of Delhi flag station, 30 feet south of public road, 2 feet north of corner post on fence line south; a stone post 6 inches square lettered "U. S. B. M." with 0.5-inch deep hole in center. United States Coast and Geodetic Survey bench mark A8, primary traverse station No. 45 (not marked); elevation, 124.816 feet.....	29 47 06.44	95 44 39.49	5,240

## East along highways to Addicks.

Barker, 4,500 feet east of, 25 feet south of center of public road, 6 inches from telephone pole; copper nail in hub, pole painted "U. S. B. M. 151," elevation, 99.04 feet.....	29 47 05.21	95 40 16.84	.....
Barker, 1.7 miles east of, 30 feet north of center of road, 50 feet south of Missouri, Kansas & Texas Ry. track, 6 inches from telephone pole; copper nail in hub, pole painted "U. S. B. M. 152," elevation, 97.33 feet.....	29 47 05.48	95 39 25.68	4,508

## Near northwest corner of quadrangle.

Cypress, 6.8 miles south by 1.9 miles west of, 6 feet south of northwest corner of fence around house; copper nail in hub, fence painted "U. S. B. M. 123," elevation, 140.82 feet.....	29 52 12.32	95 43 43.05	.....
Katy, 5.4 miles north by 4.6 miles east of, about 0.8 miles west of crossing of Bear Creek on east and west road, 35 feet north of road, 10 feet north of fence corner; iron post stamped "Prim. Trav. Sta. No. 59, 1915," elevation, 143.839 feet.....	29 51 53.33	95 44 43.03	5,629

## Along highways near north border of quadrangle.

Brink schoolhouse, 0.2 mile south and 1.8 miles west of, 15 feet south of road; copper nail in hub, witness stake painted "U. S. B. M. 189" (should be 170), elevation, 137.21 feet.....	29 52 26.00	95 42 47.76	.....
Brink schoolhouse, 0.2 mile south and 0.9 mile west of, 20 feet north of center of road; copper nail in hub, witness stake painted "U. S. B. M. 170" (should be 171), elevation, 135.08 feet...	29 52 26.72	95 41 53.24	4,800
Brink schoolhouse, 0.2 mile south and 750 feet west of, 30 feet northeast of corner of bridge over Langham Creek, 40 feet west of pine tree 3 feet in diameter; iron post stamped "Prim. Trav. Sta. No. 77, 1915," elevation, 128.303 feet.....	29 52 26.81	95 41 08.22	3,964

Magnetic declination in quadrangle, 8° 30' E.

**ALDINE QUADRANGLE.**

Near southwest corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
West Montgomery road, forks of road, road north from North Houston, 1.0 mile east of, 25 feet southwest of West Montgomery Road, at bend, 3 feet east of fence post at angle in fence line; iron post stamped "Prim. Trav. Sta. No. 133, 1915," elevation, 110.001 feet.....	29 55 20.06	95 29 51.65	Feet. 2,587
North Houston, 1.5 miles south 60° east of, 30 feet east of road, fences south and east, 4 inches west of corner fence post painted "U. S. B. M. 296"; copper nail in hub, elevation, 106.47 feet....	29 55 11.04	95 29 40.09	1,367
	29 54 35.70	95 29 44.16	3,589

## ALDINE QUADRANGLE—Continued.

Near southwest corner of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Fairbanks, 3.45 miles north and 1.7 miles east of, 30 feet east of center of road, at north end of gate, fences north, south, and east, 4 inches from corner fence post painted "U. S. B. M. 207"; copper nail in hub, elevation, 105.93 feet.....	* * *	* * *	Fed. 4,632
Fairbanks, 2.9 miles north and 1.75 miles east of, 60 feet northeast of Trinity & Brazos Valley Ry., 170 feet north and 25 feet east of road crossing, 21 feet east of corner post on right-of-way fence; iron post stamped "Prim. Trav. Sta. No. 134, 1915," elevation 97.873 feet.....	29 53 49.86	95 29 43.59	
Fairbanks, 2.6 miles north and 1.75 miles east of, T road corners north, south, and east.....	29 53 18.95	95 29 39.85	3,141
Fairbanks, 2 miles north and 1.75 miles east of, 520 feet south of bridge, 30 feet east of center of road, ash tree painted "U. S. B. M. 298"; copper nail in root, elevation 87.25 feet.....	29 53 03.82	95 29 39.62	1,530
	29 52 30.30	95 29 40.60	3,389

## In north end of quadrangle along public road.

Cypress Creek Bridge on "air line" road, about 1.25 miles south and 0.9 mile east of, near south edge of woods, 30 feet northeast of road; oak tree painted "U. S. B. M. 271"; copper nail in root, elevation 121.04 feet.....	29 59 00.01	95 29 49.20	
Pembie's store, 3.4 miles southwest of, on Erhart Road, 3,000 feet S. 20° W. from crossroads, 35 feet northwest of center of road, in open prairie; iron post stamped "Prim. Trav. Sta. No. 132, 1915," elevation 117.915 feet.....	29 58 15.06	95 29 41.94	
Crossroads.....	29 58 43.40	95 29 29.93	3,632
Pembie's store, 1.9 miles southwest of, 25 feet southeast of road, oak tree painted "U. S. B. M. 272"; copper nail in hub, elevation 120.16 feet.....	29 59 26.50	95 29 12.24	4,625
Pembie's store, 1.4 miles southwest of, on Erhart road, 75 feet northeast of house of W. T. Krimmel, 20 feet southeast of road and 20 feet west of fence line; iron post stamped "Prim. Trav. Sta. No. 123, 1915," elevation 122.366 feet.....	29 59 45.20	95 28 59.02	2,230
Pembie's store, 0.9 miles southeast of, on Erhart road, 20 feet west of road at bend; iron post stamped "Prim. Trav. Sta. No. 124, 1915," elevation 112.919 feet.....	29 59 46.00	95 27 18.96	
Pembie's store, 1.8 miles southeast of, 2.2 miles northwest of forks of E. Montgomery road, 120 feet south of gateway to small house, 25 feet west of road, 6 inches from fence corner, witness stake painted "U. S. B. M. 275"; copper nail in hub, elevation 105.45 feet.....	29 59 14.30	95 26 41.60	4,539
Aldine, 3.15 miles north and 3.1 miles west of, 1.25 miles north of forks of E. Montgomery road, 150 feet south of small house, 20 feet east of road, 6 inches from corner fence post painted "U. S. B. M. 276"; copper nail in hub, elevation 102.82 feet.....	29 58 40.38	95 26 01.97	4,888
Aldine, 2.3 miles north and 2.3 miles west of, 25 feet east of E. Montgomery road, opposite forks of road, 55 feet north of road going east in open prairie; iron post stamped "Prim. Trav. Sta. No. 125, 1915," elevation 100.508 feet.....	29 57 55.86	95 25 07.84	6,551
Aldine, 2.3 miles north and 1.5 miles west of, 1 mile west of International & Great Northern Ry., 135 feet north of road; gum tree, one of a group of five, painted "U. S. B. M. 277"; copper nail in root, elevation 101.38 feet.....	29 57 57.16	95 24 17.06	4,471

## Along road close to railroad near east border of quadrangle.

Westfield, 2 miles south of, 30 feet west of center of road, 0.60 mile north of milepost 134, 1 foot east of right-of-way fence; copper nail in hub, post and witness stake painted "U. S. B. M. 238," elevation 101.18 feet.....	29 59 39.91	95 23 44.33	
Westfield, 2.70 miles south of, 650 feet south of milepost 134, 108 feet east of track, 25 feet east of center of road, 4 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 107, 1915," elevation 102.747 feet.....	29 59 03.10	95 23 34.49	3,830
Road crossing, top of rail, elevation 103.5 feet.....			
Aldine, 2.65 miles north of, 1,800 feet north of a road crossing, 25 feet west of center of road, 4 feet east of right-of-way fence line, 15 feet east of telegraph pole; copper nail in hub, witness stake 3 feet west painted, pole painted "U. S. B. M. 239," elevation 97.217 feet.....	29 58 13.62	95 23 22.77	5,103
Aldine, 2.30 miles north of, public road crossing International & Great Northern Ry., 500 feet southeast of two-story white house; top of rail, elevation 96.1 feet.....	29 57 56.21	95 23 19.06	1,789

**ALDINE QUADRANGLE—Continued.****Along road close to railroad near east border of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Aldine, 1.75 miles north of, 40 feet east of center of railroad track, 45 feet west of public road, 1 foot east of telegraph pole, painted "U. S. B. M. 240"; elevation 87.92 feet..... International & Great Northern Ry. bridge 280, over Green's Bayou, top of rail, 87.4 feet.....	• • " 29 57 26.07	• • " 95 23 11.08	Feet. 3,126

**Along road close to railroad near west border of quadrangle.**

Aldine, 1.10 miles north of, 240 feet south of south end of highway bridge over Greens Bayou, 60 feet east of center of railroad track, 25 feet west of center of road, 8 feet east of telephone pole; iron post stamped "Prim. Trav. Sta. No. 108, 1915," elevation 82.465 feet.....	29 56 53.83	95 23 02.77	3,339
Aldine, 1,400 feet north of station, 25 feet west of center of road, 120 feet southwest of store, 1 foot from telegraph pole painted "U. S. B. M. 241"; copper nail in hub, elevation 81.595 feet.....	29 56 10.62	95 22 52.04	4,467
Aldine, 75 feet east of station, road crossing the International & Great Northern Ry.; top of rail, 85.7 feet.....	29 55 56.42	95 22 48.20	1,474
Aldine, about 0.75 mile south of, 30 feet west of center of road, 50 feet east of railroad track, about 50 feet north of steps over fence, 2 feet east of telephone pole painted "U. S. B. M. 242"; copper nail in hub, elevation 81.56 feet.....	29 55 18.79	95 22 39.05	3,887
Aldine, 1.20 miles south of, 55 feet east of center of track, 30 feet west of center of road, 300 feet south of small wooden bridge, 3 feet east of right-of-way fence line; iron post stamped "Prim. Trav. Sta. No. 109, 1915," elevation 81.122 feet.....	29 54 55.51	95 22 32.97	2,412

**ALIEF QUADRANGLE.****Along Westheimer road.**

Station.	Latitude.	Longitude.	Distance between stations.
Houston, 6.3 miles west of city limits, on Westheimer road, about 1 mile north and 0.5 mile east of Jeanetta, 25 feet south and 20 feet east of T road corner, 2.5 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 9, 1915," elevation 72.583 feet..... T road corners, roads east, west, and north.....	• • " 29 44 13.55	• • " 95 30 50.58	Feet.
Houston, 7.4 miles west of city limits, on Westheimer road, 25 feet north of center of road, on line of north and south fence, close to corner fence post; copper nail in hub; post painted "U. S. B. M. No. 17," elevation 74.53 feet.....	29 44 13.52	95 31 15.54	2,200
Houston, 8.3 miles west of city limits, on Westheimer road, 25 feet north of center of road, in line with fence line north, 1 foot from corner fence post; copper nail in hub, painted on post "U. S. B. M. No. 18," elevation 79.36 feet.....	29 44 13.35	95 31 54.66	3,449
Alief, 2 miles east and 1.5 mile north of, on Westheimer road, 25 feet south and 20 feet west of T road south, 2 feet from fence corner, about 350 feet north of large new house; iron post stamped "Prim. Trav. Sta. No. 10, 1915," elevation 81.030 feet.....	29 44 12.56	95 32 52.99	5,142
Alief, 2 miles east of, about 0.5 mile north of San Antonio & Aransas Pass Ry., 20 feet west of center of north and south road, 1 foot from corner fence post, at fence line west; post painted "U. S. B. M. No. 19"; copper nail in hub, elevation 80.48 feet.....	29 44 11.55	95 33 35.26	3,728
Alief, about 2.25 miles southeast of, 80 feet north of east and west road, north and south road crossing over San Antonio & Aransas Pass Ry.....	29 43 31.45	95 33 34.42	4,052
Alief, about 1.6 miles east of, 30 feet north of center of public road and about 60 feet south of San Antonio & Aransas Pass Ry., 1 foot from telephone pole painted "U. S. B. M. No. 20"; copper nail in hub, elevation 79.80 feet.....	29 43 03.45	95 33 33.56	2,829
Alief, about 1.1 miles east of, 30 feet south of center of public road, 100 feet south of San Antonio & Aransas Pass Ry., opposite railroad post marked "1 Mile to Station"; iron post stamped "Prim. Trav. Sta. No. 11, 1915," elevation 80.667.....	29 43 00.92	95 33 58.88	2,247
Brays Bayou, San Antonio & Aransas Pass Ry. bridge over; top of rail, elevation 83.5 feet.....	29 42 57.98	95 34 27.89	2,575
Alief station, 50 feet south and 60 feet east of, 170 feet west of road north, across track, 1 foot north of telephone pole painted "U. S. B. M. No. 21"; copper nail in hub, elevation 79.53 feet.....	29 42 53.15	95 35 33.41	5,797

## ALIEF QUADRANGLE—Continued.

## Along Westheimer road—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Alief, 1 mile south of, opposite L. L. Holland's residence, 1 foot from gatepost at entrance to barnyard; copper nail in hub, "U. S. B. M. No. 22," elevation 82.09 feet.....	* * "	* * "	Fed. 5.84
Alief, 1.75 miles south of, 25 feet west of center of north and south road, 2 feet from gatepost in wire fence line; iron post stamped "Prim. Trav. Sta. No. 12, 1915", elevation 82.533 feet.....	29 41 56.38	95 35 45.10	3.715
Alief, 2.6 miles south of, 25 feet south of east and west road, known as Richmond Road, 2 feet north of gatepost, painted "U. S. B. M. No. 23"; copper nail in hub, elevation 87.09 feet.....	29 40 32.39	95 35 44.05	4.770
Alief, 2.6 miles south by 0.8 mile east of floor of wooden culvert, elevation 86.4 feet.....			
Alief, 2.6 miles south by 1.1 miles east of, 25 feet north of center of road, 1,200 feet southwest from two-story white house; copper nail in hub, post painted "U. S. B. M. No. 24," elevation 83.95 feet.....	29 40 27.31	95 34 28.00	6.729
Alief, 2.6 miles south and 1.7 miles east of, on Richmond Road, on open prairie, no fences, N. 67° W., distant 0.5 mile to two-story white house with windmill and red barn, 1,200 feet east of small angle in road, 35 feet north of center of road; iron post stamped "Prim. Trav. Sta. No. 13, 1915," elevation 81.593 feet.....	29 40 26.91	95 33 53.06	3.082
Alief, 2.6 miles south by 2.4 miles east of, 55 feet north of east and west road; in root of lone tree on prairie; copper nail, tree painted "U. S. B. M. No. 25," elevation 75.05 feet.....	29 40 28.94	95 33 24.65	2.516
Alief, 2.6 miles south by 3.5 miles east of, 1 foot from fence post in front of one and one-half story house; copper nail in hub, post painted "U. S. B. M. No. 26," elevation 72.48 feet.....	29 40 32.79	95 32 15.87	6.080
Missouri City, about 4.2 miles north of, 60 feet east of road south, in line with road west; iron post stamped "Prim. Trav. Sta. No. 14, 1915," elevation 66.899 feet.....	29 40 34.27	95 31 40.80	3.094
Missouri City, 3 miles north and 0.6 mile east of, 35 feet east of center of north and south road, 6 inches from corner fence post at fence line east; copper nail in hub, post painted "U. S. B. M. No. 27," elevation 71.43 feet.....	29 39 46.15	95 31 40.26	4.561
Missouri City, 2.6 miles north of, 1.25 miles south of Richmond Road, 20 feet north and 25 feet east of right angle in road, 1 foot east of corner fence post painted "U. S. B. M. No. 25"; copper nail in hub, elevation 73.29 feet.....	29 39 21.82	95 32 10.52	3.628
Missouri City, about 1.7 miles north of, on south side of angle in road to southwest, 30 feet south of wooden bridge over ditch; iron post stamped "Prim. Trav. Sta. No. 15, 1915," elevation 72.764 feet.....	29 38 34.02	95 32 09.07	4.331
Missouri City, 1.2 miles north of, on east side of road, 1.5 feet from corner fence post, fence line southeast; copper nail in hub, post painted "U. S. B. M. No. 29," elevation 74.66 feet.....	29 38 12.87	95 32 31.82	2.651
Missouri City, 1 mile northwest of, 50 feet south and 10 feet east from T road corner, 1 foot from corner fence post painted "U. S. B. M. No. 30"; copper nail in hub, elevation 78.38 feet.....	29 37 42.26	95 32 59.90	3.182
Missouri City, about 1.75 miles northeast of, on road to Houston, 40 feet northwest of center of road, 40 feet from center of Southern Pacific R. R. track, 1 foot from telephone pole painted "U. S. B. M. No. 32"; copper nail in hub, elevation 70.27 feet.....	29 37 43.37	95 30 44.23	4.484
Missouri City, 2 miles northeast of; road crossing top of rail, elevation 74.2 feet.....			
Bellaire, about 3 miles west of, on Richmond road, 10 feet north of center of road, in wetterly one of two mesquite trees; copper nail in notch at base, tree painted "U. S. B. M. No. 79," elevation 67.89 feet.....	29 41 07.34	95 30 39.27	
Bellaire, about 2.25 miles west of, on Richmond Road, 45 feet south of center of road, 5 feet from corner fence post at north and south fence line, 10 feet east of gatepost; iron post stamped "Prim. Trav. Sta. No. 39, 1915," elevation 66.650 feet.....	29 41 26.62	95 30 00.43	3.98
Bellaire, about 2.2 miles west of; Richmond Road, about 0.4 mile north of, at corner of fence in open prairie, 6 inches from corner post painted "U. S. B. M. No. 80"; copper nail in hub, elevation 68.37 feet.....	29 41 47.37	95 30 00.82	2.61
Jeanetta, about 1 mile southeast of, about 150 feet south of old dredging machine in open prairie; copper nail in hub, witness stake painted "U. S. B. M. No. 81," elevation 72.18 feet.....	29 42 38.67	95 30 05.72	5.20
Jeanetta, about 1 mile southeast of, 300 feet west of ditch, in root of lone elm tree on prairie; copper nail, tree painted "U. S. B. M. No. 82," elevation 72.14 feet.....	29 42 52.55	95 30 07.05	1.41
Jeanetta, about 1 mile east of, 50 feet north of San Antonio & Aransas Pass Ry. truck, 1 foot from telephone pole painted "U. S. B. M. No. 83"; copper nail in hub, elevation 70.43 feet..	29 43 20.51	95 30 09.70	2.564

**ALIEF QUADRANGLE—Continued.****Along Jeanetta-Hillendahl road.**

Station.	Latitude.	Longitude.	Distance between stations.
Westheimer road, 1,700 feet north of Jeanetta-Hillendahl road, 25 feet north and 25 feet east of right angle bend in road, 6 inches from corner fence post painted "U. S. B. M. No. 149;" copper nail in hub, elevation 72.22 feet.....	° ' "	° ' "	Feet.....
Buffalo Bayou, Jeanetta-Hillendahl wagon road bridge over; center of floor, elevation 64.8 feet.....	29 44 30.71	95 31 22.37	.....

Magnetic declination for quadrangle, 8° 21' E.

**From Alief west along San Antonio & Aransas Pass Railway.**

San Antonio & Aransas Pass Ry. bridge No. 15.9; top of rail, elevation 85.2 feet.....			
Alief, about 1.1 miles west of, 36 feet north of wagon road, 35 feet south of railroad, 2 feet from telephone pole painted "U. S. B. M. 85"; copper nail in hub, elevation 81.97 feet.....	29 42 47.65	95 36 40.51	.....
San Antonio & Aransas Pass Ry. bridge No. 15.5; top of rail, elevation 86.2 feet.....			

**ALMEDA QUADRANGLE.****Along International & Great Northern Railway near north border of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Almeda, 0.8 mile north of International & Great Northern Ry. bridge 13; top of rail above ditch, elevation 56.4 feet.....	° ' "	° ' "	Feet.....
Almeda, 0.9 mile north of, 40 feet east of track; copper nail in hub 1 foot from telephone pole painted "U. S. B. M. 42," elevation 53.44 feet.....	29 36 59.31	95 25 04.05	.....
Almeda, 0.7 mile north of; center of track at road crossing.....	29 36 47.99	95 25 09.03	1,225
Almeda station, about 115 feet south and 90 feet east of, 30 feet north of east and west road, 2 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 21, 1915," elevation 61.962 feet.....	29 36 14.49	95 25 21.25	3,551
Almeda, about 0.6 mile east of, T road west.....	29 36 14.59	95 24 47.39	2,990
Almeda, about 0.75 miles southeast of, crossroads 35 feet northeast of; 1.5 feet east of telephone pole painted "U. S. B. M. 43," 2 feet from corner fence post; copper nail in hub, elevation 63.29 feet.....	29 35 56.13	95 24 47.12	1,865
Almeda, about 1.5 miles east by 0.3 mile south of, 25 feet north of center of road; 1 1/2 feet south of telephone pole painted "U. S. B. M. 44," copper nail in hub, elevation 63.41 feet.....	29 35 57.07	95 23 55.42	4,565
Almeda, about 2.4 miles east by 0.3 miles south of, 30 feet southwest of small bridge over ditch, 35 feet south of east and west road, 25 feet west of ditch, on top of small embankment inside of field; iron post stamped "Prim. Trav. Sta. No. 22, 1915," elevation 60.991 feet.....	29 35 57.10	95 23 02.71	4,654
Almeda, about 2.9 miles east by 0.6 miles south of, 20 feet south of east and west road; 1 foot from telephone pole painted "U. S. B. M. 45," copper nail in hub, elevation 58.18 feet.....	29 35 38.36	95 22 38.91	2,962

Magnetic declination near north border of quadrangle, 8° 27' E.

**ASHFORD QUADRANGLE.****From a point on Houston & Texas Central Railroad, 1.65 miles northwest of Satsuma, northeast along public road.**

Station.	Latitude.	Longitude.	Distance between stations.
Satsuma, 1.5 miles north and 0.5 mile west of, 15 feet south of center of road in open prairie; witness stake painted "U. S. B. M. 236"; copper nail in hub, elevation 128.08 feet.....	° ' "	° ' "	Feet.....
Satsuma, 1.75 miles north of, 50 feet south of public road, 80 feet southeast of small bridge; ash tree painted "U. S. B. M. 287"; copper nail in root, elevation 122.46 feet.....	29 55 29.04	95 35 50.89	3,167

## 546 TRIANGULATION AND PRIMARY TRAVERSE, 1913-1915.

## ASHFORD QUADRANGLE—Continued.

From a point on Houston & Texas Central Railroad, 1.65 miles northwest of Satsuma, northeast along public road—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Satsuma, 2.3 miles north and 0.8 mile east of, 35 feet north and 20 feet east of crossroads in open prairie; iron post stamped "Prim. Trav. Sta. No. 129, 1915," elevation 127.880 feet.....	29 55 57.94	95 35 04.44	Ft., 5,023
Satsuma, 2.6 miles north and 1.2 miles east of, 0.5 mile northeast of crossroads, near center line of road; oak tree painted "U. S. B. M. 288"; copper nail in root, elevation 128.74 feet.....	29 56 12.45	95 34 39.92	2,609
Satsuma, 3 miles north and 1.9 miles east of, 20 feet north of road; in root of oak tree on wire fence line, painted "U. S. B. M. 289"; copper nail, elevation 129.71 feet.....	29 56 36.75	95 34 00.87	4,223
Satsuma, 4 miles north and 2.1 miles east of, 25 feet north and 25 feet east of crossroads; iron post stamped "Prim. Trav. Sta. No. 130, 1915," elevation 128.763 feet.....	29 57 29.74	95 33 49.47	5,446
North Houston, 1.8 miles north and 1.5 miles west of, 1.3 miles west of Trinity & Brazos Valley Ry., 25 feet north of center of road in open prairie; witness stake painted "U. S. B. M. 290"; copper nail in hub, elevation 121.31 feet.....	29 57 12.61	95 32 51.42	5,392
North Houston, 1.5 miles north and 1.3 miles west of, 20 feet north and 5 feet east of crossroads, 1 foot from northeast corner of small bridge painted "U. S. B. M. 291"; copper nail in hub, elevation 123.26 feet.....	29 57 05.92	95 32 28.80	2,100
Satsuma, 3.4 miles north and about 4 miles east of, T road corners.....	29 56 56.34	95 31 56.69	2,946
North Houston, about 1.3 miles northwest of, 215 feet southeast of crossroads of West Montgomery road and Trinity & Brazos Valley Ry., 55 feet east of center of track, 30 feet west of public road, 6 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 131, 1915," elevation 121.672 feet.....	29 56 36.51	95 31 31.80	2,968
Pembie's store, 5.3 miles southwest of, Trinity & Brazos Valley Ry., and West Montgomery road crossing, 0.9 mile northeast of, 12 feet north of wire fence line which bears N. 57° E., true; oak tree painted "U. S. B. M. 292"; copper nail in root, elevation 121.15 feet.....	29 57 10.13	95 30 53.70	4,774
Pembie's store, 4.3 miles southwest of, Trinity & Brazos Valley Ry., and West Montgomery road crossing, 1.1 miles north and 1.4 miles east of, 1.5 miles southwest of "air line" road, 100 feet southeast of Einly Hargreaves' house; mulberry tree painted "U. S. B. M. 293"; copper nail in root, elevation 118.36 feet.....	29 57 37.41	95 30 05.53	5,055

## In northeast corner of quadrangle along Air-line road.

Cypress Creek Bridge, 0.7 mile southeast of, on Air-line road, 20 feet west of center of road, 3 feet from corner post, on fence line west; iron post stamped "Prim. Trav. Sta. No. 122, 1915," elevation 120.421 feet.....	29 59 54.65	95 30 22.90	.....
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## Southeast from crossing of Trinity &amp; Brazos Valley Railway and West Montgomery road.

North Houston station, about 0.7 mile north of, on West Montgomery road, 30 feet northeast of center of road, at junction of wire and board fences, 6 inches from corner fence post, painted "U. S. B. M. 294"; copper nail in hub, elevation 117.90 feet.....	29 56 09.02	95 30 55.81	.....
North Houston, about 0.5 mile N. 60° E. from, 20 feet southwest of center of road, 6 inches from corner post; on fence line west, painted "U. S. B. M. 295"; copper nail in hub, elevation 111.51 feet.....	29 55 36.73	95 30 13.96	4,905

## Along public road.

Satsuma, 1.7 miles northwest of, 50 feet north of railroad crossing, 30 feet south of road, 18 inches south of corner fence post; copper nail in hub, pole painted "U. S. B. M. 133," elevation 130.54 feet.....	29 54 52.51	95 37 11.33	.....
Satsuma, 0.75 mile northwest of, 800 feet northwest of milepost 19, 50 feet north of railroad, 30 feet south of road; 1 foot from telephone pole painted "U. S. B. M. 134"; copper nail in hub, elevation 121.81 feet.....	29 54 22.52	95 36 28.87	4,811
Satsuma, 75 feet south of store and post office, 150 feet northwest of station signboard, 80 feet north of railroad; iron post stamped "Prim. Trav. Sta. No. 64, 1915," elevation 120.704 feet.....	29 53 57.75	95 35 52.54	4,060
Private road crossing, 600 feet northeast of house, top of rail, elevation 121.6 feet.....	29 53 22.54	95 35 03.61	5,587
Satsuma, 1 mile southeast of, 50 feet west of T road north, 60 feet north of railroad, 30 feet south of road; 1 foot from telephone pole painted "U. S. B. M. 135"; copper nail in hub, elevation 117.22 feet.....			

**ASHFORD QUADRANGLE—Continued.****Along public road—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Satsuma, 2.1 miles southeast of, 60 feet northeast of railroad crossing, 35 feet south of T road southwest; 1 foot from fence corner post painted "U. S. B. M. 136"; copper nail in hub, elevation 112.95 feet.....	• ' "	• ' "	Feet.
Satsuma, 2.65 miles southeast of, 35 feet north of center of public road, 4 feet east of telephone pole; iron post stamped "Prim. Trav. Sta. No. 65, 1915," elevation 112.020 feet.....	29 52 48.73	95 34 15.58	5,435
	29 52 30.37	95 33 48.40	3,028

**Along highways near south border of quadrangle.**

Brink schoolhouse, about 4.3 miles east of, about 2.5 miles west of Houston & Texas Central R. R., 15 feet south of road, in open prairie; copper nail in hub, witness stake painted "U. S. B. M. 175," elevation 123.94 feet.....	29 52 44.89	95 36 41.91	.....
Brink schoolhouse, 5.3 miles east of, Houston & Texas Central R. R., 1.4 miles west of, 15 feet south of center of road in open prairie; copper nail in hub, witness stake painted "U. S. B. M. 176," elevation 120.24 feet.....	29 52 46.71	95 35 41.43	5,328
Houston & Texas Central R. R., 0.6 mile west of, 20 feet north of center of east and west road, 1 foot from fence line; copper nail in hub; witness stake painted "U. S. B. M. 177," no elevation.....	29 52 47.90	95 34 53.72	4,201

Magnetic declination for quadrangle, 8° 30' E.

**BELLAIRE QUADRANGLE.****Along highway in north half of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Houston, Blodgett subdivision, 320 feet southeast of intersection of Southern Pacific R. R. and San Antonio & Aransas Pass Ry. tracks, 30 feet from center of and in line with fence on south side of Fannin Street; iron post stamped "Prim. Trav. Sta. No. 6, 1915," elevation 53.693 feet.....	• ' "	• ' "	Feet.
Houston, Blodgett subdivision, crossing of Southern Pacific R. R. and San Antonio & Aransas Pass Ry.; top of rail at intersection 56.9 feet.....	29 43 54.36	95 22 59.13	.....
Montrose, northeast corner of intersection of Mount Vernon Avenue and Richmond Road; 6 inches from telephone pole painted "U. S. B. M. No. 11"; copper nail in hub, elevation 56.10 feet.....	29 43 54.56	95 23 02.78	323
Houston, city limits on Richmond Road, 20 feet north of center line of road at bend, 28 feet north of mail box No. 13; at corner post on fence line west; copper nail in hub, "U. S. B. M. No. 12," elevation 56.56 feet.....	29 44 03.15	95 23 36.61	3,105
Houston, 1,800 feet west of city limits, intersection of north and south road and Richmond Road.....	29 44 02.44	95 24 45.90	6,109
Houston, 1,800 feet west of city limits, 230 feet west of John Smith schoolhouse, 25 feet south of Westheimer road, 5 feet from corner of blacksmith shop; iron post stamped "Prim. Trav. Sta. No. 7, 1915," elevation 60.211 feet.....	29 43 50.57	95 25 06.70	2,191
Houston, about 1.25 miles west of city limits, on Westheimer road, on south end of west side of stone culvert; chiseled square, "U. S. B. M. No. 13," elevation 64.49 feet.....	29 44 30.99	95 25 06.81	4,083
Railroad crossing, Stella cut off; top of rail, elevation 67.4 feet.....	29 44 29.82	95 26 00.90	4,770
Houston, about 2.1 miles west of city limits, 80 feet west of railroad, 20 feet north of road; 1 foot from telephone pole painted "U. S. B. M. No. 14"; copper nail in hub, elevation 64.75 feet.....	29 44 29.01	95 26 53.84	4,668
Houston, 3 miles west of city limit, 200 feet west of Post Oak schoolhouse, opposite Fairview store, 1 foot from fence, 30 feet south of road; iron post stamped "Prim. Trav. Sta. No. 8, 1915," elevation 65.862 feet.....	29 44 25.64	95 27 41.22	4,190
Houston, 4.1 miles west of city limit, on Westheimer road, 1 mile west of Fairview store, 60 feet east of V. S. Ulrich's mail box; 6 inches from telephone pole painted "U. S. B. M. No. 15"; copper nail in hub, elevation 65.10 feet.....	29 44 15.06	95 28 37.68	5,091
Houston, 5.2 miles west of city limit, about 2 miles west of Fairview store, at east end of railing of small wooden bridge; copper nail in hub, "U. S. B. M. No. 16," elevation 70.43 feet.....	29 44 14.45	95 29 43.85	5,833

## BELLAIRE QUADRANGLE—Continued.

## Along highways in south half of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Missouri City, 2.65 miles northeast of, 25 feet northwest of center of road, 50 feet southeast of center of Southern Pacific R. R. track, 1 foot from wire fence line; iron post stamped "Prim. Trav. Sta. No. 17, 1915," elevation 70.391 feet.....	* * "	* * "	
Missouri City, 3.5 miles northeast of, 50 feet southeast of Southern Pacific R. R. track, 40 feet northwest of shell road; 2 feet from telephone pole, painted "U. S. B. M. No. 33"; copper nail in hub, elevation 70.30 feet.....	29 38 03.35	95 29 52.12	5,622
Missouri City, 4.2 miles northeast of, 40 feet southeast of Southern Pacific R. R. track, 40 feet northeast of road, 400 feet west of house; 2.5 feet from telephone pole painted "U. S. B. M. No. 34"; copper nail in hub, elevation 69.60 feet.....	29 38 21.34	95 29 05.71	4,482
Missouri City, 4.2 miles northeast of, 25 feet northwest of road, 55 feet southeast from Southern Pacific R. R. track, about 350 feet northeast of signboard "Station 1 mile"; 1 foot from wire fence; iron post stamped "Prim. Trav. Sta. No. 18, 1915," elevation 69.056 feet.....	29 38 39.31	95 28 19.01	4,502
Missouri City, 5.6 miles northeast of, 45 feet southeast of Southern Pacific R. R., about 70 feet southeast from shell road crossing of railroad; 3 feet from telephone pole painted "U. S. B. M. No. 35"; copper nail in hub, elevation 66.49 feet.....	29 38 56.08	95 27 35.24	4,218
Stella, 2.5 miles southwest of, 2,000 feet southwest of section house, 50 feet southeast of Southern Pacific R. R. track, 20 feet northwest of second-class road; 2 feet from telephone pole painted "U. S. B. M. No. 36"; copper nail in hub, elevation 65.56 feet.....	29 39 09.40	95 27 00.88	3,317
Stella, 1.8 miles southwest of, opposite signboard "1 mile to station," 42 feet southeast of center of Southern Pacific R. R. track; iron post stamped "Prim. Trav. Sta. No. 19, 1915," elevation 60.251 feet.....	29 39 27.97	95 26 12.79	4,640
Stella, 0.4 mile southwest of, 275 feet southwest of whistle post, 50 feet southeast of Southern Pacific R. R. track; 1.5 feet from post in right-of-way fence, painted "U. S. B. M. No. 37"; copper nail in hub, elevation 50.04 feet.....	29 40 01.93	95 24 25.02	5,523
Stella station; top of rail opposite semaphore, elevation 56.7 feet.....	29 40 13.84	95 23 47.16	3,551

## Along International &amp; Great Northern Railway.

Pierce Junction, 332 feet south of, 35 feet east of track, 35 feet west of center of public road; 1 foot from telephone pole painted "U. S. B. M. No. 38"; copper nail in hub, elevation 52.45 feet.....	29 40 10.63	95 23 47.99	332
Pierce Junction, 0.9 mile south of, 40 feet east of track, 150 feet south of sign "1 mile to R. R. crossing"; 1 foot from telephone post painted "U. S. B. M. No. 39"; copper nail in hub, elevation 50.28 feet.....	29 39 28.32	95 24 04.70	4,492
Pierce Junction, 1.75 miles south of, 900 feet south of switch, 40 feet east of track; 1 foot from telephone pole painted "U. S. B. M. No. 40"; copper nail in hub, elevation 56.92 feet.....	29 38 46.53	95 24 21.45	4,501
Almeda, 2.6 miles north of, 48 feet east of track, opposite mile board No. 9, nearly opposite white house west of road; iron post stamped "Prim. Trav. Sta. No. 20, 1915"; elevation 56.100 feet.....	29 38 27.50	95 24 28.91	2,030
Almeda, 2.1 miles north of, I. & G. N. Ry. bridge No. 17; top of rail, elevation 55.9 feet.....			
Almeda, 1.8 miles north of, 450 feet north of T road west to white house, 35 feet east of track; 1 foot from telephone pole painted "U. S. B. M. No. 41"; copper nail in hub, elevation 55.46 feet.....	29 37 44.09	95 24 46.29	4,645
Blodgett, 1 mile south of, on south end of east side of Southern Pacific R. R. bridge 5 C; copper nail and washer painted "U. S. B. M. No. 66," elevation 52.94 feet.....	29 43 05.80	95 22 48.45	
Southern Pacific R. R. bridge over Brays Bayou, No. 6 A; top of rail, elevation 51.4 feet.....			

## Along Southern Pacific Railroad.

Blodgett, 2 miles south of, 50 feet north of T road west, 30 feet west of Almeda road; 1 foot from telephone pole painted "U. S. B. M. No. 67"; copper nail in hub, elevation 48.37 feet.....	29 42 14.29	95 23 05.60	5,418
Blodgett, 2.6 miles south of, about 450 feet west of small bungalow on east side of road, in fence corner, 35 feet northeast of T road east to house; iron post stamped "Prim. Trav. Sta. No. 33, 1915," elevation 50.934 feet.....	29 41 49.77	95 23 13.27	2,567
Pierce Junction, about 1 mile northeast of, on east side of track and west side of Almeda road, 1 foot from telephone pole painted "U. S. B. M. No. 68"; copper nail in hub, elevation 50.59 feet.....	29 41 03.56	95 23 29.78	4,880

**BELLAIRE QUADRANGLE**—Continued.**Along Southern Pacific Railroad**—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Pierce Junction, about 0.3 mile north and 0.9 mile east of, 80 feet south of signboard "R. R. crossing 1 mile," 45 feet southeast from center of railroad track; iron post stamped "Prim. Trav. Sta. No. 34, 1915," elevation 52.612 feet.....	° ' "	° ' "	Feet.
Jeannetta, about 1.5 miles east of, 0.4 mile north of railroad track, in open prairie, 50 feet west of drainage ditch; copper nail in hub, witness stake painted "U. S. B. M. No. 84," elevation 69.95 feet.....	29 40 29.97	95 22 51.80	.....
	29 43 42.97	95 29 44.12	.....

**Near north border of quadrangle.**

Houston, intersection of Westheimer and Shepherd dam roads, 30 feet north and 30 feet west of, 6 inches from corner fence post painted "U. S. B. M. 148"; copper nail in hub, elevation 58.63 feet.....	29 44 32.55	95 24 38.54	.....
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Magnetic declination in quadrangle, 8° 13' E.

**BURNETT BAY QUADRANGLE.****Along public road between Crosby and Lynchburg.**

Station.	Latitude.	Longitude.	Distance between stations.
Crosby, 3.0 miles south and 0.4 mile east of, 25 feet west of road, 30 feet south of drain pipe under road, 1 foot east of telephone pole painted "U. S. B. M. 382"; copper nail in hub, elevation 46.01 feet.....	° ' "	° ' "	Feet.
Crosby, 3.5 miles south and 0.5 mile east of, 1,100 feet south of angle in road, 25 feet west of road and 15 feet north of gateway, 2½ feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 164, 1915," elevation 49.148 feet.....	29 51 55.86	95 03 40.50	.....
Crosby, 4.2 miles south and 0.6 mile east of, 250 feet northeast of a residence, 25 feet west of road at wire fence line; pine tree painted "U. S. B. M. 382"; copper nail in root, elevation 46.80 feet.....	29 51 30.09	95 03 34.44	2,658
Crosby, 5.3 miles south and 0.6 mile east of, 140 feet south of south end of bridge, 25 feet east of road; willow tree painted "U. S. B. M. 384"; copper nail in root, elevation 22.76 feet.....	29 50 54.26	95 03 30.50	3,638
Elena post office, 250 feet south of, 150 feet south of canal at San Jacinto Rice Co.'s plantation, 25 feet west of road and 10 feet south of gateway iron post stamped "Prim. Trav. Sta. No. 165, 1915," elevation 44.723 feet.....	29 49 55.21	95 03 27.06	5,971
Elena, 0.6 mile south of; crossroads.....	29 49 35.28	95 03 27.06	2,015
Elena, 0.9 mile south of, 1,870 feet south of crossroads, 25 feet east of road; persimmon tree painted "U. S. B. M. 385"; copper nail in root, elevation 41.03 feet.....	29 49 06.89	95 03 26.50	2,871
Elena, 1.9 miles south and 0.1 mile east of, 25 feet west of road; oak tree painted "U. S. B. M. 386"; copper nail in root, elevation 39.40 feet.....	29 48 48.55	95 03 25.64	1,856
Lynchburg, 1.75 miles north and 1.25 miles east of, 25 feet west and 20 feet north of T road east, 3 feet from fence line; iron post stamped "Prim. Trav. Sta. No. 166, 1915," elevation 39.431 feet.....	29 47 57.94	95 03 22.18	5,122
Lynchburg, 1 mile north and 0.9 mile east of, 35 feet west of center of road, in woods; ash tree painted "U. S. B. M. 387"; copper nail in root, elevation 4.08 feet.....	29 47 22.89	95 03 28.16	3,581
Lynchburg, 0.1 mile north and 1,800 feet east of, on what is known as Tory Hill, the northeast corner of fence around the residence of E. Sandow is distant 102 feet and the southeast corner of fence is distant 54.5 feet. Station is marked by a U. S. Corps of Engineers standard station mark, elevation 28.121 feet. There are two U. S. Corps of Engineers standard reference marks set flush with the ground, one 105.6 feet N. 89° 40' W., in line with a large cedar tree 138 feet from the station, and the other 83.6 feet N. 0° 50' W., in line with a large hackberry tree, 34 feet from the station.....	29 46 41.35	95 03 49.63	4,604
Lynchburg, about 0.4 mile south and 0.5 mile west of, about 1,500 feet north of San Jacinto battleground reservation, 200 feet north of schoolhouse, 70 feet north of road to ferry and 140 feet west of Lynchburg-Deer Park road; cottonwood tree painted "U. S. B. M. 388"; copper nail in root, elevation 5.90 feet.....	29 45 57.47	95 04 23.51	5,347
	29 45 33.35	95 05 15.76	5,210

## BURNETT BAY QUADRANGLE—Continued.

Along public road between Crosby and Lynchburg—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Lynchburg, 1.25 miles west of, 0.6 mile northwest of upper ferry across ship channel, 25 feet northeast of center of road, on bluff at edge of old river channel; elm tree painted "U. S. B. M. 389"; copper nail in root, elevation 26.72 feet.....	29 45 45.40	95 05 57.10	Fed. 3,841
Floor of bridge over drain, elevation 7.2 feet.....			
Lynchburg, 0.3 mile north and 2.1 miles west of, 20 feet south of road at edge of pine woods, 480 feet west of bridge over ravine; iron post stamped "Prim. Trav. Sta. No. 167, 1915," elevation 32.804 feet.....	29 46 09.04	95 06 48.42	5,116

## Near west border of quadrangle.

Lynchburg, 1.5 miles north and 2.75 miles west of, 25 feet east of center of road; pine tree painted "U. S. B. M. 406"; copper nail in root, elevation 40.40 feet.....	29 47 11.44	95 07 28.23	7,214
Lynchburg, 2.5 miles north and 2.7 miles west of, 25 feet east of road and 10 feet south of a private road east; 3 feet from tall post at gateway; iron post stamped "Prim. Trav. Sta. No. 175, 1915, elevation 44.345 feet.....	29 48 06.14	95 07 25.97	5,528
Sheldon, 1,800 feet northeast of, 50 feet southeast of center of road; oak tree painted "U. S. B. M. 344"; wire nail in root, elevation 49.70 feet.....	29 52 26.12	95 06 48.05	
Sheldon, 500 feet southwest of Texas & New Orleans station, 75 feet south of track, on west end of steel culvert, in top of pine post; copper nail painted "U. S. 49.5 B. M.," elevation 49.70 feet.....			
Sheldon, opposite operator's window, top of nearest rail, elevation 52.5 feet.....			
Lynchburg, 0.3 mile north by 2.6 miles west of crossroads, in floor of wooden culvert, southwest corner; copper nail painted "U. S. 34.7 B. M.," elevation 34.93 feet.....			

## Near northeast border of quadrangle.

Crosby, 2.25 miles south and 2.7 miles east of, T road easterly.....	29 52 15.30	95 01 02.33	
Crosby, 2.5 miles south and 3 miles east of, 25 feet northeast of center of road; 1 foot west of telephone pole painted "U. S. B. M. 424"; copper nail in hub, elevation 42.70 feet.....	29 52 00.29	95 00 44.88	2,159

## Along Cedar Bayou-Lynchburg road.

Lynchburg, 0.9 mile south and 2.5 miles east of, near place formerly known as Wooster, in front of house of Junius Brown, 20 feet south of road, in top of concrete horse block; bronze tablet stamped "Prim. Trav. Sta. No. 185, 1915," elevation 30.162 feet.....	29 45 03.24	95 02 00.28	
Lynchburg, 0.15 mile south and 2.8 miles east of, 20 feet east of center of road; oak tree painted "U. S. B. M. 439"; copper nail in root, elevation 31.28 feet.....	29 45 43.83	95 01 55.10	4,286
Lynchburg, 0.5 mile north and 2.8 miles east of, 20 feet west of road; oak tree painted "U. S. B. M. 440"; copper nail in root, elevation 32.50 feet.....	29 46 19.55	95 01 55.16	3,608
Lynchburg, 1.5 miles north and 2.8 miles east of, 20 feet south and 25 feet east of T road south, 20 feet west of rice irrigation canal, 15 feet north of corner fence post; iron post stamped "Prim. Trav. Sta. No. 186, 1915," elevation 37.123 feet.....	29 47 12.13	95 01 55.63	5,311
Lynchburg, 1.6 miles north and 2 miles east of, 20 feet north of center of road; oak tree on wire fence line painted "U. S. B. M. 441"; copper nail in root, elevation 35.94 feet.....	29 47 17.53	95 02 45.98	4,470

Magnetic declination for west side of quadrangle,  $8^{\circ} 15' E.$ ; for center,  $8^{\circ} 10' E.$ ; for northeast quarter,  $8^{\circ} 10' E.$ ; for southeast quarter,  $8^{\circ} 10' E.$ .

## CEDAR BAYOU QUADRANGLE.

Along Crosby-Cedar Bayou road.

Station.	Latitude.	Longitude.	Distance between stations.
Cedar Bayou post office, 7 miles north and 4.2 miles west of, 25 feet northeast of road, 30 feet northwest of gateway at entrance to farmyard; 1 foot from telephone pole painted "U. S. B. M. 425"; copper nail in hub, elevation 40.58 feet.....	• ' "	• ' "	Fed.
Cedar Bayou post office, 6.4 miles north and 3.5 miles west of, 1.170 feet northwest of angle in road, 25 feet southwest of road, 10 feet southeast of gateway, nearly opposite frame house across road; iron post stamped "Prim. Trav. Sta. No. 179, 1915," elevation 41.265 feet.....	29 51 20.33	94 59 59.51	.....
Cedar Bayou post office, 6.4 miles north and 2.6 miles west of, 25 feet north and 25 feet east of T road south, under wire fence line; 2 feet east of telephone pole painted "U. S. B. M. 426"; copper nail in hub, elevation 36.00 feet.....	29 50 42.75	94 59 17.59	5,295
Cedar Bayou post office, 5.5 miles north and 2.4 miles west of, 30 feet northeast of center of road, opposite frame house across road; 18 inches northeast of telephone pole painted "U. S. B. M. 427"; copper nail in hub, elevation 37.32 feet.....	29 50 42.42	94 58 23.66	4,750
Cedar Bayou post office, 4.6 miles north and 2.3 miles west of, 40 feet south and 10 feet west of crossroads, 12 feet southwest of corner of small bridge; iron post stamped "Prim. Trav. Sta. No. 180, 1915," elevation 37.039 feet.....	29 49 52.36	94 58 12.90	5,145
Cedar Bayou post office, 3.8 miles north and 2.1 miles west of, Ellis League brick schoolhouse, No. 15, in lower concrete step, southwest corner, painted "U. S. B. M. 428"; chiseled square, elevation 38.00 feet.....	29 49 24.41	94 58 07.56	2,863
Cedar Bayou post office, 3.8 miles north and 2 miles west of, T road south.....	29 48 27.89	94 57 53.53	5,842
Cedar Bayou post office, 2.9 miles north and 1.35 miles west of, 40 feet east of road at forks; 1 foot west of telephone pole painted "U. S. B. M. 429"; copper nail in hub, elevation 32.50 feet.....	29 48 28.10	94 57 43.85	855
Cedar Bayou post office, 2.15 miles north and 1.5 miles west of, 45 feet east and 20 feet south of crossroads, 3 feet north of corner fence post; iron post stamped "Prim. Trav. Sta. No. 181, 1915," elevation 34.970 feet.....	29 47 49.94	94 57 35.17	3,940
Cedar Bayou post office, 2 miles north and 1 mile west of; crossroads.....	29 47 27.50	94 57 17.19	2,757
Cedar Bayou post office, 1.8 miles north and 0.9 miles west of, 1,500 feet northwest of forks or road, 30 feet southeast of road, close to fence line; 1 foot southeast of telephone pole painted "U. S. B. M. 430"; copper nail in hub, elevation 30.57 feet.....	29 46 50.99	94 56 47.99	4,497
Cedar Bayou post office, 0.9 mile north and 0.6 mile west of, 30 feet north and 30 feet west of crossroads; 1 foot south of large corner fence post painted "U. S. B. M. 431"; copper nail in hub, elevation 32.16 feet.....	20 46 43.65	94 56 41.68	926
Cedar Bayou post office, 1 mile north of, 30 feet north of center of road and just west of angle in road; oak tree painted "U. S. B. M. 432"; copper nail in root, elevation 25.24 feet.....	20 46 02.04	94 55 45.29	3,355
Cedar Bayou post office, 1 mile north and 0.6 mile east of, 1 mile east of ferry across bayou, at forks of road, 115 feet S. 16° W. from corner of R. J. Tompkin's house; iron post stamped "Prim. Trav. Sta. No. 182, 1915," elevation 23.553 feet.....	20 46 04.54	94 55 12.35	2,914
Cedar Bayou post office, 0.3 mile north and 0.2 mile east of, 900 feet northeast of Masonic Hall, 15 feet southeast of road on top of concrete culvert wall, painted "U.S.B.M. 433"; chiseled square, elevation 21.03 feet.....	20 45 25.54	94 55 36.54	4,480
Cedar Bayou post office, about 550 feet northeast of, in top of east end of concrete culvert; chiseled square painted "U. S. B. M.," elevation 6.41 feet.....			

Magnetic declination for center of quadrangle, 8° 07' E.; for south side, 8° 02' E.

## CLOCINE QUADRANGLE.

Along San Antonio &amp; Aransas Pass Railway.

Station.	Latitude.	Longitude.	Distance between stations.
Alief, 2 miles west of, 30 feet north of wagon road, 40 feet south of railroad, 1 foot from telephone pole milepost 17; copper nail in hub, pole painted "U. S. B. M. 86"; elevation 83.52.....	• ' "	• ' "	Fed.
Clocine, 2.7 miles east of, 45 feet northeast of T road north, 55 feet southeast of railroad crossing north and south road, 1 foot from fence corner, 200 feet west of milepost 18; iron post stamped "Prim. Trav. Sta. 40, 1915, 85," elevation 85.498.....	29 42 43.15	95 37 35.41	.....
	29 42 38.08	95 38 36.98	5,453

## CLOCINE QUADRANGLE—Continued.

## Along San Antonio &amp; Aransas Pass Railway—Continued.

Station.	Latitude.	Longitude.	Distance between stations.	
	°	'	"	Feet.
San Antonio & Aransas Pass Ry. bridge 18.5 top of rail, elevation 89.1.....				
Clodine, 1.7 miles east of, 50 feet northeast of T road north, 40 feet southeast of railroad crossing, 1 foot from fence corner post, 250 feet northeast of a small bungalow; copper nail in hub, post painted "U. S. B. M. 87," elevation 89.850.....	29 42 33.30	95 39 36.70	5,290	
Clodine, 1 mile east of, 49 feet north of railroad track, 20 feet south of wagon road, about 200 feet south of small yellow house; copper nail in hub, "U. S. B. M. 88," elevation 93.53.....	29 42 30.98	95 40 16.10	3,483	
Clodine station, about 1,000 feet northeast of, at corner of county; a concrete monument 12 inches square and 15 inches above ground marked "10 miles," no elevation.....	29 42 34.62	95 41 09.23	4,700	
Clodine, about 240 feet south of road crossing, which is 140 feet west of San Antonio & Aransas Pass Ry. station, 25 feet west of center of north and south road and about 1.5 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 41, 1915," elevation 95.202 feet.....	29 42 22.98	95 41 17.10	1,364	

## Along Clodine-Barker road.

Station.	Latitude.	Longitude.	Distance between stations.	
	°	'	"	Feet.
Clodine, 1 mile north of, 25 feet west of center of road, 3 feet south of fence corner at fence line west; copper nail in hub, post painted "U. S. B. M. 89," elevation 93.24.....	29 43 16.50	95 41 16.50	5,416	
Clodine, about 2 miles north of, 50 feet north of T road corners, roads east, west, and north, 1 foot from fence post; copper nail in hub, post painted "U. S. B. M. 90," elevation 92.12.....	29 44 06.06	95 41 16.30	4,896	
Clodine, about 2.7 miles north of, 2.6 miles south of Barker, 0.7 mile south of bridge over Buffalo Bayou, on east side of road, close to wire fence, opposite small wooden bridge; iron post stamped "Prim. Trav. Sta. No. 42, 1915," elevation 87.716.....	29 44 46.61	95 41 06.17	4,291	

Magnetic declination for north half of quadrangle, 8° 30' E.

## CROSBY QUADRANGLE.

## Along Huffman-Crosby road.

Station.	Latitude.	Longitude.	Distance between stations.	
	°	'	"	Feet.
Crosby, 5.5 miles north and 1.4 miles west of, 20 feet west of center of road, on south side of private road west, opposite gate on east side of road, 1 foot north of telephone pole, painted "U. S. B. M. 336;" wire nail in hub, elevation 63.58 feet.....	29 50 20.44	95 05 29.33		
Crosby, 4.6 miles north and 1.2 miles west of, 100 feet north of a fence corner 25 feet west of road, 1 foot east of telephone pole painted "U. S. B. M. 337;" wire nail in hub, elevation 64.37 feet.....	29 58 35.27	95 05 18.60	4,660	
Crosby, 4.1 miles north and 1.1 miles west of, 30 feet east and 30 feet south of T road east, 3 feet southeast of corner fence post; iron post stamped "Prim. Trav. Sta. No. 146, 1915," elevation 60.775 feet.....	29 58 08.97	95 05 11.92	2,722	
Crosby, 3.7 miles north and 1 mile west of; T road west, near Gum Gulley schoolhouse.....	29 57 45.17	95 05 07.45	2,438	
Crosby, 3.2 miles north and 0.8 mile west of, 3,000 feet south of Gum Gulley schoolhouse, 30 feet west of center of road, at north end of gate; 6 inches from gate post, painted "U. S. B. M. 338;" wire nail in hub, elevation 57.48 feet.....	29 57 19.10	95 04 58.46	2,907	
Crosby, 2.3 miles north and 0.4 mile west of, 50 feet east of road at angle; gum tree painted "U. S. B. M. 339;" wire nail in root, elevation 55.77 feet.....	29 56 44.44	95 04 32.37	3,963	
Crosby, 1.5 miles north and 0.3 mile west of, 30 feet west of public road and nearly opposite a residence on east side of road, 10 feet north of gate into field, and 4 feet west of fence line; iron post stamped "Prim. Trav. Sta. No. 147, 1915," elevation 53.907 feet.....	29 55 52.00	95 04 22.86	5,364	
Crosby, 0.7 mile north of, 160 feet south of T road east, 40 feet west of center of road; pine tree painted "U. S. B. M. 340;" wire nail in root, elevation 50.07 feet.....	29 55 10.05	95 04 14.68	4,302	
Crosby station, Texas & New Orleans R. R., 100 feet northeast of, public road crossing.....	29 54 34.11	95 04 06.12	3,710	
Crosby, 410 feet southeast of road crossing, on top of concrete culvert guard wall, east side of culvert, 6 inches from north end of wall; chiseled square painted "U. S. B. M. 341," elevation 49.35 feet.....	29 54 31.03	95 04 03.14	107	

## CROSBY QUADRANGLE—Continued.

Along Crosby-Houston road.

Station.	Latitude.	Longitude.	Distance between stations.
Crosby, 1.1 miles south and 0.3 mile east of, 30 feet west of center of road, 15 feet east of fence line, 3 feet northwest of telephone pole; iron post stamped "Prim. Trav. Sta. No. 148, 1915," elevation 49.913 feet.....	29 53 36.82	95 03 48.67	Feet. 5,823
Crosby, 2 miles south and 0.3 mile east of, 30 feet south and 25 feet east of intersection of roads; top of wing wall of concrete culvert, painted "U. S. B. M. 342;" chiseled square, elevation 45.88 feet.	29 52 46.40	95 03 47.43	5,096
Crosby, 2.1 miles south and 0.8 mile west of, about 0.8 mile east of San Jacinto River, 30 feet south of public road near bend; gum tree painted "U. S. B. M. 343;" wire nail in root, elevation 19.17 feet.....	29 52 45.83	95 04 54.01	5,863
Crosby, 2.3 miles south and 1.7 miles west of 680 feet west of center pier of iron bridge over San Jacinto River, 20 feet north of center of road; iron post stamped "Prim. Trav. Sta. No. 149, 1915," elevation 27.407 feet.....	29 52 33.64	95 05 47.08	4,831

## Near southeast corner of quadrangle.

Sheldon, about 0.5 mile north and 1,000 feet west of, 6 feet east of road in woods; oak tree painted "U. S. B. M. 348;" wire nail in root, elevation 29.51 feet.....	29 52 46.10	95 07 17.53	.....
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## Along road toward Cedar Bayou and north near east side of quadrangle.

Crosby, 2.0 miles south and 1.25 miles east of, 25 feet south of road at lane south; 8 inches south of telephone pole painted "U. S. B. M. 422;" copper nail in hub, elevation 54.68 feet.....	29 52 47.00	95 02 49.37	.....
Crosby, 2.3 miles south and 2.0 miles east of, 30 feet north and 35 feet east of crossroads; 6 inches east of telephone pole painted "U. S. B. M. 423;" copper nail in hub, elevation 48.90 feet.....	29 52 35.25	95 02 08.58	3,782
Crosby, 2.3 miles south and 2.7 miles east of; at angle in road, 35 feet northeast of center of road going to Cedar Bayou and 65 feet east of T road north, 4 feet west of corner fence post at angle in fence; iron post stamped "Prim. Trav. Sta. No. 178, 1915," elevation 47.051 feet.....	29 52 35.57	95 01 24.56	3,876
Crosby, 1.5 miles south and 2.7 miles east of, 25 feet north and 25 feet west of crossroads; 1 foot north of corner fence post painted "U. S. B. M. 479;" copper nail in hub, elevation 49.43 feet.....	29 53 15.63	95 01 25.97	4,050
Crosby, 0.75 mile south of, and 2.6 miles east of, 100 feet southwest of schoolhouse, 25 feet north and 25 feet east of T road north; 6 inches southwest of corner fence post, painted "U. S. B. M. 480;" copper nail in hub, elevation 50.98 feet.....	29 53 54.91	95 01 29.38	3,980
Crosby, 2.5 miles east of, 30 feet north and 30 feet east of T road west, in open prairie; iron post stamped "Prim. Trav. Sta. No. 200, 1915," elevation 53.753 feet.....	29 54 40.20	95 01 39.47	4,661
Crosby, 0.9 miles north and 2.3 miles east of, 20 feet east of road at fence lines north and east; 1 foot west of corner fence post painted "U. S. B. M. 481;" copper nail in hub, elevation 55.23 feet.....	29 55 21.96	95 01 48.89	4,301
Crosby, 1.8 miles north and 2.1 miles east of, 50 feet south of Texas & New Orleans R. R., 20 feet north of public road at T road south; 1 foot east of telephone pole painted "U. S. B. M. 482;" copper nail in hub, elevation 55.55 feet.....	29 56 09.90	95 02 00.18	4,945
Crosby, 2.3 miles north and 2.7 miles east of, 30 feet south of public road and 75 feet west of corner of schoolhouse, 8 feet northeast of corner fence post; iron post stamped "Prim. Trav. Sta. No. 201, 1915," elevation 51.718 feet.....	29 56 35.82	95 01 25.48	4,022
Crosby, 2.9 miles north and 3.7 miles east of, 60 feet south of Texas & New Orleans R. R., 20 feet north of public road, at southwest end of gate; 1 foot south of gate post painted "U. S. B. M. 483;" copper nail in hub, elevation 57.18 feet.....	29 57 06.25	95 00 46.65	4,595
Crosby, 3.5 miles north and 4 miles east of, 40 feet south of center of road; pine tree painted "U. S. B. M. 484;" copper nail in root, elevation 66.74 feet.....	29 57 36.17	95 00 05.76	4,690
Crosby, 3.6 miles north and 3.4 miles east of, 90 feet west of road; sassafras tree painted "U. S. B. M. 485;" copper nail in root, elevation, 60.19 feet.....	29 57 40.52	95 00 44.56	3,442
Crosby, 3.5 miles north and 2.8 miles east of; T road corner east, west, and north.....	29 57 37.79	95 01 16.21	2,799
Crosby, 3.8 miles north and 2.8 miles east of, 30 feet east of road; 6 inches west of corner fence post painted "U. S. B. M. 486;" copper nail in hub, elevation 60.30 feet.....	29 57 55.25	95 01 17.43	1,768
Crosby, 4.8 miles north and 2.8 miles east of, 35 feet west of road, on small mound in open prairie; iron post stamped "Prim. Trav. Sta. No. 203, 1915," elevation 65.594 feet.....	29 58 47.25	95 01 18.95	5,256
Crosby, 5.6 miles north and 2.6 miles east of, 830 feet west of right angle in road, 35 feet north of road; ash tree painted "U. S. B. M. 487;" copper nail in root, elevation 62.38 feet.....	29 59 28.87	95 01 28.60	4,200

## CROSBY QUADRANGLE—Continued.

On prairie west of Cedar Bayou.

Station.	Latitude.	Longitude.	Distance between stations.
Crosby, 5.6 miles north and 2 miles east of, at north edge of prairie and south edge of timber fringing Cedar Bayou; ash tree painted "U. S. B. M. 488," copper nail in root, elevation 60.39 feet.....	* * 29.15	* * 95.02 07.89	Fect. 3,456
Crosby, 6 miles north and 1.4 miles east of, group of about 23 small gum trees on prairie, one of which is painted "U. S. B. M. 489"; copper nail in root, elevation 62.77 feet.....	29 59 48.79	95 02 42.42	3,628

## On unchecked spur line west from Crosby-Huffman road.

Crosby, 2.7 miles north and 0.6 mile west of T road corner north, south, and west.....	29 56 56.18	95 04 39.73	.....
Crosby, 2.7 miles north and 1.2 miles west of, near center of road; pine tree painted "U. S. B. M. 542," copper nail in root, elevation 58.07 feet.....	29 56 55.86	95 05 16.31	3,218
Crosby, 2.6 miles north and 2.15 miles west of, 50 feet south of small house and 25 feet north of road; oak tree painted "U. S. B. M. 543," copper nail in root, elevation 64.45 feet.....	29 56 53.02	95 06 15.92	5,252
Crosby, 2.8 miles north and 3 miles west of, in thick woods, 78 feet south of a wire fence, which bears about 5° south of west, north side of a dirt road, iron post stamped "Prim. Trav. Sta. No. 223, 1915," elevation 68.772 feet .....	29 56 52.28	95 07 06.19	4,424

## Near Crosby.

Crosby, Texas & New Orleans R. R. station, opposite operator's window; top of rail, elevation 48.8 feet.....	.....	.....	.....
Crosby, 3.3 miles northeast of, 1.6 miles northeast of Adlong schoolhouse, at T road northwest, 100 feet south of cattle guard 337B, 75 feet southeast of Texas & New Orleans R. R. track; in top of sawed-off post; copper nail painted "U. S. 59.4 B. M.," elevation 59.29 feet.....	.....	.....	.....
Crosby, 2.75 miles north of, at private T road west, 400 feet southeast of frame dwelling, west side of culvert, southwest corner of wooden bridge, in floor; copper nail painted "U. S. 58.6 B. M.," elevation 58.68 feet.....	.....	.....	.....

Magnetic declination for northwest quarter of quadrangle, 8° 30' E.; for center, 8° 26' E.; for east side, 8° 23' E.; for south side; 8° 23' E.

## CYPRESS QUADRANGLE.

Along Washington road.

Station.	Latitude.	Longitude.	Distance between stations.
Cypress, 3.3 miles northwest of, about 800 feet east of mile board "1 mile to Swanson," 25 feet south of center of road and 50 feet north of railroad, 8 inches from telephone pole; copper nail in hub, pole painted "U. S. B. M. 114," elevation 157.83 feet.....	* * 22.21	* * 95 44 46.91	.....
Cypress, 2.3 miles northwest of, about halfway between mileposts 28 and 29, 60 feet north of Houston & Texas Central R. R., 30 feet south of public road, 2 feet north of telephone pole; iron post stamped "Prim. Trav. Sta. No. 55, 1915," elevation 155.826 feet..	25 59 04.30	95 43 59.45	4,548
Azimuth from primary traverse station 55 to church steeple equals 233° 50'.....			
Cypress, 1.2 miles northwest of, 60 feet north of Houston & Texas Central R. R., 50 feet south of public road, 1 foot from telephone pole; copper nail in hub, pole painted "U. S. B. M. 115," elevation 154.13 feet.....	29 58 39.14	95 42 52.96	6,377
Cypress, 0.5 mile northwest of, 25 feet south of wagon road, 60 feet north of track, 1 foot from telephone pole; copper nail in hub, pole painted "U. S. B. M. 116," elevation 152.14 feet.....	29 58 25.63	95 42 17.79	3,381
Cypress, 140 feet east of station, Houston & Texas Central R. R., 50 feet north of center of track, 20 feet south of center of road, 3 feet west of telephone post, 3 feet north of fence line, 60 feet southwest of corner of Jnernen's saloon; iron post stamped "Prim. Trav. Sta. No. 56, 1915," elevation 150.275 feet .....	29 58 08.21	95 41 52.05	2,569

**CYPRESS QUADRANGLE—Continued.**  
**Along Washington road—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Cypress, 0.9 mile southeast of, 30 feet south of road, 40 feet north of railroad, 6 inches from telephone pole; copper nail in hub, pole painted "U. S. B. M. 129," elevation 142.58 feet.....	29 57 38.64	95 41 09.34	Fect. 4,800
Cypress, 1.8 miles southeast of, 35 feet south of road, 60 feet north of railroad, 1,000 feet east of Big Cypress Creek, 18 inches from telephone pole; copper nail in hub; pole painted "U. S. B. M. 130," elevation 143.27 feet.....	29 57 11.13	95 40 29.62	4,462
Cypress, 2.8 miles southeast of, 35 feet north of road, 130 feet north of Houston & Texas Central R. R., 4 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 62, 1915," elevation 143.018 feet.....	29 56 38.31	95 39 41.19	5,398
Cypress, 3.3 miles southeast of, T road south; top of rail at road crossing, elevation 144.3 feet.....			.....
Cypress, 3.7 miles southeast of, 30 feet south of road, 70 feet north of railroad, 40 feet south of T road north, 1 foot from telephone pole; copper nail in hub, pole painted "U. S. B. M. 131," elevation 140.35 feet.....	29 56 07.68	95 38 58.21	4,886
Cypress, 4.4 miles southeast of, 100 feet east of railroad crossing, 25 feet south of road, 60 feet north of railroad, 1 foot from telephone pole; copper nail in hub, pole painted "U. S. B. M. 132," elevation 136.37 feet.....	29 55 44.24	95 38 24.82	3,774
Satsuma, 2.6 miles southwest of, 400 feet east of milepost 21, 5 feet west of corner fence post, 30 feet north of road, 100 feet north of railroad; iron post stamped "Prim. Trav. Sta. No. 63, 1915," elevation 134.619 feet.....	29 55 23.62	95 37 54.49	3,385

**From Cypress south and southwest along highways to southwest corner of quadrangle.**

Cypress, 4,200 feet southwest of, about 1,000 feet east of house, 1 foot from north gatepost; copper nail in hub (T. B. M. 117), no elevation.....	29 57 51.70	95 42 32.93	.....
Cypress, 1 mile southwest of, on road to Bain's ranch, 2,200 feet south to t. b. m. 117, by north gatepost; copper nail in hub, elevation 145.89 feet.....			.....
Cypress, 1 mile south by 0.8 mile west of, 400 feet north of Cypress Creek, at ranch of Mr. Anderson (Mr. Bain, lessee), at corner of barbed and woven wire fence, in root of water oak; copper nail, tree painted "U. S. B. M. 118," elevation 143.65 feet.....	29 57 13.45	95 42 40.48	3,622
Cypress, 2 miles south by 0.8 mile west of, 0.8 mile south of Bain ranch, 20 feet south of east and west fence line, at gateway in open prairie; iron post stamped "Prim. Trav. Sta. No. 57, 1915," elevation 153.279 feet.....	29 56 22.82	95 42 39.91	5,115
Cypress, 2.9 miles south by 0.9 mile west of, 1.7 miles south of Bain ranch, in open pasture about 60 feet west of roadway leading through, on slight knoll; wire nail in hub, witness stake painted "U. S. B. M. 119," elevation 149.82 feet.....	29 55 36.63	95 45 45.23	4,600
Cypress, 3.6 miles south by 1 mile west of, at east and west line fence between two large pastures, 2 feet east of gatepost; wire nail in hub, post painted "U. S. B. M. 120," elevation 147.78 feet.....	29 55 01.17	95 42 52.12	3,633
Cypress, 4.5 miles south by 1.2 miles west of, in open prairie on small mound; wire nail in hub with witness stake painted "U. S. B. M. 121".....	29 54 15.84	95 43 05.15	4,722
Cypress, 5.2 miles south by 1.4 miles west of, 3 feet south of east and west line, 25 feet west of gateway; iron post stamped "Prim. Trav. Sta. 58, 1915," elevation 144.653 feet.....	29 53 38.27	95 43 19.50	4,000
Cypress, 6.2 miles south by 1.7 miles west of, in open prairie, 3,500 feet north, 12° W. of house (true bearing); wire nail in hub, witness stake painted "U. S. B. M. 122," elevation 140.16 feet...	29 52 46.23	95 43 33.45	5,400

**Along highways near south border of quadrangle.**

Brink schoolhouse, T road east at.....	29 52 42.83	95 40 59.43	1,794
Brink schoolhouse, 2,250 feet east of, 20 feet north of center of road; copper nail in hub; witness stake painted "171" (should be 172), elevation 130.58 feet.....	29 52 43.16	95 40 33.99	2,240
Brink schoolhouse, 1.5 miles east of, 15 feet south of road in open prairie; copper nail in hub; witness stake painted "U. S. B. M. 173," elevation 127.26 feet.....	29 52 43.20	95 39 25.84	6,000
Brink schoolhouse, 2.6 miles east of, 20 feet south of center of east and west road; copper nail in hub, 6 inches from telephone pole painted "U. S. B. M. 174," elevation 127.23 feet.....	29 52 43.80	95 38 24.55	5,397
Brink schoolhouse, 3 miles east of, T road south.....	29 52 44.29	95 37 58.37	2,305
Brink schoolhouse, 3.4 miles east of, 180 feet west of center of wood bridge with railing, 25 feet south of center of road, 9 feet north of fence line; iron post stamped "Prim. Trav. Sta. No. 76, 1915," elevation 119.162 feet.....	29 52 44.36	95 37 33.01	2,233

## CYPRESS QUADRANGLE—Continued.

Northeast from Cypress along public road toward Louetta.

Station.	Latitude.	Longitude.	Distance between stations.
Cypress, 0.8 mile northeast of, center of crossroads.....	29 58 23.15	95 41 13.33	Fret. 3,726
Cypress, 1 mile northeast of, 45 feet north of center of road; small lone oak tree painted "U. S. B. M. 233"; copper nail in root, elevation 148.82 feet.....	29 58 23.91	95 41 00.82	1,163
Cypress, 0.8 mile north, and 1.85 miles east of, about the center of public road; oak tree painted "U. S. B. M. 234"; copper nail in root, elevation 148.72 feet.....	29 58 47.20	95 40 00.21	5,712
Cypress, 1 mile north, and 2.5 miles east of, in open prairie, 35 feet south and 10 feet west of public crossroads; iron post stamped "Prim. Trav. Sta. No. 115, 1915," elevation 149.215 feet.....	29 59 03.37	95 39 24.61	3,532
Cypress, 1.65 miles north and 3 miles east of, 10 feet north of road; oak tree painted "U. S. B. M. 235"; copper nail in root, elevation 146.62 feet.....	29 59 34.32	95 38 52.43	4,218

## Along highways in northern part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Cypress, 1.80 miles north of: T road north.....	29 59 48.70	95 41 50.53	.....
Cypress, about 1.60 miles north of, 900 feet south of T road south, 30 feet west of center of road; 1 foot east of fence post painted "U. S. B. M. 213"; copper nail in hub, elevation 153.36 feet.....	29 59 38.83	95 41 57.44	1,162
Cypress, 0.70 mile north of, 30 feet west of center of road; 6 inches south of large corner fence post painted "U. S. B. M. 214"; copper nail in hub, elevation 151.02 feet.....	29 58 51.40	95 41 56.85	4,792
Cypress, 140 feet east of station, 50 feet north of center of track, 20 feet south of center of road, 3 feet west of telephone pole, 3 feet north of fence line; iron post stamped "Prim. Trav. Sta. No. 50, 1915," elevation 150.275 feet.....	29 58 08.21	95 41 52.05	4,384

Magnetic declination in quadrangle, 8° 45' E.

## DEEPWATER QUADRANGLE.

## Along highways in north half of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Deer Park, 0.9 mile west of, 250 feet southeast of bungalow, on north side of road; 1 foot from fence post painted "U. S. B. M. B."; copper nail in hub, elevation 36.1.....	29 42 41.49	95 08 21.28	Fret. .....
Deepwater, about 0.9 mile east of, 40 feet east of two-story house, on north side of road; 1 foot from fence post painted "U. S. B. M. C"; copper nail in hub, elevation 3 .49 feet.....	29 42 42.80	95 09 12.36	4,507
Deepwater station, 320 feet west of, 50 feet north of center of track, 28 feet south and 40 feet west of intersection of roads, about 4 feet from telephone pole; iron post stamped "Prim. Trav. Sta. No. 1, 1915," elevation 38.967 feet.....	29 42 43.96	95 10 17.90	5,779
Deepwater, about 0.75 mile west of, 140 feet west of private T road north; 2 feet from telephone pole painted "U. S. B. M. No. 1," in hub; copper nail and washer, elevation 35.76 feet.....	29 42 45.14	95 11 01.93	3,884
Pasadena, 0.75 mile east of, 65 feet northwest of public crossing Southern Pacific R. R., 2 feet from telephone pole painted "U. S. B. M. No. 2," in hub; copper nail, elevation 33.12 feet.....	29 42 43.56	95 11 56.05	4,774
Pasadena, 300 feet west of railroad station, 56 feet north of railroad track, about 5 feet from telephone pole; iron post stamped "Prim. Trav. Sta. No. 2, 1915," elevation 31.489 feet.....	29 42 39.82	95 12 36.93	3,625
Pasadena, about 1.1 miles west of, 20 feet east of crossroads, 2 feet from telephone pole painted "U. S. B. M. No. 3," in hub; copper nail, elevation 32.81 feet.....	29 42 33.86	95 13 41.34	5,711
Pasadena, 2.2 miles west of, about 350 feet east of road crossing Southern Pacific R. R., at El Buey flag station, 60 feet east of small station shelter; 6 inches from telephone pole painted "U. S. B. M. No. 4;" hub with copper nail and washer, elevation 35.07 feet.....	29 42 28.19	95 14 43.47	5,504

## DEEPWATER QUADRANGLE—Continued.

Along highways and interurban railway in south half of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Genoa, 0.4 mile north by 1.7 miles west of interurban station, 30 feet north of center of road, 75 feet west of corner of house, 2 feet from gate post painted "U. S. B. M. No. 53"; copper nail in hub, elevation 47.82 feet.....	• ' "	• ' "	Feet.
Genoa, 0.4 mile north by 0.8 mile west of station on interurban railway, 25 feet north of center of road, at southeast corner of yard fence at residence painted "U. S. B. M. 54"; copper nail in hub, elevation 42.77 feet.....	29 37 37.99	95 14 38.08	.....
Genoa, 0.5 mile northwest of interurban station, road crossing interurban railway; top of rail, elevation 50 feet.....	29 37 39.06	95 13 47.35	4,479
Genoa, 0.8 mile east of Galveston, Houston & Henderson R. R. station, 1,200 feet west of right angle in road, 25 feet south of road; copper nail in hub, witness stake painted "U. S. B. M. No. 56," elevation 46.03 feet.....	29 37 39.60	95 13 14.84	2,870
Genoa station, about 1.4 miles east and 0.25 mile north of, about 0.4 mile east of right angle in road, 80 feet north of center of east and west road, 1 foot west of north and south fence; iron post stamped "Prim. Trav. Sta. No. 28, 1915," elevation 43.479 feet.....	29 37 35.44	95 11 10.00	.....
Genoa station, about 2.3 miles east and 0.25 mile north of, 25 feet north of center of road, on small knoll; copper nail in hub, with witness stake painted "U. S. B. M. No. 57," elevation 41.60 feet.....	29 37 49.62	95 10 30.77	3,747
Genoa station, 3.2 miles east by 0.3 mile north of, about 900 feet west of end of road at north and south wire fence, 25 feet north of center of road; copper nail in hub, witness stake painted "U. S. B. M. No. 58," elevation 38.80 feet.....	29 37 50.38	95 09 35.74	4,858
Genoa station, 4 miles east by 0.4 mile north of, 1 mile west of Middle Bayou, 25 feet north of center of untraveled road; iron post stamped "Prim. Trav. Sta. No. 29, 1915," elevation 30.419 feet.....	29 37 51.63	95 08 42.98	4,658
Dear Park, about 3 miles south and 0.3 mile west of, 30 feet north and 30 feet west of intersection of Red Bluff road and Main Street and La Porte road; 2 feet from corner fence post painted "U. S. B. M. No. 62"; copper nail in hub, elevation 33.73 feet.....	29 37 59.45	95 07 53.21	4,463
	29 39 48.16	95 07 57.94	.....

Along highways in western part of northeast quarter of quadrangle.

Deepwater, 0.85 mile north of, 45 feet west of road, in pasture; in root of cottonwood tree painted "U. S. B. M. 414"; copper nail, elevation 34.64 feet.....	29 43 29.12	95 10 19.13	.....
Deepwater, 1.8 miles north of, 40 feet west of road, at north end of gateway leading to old pump house; 6 inches east of gatepost painted "U. S. B. M. 415"; copper nail in hub, elevation 26.90 feet.....	29 44 18.87	95 10 20.21	5,062
Deepwater, 2 miles north and 0.9 mile east of, 20 feet east of center of road at angle in road, in root of oak tree painted "U. S. B. M. 416"; copper nail, elevation 5.50 feet.....	29 44 09.24	95 09 35.89	4,026
Penn City Ferry, 575 feet west of, on north side of Buffalo Bayou, 75 feet from bank, in open pasture, U. S. Corps of Engineers permanent bench mark (their station 79+642); a concrete monument 6 inches square, with a bronze tablet marked "U. S. Eng. Dept." in top of, elevation 16.650 feet.....	29 44 25.84	95 09 23.70	1,990
Penn City ferry, about 0.7 mile north of, 30 feet east of road at northwest corner of yard around two-story brick schoolhouse; chiseled square on top of concrete monumuent post painted "U. S. B. M. 417," elevation 35.49 feet.....	29 44 57.92	95 09 18.52	3,273

Spur line down ship channel. (Checked.)

These bench marks are probably all bronze tablets marked "U. S. Engineer Department," set in top of concrete posts, 6 inches square on top and protruding above ground. The letters R and L of the descriptions refer to right and left bank going downstream and the distances given are probably the approximate distances from the bank.			
Station 107+526, 300 R, elevation 21.797 feet.....			.....
Station 107+331, 300 R, elevation 16.008 feet.....			.....
Station 104+691, 300 R, elevation 12.316 feet.....			.....
Station 94+267, 300 R, elevation 15.091 feet.....			.....
Station 93+460, 300 R, elevation 9.338 feet.....			.....
Station 92+769, 300 R, elevation 14.986 feet.....			.....
Station 91+947, 300 R, elevation 14.571 feet.....			.....
Station 91+190, 300 R, elevation 14.138 feet.....			.....
Station 90+270, 300 R, elevation 10.930 feet.....			.....

## DEEPWATER QUADRANGLE—Continued.

Spur line down ship channel—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
<b>Bench marks—Continued.</b>			
Station 89+184, 300 R, elevation 9,109 feet.....			
Station 88+010, 300 R, elevation 12,503 feet.....			
Station 87+310, 300 R, elevation 8,644 feet.....			
Station 86+459, 300 R, elevation 14,098 feet.....			
Station 85+209, 300 R, elevation 11,858 feet.....			
Station 84+608, 250 R, elevation 11,296 feet.....			
Station 84+042, 250 R, elevation 9,670 feet.....			
Station 114+085, 300 L, elevation 12,856 feet.....			
Station 113+791, 300 L, elevation 8,804 feet.....			
Station 112+730, 300 L, elevation 10,248 feet.....			
Station 111+230, 300 L, elevation 17,341 feet.....			
Station 110+304, 300 L, elevation 11,956 feet.....			
Station 109+500, 300 L, elevation 15,446 feet.....			
Station 108+191, 300 L, elevation 11,696 feet.....			
Station 107+526, 300 L, elevation 16,103 feet.....			
Station 104+691, 300 L, elevation 17,941 feet.....			
Station 103+231, 300 L, elevation 23,992 feet.....			
Station 102+051, 300 L, elevation 12,368 feet.....			
Station 101+295, 300 L, elevation 12,278 feet.....			
Station 100+133, 300 L, elevation 19,973 feet.....			
Station 99+299, 300 L, elevation 9,198 feet.....			
Station 98+223, 200 L, elevation 9,032 feet.....			
Station 96+864, 300 L, elevation 16,292 feet.....			
Station 89+186, 300 L, elevation 17,322 feet.....			
Station 89+453, 300 L, elevation 12,227 feet.....			
Station 88+010, 300 L, elevation 10,854 feet.....			
Station 87+310, 300 L, elevation 9,119 feet.....			
Station 86+459, 300 L, elevation 11,098 feet.....			
Station 86+209, 300 L, elevation 11,931 feet.....			
Station 85+209, 300 L, elevation 7,592 feet.....			
Station 84+608, 300 L, elevation 9,047 feet.....			
Station 84+496, 400 L, elevation 10,082 feet.....			
Station 84+042, 400 L, elevation 8,517 feet.....			
Station 82+012, 400 L, elevation 4,808 feet.....			
Station 80+036, 400 L, elevation 19,388 feet.....			
Station 79+642, 400 L, Penn City Ferry, 575 feet west of, on north side of Buffalo Bayou, 75 feet from bank, in open pasture, top of concrete monument 6 inches square, bronze tablet marked "U. S. Engr. Dept.", elevation 16,950 feet.....			
Station 78+142, 300 L, elevation 10,093 feet.....	29 44 13.90	95 09 13.74	
Station 77+910, 300 L, elevation 8,659 feet.....	29 44 12.75	95 09 12.42	132
Station 76+919, 300 L, elevation 7,374 feet.....	29 44 09.88	95 09 03.44	843
Station 76+146, 300 L, elevation 4,928 feet.....	29 44 10.54	95 08 55.50	703
Station 74+646, 300 L, elevation 2,544 feet.....	29 44 11.97	95 08 38.56	1,500
Station 73+612, 300 L, elevation 2,640 feet.....	29 44 12.95	95 08 26.90	1,034
Station 72+553, 300 L, elevation 5,020 feet.....	29 44 11.84	95 08 13.71	1,167
Station 71+776, 300 L, elevation 7,076 feet.....	29 44 08.31	95 08 04.86	860
Station 71+003, 300 L, elevation 6,834 feet.....			
Station 70+533, 300 L, elevation 9,356 feet.....	29 44 02.37	95 07 53.51	1,167
Station 70+083, 300 L, elevation 9,572 feet.....	29 44 01.18	95 07 49.04	413
Station 69+786, 300 L, elevation 9,694 feet.....	29 44 00.50	95 07 45.74	297
Station 68+965, 300 L, elevation 5,994 feet.....			
Harrisburg, 4.25 miles southeast of, on the right of way of the Galveston, Houston & Henderson R. R., 120 feet northwest of mile board 10, on steel and concrete bridge, 6 feet northeast of the tracks, in the center of the horizontal surface of the north abutment; copper bolt (Coast and Geodetic Survey bench mark "PB"), elevation 38,287 feet.....			
Genoa, 3.25 miles northwest of, 27 feet southwest of mile board 11, on range with the telegraph poles outside of the right-of-way fence; bottom of hole in top of stone post; (Coast and Geodetic Survey bench mark "QN"), elevation 37,212 feet.....			
Genoa, 2.25 miles northwest of, on the right of way of the Galveston, Houston & Henderson R. R., 65 feet southeast of mile board 12 and 50 feet southwest of the tracks; cross on top of section rail (Coast and Geodetic Survey bench mark "M. M. 12"), elevation 41,306 feet.....			

Magnetic declination of quadrangle,  $7^{\circ} 18' E.$ ; in northwest quarter,  $8^{\circ} 14' E.$

## FAUNA QUADRANGLE.

Along highways near south border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Carpenters Bayou, 1.1 miles east of, 280 feet west of T road north, 25 feet north of road; in root of oak tree painted "U. S. B. M. 390"; copper nail, elevation 33.02 feet.....	29 46 18.10	95 07 30.60	Ft.
Bridge over small creek; center of floor, elevation 20.6 feet.....			.....
Carpenters Bayou, 1,000 feet east of crossing, about 20 feet north of road; in root of oak tree, painted "U. S. B. M. 391"; copper nail, elevation 28.00 feet.....	29 46 16.72	95 08 24.57	4,751
Carpenters Bayou Bridge, floor of; elevation 2.03 feet.....			.....
Carpenters Bayou, 3,450 feet west of, 25 feet north of road; iron post stamped "Prim. Trav. Sta. No. 168, 1915," elevation 25.315 feet.....	29 46 16.30	95 09 13.63	4,323
Carpenters Bayou, 1.55 miles west of, 20 feet south of center of road; in root of oak tree painted "U. S. B. M. 392"; copper nail, elevation 34.03 feet.....	29 46 14.70	95 10 07.68	4,767
Greens Bayou, 0.7 mile east of lower ferry, 25 feet north of center of road, opposite a cabin, in root of oak tree painted "U. S. B. M. 393"; copper nail, elevation 32.58 feet.....	29 46 14.14	95 10 55.85	4,246
Greens Bayou, 600 feet west of lower ferry, 20 feet south of road; iron post stamped "Prim. Trav. Sta. No. 169, 1915," elevation 26.888 feet.....	29 46 07.11	95 11 35.33	3,552
Greens Bayou, 1 mile west of lower ferry, 15 feet north of center of road, in root of pine tree painted "U. S. B. M. 394"; copper nail, elevation 36 feet.....	29 46 02.36	95 12 26.60	4,551
Greens Bayou, 1.9 miles west of lower ferry across, 400 feet east of small creek, 35 feet south of center of road; in root of pine tree painted "U. S. B. M. 395"; copper nail, elevation 28.49 feet.....	29 45 59.31	95 13 21.00	4,797
Greens Bayou, about 2.3 miles west of lower ferry, 45 feet south of center of road, at edge of timber; in root of small oak tree painted "U. S. B. M. 396"; copper nail, elevation 33.63 feet.....	29 46 02.42	95 13 43.49	2,007
Greens Bayou, about 2.7 miles west of lower ferry, 25 feet north of center of road, 6 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 170, 1915," elevation 36.297 feet.....	29 46 02.74	95 14 11.72	2,489
Penn City Ferry, about 1.7 miles north of, 30 feet west of center of road at edge of woods; in root of oak tree painted "U. S. B. M. 418"; copper nail, elevation 35.92 feet.....	29 45 40.20	95 09 20.74	.....

Along public road beside Texas &amp; New Orleans Railroad from Sheldon toward Houston.

Sheldon, 3,000 feet southwest of, 500 feet northeast of a road south, 25 feet northwest of center of road, 30 feet southwest of milepost 346, between fence post and telephone pole; painted "U. S. B. M. 345"; wire nail in hub, elevation 47.20 feet.....	29 52 05.89	95 07 36.83	.....
Sheldon, 6,000 feet southwest of, 840 feet southwest of culvert, 35 feet southeast of center of road, 2 feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 150, 1915," elevation 45.418 feet.....	29 51 51.76	95 08 08.21	3,109
Sheldon, 2.25 miles southwest of, 25 feet northwest of center of road, in stump of old telephone pole; 1 foot east of pole painted "U. S. B. M. 346"; wire nail, elevation 46.71 feet.....	29 51 30.60	95 08 58.83	4,943
Sheldon, 3.2 miles southwest of, opposite east end of trestle 349A on Texas & New Orleans R. R., 30 feet northeast of end of highway bridge, 25 feet from center of road, in stump of old telephone pole, 2 feet from standing pole painted "U. S. B. M. 347"; wire nail, elevation 43.67 feet.....	29 51 05.73	95 09 56.65	5,678

Along public road beside Texas &amp; New Orleans Railroad from Sheldon toward Houston.

Fauna flag station, Texas & New Orleans R. R., 0.3 mile northeast of, nearly opposite a residence on southeast side of road, 30 feet northwest of center of road, 5 feet from telephone pole; iron post stamped "Prim. Trav. Sta. No. 151, 1915," elevation 46.674 feet.....	29 50 50.71	95 10 31.83	3,449
Fauna, 0.5 mile southwest of, 45 feet south of road; large pine tree painted "U. S. B. M. 363"; copper nail in root, elevation 44.01 feet.....	29 50 30.65	95 11 16.27	4,408
Fauna, 1.5 miles southwest of, 80 feet south of mile post 351, 45 feet south of center of road; live-oak tree painted "U. S. B. M. 364"; copper nail in root, elevation 42.06 feet.....	29 50 09.69	95 12 05.40	4,817

## FAUNA QUADRANGLE—Continued.

Along public road beside Texas &amp; New Orleans Railroad from Sheldon toward Houston—Contd.

Station.	Latitude.	Longitude.	Distance between stations.
Fauna, 2.25 miles southwest of, 1.1 miles northeast of Greens Bayou Bridge, 30 feet south of road, 3 feet from fence; 13 feet west of pine tree painted "U. S. P. B. M."; iron post stamped "Prim. Trav. Sta. No. 156, 1915," elevation 42.762 feet.....	29 49 51.93	95 12 47.20	Feet, 4,090
Greens Bayou Bridge, 700 feet northeast of center of, 30 feet south of road; concrete abutment of drain pipe, painted "U. S. B. M. 365"; chiseled square on north end of, elevation 36.93 feet.....	29 49 29.50	95 13 39.31	5,119
Green's crossing, 550 feet northeast of, 45 feet north of T road south; 6 inches from fence post painted "U. S. B. M. 366"; copper nail in hub, elevation 43.12 feet.....	29 49 10.05	95 14 26.26	4,580

## South from Green's crossing.

Green's crossing, 1.1 miles south and 0.1 mile west of, 35 feet west of road, pine tree painted "U. S. B. M. 412"; copper nail in root, elevation 42.77 feet.....	29 48 16.40	95 14 26.05	5,418
Green's crossing, 1.8 miles south and 0.6 mile west of, 50 feet north of road and 75 feet east of small house, 8 feet east of gate and wooden bridge over road ditch; small oak tree painted "U. S. B. M. 411"; copper nail in root, elevation 39.16 feet.....	29 47 40.13	95 14 55.13	4,470
Greens, top of rail nearest signboard, elevation 47.9 feet.....			

## Unchecked spur line north from Fauna.

Fauna, opposite station, top of nearest rail, elevation 49.6 feet.....			
Fauna, about 0.5 mile west and 900 feet north of; pine tree standing alone in open prairie, about 1,800 feet northwest of railroad crossing, painted "U. S. B. M. 419"; copper nail in root, elevation 45.66 feet.....	29 50 52.53	95 11 19.48	
Fauna, 1 mile west and about 0.8 mile north of, along woods road, just north of a small clearing, 15 feet west of road; pine tree painted "U. S. B. M. 420"; copper nail in root, elevation 50.24 feet.....	29 51 25.40	95 11 50.85	4,330
Fauna, 1.5 miles north and 1.25 miles west of, along woods road, 3 feet west of wagon track; pine tree painted "U. S. B. M. 421"; copper nail in root, elevation 52.41 feet.....	29 52 05.32	95 12 05.91	4,245
Fauna, 1.9 miles north and 1.1 miles west of, in small farm clearing, 160 feet east of a cabin, 100 feet southeast of well and 2 feet north of wire fence line; iron post stamped "Prim. Trav. Sta. No. 177, 1915," elevation 52.623 feet.....	29 52 23.60	95 11 53.45	2,145

## Along east border of quadrangle.

Sheldon, 3,500 feet southwest of, at T road south, on southwest corner of wooden culvert, in plank; copper nail painted "U. S. 47.3 B. M." elevation 47.43.....	29 52 03.62	95 07 41.66	
Sheldon, 0.6 mile west and 0.3 mile south of, T road south.....			
Sheldon, 0.6 mile west and 1.25 miles south of, 50 feet south of bridge over old irrigation canal, 25 feet east of road, 1 foot west of gatepost at north end of gate painted "U. S. B. M. 409"; copper nail in hub, elevation 44.55 feet.....	29 51 12.55	95 07 40.49	5,162
Sheldon, 0.6 mile west and 2.1 miles south of, 25 feet west of road, in line with fence east, private road east along fence, 4 feet east of fence, iron post stamped "Prim. Trav. Sta. No. 176, 1915," elevation 45.672 feet.....	29 50 27.76	95 07 40.16	4,525
Sheldon, 0.6 mile west and 3.2 miles south of, 35 feet west of road, 15 feet north of a fence line east; oak tree painted "U. S. B. M. 408"; one of a group of four trees; copper nail in root, elevation 46.74 feet.....	29 49 32.85	95 07 39.15	5,530
Sheldon, 0.55 mile west and 3.6 miles south of; center of crossroads. Sheldon, 0.5 mile west and 4.2 miles south of, about 290 feet west of road, in small grove of trees, about 200 feet south of small wooden bridge; gum tree painted "U. S. B. M. 407"; copper nail in root, elevation 41.25 feet.....	29 49 13.06	95 07 38.12	2,000
	29 48 38.75	95 07 34.99	3,477

Magnetic declination for north half of quadrangle,  $8^{\circ} 30' E.$ ; for east side,  $8^{\circ} 15' E.$ ; for south side,  $8^{\circ} 20' E.$

**HARMASTON QUADRANGLE.****Along public highways between Humble and Huffman.**

Station.	Latitude.	Longitude.	Distance between stations.
Humble, 2.25 miles south and 1.5 miles east of, 1.75 miles northeast of forks of road, on east end of concrete culvert, painted "U. S. B. M. 327"; hollow square chiseled in concrete, elevation 75.32 feet.....	* * "	* * "	
Humble, 1.75 miles south and 2.15 miles east of, 80 feet east of concrete culvert at angle of road, 20 feet south of center of road; pine tree painted "U. S. B. M. 328"; copper nail in root, elevation 79.27 feet.....	29 57 54.09	95 14 25.22	Feet.....
Humble, 1.25 miles south and 3 miles east of, 1,000 feet west of angle in road, 20 feet north of road in line with telephone poles; iron post stamped "Prim. Trav. Sta. No. 142, 1915", elevation 76.07 feet.....	29 58 20.96	95 13 45.84	4,401
Humble, 0.9 mile south and 3.8 miles east of, 20 feet south of road, oak tree painted "U. S. B. M. 329"; copper nail in root, elevation 70.82 feet.....	29 58 47.83	95 12 57.03	5,078
Humble, 0.6 mile south and 4.6 miles east of, 37 feet north of road; pine tree painted "U. S. B. M. 330"; copper nail in root, elevation 71.74 feet.....	29 59 05.36	95 12 09.15	4,568
Humble, 5.25 miles east of, 125 feet east of a road north to oil derrick, 20 feet south of center of road; iron post stamped "Prim. Trav. Sta. No. 143, 1915", elevation 69.515 feet.....	29 59 22.98	95 11 18.28	4,815
Humble, 6.15 miles east of, just east of a bend in road, 25 feet north of road; pine tree painted "U. S. B. M. 331"; copper nail in root, elevation 66.98 feet.....	29 59 35.44	95 10 39.89	3,684
Humble, 7 miles east of, 1/2 mile west of house on south side of road, 25 feet north of road; oak tree painted "U. S. B. M. 332"; copper nail in root, elevation 59.04 feet.....	29 59 52.52	95 09 45.18	5,027
Humble, 7.7 miles east of, 0.5 mile west of San Jacinto River, 25 feet north of road; iron post stamped "Prim. Trav. Sta. No. 144, 1915", elevation 40.186 feet.....	29 59 51.21	95 08 51.78	4,700
Huffman, 1.9 miles south and 2.5 miles west of, 750 feet east of ferry across San Jacinto River, 50 feet south of road; gum tree painted "U. S. B. M. 333"; copper nail in root, elevation 30.38 feet.....	29 59 49.08	95 08 09.85	3,694
	29 59 50.28	95 07 32.43	3,292

**Along second-class road between Sheldon and Victor.**

Sheldon, 0.6 mile north by 0.6 mile west of, 50 feet south of road, on top of old trail pump, copper nail; painted "U. S. 51.7 B. M.", elevation 51.87 feet.....	.		
Sheldon, 0.7 mile north and 0.7 mile west of, 10 feet south of a winding woods road; elm tree painted "U. S. B. M. 349"; wire nail in root; not found in 1916.....	29 52 51.88	95 07 46.39	
Sheldon, 0.7 mile north and 1.1 miles west of, 800 feet east of a fenced clearing on a newly cleared right of way for road; gum tree painted "U. S. B. M. 350"; wire nail in root, elevation 50.38 feet.....	29 53 00.67	95 08 14.97	2,588
Sheldon, 0.9 mile north and 1.7 miles west of, 15 feet north of a cleared east and west right of way for road; iron post stamped "Prim. Trav. Sta. No. 152, 1915", elevation 55.628 feet.....	29 53 08.71	95 08 49.97	3,187
Sheldon, 0.8 mile north and 2.4 miles west of, 500 feet east of a greenhouse, 4 feet south of an east and west wire fence; gum tree (one of a group) painted "U. S. B. M. 351"; wire nail in root, elevation 52.67 feet.....	29 53 09.22	95 09 30.66	3,683
Sheldon, 1.4 miles north and 2.8 miles west of, 30 feet west of prairie road; gum tree painted "U. S. B. M. 352"; wire nail in root, elevation 54.18 feet.....	29 53 35.15	95 09 57.04	4,225
Sheldon, 2.3 miles north and 3.5 miles west of, 700 feet northwest of bend in road, 1,200 feet southeast of edge of woods, 25 feet northeast of road, near small group of pine trees; iron post stamped "Prim. Trav. Sta. No. 153, 1915", elevation 56.818 feet.....	29 54 22.74	95 10 39.29	6,078
Victor, 0.9 mile south and 1.2 miles east of, 55 feet southwest of road at edge of prairie and timber; pine tree painted "U. S. B. M. 353"; wire nail in root, elevation 50.77 feet.....	29 54 53.40	95 11 24.32	5,030
Victor, 0.6 mile south and 0.7 mile east of, 55 feet north of road; large oak tree painted "U. S. B. M. 354"; wire nail in root, elevation 54.67 feet.....	29 55 08.84	95 11 54.55	3,045
Victor siding, Beaumont, Sour Lake & Western Ry., 470 feet northeast of road crossing, 55 feet southeast of track, opposite siding sign post, 2 feet from fence line; iron post stamped "Prim. Trav. Sta. No. 154, 1915", elevation 57.424 feet.....	29 55 39.22	95 12 37.16	4,847

**HARMASTON QUADRANGLE—Continued.****Along Beaumont, Sour Lake & Western Railway from Victor to Harmaston.**

Station.	Latitude.	Longitude.	Distance between stations.
Victor, 1 mile northeast of, 40 feet southeast of center of track; 8 inches from telegraph pole painted "U. S. B. M. 355"; wire nail in hub, elevation 58.27 feet.....	* * "	* * "	Fret. 4,554
Victor, 1.9 miles northeast of, 40 feet southeast of center of track; 1 foot from telegraph pole painted "U. S. B. M. 356"; wire nail in hub, elevation 59.51 feet.....	29 56 15.01	95 12 00.35	4,821
Spencer, opposite signpost, top of rail, elevation 64.6 feet.....			
Victor, 2.8 miles northeast of, 50 feet northwest of center of track; hickory tree painted "U. S. B. M. 357"; wire nail in root, elevation 63.01 feet.....	29 57 25.71	95 10 48.88	4,694
Victor, 3.7 miles northeast of, 50 feet southeast of center of track, oak tree painted "U. S. B. M. 358"; wire nail in root, elevation 66.75 feet.....	29 57 59.29	95 10 12.65	4,654
Harmaston, 680 feet northeast of signboard, 40 feet southeast of center of track, near road crossing, 10 feet from corner of fence at section house, 2½ feet from telegraph pole; iron post stamped "Prim. Trav. Sta. No. 155, 1915," elevation 68.919 feet.....	29 58 37.37	95 09 33.53	5,161
Harmaston, 1 mile northeast of, 38 feet southeast of center of track, 8 inches from telegraph pole painted "U. S. B. M. 359"; copper nail in hub, elevation 55.24 feet.....	29 59 10.93	95 08 47.20	5,300
Trestle 330-5, middle of, top of rail, elevation 50.4 feet.....			
Harmaston, 2.1 miles northeast of, 15 feet southwest of southwest corner of trestle, 20 feet from center of track; in top of square post beside warning sign post painted "U. S. B. M. 360"; copper nail, elevation 48.63 feet.....	29 59 36.94	95 07 50.29	5,653

**Near southwest corner of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Dyersdale station, Beaumont, Sour Lake & Western Ry., about 500 feet south of, 70 feet east and 20 feet south of public-road crossing; iron post stamped "Prim. Trav. Sta. No. 161, 1915," elevation 56.972 feet.....	29 53 29.47	95 14 50.70	.....
Dyersdale station, 400 feet south and ½ mile east of; oak tree painted "U. S. B. M. 413"; copper nail in root (not found, 1916).....	29 53 25.61	95 14 19.23	2,797

**Magnetic declination for quadrangle, 8° 30' E.****HILLENDAL QUADRANGLE.****Along Washington road.**

Station.	Latitude.	Longitude.	Distance between stations.
Fairbanks, 2.1 miles northwest of, 65 feet east of railroad crossing, 25 feet south of road, 2 feet from corner fence post; copper nail in hub, t. b. m. 137, elevation 103.16 feet.....	* * "	* * "	Fret. ....
Fairbanks, 1.2 miles northwest of, 230 feet east of milepost 14, 60 feet north of railroad, 20 feet south of road; 1 foot from telephone pole painted "U. S. B. M. 138"; copper nail in hub, elevation 99.51 feet.....	29 52 01.74	95 33 08.84	.....
Fairbanks station (Houston & Texas Central R. R.), about 350 feet northwest of, 35 feet north of public road, 50 feet south of store and post office, 2 feet from telephone pole; iron post stamped "Prim. Trav. Sta. 66, 1915," elevation 96.113 feet.....	29 51 32.61	95 32 27.48	4,683
Fairbanks, about 0.8 mile southeast of, 500 feet east of milepost 12, 25 feet south of center of road; 6 inches from telephone pole painted "U. S. B. M. 139"; copper nail in hub, elevation 92.86 feet.....	29 50 53.01	95 31 30.84	6,353
Fairbanks, about 1.6 miles southeast of, 150 feet northwest of milepost 11, 65 feet east of railroad crossing, 25 feet south of road; 6 inches from telephone pole painted "U. S. B. M. 140"; copper nail in hub, elevation 87.00 feet.....	29 50 24.10	95 30 51.06	4,561
	29 49 57.54	95 30 13.71	4,245

**HILLENDAHL QUADRANGLE—Continued.****Along Jeanetta-Hillendahl road.**

Station.	Latitude.	Longitude.	Distance between stations.
Hillendahl, 1 mile east by 2.2 miles south of, about 0.7 mile north-east of Buffalo Bayou bridge, 60 feet east of angle in road; copper nail in root of oak tree in edge of timber, tree painted "U. S. B. M. 150," elevation 71.59 feet.....	• • "	• • "	Feet.
Hillendahl, 1 mile east by 1.2 miles south of, 30 feet east of center of north and south road, 2.5 feet southwest of corner fence post, timber on both sides of road; iron post stamped "Prim. Trav. Sta. No. 70, 1915," elevation 80.635 feet.....	29 45 02.65	95 31 01.92	.....
Hillendahl, 1 mile east of, 65 feet northeast of intersection of main shell road and railroad track, 50 feet north of track, in line with right-of-way fence; iron post with 3-inch cap (not stamped) is a Coast and Geodetic Survey bench mark; also "Prim. Trav. Sta. No. 71, 1915," elevation 78.628 feet.....	29 45 57.90	95 31 01.98	5,580
	29 47 03.71	95 30 48.91	6,748

**Along Hillendahl-Fairbanks road.**

Hillendahl, 0.9 mile north and 1 mile east of, 6 inches from corner fence post, painted "U. S. B. M. 160"; copper nail in hub, elevation 83.62 feet.....	29 47 51.07	95 30 55.19	4,817
Hillendahl, 1.3 miles north and 1.8 miles east of, 30 feet north of center of east and west road; in root of oak tree painted "U. S. B. M. 161"; copper nail, elevation 83.99 feet.....	29 48 10.14	95 30 06.68	4,687

**Along Missouri, Kansas & Texas Railway.**

Addicks, 1.5 miles east of, 240 feet east of T road north, 20 feet south of public road, 50 feet north of Missouri, Kansas & Texas Ry.; iron post stamped "Prim. Trav. Sta. No. 73, 1915," elevation 91.600 feet.....	29 47 05.83	95 36 58.66	.....
Addicks, about 2 miles east of, 20 feet north of road; in root of oak tree close to fence line; copper nail, tree painted "U. S. B. M. 154," elevation 86.39 feet.....	29 47 06.17	95 36 33.90	2,182
Addicks, about 2.4 miles east of, 75 feet north of road crossing Missouri, Kansas & Texas Ry.; T road south.....	29 47 05.74	95 36 07.80	2,300
Addicks, about 2.8 miles east of, 25 feet south of road; 6 inches from telephone pole painted "U. S. B. M. 155"; copper nail in hub, elevation 93.11 feet.....	29 47 05.46	95 35 42.49	2,230
Addicks, about 3.7 miles east of, 25 feet south of road; 6 inches from telephone pole painted "U. S. B. M. 156"; copper nail in hub, elevation 93.24 feet.....	29 47 05.15	95 34 48.07	4,796

**Along public road.**

Hillendahl, 2 miles west of, 820 feet east of mileboard 1071, 75 feet west of small bridge, 2.5 feet south of telephone pole; copper nail in hub under wire fence, pole painted "U. S. B. M. 157," elevation 81.92 feet.....	29 47 04.81	95 33 55.02	4,675
Hillendahl, 1.3 miles west of, 25 feet south of public road, 400 feet east of mileboard 1072, 6 inches from telephone pole painted "U. S. B. M. 158"; copper nail in hub, elevation 88.11 feet.....	29 47 04.51	95 33 00.24	4,827
Hillendahl, 0.7 mile west of, on top of center of north end of concrete culvert; chiseled square (probably a Coast and Geodetic Survey bench mark), elevation 87.073 feet.....	29 47 04.00	95 32 24.32	3,165
Hillendahl, 0.3 mile east of, 30 feet south of road, 6 inches from telephone pole painted "U. S. B. M. 159"; copper nail in hub, elevation 83.02 feet.....	29 47 03.89	95 31 32.36	4,579
Hillendahl, 0.9 mile east of, T road south; top of rail at crossing, elevation 82.7 feet.....			

**Along wagon road in northeast corner of quadrangle.**

Fairbanks, 1.25 miles north and 1 mile east of, 20 feet north of east-and-west road and 25 feet east of road north, 6 inches from corner fence post; copper nail in hub, "T. B. M. 284," elevation 94.13 feet.....	29 51 55.6	95 30 24.1	4,787
Fairbanks, 3,500 feet north and 0.5 mile east of, 4,500 feet N. 30° E. from water tank, 125 feet south of small creek in open prairie; copper nail in hub, "T. B. M. 285," elevation 92.55 feet.....	29 51 23.0	95 30 54.3	4,235
Fairbanks, iron post No. 66.....	29 50 53.0	95 31 30.8	4,423

Magnetic declination, 8° 46' E.

## HOCKLEY QUADRANGLE.

From point near Hockley southeast along highway to southeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Hockley, 1.7 miles west by 0.4 mile south of, 150 feet southwest of white house, 20 feet north by 25 feet west of T road north, 8 inches from corner fence post; copper nail in hub, post painted "U. S. B. M. 191," elevation 233.05 feet.....	30 01 17.55	95 52 24.63	Ft. .
Hockley, 1.9 miles northwest of, 15 feet south by 30 feet west of intersection of roads, 6 inches from telephone pole; copper nail in hub, pole painted "U. S. B. M. 180," elevation 238.65 feet....	30 02 13.50	95 52 25.71	5,653
Hockley, 1.1 miles northwest of, 120 feet south of Houston & Texas Central R. R. track, 25 feet south of center of public road, 6 inches from corner post, on fence line south; copper nail in hub, post painted "U. S. B. M. 179," elevation 227.58 feet.....	30 01 56.49	95 51 40.28	4,346
Hockley, 600 feet west of Houston & Texas Central R. R. station, opposite milepost 36, 105 feet south of main track, 30 feet south of center of public road; iron post stamped "Prim. Trav. Sta. No. 78, 1915," elevation 221.210 feet.....	30 01 36.79	95 50 48.19	4,993
Hockley depot, opposite semaphore; top of rail, elevation 223 feet.....			.....
Hockley, 1 mile southeast of, 1 foot from telephone pole opposite railroad sign "1 mile to Hockley" 25 feet south of road; copper nail in hub, pole painted "U. S. B. M. 178," elevation 213.09 feet.....	30 01 14.61	95 49 44.94	5,994
Hockley, 1.9 miles southeast of, 120 feet north by 20 feet west of road crossing Houston & Texas Central R. R., 25 feet north of shell road, 1 foot from telephone pole; copper nail in hub, pole painted "U. S. B. M. 110," elevation 207.91 feet.....	30 00 56.00	95 48 54.16	4,844
Hockley, 2.6 miles southeast of, 25 feet south of center of shell road, about 60 feet north of center of Houston & Texas Central R. R., 1 foot from telephone pole; copper nail in hub, pole painted "U. S. B. M. 111," elevation 202.94 feet.....	30 00 37.26	95 48 05.89	4,647
Hockley, 3.7 miles southeast of, 100 feet north of railroad track, 40 feet north of section house; copper nail in root of chinaberry tree, tree painted "U. S. B. M. 112," elevation 203.05 feet.....	30 00 15.33	95 47 05.78	5,730

## Along highway north near center of south border of quadrangle.

Hockley, 1 mile south of Houston & Texas Central R. R., at a crossing 1.9 miles southeast of station, 2,400 feet north of right-angle turn in road, 30 feet east of center of roadway, 2 feet from fence post; iron post stamped "Prim. Trav. Sta. No. 53, 1915," elevation 203.814 feet.....	30 00 06.27	95 48 53.41	.....
Bench mark 110, described in preceding line .....	30 00 56.00	95 48 54.16	5,024

## Along highways through center of quadrangle.

Hockley, 3.75 miles north and 1 mile west of, 25 feet south of center of road, opposite house of Charles Imholz, 3.5 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 88, 1915," elevation 274.862 feet.....	30 04 53.71	95 51 57.22	.....
Hockley, 3.7 miles north and 0.2 mile west of, 30 feet north of road, 150 feet west of T road south, 8 inches from fence post; copper nail in hub, witness stake painted "U. S. B. M. 200," elevation 273.49 feet.....	30 04 54.48	95 51 09.39	4,202
Hockley, 3.7 miles north and 0.3 mile east of, 170 feet south of T road west, 25 feet west of center of road; in root of oak tree painted "U. S. B. M. 201;" copper nail, elevation 224.47 feet....	30 04 52.81	95 50 30.05	3,461
Hockley, 2.90 miles north and one-fourth mile east of, T road east.....	30 04 08.08	95 50 28.30	4,521
Hockley, 2.90 miles north and 0.60 mile east of, 1,800 feet east of T road east, 25 feet north of center of road, 4 feet south of wire fence; iron post stamped "Prim. Trav. Sta. No. 89, 1915," elevation 263.880 feet.....	30 04 08.55	95 50 06.47	1,831
Hockley, 2.9 miles north and 1.5 miles east of, 1,550 feet west of T road south, 25 feet north of center of road, 1 foot east of corner post on fence line north; copper nail in hub painted "U. S. B. M. 202," elevation 241.74 feet.....	30 04 09.11	95 49 13.38	4,841
Hockley, 2.9 miles north and 2.5 miles east of, 30 feet south of center of road, 60 feet west of lane north, 1 foot from fence post painted "U. S. B. M. 203;" copper nail in hub, elevation 236.98 feet....	30 04 09.19	95 48 16.63	4,988
Hockley, 2.70 miles north and 2.90 miles east of, 30 feet west of T road east, 4 feet southeast of gatepost, 2 feet from wire fence line; iron post stamped "Prim. Trav. Sta. No. 90, 1915," elevation 227.768 feet.....	30 03 58.92	95 47 54.63	2,193

**HOCKLEY QUADRANGLE**—Continued.**Along highways through center of quadrangle**—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Hockley, 2.70 miles north and 3.80 miles east of, 700 feet west of T road west, 20 feet south of center of road, at corner fence post painted "U. S. B. M. 204"; copper nail in hub, elevation 216.46 feet.....	• ' " 30 03 59.60	• ' " 95 47 00.70	Feet. 4,740
Hockley, 3 miles north and 4.2 miles east of, 25 feet south of Hockley-Rosehill road; 1 foot from east gatepost and corner post on fence line south; copper nail in hub, " U. S. B. M. 205," elevation 230.80 feet.....	30 04 17.82	95 46 14.70	4,442
Rosehill, 3 miles west of, on the Rosehill-Hockley road, 20 feet north of road at point where a dim road crosses north and south; 750 feet southwest of fence corner; iron post stamped "Prim. Trav. Sta. No. 91, 1915," elevation 230.891 feet.....	30 04 38.02	95 45 30.21	4,411

Magnetic declination for south half of quadrangle,  $8^{\circ} 30' E.$ **HOUSTON HEIGHTS QUADRANGLE.****Along public road.**

Station.	Latitude.	Longitude.	Distance between stations.
Fairbanks station, 2.4 miles southeast of, about 1,000 feet northwest of mile post 10, 40 feet north of road; 7 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 67, 1915," elevation 81.077 feet.....	• ' " 29 49 31.00	• ' " 95 29 35.38	Feet.
Fairbanks station, 3.3 miles southeast of, 850 feet northwest of railroad crossing, 20 feet south of road; 6 inches from telephone pole painted "U. S. B. M. 141"; copper nail in hub, elevation 82.54 feet.....	29 49 00.38	95 28 53.73	4,798
Fairbanks, 4.2 miles southeast of, 2,100 feet northwest of milepost 8, 20 feet south of road; 6 inches from telephone pole painted "U. S. B. M. 142"; copper nail in hub, elevation 77.80 feet.....	29 48 31.18	95 28 13.50	4,604
Eureka, 1.75 miles northwest of, about halfway between mileposts 7 and 8, 60 feet north and 30 feet west of forks of road at T road north; 5 feet from fence corner; iron post stamped "Prim. Trav. Sta. No. 68, 1915," elevation 76.616 feet.....	29 48 00.83	95 27 31.21	4,831
Eureka, 0.8 mile northwest of, 125 feet east of culvert, "R. R. 6 c," 20 feet south of road; 1 foot from telephone pole painted "U. S. B. M. 143"; copper nail in hub, elevation 72.01 feet.....	29 47 29.44	95 26 49.06	4,883
Eureka, crossing of Missouri, Kansas & Texas Ry. and Houston & Texas Central R. R., about 84 feet east and 15 feet north of, 6 feet east of cattle guard at road crossing, 25 feet south of public road; in 3-inch by 4-inch post 4 inches above ground; copper nail; pole painted "U. S. B. M. 144," elevation 68.82 feet.....	29 47 01.22	95 26 10.03	4,467
Eureka, crossing of Houston & Texas Central R. R. and Missouri, Kansas & Texas Ry.....	29 47 01.11	95 26 10.97	85
Eureka, 480 feet east of intersection of Missouri, Kansas & Texas Ry. and Houston & Texas Central R. R. tracks, block signal at north side of Missouri, Kansas & Texas track; bottom of square hole in concrete foundation, Coast and Geodetic Survey bench mark, "H8," elevation 65.595 feet.....			
Eureka, 0.9 mile southeast of, 25 feet south of center of Washington Road; 6 inches from telephone pole painted "U. S. B. M. 145"; copper nail in hub, elevation 62.23 feet.....	29 46 27.92	95 25 34.18	4,663
Houston, city limits on Washington Avenue, about 0.5 mile west of, 530 feet west of Birdsall Avenue, 30 feet north of center of road, 5 feet east of corner fence post; 8 feet from telephone pole; iron post stamped "Prim. Trav. Sta. No. 69, 1915," elevation 60.259 feet.....	29 46 14.98	95 25 18.25	1,918
Houston, intersection of Bruner Avenue and Houston & Texas Central R. R. track; top of rail, elevation 63.2 feet.....	29 46 12.58	95 24 47.76	2,696
Houston, city limits, at center of Washington Avenue.....			
Houston, about 270 feet east of city limit, 0.4 mile south of Washington Avenue, 20 feet west of center of Roy Street; in root of oak tree 2 feet in diameter; copper nail and washer; telephone painted "U. S. B. M. 146," elevation 61.28 feet.....	29 45 51.34	95 24 44.35	2,168
Buffalo Bayou, center of iron truss bridge on Shepherd Dam road. Buffalo Bayou Bridge, on Shepherd Dam road, 150 feet south of south end of bridge; east end of concrete spillway; chiseled square, elevation 46.14 feet.....	29 45 37.14	95 24 31.02	1,855

## HOUSTON HEIGHTS QUADRANGLE—Continued.

Along public road—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Buffalo Bayou Bridge, on Shepherd Dam road, 0.4 mile southwest of, 0.8 mile north of Westheimer road, 18 feet east of center of Shepherd Dam road, 20 feet south of fence corner; 6 inches from fence post painted "U. S. B. M. 147"; copper nail in hub, elevation 60.07 feet.....	29 45 16.16	95 24 37.70	Frst. 2,320
Hillendahl, 1.8 miles north and 2.1 miles east of, 150 feet south of house, 30 feet north of road, 30 feet east of lane north; in root of oak tree painted "U. S. B. M. 162"; copper nail, elevation 76.94 feet.....	29 48 00.37	95 29 05.40	
Hillendahl, 1.8 miles north and 2.8 miles east of, 25 feet south of center of road opposite white house; in root of mulberry tree painted "U. S. B. M. 163"; copper nail, elevation 76.42 feet.....	29 48 08.97	95 28 24.36	3,615
Durkee schoolhouse, 0.7 mile east of, 0.4 mile east of East Montgomery Road, 40 feet north of road; in root of lone oak tree on prairie; copper nail (t. b. m. 27); elevation 83.15 feet.....	29 52 11.66	95 22 40.87	4,734
Durkee schoolhouse, 0.25 mile east of, crossroads at East Montgomery Road.....	29 52 11.00	95 23 05.16	2,140
Durkee schoolhouse, 500 feet west of, 40 feet east and 30 feet north of crossroads; in root of poplar tree at fence line; copper nail (t. b. m. 279), elevation 83.20 feet.....	29 52 11.02	95 23 27.55	1,070
Durkee schoolhouse, 1.25 miles west of, 30 feet west of Houston-Steuhrer "airline" road, 15 feet south of T road east; iron post stamped "Prim. Trav. Sta. No. 128, 1915," elevation 88.413 feet.....	29 52 09.86	95 24 34.82	5,924
Durkee schoolhouse, about 1.75 miles west of, in open field about halfway between "air line" road and West Montgomery road; in root of lone persimmon tree, painted (t. b. m. 280); copper nail, elevation 85.42 feet.....	29 51 54.13	95 24 59.56	2,697
West Montgomery road; T road west.....	29 51 47.77	95 25 41.26	3,729
West Montgomery road, about 0.4 mile west of, at point 1.5 miles north of junction of "air line" and West Montgomery roads, 30 feet south of center of road and 4 feet north of fence line; iron post stamped "Prim. Trav. Sta. No. 127, 1915," elevation 91.885 feet.....	29 51 47.30	95 26 06.94	2,262
West Montgomery road, 1.25 miles west of, 1.8 miles east of Trinity & Brazos Valley R. R., on Fairbanks and Montgomery link road, 40 feet south of road; in root of pine tree painted "U. S. B. M. 281"; copper nail, elevation 89.18 feet.....	29 51 45.74	95 26 57.47	4,452
West Montgomery road, 2 miles west of, 1 mile east of Trinity & Brazos Valley R. R., on Fairbanks-Montgomery link road, 25 feet south of road at bend; in root of oak tree painted "U. S. B. M. 282"; copper nail (t. b. m. 282), elevation 82.02 feet.....	29 51 46.86	95 27 45.66	4,245
T road corners, road southeast.....	29 51 46.70	95 28 24.25	3,328
Fairbanks, 1 mile north and 2.7 miles east of, about 930 feet south and 590 feet east of public road crossing of Trinity & Brazos Valley R. R., northeast side of road at right angle, 120 feet east of Trinity & Brazos Valley R. R.; 3 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 128, 1915," elevation 87.049 feet.....	29 51 46.88	95 28 46.96	2,000
Fairbanks, 1.25 miles north and 2.25 miles east of, 1,550 feet west of Trinity & Brazos Valley R. R.; crossroads.....	29 51 55.98	95 29 11.25	2,329
Fairbanks, 1.2 miles north and 1.9 miles east of, 0.6 mile west of Trinity & Brazos Valley R. R.; 25 feet south of public road and 6 inches west of corner fence post; copper nail in hub (t. b. m. 283), elevation 90.56 feet.....	29 51 55.45	95 29 29.70	1,626

## Along Missouri, Kansas &amp; Texas Railway in southeast quarter of quadrangle.

Houston, In 1st Ward, 600 feet west of Taylor Street, 32 feet north of center of Missouri, Kansas & Texas Ry. track, 4 feet south of fence line; in root of pecan tree painted "U. S. B. M. 251"; copper nail, elevation 56.92 feet.....	29 46 29.76	95 22 59.94	
Houston, at northwest corner of city limits, 240 feet east of Oxford Street and between Tenth and Eleventh streets, Houston Heights; concrete monument, 8 inches square, with hole in top.....	29 47 23.43	95 23 28.14	3,339
Houston Heights, on boulevard, center of parking, 84 feet south of center of Missouri, Kansas & Texas Ry. track, midway between the two electric tracks; iron post top flush with ground; Coast and Geodetic Survey bench mark "18," "Prim. Trav. Sta. No. 114," elevation 61.017 feet.....	29 46 58.47	95 23 50.80	5,340
Houston, 140 feet south and 35 feet west of Brunner Avenue crossing of Missouri, Kansas & Texas Ry.; on root of oak tree painted "U. S. B. M. 252"; copper nail, elevation 58.34 feet.....	29 46 57.38	95 24 35.00	3,306
Houston, Missouri, Kansas & Texas Ry. trestle over White-oak Bayou; top of rail, elevation 32.4 feet.....			

## HUFFMAN QUADRANGLE.

From southeast corner of quadrangle to Huffman.

Station.	Latitude.	Longitude.	Distance between stations.
Huffman, 1.4 miles south and 1.75 miles west of, 200 feet east of crossing of Beaumont, Sour Lake & Western Ry., 30 feet south of center of road; oak tree painted "U. S. B. M. 334"; wire nail in root, elevation 58.00 feet.....	• ' "	• ' "	Feet.
Huffman, 1.4 miles south and 0.9 mile west of, 0.4 mile west of T road corners, 30 feet north of center of road; oak tree painted "U. S. B. M. 335"; wire nail in root, elevation 71.32 feet.....	30 00 13.38	95 06 50.57	.....
Huffman, 1.4 miles south and 0.5 mile west of, 20 feet east of T road corners, 2 feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 145, 1915," elevation 70.708 feet.....	30 00 14.56	95 06 00.78	4,380
Huffman, 0.7 mile south and 0.5 mile west of, 300 feet south of pipe line crossing road, 20 feet east of road; gum tree painted "U. S. B. M. 442"; copper nail in root, elevation 68.92 feet.....	30 00 14.60	95 05 35.38	2,233
Huffman, 0.35 mile west of, road crossing Beaumont, Sour Lake & Western Ry.; top of rail, elevation 72.8 feet.....	30 00 51.59	95 05 32.80	3,744
Huffman, 700 feet south and 1,600 feet west of, public road crossing Beaumont, Sour Lake & Western Railway.....	30 01 19.23	95 05 24.50	2,885

From Huffman north to Austin Scott's farms, near county line.

Huffman, 0.35 mile north and 0.2 mile west of, about 600 feet north of schoolhouse, 30 feet east of road, opposite dwelling house; cottonwood tree painted "U. S. B. M. 443"; copper nail in root, elevation 70.91 feet.....	30 01 44.51	95 05 16.87	2,637
Huffman, 1 mile north and 0.25 mile west of, 300 feet northeast of church, 20 feet west of road and 6 feet south of a fence corner; iron post stamped "Prim. Trav. Sta. No. 187, 1915," elevation 74.117 feet.....	30 02 22.39	95 05 21.84	3,852
Huffman, 1.2 miles north of, by 0.25 mile west of T road west, west side of north-south road, northeast corner of small wooden bridge, in plank; copper nail painted "U. S. 73.1 B. M.," elevation 73.12 feet.....	.....	.....	.....
Huffman, 2 miles north and 0.1 mile west of, 15 feet west of road at angle; gum tree painted "U. S. B. M. 444"; copper nail in root, elevation 74.11 feet.....	30 03 10.39	95 05 13.84	4,900
Huffman, 2.3 miles north and 0.5 mile east of, 70 feet north of public road in pasture, about 400 feet southeast of Mr. J. J. Simmon's house; lone oak tree painted "U. S. B. M. 445"; copper nail in root, elevation 74.99 feet.....	30 03 26.33	95 04 36.39	3,664
Huffman, 3.3 miles north and 0.4 mile east of, 20 feet north of dim road and 25 feet north of large oak tree painted "U. S. P. B. M.," iron post stamped "Prim. Trav. Sta. No. 188, 1915," elevation 76.155 feet.....	30 04 17.57	95 04 42.68	5,205
Huffman, 3.5 miles north and 0.4 mile west of, 200 feet south of ford crossing Loose Bayou, 5 feet north of road; oak tree painted "U. S. B. M. 446"; copper nail in root, elevation 50.70 feet.....	30 04 27.98	95 05 30.57	4,338
Huffman, 4 miles north and 0.9 mile west of, 0.9 mile northwest of Loose Bayou road, 10 feet west of road, magnolia tree painted "U. S. B. M. 447"; copper nail in root; not found in 1916.....	30 04 58.33	95 06 00.66	4,049
Huffman, 4 miles north by 0.9 mile west of, 0.9 mile northwest of Loose Bayou ford, 5 feet west of road, in root of oak tree; wire nail painted erroneously "U. S. 72.9 B. M.," elevation 75.92 feet.....	.....	.....	.....
Huffman, 4.9 miles north and 0.9 miles west of, 15 feet south of double gate in east and west fence line, 8 feet east of road; oak tree painted "U. S. B. M. 448"; copper nail in root, elevation 79.96 feet.....	30 05 33.44	95 06 02.15	3,550
Huffman, 5.2 miles north and 0.9 mile west of, 0.3 mile north of double gate just east of wagon road; iron post stamped "Prim. Trav. Sta. No. 189, 1915," elevation 83.852 feet.....	30 05 49.76	95 06 01.07	1,652
Huffman, 6 miles north and 0.9 mile west of, 10 feet east of road; magnolia tree painted "U. S. B. M. 449"; copper nail in root, elevation 90.68 feet.....	30 06 33.94	95 06 01.95	4,464
Huffman, 6.7 miles north and 1.3 miles west of, 5 feet northeast of road; pine tree painted "U. S. B. M. 450"; copper nail in root, elevation 96.66 feet.....	30 07 07.17	95 06 23.66	3,861

From Huffman northwest on old road to Porter.

Huffman, 1.3 miles north and 1.7 miles west of, 5 feet southwest of road, gum tree painted "U. S. B. M. 461"; copper nail in root, elevation 63.06 feet.....	30 02 33.68	95 06 46.90	3,740
Huffman, 1.4 miles north and 2.3 miles west of, 150 feet east of San Jacinto River, just below mouth of Loose Bayou; large gum tree painted "U. S. B. M. 462"; copper nail in root, elevation 34.08 feet.....	30 02 24.18	95 07 25.60	3,535

**HUFFMAN QUADRANGLE**-Continued.**East and north of Huffman, mostly on prairie.**

Station.	Latitude.	Longitude.	Distance between stations.
Huffman, 1 mile south and 1.85 miles east of, probably just on east side of Cedar Bayou, which is here indefinite, on west side of a grove of gum trees surrounded by a group of haw trees and bushes; small gum tree painted "U. S. B. M. 490"; copper nail in root, elevation 64.98 feet.....	• • " 30 00 36.87	• • " 95 03 15.08	Feet.
Huffman, 0.2 mile south and 2.1 miles east of, 2,000 feet north of pipeline, on east side of a grove of about 100 small gum trees; one painted "U. S. B. M. 491"; a copper nail in root, elevation 66.47 feet.....	30 01 15.66	95 03 00.42	4,126
Huffman, 0.6 mile north and 2.5 miles east of, on prairie near small round concrete-lined reservoir for stock-water supply, on south-east corner of concrete watering trough painted "U. S. B. M. 492"; chiseled mark, elevation 71.82 feet.....	30 02 00.39	95 02 39.08	4,893
Huffman, 0.8 mile north and 1.8 miles east of, opposite west end of small bridge across Cedar Bayou, which is line between Harris and Liberty counties, 54 feet north of center of Beaumont, Sour Lake & Western Ry. track; elm tree painted "U. S. B. M. 493"; copper nail in root, elevation 69.71 feet.....	30 02 08.31	95 03 16.20	3,361
Huffman, 1 mile north and 0.75 mile east of, 100 feet north of east and west road on south side of group of gum trees, one of which is painted "U. S. B. M. 494"; copper nail in root, elevation 68.90 feet.....	30 02 18.63	95 04 19.73	5,682

a T. b. ms. 491 and 492 are in Liberty County.

Magnetic declination for quadrangle, 8° 27' E.

**WEEDEN QUADRANGLE.****Along Westfield-Humble road.**

Station.	Latitude.	Longitude.	Distance between stations.
Westfield, 0.25 mile south and 1.8 miles east of, 50 feet north of center of road; lone pine tree painted "U. S. B. M. 309"; copper nail in root, elevation 93.44 feet.....	• • " 30 01 07.90	• • " 95 22 22.92	Feet.
Westfield, 0.5 mile south and 2.7 miles east of, 30 feet south of center of road, 6 feet north of fence post at angle in fence line; iron post stamped "Prim. Trav. Sta. No. 136, 1915," elevation 90.117 feet.....	30 00 57.53	95 21 28.97	4,837
Westfield, 0.5 mile south and 3.1 miles east of; forks of road; road southwest.....	30 00 53.56	95 21 04.15	2,218
Westfield, 0.6 mile south and 3.7 miles east of, 45 feet north of road, nearly north of small wooden bridge; large pine tree painted "U. S. B. M. 310"; copper nail in root, elevation 90.77 feet.....	30 00 47.91	95 20 29.36	3,112
Westfield, 0.8 mile south and 4.5 miles east of, 30 feet south of center of road; small oak tree painted "U. S. B. M. 311;" copper nail in root, elevation 93.83 feet.....	30 00 35.48	95 19 36.60	4,806
Westfield, 1 mile south and 5 miles east of, 30 feet south of center of road; iron post stamped "Prim. Trav. Sta. No. 137, 1915," elevation 93.623 feet.....	30 00 24.84	95 19 08.84	2,667
Humble, 0.3 mile north and 2.6 miles west of T road southeast.....	30 00 10.93	95 18 31.96	3,533
Humble, 0.15 mile north and 2.25 miles west of, 55 feet south of center of road at angle; gum tree painted "U. S. B. M. 312"; copper nail in root, elevation 91.89 feet.....	30 00 02.89	95 18 12.37	1,905
Humble, 0.2 mile north and 1.5 miles west of, 40 feet north of center of road; gum tree painted "U. S. B. M. 313"; copper nail in root, elevation 89.38 feet.....	30 00 04.15	95 17 27.36	3,960
Humble, 0.2 mile north and 0.7 mile west of, 100 feet east of angle in road; 30 feet north of center of road; iron post stamped "Prim. Trav. Sta. No. 138, 1915," elevation 88.965 feet.....	30 00 04.35	95 16 36.44	4,477

## WEEDEN QUADRANGLE—Continued.

From Spring to Humble through woods and along log tramroad.

Station.	Latitude.	Longitude.	Distance between stations.
	• ° "	• ° "	Feet.
Spring, 0.75 mile south and 3 miles east of, 400 feet N. 78° W. from residence of Mrs. Reardon, 120 feet south of a fence corner, 25 feet west of roadway; oak tree painted "U. S. B. M. 306"; copper nail in root, elevation 108.21 feet.....	30 04 05.37	95 21 59.16	.....
Spring, 0.85 mile south and 3 miles east of, about 400 feet south 40° west from residence of Mrs. Reardon; 15 feet northwest of large oak tree; iron post stamped "Prim. Trav. Sta. No. 135, 1915," elevation 108.363 feet.....	30 04 01.17	95 21 57.16	459
Spring, 0.9 mile south and 3.8 miles east of, about 0.3 mile northwest of Mr. Scanlon's house; in woods, at south side of road; oak tree painted "U. S. B. M. 307"; copper nail in root, elevation 105.19 feet.....	30 04 00.04	95 21 11.92	3,978
Spring, 1.15 miles south and 4.2 miles east of, 1,100 feet southeast of Mr. Scanlon's house, 20 feet south of fence corner at southeast corner of his field; pine tree painted "U. S. B. M. 316"; copper nail in root, elevation 98.99 feet.....	30 03 46.06	95 20 48.02	2,532
Humble, 4 miles north and 4.6 miles west of, 2.2 miles northwest of tramway crossing of Cypress Creek, 35 feet southwest of center of tramroad, in clearing; live-oak tree painted "U. S. B. M. 317"; copper nail in root, elevation 99.68 feet.....	30 03 23.62	95 20 31.46	2,603
Humble, 3.4 miles north and 4 miles west of, 50 feet east of tramroad and 90 feet north of a dim road crossing; oak tree painted "U. S. B. M. 318"; copper nail in root, elevation 102.66 feet.....	30 02 51.16	95 19 57.89	4,412
Humble, 2.65 miles north by 3.6 miles west of, 0.3 mile northwest of crossing of Cypress Creek, 12 feet south of tramway, in top of stump 15 inches high; copper nail painted "U. S. 80.4 B. M.," elevation 80.40 feet.....	30 02 12.10	95 19 38.65	4,233
Humble, 2.65 miles north and 3.7 miles west of, 0.4 mile northwest of crossing of Cypress Creek, 8 feet east of tramroad; oak tree painted "U. S. B. M. 319"; copper nail in root not found in 1916.....	30 01 56.23	95 19 22.11	2,162
Humble, 2.3 miles north and 3.45 miles west of, 100 feet northwest of center of tramroad, bridge across Cypress Creek, 13 feet west of track; gum tree painted "U. S. B. M. 320"; copper nail in root, elevation 61.05 feet.....	30 01 32.21	95 18 57.13	3,274
Humble, 1.85 miles north and 3 miles west of, 3,300 feet southeast of tramroad crossing of Cypress Creek, 15 feet west of track; oak tree painted "U. S. B. M. 321"; copper nail in root, elevation 97.78 feet.....	30 01 08.88	95 18 30.97	3,293
Humble, 1.4 miles north and 2.6 miles west of, 15 feet north of tramroad track; pine tree painted "U. S. B. M. 322"; copper nail in root, elevation 98.46 feet.....	30 01 01.66	95 18 01.43	2,699
Humble, 1.25 miles north and 2.1 miles west of, 115 feet west of dim settlement road crossing tramway (road leads to Evans ford on Spring Creek), 17 feet south of track in small clearing; iron post stamped "Prim. Trav. Sta. No. 139, 1915," elevation 96.985 feet.....	30 00 42.73	95 17 14.65	4,537
Humble, 0.9 mile north and 1.3 miles west of, 15 feet south of center of track; oak tree painted "U. S. B. M. 323"; copper nail in root, elevation 90.73 feet.....	30 00 24.49	95 16 31.18	4,243

## Along Houston, East &amp; West Texas Railway.

Humble, 1 mile north of, about 200 feet north of post marked "1 mile to Humble," 70 feet east of center of track; at edge of woods; gum tree painted "U. S. B. M. 472"; copper nail in root, elevation 65.88 feet.....	30 00 44.28	95 15 35.55	.....
Humble, 1.9 miles north of, opposite south end of trestle approach to bridge across San Jacinto River, 50 feet east of track and 20 feet lower in corner of right-of-way fence; iron post stamped "Prim. Trav. Sta. No. 196, 1915," elevation 48.359 feet.....	30 01 29.61	95 15 17.98	4,833
Humble, 2.5 miles north of, 350 feet north of wooden spur switch stand, 50 feet east of center of track at road crossing, pine tree painted "U. S. B. M. 471"; copper nail in root; not found in 1916.....	30 01 49.42	95 15 11.17	2,089
Weeden, opposite sign post Houston East & West Texas Ry., top of rail, elevation 62.9 feet.....			

## KATY QUADRANGLE.

From point near northeast corner of quadrangle south, west, and north in northern part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	* * "	* * "	Fct.
Katy, 5.4 miles north by 4 miles east of, 20 feet north by 20 feet east of T road, corners, roads north, south, and east; 6 inches from corner fence post; wire nail in hub; post painted "U. S. B. M. 124," elevation 145.76 feet.....	29 51 52.95	95 45 24.66	
Katy, 4.4 miles north by 4 miles east of, 20 feet west of center of north and south road, 3,000 feet south of crossroads; 6 inches from corner fence post; wire nail in hub; post painted "U. S. B. M. 125," elevation 144.01 feet.....	29 51 02.04	95 45 24.62	5,141
Katy, 4 miles north by 4 miles east of, at cross-roads.....	29 50 45.39	95 45 24.19	1,682
Katy, 4.1 miles north by 3.5 miles east of, 0.5 mile east of Stockdick schoolhouse, 25 feet south of road, 3 feet from corner fence post at north and south fence line; iron post stamped "Prim. Trav. Sta. No. 60, 1915," elevation 142.479 feet.....	29 50 44.91	95 45 54.07	2,635
Stockdick schoolhouse, crossroads at.....	29 50 44.97	95 46 24.06	2,645
Katy, 4.1 miles north by 2.6 miles east of, 1,957 feet west of crossroads at Stockdick schoolhouse, 30 feet north of center of east and west road; 1 foot from telephone pole; copper nail in hub; painted "U. S. B. M. 126," elevation 145.81 feet.....	29 50 45.08	95 46 46.25	1,957
Katy, 4.1 miles north by 1.8 miles east of, 6,641 feet west of Stockdick schoolhouse, 30 feet north of center of road; 1 foot from telephone pole; copper nail in hub; witness stake painted "U. S. B. M. 127," elevation 149.86 feet.....	29 50 44.71	95 47 33.41	4,684
Katy, 4.1 miles north by 1 mile east of, 25 feet south by 25 feet east of center of crossroads, 2.5 feet from fence corner; iron post stamped "Prim. Trav. Sta. No. 61, 1915," elevation 154.086 feet.....	29 50 43.88	95 48 23.48	3,885
Katy, 4.1 miles north of, 633 feet east of crossroads, 30 feet north of road, 1 foot from corner fence post at fence north; copper nail in hub; witness stake painted "U. S. B. M. 128," elevation 157.45 feet.....	29 50 43.91	95 49 16.77	4,096
Katy, 4.1 miles north of; center of crossroads.....	29 50 43.50	95 49 23.03	633
Katy, 4.5 miles north of, 23 feet east of center of road, 6 inches from gatepost at north end of gate, near house painted green below and yellow above; copper nail in hub; post painted "U. S. B. M. 101," elevation 160.04 feet.....	29 51 09.93	95 49 23.93	2,671
Katy, 5.6 miles north of, 2,500 feet south of white schoolhouse on west side of road, opposite private lane west, 30 feet east of center of public road; iron post stamped "Prim. Trav. Sta. No. 49, 1915," elevation 160.140 feet.....	29 52 02.07	95 49 24.36	5,238
Katy, 6.1 miles north of, 300 feet north of schoolhouse; at cross-roads, center of culvert, elevation 160.18 feet.....			
Katy, 6 miles north of; center of crossroads.....	29 52 28.28	95 49 24.95	2,649
Katy, 3.6 miles east of, about 50 feet south of Missouri, Kansas & Texas Ry.; 6 inches from telephone pole; copper nail in hub; pole painted "U. S. B. M. 95," elevation 130.36 feet.....	29 47 07.30	95 45 37.38	
Katy, 2.6 miles east of, about 50 feet south of Missouri, Kansas & Texas Ry., about 1.5 feet north of telephone pole, close to wire fence; 25 feet north of public road; pole painted "U. S. P. B. M.," United States Coast and Geodetic Survey bench mark, primary traverse station No. 46, 1915, elevation 134.488 feet.....	29 47 07.58	95 46 35.08	5,086
Stone culvert, northeast corner of, 70 feet southwest of private road crossing, elevation 137.53 feet.....			
Katy, 1.8 miles east of, about 50 feet south of railroad track, 25 feet north of center of road; 6 inches from telephone pole; copper nail in hub; pole painted "U. S. B. M. 96," elevation 135.46 feet.....	29 47 07.77	95 47 26.11	4,499
Katy, 0.9 mile east of, about 60 feet south of center of Missouri, Kansas & Texas Ry., 25 feet north of center of road, 6 inches from telephone pole; copper nail in hub; pole painted "U. S. B. M. 97," elevation 137.73 feet.....	29 47 07.97	95 48 17.14	4,49
Katy, 520 feet west of station, Missouri, Kansas & Texas Ry., 42 feet south of center of track; 4 feet east by 2 feet south of telephone pole; iron post stamped "Prim. Trav. Sta. No. 47, 1915," elevation 140.984 feet.....	29 47 08.32	95 49 18.65	5,423
Katy, in southwest corner foundation of water tank of Katy Rice Milling Co., about 175 meters (574 feet) west by 100 meters (328 feet) south of station; copper bolt set in lead (Coast and Geodetic Survey bench mark) "X7", elevation 141.355 feet.....	29 47 05.41	95 49 19.57	306
County corner, Fort Bend, Waller, and Harris counties, on bank of branch of Buffalo Bayou, just west of town of Katy; a large stone monument (no elevation).....	29 47 17.96	95 49 32.40	1,700
Katy, 0.8 mile north of, 20 feet west of center of road, 100 feet north of road forks, 600 feet south of white house with windmill on west side of road; 6 inches from cedar telephone pole; copper nail in hub; pole painted "U. S. B. M. 98," elevation 145.91 feet.....	29 47 52.00	95 49 29.03	3,453
Katy, 1.7 miles north of, 20 feet west of center of road, opposite small house on west; copper nail in hub painted "U. S. B. M. 99," elevation 149.77 feet.....	29 48 38.95	95 49 29.55	4,748

**KATY QUADRANGLE—Continued.**

**From point near northeast corner of quadrangle south, west, and north in northern part of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Katy, 2.8 miles north of, 20 feet east of center of road; close to fence line directly opposite a one and one-half story unpainted house on west side of road and about 800 feet north of red barn with star in each gable end on east side of road; iron post stamped "Prim. Trav. Sta. No. 48," elevation 156.620 feet.....	29 49 35.61	95 49 23.10	Feet. 5,752
Katy, 0.7 miles north of, about 20 feet west of center of road, 0.5 foot from telephone pole, 3,160 feet north of crossroads; copper nail in hub; pole painted "U. S. B. M. 100," elevation 156.47 feet.....	29 50 22.52	95 49 24.00	4,740

Magnetic declination in quadrangle,  $8^{\circ} 45'$  E.

**HUMBLE QUADRANGLE.**

**Along public roads from Humble to Dyersdale.**

Station.	Latitude.	Longitude.	Distance between stations.
Humble, station Houston East & West Texas Ry., 250 feet north of, 20 feet north of water tank, 12 feet east of center of track; 1 foot east of distance post to tank; copper nail in hub; post painted "U. S. B. M. 314," elevation 92.36 feet.....	29 59 54.78	95 15 55.80	Feet. .....
Humble, 0.8 mile south and 0.4 mile east of, 30 feet east of center of Humble-Houston road; 3 inches west of telephone pole; painted "U. S. B. M. 315"; copper nail in hub, elevation 87.35 feet.....	29 59 10.74	95 15 32.33	4,908
Humble, 1.4 miles south and 0.25 mile east of, 35 feet west of center of Humble-Houston road; 10 feet west of line of telephone poles; iron post stamped "Prim. Trav. Sta. No. 140, 1915," elevation 84.045 feet.....	29 58 37.40	95 15 41.47	3,464
Humble, 2.3 miles south of, 30 feet east of center of road, close to lane east; 1 foot from telephone pole painted "U. S. B. M. 325," 371;" copper nail in hub, elevation 75.25 feet.....	29 57 53.84	95 15 50.93	4,479
Humble, 2.9 miles south of, 60 feet northeast of forks of road; 1 foot from corner fence post painted "U. S. B. M. 326"; copper nail in hub, elevation 66.96 feet.....	29 57 20.87	95 15 58.58	3,398
Humble, 3.4 miles south and 0.5 mile west of; crossroads.....	29 56 55.26	95 16 26.67	3,578
Humble, 3.8 miles south and 0.9 mile west of, 15 feet southeast of center of road; at base of double pine tree painted "U. S. B. M. 371"; copper nail in hub, elevation 73.58 feet.....	29 56 34.24	95 16 49.42	2,919
Humble, 4.2 miles south and 1.35 miles west of forks of road.....	29 56 10.23	95 17 15.65	3,349
Humble, 4.6 miles south and 1.3 miles west of, 1,200 feet south 35° east from crossing of Houston-Humble road and Houston, East & West Texas Ry., 25 feet east of center of road, at small wooden bridge; iron post stamped "Prim. Trav. Sta. No. 159, 1915," elevation 67.903 feet.....	29 55 50.03	95 17 14.75	2,043
Humble, 5.6 miles south and 1.3 miles west of, in edge of timber, 20 feet west of road; gum tree painted "U. S. B. M. 372"; copper nail in hub, elevation 58.48 feet.....	29 54 55.99	95 17 14.54	5,459
Humble, 6.3 miles south and 1.3 miles west, 20 feet west of road; gum tree painted "U. S. B. M. 373"; copper nail in root, elevation 65.42 feet.....	29 54 10.58	95 17 13.79	4,589
Humble, 6.5 miles south and 1.3 miles west of, T road north.....	29 53 56.89	95 17 13.40	1,384
Dyersdale, 0.5 mile north and 2 miles west of, 1,900 feet east of T road north, 10 feet north of road; iron post stamped "Prim. Trav. Sta. No. 160, 1915," elevation 68.848 feet.....	29 53 57.22	95 16 51.60	1,920
Dyersdale, 0.5 mile north and 1 mile west of, 10 feet north of road; oak tree painted "U. S. B. M. 374"; copper nail in root, elevation 62.70 feet.....	29 53 57.97	95 15 50.74	5,357
Dyersdale, 0.5 mile north and 0.15 mile west of, 350 feet southeast of forks of road, 20 feet southwest of center of road; oak tree painted "U. S. B. M. 375"; copper nail in root, elevation 57.36 feet.....	29 53 55.70	95 15 00.83	4,399

**Along Beaumont, Sour Lake & Western Railway.**

Dyersdale, 0.5 mile south and 0.15 mile west of, 50 feet northwest of center of track, just outside right of way fence; pine tree painted "U. S. B. M. 376"; copper nail in root.....	29 52 51.85	95 15 31.22	.....
Tree fallen down in 1916; copper rail in tree, elevation 61.27 feet.....			

**HUMBLE QUADRANGLE—Continued.**

On uncheckd spur line near east border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	•    "	•    "	<i>Feet.</i>
Humble, 3.4 miles south and 0.2 mile west of, 1,500 feet east of crossroads; in pasture; pine tree painted "U. S. B. M. 361"; copper nail in root.....	29 56 56.53	95 16 09.43	
Humble, 4 miles south and 0.5 mile east of, 10 feet south of gate at south end of private lane, fences north, south, and west; 6 inches from first fence post south of gate; painted "U. S. B. M. 362"; copper nail in hub.....	29 56 26.94	95 15 26.46	4,883
Humble, 2.5 miles south and 0.7 mile east of, 4,500 feet northeast of forks on Houston-Humble Road, 20 feet west of T road north, 12 feet north of road in top of east end of concrete culvert; bronze tablet stamped "Prim. Trav. Sta. No. 141, 1915," elevation 68.884 feet.....	29 57 41.56	95 15 13.50	

## Along highways near west border of quadrangle.

Aldine, 2.15 miles south of, 5 feet south and 50 feet east of public road crossing International & Great Northern Ry., 1 foot east of corner fence post; copper nail in hub; painted "U. S. B. M. 243" on corner post brace, elevation 76.77 feet.....	29 54 06.57	95 22 20.74	
Aldine, 3.10 miles south of, 1,500 feet south of bridge over creek, 30 feet west of center of road, 1 foot east of fence line; 15 feet east of telegraph pole painted "U. S. B. M. 244"; copper nail in hub, elevation 74.77 feet.....	29 53 18.46	95 22 08.73	4,574
Alline, 3.70 miles south of, 55 feet east of center of track, 25 feet west of center of road, at gate in right-of-way fence, 4 feet east of north gate post; iron post stamped "Prim. Trav. Sta. No. 110, 1915," elevation 77.935 feet.....	29 52 49.44	95 22 01.44	3,002
Houston-Alpine road, 3.7 miles south of Aldine, 0.73 mile east of International & Great Northern Ry., 1 mile southwest of Halls Bayou, top of west end of concrete culvert; chiseled square painted "U. S. 73.1 B. M.," elevation 73.10 feet.....			

## From point 5 miles south of Humble, southwest to point 4 miles north of Houston.

Houston-Humble road, 4 miles south of Humble, east side of road, top of concrete milepost 14, elevation 75.82 feet.....			
Humble, 4.2 miles south by 1.35 miles west of, 500 feet north of road crossing Houston East & West Texas Ry., at forks of road, northeast corner of small bridge, in plank; copper nail painted "U. S. 70.7 B. M.," elevation 70.36 feet.....			
Humble, 6 miles south of, about 1 mile south of Houston East & West Texas Ry. crossing, in bottom railing, east end of bridge; copper nail painted "U. S. 74.0 B. M.," elevation 73.32 feet.....			
Humble, 7 miles south of, 1,200 feet south of bridge over large drainage ditch, 25 feet east of road, 1 foot east of telephone pole painted "U. S. 69.0 B. M.," elevation 68.89 feet.....			
Humble, 7.25 miles south of, 0.5 mile south of bridge over large drainage ditch near T road west, in top of east head wall of brick culvert, at angle in road; chiseled square painted "U. S. 73 B. M.," elevation 72.38 feet.....			
Humble, 3 miles south of, 0.75 mile north of crossroads, 600 feet north of angle in road, in top of west brick head wall of culvert; chiseled square painted "U. S. 73 B. M.," elevation 73.00 feet.....			
Humble, 8.75 miles south of, 0.6 mile southwest of Mount Houston station on Houston East & West Texas Ry., at crossroads, opposite concrete highway milepost 10, in bottom railing, east end of bridge; copper nail painted "U. S. 70 B. M.," elevation 70.15 feet.....			
Houston, 9 miles north of, on Humble road, 190 feet southwest of concrete milepost 9, in top of east end of brick culvert; chiseled square painted "U. S. 67 B. M.," elevation 66.68 feet.....			

Magnetic declination for quadrangle,  $8^{\circ} 30' E.$

## SEABROOK QUADRANGLE.

Along road from La Porte to Seabrook.

Station.	Latitude.	Longitude.	Distance between stations.
La Porte, 3.15 miles south of, 450 feet north of small wooden bridge, 25 feet west of road; 18 inches east of fence line; iron post stamped "Prim. Trav. Sta. No. 207, 1915," elevation 13.982 feet.....	29 37 09.50	95 01 06.23	Feet.....
La Porte, 4 miles south of, 30 feet east of road, at south end of gate; 1 foot west of gate post painted "U. S. B. M. 503"; copper nail in hub, elevation 14.83 feet.....	29 36 23.40	95 01 12.46	4,690
Seabrook, 2 miles north of, 490 feet north of small wooden bridge, 30 feet east of road, 10 feet north of fence corner; 1 foot west of post painted "U. S. B. M. 504"; copper nail in hub, elevation 16.37 feet.....	29 35 37.90	95 01 30.31	4,850
Seabrook, 1.25 miles north of, 50 feet east of Southern Pacific R. R., 30 feet west of road, 50 feet south of gate and private road crossing, opposite white house; 3 feet west of wire fence; iron post stamped "Prim. Trav. Sta. No. 208, 1915," elevation 22.514 feet.....	29 34 54.63	95 01 44.56	4,538
Seabrook, 1,840 feet north of, 30 feet west of road; 4 inches east of telephone pole painted "U. S. B. M. 505"; copper nail in hub, elevation 17.46 feet.....	29 34 07.81	95 01 36.74	4,801
Seabrook station, just north of; public road crossing Southern Pacific R. R.....	29 33 49.57	95 01 34.35	1,855
Seabrook, opposite station of Southern Pacific R. R.; top of rail, elevation 14.48 feet.....			
Seabrook, 1.7 miles north of, 100 feet southeast of road crossing Southern Pacific R. R., in bottom railing, west end of small wooden bridge, at angle in road; copper nail painted "U. S. 19.8 B. M.," elevation 19.90 feet.....			

## From Seabrook to Webster along public road.

Seabrook station, 0.5 mile southwest of, 30 feet south of road, on top of concrete fence wall at fence corner, painted "U. S. B. M. 506"; circle chiseled around corner, elevation 2.95 feet.....	29 33 32.35	95 01 55.24	2,537
Seabrook, 1 mile west of, 200 feet north of shore line of Clear Lake, 30 feet north of road, 10 feet west of advertising signboard marked "Houston 27 mi.": iron post stamped "Prim. Trav. Sta. No. 209, 1915," elevation 15.378 feet.....	29 33 44.91	95 02 37.95	3,990
Seabrook, 1.6 miles west of, 85 feet east of end of bridge over Taylor's Bayou, 20 feet northeast of center of road; oak tree painted "U. S. B. M. 507"; copper nail in root, elevation 15.30 feet.....	29 33 53.95	95 03 13.57	3,275
Seabrook, 2.5 miles west of, 25 feet north of road, 3 feet north of fence line; oak tree painted "U. S. B. M. 508"; copper nail in root of stump (tree blown over in 1915), elevation 19.03 feet.....	29 33 55.05	95 04 03.55	4,415
Webster, 1.4 miles north and 2.6 miles east of, 200 feet northeast of a bungalow, 100 feet west of end of Clear Lake, at approximate right angle in road, in line of road west; iron post stamped "Prim. Trav. Sta. No. 210, 1915," elevation 15.737 feet.....	29 33 23.25	95 04 29.60	4,202
Webster, 1.2 miles north and 1.75 miles east of, 25 feet north of road, nearly opposite a bungalow south of road; 6 inches south of telephone pole painted "U. S. B. M. 509"; copper nail in hub, elevation 19.13 feet.....	29 33 05.22	95 05 17.69	4,511
Webster, 0.7 mile north and 1 mile east of, 150 feet east of white house, 65 feet north of road, 35 feet north of gate; oak tree painted "U. S. B. M. 510"; copper nail in root, elevation 18.14 feet.....	29 32 50.49	95 06 05.14	4,447
Webster, 700 feet northeast of public road crossing of Galveston, Houston & Henderson R. R., 25 feet north of T road corners, road south to League City; iron post stamped "Prim. Trav. Sta. No. 211, 1915," elevation 25.734 feet.....	29 32 23.03	95 06 57.88	5,584
Webster, 0.3 mile southeast of, on right of way of Galveston, Houston & Henderson R. R., 40 feet southeast of mile board 22, 50 feet southwest of tracks; cross on top of section rail (C. & G. S. b. m. MM22), elevation 26.943 feet.....	29 32 15.43	95 07 03.80	700

## From Seabrook toward Deepwater along public road.

Seabrook, 1.7 miles north and 0.25 mile west of, public road crossing Southern Pacific R. R.....	29 35 18.36	95 01 49.00	.....
Seabrook, 1.8 miles north and 0.6 mile west of, 65 feet south of road, oak tree painted "U. S. B. M. 531"; copper nail in root, elevation 16.80 feet.....	29 35 23.37	95 02 10.33	1,950
Seabrook, 1.8 miles north and 1.25 miles west of, 1,750 feet west of Taylor's Bayou, 35 feet north of road; oak tree painted "U. S. B. M. 532"; copper nail in root, elevation 13.86 feet.....	29 35 21.46	95 02 47.65	3,301

## SEABROOK QUADRANGLE—Continued.

From Seabrook toward Deepwater along public road—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Seabrook, 1.9 miles north and 1.7 miles west of, 2,000 feet northwest of a right angle in road, 1,700 feet northeast of a house; 25 feet northeast of road beside wire fence which bears N. 50° E.; iron post stamped "Prim. Trav. Sta. No. 219, 1913," elevation 17.046 feet.....	• / " 29 35 27.87	• / " 95 03 14.91	Fect. 2,492
Seabrook, 2.3 miles north and 2.25 miles west of, about 400 feet southwest of road, in field; oak tree 4 feet in diameter painted "U. S. B. M. 533"; copper nail in root, elevation 16.89 feet.....	29 35 49.59	95 03 49.80	3,781
Seabrook, 3.1 miles north and 3.1 miles west of, 50 feet southwest of road, at edge of woods; oak tree painted "U. S. B. M. 534"; copper nail in root, elevation 20.57 feet.....	29 36 32.07	95 04 41.41	6,259
Seabrook, 3.3 miles north and 3.35 miles west of, T road northeast.....	29 36 42.50	95 04 54.60	1,570
Seabrook, 3.5 miles north and 3.6 miles west of, 970 feet northwest of bridge, 20 feet southwest of road, at edge of woods; iron post stamped "Prim. Trav. Sta. No. 220, 1915," elevation 20.213 feet.....	29 36 54.29	95 05 10.78	1,859
Seabrook, 4 miles north and 4.1 miles west of, 35 feet northeast of road; oak tree painted "U. S. B. M. 535"; copper nail in root, elevation 19.54 feet.....	29 37 16.46	95 05 39.16	3,360

Magnetic declination for quadrangle, 8° 10' E.

## LOUETTA QUADRANGLE.

Mostly along public roads.

Station.	Latitude.	Longitude.	Distance between stations.
Cypress, 3 miles north and 5 miles east of 1.5 miles west of West Montgomery road, 55 feet north of center of road; pine tree painted "U. S. B. M. 257"; copper nail in root, elevation 148.01 feet.....	• / " 30 00 45.13	• / " 95 36 51.33	Fect. 4,641
Kohrville, about 0.5 mile north and 0.8 mile west of, 0.5 mile west of West Montgomery road, at north side of road; in root of oak tree painted "U. S. B. M. 258;" copper nail, elevation 144.63 feet.....	30 00 45.07	95 35 55.70	4,891
Culvert, 30 feet south of crossroads, on West Montgomery road; top of painted bolt at northeast corner of culvert, elevation 144.1 feet.....			
Kohrville, about $\frac{1}{2}$ mile north and $\frac{1}{2}$ mile west of, T road west at junction with West Montgomery road.....	30 00 45.60	95 35 24.26	2,763
Kohrville, 0.5 mile north of, 300 feet north of a church, 25 feet west of road and 23 feet south of road west; iron post stamped "Prim. Trav. Sta. No. 117, 1915," elevation 142.128 feet.....	30 00 45.49	95 35 07.93	1,440
Louetta, 0.3 mile north of 117 and Brazos Valley Rv. crossing, 90 feet south and 45 feet west of, 40 feet south of public road; in root of oak tree painted "U. S. B. M. 259"; copper nail, elevation 141.31 feet.....	30 01 19.71	95 34 14.24	5,450
Louetta, $\frac{1}{2}$ mile northeast of, 40 feet north of Cypress-Spring road; pine tree painted "U. S. B. M. 260"; copper nail in root, elevation 140.30 feet.....	30 01 42.05	95 33 36.94	3,981
Louetta, 1.5 miles northeast of, on Cypress-Spring road, 1.15 miles west of Stuebner "air line" road, 30 feet south of road, 25 feet east of fence corner; iron post stamped "Prim. Trav. Sta. No. 120, 1915," elevation 144.007 feet.....	30 02 07.18	95 33 09.74	3,488
Spring, 3 miles south and 7.5 miles west of, 2,300 feet southwest of Stuebner "air line" road, north side of bridge across creek, at west end of bridge railing; painted "U. S. B. M. 267"; copper nail in hub, elevation 139.11 feet.....	30 02 32.14	95 32 40.92	3,574
Spring, 2.8 miles south and 7.15 miles west of: crossroads.....	30 02 43.77	95 32 18.07	2,327
Spring, 2 miles south and 6.6 miles west of, 0.6 mile east of Stuebner "air line" road, 300 feet southeast of white house, 25 feet north of road and 6 feet west of corner fence post; iron post stamped "Prim. Trav. Sta. No. 199, 1915," elevation 139.348 feet.....	30 02 58.83	95 31 37.24	3,428
Spring, 2.2 miles south and 6.2 miles west of, 450 feet south of a T road northwest at edge of pine woods; in root of pine tree painted "U. S. B. M. 478"; copper nail, elevation 132.94 feet.....	30 02 50.70	95 31 12.17	2,352
Spring, 2.5 miles south and 5.4 miles west of, 0.2 mile west of white church, 25 feet south of center of road and 6 inches from large corner fence post painted "U. S. B. M. 477"; copper nail in hub, elevation 128.93 feet.....	30 02 34.05	95 30 26.57	4,348

## LOUETTA QUADRANGLE—Continued.

## Along Air Line road near Cypress Creek.

Station.	Latitude.	Longitude.	Distance between stations.
Cypress Creek, 2.65 miles northwest of, 25 feet west of road, 12 feet from fence corner; large pine tree painted "U. S. B. M. 268"; copper nail in root, elevation 135.52 feet.....	° ° "	° ° "	Feet.
Cypress Creek, 1.75 miles northwest of, 25 feet west of road, 5 feet east of large pine tree; iron post stamped "Prim. Trav. Sta. No. 121, 1915," elevation 124.014 feet.....	30 02 17.67	95 32 12.64	.....
Cypress Creek, 0.9 mile northwest of, 100 feet southeast of bend of road, 30 feet east of road; oak tree painted "U. S. B. M. 269"; copper nail in root, elevation 118.82 feet.....	30 01 35.60	95 31 48.44	4,751
Cypress Creek, about 40 feet southwest of north end of bridge over; in root of mangolia tree painted "U. S. B. M. 270"; copper nail, elevation 108.27 feet.....	30 01 04.08	95 31 12.38	4,492
	30 00 23.38	95 30 44.06	4,807

## Along West Montgomery road north from International &amp; Great Northern Railway.

Steubner, 1.2 miles east by 1.7 miles south of, 0.4 mile north of International & Great Northern Ry., 15 feet east of road and 6 inches from base of pine tree painted "U. S. B. M. 265"; copper nail in hub, elevation 133.52 feet.....	30 06 28.83	95 32 59.19	.....
Steubner, 1 mile east and 0.8 mile south of, 1 mile north and 0.5 mile west of International & Great Northern Ry. crossing, 0.9 mile south of T road west, 40 feet east of road; oak tree painted "U. S. B. M. 264"; copper nail in root, elevation 146.37 feet.....	30 07 05.80	95 33 14.68	3,975

## Near northeast corner of quadrangle.

Rotherwood spur, International & Great Northern Ry., 1.9 miles north and 0.5 mile west of, about 1,200 feet west of farmhouse, 10 feet south of wood road; post-oak tree 18 inches in diameter, painted "U. S. B. M. 301"; copper nail in root..... NOTE.—Tree blown down. (Copper nail in top of stump, 37 feet southwest of original position of t. b. m. 301). Elevation 127.71 feet.	30 07 27.70	95 30 15.53	.....
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## Along highways near south border of north half of quadrangle.

Tomball station, about 165 feet north of Trinity & Brazos Valley Ry. depot, 20 feet west of track; in southwest corner of southeast concrete pier of water tank; bronze tablet stamped "Prim. Trav. Sta. No. 99, 1915," elevation 188.396 feet.....	30 05 55.28	95 36 50.33	5,383
Tomball, 0.75 mile east of, 90 feet north of crossroads (private road south), 15 feet east of center of north and south road; 8 feet from wire fence; in root of wild cherry tree painted "U. S. B. M. 223"; copper nail, elevation 183.64 feet.....	30 06 07.68	95 36 08.59	3,876
Hufsmith, about 0.60 mile south and 0.20 mile west of, about 900 feet south of church, 25 feet west of center of road, 6 inches from fence post, at angle in fence; painted "U. S. B. M. 224"; copper nail in hub, elevation 173.40 feet.....	30 06 50.25	95 35 58.91	4,383
Hufsmith, 200 feet northwest of station; public road crossing International & Great Northern Ry. (no elevation).....	30 07 19.24	95 35 46.69	3,118

## Along International &amp; Great Northern Railway.

Hufsmith, about 1,400 feet east of, along International & Great Northern Ry. track, 550 feet south of track, nearly opposite milepost 11, 25 feet south and 30 feet west of a right angle in road; 4 feet south of corner fence post; iron post stamped "Prim. Trav. Sta. No. 100, 1915," elevation 174.796 feet.....	30 07 06.41	95 35 33.70	1,726
Hufsmith, 1.25 miles east of, 125 feet west of public road crossing, 35 feet south of center of track; 1 foot from telegraph pole (milepost 10) painted "U. S. B. M. 225"; copper nail in hub, elevation 150.22 feet.....	30 06 41.91	95 34 41.50	5,211
Hufsmith, 2.25 miles east of, 35 feet south of track; 6 inches from telegraph pole (milepost 9) painted "U. S. B. M. 226"; copper nail in hub, elevation 152.48 feet.....	30 06 22.76	95 33 47.28	5,141

## LOUETTA QUADRANGLE—Continued.

Along International &amp; Great Northern Railway—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Hufsmith, 2.60 miles east of, 0.30 mile east of mile post 9, 30 feet south of track, 850 feet east of a private road crossing 24 feet north of telegraph pole; iron post stamped "Prim. Trav. Sta. No. 101, 1915," elevation 150.938 feet.....	* ' "	* ' "	Fect. 1,606
Hufsmith, 3.35 miles east of, 625 feet east of milepost 8, 32 feet southeast of public-road crossing, 14 feet northeast of crossing; sign post painted "U. S. B. M. 227"; copper nail in hub, elevation 137.82 feet.....	30 06 19.58	95 33 29.35	4,226
Willow, top of rail opposite store, elevation 148 feet.....	30 06 11.30	95 32 42.20	.....
Hufsmith, 4.30 miles east of, 280 feet east of road crossing, 32 feet south of track; 6 inches from telegraph pole (milepost 7) painted "U. S. B. M. 228"; copper nail in hub, elevation 145.92 feet.....	30 06 01.77	95 31 49.54	4,725
Hufsmith, 5.40 miles east of, 65 feet east of east end of "Avonak siding," 45 feet south of track; 10 feet south of milepost 6; iron post stamped "Prim. Trav. Sta. No. 102, 1915," elevation 143.855 feet.....	30 05 50.28	95 30 45.76	5,722
Spring, 5.20 miles west of; road crossing.....	30 05 46.85	95 30 23.95	1,947

## MORGANS POINT QUADRANGLE.

Near Cedar Bayou.

Station.	Latitude.	Longitude.	Distance between stations.
Cedar Bayou post office, 0.2 mile south and 0.35 mile west of, 400 feet east of brick schoolhouse, 20 feet south and 20 feet east of T road south; hackberry tree in fence corner painted "U. S. B. M. 434"; copper nail in root, elevation 25.90 feet.....	* ' "	* ' "	Fect. ....
Cedar Bayou post office, 0.2 mile south and 1.35 miles west of, 25 feet north of road, opposites small frame house; 6 feet south of fence line; iron post stamped "Prim. Trav. Sta. No. 183, 1915," elevation 38.211 feet.....	29 44 58.71	94 56 08.88	.....
Cedar Bayou post office, 0.35 mile south and 2 miles west of, 45 feet north and 35 feet west of crossroads; 18 inches south of corner fence post painted "U. S. B. M. 435"; copper nail in hub, elevation 30.67 feet.....	29 44 57.37	94 57 08.41	5,250
Cedar Bayou post office, 0.4 mile south and 3 miles west of, 25 feet north of east end of wooden bridge, at edge of timber; oak tree painted "U. S. B. M. 436"; copper nail in root, elevation 24.01 feet.....	29 44 50.88	94 57 50.07	3,731
Cedar Bayou post office, 0.6 mile south and 3.75 miles west of, 0.6 mile west of Goose Creek at angle in road, where rice irrigating canal crosses the road; 10 feet north of road and in line of canal; iron post stamped "Prim. Trav. Sta. No. 184, 1915," elevation 28.648 feet.....	29 44 47.43	94 58 50.91	5,374
	29 44 57.24	94 59 32.31	3,782

Near west border of quadrangle.

La Porte, 1.7 miles northeast of, on road to Morgans Point, 400 feet southwest of railroad crossing; oak tree painted "U. S. B. M. 520"; copper nail in root, elevation 29.25 feet .....	29 40 36.00	94 59 38.47	.....
Morgans Point U. S. Corps of Engineers triangulation station. On the crest of Aliens Hill on the south side of San Jacinto Bay, on a bluff bank about 10 meters from F. Alien's fence and 18 meters southwest of an old fort or trench. The station is marked by a U. S. Corps of Engineers standard station mark and 3 feet below the ground by a rock with a copper wire in the center. There are two standard U. S. Corps of Engineers reference marks, one on range between the house on north end of Atkinsons Island and the station distant 18.29 meters; the other distant 18.41 meters in azimuth 358° 09', elevation of station mark 28.042 feet.....	29 40 51.41	94 59 09.57	2,981

Magnetic declination for north side of quadrangle, 8° 02' E.

## MYKAWA QUADRANGLE.

Along highways in north half of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations. <i>Feet.</i>
Minnetax schoolhouse, 1.6 miles south and 0.45 mile west of, 20 feet south and 20 feet west of T road south, 1 foot from corner fence post painted "U. S. B. M. No. 46"; copper nail in hub, elevation 56.59 feet.....	* / * 29 35 34.74	* / * 95 21 46.55	.....
Minnetax schoolhouse, 1 mile south and 0.25 mile east of, 500 feet north of road west, 25 feet east of north and south road, known as "Chocolate road"; iron post stamped "Prim. Trav. Sta. No. 23, 1915," elevation 55.560 feet.....	29 35 30.91	95 21 03.42	3,843
Minnetax schoolhouse, 0.6 mile south and 0.25 mile east of, 10 feet north of T road south, 28 feet east of northeast corner of bridge over ditch; copper nail in hub, witness stake, "U. S. B. M. No. 47" painted on bridge, elevation 58.93 feet.....	29 36 27.25	95 21 05.06	4,784
Minnetax schoolhouse, about 0.5 mile east of, on north side of road, 6 inches from fence post with braces on each side; copper nail in hub, post painted "U. S. B. M. No. 48," no elevation.....	29 36 59.10	95 20 49.54	3,497
Minnetax schoolhouse, 0.9 mile east of, Minnetax farmhouse, 900 feet west of, 40 feet north of culvert over drainage ditch, alongside fence post with two braces; spike in hub at foot of east brace, "T. B. M. 48 A.," elevation 51.96 feet.....	.....	.....	.....
Mykawa, 2 miles west of, 25 feet north of T road south, 1.5 feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 24, 1915," elevation 50.729 feet.....	29 37 14.91	95 20 14.71	3,466
Mykawa, 1.2 miles west of, 25 feet north of center of east and west road, 1 foot from telephone pole painted "U. S. B. M. No. 49"; copper nail in hub, elevation 53.44 feet.....	29 37 14.71	95 19 23.05	4,560
Mykawa, 0.25 mile west of, 400 feet southwest of brick schoolhouse, 25 feet north of center of road, 1.5 feet south of telephone pole painted "U. S. B. M. No. 50"; copper nail in hub, elevation 56.04 feet.....	29 37 14.53	95 18 30.76	4,616
Mykawa station, 75 feet north of; Santa Fe R. R. at road crossing, elevation top of rail 57.5 feet.....	29 37 14.23	95 18 15.61	1,337
Mykawa station, 1,270 feet east of, 25 feet south of east and west road, 15 feet east of corner fence post, 150 feet southeast of house; iron post stamped "Prim. Trav. Sta. No. 25, 1915," elevation 56.672 feet.....	29 37 13.83	95 18 01.25	1,268
Mykawa station, about 1.15 miles east of, 510 feet south of T road east, 20 feet northeast of small wooden bridge, 6 inches from fence post in north and south fence line; copper nail in hub, bridge painted "U. S. B. M. No. 51," elevation 53.20 feet.....	29 37 14.11	95 17 06.92	4,796

## In northeast quarter of quadrangle.

Friendswood, 1.8 miles north and 3.6 miles west of, 180 feet southeast of large ditch crossing road, 25 feet northeast of road, 1 foot west of gatepost, at northwest end of gate, painted "U. S. B. M. 52"; copper nail in hub, elevation 47.53 feet.....	29 33 15.46	95 15 35.50	.....
Friendswood, 2 miles north and 4 miles west of, T road corners, road northeast.....	29 33 25.59	95 16 00.80	2,458
Friendswood, 2.35 miles north and 3.7 miles west of, 0.5 mile S. 35° W. from new bridge across Clear Creek, nearly 0.5 mile N. 35° E. from Friendswood-Pearland road, 20 feet northwest of road at fence line; iron post stamped "Prim. Trav. Sta. No. 217, 1915," elevation 47.500 feet.....	29 33 43.24	95 15 41.80	2,449
Genoa, 4.1 miles south and 3.5 miles west of, center of new bridge across Clear Creek.....	29 34 02.56	95 15 20.36	2,720

## North across prairie.

Genoa, 3.3 miles south and 3.5 miles west of, in open prairie, at wire fence line which bears S. 35° W., about 1,000 feet northeast of point where fence meets Clear Creek, 6 inches east of fence post, not painted, marked with red keel "U. S. B. M. 530"; copper nail in hub, elevation 44.97 feet.....	29 34 31.95	95 15 24.57	2,992
Genoa, 2.3 miles south and 3.5 miles west of, in open prairie 0.25 mile east of Clear Creek, 6 inches south of gate post at double gate, fence down, post not painted marked with red keel "U. S. B. M. 529"; copper nail in hub, elevation 46.75 feet.....	29 35 20.41	95 15 25.78	4,896
Genoa, 1.8 miles south and 3.25 miles west of, in open prairie, water tank at Genoa bears N. 52° 30' E., nearest timber on Clear Creek is S. 37° W., about 0.75 mile, on small mound about 2 feet above level of prairie; iron post stamped "Prim. Trav. Sta. No. 218, 1915," elevation 50.053 feet.....	29 35 47.70	95 15 07.44	3,197

## MYKAWA QUADRANGLE—Continued.

North across prairie—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Genoa, 1.2 miles south and 3.2 miles west of group of mulberry trees, four out of six blown over by recent storm, most easterly tree partly blown over in 1915, painted "U. S. 53.2 B. M." copper nail in root; elevation, 53.17 feet.....	• • " 29 36 19.53	• • " 95 15 05.25	Fed. 3,221
Genoa, 0.4 mile south and 3.2 miles west of, 3,600 feet south of Genoa-Mykawa road on east and west fence line, between posts 55 and 56 east from fence corner; copper nail in hub; no painting; elevation, 48.26 feet.....	29 37 00.95	95 15 05 08	4,184

Magnetic declination for quadrangle  $8^{\circ} 15'$  E.

## NEW CANEY QUADRANGLE.

Near Scotts Ranch.

Station.	Latitude.	Longitude.	Distance between stations.
Scotts Ranch, 0.75 mile southwest of: oak tree painted "U. S. B. M. 452," copper nail in root, elevation 67.21 feet.....	• • " 30 07 35.03	• • " 95 07 43.84	Fed. ....

Magnetic declination for quadrangle,  $8^{\circ} 30'$  E.

## SCOTTS RANCH QUADRANGLE.

Near Scotts Ranch.

Station.	Latitude.	Longitude.	Distance between stations.
Scotts Ranch, 0.5 mile south and 0.4 mile east of, 5 feet south of road; oak tree painted "U. S. B. M. 451," copper nail in root, elevation 97.48 feet.....	• • " 30 07 35.90	• • " 95 06 48.88	Fed. ....
Scotts Ranch, about 500 feet south and 100 feet east of residence of Austin Scott, 40 feet south of fence, east side of road; iron post stamped "Prim. Trav. Sta. No. 190, 1915," elevation 73.105 feet..	30 07 59.65	95 07 11.07	3,091

Magnetic declination for quadrangle,  $8^{\circ} 30'$  E.

## HOLIK QUADRANGLE.

Near east border north from center line of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Hockley, 6.4 miles south by 1.9 miles west of, 200 feet east of corner post on fence line which bears N. $19^{\circ}$ W. (true bearing), 6 inches from west gatepost; copper nail in hub, gate painted "U. S. B. M. 186," elevation 173.69 feet.....	• • " 29 56 02.59	• • " 95 52 35.49	Fed. ....
Hockley, 5.5 miles south by 2.3 miles west of, near Harris-Waller county line, 2 feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 82, 1915," elevation 181.951 feet.....	29 56 51.17	95 52 56.62	5,247
Hockley, 4.8 miles south by 2.5 miles west of, along fence near Harris-Waller county line, about 500 feet west of house in clump of china-berry trees, at south end of gateway 6 inches from gatepost; copper nail in hub, post painted "U. S. B. M. 187," elevation 191.53 feet .....	29 57 27.69	95 53 10.84	3,895
Hockley, 3.9 miles south by 2.4 miles west of, 800 feet southwest of large white house, fifteenth fence post northwest of bend in fence line, 1 foot from fence post; copper nail in hub, post painted "U. S. B. M. 188," elevation 203.55 feet.....	29 58 12.68	95 53 03.23	4,593

**HOLIK QUADRANGLE—Continued.****Near east border north from center line of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Hockley, 2.8 miles south by 2.5 miles west of, on top of what is known as "The Mound," a small hill having an elevation of about 15 feet, above the surrounding prairie, 35 feet N. 40° E. (true bearing) from the most easterly one of two lone chinaberry trees; iron post stamped "Prim. Trav. Sta. No. 83, 1915," elevation 244.869 feet.....	• ' "	• ' "	
Hockley, 2.4 miles south by 2.2 miles west of, at south end of lane, where a road turns east, 2 feet north and 1 foot west of west gate-post in east-west fence; copper nail in hub, gate painted "U. S. B. M. 189," elevation 231.66 feet.....	29 59 11.32	95 53 13.61	Feet. 5,993
	29 59 31.83	95 52 53.05	2,750

**Magnetic declination in northeast quarter of quadrangle, 8° 30' E.****PARK PLACE QUADRANGLE.****Along highways in northern part of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Pasadena, 3 miles west of, 125 feet west of west approach to bridge over Sims Bayou, 20 feet north of center of road; iron post stamped "Prim. Trav. Sta. No. 3, 1915," elevation 19.827 feet.....	• ' "	• ' "	
Pasadena, 3.75 miles west of, 130 feet south of Southern Pacific R. R., 20 feet east of private road south, 1 foot from telephone pole painted "U. S. B. M. No. 5"; copper nail in hub, elevation 35.27 feet.....	29 42 37.89	95 15 25.37	Feet. .....
Harrisburg, 0.5 mile south of; T road east.....	29 42 51.97 29 42 51.61	95 16 06.38 95 16 41.51	3,886 3,098

**Along Galveston, Houston & Henderson Railroad from Harrisburg to Houston.**

Harrisburg station, 0.3 mile north of, center of railroad bridge over Brays Bayou, elevation 27.9 feet.....	29 43 38.45	95 16 42.06	4,734
Harrisburg station, 0.6 mile north of, on east side of track, center of top surface of concrete culvert; copper bolt set in lead and lettered "U. S. B. M." (Coast and Geodetic Survey bench mark "N8"), elevation 23.359 feet.....	29 43 54.43	95 17 49.87	6,116
Harrisburg station, 1.2 miles northwest of, 270 feet east of point where Forest Hill boulevard passes under Galveston, Houston & Henderson R. R., 50 feet north of center of railroad track, 4 feet from fence line; iron post stamped "Prim. Trav. Sta. No. 4, 1915," elevation 39.215 feet.....	29 44 07.16	95 18 32.98	2,388
Houston, Second Street crossing of Galveston, Houston & Henderson R. R., 50 feet west of line of Fifteenth Street, about 30 feet south of center of railroad track, 2 feet from telephone pole painted "U. S. B. M. No. 7"; copper nail in hub, elevation 39.61 feet.....	29 44 25.92 29 44 30.75	95 19 32.29 95 19 46.85	5,561 1,375
Houston, intersection of Houston Belt & Terminal and Galveston, Houston & Henderson R. R.; top of rail, elevation 42.2 feet.....			.....
Houston, road crossing 80 feet northeast of entrance to Evergreen Cemetery; top of rail, elevation 45 feet.....			.....
Houston, Dumble Street crossing of Galveston, Houston & Henderson R. R., 25 feet south and 50 feet west of center of track; 1 foot from telephone pole painted "U. S. B. M. No. 8"; copper nail in hub, elevation 43.07 feet.....			.....
Houston, Eastwood Avenue crossing.....			.....
Houston, Milby Street crossing, 300 feet northeast of Houston Belt & Terminal R. R.; top of rail, elevation 48.6 feet.....			.....
Houston, about 0.75 mile southeast of International & Great Northern Ry. station, in line with long tangent east on Galveston, Houston & Henderson R. R., 48 feet S. 17° 20' E. of intersection of Galveston, Houston & Henderson R. R. and San Antonio & Aransas Pass Ry. freight spur to packing house; iron post stamped "Prim. Sta. No. 5, 1915," elevation 48.631 feet.....	29 44 47.32	95 20 39.51	4,935
International & Great Northern Ry. and San Antonio & Aransas Pass Ry. branch to packing house, intersection of, elevation top of rail 49.4 feet.....	29 44 34.22	95 20 52.72	1,761
Houston, at intersection of International & Great Northern Ry. and Pierce Avenue, between tracks of Galveston-Houston Interurban Ry.; 1 foot from power-line pole, 27 feet distant from crossing; copper nail in hub; "T. B. M. No. 9," elevation 46.97 feet.....	29 44 16.14	95 21 07.05	2,220

**PARK PLACE QUADRANGLE**—Continued.**Along Galveston, Houston & Henderson Railroad from Harrisburg to Houston**—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Houston, intersection of San Antonio & Aransas Pass Ry. and Galveston-Houston Interurban tracks; top of rail, elevation 51.1 feet.....	* * "	* * "	Feet.
Houston, Pierce Avenue crossing of San Antonio & Aransas Pass Ry.....	29 44 32.77	95 21 34.55	2,950
Houston, S. 27° E. and 35' feet distant from intersection of McGowan Avenue and San Antonio & Aransas Pass Ry.; 2 feet from telephone pole painted "U. S. B. M. No. 10," 15 feet from corner of yard fence; copper nail in hub, elevation 47.11 feet.....	29 44 18.90	95 21 48.17	1,544

**Along highways in southern part of quadrangle.**

Mykawa, about 1.5 miles northeast of; right-angle turn in road.....	29 37 32.38	95 16 42.32	.....
Mykawa, 1.7 miles east by 0.2 mile north of, 1,000 feet east of right angle in road, 20 feet south of center of east and west road; 1 foot from post painted "U. S. B. M. No. 52"; copper nail in hub, elevation 50.65 feet.....	.	.	.....
Mykawa, 2.6 miles east by 0.2 mile north of, 35 feet north of center of east and west road, 2.5 feet from corner fence post at small cemetery; iron post stamped "Prim. Trav. Sta. No. 26, 1915," elevation 51.727 feet.....	29 37 35.50	95 15 39.53	5,551

**Along Southern Pacific Railroad cut-off.**

Pierce Junction, 1.8 miles northeast of, 25 feet south of milepost No. 2, 60 feet west of crossroads; nail in hub, "T. B. M. No. 69," elevation 48.72 feet.....	29 40 44.71	95 22 02.06	.....
Pierce Junction, 2.8 miles northeast of, 800 feet northeast of road crossing, 48 feet south of center of track, 1 foot from fence post; copper nail in hub; "T. B. M. No. 70," elevation 46.06 feet.....	29 40 59.75	95 21 12.60	4,668
Santa Fe R. R. crossing, 1.4 miles west of, 50 feet south of center of track; iron post stamped "Prim. Trav. Sta. No. 35, 1915," elevation 45.412 feet.....	29 41 08.46	95 20 43.49	2,713
Santa Fe R. R. crossing, 0.4 mile west of; 50 feet south of center of track, 40 feet west of double gate; copper nail in hub; post painted "U. S. B. M. No. 71," elevation 42.08 feet.....	29 41 31.40	95 19 52.52	5,057
Santa Fe R. R. crossing of Southern Pacific R. R. cut-off to Harrisburg, elevation top of rail 44.3 feet.....	29 41 42.49	95 19 35.90	1,844
Brookline, crossing of Galveston-Houston electric line and Southern Pacific cut-off, 1 mile southwest of, 11 feet from center of track; chiseled square on corner of concrete foundation of semaphore post, "t. b. m. No. 72," elevation 44.13 feet.....	29 42 00.77	95 19 07.11	3,140
Brookline, crossing of Galveston-Houston electric line and Southern Pacific cut-off, 0.25 mile southwest of, on south side of track, on west side of wagon road, 2 feet from fence corner; iron post stamped "Prim. Trav. Sta. No. 36, 1915," elevation 42.193 feet.....	29 42 21.64	95 18 31.82	3,779
Brookline, intersection of Galveston-Houston Interurban and Southern Pacific cut-off tracks; top of rail, elevation 43.1 feet.....			.....

**Along highways.**

Brookline, 0.6 mile northeast of, 30 feet northwest of center of public road, 1 foot from fence corner; post painted "U. S. B. M. No. 73"; copper nail in hub, elevation 40.14 feet.....	29 42 46.94	95 17 48.46	4,309
Harrisburg station, crossing of Galveston, Houston & Henderson R. R.....	29 43 08.33	95 17 08.98	4,098
Harrisburg station, 40 feet northeast of crossing of Galveston, Houston & Henderson R. R., 15 feet north of corner of station, nearly under fence line; copper nail in hub, "U. S. B. M. No. 74," elevation 39.08 feet.....	29 43 08.45	95 17 08.49	43
Harrisburg station, 80 feet south of crossing of Galveston, Houston & Henderson R. R., at fence corner, 40 feet west of track, cross on end of section of rail driven in ground (Coast and Geodetic Survey b. m. "R. M." value discarded equals 38.271 feet), elevation 38.400 feet.....			.....
Brookline, 0.9 mile south of, on Alvin road, 280 feet south of wooden bridge, 4 feet south of mail box No. 117, 12 feet west of center of road; copper nail in hub; post painted "U. S. B. M. No. 75," elevation 37.64 feet.....	29 41 52.17	95 18 05.13	.....

**PARK PLACE QUADRANGLE—Continued.****Along highways—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Brookline, 1.9 miles south of Park Place, 1 mile west of, 40 feet southeast of road forks; 1 foot from corner fence post painted "U. S. B. M. No. 76"; copper nail in hub, elevation 40.20 feet.....	• ' "	• ' "	Fect.
Brookline, 2.8 miles south of, 420 feet south of bridge over Simms Bayou, 15 feet west of center of road, opposite private lane to Ed. Drouet's house; iron post stamped "Prim. Trav. Sta. No. 37, 1915," elevation 34.270 feet.....	29 41 05.25	95 17 46.17	5,024
Brookline, 3.8 miles south of, Simms Bayou Bridge, about 1 mile south of, 25 feet east of center of road, 6 inches from corner of fence post at fence line east; copper nail in hub, post painted "U. S. B. M. No. 77," elevation 43.82 feet.....	29 40 21.02	95 17 21.17	4,979
Brookline, 4.6 miles south of, Simms Bayou Bridge, 1.8 miles south of, 25 feet west of center of road, 6 inches from fence post; copper nail in hub; post painted "U. S. B. M. No. 78," elevation 47.21 feet.....	29 39 27.97	95 17 19.72	5,360
Mykawa, 1.1 miles east by 1 mile north of, 38 feet east of center of road, 12 feet east of north and south fence line; 2 feet north of east and west fence line; iron post stamped "Prim. Trav. Sta. No. 38, 1915," elevation 49.121 feet.....	29 38 46.56	95 17 19.54	4,182
	29 38 08.91	95 17 08.00	3,934

Magnetic declination of quadrangle,  $8^{\circ} 13' E.$ **Along highways near northeast corner of quadrangle.**

Fidelity addition, 1.1 miles north of Houston-Clinton road, about 800 feet southwest of a small white cabin, 20 feet west of main north-south graded road; iron post stamped "Prim. Trav. Sta. No. 171, 1915," elevation 35.614 feet.....	29 44 51.41	95 15 19.61	.....
Fidelity addition, 435 feet east of point where gravel road crosses track, 30 feet north of gravel road and 15 feet east of graded street north, on southwest corner of base of east concrete monument; chiseled mark, "U. S. B. M. 399," painted on wooden bridge, elevation 37.87 feet.....	29 43 54.59	95 15 18.14	5,741
Fidelity addition, 0.8 mile northwest of, 30 feet southwest of Houston-Clinton road, 500 feet southeast of a private road crossing on railway; in root of pine tree painted "U. S. B. M. 400"; copper nail, elevation 35.12 feet.....	29 44 15.13	95 16 02.64	4,440
Crossing of Galveston, Harrisburg & San Antonio Ry. and Houston Belt & Terminal Ry., 1.9 miles southeast of, 25 feet northeast of Houston-Clinton road and 10 feet west of dim road crossing; iron post stamped "Prim. Trav. Sta. No. 172, 1915," elevation 37.762 feet.....	29 44 35.03	95 16 31.92	3,271
Port Houston, 555 feet south $47^{\circ}$ west from city limit post at angle of Clinton road, about 900 feet southwest from public road crossing on Galveston, Harrisburg & San Antonio Ry., and a little below turning basin of ship channel; a stone post with tablet marked "U. S. Engrs. B. M." set in top; post is painted on one side "300" "132+291.4," elevation 37.425 feet.....	29 44 51.61	95 17 07.10	3,526
Port Houston, near city limit post; public road crossing railway.....	29 44 58.45	95 17 00.94	878
Harrisburg, 1 mile south of, crossing of Galveston, Houston & Henderson R. R., and shell road from Harrisburg to Park Place, 50 feet south of track, 25 feet east of road; iron post with 3-inch red metal cap stamped "U. S. Coast & Geodetic Survey B. M. 'Os,'" elevation 37.503 feet.....	.....	.....	.....
Harrisburg, 3.75 miles southeast of; on the right of way of Galveston, Houston & Henderson R. R., 50 feet southeast of mile board # and 50 feet southwest of track; cross on end of section of rail driven in ground ("Coast and Geodetic Survey bench mark "M9"), elevation 35.308 feet.....	.....	.....	.....

## PARK PLACE QUADRANGLE—Continued.

## U. S. Corps of Engineers bench marks along Buffalo Bayou.

Station.	Latitude.	Longitude.	Distance between stations.
These bench marks are probably all bronze tablets marked "U. S. Engineer Department," set in top of concrete posts, 6 inches square on top and protruding above ground. The letters R and L of the descriptions refer to right and left bank going downstream, and the distances given are probably the approximate distances from the bank.			
Station 132+291, 300 R, elevation 25.797 feet.	• • "	• • "	
Station 131+027, 300 R, elevation 29.898 feet.			
Station 130+092, 300 R, elevation 15.897 feet.			
Station 128+822, 300 R, elevation 15.281 feet.			
Station 127+244, 300 R, elevation 8.086 feet.			
Station 126+987, 300 R, elevation 16.392 feet.			
Houston Launch Clut, in southeast corner, railroad iron, elevation 26.33 feet.			
Station 121+846, 300 R, elevation 9.452 feet.			
Station 119+799, 300 R, elevation 18.760 feet.			
Station 119+258, 300 R, elevation 21.123 feet.			
Station 117+781, 300 R, elevation 26.638 feet.			
Station 117+281, 300 R, elevation 24.312 feet.			
Station 116+281, 300 R, elevation 13.576 feet.			
Station 115+436, 300 R, elevation 17.846 feet.			
Station 114+685, 300 R, elevation 23.244 feet.			
Station 132+291, 300 L, elevation 37.425 feet.			
Station 131+804, 300 L, elevation 22.741 feet.			
Station 131+027, 300 L, elevation 22.996 feet.			
Station 130+292, 300 L, elevation 17.116 feet.			
Station 128+822, 300 L, elevation 18.362 feet.			
Station 127+844, 300 L, elevation 27.487 feet.			
Station 126+967, 300 L, elevation 23.296 feet.			
Station 125+293, 300 L, elevation 15.037 feet.			
Station 125+584, 300 L, elevation 21.534 feet.			
Station 124+846, 300 L, elevation 24.490 feet.			
Station 123+346, 300 L, elevation 31.624 feet.			
Station 121+846, 300 L, elevation 22.636 feet.			
Station 120+730, 300 L, elevation 21.672 feet.			
Station 119+999, 300 L, elevation 22.883 feet.			

## PAULI QUADRANGLE.

Between Huffman and Ford's farm, along little-used woods road from Huffman to Porter.

Station.	Latitude.	Longitude.	Distance between stations.
Huffman, 2.7 miles west and 1.4 miles north of, 0.5 mile northwest of ford across San Jacinto River, near mouth of Loose Bayou, 20 feet north of dim road in timber; gum tree painted "U. S. B. M."; iron post stamped "Prim. Trav. Sta. No. 193, 1915," elevation 52.648 feet.	• • " 30 02 38.77	• • " 95 07 46.80	
Huffman, 3.3 miles west and 1.6 miles north of, at north side of road; oak tree painted "U. S. B. M. 463"; copper nail in root, elevation 58.70 feet.	30 02 50.96	95 08 25.19	3,591
Huffman, 3.9 miles west and 2.1 miles north of, 50 feet north of road; oak tree painted "U. S. B. M. 464"; copper nail in root, elevation 62.94 feet.	30 03 19.10	95 09 01.16	4,251
Huffman, 4.4 miles west by 3 miles north of, in fork of dim woods road, in notch at base of 2-foot oak tree; wire nail painted "U. S. B. M. 465"; elevation 52.49 feet.			
Huffman, 4.3 miles west and 2.9 miles north of, 100 feet west of road, on small knoll; large oak tree painted "U. S. B. M. 465"; copper nail in root. Not found in 1916.	30 03 57.93	95 09 26.81	4,524
Huffman, 4.6 miles west and 3.4 miles north of, 25 feet west of road, in woods; pine tree painted "U. S. P. B. M. 466"; iron post stamped "Prim. Trav. Sta. No. 194, 1915," elevation 74.737 feet.	30 04 22.01	95 09 43.62	2,846
Huffman, 5.25 miles west and 3.6 miles north of, 60 feet south of road, 90 feet south of southwest corner of cleared field; elm tree painted "U. S. B. M. 466"; copper nail in root, elevation 69.60 feet.	30 04 34.52	95 10 21.85	3,588
Huffman, 5.8 miles west and 3.85 miles north of, at south side of road; white oak tree painted "U. S. B. M. 467"; copper nail in root, elevation 71.77 feet.	30 04 47.79	95 10 54.81	3,190

## PAULI QUADRANGLE—Continued.

**Southwest from Scott's ranch, close to Harris-Montgomery County line, to county line crossing of Houston, East & West Texas Ry. all through woods.**

Station.	Latitude.	Longitude.	Distance between stations.
Scott's ranch, 1.4 miles southwest of, 1,000 feet northerly from house in clearing, 25 feet east of road, and 25 feet east of gate in wire fence, magnolia tree painted "U. S. B. M. 453"; copper nail in root, elevation 70.70 feet.....	* ' "	* ' "	Feet.....
Scott's ranch, 2 miles southwest of: large gum tree notched 4 times in 3 sides supposed to be on Harris-Montgomery county line, ground elevation 66.8 feet.....	30 07 17.28	95 08 17.68	.....
Scott's ranch, 2.2 mile southwest of: pin-oak tree painted "U. S. B. M. 454"; copper nail in root, elevation 67.32 feet.....	30 07 08.03	95 08 45.47	2,614
Scott's ranch, 3 miles southwest of: near magnolia tree painted "U. S. P. B. M." iron post stamped "Prim. Trav. Sta. No. 191, 1915," elevation 66.296 feet.....	30 07 01.76	95 08 53.84	971
Scott's ranch, 3.75 miles southwest of: oak tree painted "U. S. B. M. 455"; copper nail in root, elevation 69.23 feet.....	30 06 35.68	95 09 27.23	3,943
Scott's ranch, 4.5 miles southwest of: magnolia tree painted "U. S. B. M.", copper nail in root, elevation 66.90 feet.....	30 06 08.25	95 10 04.72	4,304
Scott's ranch, 5.3 miles southwest of: oak tree painted "U. S. B. M. 457"; copper nail in root, elevation 71.38 feet.....	30 05 41.56	95 10 38.76	4,026
Scott's ranch, 5.6 mile southwest of, 0.5 mile southeast of Mr. Ford's farm, 15 feet east of road: iron post stamped "Prim. Trav. Sta. No. 192, 1915," elevation 73.125 feet.....	30 05 12.24	95 11 09.23	3,992
Humble, 5.4 miles north and 4 miles east of, 300 feet south of a clearing; maple tree painted "U. S. B. M. 458"; copper nail in root, elevation 72.69 feet.....	30 05 00.38	95 11 23.80	1,740
Humble, 5 miles north and 3.3 miles east of: oak tree painted "U. S. B. M. 459"; copper nail in root, elevation 80.11 feet.....	30 04 35.26	95 11 57.04	3,883
Humble, 4.5 miles north and 2.7 miles east of: large oak tree painted "U. S. B. M. 468"; copper nail in root, elevation 80.31 feet.....	30 04 16.42	95 12 37.31	4,018
Humble, 4 miles north and 2 miles east of: near tree painted "U. S. B. M." iron post stamped "Prim. Trav. Sta. No. 195, 1915," elevation 78.970 feet.....	30 03 23.39	95 13 51.62	4,069
Humble, 3.6 miles north and 1.5 miles east of, 500 feet north and 0.4 mile east of road, crossing at McCarthy's spur; pine tree painted "U. S. B. M. 469"; copper nail in root, elevation 79.07 feet.....	30 03 04.30	95 14 24.83	3,498
Humble, 3.5 miles north by 1.1 miles east of, 0.5 mile northeast of Harris-Montgomery county line, 70 feet east of road crossing, at McCarthy's spur, in top of wooden bulkhead, south side of cattle guard 21 D; copper nail painted "U. S. 82.6 B. M.," elevation 82.42 feet.....	.....	.....	.....
Humble, 3.5 miles north and 1.1 miles east of: center of road crossing Houston East & West Texas Ry. at McCarthy's spur.....	30 02 59.41	95 14 50.95	2,348
Humble, 3.1 miles north and 0.9 mile east of, center of Houston East & West Texas Ry. track, opposite post marked "Harris County-Montgomery County".....	30 02 35.10	95 14 59.38	2,565
County line post, 8 inches east of; copper nail in hub, t. b. m. 470, elevation 81.01 feet.....	30 02 35.20	95 14 59.80	38

Magnetic declination for quadrangle, 8° 30' E.

## ROSEHILL QUADRANGLE.

Along highways near north and east borders of southeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Rosehill, 2.15 miles west of, on road to Hockley, 20 feet south of road; 1 foot from corner post on fence line south, painted "U. S. B. M. 206"; copper nail in hub, elevation 231.09 feet.....	* ' "	* ' "	Feet.....
Rosehill, 1.60 miles west of, crossroads.....	30 04 44.39	95 44 37.63	.....
Rosehill, 1.25 miles west of, on Hockley Road, 30 feet north of center of road, opposite house on south side of road, 1 foot south of fence post painted "U. S. B. M. 207"; copper nail in hub, elevation 225.20 feet.....	30 04 47.96	95 44 09.33	2,512
Rosehill, 0.7 mile west of, on Hockley Road, about 500 feet southwest of yellow house, 35 feet north of center of road, 6 feet from corner of fence post; iron post stamped "Prim. Trav. Sta. No. 92, 1915," elevation 219.825 feet.....	30 04 52.69	95 43 43.83	2,293
Rosehill, about 0.70 mile north of church, 15 feet south and 15 feet east of crossroads; 1 foot from corner fence post painted "U. S. B. M. 208"; copper nail in hub, elevation 215.72 feet.....	30 04 50.22	95 43 09.68	3,012
Rosehill, about 0.70 mile north of church, 15 feet south and 15 feet east of crossroads; 1 foot from corner fence post painted "U. S. B. M. 208"; copper nail in hub, elevation 215.72 feet.....	30 04 43.95	95 42 31.53	3,412

## ROSEHILL QUADRANGLE—Continued.

Along highways near north and east borders of southeast quarter of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Rosehill, about 0.50 mile east of church, 10 feet south and 15 feet west of T road west, at northeast corner of bridge on road west, 1 foot east of railing post; copper nail in hub, bridge painted "U. S. B. M. 209".	30 04 14.26	95 41 59.71	4,000 Feet.
(Note.—A new bridge has been built and the prim. trav. hub destroyed. A level bench mark was established at southeast corner of bridge, 1 foot east of railing post; copper nail in timber, elevation 197.60 feet.)			
Rosehill Church, about 0.75 mile southeast of; T road south.....	30 04 08.05	95 41 49.79	1,679
Rosehill Church, about 0.70 mile south and 0.70 mile east of, 2,350 feet south of T road south, 20 feet east of center of road, 2 feet from fence line; iron post stamped "Prim. Trav. Sta. No. 93, 1915," elevation 188.44 feet.....	30 03 36.84	95 41 49.20	2,346
Cypress, 5.1 miles north of, 20 feet west of center of road, opposite gate on east side of road, 20 feet north of corner post on fence line west; iron casting 6 inches in diameter set in ground and painted "U. S. B. M. 210"; fence post 20 feet south has "B. M." painted on it, top of casting, elevation 169.24 feet.....	30 02 40.38	95 41 50.79	5,706
Cypress, 4.1 miles north of, 25 feet east of center of road; 1 foot west of large corner fence post painted "U. S. B. M. 211"; copper nail in hub, elevation 165.60 feet.....	30 01 49.28	95 41 49.66	5,163
Cypress, 3.8 miles north of; crossroads.....	30 01 27.23	95 41 49.72	2,228
Cypress, 3.2 miles north of, 70 feet north of bridge over Little Cypress Creek, 20 feet west of center of road, in group of oak trees; iron post stamped "Prim. Trav. Sta. No. 94, 1915," elevation 161.20 feet.....	30 01 03.42	95 41 49.53	2,405
Cypress, 2.40 miles north of, 520 feet north of culvert, 25 feet west of center of road, 1 foot east of fence post painted "U. S. B. M. 212"; copper nail in hub, elevation 162.63 feet.....	30 00 19.79	95 41 51.87	4,413

Along highways near south border of northeast quarter of quadrangle.

Rosehill schoolhouse, about 50 feet north of, 25 feet south of center of road, at wire fence line; in root of chinaberry tree painted "U. S. B. M. 218," elevation 222.95 feet.....	30 04 49.04	95 41 46.33	.....
Rosehill schoolhouse, about 0.90 mile east of, 20 feet north and 20 feet east of crossroads; 6 inches from corner fence post painted "U. S. B. M. 219," elevation 220.51 feet.....	30 04 44.90	95 40 53.35	4,675
Rosehill schoolhouse, about 1.35 miles east of, 25 feet south and 15 feet east of T road south and 75 feet east of T road north, 3 feet west of corner fence post; iron post stamped "Prim. Trav. Sta. No. 97, 1915," elevation 219.21 feet.....	30 04 44.52	95 40 24.57	2,529
Rosehill schoolhouse, 1.9 miles east of; T road west.....	30 04 45.03	95 39 50.85	2,965
Rosehill schoolhouse, 2.15 miles east of, 75 feet north of center of road; 6 inches from corner post on fence line north, painted "U. S. B. M. 220"; copper nail in hub, elevation 177.83 feet.....	30 04 51.98	95 39 35.15	1,546
Tomball, 2.3 miles southwest of, on Rosehill Road, 25 feet west of center of road, 3 feet west of mail box, 2 feet east of corner fence post; 6 inches from telephone pole painted "U. S. B. M. 221"; copper nail in hub, elevation 174.52 feet.....	30 05 14.11	95 39 06.43	8,370
Tomball, 1.75 miles southwest of, 25 feet south of southwest corner of schoolhouse, 30 feet north of center of road, 2 feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 98, 1915," elevation 180.446 feet.....	30 05 20.57	95 38 25.26	3,677
Tomball, 1 mile southwest of, 100 feet east of forks of road, 8 feet southwest of corner fence post; 6 inches from telephone pole painted "U. S. B. M. 222," elevation 187.07 feet.....	30 05 24.02	95 37 39.95	2,996

Northeast from Cypress along public road toward Louetta.

Cypress, 2.4 miles north and 3.75 miles east of, 110 feet N. 38° E., from crossroads, oak tree painted "U. S. B. M. 256"; copper nail in root, elevation 148.12 feet.....	30 00 14.70	95 38 06.52	5,739
Cypress, 3 miles north and 3.35 miles east of; church steeple.....	30 00 42.50	95 38 31.10	3,544
Cypress, 2.5 miles north and 4.4 miles east of; in pine timber, 15 feet south of road, near a road turning southerly; iron post stamped "Prim. Trav. Sta. No. 116, 1915," elevation 143.277 feet.....	30 00 19.33	95 37 35.00	5,460

## SETTEGAST QUADRANGLE.

Along highways and railroad in southwest quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Houston, in second ward, 800 feet northwest of Houston Packing Co.'s plant, 1180 feet southwest of drawbridge over Buffalo Bayou, 35 feet northwest of San Antonio & Aransas Pass Ry. track; in root of oak tree, copper nail, painted "U. S. B. M. 215," elevation 39.66 feet.....	29 45 30.29	95 20 09.28	Feet.....
Buffalo Bayou, center of San Antonio & Aransas Pass Ry. drawbridge; top of rail, elevation 41.2 feet.....	29 45 38.23	95 19 59.37	1,183
Buffalo Bayou, 2,373 feet southwest of drawbridge over, crossing of Galveston, Harrisburg & San Antonio Ry. and San Antonio & Aransas Pass Ry. branch; top of rail, elevation 46.0 feet.....	29 45 56.94	95 19 43.06	2,373
Houston, about 3,100 feet south of Lyons Avenue, 600 feet north of intersection of San Antonio & Aransas Pass Transfer and Southern Pacific tracks, 40 feet east of San Antonio & Aransas Pass tracks; in root of large oak tree painted "U. S. B. M. 216"; copper nail, elevation 47.07 feet.....	29 46 02.28	95 19 42.13	544
Intersection of San Antonio & Aransas Pass Transfer and Lyons Avenue car line tracks; top of rail, elevation 51.6 feet.....			.....
Concrete post on old city limit boundary, 300 feet south of Lyons Avenue, 700 feet east of San Antonio & Aransas Pass Transfer track; paint mark on top surface, elevation 50.58 feet.....			.....
Houston, in fifth ward, 50 feet south of Texas & New Orleans R. R. 15 feet east off line of tangent south, on branch of San Antonio & Aransas Pass Ry., 8 feet east of a pine tree 2 feet in diameter; iron post stamped "Prim. Trav. Sta. No. 95, 1915," elevation 50.999 feet.....	29 46 54.42	95 19 42.95	5,267
Houston, in fifth ward, 30 feet east of center of Clark Street at point 200 feet north of end of car line; 6 inches west of telephone pole, painted "U. S. B. M. 217;" copper nail in hub, elevation 52.01 feet.....	29 47 03.32	95 20 30.30	4,270
Houston, in Taylor Park, 270 feet west of Clark Street, opposite post on east side of street marked "City Limits"; a concrete monument about 8 inches square standing 15 inches above ground, in top of which is set a bronze tablet stamped "Prim. Trav. Sta. No. 96, 1915," elevation 53.382 feet.....	29 47 23.04	95 20 33.94	2,017
Houston, at city limits, 245 feet east of intersection of Hayes Street and East Montgomery road, at entrance to Hollywood Cemetery, 48 feet south of east and west road; in root of pine tree painted "U. S. B. M. 250," copper nail, elevation 51.92 feet.....	29 47 21.56	95 21 34.59	5,346
Houston, intersection of Hogan and North Main streets.....	29 46 32.98	95 21 41.63	4,949
Houston, 280 feet northeast of south end of Missouri, Kansas & Texas Ry. trestle across White-oak Bayou, 3 feet south of sidewalk line on north side of west end of Hogan Street, where ground breaks off to bayou; iron post stamped "Prim. Trav. Sta. No. 113, 1915," elevation 44.311 feet.....	29 46 28.21	95 21 55.08	5,685
Houston, at northeast corner of Willow and Baker streets; in center of supporting pillar at southeast corner of building of Peden Iron and Steel Co.; red metal disk (Coast and Geodetic Survey bench mark "J8"), elevation 45.006 feet.....			.....
Houston, in First Ward, intersection of Houston Avenue and Missouri, Kansas & Texas Ry. track.....	29 46 29.81	95 22 20.33	2,234

## Along highways near west border of quadrangle.

Road crossing, 100 feet west of crossroads; top of rail, elevation 79.3 feet.....			
Aldine, 4.6 miles south of, 100 feet east of center of track, 25 feet east of center of road, 2 feet southwest of corner post on fence line east; copper nail in hub, brace painted "U. S. B. M. 245," elevation 74.775 feet.....	29 52 00.42	95 21 48.67	.....
Aldine, 5.50 miles south of, 30 feet east of center of track, 40 feet west of public road, 350 feet north of trestle, 2.5 feet east of telephone pole painted "U. S. B. M. 245"; copper nail in hub, elevation 72.26 feet.....	29 51 13.82	95 21 37.78	4,805
Houston, 3.80 miles north of city limits, 20 feet south and 60 feet east of road crossing, 25 feet west of center of road, 2.5 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 111, 1915," elevation 74.796 feet.....	29 50 36.62	95 21 28.37	3,850
Houston, 3.35 miles north of city limits, crossroads (no elevation). Road crossing, International & Great Northern Ry. main track, 80 feet west of crossroads; top of rail, elevation 77.5 feet.....	29 50 14.32	95 21 22.52	2,313
Houston, 2.75 miles north of city limits, 125 feet east of International & Great Northern Ry. track, 140 feet north and 80 feet east of road crossing; in root of pine tree painted "U. S. B. M. 247," copper nail, elevation 69.73 feet.....	29 49 42.68	95 21 14.31	3,276
Houston, 2.10 miles north of city limit, about 100 feet west of crossing of International & Great Northern Ry. and Houston Belt & Terminal Ry., about 25 feet north of Houston Belt & Terminal track, and 15 feet west of public road, 1 foot from crossing sign post painted "U. S. B. M. 248"; copper nail in hub, elevation 63.73 feet.....	29 49 10.09	95 21 08.45	8,333

## SETTEGAST QUADRANGLE—Continued.

## Along highways near west border of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Houston, 2.10 miles north of city limit, crossing of International & Great Northern Ry. and Houston Belt Terminal Ry.....	29 49 09.89	95 21 07.39	Fret. 95
Houston, 1.6 miles north of city limit, 20 feet south of road, 65 feet east of road crossing, 3 feet east of corner fence post; iron post stamped "Prim. Trav. Sta. No. 112, 1915," elevation 59.485 feet.....	29 48 46.40	95 21 00.86	2,441
Houston, 0.6 mile north of city limit, 40 feet north of corner post on right-of-way fence, 24 feet west of center of track, 2.5 feet from telegraph pole; copper nail in stub of telegraph pole painted "U. S. B. M. 249," elevation 53.92 feet.....	29 47 54.44	95 20 48.78	5,355
Houston, 0.30 mile north of city limit, at intersection of Houston, East & West Texas Ry. and International & Great Northern Ry.....	29 47 36.21	95 20 45.44	1,868

## Along Beaumont, Sour Lake &amp; Western Railway near Settegast.

Settegast, 1.75 miles northeast of, 20 feet east of a road crossing, 6 inches from crossing; signpost painted "U. S. B. M. 377"; copper nail in hub, elevation 59.05 feet.....	29 52 16.60	95 16 06.54	-----
Settegast, about 3,000 feet northeast of, 150 feet northeast of north end of siding, 50 feet east of road crossing, 6 feet west of corner fence post; iron post stamped "Prim. Trav. Sta. No. 162, 1915," elevation 56.547 feet.....	29 51 29.78	95 16 54.26	6,328
Settegast, 0.25 mile southwest of, 70 feet southeast of center of track, opposite gate; pine tree painted "U. S. B. M. 378," copper nail in root, elevation 50.81 feet.....	29 50 57.52	95 17 27.09	4,358

## Across country from Beaumont, Sour Lake &amp; Western Railway to East Houston.

East Houston, 2.3 miles north and 1.6 miles west of, 15 feet west of a north and south ditch and in line with a ditch west, 40 feet north of a bridge over ditch, 15 inches west of a telephone pole painted "U. S. B. M. 379"; copper nail in hub, elevation 51.58 feet.....	29 50 26.32	95 17 13.24	3,380
East Houston, 1.6 miles north and 1.15 miles west of, 200 feet south of a small sawmill on slight knoll, 25 feet west of edge of pond; iron post stamped "Prim. Trav. Sta. No. 163, 1915," elevation 51.77 feet.....	29 49 51.77	95 16 47.34	4,170
East Houston, 1 mile north and 1.2 miles west of, at southeast corner of road bridge over east and west ditch, 1 foot from corner of bridge, painted "U. S. B. M. 380;" copper nail in hub, elevation 48.22 feet.....	29 49 21.39	95 16 56.85	3,084
East Houston, 0.2 miles north and 0.7 mile west of, 2,200 feet from road crossing on Texas & New Orleans Ry. in open prairie, 6 inches from a small pine tree painted "U. S. B. M. 381;" copper nail in hub, elevation 47.80 feet.....	29 48 46.02	95 16 19.06	4,540

## From Settegast west to International &amp; Great Northern Railway through woods and along road.

Settegast, about 1.15 miles north and 0.25 mile east of, in prairie near edge of timber, 40 feet west of a large ditch, at base of pine tree painted "U. S. B. M. 537"; copper nail in hub, elevation 61.59 feet.....	29 52 07.81	95 17 03.46	-----
Settegast, about 1.15 miles north and 0.5 mile west of, 160 feet west of a pole bridge over ditch, gum tree painted "U. S. B. M. 538"; copper nail in hub, elevation 64.68 feet.....	29 52 09.62	95 17 48.35	3,958
Settegast, 1 mile north and 1.5 miles west of, 20 feet south of road, and 25 feet southeast of corner of bridge over ditch 2.2 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 221, 1915," elevation 68.920 feet.....	29 52 01.33	95 18 47.15	5,247
Settegast, 1 mile north and 2.3 miles west of, 1,630 feet east of Houston-Humble road, 50 feet north of center of road, pine tree painted "U. S. B. M. 539"; copper nail in root, elevation 60.04 feet.....	29 51 59.08	95 19 36.83	4,382
Houston-Humble road, T road east from.....	29 51 58.47	95 19 55.50	1,647
Houston-Humble road, 30 feet east of, 400 feet northeast of a T road west, large pine tree painted "U. S. B. M. 540"; copper nail in root, elevation 61.55 feet.....	29 51 36.33	95 20 07.95	2,490
Houston-Humble road, 0.4 mile west of, 25 feet south and 20 feet east of second-class crossroads, inside fence, 4 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 222, 1915," elevation 65.882 feet.....	29 51 32.72	95 20 34.82	2,396

## SETTEGAST QUADRANGLE—Continued.

From Settegast west to International & Great Northern Railway through woods and along road—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Houston—Aldine road via Clark Street, T road east from..... Houston—Aldine road via Clark Street, 75 feet east of, at point 400 feet south of angle in road, just south of vacant house; willow tree painted "U. S. B. M. 511" (tree used as gatepost); copper nail in root, elevation 66.78 feet.....	29 51 32.80 29 51 56.63	95 20 59.47 95 20 58.83	Feet. 2,173 2,410

## Near southeast corner of quadrangle.

Green's siding, 2.4 miles south and 0.5 mile west of, at intersection of fence lines, north, east, south, and west 6 inches from corner fence post; painted "U. S. B. M. 410"; copper nail in hub, eleva- tion 39.00 feet.....	29 46 49.62	95 15 04.73	.....
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## On public road along Texas &amp; New Orleans Railroad.

Green's siding, about 3,500 feet southwest of, 80 feet west of a bun- galow, 40 feet south of road, 3 feet from fence; iron post stamped "Prim. Trav. Sta. No. 157, 1915", elevation 46.893 feet.....	29 48 51.98	95 15 06.83	.....
East Houston R. R. crossing, 770 feet northeast of, 35 feet north of road; large pine tree painted "U. S. B. M. 367"; copper nail in root, elevation 48.39 feet.....	29 48 29.63 29 48 26.71	95 16 00.49 95 16 08.56	5,239 770
East Houston, railroad crossing at.....			
East Houston R. R. crossing, 1 mile southwest of, 25 feet east of telephone pole painted "U. S. B. M. 368", west end of north abutment of concrete road culvert, chiseled square, elevation 46.20 feet.....	29 48 10.47	95 16 49.23	3,940
Englewood, 3,000 feet northeast of, about 230 feet north of crossing of St. Louis & San Francisco and Texas & New Orleans R. Rs., 35 feet south of road and 7 feet north of telephone pole painted "U. S. P. B. M."; iron post stamped "Prim. Trav. Sta. No. 158, 1915", elevation 45.800 feet.....	29 47 58.05	95 17 16.81	2,735
Englewood, 1,800 feet southwest of, 30 feet south of road; 2 feet from telephone pole, painted "U. S. B. M. 369"; copper nail in hub, elevation 49.88 feet.....	29 47 37.04	95 18 05.93	4,821
Englewood, 1.25 miles southwest of, 300 feet northeast of public road crossing Texas & New Orleans R. R., 6 inches from tele- phone pole painted "U. S. B. M. 370"; copper nail in hub.....	29 47 16.08	95 18 54.75	4,794
Aldine, 4.6 miles south of, 1.25 miles east of East Montgomery road, 100 feet east of center of International & Great Northern Ry., 25 feet east of center of public road, 2 feet southwest of corner fence post, painted; copper nail in hub.....	29 52 00.4	95 21 48.7	.....

## Along highways near south border of quadrangle.

Houston, on Clinton road, Galveston, Harrisburg & San Antonio Ry. and Houston Belt & Terminal Ry. crossing, 1,800 feet east of, 35 feet north and 40 feet east of T road corners at sign "Hous- ton Harbor Additions," about 110 feet north of railway; in root of oak tree painted "U. S. B. M. 401"; copper nail, elevation 40.10 feet.....	29 45 24.81	95 17 38.82	.....
Houston Harbor, north side of turning basin, 80 feet south of Galveston, Harrisburg & San Antonio track, 230 feet southeast of dim road crossing, opposite forks of shell road; metal tablet in top of concrete monument (painted 134+418.5) U. S. E. D. B. M., elevation 42.005 feet.....			
Galveston, Harrisburg & San Antonio Ry. and Houston Belt & Terminal Ry. crossing.....	29 45 33.78	95 17 56.25	1,783
Houston, on Clinton road, Galveston, Harrisburg & San Antonio Ry. and Houston Belt & Terminal Ry. crossing, 2,800 feet west of, 60 feet north of public road crossing Galveston, Harrisburg & San Antonio Ry. and in line with public road east along railway; iron post stamped "Prim. Trav. Sta. No. 173, 1915," elevation 45.277 feet.....	29 45 44.04	95 18 26.34	2,848
Houston, on Clinton road, Galveston, Harrisburg & San Antonio Ry. and Houston Belt & Terminal Ry. crossing, 1.1 miles west of, 30 feet south of center of road, at fence line, in root of pine tree painted "U. S. B. M. 402"; copper nail, elevation 48.42 feet.....	29 45 41.21	95 19 13.57	4,226
Houston, about 550 feet north of crossing of Galveston, Harrisburg & San Antonio Ry. and San Antonio & Aransas Pass Ry., 40 feet east of San Antonio & Aransas Pass track, 3,100 feet south of Lyons Street; in root of large oak tree painted "U. S. B. M. 216"; copper nail, elevation 47.07 feet.....	29 46 02.28	95 19 42.13	2,755

## SETTEGAST QUADRANGLE—Continued.

Along highways near southeast corner of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Green Bayou, 3.5 miles west of Lower Ferry, 20 feet south and 30 feet west of T road north, 18 inches west of corner fence post on old picket fence; copper nail in hub; post painted "U. S. B. M. 397," elevation 38.42 feet.....	• • "	• • "	Feet.
Fidelity addition, 1.6 miles north of Clinton Road, 0.3 mile east of graded road north, in group of oak trees with open prairie northwest; in root of oak tree painted "U. S. B. M. 398"; copper nail, elevation 36.54 feet.....	29 46 01.50	95 15 04.50	29 45 21.69 95 15 02.54 4,024

## Near Houston.

Houston, Sims Avenue and Opollus Street, northwest corner of concrete footing of water tank of Moncrief-Lenoir Manufacturing Co.; chiseled square painted "U. S. 54.2 B. M.," elevation 54.18 feet.....			
Englewood, 1.25 miles southwest, about 360 feet southwest of signal tower, 250 feet northeast of road crossing, on north side of Texas & New Orleans R. R. track, top of concrete base of semaphore signal; chiseled square, elevation 51.61 feet.....			
Englewood, opposite operator's window, top of nearest rail, elevation 51.7 feet.....			
Settegast, opposite station signpost, top of nearest rail, elevation 56.7 feet.....			
Houston-Humble road, about 4 miles north of city limits, 100 feet southwest of T road east toward Settegast, west end of concrete and brick culvert; chiseled square painted "U. S. 62.4 B. M.," elevation 62.50 feet.....			
Houston-Aldine road, about 8 miles northwest of Houston city limits, 0.25 mile south of vacant house, on top of east end of concrete culvert over drainage ditch; chiseled square, culvert painted "U. S. 68.9 B. M.," elevation 68.97 feet.....			
Houston, city limits, 3.9 miles northwest of, 1 mile northwest of forks of Houston-Humble road and Houston-Aldine road, on the latter road, 30 feet west of lone pine tree, in top of east end of concrete culvert; chiseled square, elevation 71.69 feet.....			

## Along left bank of Buffalo Bayou.

These bench marks are probably all bronze tablets marked "U. S. Engineers Department," set in top of concrete posts, 6 inches square on top and protruding above the ground. The letters R and L of the descriptions refer to right and left bank going down stream and the distance given are probably the approximate distances from the bank.			
Houston Harbor, north side of turning basin, 80 feet south of Galveston, Harrisburg & San Antonio Ry. track 230 feet southeast of dike road, marked "134+418 300' L" ..... 42.005 feet.			
Station No. 133+792, 300' L ..... 37.924 feet.			
Station No. 133+024, 300' L ..... 40.308 feet.			

Magnetic declination near south border of quadrangle, 8° 18' E.

## SPRING QUADRANGLE.

Along International &amp; Great Northern Railway.

Station.	Latitude.	Longitude.	Distance between stations.
Spring, 4.85 miles west of, 380 feet east of mile post 5.22 feet south of road crossing at "Rotherwood spur," 1 foot from crossing signboard painted "U. S. B. M. 229"; copper nail in hub, elevation 143.78 feet.....	• • "	• • "	Feet.
Road crossing; top of rail, elevation 141.5 feet.....	30 05 39.82	95 29 45.89	3,418
Spring, 3.80 miles west of, 500 feet east of mile post 4, 18 feet south of track at road crossing signpost; copper nail in hub; 1 foot north of post, painted on cattle guard "U. S. B. M. 230," elevation 136.38 feet.....	30 05 28.96	95 28 44.73	5,484

## SPRING QUADRANGLE—Continued.

## Along International &amp; Great Northern Railway—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Spring, 3.25 miles west of, 1,900 feet west of milepost 3, 45 feet south and 15 feet west of road crossing, 3 feet from corner fence post; iron post stamped "Prim. Trav. Sta. No. 103, 1915," elevation 140.603 feet.....	* * "	* * "	Fect. 3,002
Spring, 2.30 miles west of, 2,300 feet west of milepost 2, 32 feet south of track; 1 foot from telegraph pole painted "U. S. B. M. 231"; copper nail in hub, elevation 135.08 feet.....	30 05 22.72	95 28 11.33	4,940
Spring, 1.40 miles west of, 2,300 feet east of milepost 2, 970 feet west of road crossing, 30 feet south of track; 6 inches from telegraph pole painted "U. S. B. M. 232"; copper nail in hub, elevation 131.17 feet.....	30 05 13.04	95 27 16.24	4,621
Spring, 1 mile west of, 500 feet west of milepost 1, 66 feet north of track at private road crossing, 4 feet from post at west end of gate; iron post stamped "Prim. Trav. Sta. No. 104, 1915," elevation 128.903 feet.....	30 05 00.34	95 26 24.71	2,161
Spring station, 100 feet north of International & Great Northern Ry. depot, 50 feet west of main line track; 1 foot west of telegraph pole painted "U. S. B. M. 233"; copper nail in hub, elevation 120.63 feet.....	30 04 45.84	95 25 01.92	5,350

## Along public road.

Spring, 0.9 mile south of, 60 feet west of track, 25 feet east of road, 1 foot west of center post under shanty painted red; copper nail in hub; post painted "U. S. B. M. 234," elevation 118.40 feet.....	30 03 59.35	95 24 50.32	4,806
Spring, 2 miles south of, 52 feet west of track, 30 feet east of center of road, 20 feet north of gate; iron post stamped "Prim. Trav. Sta. No. 105, 1915," elevation 109.802 feet.....	30 03 06.69	95 24 37.18	5,443
Spring, 2.90 miles south of, 55 feet west of road crossing, 30 feet east of road, 1 foot west of corner fence post; copper nail in hub, painted on fence brace, "U. S. B. M. 235," elevation 92.44 feet.....	30 02 18.20	95 24 25.05	5,015
International & Great Northern Ry. bridge No. 275, top of rail directly above Cypress Creek, elevation 92.1 feet.....			.....
Westfield, 1,200 feet north of, 30 feet west of center of road, corner post on fence line west; 6 inches east of corner post painted "U. S. B. M. 236"; copper nail in hub, elevation 106.19 feet.....	30 01 30.88	95 24 13.94	4,879
Westfield, T road corners at, shell road west.....	30 01 20.78	95 24 11.04	1,052
Westfield, 1,030 feet south of, 65 feet south and 60 feet west of public-road crossing International & Great Northern Ry., 20 feet north of corner fence post; iron post stamped "Prim. Trav. Sta. No. 106, 1915," elevation 108.00 feet.....	30 01 09.20	95 24 08.07	1,196
Westfield, 1.1 miles south of, 30 feet west of center of road, about 50 feet east of center of track, 2.0 feet southeast of International & Great Northern Ry. bridge 277; copper nail in hub; witness stake painted "U. S. B. M. 237," elevation 100.99 feet.....	30 00 23.43	95 23 55.19	4,760

## From Rotherwood spur, International &amp; Great Northern Railway, north along second-class road through woods. (Unchecked spur line.)

Rotherwood spur, 0.9 mile north of, about 800 feet south of crossing of Willow Creek, 10 feet west of road, in root of large oak tree painted "U. S. B. M. 299"; 4 feet north of body of tree, copper nail, elevation 122.62 feet.....	30 06 25.38	95 29 31.99	.....
Rotherwood spur, 1.7 miles north of, 0.6 mile north of Willow Creek crossing, 15 feet east of road; in root of oak tree painted "U. S. B. M. 300"; copper nail, elevation 124.61 feet.....	30 07 02.23	95 29 49.00	.....

## Along public road from Spring southwest toward Klein.

Spring, 0.7 mile west of, 300 feet north of shell road and 150 feet east of a white house; large leaning oak tree painted "U. S. B. M. 473"; copper nail in root, elevation 124.70 feet.....	30 04 38.96	95 25 49.30	.....
Spring, 1.1 miles west and 1,800 feet south of crossroads.....	30 04 27.94	95 26 09.65	2,100
Spring, 1.5 miles west and 3,000 feet south of, 25 feet north of center of road; 1 foot south of west gatepost and corner post on fence line north painted "U. S. B. M. 471"; copper nail in hub, elevation 122.88 feet.....	30 04 15.92	95 26 33.04	2,388
Spring, 2.4 miles west and 1 mile south of, 1,000 feet east of a grove of trees on south side of road, 25 feet south of center of road; iron post stamped "Prim. Trav. Sta. No. 197, 1915," elevation 130.216 feet.....	30 03 54.35	95 27 25.58	5,107

## SPRING QUADRANGLE—Continued.

Along public road from Spring Southwest toward Klein—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Spring, 3.25 miles west and 1.25 miles south of, 150 feet east of bend in road, 80 feet south of road; in open prairie; small gum tree painted "U. S. B. M. 473"; copper nail in root, elevation 129.88 feet.....	• ' "	• ' "	Ft.
	30 03 41.28	95 28 17.90	4,735
Spring, 4 miles west and 1.65 miles south of, on north bank of small creek, 60 feet east of bridge, 40 feet south of road; gum tree painted "U. S. B. M. 476"; copper nail in root, elevation 122.15 feet.....	30 03 19.48	95 28 58.06	4,160
Spring, 4.5 miles west and 2 miles south of, in open prairie, 10 feet north and 25 feet west of crossroads; iron post stamped "Prim. Trav. Sta. No. 198, 1915," elevation 133.855 feet.....	30 03 00.20	95 29 33.79	3,695

## Near south border of quadrangle.

Pembie's store, 0.7 mile southwest of, at east end of a pond, 20 feet southeast of center of road; gum tree painted "U. S. B. M. 273"; copper nail in root, elevation 118.22 feet.....	30 00 04.32	95 28 24.46	.....
Pembie's store, at intersection of west fork of East Montgomery Road and Elhart road, 10 feet east and 20 feet north of crossroads; 6 inches from corner fence post painted "U. S. B. M. 274"; copper nail in hub, elevation 117.84 feet.....	30 00 24.28	95 27 49.12	3,705

## From Westfield east on road to Humble.

Westfield, about 1 mile east of, 425 feet northwest of school building district No. 29, 20 feet south of center of road; pine tree painted "U. S. B. M. 308"; copper nail in root, elevation 108.83 feet.....	30 01 15.97	95 23 12.76	.....
Westfield, 1.4 miles east of; crossroads.....	30 01 11.93	95 22 48.15	2,201

## From Spring east on road to Bender Lake.

Spring, 0.5 mile south and 0.7 mile east of, in woods, 40 feet north of road; pine tree 2 feet in diameter painted "U. S. B. M. 303"; copper nail in root, elevation 119.86 feet.....	30 04 21.39	95 24 21.13	.....
Spring, 0.7 mile south and 1.4 miles east of, 400 feet southeast of angle in road rounding fence corner, 15 feet southwest of road; gum tree painted "U. S. B. M. 304"; copper nail in root, elevation 114.73 feet.....	30 04 08.82	95 23 36.30	4,139
Spring, 0.9 mile south and 2.2 miles east of, in woods, 15 feet west of road; large oak tree painted "U. S. B. M. 305"; copper nail in root, elevation 109.71 feet.....	30 03 59.70	95 22 49.14	4,246

## LA PORTE QUADRANGLE.

Along public road from Deer Park to La Porte.

Station.	Latitude.	Longitude.	Distance between stations.
Deer Park, 160 feet north of Southern Pacific R. R. track, 25 feet north and 15 feet west of crossroads, inside plan's railing at culvert; iron post stamped "Prim. Trav. Sta. No. 32, 1915," elevation 36.332 feet.....	• ' "	• ' "	Ft.
	29 42 40.62	95 07 26.59	.....
Deer Park, 0.6 mile east of, 350 feet east of wooden bridge, on north side of road; copper nail in hub, painted "U. S. B. M. 'A.,'" elevation 33.89 feet.....	29 42 36.36	95 06 49.90	3,265
Thayer triangulation station (U. S. Engineers), about 1.25 miles east of Deer Park station, 467 feet S. 4° E. (true) from road crossing Southern Pacific R. R. between cattle guards 18A and 18B; iron post stamped "U. S. E. D.," reference mark, iron post 124.4 feet southwest (north reference mark not found), elevation 39.301 feet.....	29 42 19.96	95 06 13.90	3,582
Deer Park, 2.1 miles southeast of, 25 feet south of road; 1 foot south of telephone pole, painted "U. S. B. M. 495"; copper nail in hub, elevation 39.84 feet.....	29 42 10.68	95 05 26.62	4,272
Deer Park, 3 miles southeast of, 25 feet south of road; 6 inches south of telephone pole painted "U. S. B. M. 496"; copper nail in hub, elevation 36.03 feet.....	29 41 56.18	95 04 38.57	4,483

## LA PORTE QUADRANGLE—Continued.

Along public road from Deer Park to La Porte—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Deer Park, 3.6 miles southeast of, 75 feet S. $34^{\circ}$ E. of road crossing of Southern Pacific R. R., 3 feet south of right-of-way fence; iron post stamped "Prim. Trav. Sta. No. 204, 1915," elevation 35.866 feet.....	• ' "	• ' "	Feet. 3,639
La Porte, 1.8 miles north and 2 miles west of, 30 feet south of Southern Pacific R. R., 35 feet north of road; 6 inches south of telephone pole painted "U. S. B. M. 497"; copper nail in hub, elevation 30.18 feet.....	29 41 43.44	95 03 59.96	
La Porte, 1.4 miles north and 1.65 miles west of, about 1,500 feet southwest of Strang station, 30 feet north and 20 feet east of crossroads; small ash tree painted "U. S. B. M. 498"; copper nail in root, elevation 27.98 feet.....	29 41 27.87	95 03 07.61	4,877
La Porte, 0.3 mile north and 1.6 miles west of, about 2,000 feet north $62^{\circ}$ west from La Porte station, 25 feet east of center of road, opposite T road west; iron post stamped "Prim. Trav. Sta. No. 205, 1915," elevation 28.829 feet.....	29 41 07.88	95 02 48.44	2,632
La Porte, 1.2 miles west of, about 140 feet south of La Porte Ry. station and 50 feet east of railroad track; 30 feet south of public road and 8 inches north of telephone pole painted "U. S. B. M. 499"; copper nail in hub, elevation 25.66 feet.....	29 40 11.87	95 02 47.07	5,658
La Porte, 1,650 feet west of road forks, 4,600 feet east of railroad track, 30 feet south of road; 6 inches north of telephone pole painted "U. S. B. M. 500"; copper nail in hub, elevation 27.41 feet.....	29 39 53.27	95 02 20.27	3,019
La Porte, forks of road at; roads to Seabrook, Sylvan Beach, Mergans Point, and Houston.....	29 39 54.17	95 01 28.27	4,587
La Porte, 3,300 feet northeast of forks of road, south end of concrete culvert, west end of wall; railing painted "U. S. B. M. 519"; chiseled square, elevation 23.92 feet.....	29 39 54.79	95 01 09.54	1,652
La Porte, at intersection of Main Street, Broadway and San Jacinto Avenue, in top of post 1 foot high; copper nail painted "U. S. 26.3 B. M.," elevation, 26.28 feet.....	29 40 10.40	95 00 34.15	3,340

## Along La Porte-Seabrook road.

La Porte, 0.7 mile south of, 0.5 mile west of Sylvan station, 200 feet north of a house, 25 feet west of road and 80 feet north of a lane west; from post stamped "Prim. Trav. Sta. No. 206, 1915," elevation 22.264 feet.....	29 39 18.41	95 01 09.00	.....
La Porte, 1.4 miles south of, 300 feet south of Little Cedar Bayou, 45 feet east of road; oak tree painted "U. S. B. M. 501"; copper nail in root, elevation 16.92 feet.....	29 38 41.84	95 01 07.41	3,697
La Porte, 2.25 miles south of, 600 feet south of second-class cross-road, 25 feet east of road; cedar tree painted "U. S. B. M. 502"; copper nail in root, elevation 16.20 feet.....	29 37 57.32	95 01 06.62	1,500

## Along Lynchburg-Deer Park road.

San Jacinto battle field, 2,000 feet south of, 22 feet east of center of road; in root of hackberry tree painted "U. S. B. M. 403"; copper nail, elevation 13.13 feet.....	29 44 46.76	95 05 23.79	.....
San Jacinto battle field, 1.4 miles south of, 10 feet south and 25 feet east of T road west; 6 feet north of telephone pole; iron post stamped "Prim. Trav. Sta. No. 174, 1915," elevation 33.833 feet.....	29 43 58.70	95 05 23.20	4,854
Deer Park, about 1.1 miles north and 1.2 miles east of, 60 feet southeast of center of road, in pasture; in root of one of a group of seven trees; copper nail; tree painted "U. S. B. M. 404".....	29 43 46.00	95 06 17.94	4,996
Deer Park, 1 mile north and 0.5 miles east of, 25 feet southeast of center of road, close to wire fence line; in root of oak tree painted "U. S. B. M. 405"; copper nail, elevation 30.68 feet.....	29 43 31.76	95 06 59.85	3,964

## In northwest corner of quadrangle.

Cedar Bayou post office, 0.75 mile south and 5.7 miles west of, 50 feet east of a house on north side of road, 25 feet north of road; oak tree painted "U. S. B. M. 437"; copper nail in root, elevation 29.39 feet.....	29 44 53.64	95 00 30.28	.....
Cedar Bayou post office, 0.75 mile south and 6.5 miles west of, 20 feet north of road at wire fence line; oak tree painted "U. S. B. M. 438"; copper nail in root, elevation 30.41 feet.....	29 44 53.55	95 01 18.48	4,250
Cedar Bayou post office, 0.75 mile south and 7 miles west of, T road corners.....	29 44 54.32	95 01 53.32	3,074

**LA PORTE QUADRANGLE—Continued.**

Near west border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Deer Park, 5.9 miles south and 1.4 miles east of, on Red Bluff road, 50 feet west of road at edge of timber, prairie on east; oak tree painted "U. S. B. M. 536"; copper nail in root, elevation 20.99 feet.....	* * "	* * "	Feet.
Deer Park, 5.4 miles south of, 0.5 mile west of Red Bluff road, 600 feet south of dwelling house, 25 feet north of roadway, 600 feet west of Middle Bayou, 2 feet south of corner fence post; copper nail in hub; post painted "U. S. B. M. No. 59"; elevation 23.18 feet.....	29 37 33.29	95 06 02.01	
Deer Park, 5.25 miles south and 1 mile east of, on Red Bluff road, about 0.4 mile east of Middle Bayou, 30 feet east of road, 4 feet east of fence line in field; copper nail in hub; witness stake painted "U. S. B. M. No. 60"; elevation 25.05 feet.....	29 38 00.35	95 06 56.51	5,533
Deer Park, 4.25 miles south and 0.4 mile east of, on Red Bluff road, 30 feet west of center of road, 100 feet north of fence corner and lane southwest; 6 inches from fence post painted "U. S. B. M. No. 61"; copper nail in hub, elevation 25.93 feet.....	29 38 05.22	95 06 28.29	2,540
Deer Park, 4.2 miles south of, 150 feet north of Mr. English's house, 30 feet west of road, 1.5 feet from wire fence line; iron post stamped "Prim. Trav. Sta. No. 30, 1915," elevation 31.411 feet.....	29 38 40.31	95 06 59.72	4,501
Deer Park, 3.35 miles south, 0.4 mile east of, 0.9 mile east of intersection of Red Bluff road and Main Street, La. Porte road, 25 feet south of center of east and west road, 1.5 feet from wire fence; copper nail in hub; witness stake painted "U. S. B. M. No. 63"; elevation 36.54 feet.....	29 39 01.48	95 07 18.38	2,693
Deer Park, 2.35 miles south of, 10 feet east of old trail on open prairie; iron post stamped "Prim. Trav. Sta. No. 31, 1915," witness stake painted "U. S. P. B. M." elevation 41.162 feet.....	29 40 39.00	95 07 23.58	5,394
Deer Park, 1.5 miles south of, 10 feet west of dim roadway on open prairie; copper nail in hub; witness stake painted "U. S. B. M. No. 64"; elevation 39.70 feet.....	29 41 23.53	95 07 24.77	4,499
Deer Park, 0.7 mile south of; on west side of road, at edge of embankment made by ditch excavation; copper nail in hub; witness stake painted "U. S. B. M. No. 65"; elevation 37.47 feet.....	29 42 02.17	95 07 25.64	3,904
Deer Park, 1.6 miles north of; on north side of ship channel, U. S. Engineers' bench mark, station 67+63; tablet in top of concrete monument 6 inches square, elevation, determined from leveling by U. S. Corps of Engineers, 7.140 feet.....	29 44 02.84	95 07 24.68	

**Along Buffalo Bayou.**

These bench marks are probably all bronze tablets marked "U. S. Engineer Department," set in top of concrete posts, 6 inches square on top and protruding above ground. The letters R and L of the descriptions refer to right and left bank going downstream and the distances given are probably the approximate distances from the bank.			
Station 66+436 300 L, elevation, 3,626 feet.....			
Station 65+533 300 L, elevation, 5,382 feet.....			
Station 64+053 300 L, elevation, 8,016 feet.....			

Magnetic declination for quadrangle,  $8^{\circ} 10' E.$ **STUEBNER QUADRANGLE.**

Along highways in south part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Hufsmith, International & Great Northern Ry. crossing; top of rail, elevation 170.0 feet.....	* * "	* * "	Feet.
Hufsmith, 0.75 mile north of, 400 feet south of bridge over Spring Creek, 15 feet west of public road; gum tree painted "U. S. B. M. 260"; copper nail in root, elevation 151.09 feet.....	30 07 57.40	95 35 47.71	
Hufsmith, about 0.8 mile north and 0.7 east of, along a woods road near Spring Creek, 20 feet south of road and 120 feet west of a bridge over ravine; oak tree painted "U. S. B. M. 261"; copper nail in root, elevation 150.93 feet.....	30 08 02.26	95 35 12.92	3,094

## STUEBNER QUADRANGLE—Continued.

Along highways in south part of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Hufsmith, 0.8 mile north and 0.7 mile east of, just on north side of road; iron bar 2.5 inches in diameter and standing 3 feet high, probable land corner.....	• ' " 30 08 02.50	• ' " 95 35 04.62	Feet. 730
Hufsmith, 0.9 mile north and 1 mile east of, along road near Spring Creek, 250 feet southwest of cabin, 20 feet north of road, 12 feet west of oak tree and 3 feet from fence corner; iron post stamped "Prim. Trav. Sta. No. 118, 1915," elevation 177.882 feet.....	30 08 07.05	95 34 46.54	1,653
Stuebner (post office discontinued), 250 feet east of, 30 feet north of center of road, iron bar about 1½ inches square and standing 1 foot above ground; pine tree near, painted "U. S. B. M. 282"; top of bar, elevation 182.35 feet.....	30 07 47.60	95 34 14.46	3,435
Stuebner, 0.7 mile east of, 20 feet south of center of road; pine tree painted "U. S. B. M. 283"; copper nail in root, elevation 172.28 feet.....	30 07 51.26	95 33 32.08	3,741
Stuebner, 1 mile east of, 1.5 miles south of crossing of Spring Creek, 25 feet east of center of road at T road west; iron post stamped "Prim. Trav. Sta. No. 119, 1915," elevation 165.409 feet.....	30 07 51.77	95 33 11.83	1,779

## Near southeast corner of quadrangle.

Rotherwood spur, International & Great Northern Ry., 2.15 miles north and 0.6 mile west of, 2,000 feet northwest of a house, 600 feet north of woods road, along old trail; tree painted "U. S. B. M. 302"; copper nail in root (no elevation determined).....	30 07 32.04	95 30 22.07	.....
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Magnetic declination, 8° 35' E.

## SUGARLAND QUADRANGLE.

Near Missouri City.

Station.	Latitude.	Longitude.	Distance between stations.
Missouri City station, opposite southwest end of, 90 feet from public road crossing over track, 30 feet north of center of main road to Houston, 1 foot from right-of-way fence line; iron post stamped "Prim. Trav. Sta. No. 16, 1915," elevation 80.250 feet.....	• ' " 29 37 07.35	• ' " 95 32 17.34	Feet. .....
Missouri City, 0.8 mile northeast of, 300 feet east of public road crossing, 40 feet northwest of Houston Road, and about 40 feet from center of Southern Pacific R. R. track, 2 feet from telephone pole painted "U. S. B. M. No. 31"; copper nail in hub, elevation 71.98 feet.....	29 37 25.47	95 31 30.75	4,501

## SWANSON QUADRANGLE.

Along highways north through center of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Katy, 6.6 miles north of, 20 feet east of center of road, 0.5 mile north of white schoolhouse, 6 inches from corner fence post at fence line east; copper nail in hub; post painted "U. S. B. M. 102," elevation 163.46 feet.....	• ' " 29 52 54.34	• ' " 95 49 25.10	.....
Katy, 7.5 miles north of, 20 feet east of center of road, 1 foot from corner fence post at north end of gate; copper nail in hub; post painted "U. S. B. M. 103," elevation 171.64 feet.....	29 53 42.91	95 49 25.57	4,906
Katy, 8.1 miles north and 0.2 mile east of, in line with private road north, 20 feet south of center of east and west road, close to corner fence post at fence line south; iron post stamped "Prim. Trav. Sta. No. 50, 1915," elevation 163.046 feet.....	29 54 12.70	95 49 10.92	3,274

## SWANSON QUADRANGLE—Continued.

Along highways north through center of quadrangle—Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Katy, 8.1 miles north by 1 mile east of, 27 feet south by 26 feet west of post set at intersection of roads, 2 feet north of corner fence post; copper nail in hub; post painted "U. S. B. M. 104," elevation 159.42 feet.....	• ' "	• ' "	Feet. 3,915
Katy, 9 miles north by 1 mile east of, on west side of dim road, 6 inches from fence post; copper nail in hub; post painted "U. S. B. M. 105," elevation 162.21 feet.....	29 54 01.13	95 48 26.46	4,865
Katy, 10 miles north by 1 mile east of, 815 feet north of fence corner, 3 feet west of north and south fence line and 20 feet east of dim roadway; iron post stamped "No. 51, 1915," elevation 164.283 feet.....	29 55 49.65	95 48 27.19	4,900
Katy, 10.9 miles north by 1 mile east of, 1,900 feet south of Big Cypress Creek, 30 feet west of center of roadway, 6 inches from fence post; copper nail in hub; post painted "U. S. B. M. 106," elevation 160.93 feet.....	29 56 40.07	95 48 28.94	5,095
Katy, 11.3 miles north by 1 mile east of, 100 feet north of Big Cypress Creek, 25 feet north by 5 feet west of northwest corner of bridge on west side of road; copper nail and washer in root of water oak; corner of bridge painted "U. S. B. M. 107," and with an arrow, elevation 157.24 feet.....	29 57 00.11	95 48 29.46	2,024
Katy, 12.4 miles north by 1 mile east of, 1.1 miles north of Big Cypress Creek, 3.2 miles south of Houston & Texas Central R. R., 30 feet east of center of road, 2 feet from tall fence post; iron post stamped "Prim. Trav. Sta. No. 52, 1915," elevation 168.080 feet.....	29 57 05.22	95 48 30.11	5,971
Katy, 13.4 miles north by 1 mile east of, 2.1 miles north of Big Cypress Creek, 2.2 miles south of Houston & Texas Central R. R., 30 feet west of center of road, 6 inches from fence corner and gatepost; copper nail in hub; post painted "U. S. B. M. 108," elevation 180.23 feet.....	29 58 50.80	95 48 31.25	5,212
Katy, 14.4 miles north by 1 mile east of, 3.1 miles north of Big Cypress Creek, 30 feet east by 25 feet south of T road south, 1 foot from corner fence post; copper nail in hub; fence painted "U. S. B. M. 109," elevation 198.36 feet.....	29 59 42.58	95 48 32.36	5,231
Hockley, 6.5 miles south by 1.2 miles east of, 4,500 feet west of Katy and Hockley road, in open prairie; copper nail in hub with witness stake painted "U. S. B. M. 183," elevation 163.30 feet.....	29 55 42.25	95 49 18.05	.....
Hockley, 6.5 miles south by 0.6 mile east of, near gateway on a private road across prairie to Hockley, at north end of lane and near the head of timber on Big Cypress Creek, 6 feet west of gatepost and close to wire fence line; copper nail in hub; painted on gate "U. S. B. M. 184," elevation 160.02 feet.....	29 55 39.60	95 49 56.58	3,400
Hockley, 6 miles south of, about 0.8 mile northwest of head of timber of Big Cypress Creek, 4 feet southeast of gatepost at double gateway; iron post stamped "Prim. Trav. Sta. No. 81, 1915," elevation 169.512 feet.....	29 56 04.33	95 50 38.05	4,422
Hockley, 6 miles south by 1 mile west of, on prairie, 5 feet east of corner post on fence line north, 50 feet north of a jog west in fence line; copper nail in hub; post painted "U. S. B. M. 185," elevation 171.78 feet.....	29 56 03.52	95 51 44.77	5,870

## Near Swanson.

Hockley, 4.5 miles southeast of, 0.6 mile northwest of Swanson, 0.6 mile southeast of section house, nearly opposite milepost 31, 55 feet north of Houston & Texas Central R. R. track, 25 feet south of shell road, 2.5 feet north of telephone pole; iron post stamped "Prim. Trav. Sta. No. 54, 1915," elevation 194.546 feet..	29 59 57.98	95 46 21.62	.....
Swanson, 1,500 feet east of station signboard on Houston & Texas Central R. R., 25 feet south of center of shell road, 50 feet north of track, 600 feet west of milepost 30, 6 inches from telephone pole; copper nail in hub; pole painted "U. S. B. M. 113," elevation 187.62 feet.....	29 59 40.08	95 45 34.24	4,542

Magnetic declination in quadrangle,  $8^{\circ} 45' E.$

## WALLER QUADRANGLE.

Along public roads in southeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Hockley, 2.70 miles northwest of, 15 feet south of center of road, 4 feet from west end and in top of south abutment of concrete culvert; bronze tablet stamped "Prim. Trav. Sta. No. 79, 1915," elevation 216.121 feet.....	30 02 30.80	95 53 11.43	Feet. 4,883
Waller, 1.75 miles southeast of, about 100 feet west and 65 feet south of road crossing Houston & Texas Central R. R., 30 feet south of public road; in root of sycamore tree painted "U. S. B. M. 181"; copper nail, elevation 212.58 feet.....	30 02 48.33	95 53 58.61	4,509
Waller, 1.20 miles southeast of, crossroads.....	30 03 00.36	95 54 29.99	3,013
Waller, 0.50 mile southeast of, 25 feet south of center of road; 1 foot from telephone pole, close to fence line, painted "U. S. B. M. 182"; copper nail in hub, elevation 284.54 feet.....	30 03 08.39	95 54 51.76	2,078
Waller station, about 1,900 feet southeast of, 47 feet south of Houston & Texas Central R. R., 23 feet southeast of county line post, 2.5 feet north of fence line; iron post stamped "Prim. Trav. Sta. No. 80, 1915," elevation 241.63 feet.....	30 03 16.48	95 55 16.59	2,330
Waller station, about 1,885 feet southeast of, about 30 feet south of Houston & Texas Central R. R.; post marked "Harris County-Waller County".....	30 03 16.68	95 55 16.74	23
Waller, 0.6 mile north of, 20 feet east of road, at corner of fence where lane turns east, 6 inches from corner fence post; copper nail in hub; post painted "U. S. B. M. 192," elevation 206.29 feet.....	30 03 56.36	95 55 16.31	4,049
T road west, 200 feet north of, top of east end of small wooden culvert, elevation 265.10 feet.....			.....
Waller, 1.6 miles north of, 25 feet south and 25 feet east of T road east; 6 inches from corner fence post painted "U. S. B. M. 193"; copper nail in hub, elevation 274.06 feet.....	30 04 46.98	95 55 17.33	5,114
Waller, 2.4 miles north of, in line with road north at east end of 300 foot jog, 3 feet north of wire fence, 8 feet west of telephone pole; iron post stamped "Prim. Trav. Sta. No. 85, 1915," elevation 271.03 feet.....	30 05 21.92	95 55 14.56	3,539
Waller, 3.4 miles north of, 20 feet east of road, at corner post on fence line east; 6 inches from fence post painted "U. S. B. M. 194"; copper nail in hub, elevation 276.83 feet.....	30 06 13.59	95 55 15.42	5,220
Waller, about 2.9 miles north of and 0.5 mile east of, 920 feet north of T road east and 900 feet north of T road west, 20 feet east of road, 1 foot from corner post on fence line east; copper nail in hub "U. S. B. M. 195," elevation 286.72 feet.....	30 06 42.05	95 54 55.36	3,370
Waller, 4.7 miles north and about 0.5 mile east of, 0.5 mile south of Harris-Montgomery county line, at T road south and in line with road south, 2 feet south of wire fence; iron post stamped "Prim. Trav. Sta. No. 86, 1915," elevation 273.24 feet.....	30 07 25.68	95 54 56.38	4,409
Waller, 3.7 miles north and 1.6 mile east of, 25 feet north of center of road, 100 feet west of point in road opposite Bentford schoolhouse, at east gate post; 6 inches from post painted "U. S. B. M. 196"; copper nail in hub, elevation 271.04 feet.....	30 06 33.83	95 53 45.59	8,132
Waller, 3.75 miles north and 1.80 miles east of, crossroads.....	30 06 33.82	95 53 31.97	1,196
Waller, 3.75 miles north and 2.5 miles east of, 400 feet north of old two-story house, 25 feet north of center of road; 6 inches from fence post with 2-inch by 4-inch timber supporting telephone wire painted "U. S. B. M. 197"; copper nail in hub, elevation 283.49.....	30 06 34.35	95 52 50.77	2,830
Waller, 3.7 miles north and 2.7 miles east of, 20 feet east of T road west, 3 feet from north and south fence line; iron post stamped "Prim. Trav. Sta. No. 87, 1915," elevation 266.894 feet.....	30 06 34.37	95 52 41.25	1,627
Hockley, 4.7 miles north and 1.7 miles west of, 25 feet west of center of road, 60 feet north of ridge, at corner of fence on road west; 6 inches from post painted "U. S. B. M. 198"; copper nail in hub.....	30 05 43.76	95 52 40.80	5,114
Hockley, 3.7 miles north and 1.7 miles west of, 20 feet west and 15 feet south of T road east, 25 feet north of Charles Schultz's mail box; copper nail in hub, "U. S. B. M. 199," elevation 274.12 feet..	30 04 53.61	95 52 39.79	5,066

From point near southeast corner of quadrangle north to point 1.7 miles west of Hockley.

Hockley, 1.3 miles south by 2.5 miles west of, 1 mile south of T road south 6 inches from corner post on fence line east; copper nail in hub; post painted "U. S. B. M. 190," elevation 230.83 feet....	30 00 24.40	95 52 54.64	.....
Hockley, 0.2 mile south by 2.5 miles west of, at T road south, in line with road south, 20 feet north of center of east and west road, 2 feet from wire fence; iron post stamped "Prim. Trav. Sta. No. 84, 1915," elevation 235.066 feet.....	30 01 17.38	95 52 56.15	5,354

Magnetic declination for southeast quarter of quadrangle, 8° 30' E.

**WALLEY QUADRANGLE.**

On uncheckd spur line.

Station.	Latitude.	Longitude.	Distance between stations.
Crosby, about 6.3 miles northeast of, on road to Liberty, 125 feet south of Texas & New Orleans R. R., 250 feet west of bridge across Cedar Bayou, 30 feet south of public road and 6 feet north of wire fence; iron post stamped "Prim. Trav. Sta. No. 202, 1915," elevation 54.066 feet.....	29 58 14.90	94 59 16.33	Feet.

Magnetic declination for quadrangle,  $8^{\circ} 23' E.$ **WEBSTER QUADRANGLE.**

Along highways near north border of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Genoa station, Galveston & Houston Electric Ry., 90 feet east and 30 feet south of road crossing, 35 feet south of center of road; 2 feet east of right-of-way fence; iron post stamped "Prim. Trav. Sta. No. 27, 1915," elevation 49.112 feet.....	29 37 22.32	95 12 57.20	Feet.
Genoa station, Galveston, Houston & Henderson R. R., about 440 feet north of, 80 feet west of track, 6 feet outside right-of-way fence; 3 feet from telephone pole painted "U. S. B. M. 53"; copper nail in hub (no elevation).....	29 37 25.06	95 11 54.95	5,500
Genoa station, Galveston, Houston & Henderson R. R., 180 feet north of, 25 feet west of center of track, on south side of water tank, in concrete foundation; bronze tablet; no elevation; stamped "C. and G. S. B. M. R8," elevation 49.846 feet.....	29 37 23.36	95 11 53.03	242

Along public road between Webster and Genoa.

Webster, about 0.75 mile northwest of, 40 feet northeast of center of road; 1 foot west of telephone pole painted "U. S. B. M. 511"; copper nail in hub, elevation 27.921 feet.....	29 32 44.50	95 07 31.63	.....
Webster, 1.6 miles northwest of, 55 feet southwest of center of Galveston, Houston & Henderson Ry. track, 25 feet northeast of road; 6 inches west of telephone pole painted "U. S. B. M. 512"; copper nail in hub, elevation 32.78 feet.....	29 33 18.79	95 08 03.93	4,487
Webster, 2.4 miles northwest of, 55 feet southwest of center of Galveston, Houston & Henderson R. R. track, 25 feet northeast of road; iron post stamped "Prim. Trav. Sta. No. 212, 1915", elevation 35.265 feet.....	29 33 53.16	95 08 36.07	4,485
Webster 3.3 miles northwest of, 150 feet south of signpost "Olcott 1 mi.," 50 feet southwest of Galveston, Houston & Henderson R. R., 30 feet northeast of road; 6 inches west of telephone pole painted "U. S. B. M. 513"; copper nail in hub, elevation 29.10 feet.....	29 34 29.72	95 09 10.29	4,772
Genoa, 3.4 miles southeast of, 55 feet southwest of Galveston, Houston & Henderson R. R., 25 feet northeast of road; 6 inches southwest of telephone pole painted "U. S. B. M. 514"; copper nail in hub, elevation 29.52 feet.....	29 35 05.02	95 09 43.37	4,609
Genoa, 2.6 miles southeast of, opposite Olcott'siding, 55 feet southwest of Galveston, Houston & Henderson R. R., 25 feet northeast of road; 20 feet northwest of steps over wire fence; iron post stamped "Prim. Trav. Sta. No. 213, 1915", elevation 34.114 feet.....	29 35 38.65	95 10 14.94	4,394
Genoa, 1.75 miles southeast of, 25 feet northeast of road; 6 inches south of telephone pole painted "U. S. B. M. 515"; copper nail in stub of old telephone pole, elevation 42.10 feet.....	29 36 13.51	95 10 47.70	4,537
Genoa, about 0.9 mile southeast of, 25 feet northeast of road; 6 inches west of telephone pole painted "U. S. B. M. 516"; copper nail in hub, elevation 41.06 feet.....	29 36 45.79	95 11 18.04	4,219

## WEBSTER QUADRANGLE—Continued.

## Along public road between Webster and Friendswood.

Station.	Latitude.	Longitude.	Distance between stations.
	° ° "	° ° "	Fect.
Webster station, Galveston-Houston Interurban R. R., near road crossing at, 10 feet northeast of center of track and 15 feet southeast of center of road; 6 inches from crossing signboard; copper nail in hub (t. b. m. 517), elevation 29.31 feet.....	29 31 53.18	95 07 34.68	.....
Webster, 1 mile south and 1.25 miles west of, opposite old irrigation pump house, 40 feet north of road, 4 feet from northeast corner of bridge over ditch; 6 inches from post at east end of gate, painted "U. S. B. M. 518"; copper nail in hub, elevation 23.48 feet.....	29 31 25.32	95 08 14.59	4,511
Webster, 1 mile south and 2.5 miles west of, 700 feet southwest of crossroads, 25 feet southeast of center of road, near fence corner; iron post stamped "Prim. Trav. Sta. No. 214, 1915", elevation 28.648 feet.....	29 31 26.62	95 09 31.07	6,757
Webster, 0.6 miles south and 2.8 miles west of; crossroads; shell road north, east, and southwest.....	29 31 49.73	95 09 47.54	2,751
Webster, 1 mile south and 3.15 miles west of, 50 feet south of right angle in road; 6 inches north of telephone pole painted "U. S. B. M. 521"; copper nail in hub, elevation 27.38 feet.....	29 31 30.40	95 10 08.15	2,670
Webster, 0.8 mile south and 4 miles west of, 35 feet northwest of road; 6 inches east of telephone pole painted "U. S. B. M. 522"; copper nail in hub, elevation 30.35 feet.....	29 31 37.00	95 10 55.45	4,231
Webster, 1 mile south and 4.2 miles west of, 300 feet northeast of east end of bridge across Clear Creek, 50 feet northwest of road, 10 feet inside fence line at edge of woods; iron post stamped "Prim. Trav. Sta. No. 215, 1915", elevation 18.115 feet.....	29 31 26.29	95 11 09.80	1,667

## From Friendswood northwest on Pearland road.

Friendswood, about 70 feet south of crossroads, concrete post, 5 feet high at corner of fence around Friendswood Academy; painted "U. S. B. M. 523"; chiseled square on top of post, elevation 37.50 feet.....	29 31 41.26	95 11 50.65	4,655
Friendswood, 0.9 mile northwest of, 100 feet northwest of entrance to farmyard, 25 feet northeast of center of road; 6 inches west of telephone pole painted "U. S. B. M. 524"; copper nail in hub, elevation 32.24 feet.....	29 32 13.62	95 12 38.60	4,752
Friendswood, 2.35 miles northwest of, 30 feet south of crossroads, 3 feet north of corner fence post; iron post stamped "Prim. Trav. Sta. No. 216, 1915", elevation 41.855 feet.....	29 32 49.61	95 13 54.71	7,635
Friendswood, 1.35 miles north and 2.7 miles west of, just north of Mary's Bayou, 60 feet southwest of road, oak tree painted "U. S. B. M. 525"; copper nail in root, elevation 43.41 feet.....	29 32 51.79	95 14 40.13	4,017

## Near Genoa and Webster.

Genoa, 1.75 miles southeast of, top of vertical section rail; chiseled cross (C. & G. S. B. M. 16), elevation, 43.573 feet.....	.....	.....	.....
Webster, 1 mile northwest of, 18 telegraph poles northwest of mile board 21, 115 feet northeast of Galveston, Houston & Henderson Ry. tracks, 50 feet southwest of an artesian well, on land owned by Harvey T. D. Wilson, set in clay; on 3-inch red metal cap on iron pipe (C. & G. S. b. m. T8), elevation, 31.506 feet.....	.....	.....	.....
Webster, 1 mile south by 3.15 miles west of, 50 feet south of right angle in road, 6 inches north of telephone pole; copper nail in hub painted "U. S. 27.4 B. M. 521", elevation, 27.38 feet.....	.....	.....	.....
Genoa, about 3.5 miles southwest of, at south edge of prairie, 800 feet north of edge of timber, on fence line, 18 inches southwest of fence post; wire nail in hub painted "U. S. 33.9 B. M.", elevation, 33.90 feet.....	.....	.....	.....

## \* WASHINGTON.

### TRIANGULATION STATIONS.

**Bialock Island, Pasco, and Prosser quadrangles.**

**BENTON, FRANKLIN, AND KLICKITAT COUNTIES.**

During the season of 1906 C. F. Urquhart and A. I. Oliver extended triangulation over the above-named quadrangles. Positions were originally computed on Spokane datum (see Bulletin 440), but a correction of 3.1" has been added to all latitudes and 7.6" subtracted from all longitudes to reduce them to approximate North American datum.

#### **ALDER, KLICKITAT COUNTY, WASH.**

Station is on highest point of ridge just north of Columbia River and about 1 mile west from Alder Creek. It can be reached by road from Mr. Warner's ranch. The road crosses ridge about 0.25 mile west from station. Point is 2 miles from Warner's ranch and 6 miles from Castle Rock post office, at which point there is a ferry across Columbia River.

Signal: A quadripod supporting two targets of black cloth at right angles to each other.

Station mark: An aluminum tablet set in solid rock under center of signal. There is a cairn 4 feet in diameter and 2-5 feet high over tablet.

[Latitude  $45^{\circ} 51' 00.89''$ . Longitude  $119^{\circ} 56' 21.48''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "		<i>Log. meters.</i>
Mule.....	128 49 59.95	308 34 30.47	4.5525585	
Horse.....	189 22 28.19	9 25 36.30	4.5371674	
Bender.....	213 13 26.58	33 29 41.38	4.7237848	
Irrigon.....	246 07 19.92	66 23 47.98	4.5104470	
Granite.....	292 42 51.96	113 02 01.61	4.575215	
Gleason.....	315 22 37.42	135 44 26.02	4.752493	
None.....	346 55 06.35	166 40 37.53	4.6370650	

#### **BENDER, BENTON COUNTY, WASH.**

On high point of ridge in Horseheaven country overlooking Yakima River, about 10 miles east of Prosser. The third grade east from Prosser goes within 2 miles (southwest) of station.

Signal: A quadripod supporting two black targets at right angles to each other.

Station mark: An aluminum tablet, triangulation, set in 15 by 15 by 24 inch rock is sunk flush with surface of ground under center of signal.

[Latitude  $46^{\circ} 14' 53.01''$ . Longitude  $119^{\circ} 33' 47.48''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Alder.....	° ' "	° ' "	<i>Log. meters.</i>
Horse.....	33 29 41.38	213 13 26.58	4.7237848
Hembree.....	66 30 47.25	246 17 38.68	4.4075870
Outlook.....	96 01 15.58	275 29 30.34	4.7338837
Rattlesnake.....	122 29 32.05	302 06 23.72	4.6338837
Hartman.....	136 26 06.17	316 14 07.90	4.477840
White Bluff.....	173 02 34.88	353 01 28.80	4.2073143
Erie.....	235 09 00.07	55 22 25.60	4.4623209
Jumpoff Joe.....	274 39 07.61	94 49 45.02	4.2781434
Horseheaven.....	295 18 13.39	115 37 01.18	4.5698130
Irrigon.....	313 29 41.54	133 38 28.34	4.3816136
	359 08 35.07	179 08 50.68	4.4938760

**HARTMAN, BENTON COUNTY, WASH.**

Station is on southeast end of Rattlesnake range of hills and was established by the Reclamation Service. It is not on the highest point of mountain but about 300 yards southeast from highest point. It is about 18 miles from Prosser and 15 from Kiowa. The nearest ranch is owned by Mrs. Houskins. Buckboard can be driven to station from this ranch.

Signal: A rock cairn about  $4\frac{1}{2}$  feet high with a small lumber structure over it.

Station mark: A hub.

[Latitude  $46^{\circ} 23' 31.17''$ . Longitude  $119^{\circ} 35' 18.85''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Horse.....	° ' "	° ' "	<i>Log. meters.</i>
Rattlesnake.....	39 21 27.44	219 09 23.95	4.5294005
White Bluff.....	108 03 26.79	287 52 33.85	4.3661107
Erie.....	268 42 52.34	88 57 24.99	4.4108898
Horseheaven.....	310 01 59.39	130 13 43.64	4.4354534
Bender.....	329 10 05.89	149 20 59.40	4.5788612
	353 01 28.80	173 02 34.88	4.2073143

**HORSE, BENTON COUNTY, WASH.**

On high point of ridge about 6 miles west from Prosser. Grade goes up ridge from Yakima River about 2 miles east from signal and turns west, running within 1 mile of signal.

Signal: A quadripod with two targets at right angles with black cloth on them.

Station mark: An aluminum tablet set in small rock flush with surface of ground, and under a cairn of rocks  $3\frac{1}{2}$  feet high and 4 feet in diameter.

[Latitude  $46^{\circ} 09' 21.63''$ . Longitude  $119^{\circ} 51' 59.99''$ .]

To station—	Azimuth.	Back azimuth.	Distance.
Alder.....	° ' "	° ' "	<i>Log. meters.</i>
Mule.....	9 25 36.30	189 22 28.19	4.5371674
Hembree.....	70 53 43.10	250 35 02.81	4.5486626
Snipes.....	115 51 13.46	295 32 38.59	4.5648934
Outlook.....	135 24 29.24	315 14 51.07	4.3574012
Rattlesnake.....	154 02 29.46	333 52 32.31	4.6046605
Hartman.....	183 45 13.13	3 46 25.30	4.5124619
Prosser.....	219 09 23.95	39 21 27.44	4.5294005
Bender.....	229 42 04.40	49 46 18.59	3.9956999
Horseheaven.....	246 17 38.68	66 30 47.25	4.4075870
Irrigon.....	278 38 38.47	99 01 32.41	4.6171032
	311 03 32.91	131 16 55.23	4.5026412

**HORSEHEAVEN, BENTON COUNTY, WASH.**

On a high, flat ridge in the Horseheaven country about 16 miles southwest from Kennewick, and about 8 or 10 miles east from Horseheaven post office. To reach point from Kennewick, go up railroad to Relief, thence by road southwest to highest point of ridge.

Signal: A lumber quadripod with black and white targets.

Station mark: A triangulation tablet set in rock under center of signal.

[Latitude 46° 05' 55.63". Longitude 119° 20' 14.10".]

To station—	Azimuth.	Back azimuth.	Distance.	<i>Log. meters.</i>
Irrigon.....	49 29 48.96	229 20 19.13	4.3506138	
Horse.....	99 01 32.41	278 38 38.47	4.6171032	
Bender.....	133 38 28.34	313 28 41.54	4.3816136	
Hartman.....	149 20 59.40	329 10 05.89	4.5788612	
Erie.....	185 38 00.34	5 38 50.23	4.1788960	
Jumpoff Joe.....	267 41 42.16	87 50 42.45	4.2073033	

**JUMPOFF JOE, BENTON COUNTY, WASH.**

On highest point of a well-known ridge called "Jumpoff Joe." It is about 7 or 8 miles south of Kennewick, and can be seen from the town. There is a good road from Kennewick to summit of ridge, and buckboard can be driven from there to signal.

Signal: A lumber quadripod with black and white cloth on it.

Station mark: A triangulation tablet set in rock placed under center of signal.

[Latitude 46° 06' 15.94". Longitude 119° 07' 44.28".]

To station—	Azimuth.	Back azimuth.	Distance.	<i>Log. meters.</i>
Horseheaven.....	87 50 42.45	267 41 42.16	4.2073033	
Bender.....	115 37 01.18	295 18 13.39	4.5698130	
Erie.....	134 39 46.38	314 31 35.37	4.3118793	
Richland.....	149 11 13.88	329 04 55.00	4.3413756	
White Bluff.....	163 32 19.83	313 26 55.19	4.5299924	
Kennewick.....	184 57 06.88	4 57 38.92	4.0127979	
Pasco.....	191 45 42.35	11 48 03.40	4.3122722	
Pasco water tank.....	194 24 10.88	14 26 12.11	4.1607141	
Page.....	218 19 01.22	38 31 50.78	4.5651622	
Leroy.....	242 48 43.65	63 03 55.53	4.4836530	
Walla Walla.....	292 40 46.23	112 52 11.77	4.3461720	

**KENNEWICK, BENTON COUNTY, WASH. (Not occupied.)**

Station mark: The pole in cupola on large brick schoolhouse in town of Kennewick on Northern Pacific Railroad.

[Latitude 46° 12' 12.02". Longitude 119° 06' 59.85".]

To station—	Azimuth.	Back azimuth.	Distance.	<i>Log. meters.</i>
Jumpoff Joe.....	* * *	* * *	4.0427979	
Erie.....	102 25 19.27	282 16 35.77	4.2015347	
Pasco.....	199 34 00.06	19 35 46.37	3.9847832	

**MULE, KLICKITAT COUNTY, WASH.**

Located on northeast top of a bald ridge about 4 miles to the north of Bickleton. Bickleton is reached by wagon road from Prosser, a distance of about 30 miles. A buckboard can be taken on to point from Bickleton side. Highest top of hill is southwest of the signal 100 yards but is not more than 2 or 3 feet higher. View to the southwest is cut out by near-by mountains but the view is good in all other directions.

Signal: A mound of rock 5 feet high and centered over this is an upright timber standing 13 feet high, which carries two sheets of white cloth 4 by 6 feet at right angles to each other.

Station mark: The rock cairn.

[Latitude 46° 03' 03.73". Longitude 120° 17' 54.69".]

To station—	Azimuth.	Back azimuth.	Distance.
Hembree.....	°   '   "	°   '   "	
	180 28 39.42	0 28 47.17	4.446732
Outlook.....	198 00 19.10	18 09 05.82	4.701623
Rattlesnake.....	218 35 47.03	38 55 42.18	4.752853
Horse.....	250 35 02.81	70 53 43.10	4.542426
Alder.....	308 34 30.47	128 49 59.95	4.552535

**OUTLOOK, BENTON COUNTY, WASH.**

On a high flat-topped ridge of the Rattlesnake Mountains north from Outlook post office and near the head of Moxee Valley. It can be driven to from either the Yakima or Moxee valley. An old road crosses the ridge about 2½ miles west from signal, and from summit on road buckboard can be driven up ridge to signal.

Signal: A lumber tripod.

Station mark: A small rock cairn.

[Latitude 46° 28' 52.50". Longitude 120° 05' 45.76".]

To station—	Azimuth.	Back azimuth.	Distance.
Mule.....	°   '   "	°   '   "	
Hembree.....	18 09 05.82	198 00 19.10	4.701623
Satas <sup>a</sup> .....	37 15 10.71	217 06 30.69	4.401724
Atanum.....	64 04 19.1	243 35 48.9	4.7501303
Moxee.....	96 08 53.06	275 47 18.68	4.5827464
Rattlesnake.....	144 53 48.13	324 47 37.48	4.271291
Bender.....	280 28 02.25	100 39 13.21	4.3028534
Horse.....	302 06 23.72	122 29 32.05	4.685587
Snipes.....	333 52 32.31	154 02 29.46	4.1041745
	358 21 41.27	178 21 59.47	4.2743865

\* From Ellensburg datum.

**PASCO, FRANKLIN COUNTY, WASH.**

Station is on a sagebrush hill 3 or 4 miles north of Pasco. To reach station go up road on east side of railroad track. There is one road which turns to the right and another to the left, but the road running practically straight passes within 100 yards of signal. Signal can be seen after getting about 1 mile from town.

Signal: A lumber quadripod with white and black cloth on it.

Station mark: A triangulation tablet set in rock, placed under center of signal.

[Latitude 46° 17' 06.67". Longitude 119° 04' 28.85".]

To station—	Azimuth.	Back azimuth.	Distance.
Pasco water tank.....	5 32 03.37	185 31 46.34	3.7851985
Jumpoff Joe.....	11 48 03.40	191 45 42.35	4.3122722
Kennewick.....	19 35 46.37	199 34 00.06	3.9847832
Eric.....	73 12 14.37	253 01 41.42	4.2924577
Page.....	244 52 54.95	65 03 24.32	4.3127162
Lerlere.....	285 08 03.64	105 20 55.70	4.3731992
Wallaula.....	330 24 54.62	150 34 00.24	4.5179564

**ERIE, BENTON COUNTY, WASH.**

On a bald hill between Yakima River near its mouth and the Northern Pacific Railway. It is about 4 miles southwest from Richland and 10 or 12 miles west from Kennewick. Can drive to summit of hill.

Signal: A lumber quadrupod with white and black targets.

Station mark: Triangulation tablet set in rock under center of signal.

Observer: C. F. Urquhart, 1906.

[Latitude 46° 14' 02.22". Longitude 119° 19' 04.94".]

To station—	Azimuth.	Back azimuth.	Distance.
Horseheaven.....	5 38 50.23	185 38 00.34	4.1788960
Bender.....	94 49 45.02	274 39 07.61	4.2781434
Hartman.....	130 13 43.64	310 01 50.39	4.4354534
White Bluff.....	195 16 22.12	15 19 09.34	4.2731138
Pasco.....	253 01 41.42	73 12 14.37	4.2924577
Pasco water tank.....	271 05 44.67	91 15 57.56	4.2598434
Richland.....	216 52 14.62	36 54 07.34	3.7445776
Kennewick.....	282 16 35.77	102 25 19.27	4.2016347
Jumpoff Joe.....	314 31 35.37	134 39 46.38	4.3118793

**PASCO WATER TANK, FRANKLIN COUNTY, WASH. (Not occupied.)**

Station mark: Northern Pacific Railway water tank in town of Pasco.

[Latitude 46° 13' 50.08". Longitude 119° 04' 06.22".]

To station—	Azimuth.	Back azimuth.	Distance.
Jumpoff Joe.....	14 26 12.11	194 24 10.88	4.1607111
Eric.....	91 15 57.56	271 05 44.67	4.2598434
Pasco.....	185 31 46.34	5 32 03.37	3.7851985

**PROSSER, BENTON COUNTY, WASH. (Not occupied.)**

Station mark: Center of smokestack on power plant near lower bridge on Yakima River at Prosser.

[Latitude 46° 12' 48.86". Longitude 119° 46' 08.76".]

To station—	Azimuth.	Back azimuth.	Distance.
Horse.....	49 46 18.59	229 42 04.40	3.9956609
Rattlesnake.....	168 19 29.01	348 16 26.40	4.4253306

**RATTLESNAKE, BENTON COUNTY, WASH.**

Station is on the highest point near center of Rattlesnake range, about 20 miles north-northwest from Prosser. Take the Rattlesnake road to Mr. Dyke's ranch, thence by road north to summit of ridge, thence west along ridge to signal. One high point is passed before signal is reached.

Signal: A small cairn with lumber tripod built over it.

Station mark: A triangulation tablet set in rock, 20 inches in diameter, placed under center of cairn.

[Latitude 46° 26' 53.32". Longitude 119° 50' 20.21".]

To station—	Azimuth.	Back azimuth.	Distance.
Horse.....	• ' "	• ' "	
Mule.....	3 46 25.30	183 45 13.13	4.5124619
Snipes.....	38 55 42.18	218 35 47.03	4.7528832
Hembree.....	51 55 48.39	231 44 56.56	4.3886805
Outlook.....	64 56 29.51	244 36 39.68	4.5892312
Moxee.....	100 39 13.21	280 28 02.25	4.3029654
Coal.....	122 08 55.47	301 51 33.19	4.5573757
Hartman.....	169 06 23.35	340 04 25.80	4.2610327
Bender.....	287 52 33.85	108 03 26.79	4.3061107
Prosser power plant.....	316 14 07.90	136 26 06.17	4.4877800
	348 16 26.40	168 19 29.01	4.4253306

**SNIPES, BENTON COUNTY, WASH. (Not occupied.)**

On well-known and prominent hill 2 or 3 miles west of Sunnyside.

Station mark: A cairn about 5 feet high on summit of hill.

[Latitude 46° 18' 43.62". Longitude 120° 05' 20.62".]

To station—	Azimuth.	Back azimuth.	Distance.
Hembree.....	• ' "	• ' "	
Outlook.....	84 56 26.38	264 47 28.91	4.2035339
Rattlesnake.....	178 21 59.47	338 21 41.27	4.2743955
Horse.....	231 44 56.56	51 55 48.39	4.3886805
	315 14 51.07	135 24 29.22	4.3874012

**WHITE BLUFF, FRANKLIN COUNTY, WASH.**

On the north side of and overlooking Columbia River about 16 miles above Pasco. It is first of the white bluffs going up the river. The road known as the river road from Pasco passes within 100 yards of the signal. This road goes to river about 4.5 miles from Pasco, thence up river to Richland Ferry, thence through sagebrush to river again at foot of bluff, thence up hill to signal.

Signal: A lumber quadripod with white and black cloth on it.

Station mark: A triangulation tablet set in rock placed under center of signal.

[Latitude 46° 23' 48.11". Longitude 119° 15' 13.70".]

To station—	Azimuth.	Back azimuth.	Distance.
Erie.....	• ' "	• ' "	
Bender.....	15 19 09.34	195 16 22.12	4.2731138
Hartman.....	55 22 25.80	235 09 00.07	4.4623299
Page.....	88 57 24.99	268 42 52.34	4.4108378
Lerler.....	276 22 16.19	98 40 32.98	4.5130440
Jumpoff Joe.....	296 45 59.58	117 06 38.67	4.6141395
	343 26 55.19	163 32 19.83	4.5299924

## PRIMARY TRAVERSE.

Cape Elizabeth (30'), Hoquiam (15'), Humptulips (30'), and Ocosta (15') quadrangles.

## CHEHALIS COUNTY.

The following geographic positions on North American datum were determined by primary traverse and are based upon Coast and Geodetic Survey triangulation stations Chehalis, Drummond, Flat, Langley, Lone Tree, and Tank. The work was done by L. F. Biggs in 1913.

## CAPE ELIZABETH QUADRANGLE.

Along highways in southeast quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Small bridge at logging camp, west end of, 375 feet southeast of log chute.....	° ' "	° ' "	Feet.
Two bridges, center of one farthest east.....	47 03 20.8	124 00 00.7	4,903
Small bridge, center of.....	47 03 57.2	124 00 47.5	2,082
Blazed tree, south edge of road on section line.....	47 04 00.9	124 01 17.1	1,089
Small pump, south of road.....	47 04 05.7	124 01 31.1	3,638
Bridge, 210 feet west to T road south.....	47 04 22.9	124 02 17.2	1,139
Tulips, center of Northern Pacific Ry. track at road crossing.....	47 04 20.8	124 02 33.4	1,555
Tps. 18 and 19 N., R. 11 W., corner secs. 3, 4, 33, and 34, 1,970 feet west of L in road.....	47 04 20.7	124 02 55.8	4,750
T road south, 100 feet east of track at crossing.....	47 05 07.1	124 02 45.5	4,486
Newtown post office, 1 mile northwest of, in southeast pier of bridge over Humptulips River; aluminum tablet stamped "Prim. Trav. Sta. No. 8, elevation 37 feet 1911".....	47 05 35.1	124 03 35.6	1,549
Section X at camp (blaze not found, but fence supposed to be line). T road northeast, signboard reads: Copalis, 5.5 miles; Moclips, 14.5 miles; Hoquiam, 15.4 miles.....	47 06 02.1	124 03 38.8	3,998
Copalis, Northern Pacific Ry. crossing.....	47 06 30.3	124 04 06.0	3,419
Center of track at logging road.....	47 06 46.8	124 04 42.1	3,998
Notched tree, apparently section crossing.....	47 06 57.5	124 05 05.3	1,935
Langley triangulation station, Coast and Geodetic Survey.....	47 06 58.3	124 05 53.8	3,359
L road south, at south end of long tangent.....	47 07 00.26	124 06 46.45	3,647
Copalis schoolhouse, 0.80 mile east of corner sections.....	47 07 07.8	124 09 05.9	9,674
Copalis schoolhouse, 20 feet northwest of; iron post stamped "Prim. Trav. Sta. No. 9, 1911; elev. 24 feet, Wash.".....	47 06 54.9	124 09 06.1	1,310
Small stream crossing.....	47 06 55.0	124 10 05.6	4,117
Fisherman's tower.....	47 06 27.8	124 10 38.4	3,577
Small stream crossing.....	47 05 58.6	124 10 27.0	3,071
Stack on mill.....	47 05 21.7	124 10 24.0	3,752
Mouth of creek, on north side, at high-water mark.....	47 05 20.5	124 10 13.4	743
Fisherman's tower.....	47 04 42.2	124 10 07.5	3,900
Mail box.....	47 03 35.0	124 10 01.2	6,829
Mail rack, U. S. G. S. No. 1.....	47 03 01.7	124 09 58.4	3,382
Mail rack, U. S. G. S. No. 2.....	47 02 39.2	124 09 57.0	2,291
Oyhut road, mail rack at.....	47 01 25.4	124 09 46.1	7,510
Iron bench-mark post "Prim. Trav. Sta. No. 10".....	47 01 03.3	124 09 45.2	2,250
	47 01 04.2	124 09 23.8	1,483

Along Northern Pacific Railway in southeast quarter of quadrangle.

Road crossing, center of track.....	47 04 03.8	124 02 36.5	.....
Do.....	47 03 54.3	124 02 25.6	1,226
Center of bridge.....	47 03 45.0	124 02 15.2	1,189
Primary traverse station No. 11, elevation 17 feet.....	47 03 26.0	124 02 10.8	1,943
Northern Pacific Ry., west end of tangent.....	47 02 41.5	124 02 11.7	4,510
Center of bridge.....	47 01 52.2	124 01 28.8	5,812
Chenols Creek station, center of track at.....	47 01 50.2	124 01 27.1	240
Gray Gables, road crossing 270 feet northwest of station.....	47 00 52.2	124 00 32.9	6,976
Prim. Trav. Sta. No. 12, elevation 6 feet; iron post.....	47 00 19.6	124 00 07.7	3,731
Center of bridge.....	47 00 14.7	124 00 09.2	506

Magnetic declination in southeast quarter of quadrangle, 23° 50' E.

## OCOSTA QUADRANGLE.

Along highways in northwestern part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Box signal.....	• ′ ″	• ′ ″	Fect.
United States engineering department signal.....	46 59 37.1	124 09 28.9	.....
Lone Tree triangulation station, Coast and Geodetic Survey.....	46 58 14.0	124 09 37.6	8,444
	46 57 07.68	124 07 35.78	10,795

Magnetic declination near north border of quadrangle, 23° 40' E.

## HOQUIAM QUADRANGLE.

Along highways in northeastern part of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
Tank triangulation station (Coast and Geodetic Survey) on southwest side of platform of water tank in southwest part of Aberdeen; station mark an iron pipe 1½ inches diameter, 9 feet long, driven 8 feet in ground.....	• ′ ″	• ′ ″	Fect.
Aberdeen, city hall, west side of main entrance, in top of corner stone; aluminum tablet stamped "Prim. Trav. Sta. No. 1, Wash., 1911".....	46 58 00.71	123 49 45.49	.....
Aberdeen, 0.90 mile northwest of, T road.....	46 58 35.0	123 48 59.7	4,707
Aberdeen, 1.25 miles northwest of, at north end of bridge, center of Y road.....	46 59 22.1	123 48 47.4	4,550
Aberdeen, 1.65 miles northwest of, U. S. t. b. m., elevation 21 feet.....	46 59 38.3	123 48 43.1	1,662
	46 59 54.3	123 48 25.5	2,033

Along highways near Flat triangulation station.

Flat triangulation station, Coast and Geodetic Survey, on north shore of Grays Harbor, about 0.5 mile west of Hoquiam. It is 27.9 meters south of Northern Pacific Ry. track, 25 meters from and 2 feet above high-water mark. Station mark a copper tack in top of a spruce hub, 12 by 6 by 22 inches.....	46 58 45.22	123 54 13.50	.....
Hoquiam, intersection of Emerson and Lincoln streets.....	46 58 53.0	123 53 05.2	4,803
Hoquiam, 0.80 mile north of, T road west.....	46 59 35.7	123 53 05.2	4,320
Hoquiam, 1.30 miles northwest of, at mouth of Little Hoquiam River, at west end of bridge, 15 feet south of road; iron post stamped "Prim. Trav. Sta. No. 6, elevation 16, Wash., 1911".....	46 59 42.6	123 53 40.3	2,539

Along Northern Pacific Railway in northwest quarter of quadrangle.

United States bench mark, elevation 13 feet, also primary traverse station No. 13.....	46 58 57.7	123 58 36.3	10,120
Grays Harbor city station.....	46 58 58.3	123 57 27.8	4,752
Grays Harbor city station, 0.40 mile southeast of, water column.....	46 59 01.6	123 56 58.2	2,085
Grays Harbor city station, 1.90 miles southeast of; iron post stamped "Prim. Trav. Sta. No. 14, elevation 10 feet".....	46 58 56.3	123 55 05.5	7,831

Along highways in northeast quarter of quadrangle.

Drummond triangulation station, Coast and Geodetic Survey.....	46 57 04.26	123 51 10.98	.....
Railroad bridge, center of.....	46 57 02.3	123 51 02.3	632
Drummond triangulation station, 0.60 mile southeast of, cross-roads.....	46 56 38.0	123 50 48.3	2,647
Drummond triangulation station, 0.85 mile southeast of, center of bridge.....	46 56 26.3	123 50 40.6	1,304
Drummond triangulation station, 1.20 miles southeast of, hub at bridge.....	46 56 07.9	123 50 33.1	1,931
Drummond triangulation station, 1.90 miles southeast of, U. S. b. m. elevation 24 feet.....	46 55 53.4	123 50 24.0	1,600
Newskak schoolhouse, 1.60 miles northwest of, bridge over small stream.....	46 55 23.4	123 49 32.0	4,717
Newskak schoolhouse, 1.50 miles northwest of, t. b. m. elevation 51 feet.....	46 55 20.0	123 49 29.0	400

**HOQUILAM QUADRANGLE—Continued.****Along highways in northeast quarter of quadrangle—Continued.**

Station.	Latitude.	Longitude.	Distance between stations.
Newskak schoolhouse, 1.10 miles northwest of, U. S. t. b. m. elevation 55 feet.....	° ' "	° ' "	
	46 54 59.0	123 49 19.5	2,236
Newskak schoolhouse, 0.60 mile northwest of, center of bridge.....	46 54 54.5	123 49 20.0	452
Newskak schoolhouse, 0.14 mile northwest of, southwest corner sec. 33.....	46 54 31.1	123 49 12.7	2,422
Newskak schoolhouse.....	46 54 30.7	123 49 01.6	769

**Along highways between Drummond and Chehalis triangulation stations.**

T. 17 N., R. 9 W., corner secs. 16, 17, 20, and 21, 0.90 mile southwest of.....	46 56 53.5	123 50 15.9	
T. 17 N., R. 9 W., corner secs. 16, 17, 20, and 21.....	46 57 07.9	123 49 10.3	4,782
T. 17 N., R. 9 W., corner secs. 16, 17, 20, and 21, about 0.40 mile north of, at angle in wagon road, center of Northern Pacific R. R. track. Chehalis triangulation station, Coast and Geodetic Survey, south side of Grays Harbor at mouth of Chehalis River, just west of South Aberdeen; station mark, iron pipe, 2½ inches in diameter, 9 feet long, set 7 feet in ground.....	46 57 27.3	123 49 10.4	1,960
	46 57 33.52	123 49 10.58	630

Magnetic declination near north border of quadrangle, 24° 10' E.

**HUMPTULIPS QUADRANGLE.****Along highways in southwest quarter of quadrangle.**

Station.	Latitude.	Longitude.	Distance between stations.
Aberdeen, 3.35 miles northeast of, 45 feet northeast of district schoolhouse No. 10, on west side of road; iron post stamped "Prim. Trav. Sta. No. 2, 1911-13 Wash.".....	° ' "	° ' "	
	47 00 35.9	123 48 44.2	
Aberdeen, 4.40 miles northeast of, center of road in front of house. District schoolhouse No. 10, 1.25 miles northeast of, small bridge over creek.....	47 01 31.0	123 48 54.0	5,626
District schoolhouse No. 10, 2.65 miles northeast of, 200 feet north of road to A. F. Coates Logging Co., 15 feet west of road; iron bench mark post stamped "Prim. Trav. Sta. No. 3, 24, 1911, Wash.".....	47 01 40.5	123 48 49.7	1,004
District schoolhouse No. 10, 2.90 miles northeast of, center of bridge.....	47 02 29.3	123 47 33.0	7,263
District schoolhouse No. 10, 3.30 miles northeast of, T road east.....	47 02 41.0	123 47 31.3	1,190
District schoolhouse No. 10, 3.80 miles northeast of, T road east.....	47 03 01.9	123 47 24.8	2,163
District schoolhouse No. 10, 4.60 miles northeast of, T. 18 N., R. 9 W., corner secs. 2, 3, 10, and 11.....	47 03 20.5	123 47 02.4	2,437
Wishkhan, in top of southwest pier of steel bridge over Wishkhan River; aluminum tablet stamped "Prim. Trav. Sta. No. 4, Wash. 26, 1911".....	47 04 00.2	123 46 37.5	4,375
T. 19 N., R. 9 W., ¼ corner south side sec. 35, T road north.....	47 04 20.8	123 46 10.9	2,783
Schoolhouse No. 34, 650 feet north of, angle to west in road.....	47 04 51.7	123 45 53.6	3,356
Schoolhouse No. 34, 0.50 mile northwest of, south end of bridge.....	47 05 36.8	123 45 53.2	4,569
T. 19 N., R. 9 W., ¼ corner west side sec. 26.....	47 05 54.4	123 46 11.4	2,175
T. 19 N., R. 9 W., corner secs. 22, 23, 26, and 27.....	47 06 09.1	123 46 31.4	2,037
T. 19 N., R. 9 W., ½ corner north side of sec. 27, 50 feet southwest of Matson house (corner not positively identified).....	47 06 35.3	123 46 30.9	2,046
Matson house, 0.60 mile northwest of, saddle center of road.....	47 06 35.4	123 47 10.4	2,727
Harry Lloyd's house, 100 feet west of, 350 feet north of footbridge over river, 8 feet west of T road east; iron gas pipe 4 feet by 1½ inches, driven 3½ feet into ground.....	47 06 56.9	123 47 40.5	3,013
T. 19 N., R. 9 W., 10 feet west of Polson logging railroad, at junction of old grade to northwest, near center of sec. 19; iron post stamped "Prim. Trav. Sta. No. 6".....	47 07 04.1	123 48 26.1	3,242
Prim. Trav. Sta. No. 6, 1.50 miles northwest of, west end of long tangent at farthest point north of old railroad grade, center of cut.....	47 06 58.8	123 50 41.4	9,370
Prim. Trav. Sta. No. 6, 3 miles west of, center of bridge over creek.....	47 07 31.5	123 52 26.6	7,991
Prim. Trav. Sta. No. 6, 4.25 miles southwest of, U. S. b. m. stamped "Prim. Trav. Sta. No. 16, elevation 307 ft.".....	47 06 35.8	123 53 45.1	7,829
Barnesville, 3.80 miles northeast of, Y road.....	47 05 59.8	123 55 05.3	6,640
Barnesville, 2.80 miles northeast of, iron bench mark post stamped "Prim. Trav. Sta. No. 15, elevation 42 feet".....	47 04 58.7	123 55 08.8	6,196
Barnesville, 2.60 miles northeast of, T. 18 N., R. 10 W., ¼ corner south side sec. 4, center of stream.....	47 04 12.3	123 55 42.2	5,243
Barnesville, 1.35 miles northeast of, center of bridge over river.....	47 04 05.7	123 55 53.5	1,030
Barnesville, 0.70 mile northeast of, center of bridge.....	47 03 04.3	123 55 27.5	6,171
	47 02 30.8	123 55 20.9	3,424

Along highways in southwest corner of southwest quarter of quadrangle.

Station.	Latitude.	Longitude.	Distance between stations.
	*	' "	Feet.
Temporary bench mark at L in road, elevation 7 feet.....	47 00 24.9	123 54 21.9	
Center of small bridge.....	47 00 56.3	123 54 48.0	3,667
Hoquiam, about 5 miles north of, south of junction of Humptulips-Moolips road, in top of southeast pier of bridge; aluminum tablet stamped "Prim. Trav. Sta. No. 7, elev. 10, Wash., 1911"....	47 01 52.2	123 55 17.4	6,021
District schoolhouse No. 71, center of road in front of.....	47 02 01.8	123 55 31.4	1,378
District schoolhouse No. 71, 0.54 mile northwest of, center of small bridge over creek.....	47 02 13.2	123 56 08.6	2,522
T. 18 N., R. 10 W., corner secs. 16, 17, 20, and 21.....	47 02 19.6	123 56 32.6	1,788
T. 18 N., R. 10 W., corner secs. 16, 17, 20, and 21, 0.32 mile northwest of, center of small bridge over creek.....	47 02 26.8	123 56 54.7	1,690
T. 18 N., R. 10 W., corner secs. 16, 17, 20, and 21, 1.10 miles northwest of, center of road at Y road west.....	47 02 38.9	123 57 51.2	4,101
T. 18 N., R. 10 W., corner secs. 16, 17, 20, and 21, 1.35 miles northwest of, center of T road east.....	47 02 51.6	123 57 54.5	1,309
T. 18 N., R. 10 W., corner secs. 16, 17, 20, and 21, 2.55 miles northwest of, center of bridge at old south road.....	47 03 13.3	123 59 18.5	6,216
T. 18 N., R. 10 W., corner secs. 16, 17, 20, and 21, 2.90 miles northwest of, center of small bridge over creek.....	47 03 18.7	123 59 43.8	1,840
T. 18 N., R. 10 W., corner secs. 16, 17, 20, and 21, 3 miles northwest of, center of bridge over creek.....	47 03 19.2	123 59 52.1	579

Magnetic declination near east border of southwest quarter of quadrangle,  $23^{\circ} 47'$  E.; near west border,  $24^{\circ} 34'$  E.

## VIRGINIA AND WEST VIRGINIA.

### PRIMARY TRAVERSE.

**Berryville, Gerrardstown, Martinsburg, Stephens City, and Williamsport quadrangles.**

**CLARKE AND FREDERICK COUNTIES, VA.; BERKELEY AND JEFFERSON, COUNTIES, W. VA.**

The following geographic positions on North American datum were determined from primary traverse by G. T. Hawkins in 1914. Several circuits were run in the above-mentioned quadrangles, all being based on Birch triangulation station, described in the Twentieth Annual Report, part 1.

#### BERRYVILLE QUADRANGLE.

**From Summit Point along highways via Castlemans Ferry and Snickers Gap to southeast corner of West Virginia.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>WEST VIRGINIA.</b>			
Summit Point, crossing north of station.....	39 15 04.6	77 57 22.3	
Summit Point, four corners, $\frac{1}{4}$ miles south of.....	39 13 27.5	77 57 22.7	9,818
T road south, 30 feet southeast to two mail boxes.....	39 13 14.1	77 55 54.2	7,100
Ripon station, road crossing Norfolk Southern Ry. at.....	39 13 09.8	77 54 55.5	4,639
Ripon Village, four corners at.....	39 13 06.4	77 51 18.0	2,968
Four corners, at small creek, 40 feet south to two mail boxes.....	39 11 47.0	77 53 46.8	8,398
Wickliff, $\frac{1}{4}$ mile north of, in triangle formed by three roads 30 feet southwest of large pile of stone, and 30 feet south of gate; tablet in stone in place and stamped "Prim. Trav. Sta. No. 7, 1914".....	39 10 35.9	77 53 25.4	7,384
State line crossing wagon road.....	39 10 26.7	77 53 31.5	1,040
<b>VIRGINIA (CHECKED SPUR LINE).</b>			
Wickliff, three corners $\frac{1}{4}$ mile west of.....	39 09 50.0	77 53 50.6	4,012
Battle monument marked Early and Crook, July 18, 1864, at elbow in road.....	39 09 01.7	77 53 24.8	5,293
Castlemans Ferry bridge, west end of truss work.....	39 07 27.4	77 53 32.1	9,556
Church, road leading south from pike at.....	39 07 01.6	77 51 34.8	9,606
Snickers Gap, four corners at.....	39 06 55.3	77 50 44.7	3,996
Flag pole on top of F. G. Carpenter's house.....	39 07 41.4	77 50 49.2	4,670
Southeast corner of West Virginia, drilled cross in top of stone.....	39 07 56.2	77 49 41.7	5,524

**From bench mark No. 7 northeast to Mechanicsburg.**

WEST VIRGINIA.			
B. m. No. 7, 1914.....	39 10 35.9	77 53 25.4	
Three corners, roads east, west, and south, 20 feet east to stone.....	39 10 37.6	77 52 52.1	2,630
T road west, 500 feet west to windmill.....	39 11 32.4	77 52 19.1	6,125
Four corners, 20 feet southwest to battle monument No. 15.....	39 12 21.2	77 51 48.0	5,515
Kabletown, T road south, north of, 100 feet northwest to church, 200 feet southeast to schoolhouse.....	39 13 16.7	77 51 34.1	5,732
T road southeast, 150 feet northwest to house.....	39 14 03.6	77 51 06.8	5,203

**From bench mark No. 10 east to Summit Point.**

B. m. No. 10, 1914.....	39 14 34.2	78 00 28.0	
Milepost 19, on valley branch of Baltimore & Ohio R. R., road crossing near.....	39 14 45.1	77 58 39.8	8,580
Summit Point, station crossing north of.....	39 15 04.6	77 57 22.3	6,404

Magnetic declination  $5^{\circ} 08' W.$

## GERRARDSTOWN QUADRANGLE.

## Along highways.

Station.	Latitude.	Longitude.	Distance between stations.
<b>WEST VIRGINIA.</b>			
Birch triangulation station, about 8 miles southwest from Martinsburg, on the highest point of a ridge; signal tree.....	° ' "	° ' "	
Fairview schoolhouse, T road north at.....	39 25 12.0	78 05 21.4	
Big frame house, T road north in front of.....	39 19 34.5	78 00 33.6	3,570
Three corners, 90 feet south to small white house.....	39 19 38.6	78 01 22.6	
	39 20 27.4	78 01 06.3	5,100

## Along Cumberland Valley Railroad.

Inwood, $\frac{1}{2}$ mile east of, on north side east and west road and on west side of pine, in solid rock, 30 feet northwest of old house; tablet stamped "Prim. Trav. Sta. No. 6, 1914".....	Latitude.	Longitude.	Distance to Birch triangulation station.
Inwood, road crossing Cumberland Valley R. R. at.....	39 21 27.9	78 02 23.9	8,640
Darkesville station, railroad crossing at.....	39 21 31.4	78 02 39.7	1,290
Darkesville station, railroad crossing 1 $\frac{1}{2}$ miles north of.....	39 22 23.8	78 01 55.2	6,361
Tabler station, railroad crossing at.....	39 23 20.7	78 01 07.2	6,880
Tabler station, railroad crossing at.....	39 23 55.2	78 00 38.1	4,171
Tabler station, crossing at.....	39 23 55.2	78 00 38.1	23,550
Tabler station, crossing $\frac{1}{2}$ mile northeast of.....	39 24 29.1	78 00 09.4	4,100

a Distance to Birch triangulation station.

## From Inwood west and south along highways through Whitehall and Clearbrook to Brucetown.

WEST VIRGINIA.	Latitude.	Longitude.	Distance between stations.
Inwood, road crossing Cumberland Valley Ry. at.....	39 21 31.4	78 02 39.7	
Second class T road north.....	39 21 40.7	78 03 52.2	5,770
Four corners, 130 feet south to creek crossing north and south road.....	39 21 57.1	78 04 42.2	4,272
Three corners, 20 feet west to signpost.....	39 21 02.9	78 05 05.8	5,788
T road west, 20 feet east to telephone post.....	39 20 17.0	78 05 43.8	5,515
T road west, also State line (?) 100 feet west to 4-foot oak.....	39 19 30.9	78 07 10.8	8,264
VIRGINIA.			
Three corners, 40 feet south to two mail boxes.....	39 19 01.0	78 07 52.7	4,451
T road northwest, 20 feet northwest to mail box.....	39 18 17.1	78 08 25.9	5,153
Whitehall four corners, 40 feet southwest to store.....	39 17 29.5	78 08 55.4	5,346
T road northwest, 50 feet southeast to house, 60 feet southwest to mail box.....	39 16 30.2	78 09 44.2	7,121
Whitehall, 2 $\frac{1}{4}$ miles southwest of near four corners, on north side of east and west road and 120 feet from four corners, in solid ledge, tablet stamped "Prim. Trav. Sta. No. 9, 1914".....	39 15 35.4	78 10 00.5	5,688
Wellstown, T road east, $\frac{1}{2}$ mile north of, 300 feet north to house.....	39 15 34.9	78 08 00.4	9,445
Clearbrook station, highway crossing Cumberland Valley R. R., 300 feet southwest of.....	39 15 22.2	78 05 50.6	10,290
Brucetown, three corners at west end of; 30 feet northeast to iron fence.....	39 15 16.7	78 04 01.6	8,588

Magnetic declination, 5° 17' W.

## MARTINSBURG QUADRANGLE.

## Along Cumberland Valley Railroad.

Station.	Latitude.	Longitude.	Distance between stations.
<b>WEST VIRGINIA.</b>			
Milepost 96, railway opposite.....	° ' "	° ' "	
Milepost 95, railway crossing 200 feet south of.....	39 25 50.7	77 59 31.6	
Martinsburg, railway crossing.....	39 26 37.7	77 59 12.2	5,000
Martinsburg, crossing of Cumberland Valley and Baltimore & Ohio R. Rs.....	39 27 27.2	77 58 17.2	6,608
Martinsburg, crossing of turnpike and Cumberland Valley R. R. north of.....	39 28 00.1	77 57 51.3	3,900
Berkeley station, crossing $\frac{1}{2}$ mile southwest of.....	39 28 47.4	77 57 03.0	6,100
	39 29 45.7	77 56 16.7	6,931

## MARTINSBURG QUADRANGLE—Continued.

## Along highways.

Station.	Latitude.	Longitude.	Distance between stations.
	° ' "	° ' "	Feet.
Four corners, 30 feet southwest to old house.....	39 29 47.7	77 53 38.3	.....
Greensburg, four corners at.....	39 29 24.8	77 53 08.0	3,317
Second-class T road south through gate.....	39 29 24.2	77 51 02.2	9,885
Scrabble, T road north at post office.....	39 29 00.1	77 49 59.6	5,485
Scrabble, 400 feet east of on south side of road in solid rock, 61 feet from southeast corner of iron bridge, 56 feet from southwest corner of blacksmith shop, regulation tablet stamped "Prim. Trav. Sta. No. 2, 1914".....	39 28 57.9	77 49 55.3	406
Maple Shade farm gate, three corners 100 feet southwest of.....	39 28 59.9	77 48 38.1	6,060
Second-class T lane east.....	39 28 11.9	77 48 37.6	4,855
Three corners, 150 feet east to house.....	39 27 25.9	77 48 45.8	4,700
Shepherdstown station, crossing Norfolk and Western Ry., 250 feet northeast of.....	39 25 49.9	77 48 04.6	10,240
Shepherdstown station, 1½ miles southwest of, pike opposite battle monument No. 2.....	39 24 55.0	77 50 17.3	11,807
Second-class T road west, 30 feet southwest to end of stone fence.....	39 24 37.9	77 50 59.7	3,746
Crossroads, 150 feet north to large brick house.....	39 23 59.0	77 52 18.8	7,356
Kearneyville, in solid rock, 15 feet east of pike, 6 feet west of fence 200 feet south of main line of Baltimore & Ohio R. R.; tablet stamped "Prim. Trav. Sta. No. 8, 1914".....	39 23 17.5	77 53 06.6	5,630
Kearneyville, 4 miles southwest of, T road northwest, 100 feet north to negro's house.....	39 22 56.2	77 53 38.8	3,318
Three corners, transmission line runs southeast.....	39 22 35.4	77 54 04.1	2,900
Three corners, T road northwest, 250 feet northeast to school- house.....	39 21 54.2	77 54 54.1	5,718
Three corners, 180 feet southeast to house.....	39 21 22.9	77 55 33.1	4,408
Leetown, three corners at, 40 feet east to battle monument No. 11.....	39 20 54.5	77 56 00.0	3,574
Leetown, three corners at, ½ mile southwest of, 30 feet north to sign posted "Keep off".....	39 20 40.2	77 56 22.0	2,250
T lane northwest.....	39 20 00.2	77 57 03.1	5,176
T road southeast, 30 feet east to two mail boxes.....	39 19 30.6	77 57 32.6	3,792
T road northwest, 50 feet west to mailbox.....	39 19 08.9	77 58 08.8	3,590
Middleway, four corners at, 30 feet northeast to house, 30 feet southwest to house, 30 feet southwest to Bunkerhill.....	39 18 12.5	77 58 58.9	6,931
Center of iron bridge, also county line between Berkeley and Jefferson Counties.....	39 18 36.9	77 59 52.2	4,861

Magnetic declination for north border of quadrangle,  $5^{\circ} 20' W.$ ; for center,  $5^{\circ} 14' W.$

From Shepherdstown along highways via Harpers Ferry, Charles Town, and Summit Point to  
adjusted position at Middleway.

Shepherdstown.....	39 25 49.9	77 48 04.6	.....
Shepherdstown, T road east, 1 mile south of.....	39 25 04.2	77 48 21.9	4,898
Short jog in road, north end of, 40 feet north to gate.....	39 24 16.7	77 46 53.1	8,600
Mohlers crossroads, 75 feet west to battle monument No. 5.....	39 23 45.3	77 45 54.7	5,580
Shepherdstown, 4 miles southeast of, 300 feet west of Potomac River on east side of road, and 100 feet south of small branch, in solid ledge; tablet (no stamped marks, as dies were lost).....	39 22 52.9	77 45 16.0	6,114
Second-class road to east, 50 feet southeast to three mail boxes.....	39 21 49.4	77 44 57.2	6,590
Three-corners at transmission line.....	39 20 23.4	77 45 51.6	9,701
Pitchers Mill, road crossing creek at.....	39 20 01.5	77 45 40.1	2,117
Old toll house 2 miles west of Harpers Ferry, four corners at.....	39 18 59.5	77 46 18.7	7,237
Millville, road crossing Baltimore & Ohio R. R. at.....	39 17 36.9	77 47 10.4	8,300
Millville, 1 mile south of, on west bank of Shenandoah River, at ferry landing and at T road west, 46 feet southwest of 40- inch burr oak, in solid rock; tablet (no stamped letters, as dies were lost).....	39 16 50.8	77 47 22.6	4,754
Turn in road, 40 feet south to house, 130 feet northwest to house, 30 feet west to green pump.....	39 15 52.3	77 47 27.9	5,942
Three-corners, 30 feet north to house, 60 feet southwest to house.....	39 15 17.4	77 48 08.7	8,680
Mechanicsburg, four corners.....	39 15 42.0	77 49 53.5	4,323
Charles Town, three corners, south of, 60 feet east to small white house.....	39 16 40.3	77 51 09.2	8,376
Charles Town, corner Berryville pike, Summit Point road and southwest street.....	39 17 15.6	77 51 49.7	4,784
Charles Town, 2 miles southwest of, on west side Summit Point Road, 2 feet east of fence and 150 feet southwest of S. P. Stick- el's house, in solid rock; tablet stamped "Prim. Trav. Sta. No. 5, 1914".....	39 16 26.9	77 54 33.5	13,787
Crossroads, 30 feet north to mail box.....	39 15 49.5	77 55 26.6	5,640
Summit Point station, road crossing Baltimore & Ohio R. R., 1,000 feet northeast of.....	39 15 04.6	77 57 22.3	10,180

**MARTINSBURG QUADRANGLE**-Continued.

**From Shepherdstown along highways via Harpers Ferry, Charles Town, and Summit Point to adjusted position at Middleway**-Continued.

Station.	Latitude.	Longitude.	Distance between stations.
Summit Point, crossroad 1 mile north of, 40 feet south to gate, 70 feet north to gate.....	* * "	77 57 55.3	4,883
Crugers, four corners.....	39 15 45.5	77 58 51.9	5,181
T road west, 60 feet west to concrete bridge.....	39 16 11.7	77 58 06.2	8,762
Middleway, four corners at, 30 feet southwest to sign post "Bunkerhill".....	39 17 37.6	77 58 58.9	3,571
	39 18 12.5		

Magnetic declination for south border of quadrangle,  $5^{\circ} 11' W.$ ; for east border,  $4^{\circ} 51' W.$ ; for west border,  $5^{\circ} 16' W.$ .

**Near Mechanicsburg.**

Mechanicsburg, middle of iron bridge 1 mile southwest of.....	39 15 03.4	77 50 26.8	.....
Mechanicsburg, four corners.....	39 15 42.0	77 49 53.5	4,700

**STEPHEN'S CITY QUADRANGLE.****Near Wadesville.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>VIRGINIA.</b>			
Wadesville, highway crossing Baltimore & Ohio R. R. at.....	* * "	78 02 22.0	Feet.
Swimley station, 15 feet south of Baltimore & Ohio R. R., 100 feet east of mail crane, and 70 feet west of crossing, in stone in place; tablet marked "Prim. Trav. Sta. No. 10, 1914".....	39 14 33.8		8,957
Milepost No. 19, crossing near .....	39 14 34.2	78 00 28.0	8,965
	39 14 45.1	77 58 39.8	8,580

**WILLIAMSPORT QUADRANGLE.****Near Berkeley.**

Station.	Latitude.	Longitude.	Distance between stations.
<b>WEST VIRGINIA.</b>			
Berkeley station, 0.25 mile northeast of, 60 feet north of bridge over railway, 15 feet west of west rail on Cumberland Valley R. R., and 10 feet north of whistle post in solid rock; regula- tion tablet stamped "Prim. Trav. Sta. No. 1, 1914".....	* * "	78 55 26.4	.....
T road east on east side of Cumberland Valley R. R., 0.75 mile northeast of Berkeley.....	39 30 15.4	78 55 04.2	1,913
	39 30 23.4		

## WEST VIRGINIA.

### TRIANGULATION STATIONS.

**Bluefield, Bramwell, Flatop, Hinton, and Peterstown 15' quadrangles.**

**MERCER, MONROE, SUMMERS, AND WYOMING COUNTIES.**

The following positions on North American datum are based on Pipestem, Huff, and Pilot (2) triangulation stations of the Geological Survey, established in 1909 and 1911, described in Bulletins 496 and 551.

The triangulation work was done by G. T. Hawkins in 1913.

#### BENT, MERCER COUNTY, W. VA.

On land owned by Mr. Ferguson, who lives about 1.5 miles northeast of Athens and 0.25 mile east of main road from Princeton to Hinton. The station is 0.3 mile nearly east from Mr. Ferguson's house on a bald knob of the mountain.

**Station mark:** Tablet in top of sandstone 8 by 12 by 30 inches set 26 inches in ground.

**Reference marks:** Stone in place 3 by 5 by 12 inches above ground, southeast 45 feet; locust tree, 6 inches in diameter, is southwest and over edge of hill 110 feet distant.

**Signal:** Tripod built of poles with white flagging on sides and flagpole.

[Latitude 37° 26' 54.87". Longitude 80° 59' 30.23".]

To station.	Azimuth.	Back azimuth.	Distance.	
Tank.....	• ' "	• ' "	<i>Log.</i>	<i>meters.</i>
Black.....	41 06 04	221 02 29	4.1229100	8.246
Black.....	60 53 00.65	240 48 05.62	4.2841581	11.954
Pilot (2).....	99 13 41	279 03 29	4.3996400	15.595
Huff.....	145 13 17.12	325 08 47.56	4.2796188	11.830
Pipestem.....	192 51 38.17	12 52 19.48	3.8744998	4.654
Elgood.....	323 05 25.08	143 07 25.49	3.9093799	5.043
Buckhorn.....	356 37 08.46	176 37 33.65	4.2389350	10.772

#### BLACK, MERCER COUNTY, W. VA.

On a partly cleared knob of Blackoak Mountain on land owned by Mr. Falkner, about 4 miles nearly due west from Princeton and 0.25 mile northwest of Mr. Falkner's house.

**Station mark:** A West Virginia tablet cemented in solid limestone ledge on east end of knob a few feet below the highest part.

**Signal:** White target about 50 feet above ground in a straight locust tree.

**Reference marks:** Rail fence 3 feet north; signal tree 12-inch locust 32.7 feet north.

[Latitude 37° 21' 50.99". Longitude 81° 10' 53.44".]

To station.	Azimuth.	Back azimuth.	Distance.	
Pilot (2).....	• ' "	• ' "	<i>Log.</i>	<i>meters.</i>
Huff.....	149 07 34	329 04 17	4.1921700	9.672
Bent.....	193 17 04.19	13 19 30.57	4.4097207	15.961
Pipestem.....	227 51 35.32	47 59 11.93	4.3957866	15.457
Bent.....	240 48 05.62	60 55 00.65	4.2841581	11.954
Elgood.....	262 22 08.76	82 31 03.81	4.3399433	13.592
Tank.....	274 28 25	94 31 45	3.9092600	5.042
Buckhorn.....	293 55 16.84	114 02 36.30	4.2906578	12.134

## BUCKHORN, GILES COUNTY, VA., AND MERCER COUNTY, W. VA.

On State line between Virginia and West Virginia on Buckhorn Ridge at its junction with New River Mountain, about 4 miles south from Oakvale and near old Geological Survey station of same name, which was not found.

Station mark: Tablet in solid rock.

Signal: An old snag with laurel brush woven in top and all brush near station cut down.

Reference marks: Crosses on rocks, one 6.5 feet west and the other 18.5 feet southeast.

[Latitude 37° 17' 33.52". Longitude 80° 58' 48.72".]

To station.	Azimuth.	Back azimuth.	Distance.	
Black.....	• ' "	• ' "		
Bent.....	114 02 36.30	293 55 16.84	4.2906578	12.134
Elgood.....	176 37 33.65	356 37 08.46	4.2389350	10.772
Crotty.....	199 36 42.53	19 38 17.55	4.0599738	7.134
	226 50 48.98	46 58 52.54	4.3052889	12.550

## CROTTY, MONROE COUNTY, W. VA.

On Crotty Mountain, 1.5 miles northwest of Peterstown, on end of bare knob 125 feet north of road crossing ridge and 5 feet northwest of an apple tree. Mr. J. D. Reed is the owner of the land.

Station mark: Tablet in top of 30 by 18 by 5 inch sandstone block set 26 inches in ground.

Signal: Lone apple tree with targets.

Reference marks: Signal tree 5 feet southeast; wire fence 110 feet south.

[Latitude 37° 25' 01.18". Longitude 80° 48' 49.53".]

To station.	Azimuth.	Back azimuth.	Distance.	
Buckhorn.....	• ' "	• ' "		
Elgood.....	46 56 52.54	226 50 48.98	4.3052889	12.550
Pipestem.....	74 41 30.38	254 37 01.57	4.0525628	7.013
	127 33 44.24	307 27 55.79	4.2491108	11.027

## ELGOOD, MERCER COUNTY, W. VA.

About 0.5 mile nearly south of Elgood post office on a knob with scattering trees on top and sides; there is a graveyard on top with fence around it. The point is about 300 yards west from road leading from Elgood to Oakdale.

Station mark: Tablet set in solid rock.

Signal: A poplar tree in graveyard with white targets.

Reference marks: Southwest corner of fence around graveyard is distant 37 feet. Cross on rock is N. 20° W. and distant 5.5 feet; another cross on a rock is S. 30° W., distant 9.3 feet.

[Latitude 37° 23' 24.30". Longitude 80° 56' 12.07".]

To station.	Azimuth.	Back azimuth.	Distance.	
Buckhorn.....	• ' "	• ' "		
Black.....	19 38 17.55	199 36 42.53	4.0599738	7.134
Bent.....	82 31 03.81	262 22 08.76	4.3399433	13.592
Pipestem.....	143 07 25.49	323 05 25.08	3.9093799	5.043
Crotty.....	166 56 32.36	346 55 13.12	4.1510756	8.799
	254 37 01.57	74 41 30.38	4.0525628	7.013

**HUFF, MERCER-SUMMERS COUNTY LINE, W. VA.**

About 75 feet northeast of highest point of Huff Knob of Flattop Mountains. The Knob is bare (now pasture) and is 0.4 mile a little north of west of store and post office of Flattop. It is near the line between Mercer and Summers counties and on land owned by B. W. Green and Albert Bolin, whose north-south fence line crosses near station. A good view can be obtained in all directions. The station mark is 4 feet east of north-south fence on line between B. W. Green and Albert Bolin, 210 feet south of a T fence east and 19.5 feet west of a dead chestnut snag 30 inches in diameter and 15 feet high.

Station mark: Bronze West Virginia tablet cemented in top of 6 by 6 by 24 inch sandstone post set 20 inches in ground.

Signal: Flags and targets in a dead chestnut snag 30 inches in diameter and 15 feet high, which stands 19.5 feet east of station and on east brink of knob.

[Latitude  $37^{\circ} 35' 21.85''$ . Longitude  $81^{\circ} 06' 52.85''$ .]

To station.	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Black <sup>a</sup> .....	• ' "	• ' "	4.3097207	15.961
Ivy.....	13 19 30.57	193 17 04.19	4.6003419	24.757
Phipps.....	123 38 40.90	303 24 52.17	4.4113864	16.023
Ellison.....	156 24 04.99	336 19 46.98	4.2831587	11.926
Freezeland.....	192 42 27.34	12 44 12.76	4.2956618	12.275
Wolf.....	225 22 15.98	45 28 06.61	4.3682683	14.508
Pipestem.....	275 45 15.75	95 54 53.06	4.1774183	9.349
Bent <sup>a</sup> .....	303 33 47.29	123 38 58.44	4.2796188	11.830
	325 08 47.56	145 13 17.12		

<sup>a</sup> By G. T. Hawkins in 1913; others by C. B. Kendall in 1911.

**PILOT (2), WYOMING COUNTY, W. VA.**

On a sharp cleared knob 0.5 mile southwest of Black post office. The road from Clark Gap to Black passes within 200 yards of station.

Station mark: A bronze tablet set in a sandstone post.

Signal: A quadripod signal covered with white cloth target.

Reference mark: A 1-inch hole drilled in ledge, true azimuth  $293^{\circ} 25'$ , distant 29.30 feet from station mark.

[Latitude  $37^{\circ} 29' 04.23''$ . Longitude  $81^{\circ} 16' 18.40''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Lambert.....	• ' "	• ' "	3.9197539	.....
Bearwallow.....	49 01 34.43	228 58 48.08	4.6978483	.....
Indian.....	57 47 48.81	237 30 29.74	4.4083000	.....
Hensley.....	91 33 42	271 23 08	4.617933	.....
Burning Rock.....	91 47 04.18	271 30 04.14	4.6156523	.....
Shumate.....	121 51 19.31	301 35 44.06	4.5891176	.....
Ivy.....	133 49 28	313 41 48	4.3996900	.....
Phipps.....	150 08 29.83	330 00 27.44	4.5195200	.....
Bent <sup>a</sup> .....	185 41 21	5 42 53	4.3996100	15.595
Black <sup>a</sup> .....	279 03 29	99 13 41	4.1921700	9.672
	329 04 17	149 07 34		

<sup>a</sup> By G. T. Hawkins in 1913; others by Oscar Jones in 1909.

**PIPESTEM, MERCER COUNTY, W. VA.**

On highest part of Pipestem Knob, 2.25 miles a little west of south of Pipestem and 0.5 mile west of the Pipestem Primitive Baptist Church. The knob is owned by E. V. Neely, whose dwelling is at the south foot of the knob. The knob is cleared with exception of small trees on north and west slopes.

Station mark: A bronze West Virginia tablet cemented in top of 6 by 6 by 30 inch sandstone set 26 inches in ground.

Signal: A pole quadripod with flag and targets over station mark.

Reference marks: No. 1 is triangle cut on apple tree, distant 37.5 feet, true azimuth  $107^{\circ} 06'$ ; No. 2 is triangle cut on apple tree, distant 96.2 feet, true azimuth  $133^{\circ} 46'$ ; No. 3 is triangle cut on apple tree, distant 126 feet, true azimuth  $166^{\circ} 09'$ .

[Latitude  $37^{\circ} 30' 51.73''$ . Longitude  $80^{\circ} 58' 22.34''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Bent a.	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
	12 52 19.48	192 51 38.17	3.8744988	4.654
Black a.	47 59 11.93	227 51 35.32	4.3957886	15.457
Huff.	123 38 58.44	303 33 47.29	4.1774183	9.349
Freezeeland.	184 00 26.52	4 01 06.26	4.3472911	13.824
Wolf.	240 53 04.06	60 57 29.80	4.0881705	7.612
Hightop.	253 57 31.92	74 07 15.41	4.3882466	15.191
Crotty a.	307 27 55.79	127 33 44.24	4.2491108	11.027
Elgood a.	346 55 13.12	166 56 32.36	4.1510756	8.799

a By G. T. Hawkins in 1913; others by C. B. Kendall in 1911.

#### PRINCETON TANK, MERCER COUNTY, W. VA. (Not occupied.)

A large iron water tank about 70 feet above ground in southeast part of Princeton. Station mark: Center of tank.

[Latitude  $37^{\circ} 21' 30.33''$ . Longitude  $81^{\circ} 05' 24.73''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Black.	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Black.	94 31 45	274 28 25	3.90926	5.042
Bent.	221 02 29	41 06 04	4.12291	8.246

#### Hacker Valley and Pickens quadrangles.

#### BRAXTON, POCAHONTAS, RANDOLPH, UPHUR, AND WEBSTER COUNTIES.

In 1913 C. B. Kendall extended triangulation southward from Big Run (2) and Sugar (2), described in Bulletin 551, into Hacker Valley and Pickens quadrangles. He occupied four new stations and located seven points by intersections on North American datum.

#### BIG RUN NO. (21), UPHUR COUNTY, W. VA.

On mountain at head of Big Run, about 1.5 miles east of Holly Grove, on land owned by Mrs. C. E. Carpenter, who lives on ridge on southeast side of knob.

Station mark: A sandstone post 11 inches square by 30 inches long sunk 26 inches in ground, in center of top of which is cemented a bronze triangulation tablet.

Theodolite elevated 70 feet on tower. Observer on platform in tree.

[Latitude  $38^{\circ} 47' 40.77''$ . Longitude  $80^{\circ} 15' 31.35''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Degarmo.	• ′ ″	• ′ ″	<i>Log. meters.</i>	<i>Miles.</i>
Sugar.	9 39 16.23	189 38 26.49	4.0588904	7.116
Devils Darning Needle.	89 50 11.54	269 42 04.18	4.2735297	11.665
Handkerchief.	95 14 00.30	275 07 00.02	4.2108742	10.098
Bald.	122 51 39.16	302 45 53.27	4.1994971	9.837
Sugarloaf.	132 44 40.91	312 37 04.68	4.3773554	14.815
Bear.	135 14 35.08	315 03 05.23	4.5741980	23.310
Goinour.	174 42 06.26	354 40 55.67	4.4662017	18.178
Leonard.	179 07 10.67	359 07 02.60	4.2991536	12.374
Proudfoot.	182 42 14.95	2 42 40.63	4.3194062	12.964
Moore.	225 27 50.45	45 35 56.65	4.4177237	16.258
Big Run No. 1.	293 03 36.49	113 09 15.35	4.1523621	8.826
Buffalo.	207 08 37	.....	1.6894800	(a)
Turkey Bone.	41 45 55	221 42 05	4.1266000	8.298
Winkler.	341 17 22.15	161 19 58.43	4.2750312	11.705
	341 05 34.42	161 08 35.53	4.3349752	13.438

• 160.5 feet.

**BUCKWHEAT, RANDOLPH COUNTY, W. VA. (Not occupied.)**

Flag in top of a tall sugar-maple tree, 30 feet east of the center of the Hacker Valley and Pickens public road and 135 feet south of the front door of the Buckwheat Church, about 3 miles northwest of Pickens.

Signal and station mark: Flag in tree.

[Latitude 38° 39' 37.23". Longitude 80° 15' 28.65".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ' "	* ' "	Log. meters.	Miles.
Potato.....	13 30 44	193 29 12	4.18502	9.514
Degarmo.....	151 15 05	331 14 14	3.61583	2.566
Turkey Bone.....	296 08 00	116 10 34	3.82341	4.138
Winkler.....	308 38 09	128 41 08	3.94886	5.524

**BUFFALO, WEBSTER COUNTY, W. VA. (Not occupied.)**

Ten angles taken to this point from each of six occupied stations. A very prominent lone tree which stands on the northeast end of a cleared ridge about 0.5 mile east of the Buffalo Run public road at a point about 2 miles southeast of Cleveland. The ridge extends northeast. The northeast end is cleared and the southwest timbered. Tree stands a few feet southwest of where ridge falls off to the northeast.

Signal and station mark: The tree, which was not flagged.

[Latitude 38° 42' 17.60". Longitude 80° 21' 39.44".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ' "	* ' "	Log. meters.	Miles.
Sugar.....	135 01 04	314 56 47	4.14582	8.692
Big Run.....	221 42 05	41 45 55	4.12560	8.298
Degarmo.....	280 44 03	100 46 57	3.85122	4.411
Potato.....	344 45 22	164 47 42	4.31290	12.772

**CHEAT, POCOHONTAS COUNTY, W. VA. (Not occupied; sighted from only two stations.)**

Highest point of the Cheat Mountains, about 4 miles southeast of Mingo post office and about 1½ miles northwest of gap through which the Cheat River Lumber Co.'s log road passes. Mountain is very difficult of ascent on account of windfall and briars.

Station mark and signal: Flag and targets in pine tree, highest on mountain.  
(No check on this position.)

[Latitude 38° 27' 48.13". Longitude 79° 58' 05.93".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ' "	* ' "	Log. meters.	Miles.
Potato.....	103 41 56	283 29 35	4.47247	18.443
Winkler.....	131 46 20	311 38 29	4.38950	15.235

**COOL SPRING, WEBSTER COUNTY, W. VA. (Not occupied.)**

On the northeast end of the Cool Spring knob at the head of the Cool Spring run. The knob is the highest part of the divide between Holly River, Grassy Creek, and the left fork of Grassy and is about 2½ miles southwest of Jumbo and 2 miles southeast of Diana. Station is about 100 feet southwest of where the ridge begins to break off to the northeast and is near the east slope of ridge, about 200 feet west of the west fence along edge of meadow field on hillside on the left fork of Grassy Creek slope.

Signal: Flag and targets in a tall hickory tree 2 feet in diameter.

Station mark: A bronze West Virginia tablet in top of a sandstone block 8 inches by 12 inches by 30 inches set 24 inches in ground directly under signal.

[Latitude 38° 33' 00.08". Longitude 80° 25' 51.53".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters	Miles.
Degarmo.....	219 27 26	39 33 03	4.31307	12.780
Turkey Bone.....	246 03 29	66 12 44	4.36224	14.308
Potato.....	282 53 14	102 58 10	4.07215	7.337

**DEGARMO, WEBSTER COUNTY, W. VA.**

On a slightly elevated timbered point of the Buckwheat ridge about 500 feet west of the public road between Buckwheat Church and Goshen Church, 3 miles northwest of the former and  $2\frac{1}{2}$  miles southeast of the latter. Station is 450 feet west of S. C. Degarmo's residence and about 700 feet southwest of the corner of Randolph, Upshur, and Webster counties.

Signal: Flag and targets in top of large red-oak tree, 60 feet west of the corner of a rail fence at a private graveyard. A platform was erected in top of signal tree 90 feet above ground and a quadripod of dead poles was extended from the crotch of three forks of the tree for instrument stand; tree was guyed by wire and was fairly steady. Instrument was elevated 95 feet.

Station mark: A sandstone 10 by 12 by 30 inches set 26 inches in ground in top of which was set a bronze tablet. Stone set directly under instrument and is 4.8 feet northwest of signal.

[Latitude 38° 41' 34.62". Longitude 80° 16' 50.82".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters	Miles.
Potato.....	4 54 13.34	184 53 32.44	4.2689326	11.542
Cool Spring.....	39 33 03	219 27 26	4.3130700	12.780
Buffalo.....	100 46 57	280 44 03	3.8512200	4.411
Sugar.....	123 40 51.03	303 33 33.94	4.3065278	12.556
Big Run.....	189 33 26.49	9 39 16.23	4.0588994	7.116
Turkey Bone.....	309 25 55.16	129 29 20.90	4.0133639	6.408
Winkler.....	315 44 53.05	135 48 43.59	4.1071315	7.932
Buckwheat.....	331 14 14	151 15 05	3.6158300	2.566

**ELK, RANDOLPH COUNTY, W. VA. (Not occupied; sighted from two points only.)**

On the highest part of Elk Mountain, which lies between the valley fork and Dry Branch of Elk River, and about  $3\frac{1}{2}$  miles west of Mingo and 3 miles southwest of Blue Spring post office. Can be easily reached from Mingo by road to Mr. Hamrick's dwelling, thence by trail to a farm on the east end of mountain, thence by sheep trail along ridge to a point where oak, etc., timber gives way to pine exclusively.

Signal and station mark: Flag and targets in top of a pine tree 135 feet high. Tree is cleated and stands about 150 feet northwest of the very top of ridge. Signal tree is the tallest tree on ridge.

(No check on this position.)

[Latitude 38° 30' 11.24". Longitude 80° 06' 14.96".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters	Miles.
Potato.....	98 38 34	278 31 17	4.23515	10.678
Winkler.....	151 31 58	331 29 12	4.13162	8.413

**LONE TREE, RANDOLPH COUNTY, W. VA. (Not occupied.)**

A lone dead pine tree standing on the highest part of a fire-scaled knob of Rich Mountain at the head of Beech Run, about 3 miles along an old trail (now impassable) which leaves the Pickens and Monterville Park road at Whetman Knob. Station will be hard to identify except from a distance. There are other dead pines on the hill but none very near nor as high.

Signal and station mark: The tree, not flagged.

(No check on this position.)

[Latitude 38° 38' 53.42". Longitude 80° 05' 49.72".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Winkler.....	59 16 49	239 13 47	3.91476	5.106
Turkey Bone.....	78 51 55	258 48 28	3.91269	5.082

**MORGAN, RANDOLPH COUNTY, W. VA. (Not occupied.)**

On the northeast end of a prominent cleared knob on the south edge of the Pickens and Webster Springs public road at a point about 3½ miles southwest of Pickens and three-fourths mile northeast of the Morgan school. Land is owned by Mr. Morgan, who lives on the same road about three-fourths mile northeast of station.

Signal and station mark: Flag in chestnut tree which stands a few feet northeast of the northeast end of knob.

[Latitude 38° 36' 47.52". Longitude 80° 14' 13.68".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Potato.....	29 11 58	209 09 53	4.04372	6.872
Turkey Bone.....	241 05 24	61 07 11	3.67735	2.955
Winkler.....	273 32 22	93 34 34	3.71081	3.192

**POTATO, WEBSTER COUNTY, W. VA.**

On the highest part of Potato Knob, of the Paint Mountains, at the head of Potato Knob Run and about 1 mile northeast of Woodzell post office.

Station is on land owned by Clark Stolnaker and is about one-half mile east of his residence. A small pasture field is about 500 feet west of station and the Staunton-Slovens old State road along the top of Paint Mountain passes around the hill about 1,000 feet south. Paint Mountain Methodist Church is about 1 mile southwest.

Signal: Flag and targets in top of a large sugar maple, which overlooks other trees in every direction, affording a good view all around; a quadrupod of dead poles was erected in crotch of forks of tree and extends 32 feet up for instrument stand. Observing platform in top of tree is 82 feet above ground, the corners of which were securely guyed. Tree was very steady. Instrument elevated 86 feet.

Station mark: A sandstone block 8 by 10 by 30 inches, set 24 inches in ground, in top of which is a bronze West Virginia tablet. Three reference marks were left, consisting of small triangles cut on trees.

Azimuths and distances from station mark to reference marks:

	Azimuth.	Distance from sta- tion mark (feet).
No. 1.....	358 03	49.65
No. 2.....	89 03	31.42
No. 3.....	279 23	8.14

A wire nail was driven in center of each triangle. Station mark set directly under center of instrument.

<sup>1</sup> See p. 630.

[Latitude 38° 31' 34.41". Longitude 80° 17' 56.37".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Cool Spring.....	102 58 10	282 53 14	4.0721500	7.337
Sugar.....	152 48 53.03	332 42 17.68	4.5241307	20.772
Buffalo.....	164 47 42	344 45 22	4.3129000	12.772
Degarmo.....	184 53 32.44	4 54 13.34	4.2689326	11.542
Buckwheat.....	193 29 12	13 30 44	4.1850200	9.514
Morgan.....	209 09 53	29 11 58	4.0437200	6.872
Turkey Bone.....	218 36 41.28	38 40 47.52	4.1848220	9.510
Winkler.....	228 22 58.07	48 27 26.05	4.1481982	8.741
Elk.....	278 31 17	98 38 34	4.2351500	10.678
Cheat.....	283 29 35	103 41 56	4.4724700	18.443

**SUGAR NO. 2, BRAXTON COUNTY, W. VA.**

On mountain locally known as Sugar Knob, about 2 miles south from Ireland, on land of W. S. Bird.

Station mark: A sandstone block 11 by 13 by 24 inches, set 22 inches in ground, in center of top of which is cemented a bronze triangulation tablet.

Reference mark: A conspicuous large white oak tree 3.7 feet in diameter, 69.1 feet distant, 196° 17' true azimuth from station.

[Latitude 38° 47' 38.31". Longitude 80° 28' 29.23".]

To station—	Azimuth.	Back azimuth.	Distance.	
	* ° ′ ″	* ° ′ ″	Log. meters.	Miles.
Sugarloaf.....	163 53 23.18	343 50 01.97	4.4434927	17.252
Bald.....	184 18 45.17	4 19 17.09	4.2117985	10.119
Bear.....	208 42 20.84	28 49 19.00	4.5226559	20.702
Handkerchief.....	212 13 02.82	32 15 24.71	4.0099390	6.358
Devils Darning Needle.....	239 11 39.69	59 12 46.85	3.4788949	1.871
Big Run No. 2.....	269 42 04.18	89 50 11.54	4.2735297	11.665
Degarmo.....	303 33 33.94	123 40 51.03	4.3065278	12.586
Buffalo.....	314 56 47	135 01 04	4.1458200	8.602
Potato.....	332 42 17.68	152 48 53.03	4.5241307	20.772

**TURKEY BONE, RANDOLPH COUNTY, W. VA.**

On the highest part of Little Turkey Bone Mountain, which is situated about 2 miles southeast of Pickens, 1,000 feet northeast of the Pickens-Monterville road where it crosses the ridge in gap between the Big and Little Turkey Bone Mountains. Land is owned by the Pickens estate.

Signal: Flag and targets in a cherry tree 3 feet in diameter which stands about 25 feet north of highest part of mountain. A dead chestnut pole, well guyed, extends from the ground for instrument stand.

Station mark: A 6 by 12 by 30 inch sandstone block set 24 inches in ground in the top of which is cemented a bronze West Virginia triangulation tablet.

Reference marks: Triangles cut as follows:

On beech tree, magnetic azimuth 253°; distance 22.65 feet.

On oak tree, magnetic azimuth 113°; distance 27.32 feet.

On oak tree, magnetic azimuth 17°; distance 33.49 feet.

On cherry signal tree, magnetic azimuth 333°; distance 4.95 feet.

Distance, tablet to signal, 3.4 feet; height of platform, 53.5 feet; height of instrument, 58.5 feet.

[Latitude 38° 38' 02.07". Longitude 80° 11' 21.51".]

To station—	Azimuth.	Back azimuth.	Distnce.	
	• ' "	• ' "	Log. meters.	Miles.
Potato.....	38 40 47.52	218 36 41.28	4.184220	9.510
Morgan.....	61 07 11	241 05 24	3.6773500	2.955
Cool Spring.....	66 12 44	246 03 29	4.3622400	14.308
Buckwheat.....	116 10 15	296 07 41	3.8233400	4.138
Degarmo.....	129 29 20.90	309 25 55.16	4.0133639	6.408
Big Run.....	161 19 58.43	341 17 22.15	4.2730312	11.705
Lone Tree.....	258 48 28	78 51 55	3.9126400	5.082
Winkler.....	339 48 29.95	159 48 54.79	3.4454426	1.733

**WINKLER, RANDOLPH COUNTY, W. VA.**

On the highest part of Winkler Knob, which is between the heads of Back Fork of Elk Creek and Sugar Creek and is  $3\frac{1}{2}$  miles southeast of Pickens and 1 mile south of the Pickens-Monterville public road. The highest point of knob is formed by a loose sandstone ledge about 10 feet high; the station is on the west edge of ledge opposite the center. The ledge is about 100 feet wide east and west and 250 feet north and south.

Signal: Flag and targets in birch tree which stands on west edge of ledge and is not very secure, as it has no roots on the west side. A platform of poles was built in the very top of tree 47 feet above ground and a pole, well guyed, was erected for instrument support.

Station mark: Bronze West Virginia tablet set in solid sandstone ledge between the roots of signal tree upon which the instrument pole was set and plumbed so that instrument was directly over tablet.

Reference marks: Triangles cut as follows:

No. 1, on 18-inch birch, azimuth 38.04°; distance 38.2 feet.

No. 2, on 18-inch sugar maple, azimuth 153.15°; distance 23.5 feet.

No. 3, on 6-inch birch, azimuth 283.43°; distance 26.6 feet.

No. 4, on 18-inch birch, azimuth 348.51°; distance 29.3 feet.

[Latitude 38° 36' 37.18". Longitude 80° 10' 41.72".]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ' "	• ' "	Log. meters.	Miles.
Potato.....	48 27 29.05	228 22 58.07	4.1481982	8.741
Morgan.....	93 34 34	273 32 22	3.7108100	3.192
Buckwheat.....	128 41 08	308 38 09	3.9488600	5.524
Degarmo.....	135 48 43.59	315 44 53.05	4.1071315	7.952
Big Run.....	161 08 35.53	341 05 34.42	4.3349752	13.438
Turkey Bone.....	159 48 54.79	339 48 29.95	3.4454426	1.733
Lone Tree.....	239 13 47	59 16 49	3.9147600	5.106
Cheat.....	311 38 29	131 46 20	4.3895400	15.235
Elk.....	331 29 12	151 31 58	4.1316200	8.413

**Summersville and Winona quadrangles.****FAYETTE, GREENBRIER, AND NICHOLAS COUNTIES.**

During the season of 1913 Geo. T. Hawkins extended triangulation northward from Boggs and Meador, established by C. B. Kendall in 1911 (described in Bulletin 551) and connected with Summersville station of the Coast and Geodetic Survey. Seven new stations were occupied and one point was located by intersections, all being on North American datum.

## BOGGS, GREENBRIER COUNTY, W. VA.

On southeast slope near south end of Boggs Knob, which is highest part of ridge between Sewell and Little Sewell creeks. It is 3.5 miles northeast of Springdale on land owned by Mr. Tuicher, who lives at foot of knob about 0.25 mile west of station. The knob is broad and flat on top with a fringe of timber bordering all sides except north and northwest. Timber was cut around station, so that view is unobstructed from south around to north. The station mark is on east edge of cleared space 30.7 feet southeast of large white-oak tree used as a signal tree and standing alone, and 120 feet north of a trail leading from point of knob down to Mr. Tuicher's dwelling.

Station mark: A bronze West Virginia tablet set in top of large flat sandstone boulder.

Signal: Flags and targets in top of 36-inch white-oak tree standing alone 30.7 feet northwest of station mark.

Reference marks: No. 1 is triangle cut on 8-inch chestnut tree, distant 33.2 feet, true azimuth  $320^{\circ} 13'$ ; No. 2 is triangle cut on 36-inch white-oak tree (signal tree) distant 29.3 feet, true azimuth  $124^{\circ}$ ; Nos. 3, 4, and 5 are 1-inch drill holes in bowlders for tripod rests.

[Latitude  $37^{\circ} 55' 05.21''$ . Longitude  $80^{\circ} 46' 51.27''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Freezeland.....	34 13 02.94	214 06 38.13	4.4367133	16.965
Ellison.....	54 52 20.23	234 41 48.95	4.4885504	19.138
Meador.....	93 41 53.79	273 34 54.39	4.2227273	10.377
Alpha.....	108 05 29.41	287 51 23.53	4.5475704	21.924
Sewell a.....	159 24 02.37	339 23 02.41	3.8302075	4.203
Sugar Grove a.....	174 05 08.31	354 04 15.30	4.3086850	12.648
Keeney.....	337 27 14.53	157 30 01.46	4.2396984	10.791

a By G. T. Hawkins in 1913.

## GRINDSTONE, FAYETTE COUNTY, W. VA.

On southeastern one of three knobs on Dogwood Ridge about 1.5 miles northwest of Clifty post office and 0.5 mile north of S. V. Kisler's store (a good place to stop). The knob was cleared of timber except for sugar-maple tree 24 inches in diameter, which was used for signal, and a few small locusts on east side of knob.

Station mark: Sandstone block 7 by 8 by 30 inches set 26 inches in ground, with tablet in top.

Signal: Sugar maple 24 inches in diameter, with white targets.

Reference marks: Sugar maple 24 inches in diameter, 8.5 feet northeast. Corner of three rail fences 12 feet north.

[Latitude  $38^{\circ} 09' 46.16''$ . Longitude  $80^{\circ} 50' 37.04''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Gross.....	191 32 46.92	11 34 20.67	4.2643220	11.420
Summersville.....	219 31 26.91	39 36 04.91	4.2345072	10.662
Nebo.....	251 02 25.24	71 07 27.44	4.0996140	7.816
Sugar.....	292 36 42.69	112 43 42.37	4.2538129	11.147
Hane.....	315 04 05	135 07 30	4.0587400	7.114
Sewell.....	321 55 01.81	142 01 53.87	4.4223125	16.431
Holliday.....	327 13 53.25	147 17 33.04	4.2054082	9.971
Meador.....	355 29 12	175 29 58	4.4174500	16.248

**GROSS, NICHOLAS COUNTY, W. VA.**

Knob on Twentymile Mountain, about 10 miles northwest from Summersville, and 2 miles northwest of Gilboa. It is on land owned by Frank Gross and 300 yards northeast of an old house; 200 yards south of small vacant house, on line of rail fence north-south and 100 feet west of second-class road. The knob is cleared on west; and good views may be had from south through west to north. Lines were cut through timber to other points.

Station mark: Sandstone block 10 by 12 by 24 feet set 20 inches in ground with tablet in top.

Signal: Chestnut tree with tuft in top and white targets.

Reference mark: Chestnut signal tree, 14.5 feet distant, true azimuth 267° from station mark.

[Latitude 38° 19' 30.16". Longitude 80° 57' 05.59".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Grindstone.....	11 34 20.67	191 32 46.92	4.2643220	11.420
Hill.....	240 37 51.97	60 44 21.67	4.2425978	10.863
Summersville.....	303 24 12.26	123 27 16.88	3.9381178	5.389

**HANE, FAYETTE COUNTY, W. VA. (Not occupied.)**

One mile north of Russellville on land owned by Mr. Hane. A bald hill with a few walnut trees on top and a small inclosure with three graves on highest point.

Station mark: Tallest walnut tree, which stands on top a short distance north of graves.

[Latitude 38° 05' 23.20". Longitude 80° 54' 05.30".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Grindstone.....	135 07 30	315 04 05	4.05874	7.114
Neho.....	197 25 12	17 26 49	4.10626	7.936
Holliday.....	353 41 23	173 42 11	3.73398	3.368

**HILL, NICHOLAS COUNTY, W. VA.**

About 10 miles north by 3 miles east of Summersville, 2 miles northeast of old Hookersville post office, on highest knob in neighborhood, and about 0.8 mile south of McCoy's field. The point is heavily wooded on top; station is near the southeast end of the knob.

Station mark: Tablet cemented in rock.

Signal: 30-inch red-oak tree.

Reference marks: Triangles on trees; 14-inch chestnut tree 20 feet northwest; 30-inch chestnut tree 10 feet southwest; and 18-inch hickory tree 16 feet northeast.

[Latitude 38° 24' 07.76". Longitude 80° 46' 37.70".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Nebo.....	17 26 55.64	197 23 55.61	4.3723448	14.645
Summersville.....	31 01 52.97	210 58 24.23	4.1920018	9.668
Gross.....	60 44 21.67	240 37 51.97	4.2425978	10.863

## HOLLIDAY, FAYETTE COUNT, W. VA.

On cleared knob with fringe of trees on south, 3 miles north of Ravenseye post office and 1.5 miles north of west from Corlis post office, on land owned by Mr. Holliday. Good view from west around through north to southeast.

Station mark: Sandstone block 6 by 10 by 30 inches set 28 inches in ground, with tablet in top.

Signal: Cloth targets in dead chestnut.

Reference marks: Large stump south  $20^{\circ}$  east, distant 57 feet; T fence northeast, distant 34 feet.

[Latitude  $38^{\circ} 02' 28.36''$ . Longitude  $80^{\circ} 53' 40.85''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Meador.....	27 52 13	207 49 28	4.1539000	8.857
Grindstone.....	147 17 33.04	327 13 53.25	4.2054052	9.971
Hane.....	173 42 11	353 41 23	3.7339000	3.368
Nebo.....	190 24 31.49	10 25 53.39	4.2521508	11.105
Sugar.....	230 06 38.35	50 09 57.83	4.0116774	6.333

## MEADOR, FAYETTE COUNTY, W. VA.

On highest part of cleared (meadow) ridge owned by John L. Meador, about 2.25 miles northwest of Big Sewell Mountain and 1.5 miles northwest of Mount Ida. Mr. Meador's dwelling is at foot of ridge about 0.5 mile a little southeast of station. The station is about midway between two rail fences which inclose a meadow field and is about 130 feet northeast of southwest slope of the last rise of hill and 7.4 feet west of a 14-inch dead chestnut snag.

Station mark: A 6 by 6 by 30 inch sandstone post set 26 inches in ground, in top of which is cemented a bronze West Virginia tablet. The stone is 7.4 feet west of a 14-inch dead chestnut snag and 3.8 feet west of signal pole.

Signal: A 40-foot chestnut pole set in ground and braced to dead chestnut snag. Pole carries flags and targets.

Reference marks: No. 1 is stone pile 6 feet in diameter, 18.4 feet, distant, true azimuth  $333^{\circ} 48'$ ; No. 2 is 6-foot stone pile distant 53.3 feet, true azimuth  $104^{\circ} 32'$ ; No. 3 is small triangle cut on apple tree distant 144.5 feet, true azimuth  $215^{\circ} 09'$ .

[Latitude  $37^{\circ} 55' 39.60''$ . Longitude  $80^{\circ} 58' 13.66''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	*	*	Log. meters.	Miles.
Plumley.....	1 17 14	181 17 12	4.0092000	7.809
Ellison.....	24 16 33.41	204 13 00.71	4.3147530	12.826
Phipps.....	58 54 05.55	238 44 27.87	4.4295650	16.708
Paint.....	94 20 46.67	274 08 18.59	4.4741306	18.513
Alpha.....	120 13 57.92	300 06 51.81	4.2912120	12.150
Grindstone.....	175 29 58	355 29 12	4.4174500	16.248
Holliday a.....	207 49 28	27 52 13	4.1539000	8.857
Sugar Grove a.....	217 06 58.01	37 13 05.25	4.3816100	14.961
Sewell a.....	249 41 23.24	69 47 22.94	4.1824569	9.458
Boggs.....	273 34 54.39	93 41 53.79	4.2227273	10.377
Freezeland.....	356 45 17.86	176 45 51.45	4.3750376	14.736

a By G. T. Hawkins in 1913.

## NEBO, NICHOLAS COUNTY, W. VA.

About 8 miles nearly south of Summersville and 0.5 mile west of Nebo post office, on a low, bald knob, which is cultivated and has a double locust tree standing on highest part. It is on land owned by Mr. King, whose house is 150 yards southwest from signal.

**Station mark:** Sandstone block 8 by 8 by 30 inches with cross and letters "U. S. G. S." cut on top, set 30 inches in ground.

**Signal:** Double locust standing on highest part of knob.

**Reference marks:** Double locust N.  $70^{\circ}$  W., distant 24 feet; dead walnut snag N.  $70^{\circ}$  E. distant 125 feet. A plank fence is 50 feet south.

[Latitude  $38^{\circ} 11' 58.42''$ . Longitude  $80^{\circ} 51' 28.16''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
Holliday.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Hane.....	10 25 53.39	190 24 31.49	4.2521508	11.105
Grindstone.....	17 26 49	197 25 12	4.1062000	7.936
Summersville.....	71 07 27.44	251 02 25.24	4.0996140	7.816
Hill.....	173 59 59.25	353 59 34.76	3.9638515	5.717
Sugar.....	197 23 55.61	17 26 35.64	4.3723448	14.645
	337 04 23.53	157 06 21.39	4.0767756	7.415

#### SEWELL, GREENBRIER COUNTY, W. VA.

Highest knob on Big Sewell Mountain, 2 miles northwest from Rainelle on land owned by Mr. Miles. Station can be reached by going 2 miles northwest from Rainelle to schoolhouse on top of hill, thence along wood road leading through gate to top, which is cultivated field with a barn standing on highest part. The west comb of roof was used for signal, and lines were cut through timber north and northwest.

**Station mark:** Sandstone block 10 by 10 by 30 inches set 28 inches in ground, with tablet in top.

**Signal:** West comb of roof of barn in cultivated field.

**Reference marks:** Northwest corner of barn is southeast, distant 4 feet; southwest corner of barn is S.  $20^{\circ}$  E., distant 30 feet.

[Latitude  $37^{\circ} 58' 30.56''$ . Longitude  $80^{\circ} 48' 28.78''$ .]

To station.	Azimuth.	Back azimuth.	Distance.	
Meador.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Grindstone.....	69 47 22.94	249 41 23.24	4.1824569	9.458
Sugar.....	142 01 53.87	321 55 01.81	4.4223125	16.431
Boggs.....	181 08 44.11	1 08 51.15	4.1435945	8.649
	339 23 02.41	159 24 02.37	3.8302075	4.203

#### SUGAR GROVE, NICHOLAS COUNTY, W. VA.

About 7 miles east of Russellville post office and 150 yards west from the Sugar Grove Church on land owned by Joseph Nutter, and 200 yards north from his house on a cleared ridge. A good view can be obtained from southeast around through south and west to north.

**Station mark:** Sandstone block 6 by 8 by 30 inches, set 28 inches in ground, with tablet in top.

**Signal:** Sawed lumber tripod with targets.

**Reference marks:** Old chestnut stump S.  $10^{\circ}$  E., distant 40 feet.

[Latitude  $38^{\circ} 06' 01.90''$ . Longitude  $80^{\circ} 48' 17.36''$ .]

To station.	Azimuth.	Back azimuth.	Distance.	
Sewell.....	* * "	* * "	<i>Log. meters.</i>	<i>Miles.</i>
Meador.....	1 08 51.15	181 08 44.11	4.1435945	8.649
Holliday.....	37 13 05.25	217 06 58.01	4.3816100	14.961
Grindstone.....	50 09 57.83	230 06 38.35	4.0116774	6.383
Nebo.....	112 43 42.37	292 36 42.69	4.2338129	11.147
Boggs.....	157 06 21.39	337 04 23.53	4.0767756	7.415
	354 04 15.30	174 08 08.31	4.3089850	12.648

**SUMMERSVILLE (PINE), NICHOLAS COUNTY, W. VA.**

A Coast and Geodetic Survey triangulation station on a ridge 1 mile from Nicholas courthouse belfry and bearing  $6^{\circ}$  north of west. A large tree left standing is visible for 40 miles. A spike is driven into this tree and station bears  $354^{\circ} 40'$ , distant 15.4 feet from this spike. Nearest railroad station is Kanawha Falls, on Chesapeake & Ohio R. R., 32 miles distant.

Station mark: Bottle set into a hole with sandstone block placed over it, 6 by 6 by 30 inches, and cross cut on top.

Reference marks: Four sandstone blocks set north, south, east, and west, with arrow cut on top pointing to center; distance, north block 7.02 feet, south block 7 feet, east block 7.29 feet, and west block 6.90 feet.

[Latitude  $38^{\circ} 18' 55.36''$ , C. & G. S.;  $38^{\circ} 18' 55.21''$ , U. S. G. S., Longitude  $80^{\circ} 52' 07.75''$ , C. & G. S.;  $80^{\circ} 52' 07.73''$ , U. S. G. S.]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Grindstone <sup>a</sup> .....	39 36 04.91	219 31 26.91	4.2345072	10.662
Ivy.....	45 04 21.2	224 41 20.6	4.8894847	.....
Gross <sup>a</sup> .....	123 27 16.88	303 24 12.26	3.9381178	5.389
Hill <sup>a</sup> .....	210 58 28.23	31 01 52.97	4.1920018	9.668
Nebo <sup>a</sup> .....	353 59 34.76	173 59 59.25	3.9638515	5.717
Beech.....	309 07 23.1	129 17 09.9	4.4741263	.....

<sup>a</sup> By G. T. Hawkins, 1913.

**Cowen, Richwood, and Webster Springs quadrangles.****NICHOLAS AND WEBSTER COUNTIES.**

In the summer of 1915 Oscar Jones established 15 new triangulation points for the control of the above-named 15-minute quadrangles, based on Beech and Summersville stations of the United States Coast and Geodetic Survey. He also connected with Nebo and Potato, stations previously located by the United States Geological Survey, all on North American datum.

**BEECH, GREENBRIER COUNTY, W. VA.**

About 11 miles northeast of Snow Hill post office and 4 miles north of the house of Albert G. Williams, on the highest point of Beech Knob. The station is marked by a cross in the top of a rough sandstone post 6 inches square and 2 feet long. There are four reference marks, each consisting of a rough sandstone post marked with a drill hole, at the following distances and directions from the station: 2.10 meters north, 2.08 meters east, 2.13 meters south, and 2.16 meters west.

[Latitude,  $38^{\circ} 06' 44.56''$ . Longitude,  $80^{\circ} 36' 18.96''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	• ′ ″	• ′ ″	Log. meters.	Miles.
Briery.....	261 06 00.41	81 15 39.86	4.3642015	.....
Keeney.....	13 11 42.73	193 08 01.24	4.5868192	.....
Nebo.....	113 41 59.80	293 32 38.68	4.3831111	15.01
Summersville.....	129 17 09.86	309 07 23.15	4.4741263	18.52
Fury.....	133 33 15.25	313 28 05.53	4.2259592	10.45
Cottle.....	172 23 08.17	352 21 34.51	4.4229405	17.23
Collins.....	180 44 15.48	0 44 19.90	4.1300307	8.38
Madden.....	184 09 51.43	4 10 25.09	4.2682733	11.53
Cowen.....	191 08 05.62	11 10 43.87	4.5067203	19.96
Hunter.....	211 51 02.02	31 55 56.49	4.3411195	13.63

<sup>1</sup> See p. 632.

## CLIFF, WEBSTER COUNTY, W. VA.

On Cliff Knob, 12 miles northeast of Richwood. Knob is timbered on north.  
Station mark: Tablet in sandstone ledge.

[Latitude 38° 17' 48.94". Longitude 80° 27' 00.63".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Hunter.....	46 59 43.78	226 58 52.91	3.4359976	1.70
Madden.....	80 48 36.98	260 43 25.26	4.0928161	7.70
Cottle.....	112 09 40.12	292 02 20.01	4.2696099	11.56

## COLLINS, NICHOLAS COUNTY, W. VA.

On a cleared hill 2 miles east of Fenwick, on land owned by Mr. George Collins, who lives 200 yards southwest of station.

Station mark: A large dead chestnut tree on highest point of hill; four spikes driven in blazes 2 feet above ground.

[Latitude 38° 14' 02.07". Longitude 80° 36' 11.82".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Summersville.....	103 01 44.41	282 51 52.49	4.3774466	14.82
Cottle.....	164 37 40.63	344 36 02.42	4.1618106	9.02
Beech.....	0 44 19.90	180 44 15.48	4.1300307	8.38

## COTTLER, NICHOLAS COUNTY, W. VA.

On Cottle Knob, 2 miles west of Camden-on-Gauley. Knob was partly cleared of timber. Instrument elevated 40 feet.

Station mark: Tablet in sandstone post.

[Latitude 38° 21' 35.95". Longitude 80° 38' 50.30".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Fury.....	28 10 08.76	208 06 31.96	4.2500235	11.20
Nebo.....	46 02 32.01	225 54 42.49	4.4085366	15.92
Wild Cat.....	58 48 58.17	238 45 50.25	3.9346042	5.35
Summersville.....	66 00 09.43	245 51 54.95	4.3264599	13.18
Locust.....	226 52 38.30	40 57 32.01	4.2431778	10.38
Miller.....	234 24 07.48	53 33 06.60	4.4179601	16.27
Potato.....	234 36 14.95	58 49 14.47	4.5512013	22.11
Payne.....	241 40 28.32	61 49 12.49	4.3662056	14.44
Cowen.....	247 47 38.66	67 51 51.30	4.0270911	6.63
Mitten.....	265 43 00.44	85 53 24.39	4.3886033	15.20
Red Oak.....	272 17 33.55	92 25 14.80	4.2567703	11.22
Cliff.....	292 02 20.01	112 09 40.12	4.2096799	11.56
Hunter.....	306 06 46.94	120 13 16.06	4.2463215	10.96
Madden.....	330 46 52.25	150 49 00.44	4.0123026	6.40
Collins.....	341 36 02.42	164 37 40.63	4.1618106	9.02
Beech.....	352 21 34.51	172 23 08.17	4.4429405	17.23

**COWEN, WEBSTER COUNTY, W. VA.**

On a high cleared knob 2 miles southeast of Cowen.

Station mark: Tablet in sandstone boulder.

[Latitude  $38^{\circ} 23' 46.18''$ . Longitude  $80^{\circ} 32' 08.38''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Beech.....	• ' "	• ' "	4.50672.03	19.96
Madden.....	11 10 43.87	191 08 05.62		
Cottle.....	20 30 17.84	200 28 13.66	4.0126903	8.06
Locust.....	67 51 51.30	247 47 38.66	4.0279891	6.63
Payne.....	189 49 13.24	9 49 54.10	3.9703334	5.81
Red Oak.....	236 36 07.31	56 40 38.78	4.1032736	7.88
Hunter.....	300 15 09.46	120 18 38.27	3.9756573	5.88
	337 24 06.44	157 26 23.30	4.1447457	8.69

**FURY, NICHOLAS COUNTY, W. VA.**

On a well-known cleared knob called Fury Knob, 11 miles southeast of Summersville, W. Va., on land owned by Dr. Groves, who lives 300 yards south of the station.

Station mark: Tablet set in sandstone post.

[Latitude  $38^{\circ} 13' 00.27''$ . Longitude  $80^{\circ} 44' 40.21''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Nebu.....	• ' "	• ' "	4.0045927	6.28
Summersville.....	79 10 57.19	239 06 44.83	4.1161561	8.12
Wild Cat.....	123 42 16.46	303 37 39.37	4.0606756	7.15
Cottle.....	185 41 37.18	5 42 06.37	4.2560235	11.20
Beech.....	208 06 31.96	28 10 08.76	4.2258592	10.45
	313 28 05.53	133 33 15.25		

**HUNTER, NICHOLAS COUNTY, W. VA.**

On the south end of a timbered ridge 10 miles northeast of Richwood, W. Va., and 1 mile northeast of the old Hunter place. Ridge is heavily timbered and lines of sight were cut to other stations.

Station mark: Tablet in sandstone post.

[Latitude  $38^{\circ} 16' 48.57''$ . Longitude  $80^{\circ} 28' 22.74''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Beech.....	• ' "	• ' "	4.3411195	13.63
Madden.....	31 55 56.49	211 51 02.02		
Cottle.....	89 20 04.34	269 15 43.64	4.0098233	6.36
Cowen.....	120 13 16.06	300 06 46.94	4.2463215	10.96
Cliff.....	157 26 23.30	337 24 06.44	4.1447457	8.69
	226 58 52.91	46 59 43.78	3.4359976	1.70

**LOCUST, WEBSTER COUNTY, W. VA.**

On Locust Knob, 3 miles east of Wainville, W. Va. Road from Wainville to Webster Springs passes 300 yards south of station. Knob is timbered; instrument elevated 50 feet.

Station mark: Tablet in sandstone post.

[Latitude 38° 28' 44.96". Longitude 80° 30' 57.66".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Cowen.....	9 49 54.10	189 49 32.24	3.9703534	5.81
Madden.....	16 13 23.51	196 10 38.42	4.3642278	14.37
Cottle.....	40 57 32.01	220 52 38.30	4.2431778	10.88
Potato.....	254 25 51.02	74 33 57.32	4.2931894	12.20
Miller.....	256 08 59.31	76 13 04.97	3.9934915	6.12
Three Point.....	258 50 56.30	78 57 05.74	4.1661105	9.11
Payne.....	283 52 44.76	103 56 35.59	3.9669365	5.76
Turkey.....	301 39 16.71	121 46 50.69	4.3186129	12.94
Red Oak.....	334 48 17.58	154 51 05.75	4.1885553	9.59

**MADDEN, NICHOLAS COUNTY, W. VA.**

On the east end of a timbered ridge 2 miles southeast of Woodbine, W. Va., on land owned by A. Madden, who lives 200 yards north of the station. Road from Camden to Richwood is 100 yards east of the station. View is cut off northwest by west to southwest.

Station mark: A tablet in sandstone post.

[Latitude 38° 16' 44.50". Longitude 80° 35' 23.55".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Beech.....	4 10 25.60	184 09 51.43	4.2682733	11.53
Cottle.....	150 49 00.44	330 46 52.25	4.0124026	6.40
Locust.....	196 10 38.42	16 13 23.51	4.36-2278	14.37
Cowen.....	200 28 13.66	20 30 17.84	4.1126903	8.06
Cliff.....	210 43 25.26	80 48 36.88	4.0992161	7.70
Hunter.....	269 15 43.64	89 20 04.34	4.0098233	6.36

**MILLER, WEBSTER COUNTY, W. VA.**

On Miller Knob, which is cleared, 2.5 miles north of Webster Springs.

Station mark: Tablet in sandstone post.

[Latitude 38° 30' 01.26". Longitude 80° 24' 22.94".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Payne.....	7 08 29.61	187 08 14.89	3.66-2906	2.87
Cottle.....	53 33 06.60	233 24 07.48	4.4179601	16.27
Locust.....	76 13 04.97	256 08 59.31	3.993-915	6.12
Potato.....	252 46 15.97	72 50 16.60	3.9912161	6.09
Turkey.....	328 30 16.72	148 33 45.40	4.1920846	9.69

**MITTEN, WEBSTER COUNTY, W. VA. Not occupied.**

On Mitten Ridge, on the divide between Williams and Janley rivers, 3 miles north of Jake Mullen's, at Three Forks of Williams River. Ridge is flat and heavily timbered.

Station mark: Basswood tree 18 inches in diameter; 4 spikes driven in blazes.

No check on this position.

[Latitude 38° 22' 34.02". Longitude 80° 22' 05.08".]

To station—	Azimuth.	Back azimuth.	Distance.	
			Log. meters.	Miles.
Cottle.....	85 53 24.39	265 43 00.44	4.3886063	15.20
Three Point.....	185 55 01.60	5 55 39.61	4.1564343	8.91

## NEBO, NICHOLAS COUNTY, W. VA.

About 8 miles nearly south of Summersville and 0.5 mile west of Nebo post office, on a low bald knob, which is cultivated and has a double locust tree standing on highest part. It is on land owned by Mr. King, whose house is 150 yards southwest from signal.

Station mark: Sandstone block 8 by 8 by 30 inches with cross and letters "U. S. G. S." cut on top, set 30 inches in ground.

Signal: Double locust standing on highest part of knob.

Reference marks: Double locust N. 70° W., distant 24 feet; dead walnut snag N. 70° E., distant 125 feet. A plank fence is 50 feet south.

NOTE.—See position by Hawkins, 1913, pages 624-625.

[Latitude 38° 11' 58.55". Longitude 80° 51' 28.17".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Summersville.....	173 59 55.22	353 59 30.72	3. 9638684	5.72
Cottle.....	225 54 42.49	46 02 32.01	4. 4085366	15.92
Fury.....	259 06 44.83	79 10 57.19	4. 0045927	6.28
Beech.....	293 32 38.08	113 41 59.80	4. 3831111	15.01

## PAYNE, WEBSTER COUNTY, W. VA.

On Paynes Knob, 1.5 miles south of Webster Springs, W. Va. Knob is heavily timbered; instrument elevated 60 feet.

Station mark: Oak tree 18 inches in diameter, four spikes driven in blazes 2 feet above ground.

[Latitude 38° 27' 32.71". Longitude 80° 24' 46.61".]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Cowen.....	56 40 38.75	236 36 07.31	4. 1032736	7.88
Cottle.....	61 49 12.49	241 40 28.32	4. 3662056	14.44
Locust.....	103 50 35.59	283 52 44.76	3. 9669365	5.76
Miller.....	187 08 14.89	7 08 29.61	3. 6642906	2.87
Potato.....	233 00 21.43	53 04 37.67	4. 0947161	7.73

## POTATO, WEBSTER COUNTY, W. VA.

On the highest part of Potato Knob, of the Paint Mountain range, at the head of Potato Knob Run and about 1 mile northeast of Woodzell post office, on land owned by Mr. Clark Stolnaker and about one-half mile east of his residence. A small pasture field is about 500 feet west of station and the Staunton-Slovens old State road along the top of Paint Mountain passes around the hill about 1,000 feet south. Paint Mountain Methodist Church is about 1 mile southwest.

Signal: Flag and targets in top of a large sugar maple, which overlooks other trees in every direction, affording a good view all around; a quadrupod of dead poles was erected in crotch of forks of tree and extends 32 feet up for instrument stand. Observing platform in top of tree is 82 feet above ground; the corners of platform were securely guyed. Tree was very steady. Instrument elevated 86 feet.

Station mark: A sandstone 8 by 10 by 30 inches set 24 inches in ground, in top of which is a bronze West Virginia tablet; three reference marks were left, consisting of small triangles cut on trees.

## WEST VIRGINIA.

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## Azimuths and distances from station mark to reference marks:

	Azimuth.	Distance from station mark. Feet.
No. 1.....	358 03	49.65
No. 2.....	89 03	31.42
No. 3.....	279 23	8.14

A wire nail was driven in center of each triangle. Station mark set directly under center of instrument.

NOTE.—See position by Kendall, 1913, pages 619–620.

[Latitude  $38^{\circ} 31' 35.22''$ . Longitude  $80^{\circ} 17' 56.53''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Payne.....	53 04 37.67	233 00 21.43	4.0947161	7.73
Cottle.....	58 49 14.47	238 36 14.95	4.5512013	22.11
Miller.....	72 50 16.60	252 46 15.97	3.9912161	6.09
Locust.....	74 33 57.32	254 25 51.02	4.2931894	12.20

## RED OAK, WEBSTER COUNTY, W. VA. (Not occupied.)

On Red Oak Knob, on divide between Williams and Cranberry rivers, 3 miles west of Jake Mullen's, at Three Forks of Williams River. Knob is heavily timbered.

Station mark: Chestnut tree 24 inches in diameter; four blazes with spikes driven in each.

Reference mark: Chestnut tree 18 inches in diameter bears northwest 18 feet distant; blaze with spike facing station.

Chestnut tree 15 inches in diameter bears southwest 15 feet distant; blaze with spike facing station tree.

[Latitude  $38^{\circ} 21' 11.86''$ . Longitude  $80^{\circ} 26' 27.02''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Cottle.....	92 25 14.80	272 17 33.55	4.2567703	11.22
Cowen.....	120 18 38.27	300 15 09.46	3.9756573	5.88
Locust.....	154 51 05.75	334 48 17.58	4.1885553	9.59
Three Point.....	204 58 41.85	25 02 02.56	4.2678735	11.51

## TURKEY, WEBSTER COUNTY, W. VA. (Not occupied.)

No check on this position. On Turkey Knob, on divide between Williams and Gauley Rivers, 6 miles northeast of Jake Mullen's at three forks of Williams River. Knob is flat and heavily timbered.

Station mark: White maple 16 inches in diameter; four spikes driven in blazes 2 feet above ground.

Reference marks, each having blaze with spike facing station: No. 1, red oak 7 inches in diameter; No. 2, birch 7 inches in diameter; Nos. 3 and 4, each, beech 10 inches in diameter.

[Latitude  $38^{\circ} 22' 49.86''$ . Longitude  $80^{\circ} 18' 47.27''$ .]

To station—	Azimuth.	Back azimuth.	Distance.	
	° ' "	° ' "	Log. meters.	Miles.
Locust.....	121 46 50.69	301 39 16.71	4.3186129	12.94
Miller.....	148 33 45.40	328 30 16.72	4.1929846	9.66

## WILD CAT, NICHOLAS COUNTY, W. VA. (Not occupied.)

On Wild Cat Knob, 1 mile east of Persinger, W. Va. Cleared on north; timbered on south.

Station mark: Oak tree 12 inches in diameter, blazed with four spikes in each blaze.

Reference mark: Cross cut in large sandstone boulder over which is a pile of stones; azimuth from tree to cross 262°; distance 15.8 feet.

[Latitude 38° 19' 11.39". Longitude 80° 43' 53.25".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Fury.....	5 42 06.37	185 41 27.28	3.0606756	7.15
Summersville.....	70 48 14.81	250 42 58.79	4.1046995	7.91
Cottle.....	238 45 50.25	58 48 58.17	3.9346042	5.35

## THREE POINT, WEBSTER COUNTY, W. VA.

Three miles northeast of Webster Springs, W. Va.

Station mark: Tree on east side of road; triangular blaze on tree, in which a large spike is driven.

[Latitude 38° 30' 16.49". Longitude 80° 21' 04.09".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Mitten.....	5 55 39.61	185 55 01.69	4.1564343	8.91
Red Oak.....	25 02 02.56	204 58 41.85	4.2678735	11.51
Cottle.....	58 15 59.61	238 04 57.12	4.4833948	18.91
Locust.....	78 57 05.74	258 50 56.30	4.1661105	9.11

SUMMERSVILLE, NICHOLAS COUNTY, W. VA.<sup>1</sup>

On a ridge about 1 mile west of Summersville and very nearly in the prolongation of the main street of the town. The station is marked by cross in top of stone post. The reference marks are at the following distances and directions from the station; 2.14 meters north, 2.22 meters east, 2.13 meters south, and 2.10 meters west. A large lone tree, visible for 40 miles, is 4.69 meters from the station in azimuth 174° 40' and is marked with a spike. Two stumps marked with spikes are respectively 4.27 meters from the station in azimuth 330° 17' and 6.34 meters in azimuth 141° 51'. A station of the United States Coast and Geodetic Survey.

[Latitude 38° 18' 55.36". Longitude 80° 52' 07.75".]

To station—	Azimuth.	Back azimuth.	Distance.	
	°   '   "	°   '   "	Log. meters.	Miles.
Briery.....	288 15 06.66	106 34 34.13	4.6847649	.....
Cottle.....	245 51 54.95	66 00 09.43	4.3266599	13.18
Wild Cat.....	250 42 58.79	70 48 14.81	4.1046995	7.91
Collins.....	282 51 52.49	103 01 44.41	4.3774466	14.82
Fury.....	303 37 39.37	123 42 16.46	4.1164561	8.13
Beech.....	309 07 23.15	129 17 09.86	4.4741263	18.53
Nebo.....	353 59 30.72	173 59 55.22	3.9638684	5.72

<sup>1</sup> See p. 626.

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