

Serial No. 88

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
E. LESTER JONES, SUPERINTENDENT

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TERRESTRIAL MAGNETISM

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RESULTS OF MAGNETIC OBSERVATIONS MADE  
BY THE UNITED STATES COAST AND  
GEODETIC SURVEY IN 1917

BY

DANIEL L. HAZARD  
CHIEF, DIVISION OF TERRESTRIAL MAGNETISM

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Special Publication No. 51



PRICE, 10 CENTS

Sold only by the Superintendent of Documents, Government Printing Office,  
Washington, D. C.

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WASHINGTON  
GOVERNMENT PRINTING OFFICE  
1918

# National Oceanic and Atmospheric Administration

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January 19, 2007



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# RESULTS OF MAGNETIC OBSERVATIONS MADE BY THE UNITED STATES COAST AND GEODETIC SURVEY IN 1917.

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By DANIEL L. HAZARD, *Chief, Division of Terrestrial Magnetism.*

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## INTRODUCTION.

In 1882 the results of magnetic observations made by this Bureau prior to 1881, together with descriptions of stations, were published as Appendix 9, Report for 1881. From that time to 1902 the results were published only in connection with a discussion of the distribution or secular change of one or more of the three magnetic elements. In Magnetic Declination Tables and Isogonic Charts for 1902 the declination results were given for all stations occupied up to that time and descriptions were given of the stations occupied subsequent to 1881. From 1903 to 1911 there was published annually an appendix to the Superintendent's report, giving the results of magnetic observations made during the fiscal year (July to June) covered by the report.

When in 1912 it was decided to confine the annual report of the Superintendent to administrative matters and to publish separately the scientific results which had formerly appeared as appendices to the report, the time was deemed opportune to change from the *fiscal year* to the *calendar year* in the publication of the results of magnetic observations in the field. Accordingly, Special Publication No. 15 contained the results of observations made between July 1, 1911, and December 31, 1912, Special Publication No. 20 the results for the year 1913, Special Publication No. 25 the results for the year 1914, Special Publication No. 36 the results for the year 1915, and Special Publication No. 42 the results for the year 1916.

Five magnetic observatories have continued in operation throughout the year: At Cheltenham, Md.; Sitka, Alaska; near Honolulu, Hawaii; on Vieques Island, P. R.; and near Tucson, Ariz. Their records have furnished the means for reducing to mean of day the values of declination obtained from the field observations. There will be found in the tables the mean values of the magnetic elements for each of the observatories for the year 1917.

## DISTRIBUTION OF OBSERVATIONS ON LAND.

The distribution of the stations on land is shown in the following table, from which it will be seen that observations were made in 28 States and Territories. Numerous old stations were reoccupied in order to determine the secular change of the magnetic elements, and many auxiliary stations were occupied where previous observations had indicated the presence of local disturbance. In the case of these auxiliary stations the observing program was usually very much curtailed, being limited to morning or afternoon azimuth, one set of declination with magnet erect, one set of oscillations, and dip with one needle without reversal of polarities. The lettered auxiliary stations (A, B—) are usually within a few hundred feet of the primary, the numbered stations (1, 2, 3—) several miles away.

*Summary of results on land.*

State.	Localities.	Stations.	Old localities re-occupied.	Declination results.	Dip results.	Intensity results.
Alabama.....	1	1	1	1	1	1
Alaska.....	4	4	1	6	2	2
Arizona.....	2	2	2	3	3	3
Arkansas.....	4	10	1	10	10	10
California.....	26	26	5	26	26	26
Colorado.....	9	13	3	13	13	13
Florida.....	3	3	1	3	3	3
Georgia.....	2	3	2	3	2	2
Hawaii.....	1	1	1	1	1	1
Idaho.....	1	1	0	1	1	1
Illinois.....	7	7	2	7	7	7
Iowa.....	20	40	3	40	35	35
Kansas.....	8	32	3	32	29	29
Maryland.....	1	1	1	6	7	6
Mississippi.....	1	1	1	1	1	1
Missouri.....	13	19	1	19	18	18
Nevada.....	4	4	0	4	4	4
New Mexico.....	10	19	2	19	18	18
North Carolina.....	5	14	4	14	13	13
Oklahoma.....	3	3	1	3	3	3
Oregon.....	26	48	4	48	43	35
Porto Rico.....	1	1	1	1	1	1
South Carolina.....	7	25	4	24	23	23
Tennessee.....	3	4	3	4	4	4
Texas.....	1	1	1	1	1	1
Utah.....	2	2	2	2	2	2
Washington.....	19	31	2	31	27	23
Wisconsin.....	19	58	5	58	58	58
Total.....	203	374	57	381	350	343

## SECULAR CHANGE OF THE MAGNETIC DECLINATION.

A comparison of the declination results at "repeat" stations occupied during the year with the results of earlier observations in the same localities is presented in the following table. The letter after the name of a station indicates (a) that the old station was reoccupied exactly, (b) that the new station was very near the old one, and (c) that the new station was some distance (a quarter of a mile or more) from the old one. A tabular value of the annual change refers approximately to the middle of the period from which it is derived. A plus sign indicates increasing east declination or decreasing west declination; a minus sign, the reverse.

Comparison of declination results at repeat stations.

State and station.	Former observations.		Last observations.		Average annual change.
	Date.	Declination.	Date.	Declination.	
Florida:					
Gainesville (a).....	1915, Jy...	2 10.6 E...	1917, Je...	2 06.4 E...	-2.2
Georgia:					
Waycross (a).....	1908, Mh...	1 05.8 E...	1917, Je...	1 01.6 E...	-0.5
Savannah (a).....	1914, Ap...	0 22.2 E...	1917, Je...	0 20.4 E...	-0.6
South Carolina:					
Barnwell (c).....	1904, Fe...	1 32.9 E...	1917, Je...	1 05.7 E...	-2.0
Laurens (a).....	1912, Mh...	0 10.8 W...	1917, Jy...	0 17.5 W...	-1.3
Chester (a).....	1912, Ap...	2 34.7 W...	1917, Jy...	2 42.7 W...	-1.5
North Carolina:					
Raleigh (a).....	1913, Je...	2 48.0 W...	1917, Jy...	2 57.7 W...	-2.4
Goldsboro (a).....	1908, Mh...	2 13.3 W...	1917, Jy...	2 44.8 W...	-3.4
Wadesboro (c).....	1904, Je...	0 11.7 W...	1917, Jy...	0 54.0 W...	-3.1
Maryland:					
Cheltenham Observatory (a).....	1915, year.	6 04.0 W...	1917, year.	6 10.3 W...	-3.2
Tennessee:					
Knoxville (a).....	1914, Mh...	0 24.4 W...	1917, Mh...	0 21.1 W...	+1.1
Athens (a).....	1914, Mh...	0 32.1 E...	1917, Mh...	0 32.1 E...	0.0
Memphis (a).....	1914, Au...	5 29.2 E...	1917, Ap...	5 34.0 E...	+1.8
Alabama:					
Huntsville (a).....	1914, Mh...	3 59.2 E...	1917, Mh...	4 01.6 E...	+0.8
Mississippi:					
Corinth (a).....	1914, Je...	4 47.8 E...	1917, Mh...	4 51.4 E...	+1.3
Arkansas:					
Yellville (a).....	1905, No...	7 49.4 E...	1917, Ap...	8 08.2 E...	+1.6
Oklahoma:					
Vinita (b).....	1910, Se...	8 34.0 E...	1917, My...	8 43.5 E...	+1.4
Missouri:					
Forsyth (a).....	1908, Au...	5 53.4 E...	1917, My...	6 00.4 E...	+0.8
Kansas:					
Anthony (b).....	1906, Oc...	9 09.9 E...	1917, My...	9 30.6 E...	+2.0
Cimarron (a).....	1904, No...	10 32.0 E...	1917, Oc...	10 57.4 E...	+2.0
Salina (a).....	1909, Jy...	11 13.9 E...	1917, Je...	11 25.8 E...	+1.5
Iowa:					
Wapello (a).....	1908, Se...	4 54.5 E...	1917, Au...	4 50.2 E...	-0.5
Tipton (a).....	1908, Se...	7 28.9 E...	1917, Oc...	7 21.6 E...	-0.8
Clinton (a).....	1908, Se...	4 16.4 E...	1917, Se...	4 08.6 E...	-0.9
Illinois:					
Urbana (a).....	1907, Au...	3 26.3 E...	1917, Je...	3 13.2 E...	-1.3
Wisconsin:					
Hudson (b).....	1908, Jy...	3 56.8 E...	1917, Au...	3 35.0 E...	-2.4
Rhineland (a).....	1905, Au...	0 34.9 E...	1917, Oc...	0 02.0 E...	-2.7
West Bend (a).....	1908, Se...	3 56.9 E...	1917, Oc...	3 40.2 E...	-1.8
Port Washington (a).....	1908, Se...	1 56.9 E...	1917, No...	1 35.8 E...	-2.3
Milwaukee (a).....	1914, Se...	3 05.4 E...	1917, No...	3 00.2 E...	-1.6
Texas:					
Amarillo (a).....	1914, Mh...	12 15.0 E...	1917, Mh...	12 19.0 E...	+1.3
New Mexico:					
Tucumcari (a).....	1914, Mh...	12 51.2 E...	1917, Mh...	12 58.1 E...	+2.3
Springer (c).....	1899, De...	14 04.8 E...	1917, Ap...	14 53.4 E...	+2.8
Arizona:					
Yuma (a).....	1914, Ap...	14 45.4 E...	1917, Oc...	14 52.4 E...	+2.0
Tucson Observatory (a).....	1915, year.	13 42.5 E...	1917, year.	13 46.2 E...	+1.8
Colorado:					
Trinidad (a).....	1914, Ap...	14 22.4 E...	1917, Ap...	14 24.9 E...	+0.8
Durango (a).....	1913, Jy...	14 35.3 E...	1917, Ap...	14 38.6 E...	+0.9
Grand Junction (a).....	1913, Au...	15 35.4 E...	1917, My...	15 39.6 E...	+1.1
Utah:					
Green River (a).....	1913, Au...	16 09.2 E...	1917, My...	16 14.2 E...	+1.3
Ogden (a).....	1913, Au...	18 09.6 E...	1917, My...	18 10.0 E...	+0.1
Washington:					
Spokane (a).....	1914, Au...	23 40.2 E...	1917, Je...	23 43.0 E...	+1.0
Seattle (a).....	1914, Jy...	23 44.2 E...	1917, Mh...	23 47.0 E...	+1.0
Do. (a).....	1914, Jy...	23 44.2 E...	1917, Jy...	23 44.6 E...	+0.1
Oregon:					
Pendleton (a).....	1914, Jy...	21 58.0 E...	1917, Je...	21 58.4 E...	+0.1
Portland (a).....	1914, My...	23 29.6 E...	1917, Au...	23 22.6 E...	-2.2
Eugene (a).....	1914, My...	23 39.4 E...	1917, Au...	23 38.9 E...	-0.2
California:					
Stockton (a).....	1914, My...	18 05.2 E...	1917, Se...	18 07.3 E...	+0.6
Barstow (b).....	1914, My...	16 03.4 E...	1917, Oc...	16 09.0 E...	+1.6
San Bernardino (a).....	1914, My...	15 40.6 E...	1917, Oc...	15 44.7 E...	+1.2
Indio (a).....	1914, Ap...	15 24.0 E...	1917, Oc...	15 28.3 E...	+1.2
Alaska:					
Sitka Observatory (a).....	1915, year.	30 23.3 E...	1917, year.	30 25.0 E...	+0.8
Hawaii:					
Honolulu Observatory (a).....	1915, year.	9 41.6 E...	1917, year.	9 46.3 E...	+2.4
Porto Rico:					
Vieques Observatory (a).....	1915, year.	3 10.2 W...	1917, year.	3 26.9 W...	-8.4

## OBSERVATIONS AT SEA.

Only such observations were made on board ship as were required for the determination of the deviations of the ship's compasses for the purposes of navigation, except in the case of the steamer *Patterson*, C. G. Quillian commanding. The results of these observations are given on page 18. The tabular values of horizontal intensity were computed from the observed dip and total intensity. The general arrangement of the table is indicated by the headings. Each value is the result of observations on 8 or 16 equidistant headings, swinging ship both with port and starboard helms. In the column headed "Sea," *sm* means smooth; *lt sw*, light swell.

## INSTRUMENTAL CORRECTIONS.

Most of the instruments used in the field work have been compared with the observatory instruments at Cheltenham at the end of the year, the results in general differing but little from those obtained at the end of 1916.

Beginning with 1913 the results of horizontal intensity observations made by the Coast and Geodetic Survey have been reduced to the international standard of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington. The published results of horizontal intensity determinations made before that year must be diminished by 0.001 H to reduce them to that standard.

The instrumental corrections indicated in the tables below have been applied.

*Corrections to magnetometers.*

Number.	Pattern.	Correction to east declination.	Correction to H in parts of H.
4	.....	0.0	-0.0013
17	C. & G. S. ....	0.0	.0000
19	C. & G. S. ....	0.0	.0000
20	C. & G. S. ....	0.0	.0000
26	Wild-Edelmann.....	0.0	-.0010
30	India Survey.....	0.0	.0000
31	India Survey.....	0.0	-.0007
36	India Survey.....	-0.4	.0000
37	India Survey.....	0.0	+.0012
38	Carnegie Institution.....	0.0	-.0010

*Corrections to dip circles.*

Number.	Pattern.	Needles.	Correction.
15	Kew-Casella.....	1	-0.2
		2	-1.8
33	L. C. Dover.....	1	-0.4
		2	-0.5
36	Kew-Dover.....	1	-2.0
		2	0.0
56	Kew-Casella.....	1	-0.4
		<sup>a</sup> 3	-1.6
5678	Kew-Casella.....	1	-1.5
		2	-2.2
		5	-0.9
		6	-2.1

<sup>a</sup> This needle was originally used with dip circle No. 18.

## DIURNAL VARIATION CORRECTION.

Each value of the magnetic declination has been corrected for diurnal variation with the aid of the continuous observations at the nearest magnetic observatory, allowance being made for the change in diurnal range with change in magnetic latitude. No attempt has been made to correct the dip and intensity results for diurnal variation.

## ARRANGEMENT OF TABLE.

The results presented are arranged by States alphabetically, and the results for each State are given in the order of increasing latitudes. The latitudes and longitudes are in most cases the results of solar observations made with the small theodolite which forms a part of the magnetometer. In default of observations, a chart, or a topographic sheet of the United States Geological Survey, the geographic coordinates were scaled from the best available map, usually a post-route map. In such cases only the nearest whole minute of latitude or longitude is given. The horizontal intensity is expressed in terms of the one hundred-thousandth part of a C. G. S. unit of intensity of magnetic force, termed a gamma and designated by the Greek letter  $\gamma$ .

In order to include the desired amount of information in the available space, the months have been abbreviated as follows:

January	Ja	May	My	September	Se
February	Fe	June	Je	October	Oc
March	Mh	July	Jy	November	No
April	Ap	August	Au	December	De

Where the number in the magnetometer column is in italics, the declination observations were made with a compass declinometer. The numbers shown as a decimal in the column headed D. C. give the needles used. Dip circle 5678 is designated as 78 in the tabulation in order to conserve space.

The observer is indicated by the initials of his name. The names of the observers are as follows:

F. L. Adams.	P. V. Lane.	H. W. Pease.
H. R. Bartlett.	H. E. McComb.	S. G. Townshend, jr.
J. R. Benton	W. W. Merrymon.	F. P. Ulrich.
G. Hartnell.	F. Neumann.	
W. M. Hill.	W. H. Overshiner.	

## Magnetic observations on land.

## ALABAMA.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
Huntsville.....	34 44.1	86 34.7	Mh 29	<i>East.</i> 4 01.6	66 52.4	22538	38	36.12	W.M.H.

## ALASKA.

Sitka Observatory....	57 03.0	135 20.1	Je 25-29	30 22.2	74 25.2	15574	4	38.12	J.W.G.
Do.....	57 03.0	135 20.1	Year	30 25.0	74 25.1	15579	37	2EI	J.W.G.
Rate, Lisianski Inlet.	57 50.9	136 26.9	Je 30	28 26.2	.....	.....	4	.....	P.V.L.
Kay, Lisianski Inlet.	57 55.4	136 21.7	Je 23	30 56.4	.....	.....	4	.....	H.R.B.&
Port Nellie Juan.....	60 34.8	148 09.2	Au 15	27 46.9	.....	.....	8	.....	P.V.L. W.H.O.

## ARIZONA.

Yuma.....	32 43.8	114 37.0	Oc 26	14 52.4	59 03.0	26900	20	78.25	H.E.M.
Tucson Observatory..	32 14.8	110 50.1	Oc 29-30	13 46.4	59 30.8	26938	20	78.25	H.E.M.
Do.....	32 14.8	110 50.1	Oc 30-31	.....	59 27.3	.....	.....	78.16	H.E.M.
Do.....	32 14.8	110 50.1	Year	13 46.2	59 26.7	27018	30	3EI	P.P.U.

## ARKANSAS.

Booneville.....	35 08.4	93 55.5	My 10-11	7 56.5	65 46.8	23715	38	36.12	W.M.H.
Greenwood.....	35 12.3	94 15.3	My 14	8 00.0	65 47.0	23650	38	36.12	W.M.H.
Tyronza.....	35 29.4	90 21.9	Ap 18	6 01.0	66 34.1	23006	38	36.12	W.M.H.
Yellville, aux. 4.....	36 07.2	92 34.2	Ap 26	7 09.7	66 51.3	22755	38	36.1	W.M.H.
Yellville, aux. 2.....	36 10.5	92 38.7	Ap 23	5 49.4	66 49.5	22957	38	36.1	W.M.H.
Yellville, aux. 1.....	36 14.3	92 40.7	Ap 23	8 00.9	67 18.2	22534	38	36.1	W.M.H.
Yellville.....	36 14.4	92 40.9	Ap 21	8 08.2	67 13.6	22544	38	36.12	W.M.H.
Yellville, aux. 5.....	36 16.2	92 32.3	Ap 27	6 53.7	67 21.4	22371	38	36.1	W.M.H.
Yellville, aux. 6.....	33 17.3	92 55.0	Ap 28	6 26.9	67 00.1	22518	38	36.1	W.M.H.
Yellville, aux. 3.....	33 19.9	92 39.7	Ap 25	7 22.3	67 36.5	22214	38	36.1	W.M.H.

## CALIFORNIA.

Niland.....	33 14.6	115 30.2	Oc 25	15 08.0	59 13.6	26812	20	78.25	H.E.M.
Indio.....	33 43.0	116 13.1	Oc 24	15 28.3	59 26.8	26714	20	78.25	H.E.M.
Santa Ana.....	33 45.0	117 53.8	Oc 20, 22	15 43.2	59 24.5	26600	20	78.25	H.E.M.
Riverside.....	33 57.2	117 23.1	Oc 18	16 11.2	59 28.7	26638	20	78.25	H.E.M.
San Bernardino.....	34 06.1	117 19.2	Oc 16	15 44.7	59 41.6	26478	20	78.25	H.E.M.
Barstow.....	34 53.9	117 01.8	Oc 13	16 09.0	60 35.0	25912	20	78.25	H.E.M.
Silver Lake.....	35 22.4	116 06.0	Oc 12	16 09.0	61 18.4	25641	20	78.25	H.E.M.
Brown.....	35 45.8	117 51.0	Se 27	16 43.4	61 10.4	25663	20	78.25	H.E.M.
Teocapa.....	35 52.0	116 13.4	Oc 11	15 52.2	61 48.2	25426	20	78.25	H.E.M.
Death Valley.....	36 17.8	116 24.9	Oc 10	16 37.4	62 04.0	25231	20	78.25	H.E.M.
Cartago.....	36 19.7	117 59.9	Se 28	16 13.6	61 37.3	25292	20	78.25	H.E.M.
Hanford.....	36 20.5	119 39.2	Se 26	17 10.7	61 23.2	25373	20	78.25	H.E.M.
Independence.....	36 48.3	118 11.9	Se 29	16 29.8	62 33.6	24895	20	78.25	H.E.M.
Laws.....	37 24.1	118 20.7	Se 30	16 52.6	64 44.8	24704	20	78.25	H.E.M.
Stockton.....	37 58.6	121 17.0	Se 25	18 07.3	63 00.0	24768	20	78.25	H.E.M.
Point Reyes Station..	38 03.9	122 48.1	Se 24	18 17.8	62 14.4	24762	20	78.25	H.E.M.
Montrio.....	38 28.0	123 01.5	Se 23	18 34.1	62 03.5	24583	20	78.25	H.E.M.
Cloverdale.....	38 49	123 01.6	Se 21	19 05.6	62 52.4	24578	20	78.25	H.E.M.
Lakeport.....	39 03	122 53.9	Se 20	18 52.3	62 54.4	24354	20	78.25	H.E.M.
Fort Bragg.....	39 26.7	123 46.8	Se 17	19 05.4	63 21.4	24094	20	78.25	H.E.M.
Dos Rios.....	39 43	123 20.1	Se 15, 16	19 03.2	63 42.8	23971	20	78.25	H.E.M.
Alderpoint.....	40 10.8	123 35.8	Se 14, 15	19 26.8	64 03.5	23764	20	78.25	H.E.M.
Scottia.....	40 28.8	124 05.4	Se 13	19 25.2	64 06.8	23686	20	78.25	H.E.M.
Eureka.....	40 45.6	124 07.9	Se 10	19 43.9	64 30.7	23460	20	78.25	H.E.M.
Orick.....	41 16.8	124 03.7	Se 9	20 03.1	64 51.0	23223	20	78.25	H.E.M.
Crescent City.....	41 45.0	124 12.5	Se 8	20 21.7	65 15.3	22968	20	78.25	H.E.M.

## Magnetic observations on land—Continued.

## COLORADO.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
	° /	° /		<i>East.</i>	° /	γ			
Tercio.....	37 02.2	104 55.8	Ap 13	14 08.2	64 57.4	24124	20	78.12	H. E. M.
Trinidad, aux. 2.....	37 08.0	104 33.8	Ap 10	14 14.4	65 42.9	23251	20	78.1	H. E. M.
Trinidad, aux. 3.....	37 08.9	104 23.8	Ap 12	14 11.4	65 19.5	23707	20	78.1	H. E. M.
Trinidad.....	37 10.0	104 29.0	Ap 10	14 24.9	65 40.6	23434	20	78.12	H. E. M.
San Luis.....	37 12.3	105 25.6	Ap 20	14 07.8	65 03.4	23846	20	78.12	H. E. M.
Trinidad, aux. 4.....	37 12.6	104 30.9	Ap 12	14 01.4	65 18.6	23590	20	78.1	H. E. M.
Trinidad, aux. 1.....	37 13.8	104 27.3	Ap 10	14 28.2	65 35.3	23546	20	78.1	H. E. M.
Durango.....	37 16.6	107 52.4	Ap 23	14 38.6	64 55.6	23838	20	78.12	H. E. M.
Fort Garland.....	37 26.2	105 26.3	Ap 18	14 16.8	65 15.9	23724	20	78.12	H. E. M.
Paonia.....	38 53.8	107 37.8	My 2	16 01.9	66 32.1	22643	20	78.12	H. E. M.
Grand Junction.....	39 04.8	108 33.2	My 4	15 39.6	66 32.7	22757	20	78.125	H. E. M.
De Beque.....	39 19.9	108 13.0	My 8	15 14.0	66 28.4	23206	20	78.12	H. E. M.
Do.....	39 19.9	108 13.0	My 8		66 29.6			78.56	H. E. M.
Rifle.....	39 32.3	107 47.3	My 10	15 36.9	67 03.6	22556	20	78.26	H. E. M.

## FLORIDA.

Gainesville.....	29 38.3	82 20.4	Je 9	2 06.4	62 12.9	25337	17	15.12	J. R. B.
Cross City.....	29 38.6	83 06.0	Je 12	1 54.9	61 34.0	25719	17	15.12	J. R. B.
Newberry.....	29 38.9	82 35.4	Je 11	2 25.4	61 53.4	25408	17	15.12	J. R. B.

## GEORGIA.

Waycross.....	31 12.2	82 24.5	Je 15, 16	1 01.6	63 18.8	24744	17	15.12	J. R. B.
Waycross, aux. A.....	31 12.2	82 24.5	Je 15	1 03.1			17		J. R. B.
Savannah.....	32 01.2	81 05.0	Je 18	0 20.4	64 21.6	24001	17	15.12	J. R. B.

## HAWAII.

Honolulu Observatory	21 19.2	158 03.8	Year	9 46.3	39 27.9	28926	36	4EI	F. N.
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## IDAHO.

Preston.....	42 06.5	111 52.8	My 16	18 22.0	68 27.8	21318	20	78.26	H. E. M.
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## ILLINOIS.

Urbana.....	40 06.1	88 14.1	Je 22, 23	3 13.2	71 05.4	19429	19	56.13	W. W. M.
Saybrook.....	40 24.9	88 30.7	Je 29	4 03.2	71 16.0	19316	19	56.13	W. W. M.
Hoopston.....	40 28	87 42.2	Je 27	2 33.6	71 38.4	19125	19	56.13	W. W. M.
Chatsworth.....	40 45.7	88 16.3	Jy 2	3 10.6	71 52.1	18821	19	56.13	W. W. M.
Streator.....	41 08.9	88 50.0	Jy 10	3 49.9	72 03.1	18664	19	56.13	W. W. M.
Rochelle.....	41 56.1	89 04.9	Jy 17	3 13.6	72 47.1	18068	19	56.13	W. W. M.
Rockford.....	42 16.8	89 04.7	Jy 19	3 02.8	72 46.8	18062	19	56.13	W. W. M.

## IOWA.

Lineville.....	40 35.6	93 31.8	Jy 27, 28	8 58.6	70 43.6	19852	38	36.12	W. M. H.
Lineville, aux. A.....	40 36	93 32	Jy 28	9 03.3			38		W. M. H.
Davis City.....	40 39.0	93 51.3	Jy 24	8 03.0	70 58.6	19648	38	36.12	W. M. H.
Humeston.....	40 51.5	93 31.0	Jy 25, 26	7 32.4	71 17.4	19247	38	36.12	W. M. H.
Mediapolis.....	41 00.4	91 08.6	Au 22	6 02.2	71 40.4	19106	38	36.12	W. M. H.
Wapello, aux. 6.....	41 06	91 09.3	Au 30	6 04.2	71 52.4	18899	38	36.1	W. M. H.
Wapello, aux. 8.....	41 08	91 03	Au 31	5 25.5	71 50.1	18779	38	36.1	W. M. H.
Wapello, aux. 1.....	41 09	91 10	Au 28	5 22.0	71 47.8	18924	38	36.1	W. M. H.
Wapello, aux. 5.....	41 10	91 07.0	Au 29	5 33.9	71 50.6	18797	38	36.1	W. M. H.
Wapello, aux. 9.....	41 10	90 56.7	Se 5	5 42.5	72 00.6	18620	38	36.1	W. M. H.

Magnetic observations on land—Continued.

IOWA—Continued.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
Wapello.....	41 11.4	91 11.0	Au 24, 25	4 50.2	71 47.2	18964	38	36.12	W. M. H.
Wapello, aux. A.....	41 11.4	91 11.0	Au 25	4 52.3			38		W. M. H.
Wapello, aux. 4.....	41 11	91 12.9	Au 29	6 00.7	71 42.1	19196	38	36.1	W. M. H.
Wapello, aux. 2.....	41 12	91 08	Au 28	4 41.3	71 48.3	18874	38	36.1	W. M. H.
Wapello, aux. 3.....	41 15	91 11.0	Au 29	3 42.1	71 51.6	18987	38	36.1	W. M. H.
Columbus Junction...	41 16.4	91 19.4	Se 6, 7	5 48.5	72 02.8	18896	38	36.12	W. M. H.
Wapello, aux. 7.....	41 20	91 14	Au 30	5 30.8	72 08.2	18732	38	36.1	W. M. H.
West Liberty.....	41 34.0	91 15.8	Se 8, 9	6 44.8	72 16.1	18610	38	36.12	W. M. H.
Wilton Junction.....	41 36.0	91 00.7	Se 12	5 10.7	72 06.2	18640	38	36.12	W. M. H.
Clinton, aux. 1.....	41 39.0	90 04.6	Oc 24	5 52.2	72 18.9	18290	38	36.1	W. M. H.
Princeton.....	41 40.6	90 21.4	Se 15	4 52.2	72 22.6	18398	38	36.12	W. M. H.
Tipton, aux. 1.....	41 40.7	91 00.4	Oc 14	6 37.5	72 08.0	18617	38	36.1	W. M. H.
Tipton, aux. 2.....	41 44.4	90 58.5	Oc 15	6 23.3	72 35.2	18371	38	36.1	W. M. H.
Tipton, aux. 4.....	41 46.2	91 14.9	Oc 15	6 07.4	72 29.4	18252	38	36.1	W. M. H.
Tipton.....	41 46.6	91 08.4	Oc 12	7 21.6	72 26.6	18368	38	36.12	W. M. H.
Tipton, aux. A.....	41 46.6	91 08.4	Oc 13	7 22.5			38		W. M. H.
Clinton, aux. 3.....	41 47	89 52	Oc 25	4 55.9	72 17.8	18393	38	36.1	W. M. H.
De Witt.....	41 49.4	90 31.8	Oc 17, 18	5 08.6	72 36.8	18186	38	36.12	W. M. H.
Wheatland.....	41 49.9	90 50.1	Oc 6, 7	5 49.6	72 37.5	18398	38	36.12	W. M. H.
Tipton, aux. 3.....	41 50.3	91 08.1	Oc 15	6 37.2	72 31.0	18283	38	36.1	W. M. H.
Clinton.....	41 54.0	90 10.2	Se 17, 18	4 08.6	72 06.8	18674	38	36.12	W. M. H.
Clinton, aux. A.....	41 54.0	90 10.2	Se 18	4 09.6			38		W. M. H.
Stanwood.....	41 54.3	91 10.3	Oc 9, 10	6 12.8	72 56.0	17857	38	36.12	W. M. H.
Oxford Junction.....	41 58.9	90 57.4	Se 30	5 14.6	73 07.7	17738	38	36.12	W. M. H.
Monmouth.....	42 04.4	90 52.3	Oc 4	5 48.9	72 42.4	18098	38	36.12	W. M. H.
Green Island.....	42 09	90 19.4	Se 19, 20	4 49.8	72 48.9	18152	38	36.12	W. M. H.
Clinton, aux. 2.....	42 13.0	90 01.5	Oc 24	5 25.2			38		W. M. H.
Lamotte.....	42 17.5	90 36.9	Se 22, 23	6 08.4	73 11.6	17648	38	36.12	W. M. H.
Cascade.....	42 17.9	91 00.7	Se 25	6 21.8	73 08.6	17731	38	36.12	W. M. H.
Farley.....	42 26.5	91 01.0	Se 27, 28	6 31.3	73 10.4	17550	38	36.12	W. M. H.

KANSAS.

Anthony, aux. 5.....	37 05	97 53	Je 6	10 30.5	66 57.3	22611	38	36.1	W. M. H.
Anthony, aux. 2.....	37 06.2	98 07.8	Je 2	10 21.5	67 10.4	22612	38	36.1	W. M. H.
Anthony, aux. 1.....	37 06.3	97 58.0	Je 2	9 39.0	66 57.9	22667	38	36.1	W. M. H.
Anthony, aux. 6.....	37 09	98 09	Je 6	10 03.7	67 14.1	22604	38	36.1	W. M. H.
Anthony, old.....	37 09.2	98 01.7	My 28, 29	9 43.6	67 08.6	22660	38	36.12	W. M. H.
Anthony, aux. A.....	37 09.2	98 01.7	My 29	9 30.6			38		W. M. H.
Anthony, new.....	37 09.7	98 01.6	My 30, 31	9 31.8	67 12.2	22556	38	36.12	W. M. H.
Anthony, aux. 4.....	37 12	97 51	Je 5	10 26.3	67 01.7	22517	38	36.1	W. M. H.
Anthony, aux. 3.....	37 17	98 02	Je 5	9 49.6	67 14.2	22483	38	36.1	W. M. H.
Copeland.....	37 32.3	100 38.7	Je 8, 9	11 59.1	66 53.7	22827	38	36.12	W. M. H.
Cimarron, aux. 7.....	37 33	100 13.7	Je 26	11 40.2	66 56.1	22605	38	36.1	W. M. H.
Santa Fe.....	37 33.7	100 52.3	Je 12	12 16.0	66 55.0	22770	38	36.12	W. M. H.
New Ullyses.....	37 33.9	101 18.9	Je 15	12 13.7	66 36.4	22912	38	36.12	W. M. H.
Johnson.....	37 34.4	101 45.0	Je 18	12 29.6	66 27.0	23077	38	36.12	W. M. H.
Cimarron, aux. 3.....	37 38	100 18.8	Je 23	11 29.9	67 12.0	22674	38	36.1	W. M. H.
Cimarron, aux. 1.....	37 45.8	100 20.1	Je 22	10 59.2	66 59.4	22733	38	36.1	W. M. H.
Cimarron, aux. 5.....	37 47	100 10	Je 25	11 36.8	66 59.8	22554	38	36.1	W. M. H.
Cimarron.....	37 49	100 20	Je 20	10 57.4	66 55.8	22814	38	36.12	W. M. H.
Cimarron, aux. A.....	37 49	100 20	Je 21	9 55.3			38		W. M. H.
Cimarron, aux. 4.....	37 50	100 27	Je 25	11 32.7	67 17.8	22634	38	36.1	W. M. H.
Cimarron, aux. 8.....	37 53	100 40.4	Je 27	12 20.8	66 58.7	22808	38	36.1	W. M. H.
Cimarron, aux. 2.....	37 57	100 19.2	Je 23	11 19.6	67 15.8	22601	38	36.1	W. M. H.
Cimarron, aux. 6.....	38 04	100 17	Je 26	11 54.4	67 25.7	22439	38	36.1	W. M. H.
Salina, aux. 6.....	38 34	97 49	Jy 11	11 19.1	68 12.1	21890	38	36.1	W. M. H.
Salina, aux. 2.....	38 40	97 46	Jy 9	11 10.8	68 17.4	21716	38	36.1	W. M. H.
Herington.....	38 39.7	96 56.4	Jy 12, 13	9 31.9	68 17.2	21970	38	36.12	W. M. H.
Salina, aux. 5.....	38 46	97 52	Jy 10	10 55.2	68 09.2	21757	38	36.1	W. M. H.
Salina, aux. 1.....	38 47.9	97 45.2	Jy 7	11 02.0	68 20.5	21712	38	36.1	W. M. H.
Salina.....	38 49	97 37	Je 30	11 25.8	68 28.8	21625	38	36.12	W. M. H.
Salina, aux. A.....	38 49	97 37	Jy 2	11 30.9			38		W. M. H.
Salina, aux. 3.....	38 55.5	97 21.8	Jy 9	10 29.5	68 35.1	21570	38	36.1	W. M. H.
Salina, aux. 4.....	39 02	97 36	Jy 10	11 19.9	68 37.7	21522	38	36.1	W. M. H.

Magnetic observations on land—Continued.

MARYLAND.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
Cheltenham Observa- tory .....	38 44.0	76 50.5	Fe 8-14	West. 6 09.6	70 52.3	19290	38	36.12	S. G. T.
Do. ....	38 44.0	76 50.5	Fe 23	6 08.8	70 52.0	19280	17	78.12	G. H.
Do. ....	38 44.0	76 50.5	Fe 23-26	6 11.3	70 52.8	19246	17	78.56	G. H.
Do. ....	38 44.0	76 50.5	No 9, 10		70 55.7			15.12	G. H.
Do. ....	38 44.0	76 50.5	No 12						G. H.
Do. ....	38 44.0	76 50.5	No 12, 13		70 54.8			36.12	G. H.
Do. ....	38 44.0	76 50.5	No 14, 16	6 10.6		19230	38		G. H.
Do. ....	38 44.0	76 50.5	De 10, 11	6 12.1	70 51.4	19260	19	56.13	G. H.
Do. ....	38 44.0	76 50.5	Year	6 10.3	70 51.8	19269	26	26E1	G. H.

MISSISSIPPI.

Corinth .....	31 55.3	88 31.2	Mh 31	East. 4 51.4	66 28.0	22878	38	36.12	W. M. H.
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MISSOURI.

Thayer .....	36 31.3	91 32.6	Ap 6	6 35.9	67 25.5	22262	38	36.12	W. M. H.
Gainesville .....	36 36.2	92 26.0	Ap 14	6 46.2	67 27.8	22274	38	36.12	W. M. H.
Forsyth, aux. 3 .....	36 37.4	93 10.0	My 5	7 04.2	67 07.3	22450	38	36.1	W. M. H.
Forsyth, aux. 1 .....	36 39.6	93 07.5	My 3	6 45.5	67 21.8	22348	38	36.1	W. M. H.
Forsyth, aux. 2 .....	36 41	93 02	My 5	6 59.9	67 21.0	22188	38	36.1	W. M. H.
Forsyth .....	36 41.6	93 05.9	My 1	6 00.4	67 30.2	22270	38	36.12	W. M. H.
Forsyth, aux. A .....	36 41.6	93 05.9	My 2	6 03.2	67 30.2	22270	38	36.12	W. M. H.
Alton .....	36 41.7	91 25.7	Ap 9, 10	5 56.0	67 41.9	22134	38	36.12	W. M. H.
Forsyth, aux. 5 .....	36 43.9	93 11.7	My 7	7 33.3	67 46.8	22016	38	36.1	W. M. H.
Forsyth, aux. 4 .....	36 44	93 02	My 6	6 53.2	67 21.0	22197	38	36.1	W. M. H.
Lawson .....	39 26.2	94 12.2	Jy 16	9 06.5	69 45.3	20752	38	36.12	W. M. H.
Kingston .....	39 39.4	93 59.1	Jy 17, 18	8 20.8	70 32.2	20900	38	36.12	W. M. H.
Bucklin .....	39 47.2	92 53.0	Au 16	7 14.9	70 25.1	20021	38	36.12	W. M. H.
Linneus .....	39 52.4	93 11.6	Au 13	7 04.7	70 27.8	20016	38	36.12	W. M. H.
Trenton .....	40 05.2	93 36.6	Au 3, 4	7 12.2	70 37.2	19918	38	36.12	W. M. H.
Kirksville .....	40 11.6	92 36.0	Au 19, 20	7 19.8	70 54.8	19784	38	36.12	W. M. H.
Bethany .....	40 15.8	93 56.3	Jy 21	7 57.0	70 37.8	19871	38	36.12	W. M. H.
Princeton .....	40 24.1	93 36.8	Jy 30, 31	7 46.9	70 46.4	19854	38	36.12	W. M. H.
Unionville .....	40 27.8	93 00.8	Au 9, 10	6 57.3	70 54.4	19586	38	36.12	W. M. H.

NEVADA.

Betty .....	36 51.3	116 45.6	Oct 8, 9	16 48.8	62 33.0	25022	20	78.25	H. E. M.
Bonnie Clare .....	37 14.2	117 06.0	Oct 6, 7	17 09.0	62 51.5	24864	20	78.25	H. E. M.
Goldfield .....	37 43.2	117 13.7	Oct 4	17 25.5	63 06.2	24572	20	78.25	H. E. M.
Mt. Montgomery .....	38 00.3	118 19.3	Oct 2	18 12.0	63 24.6	24414	20	78.25	H. E. M.

NEW MEXICO.

Endee .....	35 07.1	103 07.1	Mh 24	11 51.2	64 06.7	24626	20	78.12	H. E. M.
Tucumcari .....	35 11.4	103 44.1	Mh 26	12 58.1	63 35.0	25018	20	78.12	H. E. M.
Mosquero .....	35 47	103 58.4	Mh 27	13 13.1	64 20.7	24590	20	78.12	H. E. M.
Mora .....	35 57.6	105 18.3	Ap 6	12 50.3	64 34.2	24126	20	78.12	H. E. M.
Mills, aux. 3 .....	36 02	104 13	Mh 30	14 26.5	64 21.5	24653	20	78.1	H. E. M.
Mills .....	36 06.0	104 14.6	Mh 28, 29	14 26.5	64 46.6	24228	20	78.12	H. E. M.
Mills, aux. A .....	36 06.0	104 14.6	Mh 29	14 26.6			20		H. E. M.
Mills, aux. 1 .....	36 06	104 09	Mh 29	13 25.3	65 01.7	24234	20	78.1	H. E. M.
Mills, aux. 2 .....	36 07	104 19	Mh 29	13 47.9	65 01.6	23892	20	78.1	H. E. M.
Mills, aux. 4 .....	36 10	104 14	Mh 30	14 16.6	64 51.1	24087	20	78.1	H. E. M.

Magnetic observations on land—Continued.

NEW MEXICO—Continued.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
Springer, aux. 3.....	36 17.4	104 38.5	Ap 4	14 14.1	64 26.2	24543	20	78.1	H.E.M.
Springer, aux. 1.....	36 19.6	104 29.9	Ap 3	13 46.8	64 29.9	24486	20	78.1	H.E.M.
Springer, aux. 4.....	36 21.8	104 43.8	Ap 4	14 15.5	64 39.3	24291	20	78.1	H.E.M.
Springer.....	36 22.5	104 37.4	Ap 2	14 53.4	64 30.4	24460	20	78.12	H.E.M.
Springer, aux. 2.....	36 27.0	104 35.3	Ap 4	14 17.5	65 10.9	23855	20	78.1	H.E.M.
Ute Park.....	36 33.9	105 06.2	Ap 7	13 43.6	64 39.7	24174	20	78.12	H.E.M.
Tierra Amarilla.....	36 40	106 32.5	Ap 21	14 10.0	64 32.1	24171	20	78.12	H.E.M.
Shiprock.....	36 47.2	108 40.6	Ap 25	14 16.8	64 35.4	24134	20	78.12	H.E.M.
Aztec.....	36 50	107 59.8	Ap 25	14 24.8	64 27.7	24258	20	78.12	H.E.M.

NORTH CAROLINA.

	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	M.	D. C.	Observer.
Rockingham, aux. 2.....	34 51	79 47	Jy 23	1 45.8	66 52.2	22150	17	15.1	J.R.B.
Wadesboro, aux. 4.....	34 53	80 05.3	Jy 17	0 22.0	66 37.6	22648	17	15.1	J.R.B.
Rockingham.....	34 56.8	79 45.3	Jy 19, 20	1 25.4	67 39.4	21474	17	15.12	J.R.B.
Rockingham, aux. 1.....	34 57	79 52	Jy 23	2 36.1	68 26.0	20773	17	15.1	J.R.B.
Wadesboro.....	34 57.8	80 04.4	Jy 13, 14	0 54.0	67 17.6	21802	17	15.12	J.R.B.
Wadesboro, aux. A.....	34 57.8	80 04.4	Jy 13	0 58.3	.....	.....	17	.....	J.R.B.
Rockingham, aux. 3.....	34 58	79 39.0	Jy 23	1 55.0	67 22.4	21833	17	15.1	J.R.B.
Wadesboro, aux. 1.....	34 58	79 59	Jy 16	0 52.2	68 10.3	21191	17	15.1	J.R.B.
Wadesboro, aux. 3.....	35 00	80 12.6	Jy 17	1 25.7	67 08.2	22022	17	15.1	J.R.B.
Wadesboro, aux. 2.....	35 02	80 04.3	Jy 16	1 20.8	67 17.6	21899	17	15.1	J.R.B.
Rockingham, aux. 4.....	35 03	79 44	Jy 24	1 50.8	67 21.8	21790	17	15.1	J.R.B.
Aberdeen.....	35 07.0	79 26.2	Jy 25, 26	1 47.6	67 26.1	21834	17	15.12	J.R.B.
Goldshoro.....	35 22.0	77 58.3	Jy 31	2 44.8	67 45.8	21431	17	15.12	J.R.B.
Raleigh.....	35 48.0	78 40.6	Jy 27	2 57.7	68 04.9	21353	17	15.12	J.R.B.

OKLAHOMA.

	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	M.	D. C.	Observer.
Stillwell.....	35 49	94 38	My 16, 17	8 26.0	66 19.7	23159	38	36.12	W.M.H.
Jay.....	36 25.2	94 48.5	My 18, 19	8 39.0	66 55.7	22803	38	36.12	W.M.H.
Vinita.....	36 38.7	95 03.3	My 25	8 43.5	67 02.7	22770	38	36.12	W.M.H.

OREGON.

	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	M.	D. C.	Observer.
Gold Beach.....	42 25	124 25.0	Se 7	21 16.9	65 50.0	22518	20	78.25	H.E.M.
Langlois.....	42 55.7	124 27.0	Se 5, 6	21 15.0	66 12.6	22318	20	78.25	H.E.M.
Cokuille.....	43 11	124 11	Se 3, 4	20 33.3	66 14.7	22204	20	78.25	H.E.M.
Elkton.....	43 37.7	123 33.8	Se 1	21 58.4	66 58.0	21882	20	78.25	H.E.M.
Reedsport.....	43 42.1	124 06.8	Au 31	21 14.4	67 24.8	21690	20	78.25	H.E.M.
Juntura.....	43 44	118 05.6	My 24, 25	20 17.1	68 34.4	20952	20	78.12	H.E.M.
Oakridge.....	43 45.1	122 27.5	Au 28	20 24.6	67 14.3	21883	20	78.25	H.E.M.
Oakridge, aux. A.....	43 45.1	122 27.5	Au 28	20 38.2	.....	.....	20	.....	H.E.M.
Oakridge, aux. B.....	43 45.1	122 27.5	Au 28	20 40.8	.....	.....	20	.....	H.E.M.
Eugene, aux. 4.....	43 53.6	122 54.0	Au 25	22 22.7	67 56.6	21713	20	78.2	H.E.M.
Vale.....	43 59	117 15	My 21, 22	21 31.0	68 48.1	20993	20	78.126	H.E.M.
Ontario.....	44 01.7	116 58.2	My 18	20 46.5	68 53.3	20861	20	78.126	H.E.M.
Eugene.....	44 03.5	123 05.5	Au 23	23 38.9	69 22.8	20301	20	78.25	H.E.M.
Eugene, aux. A.....	44 03.5	123 05.5	Au 23	22 42.2	.....	.....	20	.....	H.E.M.
Eugene, aux. B.....	44 03.5	123 05.5	Au 23	22 21.4	.....	.....	20	.....	H.E.M.
Bend.....	44 03.9	121 18.8	Jy 23	21 20.5	68 21.2	21104	20	78.25	H.E.M.
Eugene, aux. 3.....	44 04.0	122 46.8	Au 24	23 04.1	67 54.2	21586	20	78.2	H.E.M.
Eugene, aux. 1.....	44 04.4	122 58.6	Au 24	22 41.4	67 39.2	21674	20	78.2	H.E.M.
Eugene, aux. 2.....	44 04.4	123 05.0	Au 24	21 52.8	67 34.9	21646	20	78.2	H.E.M.
Eugene, aux. 5.....	44 05.8	123 03.1	Au 25	21 26.5	67 39.6	21632	20	78.2	H.E.M.
Brogan.....	44 14	117 30.9	My 25, 26	21 11.4	68 55.8	20769	20	78.12	H.E.M.
Huntington.....	44 20.9	117 17.0	My 29	21 30.2	68 56.9	20813	20	78.12	H.E.M.
Culver.....	44 32.4	121 11.4	Jy 21	22 00.2	68 22.0	20968	20	78.25	H.E.M.
Dallas.....	44 55.0	123 18.6	Au 21	21 39.1	67 53.6	21574	20	78.25	H.E.M.
Homestead.....	45 01.5	116 49.1	My 31	21 43.6	69 27.5	20321	20	78.12	H.E.M.

*Magnetic observations on land—Continued.*

OREGON—Continued.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
				<i>West.</i>					
Pacific City.....	45 12.4	123 57.8	Au 18	22 34.2	68 25.6	20734	20	78.25	H. E. M.
La Grande.....	45 19.6	118 05.4	Je 4	21 19.4	69 36.8	20249	20	78.12	H. E. M.
Oregon City.....	45 21.1	122 35	Jy 31	22 06.4	69 03.6	20442	20	78.25	H. E. M.
Enterprise.....	45 25.8	117 17.8	Je 5, 6	21 33.1	69 51.0	20190	20	78.12	H. E. M.
Tillamook.....	45 27.4	123 49.4	Au 16, 17	23 08.6	68 39.7	20859	20	78.25	H. E. M.
Hood River, aux. 5.....	45 30.0	121 39.8	Jy 29	22 49.7	69 11.2	20253	20	78.2	H. E. M.
Portland.....	45 31.0	122 42.6	Au 2	23 22.6	68 35.6	20886	20	78.25	H. E. M.
Hood River, aux. 4.....	45 36.0	121 31.8	Jy 29	20 52.4	69 10.4	20523	20	78.2	H. E. M.
Hood River, aux. 2.....	45 39.0	121 28.0	Jy 28	23 55.1	69 18.0	20222	20	78.2	H. E. M.
Pendleton.....	45 40.3	118 47.4	Je 8	21 58.4	69 22.0	20458	20	78.12	H. E. M.
Hood River, aux. 3.....	45 40.7	121 28.8	Jy 28	22 16.0	69 01.0	20792	20	78.2	H. E. M.
Mohler.....	45 42.1	123 53	Au 15	23 07.0	68 45.7	20650	20	78.2	H. E. M.
Hood River, aux. 1.....	45 42.5	121 31.4	Jy 27	22 38.1	68 52.1	20569	20	78.2	H. E. M.
St. Helens, aux. 4.....	45 42.7	122 53	Au 8	22 35.6	69 40.6	.....	20	78.2	H. E. M.
Hood River.....	45 43.2	121 32.2	Jy 25	21 20.6	69 14.6	20503	20	78.25	H. E. M.
Hood River, aux. A.....	45 43.2	121 32.2	Jy 25	21 32.8	.....	.....	20	.....	H. E. M.
St. Helens, aux. 3.....	45 46.6	122 52.2	Au 8	23 06.7	68 59.4	.....	20	78.2	H. E. M.
St. Helens.....	45 51.9	122 49.7	Au 6, 7	21 19.7	68 28.8	.....	20	78.25	H. E. M.
St. Helens, aux. 5.....	45 52.3	122 54	Au 8	23 53.8	69 25.6	.....	20	78.2	H. E. M.
St. Helens, aux. 2.....	45 52.3	122 50.9	Au 7	23 36.4	69 00.9	.....	20	78.2	H. E. M.
St. Helens, aux. 7.....	45 52.4	122 47.9	Au 9	21 13.6	69 44.4	.....	20	78.2	H. E. M.
St. Helens, aux. 1.....	45 53.6	122 49	Au 7	22 30.0	69 20.4	.....	20	78.2	H. E. M.
St. Helens, aux. 6.....	45 54.4	123 00	Au 6, 8	25 00.9	69 04.8	.....	20	78.2	H. E. M.

PORTO RICO.

Porto Rico Observa- tory.....	18 08.8	65 26.9	Year	<i>West.</i> 3 26.9	51 04.1	28057	31	1E1	F. L. A.
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SOUTH CAROLINA.

Barnwell, aux. 2.....	33 05	81 20	Je 23, 29	0 23.8	65 10.3	23430	17	15.1	J. R. B.
Barnwell, aux. 8.....	33 11	81 11	Je 25	0 05.9	65 21.8	23458	17	15.1	J. R. B.
Barnwell, aux. 1.....	33 11	81 20	Je 23	<i>East.</i> 1 00.2	66 02.6	23032	17	15.1	J. R. B.
Barnwell, aux. 7.....	33 14	81 17.3	Je 25	<i>West.</i> 1 17.5	65 24.3	23480	17	15.1	J. R. B.
Barnwell, aux. 6.....	33 14	81 32	Je 25	<i>East.</i> 0 52.4	65 46.4	22965	17	15.1	J. R. B.
Barnwell, aux. 5.....	33 14	81 26	Je 25	1 42.1	66 45.1	22213	17	15.1	J. R. B.
Barnwell.....	33 15.1	81 22.5	Je 22	1 05.7	66 25.8	22460	17	15.12	J. R. B.
Barnwell, aux. 3.....	33 19	81 17	Je 23	0 19.0	66 06.0	22969	17	15.1	J. R. B.
Barnwell, aux. 4.....	33 21	81 15	Je 23	0 17.5	65 51.8	23032	17	15.1	J. R. B.
Salley.....	33 33.4	81 18.9	Je 26, 27	11 15.6	66 01.6	22938	17	15.12	J. R. B.
Columbia.....	34 03	81.02	Je 28, 29	0 17.5	66 54.0	22150	17	15.12	J. R. B.
MeBee.....	34 28.6	80 16.4	Jy 10, 11	<i>West.</i> 1 12.6	66 49.1	22250	17	15.12	J. R. B.
Laurens, new.....	34 29.9	82 02.6	Jy 3	0 11.3	66 40.8	22536	17	15.12	J. R. B.
Laurens, old.....	34 30	82 02	Jy 2	0 17.5	.....	.....	17	.....	J. R. B.
Chester, aux. 2.....	34 33	81 10	Jy 6	0 23.1	67 45.9	21640	17	15.1	J. R. B.
Chester, aux. 1.....	34 38	81 12.0	Jy 6	0 47.9	66 31.4	22734	17	15.1	J. R. B.
Chester.....	34 42.7	81 13.1	Jy 5	2 42.7	67 06.7	22246	17	15.12	J. R. B.
Chester, aux. A.....	34 42.7	81 13.1	Jy 5	2 49.4	.....	.....	17	.....	J. R. B.
Chester, aux. 5.....	34 43	81 11.2	Jy 7	<i>East.</i> 0 38.3	68 28.4	20941	17	15.1	J. R. B.
Chester, aux. 6.....	34 43	81 16.8	Jy 7	<i>West.</i> 0 39.8	66 56.6	22510	17	15.1	J. R. B.
Cheraw.....	34 43.1	79 54.0	Jy 12	1 02.8	67 01.8	22066	17	15.12	J. R. B.
Chester, aux. 7.....	34 44	81 07.0	Jy 9	7 07.8	66 16.2	23426	17	15.1	J. R. B.

## Magnetic observations on land—Continued.

## SOUTH CAROLINA—Continued.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
Chester, aux. 3.....	34 46	81 14	Jy 7	<i>East.</i> 0 00.5	66 41.3	22358	17	15.1	J.R.B.
Chester, aux. 8.....	34 46	81 11	Jy 9	<i>West.</i> 0 40.4	66 56.6	22313	17	15.1	J.R.B.
Chester, aux. 4.....	34 52	81 15	Jy 7	0 32.6	66 50.7	22416	17	15.1	J.R.B.

## TENNESSEE.

Memphis.....	35 08.3	90 00.7	Ap. 3, 5	<i>East.</i> 5 34.0	66 25.0	23166	38	36.12	W.M.H.
Athens.....	35 27.0	84 35.7	Mh 27	0 32.1	66 48.0	22695	38	36.12	W.M.H.
Knoxville, old.....	35 56	83 57	Mh 21	<i>West.</i> 0 21.1	67 14.7	22337	38	36.12	W.M.H.
Knoxville, new.....	35 56	83 57	Mh 23, 24	0 25.8	67 24.8	22278	38	36.12	W.M.H.

## TEXAS.

Amarillo.....	35 11.7	101 49.6	Mh 22	<i>East.</i> 12 19.0	64 17.6	24638	20	78.12	H.E.M.
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## UTAH.

Green River.....	38 59.4	110 10.2	My 12	16 14.2	66 11.4	23010	20	78.26	H.E.M.
Ogden.....	41 13.1	111 59.9	My 15	18 10.0	67 33.5	22041	20	78.26	H.E.M.

## WASHINGTON.

Cathlamet, aux. 1.....	46 10.2	123 19.0	Au 13	<i>East.</i> 24 26.6	69 38.7	.....	20	78.2	H.E.M.
Cathlamet, aux. A.....	46 11.8	123 23	Au. 11	25 23.4	.....	.....	20	.....	H.E.M.
Cathlamet.....	46 11.8	123 23	Au. 11	24 28.6	69 40.4	.....	20	78.25	H.E.M.
Prosser.....	46 12.3	119 45.2	Jy 18, 19	22 42.1	70 01.4	19871	20	78.25	H.E.M.
Cathlamet, aux. 2.....	46 13.6	123 20.1	Au. 13	25 00.2	69 53.2	.....	20	78.2	H.E.M.
Pasco.....	46 13.8	119 05.1	Je 11	22 12.8	70 31.4	19456	20	78.12	H.E.M.
Cathlamet, aux. 4.....	46 16	123 26	Au. 13	25 14.2	.....	.....	20	.....	H.E.M.
Cathlamet, aux. 3.....	46 16.2	123 19.1	Au. 13	25 04.2	69 58.8	.....	20	78.2	H.E.M.
Connell.....	46 39	118 49.8	Je 13, 14	23 34.5	70 53.0	19092	20	78.12	H.E.M.
Cle Elum.....	47 12	120 56	Jy 16	23 29.7	70 28.6	19424	20	78.25	H.E.M.
Eagle Gorge.....	47 16.0	121 45.7	Jy 14	23 52.8	70 02.4	19503	20	78.2	H.E.M.
Ephrata.....	47 19.6	119 31.7	Je 15	22 56.9	71 15.8	19169	20	78.125	H.E.M.
Wenatchee.....	47 25.0	120 20	Jy 4, 5	23 12.1	70 59.6	19062	20	78.25	H.E.M.
Seattle.....	47 33.1	122 15.2	Mh 22, 31	23 47.0	70 37.9	19206	4	33.12	H.W.P.
Seattle.....	47 33.1	122 15.2	Jy 12	23 44.6	70 37.1	19210	20	78.25	H.E.M.
Restoration Point.....	47 35.1	122 28.7	Fe 24, 26	24 14.4	70 34.3	19296	4	33.12	H.W.P.
Waterville.....	47 38.4	120 02.8	Jy 6	23 18.6	71 05.4	18968	20	78.25	H.E.M.
Davenport.....	47 40.0	118 08.9	Je 20	23 54.6	70 45.6	19645	20	78.125	H.E.M.
Berlin.....	47 43.0	121 23.7	Jy 10	23 13.0	71 02.5	18959	20	78.25	H.E.M.
Wilbur, aux. 4.....	47 43.0	118 41.0	Je 19	24 38.3	72 50.9	17573	20	78.2	H.E.M.
Spokane.....	47 43.1	117 31.2	Je 22	23 43.0	71 41.5	18606	20	78.125	H.E.M.
Wilbur, aux. A.....	47 46	118 42	Je 18	23 21.8	.....	.....	20	.....	H.E.M.
Wilbur, aux. B.....	47 46	118 42	Je 18	23 41.5	.....	.....	20	.....	H.E.M.
Wilbur, aux. 1.....	47 46.4	118 37.2	Je 19	21 28.6	71 51.1	18809	20	78.2	H.E.M.
Wilbur, aux. 2.....	47 46.4	118 47.4	Je 19	23 08.8	71 09.5	18917	20	78.2	H.E.M.
Wilbur.....	47 46.5	118 42.4	Je 18	24 58.0	71 45.1	18730	20	78.125	H.E.M.
Wilbur, aux. 3.....	47 50	118 41.7	Je 19	23 10.3	71 36.0	18523	20	78.2	H.E.M.
Springdale.....	48 04.0	117 45.2	Je 25, 26	23 56.7	71 59.4	18244	20	78.125	H.E.M.
Fateros.....	48 03.6	119 53.7	Jy 2, 3	24 00.5	71 16.4	18850	20	78.25	H.E.M.
Okanogan.....	48 22.0	119 35.4	Je 29, 30	24 01.2	71 40.0	18496	20	78.125	H.E.M.
Republic.....	48 38.8	118 44.2	Je 27	24 50.0	72 03.0	18214	20	78.125	H.E.M.

*Magnetic observations on land—Continued.*

WISCONSIN.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Instruments.		Observer.
							M.	D. C.	
				<i>East.</i>					
Delavan, aux. 5.....	42 34.3	88 33.3	Jy 27	2 03.0	72 57.3	17937	19	56.13	W. W. M.
Delavan, aux. 6.....	42 34.9	88 40.6	Jy 30	2 11.3	72 57.7	18094	19	56.13	W. W. M.
Delavan, aux. 1.....	42 36.8	88 36.2	Jy 25	1 45.0	72 59.4	18044	19	56.13	W. W. M.
Delavan, aux. 2.....	42 37.1	88 31.1	Jy 30	1 33.4	72 57.8	17914	19	56.13	W. W. M.
Delavan, aux. 4.....	42 37.6	88 40.7	Jy 26	2 33.2	73 09.0	17998	19	56.13	W. W. M.
Delavan.....	42 38.5	88 38.2	Jy 21	1 50.6	73 07.8	17985	19	56.13	W. W. M.
Delavan, aux. 3.....	42 39.0	88 40.6	Jy 26	2 56.8	73 13.9	17879	19	56.13	W. W. M.
Pecks Station, aux. 5.	42 39.7	88 24.8	Au 4	2 31.2	73 12.8	17658	19	56.13	W. W. M.
Pecks Station, aux. 2.	42 44.0	88 37.7	Au 3	2 40.0	73 41.8	17391	19	56.13	W. W. M.
Pecks Station.....	42 44.4	88 30.8	Jy 31	1 06.8	73 42.8	17178	19	56.13	W. W. M.
Pecks Station, aux. 4.	42 44.8	88 24.2	Au 4	2 25.1	73 28.0	17454	19	56.13	W. W. M.
Pecks Station, aux. 1.	42 46.1	88 33.0	Au 3	0 23.4	73 42.6	17144	19	56.13	W. W. M.
Pecks Station, aux. 3.	42 49.9	88 24.7	Au 6	2 20.8	73 33.6	17392	19	56.13	W. W. M.
Milwaukee.....	43 04.0	87 52.3	No 6	3 00.2	73 54.8	17127	19	56.13	W. W. M.
Port Washington, aux. 1.....	43 19.2	87 54.0	No 2	2 22.2	74 20.2	16596	19	56.1	W. W. M.
Port Washington, aux. 5.....	43 21.2	88 05.0	No 4	4 55.2	74 20.6	16701	19	56.1	W. W. M.
West Bend, aux. 2.....	43 21.6	88 12.1	Oct 25	3 36.5	74 01.0	16877	19	56.1	W. W. M.
Port Washington, aux. 2.....	43 23.0	87 58.8	No 3	2 31.8	74 24.3	16548	19	56.1	W. W. M.
Port Washington.....	43 23.8	87 52.7	No 1	1 35.8	74 09.0	16736	19	56.13	W. W. M.
West Bend, aux. 4.....	43 24.7	88 04.7	Oct 27	4 30.2	74 21.6	16604	19	56.1	W. W. M.
West Bend, aux. 1.....	43 25.6	88 16.3	Oct 24	3 20.3	74 09.2	16837	19	56.1	W. W. M.
West Bend.....	43 25.7	88 10.7	Oct 20	3 40.2	74 22.4	16706	19	56.13	W. W. M.
Port Washington, aux. 3.....	43 28.2	87 56.5	No 3	2 09.0	74 19.0	16568	19	56.1	W. W. M.
Port Washington, aux. 4.....	43 28.2	87 49.3	No 4	2 44.4	74 14.4	16756	19	56.1	W. W. M.
West Bend, aux. 3.....	43 31.0	88 12.0	Oct 25	3 12.4	74 33.6	16552	19	56.1	W. W. M.
Valley Junction.....	44 03.4	90 23.4	Au 11	4 58.8	74 37.7	16260	19	56.13	W. W. M.
New London.....	44 22.8	88 44.7	Oct 15	3 13.2	74 49.8	16057	19	56.13	W. W. M.
Mondovi.....	44 34.6	91 42.3	Au 20	5 28.9	74 32.8	16468	19	56.13	W. W. M.
Fairchild.....	44 36.3	90 58.5	Au 17	4 58.7	74 41.4	16268	19	56.13	W. W. M.
Eland.....	44 52.1	89 12.4	Oct 13	3 20.8	74 47.4	16151	19	56.13	W. W. M.
Hudson, aux. 3.....	44 54.2	92 40.2	Au 30	5 50.6	74 38.4	16402	19	56.13	W. W. M.
Hudson, aux. 2.....	44 56.2	92 46.3	Au 29	7 28.6	74 54.0	16586	19	56.13	W. W. M.
Hudson, aux. 4.....	44 56.7	92 38.1	Au 30	6 09.8	74 36.2	16397	19	56.13	W. W. M.
Woodville.....	44 57.2	92 17.0	Au 22	6 06.1	74 48.7	16287	19	56.13	W. W. M.
Hudson, aux. 1.....	44 58	92 48.3	Au 29	7 00.4	74 43.2	16380	19	56.13	W. W. M.
Hudson, old.....	44 58.1	92 44.4	Au 25	3 35.0	74 34.4	16749	19	56.13	W. W. M.
Hudson, new.....	44 58.6	92 44.0	Au 28	3 52.6	74 38.6	16644	19	56.13	W. W. M.
Hudson, aux. 5.....	44 59.3	92 41.3	Au 31	3 34.1	74 39.1	16473	19	56.13	W. W. M.
Hudson, aux. 6.....	45 01.0	92 38.9	Au 31	4 50.1	74 33.4	16444	19	56.13	W. W. M.
Rhineland, aux. 4.....	45 34.2	89 26.5	Oct 6	4 29.3	75 21.1	15735	19	56.1	W. W. M.
Rhineland, aux. 3.....	45 35.8	89 20.7	Oct 6	0 12.4	75 22.4	15738	19	56.1	W. W. M.
Rhineland.....	45 38.0	89 23.9	Oct 3	0 02.0	76 05.0	15308	19	56.13	W. W. M.
Rhineland, aux. 2.....	45 40.5	89 28.3	Oct 8	3 28.0	76 33.4	14985	19	56.1	W. W. M.
Spooner, aux. 7.....	45 42.8	91 48.2	Se 16	5 01.1	75 30.9	15489	19	56.1	W. W. M.
Rhineland, aux. 1.....	45 44.9	89 20.2	Oct 7	3 20.7	75 40.6	15377	19	56.1	W. W. M.
Spooner, aux. 2.....	45 46.2	91 53.9	Se 10	4 09.9	75 20.0	15723	19	56.1	W. W. M.
Spooner, aux. 3.....	45 48.8	91 46.0	Se 11	4 51.4	75 27.0	15572	19	56.1	W. W. M.
Spooner.....	45 49.7	91 53.8	Se 7	3 32.0	75 19.0	15809	19	56.13	W. W. M.
Spooner, aux. 1.....	45 49.8	91 59.3	Se 10	4 21.6	76 00.6	15511	19	56.1	W. W. M.
Spooner, aux. 5.....	45 50.4	92 06.7	Se 15	5 02.6	76 02.1	15197	19	56.1	W. W. M.
Woodruff.....	45 53.3	89 41.9	Oct 1	3 18.2	75 57.0	15028	19	56.13	W. W. M.
Spooner, aux. 4.....	45 54.1	91 53.3	Se 11	2 16.2	75 38.4	15460	19	56.1	W. W. M.
Spooner, aux. 8.....	45 54.5	91 44.5	Se 16	4 39.4	75 17.6	15749	19	56.1	W. W. M.
Spooner, aux. 6.....	45 58.2	91 57.1	Se 17	1 29.7	74 57.7	16272	19	56.1	W. W. M.
Mercer.....	46 10.6	90 05.0	Se 25	4 59.6	76 24.2	14628	19	56.13	W. W. M.
Drummond.....	46 20	91 15.2	Se 19	4 58.4	76 24.1	14846	19	56.13	W. W. M.
Moore.....	46 20.9	90 30.1	Se 23	9 55.6	77 56.0	12948	19	56.13	W. W. M.
Marengo.....	46 26.2	90 48.9	Se 21	4 45.3	76 13.6	14912	19	56.13	W. W. M.

*Magnetic observations at sea.*

## PACIFIC OCEAN.

Station.	Lat.	Long.	Date.	Decl'n.	Dip.	Hor. int.	Total int.	Ship.	Headings.	Sea.
	° ' "	° ' "		<i>East.</i> ° ' "	° ' "	<i>c. g. s.</i> 0.1853	<i>c. g. s.</i> 0.5875			
Straits of Georgia..	49 34	124 31	Ap 28	24 21	71 37			Patterson.	8	Sm.
Queen Charlotte Sound.....	51 05	127 48	Ap 29	26 44	71 59	.1802	.5825	.....do.....	8	Lt. sw.
Lama Passage.....	52 04	128 06	Ap 29	28 18	72 45	.1733	.5843	.....do.....	8	Sm.
Millbank Sound.....	52 24	128 33	Ap 30	28 34	73 31	.1636	.5765	.....do.....	16	Sm.
Fraser Reach.....	53 10	128 36	Ap 30	29 13	73 30	.1662	.5852	.....do.....	8	Sm.
Chatham Sound....	54 15	130 30	My 1	29 26	74 01	.1603	.5820	.....do.....	8	Sm.

## DESCRIPTIONS OF STATIONS.

Magnetic observers are instructed to mark each station (except auxiliary stations for development of local disturbance) in as permanent a manner as possible, either with a stone, a draintile filled with cement, or a post of some durable wood, so that it may be available for future occupation. They are also required to furnish a sufficiently detailed description to locate the station even if the marking should be destroyed, and to determine the bearings of two or three prominent objects in addition to the one used as a reference mark in the azimuth and declination observations. The information is given in abridged form on the following pages. Further details can usually be obtained upon application to the Superintendent of the Coast and Geodetic Survey.

The usual method of marking a station is by a stone post about 30 inches long and 6 inches square, set so as to project 2 or 3 inches above the ground. In the center of the top is set a circular bronze plate  $3\frac{1}{4}$  inches in diameter.

When the local authorities desire it and are willing to bear the expense, a second stone is set to mark the true meridian.

The descriptions of stations are arranged alphabetically by States and by names of stations.

## ALABAMA.

*Huntsville, Madison County.*—The station of 1914 was reoccupied. It is in the southwestern part of the public-school grounds, about one-half mile northeast of the courthouse square. The station is 75.5 feet from the southwest corner of the schoolhouse, 18.4 feet south and east from a large oak tree 4 or 5 feet in diameter, and 50.9 feet from the center of the brick sidewalk on Calhoun Street. It is marked by a limestone post 5 by 5 by 24 inches, lettered U. S. 1910, and projecting 1 inch above ground. The following true bearings were determined in 1910:

Spire of Episcopal Church (mark).....	30 51.5 west of south
Point of gable cornice of large business building seen just over hip roof of small dwelling.....	49 42.3 west of south
Peak of tower of Dallas mill.....	3 13.7 west of north

ARIZONA.

*Yuma, Yuma County.*—The station of 1914 was reoccupied. It is on the grounds of the Indian school across the Colorado River from Yuma. The buildings of the school are on a hill. The magnetic station is on a shoulder of this hill at the west end. It is 70 yards down the slope of the hill from a small gateway, which is the west entrance to the grounds. It is 12 feet north of the middle of a path which leads from this gateway down over the shoulder of the hill; also 119.4 feet from a bench mark of the United States Reclamation Service, consisting of brass plate set in the top of a 3-inch iron pipe extending about 18 inches above ground. The station is marked by a brass magnetic station mark set in cement in the end of a 6-inch sewer tile 24 inches long and extending about 2 inches above the ground. The following true bearings were determined in 1914 and 1917:

Base of flagstaff on courthouse (mark).....	21	13.9	west of south
United States Reclamation Service bench mark.....	0	08.9	east of south
Tip of dome on Yuma grammar-school building.....	16	16.2	west of south
Highest point of Cago Muchacho Mountain.....	42	12.0	west of north
Highest point of Picacho Mountain.....	9	09.2	west of north
Ball at apex of elevated steel water tank beyond concrete canal.....	63	32.1	west of north
Left edge of corner post at northwest corner of school building.....	89	45.1	east of north

ARKANSAS.

*Booneville, Logan County.*—The station is about one-fourth mile northwest from the center of the town in the eastern part of the high-school grounds. It is 85.5 feet west from the east fence of the grounds; 55.5 feet southwest from the center of the trunk of the most southern of a grove of large oak trees, and about 245 feet north from the south fence of the grounds. It is marked by a limestone post 6 by 6 by 24 inches, with a bronze plate set in the top, which is about 2 inches above the ground. The following true bearings were determined:

Top of courthouse cupola (mark).....	47	26.6	east of south
Upper west edge of railroad water tank.....	37	59.6	west of south
Lower southeast corner of east tower of high-school building.....	76	59.2	west of south
North gable of Church of Christ, under shingles.....	56	27.8	east of south

*Greenwood, Sebastian County.*—The station is about one-fourth mile southwest from the center of the town in the southern part of a pasture belonging to the Harpers and bounded on the east by the tracks of the Midland Valley Railroad and on the southwest corner of the lumber yard's southern shed, 30 feet north from a row of fence posts, about 95 feet north from the creek, and about 265 feet west from the tracks of the Midland Valley Railroad. It is marked by a stone post 6 by 5 by 25 inches with a bronze disk set in the top, which is about 2 inches above the ground. The following true bearings were determined:

Top of Methodist Church steeple (mark).....	1	47.0	west of north
Top of courthouse cupola.....	32	37.7	east of north
Highest point of Baptist Church tower.....	6	20.3	west of north
East gable of Presbyterian Church.....	25	22.7	west of north

## ARKANSAS—continued.

*Tyronza, Poinsett County.*—The station is about one-fourth of a mile southeast from the center of the town in the southern part of the pasture southeast across the railroad tracks from the St. Louis-San Francisco Railway station. It is about 800 feet southeast from the station. It is not marked.

*Yellville, Marion County.*—The station of 1905 was reoccupied. It is about one-fourth mile northwest from the town's center in the eastern part of the public-school grounds. It is 150 feet northeast from the northeast corner of the school building, 27.8 feet from the east fence, 13.7 feet east from the center of the trunk of an oak tree, and 55.2 feet south from the center of the trunk of another oak tree. It is marked by a cotton-rock post 4 by 8 by 32 inches, with its top flush with the ground, and lettered U. S. 1917, with a hole in the center. The following true bearings were determined:

West gable of Masonic Temple (mark).....	69	04.2	east of north
Center of southeast corner of schoolhouse.....	55	34.0	west of south
Lower northwest corner of schoolhouse above founda- tion.....	80	38.6	west of south

Six auxiliary stations were also occupied. Station No. 1 is about 1,000 feet southeast from the primary magnetic station, and about 300 feet west from the Methodist Church. No. 2 is about  $4\frac{1}{2}$  miles southeast from the primary magnetic station and about 500 feet south from the deserted store marked Cowan on the map. It is just beyond the turn where the wagon road running northeast turns to the southeast and on the west side of the road. No. 3 is near the center of the village of Kingdon Springs, about 250 feet south from the deserted store on the east side of the main road. No. 4 is about 500 feet southeast from the center of the new town of Rush, as distinguished from the old town. It is about 800 feet east from the Brockman Hotel and about 300 feet northeast from the Golden Rule store. It is  $12\frac{1}{2}$  miles southeast from the primary magnetic station. No. 5 is in an open space about 1,000 feet a little west of south from the center of the town of Cotter, about 200 feet south from the tracks of the St. Louis, Iron Mountain & Southern Railway and about 500 feet southwest from the Commercial Hotel. No. 6 is about 200 feet west from the center of the town of Zinc; about 300 feet northwest from the railroad station; about 500 feet southeast from the railroad water tank, and about 140 feet southwest from the railroad track. It is in an open space on the east bank of the creek.

## CALIFORNIA.

*Alderpoint, Humboldt County.*—The station is at the intersection of two streets (proposed) one block west and one block north of the hotel and post office. It is about 600 feet southwest of the depot and is not marked.

*Barstow, San Bernardino County.*—The station of 1914 could not be recovered, but the new station is but a short distance from the old one. It is 205 feet north of the fence between the railroad yards and the highway, 312 feet west of the highway to the east; 360 feet from the nearest corner of the concrete pier of the steel bridge across the Mohave River, and 90 feet south of the river bank. The station is marked by a piece of red tufa rock about 10 by 10 by 30 inches, projecting 6 inches above the ground, the highest point marking the spot. The following true bearings were determined:

Upper east edge of eastern one of three iron tanks (mark).....	38	24.5	east of south
Center of left-hand smokestack at factory.....	32	11.1	east of south
West gable of long frame building in railroad yards....	13	58.8	east of south
Ball at apex of dome on southeast corner of the Harvey Hotel.....	41	10.8	west of south
Apex of distant mountain.....	18	49.4	west of north

CALIFORNIA—continued.

*Brown, Kern County.*—The station is on the desert 400 feet northeast of the depot and 200 feet east of the Southern Pacific Railroad track. It is not marked.

*Cartago, Inyo County.*—The station is on the desert one-fourth mile southeast of the switch and 800 feet east of the Southern Pacific track. It is also about one fourth mile from the southwest corner of Owens Lake. It is not marked.

*Cloverdale, Sonoma County.*—The station is on the side hill 250 feet southeast of the depot and 150 feet east of the Northwestern Pacific Railroad track. It is not marked.

*Crescent City, Del Norte County.*—The station is near the southwest corner of the city park or camp grounds about 1.5 miles northwest of the center of the town. It is 153 feet north of the fence on the south side of the park; 82 feet west of a small ravine running through the park; 250 feet southwest of the pump, and about 400 feet northeast of the cliff along the shore of the Pacific Ocean. It is marked by a bronze disk set in the top of a concrete monument 15 by 15 by 30 inches, projecting 6 inches above the ground. The following true bearings were determined:

Spire on lighthouse tower (mark).....	34 59.4 east of south
North gable of lighthouse.....	35 14.0 east of south
Extreme right edge of perpendicular cliff on rocky island beyond lighthouse.....	29 59.5 east of south
Southwest corner of large residence.....	67 45.9 east of south
Flagpole near lighthouse.....	36 31.9 east of south

*Death Valley, Inyo County.*—The station is on the desert 500 feet southwest of the Tonopah & Tidewater depot and 300 feet west of the main track. It is not marked.

*Dos Rios, Mendocino County.*—The station is on the side hill between the hotel and the depot, about 500 feet from the depot and 200 feet from the hotel. It is also 75 feet north of a very large oak tree and is not marked.

*Eureka, Humboldt County.*—The station is near the southeast corner of Sequoia Park, 1 mile east and 2 miles south of the center of the city. It is 200 feet west of the fence on the east side of the park; 18 feet north of the south fence, and 65 feet southwest of the south corner of the band stand. It is marked by a bronze disk set in the top of a concrete monument 16 by 16 by 24 inches, projecting 6 inches above the ground. A concrete reference mark was set in line with the east fence. This mark is 6 by 6 by 12 inches, set flush with the ground, and 30 feet north of the southeast corner of the park. The following true bearings were determined:

Center of chimney on house two blocks to south (mark).....	15 17.0 east of south
Center mark on small concrete monument in line with east fence.....	86 21.3 east of north
Right edge of brick oven 300 feet distant.....	23 10.2 west of north

*Fort Bragg, Mendocino County.*—The station is near the southeast corner of the city park or camp grounds, about one-half mile south of the center of the town. It is 400 feet south of the fence around the ball park and 16 feet west of the fence on the east side of the park. It is not marked.

*Hanford, Kings County.*—The station is near the center of the county fair grounds, 1 mile west of the center of the city. It is in line with the west side of the grand stand and 110 feet south of its southwest corner; 65 feet west of the fence around the race track, and 104 feet east of the east side of the long barn on the west side of the grounds. It is marked by a round marble post 8 inches in diameter by 30 inches long lettered

## CALIFORNIA—continued.

“U. S. 17” center marked and set flush with the ground. The following true bearings were determined:

Methodist Episcopal Church spire (mark).....	83	08.5	east of south
Iron flag pole on courthouse yard.....	81	31.2	east of south
Holland Church spire.....	71	01.6	east of north
Left edge of large post at southwest corner of deer park.	7	53.6	west of north
Left edge of brick chimney on ward building at hospital.....	59	09.2	east of south

*Independence, Inyo County.*—The station is near the northeast corner of the grammar-school grounds, one-fourth mile northeast of the center of the town. It is 23.5 feet south of the north fence; 44 feet west of the east fence; in line with the east side of the school building, and 98 feet from its northeast corner. It is marked by a rough granite post 6 by 6 by 14 inches with a center mark and sets flush with the ground. The following true bearings were determined:

Left edge of county courthouse (mark).....	12	56.1	west of south
Spire on courthouse tower.....	17	08.9	west of south
Southeast corner of Mr. Mair's residence.....	80	44.7	west of north
Left edge of chimney on the Robison residence, one block east of schoolhouse.....	85	58.7	east of south

*Indio, Riverside County.*—The station of 1905 was reoccupied, 700 or 800 feet a little east of south of the Southern Pacific Railroad station. It is two blocks east of the schoolhouse and north of a road running east and west. It is 187.7 feet from a fence to the south; 235.8 feet from a fence to the west, and 58 yards from the third telephone pole east of the street running south from the railroad past the schoolhouse. The station is marked by a discarded brass or bronze pressure tank, about 15 inches long, one end having a three-fourths inch hole in the center. This end was placed up, the center of the hole marking the exact spot. It was covered by a heap of earth about 2½ feet high. The following true bearings were determined in 1905 and 1917:

Tip of railroad water tank west of station (mark).....	11	10.1	west of north
Tip of railroad water tank east of railroad station.....	21	40.8	east of north
Highest point on near-by mountain range.....	58	10.8	west of south
Tip of north gable of O. W. Moore's house.....	51	21.6	west of south
Right edge of Mr. Shirlitz's cottage.....	70	36.4	west of north

*Lakeport, Lake County.*—The station is near the northwest corner of the courthouse square near the center of the town. It is 8.4 feet south of the south edge of the cement curb on the north side of the square; 8 feet east of the east edge of the curb on the west side, and 11.7 feet from the intersection of these two edges. It is marked by a bronze disk set in the top of a concrete monument 12 by 12 by 40 inches, projecting 8 inches above the ground. The following true bearings were determined:

Southeast corner of Levi's brick store building (mark).....	78	28.6	east of north
Northwest corner of the Levi block (2nd floor).....	88	35.6	east of north
Spire on east gable of the Allen house.....	18	02.3	west of south
South edge of base of flagpole on grammar-school grounds.....	76	34.8	west of north
Spire on cupola of grammar school.....	69	30.4	west of north

CALIFORNIA—continued.

*Laws, Inyo County.*—The station is on a meadow 500 feet northeast of the depot and 150 feet east of the Southern Pacific Railroad. It is not marked.

*Montrio, Sonoma County.*—The station is on a hill one-fourth mile north of the center of the town. It is in line with a long bridge across the river and also in line with the south side of the church on the hill to the east. It is 150 feet southwest of a residence; 700 feet west of the above-mentioned church, and 100 feet north of the road along the foot of the hill. The station is not marked.

*Niland, Imperial County.*—The station is on the desert about 400 feet west of the Southern Pacific station. It is 175 feet south of the Southern Pacific Railroad track; 215 feet west of the west side of the walk on the east side of the street just west of the Southern Pacific Railroad station, and 62 feet southeast of the edge of a concrete culvert. It is not marked.

*Orick, Humboldt County.*—The station is in Robert Swan's clover field, about 1 mile west of the new hotel and post office. It is about 1,000 feet west of the east fence and 40 feet south of the fence along the road to the north. It is not marked.

*Point Reyes, Marin County.*—The station is near the northeast corner of the meadow below the hotel and belonging to the hotel company. It is 60 feet south of the north fence and 100 feet west of the east fence. It is not marked.

*Riverside, Riverside County.*—The station is on the grounds of the Polytechnic High School, 1 mile southeast of the center of the city. It is 93.3 feet northeast of the northeast corner of the science hall; 126.7 feet northeast of its southeast corner; 24.6 feet north of its north side produced, and 12.4 feet east of the center of a palm tree. It overlooks a large arroyo to the north and east. It is marked by a granite post 5 by 5 by 24 inches lettered U. S. and center marked, which projects 1 inch above the ground. The following true bearings were determined:

	o /	
Spire on the Grant school building (mark).....	21	17.6 west of north
Left edge of concrete chimney at southwest corner of large residence across the arroyo.....	86	20.2 east of north
Southeast corner of railing above roof on John Correja's residence.....	38	36.1 west of south
Extreme north edge of main school building (on bricks).....	77	55.9 west of north
Memorial cross on Rubidoux Mountain.....	43	21.3 west of north

*San Bernardino, San Bernardino County.*—The station of 1910 was reoccupied. It is in the southwest corner of the grounds of the county hospital, about 1 mile southwest of the courthouse. It is 70.3 feet east of a fence made with posts of driven piles and 76.5 feet north of another fence. The station is marked by a granite post 6 by 8 by 40 inches, projecting about 12 inches above ground, and lettered U. S. C. & G. S., 1910. The following true bearings were determined in 1914 and 1917:

	o /	
Upper northwest corner of main hospital building, edge of bricks (mark).....	59	08.9 east of north
Northwest corner of small cement building just under eaves of roof.....	66	22.3 east of north
Point of northwest corner post of railing above porch at north end of main building.....	58	16.9 east of north
Southeast corner of main building (on bricks).....	69	05.1 east of north

*Santa Ana, Orange County.*—The station is on property owned by Mr. E. L. Covington, about 1.5 miles west of the center of the city. It is 104 feet north of the northeast corner of Mr. Covington's house; 113 feet northeast of the northwest corner; 22 feet

## CALIFORNIA—continued.

north of a fence, and 14.5 feet west of the east property line. The station is marked by a round cedar post 6 inches in diameter and 24 inches long, projecting 2 inches above the ground. The following true bearings were determined:

Right edge of elevated tank (mark).....	0 49.3	east of north
Southwest corner of residence across street to south.	41 49.9	east of south
Right edge of chimney on Mr. Johnson's residence.	29 29.6	west of south

*Scotia, Humboldt County.*—The station is on a small hill at the east end of a street running by the Scotia Hotel. It is about one-fourth mile southeast of the center of the town. It is also in line with the southeast side of Fraternal Hall and 65 feet from its south corner. It is 30 feet from the fence at the end of the street. The station is not marked.

*Silver Lake, San Bernardino County.*—The station is on the desert 320 feet northwest of the northwest corner of the depot and 200 feet north of the main track of the Tonopah & Tidewater Railroad. It is not marked.

*Stockton, San Joaquin County.*—The station of 1914 was reoccupied. It is near the northwest corner of the rural cemetery, 2½ miles north of the courthouse. The azimuth station is marked by a marble post 4 by 4 by 48 inches, projecting 18 inches above the ground. It is lettered "U. S. C. & G. S. 1897, Magnetic Station." It is on a dike 16 feet south of the north fence and 30.5 feet from the northwest corner. The magnetic station is not marked, but is in line with the azimuth station and the Methodist Episcopal Church spire and 10 feet from the south face of the post and 31 feet from the west fence. The following true bearings were determined in 1914:

Spire of Central Methodist Episcopal Church (mark)..	6 22.4	east of south
Pole on roof of square tank house.....	14 52.5	west of south
Spire of small church.....	15 09.0	west of south
Apex of square tower.....	20 05.7	west of south
Upper northwest corner of car barn.....	9 38.9	west of south

*Tecopa, Inyo County.*—The station is on an alkali flat 200 feet northwest of the northwest corner of the Tonopah & Tidewater depot and 250 feet west of the main track. It is not marked.

## COLORADO.

*De Beque, Mesa County.*—The station is in an open lot near the south edge of town. It is 300 feet southwest of the southwest corner of the hotel; 340 feet west of the depot, and 15 feet north of the walk leading west from the depot. It is not marked.

*Durango, La Plata County.*—The station of 1905 was reoccupied. It is on the mesa about one-half mile northeast of the town, on land leased by the town near reservoir No. 1. It is 71.3 feet west of the southwest corner of the wooden fence surrounding reservoir No. 1, and 117.8 feet south of the southwest corner of a small wooden tower upon which is a water gauge. The station is marked by a 4-inch glazed pipe partly filled with cement. The cement is lettered U. S. The following true bearings were determined in 1905 and 1917:

Point at top of eastern clock on courthouse.....	49 49.4	west of south
Methodist Episcopal Church spire.....	50 23.0	west of south
First Presbyterian Church spire.....	58 24.0	west of south
Flagstaff on city hall cupola.....	53 49.8	west of south
Apex of steel water tank on side of mountain south- west of town.....	32 26.1	west of south

COLORADO—continued.

*Fort Garland, Costilla County.*—The station is one-tenth mile southeast of the center of the town. It is in an open lot, 220 feet south of the main railroad track, 15 feet east of an irrigation ditch, and 52 feet northeast of a lock in this ditch. It is not marked.

*Grand Junction, Mesa County.*—The station of 1905 was reoccupied. It is in the northeast corner of the fairgrounds, northeast of the race track and grand stand, and about 1½ miles northeast of the town. It is 102.7 feet south of the north fence of the fairgrounds, 215.7 feet west of the fence on the east, and 225.5 feet north of the outside fence on the north side of the race track. The station is marked by a sandstone post 6 by 6 by 30 inches, projecting about 3 inches above the ground and lettered U. S. C. & G. S., 1905. The following true bearings were determined in 1913 and 1917:

Left edge of rock exposure at tip of rounded mesa (mark).....	0 24.5 west of north
East gable of house.....	40 39.4 west of north
Flagpole on judge's stand.....	16 27.2 west of south
Perpendicular cliff at west end of mesa 6 miles distant.....	28 13.2 east of north
Right edge of brick chimney on house.....	13 21.6 east of north

*Paonia, Delta County.*—The station is near the southwest corner of the high-school grounds, one-fourth mile north of the center of the town. It is 80.9 feet southwest of the southwest corner of the high-school building, 16.4 feet southeast of the southeast corner of the grammar-school building. The north edge of the walk along the south side of the grounds if produced westward passes 24.3 feet south of the station. It is marked by a round concrete post 12 by 36 inches, projecting 4 inches above ground and having a bronze disk in the center of the top. The following true bearings were determined:

North gable of Lighthall's residence on high mesa (mark).....	16 15.3 east of south
Flagpole on cupola of grammar school.....	72 00.2 west of north
Northeast corner of grammar school.....	51 02.9 west of north
Left edge of brick residence just south of grammar school.....	58 10.3 west of south

*Rifle, Garfield County.*—The station is on the fairgrounds, one-half mile north of the center of the town and 15 rods north of Rifle Creek. It is 81 feet west of the board fence on the east side of the grounds; 140 feet northwest of the north corner of the grand stand, and in line with its east end. The station is not marked.

*San Luis, Costilla County.*—The station is near the northeast corner of the courthouse square and near the center of the town. It is 173 feet southeast of the northeast corner of the courthouse; 34 feet southwest of the center of a large cottonwood tree; and 35.8 feet northwest of the center of a second cottonwood tree. It is marked by a cement post 3 by 8 by 24 inches, center marked with cross and drill hole, projecting 4 inches above the ground. The following true bearings were determined:

Catholic Church spire (mark).....	10 33.6 east of north
Northeast gable of courthouse.....	63 25.9 west of north
Flagstaff on courthouse tower.....	81 38.9 west of north
North gable of Valdez's residence.....	46 45.7 west of south
Right-hand peak of Culebra Mountain.....	52 12.0 east of south

*Tercio, Las Animas County.*—The station is at the foot of a high hill and 300 feet south of the depot, 20 feet south of the bank of a stream, and one-fourth mile east of the center of the town. It is not marked.

## COLORADO—continued.

*Trinidad, Las Animas County.*—The station of 1914 was reoccupied. It is on a knoll near the center of a vacant lot, one-half mile southeast of the center of the town. It is near the center of Walnut Street produced northward, 30 feet from the brow of the knoll in all directions except south, and 225 feet north of the cement curb on the south side of Fifth Street. It is marked by a granite post 6 by 8 inches, projecting 8 inches above the ground, and center marked on top. The following true bearings were determined:

Simpson's rest monument on mesa (mark).....	35 53.2 west of north
Perpendicular cliff 4 miles distant.....	1 05.6 west of north
Cupola on school building.....	70 01.3 west of north
Jewish Synagogue spire.....	83 22.8 west of south
Apex of band stand in city park.....	26 26.5 west of north

Four auxiliary stations were occupied as follows: Auxiliary station No. 1 is on the side of the road 1 mile north of Elmore; No. 2 is just west of Sopris, about 20 rods south of the wagon-road bridge across Purgatory River; No. 3 is 1½ miles northeast of Gray Creek and 10 rods east of railroad; and No. 4 is about 4 miles northwest of the primary station in Powell Canyon.

## FLORIDA.

*Cross City, Lafayette County.*—The station is about 1 mile east of the town, on the south side of the road to Old Town. It is in a small clearing just opposite a wooden culvert 15 feet long on the Atlantic Coast Line Railroad, being the next culvert west of railroad milepost 117. The point is 325 feet south of the fence along the railroad right of way. The station is not marked.

*Gainesville, Alachua County.*—The station of 1915 was reoccupied. It is in the southeastern part of the campus of the University of Florida, about 2 miles west from the center of the town and about 650 feet east from the engineering building. It is 177.2 feet from the fence on the east boundary of the campus and 358 feet from the fence on the south boundary. The station is marked by a granite post 6 by 6 by 33 inches, projecting about 7 inches above the ground, and lettered U. S. C. & G. S., 1914. The following true bearings were determined in 1917:

Water tower at ice plant (mark).....	70 59.5 east of south
Spire of Presbyterian Church.....	81 30.2 east of north
Northernmost one of the eastern gables of the university commons.....	82 47.2 west of north
Southeast gable of Agricultural College building.....	80 59.9 west of north

A similar post about 400 feet distant marks the north end of a meridian line. The station together with the stone at the north end of the meridian line were disturbed by plowing in 1916. Both stones were reset.

*Newberry, Alachua County.*—The station is about one-half mile east of the town in an unfenced field full of scrub palmetto. The field is on the south side of the main highway between Newberry and Gainesville, opposite the 1-mile post. The station is 300 feet south of the south side of the highway and 360 feet northeast of an old railroad spur. It is nearly northeast from a deep pit or well, with two trees growing close to it near the track. It is not marked.

GEORGIA.

*Savannah, Chatham County.*—The station of 1914 was reoccupied. It is in the southwest corner of the pecan grove on the farm of William H. Robertson, head commissioner of parks and trees, and about 4 miles southeast from the business center of the town. It is between the third and fourth pecan trees from the west in the third row from the south; 19.9 feet east from the center of the trunk of this third tree, and 20.4 feet from the center of the trunk of this fourth tree. It is also 91 feet from the property line to the south and 120 feet from the property line to the west and about 300 feet south from the farmhouse. The station is marked by a marble post 5 by 6 by 36 inches, projecting about 7 inches above the ground, and having a brass magnetic station marker set in the top. The following true bearings were determined in 1914:

West knob at top of roof of Mr. Robertson's farmhouse	o /	
(mark).....	19	49.7 east of north
East knob at top of roof of Mr. Robertson's farmhouse..	22	06.8 east of north
Central point in a line of copper nails about 230 feet distant and about 5 feet above ground, in pine tree trunk.....	68	56.7 west of south
Cross of copper nails about 5 feet above ground, in a pine tree trunk about 180 feet distant.....	22	09.6 east of south

*Waycross, Ware County.*—The station of 1908 was reoccupied. The marble slab had been moved by mistake but replaced as nearly as possible in its original position. It is about 1½ miles northeast of the center of the town, in the northeastern corner of the grounds of the new Piedmont Institute. The station is about 11 feet northwest of a line between the northeast corner of the college building and a large pine tree at the northeast corner of the grounds. It is 87.7 feet southwest from the center of this pine tree and 190.6 feet northeast of the northeast corner of the college building. It is marked by a marble slab 2 by 6 by 28 inches, projecting about 6 inches above the ground, and lettered U. S. on the top and "1908" on one side. Auxiliary station A is about 295 feet south-southwest of the primary. The following true bearings were determined in 1917:

Courthouse spire (mark).....	o /	72	21.5 west of south
First African Methodist Episcopal Church.....	12	14.8 west of south	
West lightning rod on residence one-fourth mile distant	52	56.2 east of south	
East edge of top of water tower.....	59	08.2 west of south	

IDAHO.

*Preston, Franklin County.*—The station is in the fairgrounds, one-half mile north of the town's center. It is 85.5 feet southwest of the southwest corner of the exhibition hall; 18 feet north of the board fence on the south side of the grounds; 225.5 feet west of the board fence on the east side; 82 feet southeast of the edge of the track. It is marked by a bronze disk in the top of a round concrete post 12 by 24 inches, projecting 3 inches above ground. The following true bearings were determined:

Left edge of chimney on Mr. Bosworth's residence	o /	
(mark).....	26	50.1 west of north
East gable of house just west of above residence.....	34	05.0 west of north
Center of east dormer gable on house west of fairgrounds.....	87	58.0 west of north
Center of brick chimney on house just east of fairgrounds.....	43	01.5 east of north
Southeast corner of concrete-block house near northeast corner of fairgrounds.....	14	09.0 east of north

## ILLINOIS.

*Chatsworth, Livingston County.*—The station is in the Protestant cemetery, which is about three-fourths mile north and 1 mile east of the crossing of the Toledo, Peoria and Western Railway and the Illinois Central Railroad. It is in the southeast corner of the cemetery, 70.8 feet from the east fence and 91 feet from the south fence. It is marked by a bronze disk dated 1917, set in the top of a concrete post 7 by 7 by 30 inches, projecting 2 inches above the ground. The following true bearings were determined:

	° /	
Spire of Lutheran Church (mark).....	44 41.1	west of south
Center of the taller brick chimney at tile factory.....	89 12.7	west of south
Near gable of red barn at John Albert's.....	13 28.1	west of north
Near gable on cupola of barn at Theodore Weinan's....	79 48.3	east of north
Windmill tower at Stodard's farm.....	51 49.6	east of south

*Hoopeston, Vermilion County.*—The station is in the southeast corner of the McFerrer Park. It is 1 mile west and one-half mile south of the center of the town. It is 81.5 feet from the south fence of the park and 132.3 feet from the east fence and 39 feet east of the east side of an old concrete foundation for small house or flower bed. The station is marked by a limestone post 6 by 8 by 30 inches, with a bronze disk dated 1917 set in the top, and projecting 2 inches above the ground. The following true bearings were determined:

	° /	
Near gable on Mr. Waklan's farmhouse.....	5 03.7	west of south
Windmill on farm 2 or 3 miles distant.....	69 37.3	west of north
Tower on Hoopeston school building.....	39 51.5	east of north
Tip of tower of town clock.....	62 00.7	east of north
Tiptop of water tank at Sprague Co.'s plant.....	87 06.7	east of north

*Rochelle, Ogle County.*—The station is located in the Lawn Ridge Cemetery, lot No. 5, block 19. The station is marked by a bronze disk dated 1917 set in the top of a Bedford limestone post 6 by 8 by 30 inches, set flush with the ground. The following true bearings were determined:

	° /	
Center of chimney of Stocking Canning Co., three-fourths mile distant (mark).....	6 45.6	east of south
Tip of silo on Stocking Canning Co.'s farm, one-fourth mile distant.....	68 22.5	west of south
Center of silo at Old Sand Pitts farm, 3 miles distant..	0 38.2	east of north
Tip of silo at Mr. Lyman Birdsall's farm, 1 mile distant.	35 45.1	east of north
Center of chimney at city power plant.....	42 00.9	east of south

*Rockford, Winnebago County.*—The station of 1891 was reoccupied. It is in Cedar Bluff cemetery about 250 feet due east of the tool house; 22.2 feet from the iron fence along the north side of the cemetery, and 4 feet east of the line of trees along the north and south cemetery road, being about 15 inches from the southwest corner of lot 5, block 17. It is marked by a dressed limestone rock 5 by 5 inches, lettered U. S., set flush with the ground. The following true bearings were determined in 1917:

	° /	
Center of Hughston tombstone (mark).....	16 56.1	east of south
Center of round red granite tombstone, Churchill and Rogers.....	10 10.1	west of south
Center of chimney at ice plant.....	79 53.5	west of north
Center of window of brick barn at Neumeister's.....	7 43.1	west of north
Northwest corner of base of Bartholomew tombstone on hilltop east.....	76 40.9	east of south

ILLINOIS—continued.

*Saybrook, McLean County.*—The station is in the South Cemetery, about three-fourths mile southeast of the Lake Erie & Western Railroad depot. The station is near the middle of the west side of the cemetery, 50.9 feet from the west fence. It is in the middle of the pathway, which is a continuation of the main driveway that leads west through the cemetery from the main east entrance. It is just north of block No. 134 and 14 feet from the northeast corner of block No. 134 and 20.4 feet from the northeast corner of block No. 135, which is the block immediately west of block No. 134. It is marked by a bronze disk, dated 1917, set in the top of a Bedford limestone post 6 by 8 by 30 inches, projecting 2 inches above the ground. The following true bearings were determined:

	o /	
East gable of east barn at Wallace Joules (mark).....	4 47.8	east of south
East gable of Mr. H. Mostoller's new house.....	75 00.3	west of south
Center of chute on silo at William Rowe's barn.....	69 23.7	west of north
Lightning rod in middle of J. Marsh's barn roof.....	29 17.6	east of north
Center of top of south post at main east entrance to cemetery.....	88 06.7	east of north

*Streator, La Salle County.*—The station is located in the fairgrounds 2 miles north of the Chicago, Burlington & Quincy Railroad depot, and just west of their tracks. It is inside the race track and near the northwest corner of the plot of ground surrounded by the track. It is 201 feet from the north fence of the fairground proper, and is 98.5 feet from the north gate post of the northwest gate leading into this central plot of ground from the race track. It is marked by a bronze disk, dated 1917, set in the top of a Bedford limestone post 6 by 8 by 30 inches, projecting 2 inches above the ground. The following true bearings were determined:

	o /	
West edge at base of square brick chimney of mine No. 2.....	5 19.5	west of south
Center of pole on cupola of Floral Hall.....	88 44.5	west of south
Pole on cupola of Ed. Kuhn's barn.....	23 41.2	west of north
Tip of red silo at Dougherty's farm.....	73 45.9	east of north
Center of chimney of milk-bottle factory.....	58 37.4	east of south

*Urbana, Champaign County.*—The station of 1907 in the Roselawn Cemetery was reoccupied. It is 130.1 feet southwest from the southwest corner of the base of the John E. Strong monument and 30.6 feet from a small birch tree west of the station next to the driveway. It is in an alley on block E, between lots 19, 20, 21, and 22, near the center of the cemetery. It is marked by a bronze disk set in a limestone post flush with the ground. The disk is marked 1917. The following true bearings were determined:

	o /	
Point on tiptop of university barn, smaller one of the two.....	48 20.2	east of south
Tiptop of silo at barn on old Haine's homestead (1½ miles west).....	75 11.8	west of north
Middle (near) edge of square brick chimney at Yeate's greenhouse.....	24 29.7	east of north

IOWA.

*Cascade, Dubuque County.*—The station is about 1,000 feet east of the center of the town in the southeastern part of the city park, which is on the west bank of the river opposite to the Cascade mill. It is 63 feet northeast from the nearest edge of the sidewalk on the southwest border of the park, 142.2 feet southeast from the south corner of the park pavillion, and 145.8 feet northwest of the stone foundation of a barn. The station is marked by a bronze disk set in the top of a limestone post 7 by 12 by 18

IOWA—continued.

inches and flush with the surface of the ground. The following true bearings were determined:

	° /	
Northeast gable of a barn (mark).....	0	28.4 west of south
Center of northeast corner of the store on southwest corner of the intersection of street across the bridge and street on west side of the river.....	49	51.7 west of north
Center of southwest corner of the store at the north end of the street on the west side of the river.....	44	13.3 west of north
Lower northwest corner of the northwest corner post of the park pavilion .....	26	50.9 west of north

*Clinton, Clinton County.*—The station of 1908 was reoccupied. It is in Eagle Point Park, about 3½ miles north of Clinton, near the edge of the bluff of the Mississippi River. It is 105.5 feet from the southeast corner of the dance hall and 50 feet from the fence east of station running along the edge of the bluff. The station is marked by a Bedford limestone post 6 by 6 by 18 inches, sunk 2 inches below the surface of the ground, and lettered U. S. C. & G. S. The following true bearings were determined in 1908:

	° /	
Right edge of tall white monument in the cemetery west of the park.....	67	29.8 west of south
Right edge of northeast corner post of the dance-hall porch.....	62	37.7 west of north

In addition to the above, three auxiliary stations were occupied. Auxiliary No. 1 is about one-half mile south from the center of the town of Erie, Ill., and about 17.8 miles southeast of the primary. It is in the northeast corner of the first pasture beyond the last house on the west side of the road running south from the town's center, about 60 feet south of the north fence, and 75 feet west of the east fence. No. 2 is about 17 miles northeast of the primary station and about 1 mile southeast of the store called Pleasant Valley. It is also 7 miles north of Mount Carroll, Ill. No. 3 is about 13 miles southeast of the primary and one-half mile south of the center of the town of Round Grove. It is in the southeast corner of the field, on the south side of the inclosure, about the last house on the west side of the road running a little east of south from the town's center. It is about 75 feet from the south and east fences of the field.

*Columbus Junction, Louisa County.*—The station is about 1 mile south of the center of the town in the central part of the Chautauqua grounds near the two Chautauqua buildings. It is about 210 feet southeast of the northern building and about 225 feet east of the southern building. It is not marked.

*Davis City, Decatur County.*—The station is about one-fourth mile northeast of the center of the town in the northeastern corner of the city park. It is 39 feet west of the east park fence and 81 feet south of the north park fence. The station is not marked.

*Dewitt, Clinton County.*—The station is about one-half mile northeast of the center of the town in the northeast corner of the infield within the race track of the fairgrounds. It is 128 feet west from the inside edge of the race track to the east and 209.5 feet south from the inside edge of the race track to the north. It is marked by a limestone post 30 by 6 by 6 inches, with a bronze disk set in the top, projecting 5 inches above the ground. The following true bearings were determined:

	° /	
Top of Catholic Church steeple (mark).....	60	56.1 west of south
Top of judges' stand at the race track.....	26	44.3 west of south
North gable of the grand stand.....	42	19.5 west of south
North gable of south red barn in the fairgrounds.....	9	37.0 west of south

IOWA—continued.

*Farley, Dubuque County.*—The station is about one-half mile southwest of the center of the town in the southeastern part of where the infield of the fairground may be traced. The fairground is divided into fields which belong to Mr. James Wilson. The station is 60.2 feet northwest of the northwest side of the judges' stand and 107.8 feet northwest from the northwest corner of the grand stand. Observations were made over the center of a limestone block 12 by 12 inches at the top and projecting 1 inch above the ground. The following true bearings were determined:

Top of Catholic Church steeple (mark).....	65	32.5	east of north
Upper northwest corner of Mr. James Wilson's house under eaves of roof.....	32	37.0	east of north
South gable of a yellow house.....	5	15.9	west of north

*Green Island, Jackson County.*—The station is about one-half mile west of the point marked Green Island on the railroad, in the southeastern corner of the pasture, which is on the north side of the Chicago, Milwaukee & St. Paul Railroad track north from the garage owned by Mr. Krabbenhoist. It is about 300 feet north from the south fence of the pasture and about 150 feet west of the east pasture fence. The station is not marked.

*Humeston, Wayne County.*—The station is about one-fourth mile southwest of the center of the town in the southern part of the public-school ground. It is 38 feet north from the south fence of the ground and 210 feet southwest of the southwest corner of the schoolhouse. The station is not marked.

*La Motte, Jackson County.*—The station is about 1,200 feet southeast of the center of the town, in the western part of a pasture which belongs to John Neff, and is east across the Chicago, Milwaukee & St. Paul narrow-gauge railroad track from the railroad station. It is about 250 feet southeast of the railroad station and 60 feet northwest of a spring. The station is not marked.

*Lineville, Wayne County.*—The station is about 1,000 feet northwest of the center of the town in the eastern part of the public-school ground. It is about 250 feet east of the schoolhouse; 48 feet west of the sidewalk on the east side of the ground, and 120 feet north of the south fence. The station is not marked.

Auxiliary station A is 150 feet northeast of the primary.

*Mediapolis, Des Moines County.*—The station is about 1½ miles east of the center of the town in the southeast corner of the Chautauqua grounds, which formerly belonged to a private school. It is 99.1 feet west of the east fence; 127.8 feet north of the south fence; 217 feet southeast of the southeast corner of the old school building, and 36.6 feet south from the center of the trunk of a large oak tree. It is marked by the neck of a glass bottle set in a terra-cotta pipe 4 by 12 inches and buried 3 inches under the ground. The following true bearings were determined:

Lower northwest corner of the house south across the road from the gate of the Chautauqua grounds ° / (mark).....	47	57.8	west of south
Upper southwest corner, under eaves, of old school building on the Chautauqua grounds.....	36	11.2	west of north
Upper southeast corner under eaves of a red cabin west of the mark.....	48	44.7	west of south

*Monmouth, Jackson County.*—The station is about one-fourth mile southeast of the center of the town in the northeastern corner of the yard surrounding the house of Albert Sinkey. It is about 60 feet west from the east fence of the yard; 100 feet south from the north fence, and 150 feet southeast of the house. The station is not marked.

## IOWA—continued.

*Oxford Junction, Jones County.*—The station is about 1,000 feet southwest of the center of the town and southeast from the railroad station in a triangle formed by the tracks of the Chicago, Milwaukee & St. Paul Railroad. It is about 190 feet south from the track to the north and about 150 feet, respectively, from the tracks to the southeast and to the southwest. The station is not marked.

*Princeton, Scott County.*—The station is about three-fourths of a mile west of the center of the town in the northeast corner of a field belonging to Andrew Henry, which is the next field west from the yard of Andrew Henry's house. It is about 200 feet south from the north fence of the field and 150 feet west of the east fence. The station is not marked.

*Stanwood, Cedar County.*—The station is about  $1\frac{1}{4}$  miles northwest from the center of the town in the southwestern corner of 90 acres of meadow land belonging to Mr. C. L. Rigby. It is about 1,000 feet a little south of east from the farmhouse and about 300 feet, respectively, from the south and west fences of the 90-acre field. The station is not marked.

*Tipton, Cedar County.*—The station of 1908 was reoccupied. It is inside of the race track at the fairgrounds, near the north end of the inclosed space. It is 69 feet from the station to the nearest point north in the inside race-track fence and 218.5 feet southeast to the judges' stand. The station is almost due west of the north end of the grand stand. It is marked by a Bedford limestone post, 6 by 6 by 15 inches, set flush with the ground, and lettered U. S. C. & G. S. The following true bearings were determined in 1908:

South cupola of a barn.....	70 49. 8 west of south
North cupola of same barn.....	72 04. 7 west of south
Center of windmill tower at fairgrounds.....	79 25. 8 east of south

In addition to the above primary station five auxiliary stations were occupied. Auxiliary Station A is about 400 feet southwest from the primary station. Auxiliary No. 1 is about 1,000 feet northeast of the center of the town of Rochester, in the south corner of the next field northeast to the inclosure about Frank Kester's barn. It is about 6 miles south and three-fourths mile west of the primary. No. 2 is at Bennett, about one-fourth mile southeast of the center of the town, in a pasture on the south side of the Rock Island Railroad tracks, and about 700 feet southeast of the Rock Island Railway depot. It is  $8\frac{1}{2}$  miles east and three-fourths mile south of the primary. No. 3 is about one-fourth mile southwest of the point marked Wald on the railroad and  $4\frac{1}{4}$  miles north of the primary. It is in the second field south of the grain elevator; about 300 feet west from the east fence of the field, and 150 feet south of the north fence. No. 4 is about one-fourth mile northwest of the center of the town of Buchanan, in a field on the east side of the road on the west edge of the town, and about 100 feet east of the west fence of the field. It is  $5\frac{1}{4}$  miles west and one-half mile south of the primary station.

*Wapello, Louisa County.*—The station is in the fairgrounds northwest of the town and south of the race track. It is 58.5 feet southeast from the nearest point in the race-track fence and 90.8 feet east from the grand stand. It is also 87 feet southwest from the corner of a small house standing by the race track. The station is marked by a cement block, 8 by 8 by 18 inches, set flush with the surface of the ground, and lettered U. S. C. & G. S. The following true bearings were determined:

Spire of church.....	32 04. 0 east of south
Left edge of iron smokestack.....	50 49. 4 west of south
Left edge of judges' stand.....	79 35. 8 west of north

IOWA—continued.

Auxiliary station A is located 500 feet north of the magnetic station. Also nine other auxiliary stations were occupied as follows: No. 1 is in the northeast corner of the grounds of the Maplewood schoolhouse, 2½ miles southeast of the primary. No. 2 is in the eastern part of the grounds of the Harrison school, 2¾ miles northeast of the primary. No. 3 is in the south angle of the triangular school yard at a schoolhouse two-thirds of the distance from Wapello to Grand View and 4.3 miles north of the primary. No. 4 is in the northeast corner of the school yard at the Pleasant Prairie school, about 2½ miles southwest of the primary. No. 5 is in the southern part of the grounds of the Oak Grove school, which is 4.8 miles southeast of the primary. No. 6 is about 600 feet northeast of the railroad station at Newport, 6.8 miles south of the primary. No. 7 is in the southeast corner of the school grounds, about one-fourth mile northeast of the town of Letts, which is about 11¼ miles northwest of the primary. No. 8 is in the southeastern part of the grounds surrounding the schoolhouse at Toolesburg, about 8 miles southeast of the primary. No. 9 is about one-fourth mile south of Arpee, 14 miles southeast of the primary.

*West Liberty, Muscatine County.*—The station is about one-fourth mile south of the center of the town in the southeastern part of the infield within the race track at the fairgrounds. It is 142.8 feet west from the inside fence surrounding the race track; 222.7 feet north of the one-eighth mile mark on this fence; 109 feet northwest from a cross of galvanized nails about 1 foot above the ground in the trunk of a cottonwood tree, and 109 feet northeast from a vertical line of galvanized nails 1 foot above the ground in the trunk of an oak tree. The station is marked by the necks of two glass bottles, one placed above the other with the top one about 3 inches underground. Two horizontal glass bottles are placed against the neck of the top bottle. The following true bearings were determined:

	o /	
Upper east edge of railroad water tank (mark).....	24	33.2 west of north
Top of town water tank.....	7	40.0 east of north
Top of cupola on the exhibition building.....	41	43.7 west of north
Top of judges' stand.....	80	27.4 west of north

*Wheatland, Clinton County.*—The station is about one-fourth mile southeast of the center of the town in a field which belongs to Mr. Frederick Rowold, and which has its south border on the Chicago & North Western Railroad track and its north border at the back of the yard of Mr. Rowold's house. It is about 205 feet north from the south fence of the field and about 57 feet, respectively, from the east and west fences. The station is not marked.

*Wilton Junction, Muscatine County.*—The station is about three-fourths mile northeast of the center of the town in the northwestern part of the infield within the race track at the fairgrounds. It is 132.5 feet east of the inside of the race track to the west; 134 feet northeast from the north end of the short fence on the inside of the race track west of the judges' stand, and 355.9 feet northeast from the northeast corner of the judges' stand. The station is marked by the neck of a quart glass bottle buried 4 inches under the ground, and supported by three pint bottles placed horizontally. The following true bearings were determined:

	o /	
Top of octagonal exhibition building.....	4	20.4 east of south
Top of town water tank.....	32	12.0 west of south
Top of German Lutheran Church steeple.....	63	39.3 west of south.
South gable of house near northeast corner of fairgrounds	37	55.0 east of north
Top of judges' stand.....	19	06.2 west of south

## KANSAS.

*Anthony, Harper County.*—The station of 1906 was reoccupied but was found to be no longer suited for magnetic observations. A new station was therefore established about three-fourths mile to the northeast. The station is about 1 mile northeast from the center of the town, in the southeastern part of the infield within the race track at the county fairgrounds. It is 68.4 feet west from the one-eighth mile post at the inside fence of the race track and 81.3 feet south from the same fence. It is marked by a stone post 4 by 4 by 15 inches, with its top in the shape of a truncated pyramid, which projects about 2 inches above the ground. The following true bearings were determined:

North gable on the stone tool house (mark).....	28 38.5	east of south
West gable of northern row of horse stables.....	17 45.3	east of south
North gable on cupola of exhibition building under shingles.....	45 12.5	east of south
Top of judges' stand.....	12 48.1	west of south
Top of town water tank.....	52 35.1	west of south

In addition to the above primary station seven auxiliary stations were occupied as follows: Auxiliary station A is 200 feet northeast of the station of 1906. No. 1 is about 5 miles southeast of the primary and 300 feet northeast of the point on the railroad called Derry. No. 2 is about 7 miles southwest of the primary and 250 feet northeast of the point marked Shock on the railroad. No. 3 is at Harper, about one-fourth mile south from the center of the town, and about 10 miles north from the primary. No. 4 is 11 miles a little north of east from the primary, and 1,000 feet northwest of the center of the town of Freeport. No. 5 is about 11 miles southeast from the primary and one-fourth mile south of the center of the town of Bluff City. No. 6 is 6½ miles directly west from the center of Anthony, in the southwestern corner of the Flowerdale schoolhouse grounds.

*Cimarron, Gray County.*—The station is on the grounds of the public school. It is 148.8 feet and 151.4 feet, respectively, from the northwest and northeast corners of the building. The station is marked by a limestone post, 6 by 6 by 30 inches, set flush with the ground, and lettered U. S. C. & G. S., 1904. The following true bearings were determined in 1904 and 1917:

Base of flagstaff of the Luther Inn.....	53 16.9	west of south
Upper northwest corner of the cupola on the Doreau building under the eaves.....	36 05.8	west of south
Top of the town water tank.....	12 04.7	west of north

In addition to the above primary station nine auxiliary stations were also occupied. Auxiliary station No. A is about 360 feet northeast from the primary station. No. 1 is 3½ miles south from the primary in the northwest corner of the grounds of the Lincoln schoolhouse. No. 2 is 9.1 miles north from the primary and about 300 feet southeast from the Rising Star schoolhouse. No. 3 is 11 miles south from the primary, about 700 feet northeast from the point marked Haggard on the railroad and about 300 feet northwest from the Haggard post office. No. 4 is 6.1 miles a little north of west from the primary, and about one-fourth mile northeast from the center of Ingalls. No. 5 is 9.7 miles a little south of east from the primary and about one-fourth mile south from the center of Howell. No. 6 is northeast—17.5 miles north and 3.5 miles east—from the primary and about 600 feet southeast from the post office at Kalvesta. No. 7 is southeast—17.7 miles south and 6.6 miles east—from the primary station and 200 feet south from the post office of Cave. No. 8 is 18.9 miles a little north of west from the primary, 300 feet northwest from the schoolhouse at Pierceville.

KANSAS—continued.

*Copeland, Gray County.*—The station is about 500 feet south from the center of the town, in the eastern part of the lot on which stands the Christian Church. It is about 240 feet southeast from the stake marked N. W. 17 at the northwest corner of the lot and about 110 feet northeast from the northeast corner of the Christian Church. It is not marked.

*Herington, Dickinson County.*—The station is about 1 mile southeast of the center of the town in the northern part of the fairgrounds. It is about 100 feet northwest of the northwest corner of the race track grand stand and 150 feet southwest of the northeast fence of the grounds. The station is not marked.

*Johnson, Stanton County.*—The station is about 800 feet northwest from the center of the town, in the northeastern part of the public-school grounds. It is 172.4 feet northeast from the northwest corner of the school building, 137.2 feet northeast from the northeast corner, and 183.3 feet northeast from the southeast corner of the same. It is marked by the neck of a white glass quart bottle buried 4 inches under the ground. The following true bearings were determined:

	°	/	
North gable of the church under the roof (mark) . . . . .	19	02.3	east of south
Top of the church steeple . . . . .	19	45.7	east of south
Upper northeast corner of Johnson Hotel, under eaves . . . . .	57	34.4	east of south
Upper northeast corner of the courthouse . . . . .	79	16.8	east of south

*New Ulysses, Grant County.*—The station is about 400 feet east from the center of the town, in the northeastern corner of the courthouse grounds. It is 37.5 feet west from the east fence of the grounds, 42.1 feet south from the north fence, and 125.4 feet southeast from the wooden courthouse. It is marked by the neck of a white glass quart bottle buried 3 inches below the ground. The following true bearings were determined:

	°	/	
Top of schoolhouse cupola at the old town (mark) . . . . .	60	08.8	east of south
Upper southwest corner of Hotel Ulysses, under eaves . . . . .	79	54.0	west of north
South gable of C. S. Terrill's ranch house . . . . .	70	48.0	east of north

*Salina, Salina County.*—The station of 1904 was reoccupied. It is on the grounds of the Kansas Wesleyan University at a point 327.6 feet northeast of the northeast corner of the main building, 209.2 feet south and a little east of the southeast corner of the dwelling across the street, and 300 feet (about) west of the tracks on the McPherson branch, Union Pacific Railroad. It is marked by a limestone post 6 by 6 by 30 inches, set flush with the ground, and lettered U. S. C. & G. S., 1904. The following true bearings were determined in 1909 and 1917:

	°	/	
Figure 1 on corner stone of the university building (mark) . . . . .	62	04.2	west of south
East gable of ladies' dormitory . . . . .	65	57.5	west of north
Scroll ornament on south gable of center of three white houses south across the street . . . . .	18	19.8	east of north
Top of clock cupola of the south university building . . . . .	10	31.1	west of south

Seven auxiliary stations were also occupied. Auxiliary station A is 650 feet southwest of the primary. Auxiliary No. 1 is near the center of the town of Bavaria, which is about 7 miles southwest of the primary station. No. 2 is about 1 mile east of the center of Falun and 15 miles southwest of the primary. No. 3 is about one-half mile northeast of the center of Solomon and 14 miles a little north of east from the primary. No. 4 is one-fourth mile north from the center of Bennington and 15½ miles north of the primary. No. 5 is near the center of the town of Brockville in the eastern part of the baseball field. It is about 15 miles southwest of the primary. No. 6 is in the

## KANSAS—continued.

southwestern part of the city park at Lindsborg. It is 17 miles south of the primary station.

*Santa Fe, Haskell County.*—The station is about one-fourth mile southeast from the center of the town, a short distance northwest from the intersection of the road on the east side of the Dunkard Church and the road on the north side of J. S. Patrick's house. It is 154 feet west from the center of the first road and 110.5 feet north from the center of the second road. It is marked by a cement-filled hole about 20 inches deep and about 10 inches in diameter. The top of the cement is flush with the ground and is lettered W. S. 1917, with a hole to indicate the exact spot. The following true bearings were determined:

Top of Dunkard Church cupola (mark).....	2 36.2 east of north
Top of Methodist Church cupola.....	7 14.4 west of north
South gable of the schoolhouse.....	18 27.7 east of north
East gable of Mr. J. S. Patrick's house.....	79 20.3 west of south

A similar mark lettered N. M., 371 feet distant, with a hole in the top, marks the north end of a meridian line.

## MISSISSIPPI.

*Corinth, Alcorn County.*—The station of 1905 was reoccupied. It is in the grounds of the public school, 76.3 feet from the southeast corner of the building and 86.6 feet from the northeast corner. It is 30.7 feet from the fence to the south. The station is marked by a blue limestone post, set flush with the ground, and lettered U. S. C. & G. S., 1905. The following true bearings were determined in 1914:

Iron pipe on S. P. Bramlitt's house (mark).....	70 20.9 east of south
Top of cupola of new Baptist Church.....	57 42.4 west of north

## MISSOURI.

*Alton, Oregon County.*—The station is about one-half mile west of the center of the town in the northwest corner of the orchard of Mr. Wade Haiskell and southeast of his house. It is 68.4 feet southeast from the southeast corner of the east inclosed lot on the south side of Haiskell's yard; 60.4 feet east of the west orchard fence; 13.2 feet northeast from the center of the trunk of a small cedar tree, and about 240 feet south of the north pasture fence. It is marked by a cement block about 24 inches long, with a bronze disk in the top flush with the ground. The following true bearings were determined:

Top of schoolhouse cupola (mark).....	71 25.0 east of south
Upper northeast corner of schoolhouse cupola, under eaves.....	71 35.4 east of south
Top of Baptist Church steeple.....	73 48.1 east of south
South gable of Carvin Gohit's house.....	7 30.3 east of north

A rough field stone about 24 inches long and 3 inches in diameter at the top, 225 feet distant, and projecting 3 inches above the ground, was set to mark the south end of a meridian line. This stone is cemented in the ground. Owing to an error in computation the true bearing of the stone is  $0^{\circ} 00'.8$  west of south.

*Bethany, Harrison County.*—The station is about 1 mile southwest of the center of the town at the county fairgrounds in the northern part of the infield within the race track. It is 130.1 feet south from the inside fence surrounding the race track and 207.1 feet southeast from the nearest point of the judges' stand. It is marked by a

MISSOURI—continued.

limestone post 30 by 6 by 6 inches, with a bronze disk set in the top, which projects about 5 inches above the ground. The following true bearings were determined:

West gable of ticket office at north gate (mark).....	28 28.9 east of north
West gable of sheep and hog barn.....	63 17.4 east of north
Point of south gable of cattle barn.....	77 50.7 east of north
Cupola of the Webster school.....	16 11.9 east of north

*Bucklin, Linn County.*—The station is about one-half mile south of the center of the town in the northwest part of the city park. It is about 60 feet south from the north edge of the park and about 95 feet east from the west edge of the park.

*Forsyth, Taney County.*—The station of 1908 was reoccupied. It is about three-fourths mile north from the center of town in the northern part of the grounds which surrounded the Presbyterian College, now burned down. It is 41.3 feet south from the north fence of the ground and 55.5 feet a little north of east from the pipe of an iron pump. It is marked by a Bedford limestone post 6 by 6 by 34 inches, projecting about 12 inches above the ground, and lettered U. S. C. & G. S. 1908. The following true bearings were determined:

West gable of a farmhouse about 1 mile distant (mark)..	21 55.5 east of north
North gable of building belonging to high school at south side of the grounds.....	19 26.4 west of south
Upper northwest edge of the water tank on the grounds.	60 55.7 west of south

Six auxiliary stations were also occupied. Auxiliary station A is 250 feet southeast of the primary. Station No. 1 is in the central part of the village of Camp Ozark about 500 feet northwest from the boat landing, and about 2½ miles southwest from the principal station. No. 2 is in the northwest corner of the public-school grounds, about 800 feet north from the center of the village of Kissee Mills. It is about 38 feet northeast from the southwest fence of the grounds and about 93 feet southwest from the northwest corner of the schoolhouse. No. 3 is in the southwest part of the public-school grounds, about 300 feet southeast from the center of the village of Kirbyville. It is about 70 feet north from the south fence of the grounds and about 60 feet east from the west fence. No. 4 is in the northern part of the public-school grounds in the town of Taneyville, about 400 feet south from the center of the village, and about 200 feet north from the schoolhouse. No. 5 is about 250 feet southeast from the center of the village of Walnut Shade, in the southwest corner of the field bounded on the south by the creek and on the west by the main road. It is about 39 feet north from the south fence of the field and about 100 feet east from the west fence.

*Gainesville, Ozark County.*—The station is in the southwest part of the new school-house grounds, about 1,000 feet southwest from the town's center. It is 47 feet north from the south fence; 142 feet southwest from the southwest corner of the schoolhouse, and about 207 feet west from the east fence. It is marked by a cement block 6 inches in diameter and 26 inches long, with a bronze disk set in the top, which is 1 inch above the ground. The following true bearings were determined:

Top of Methodist Church cupola (mark).....	86 36.5 east of north
Southeast gable of Everett Luny's house.....	2 45.2 east of north
Upper northwest corner of Woods & Reed Mercantile Co., under eaves.....	75 54.5 east of north
Lower northwest corner of schoolhouse.....	14 50.3 east of north

*Kingston, Caldwell County.*—The station is about one-half mile northeast from the center of the town near the top of a low hill north of the central part of a pasture, which

## MISSOURI—continued.

belongs to S. C. Rogers, and is on the north side of the cemetery. It is 224 feet south-east of a spring; 34.9 feet a little south of west from the northwest corner of the remains of a foundation of a stone house, and 124.4 feet west from the center of the trunk of a large lone tree on the east side of the hill. It is marked by a rough blue limestone about 9 by 3 inches at the bottom and 24 inches long, coming to a point at the top which is 4 inches above the ground. A notch in the top indicates the exact spot, and the letters U. S. are cut on the west side. The following true bearings were determined:

	° /	
Top of the Fugitt monument in the cemetery (mark).....	9	20.9 west of south
Top of courthouse cupola.....	11	04.8 west of south
Center of north window in cupola of schoolhouse.....	5	54.2 west of south

*Kirksville, Adair County.*—The station is about three-fourths mile south from the center of the town in the southwest corner of the pasture on the west side of the yard of the dwelling house on the normal school experiment farm. It is 75.5 feet east from the west pasture fence and 82 feet north of the south pasture fence. It is marked by a limestone post 6 by 6 by 24 inches, projecting 2 inches above the ground, and having a bronze disk in the top. The following true bearings were determined:

	° /	
Top of courthouse cupola (mark).....	0	53.1 west of north
Top of south edge of cupola of the next house west of the Grimm Hospital.....	11	54.4 east of north
Center of the southwest corner of the Grimm Hospital..	20	52.0 east of north

*Lawson, Ray County.*—The station is about 1,000 feet southeast from the center of the town in the southern part of the baseball field at the southeast side of the Santa Fe Railroad station. It is about 300 feet southeast of the station; 55 feet north of the south fence of the field, and 250 feet east of the west fence of the field. It is not marked.

*Linneus, Linn County.*—The station is about one-fourth mile east of the center of the town in the southeast corner of the city park. It is 48.2 feet north of the fence on the north side of the baseball field; 114.5 feet west of the east edge of the park, and 149.5 feet northeast of the northeast corner of a wooden bridge. It is marked by a limestone post 6 by 6 by 26 inches, with a bronze disk set in the top, which is about 2 inches above the ground. The following true bearings were determined:

	° /	
Lower southeast corner of First Baptist Church (mark).....	65	17.6 east of north
Southeast corner of upper step of stone steps at south- east door of Christian Church.....	13	12.3 east of north
Top of fountain in the city park.....	66	36.3 west of north

*Princeton, Mercer County.*—The station is about three-fourths mile west of the center of the town in the southwest part of the old fairgrounds, which is now used as a Chautauqua meeting ground. It is 297 feet east of the west fence; 212.6 feet south of the north fence, and about 36 feet north from the northwest edge of the lake. It is marked by a limestone post 6 by 6 by 28 inches, with a hole in the center of the top, and lettered U. S. C. & G. S., 1917, projecting 4 inches above the ground. The following true bearings were determined:

	° /	
West gable of a red barn (mark).....	67	34.3 east of north
West gable at the tip of the Atley Grain Co.'s elevator..	89	25.8 east of south
Top of schoolhouse cupola.....	85	40.4 east of south
Lower southeast corner of Edward Kauffman's sheep barn.....	41	02.6 east of north

MISSOURI—continued.

*Thayer, Oregon County.*—The station is about one-fourth mile east of the center of the town in the southwest corner of the fairground. It is about 80 feet from the west fence and 120 feet from the south fence. The station is not marked.

*Trenton, Grundy County.*—The station is in the southwestern part of the infield within the race track at the county fairgrounds, about 1½ miles north of the center of the town. It is 162 feet east of the inside fence surrounding the race track; 108 feet southeast of the southeast corner of the fence surrounding the judges' stand, and about 280 feet northwest from a pond. It is marked by a limestone post 6 by 6 by 28 inches, lettered U. S. C. & G. S., 1917, on top, and projecting about 4 inches above the ground. The following true bearings were determined:

Top of Third Ward school cupola (mark) . . . . .	86	06.6 west of south
Top of United Brethren Church steeple . . . . .	83	17.8 west of south
Top of roof of octagonal exhibition building . . . . .	4	31.5 west of north
Center of top smokestack of the Rock Island Railroad shops . . . . .	15	39.4 west of south

*Unionville, Putnam County.*—The station is about 1½ miles west of the center of the town in the west part of the inclosure surrounding the city reservoir, a pond. It is 116.5 feet east of the west fence; 77.7 feet west of the west edge of the pond, and about 345 feet south from the north edge of the pond. It is marked by a limestone post 6 by 6 by 28 inches, lettered U. S. C. & G. S., 1917, on the top, with a hole in the center, which is about 4 inches above the ground. The following true bearings were determined:

Top of cupola of J. J. Vrooman's barn (mark) . . . . .	87	42.8 east of south
West gable of a farmhouse . . . . .	79	08.5 east of north
West gable of David Mowrer's house . . . . .	79	35.9 east of south

A limestone post about 350 feet distant, with a hole in its top, set about 3 inches above the ground, marks the north end of a meridian line. It is at the edge of the cement levee on the north edge of the pond.

NEVADA.

*Beatty, Nye County.*—The station is on the desert in line with the north side of the Tonapah & Tidewater depot and 300 feet southwest of its northwest corner. It is not marked.

*Bonnie Clare, Nye County.*—The station is on the desert 200 feet northeast of the Tonapah & Tidewater Railroad and 350 feet east of the southeast corner of the depot. It is not marked.

*Goldfield, Esmeralda County.*—The station is on a lot reserved for school purposes 1 mile north of the center of the city. This lot is bounded by Columbia, Park, and Rich Streets. The station is 225 feet northeast from a very large granite monument near the intersection of Columbia and Park Streets; 220 feet southwest from a large concrete foundation; 92 feet south of the north property line of the reservation, and 160 feet northwest from the northwest corner of Mr. McKenna's house. It is marked by a rough granite post 6 by 8 by 20 inches, center marked and projecting 1 inch above the ground. The following true bearings were determined:

Spire on cupola of Cedar Street school (mark) . . . . .	47	08.3 west of south
South gable of Tonapah & Goldfield Railroad shops . . . . .	86	38.0 west of north
Left edge of Tonapah & Goldfield Railroad water tank . . . . .	64	24.0 west of north
Base of flagpole on Columbia Mountain . . . . .	22	29.9 east of north
Left edge of chimney on square cottage two blocks to the south . . . . .	2	48.0 west of south

*Mount Montgomery, Mineral County.*—The station is on the desert in line with the north end of the depot and 250 feet west of its northwest corner. It is not marked.

## NEW MEXICO.

*Aztec, San Juan County.*—The station is near the southeast corner of the courthouse square, one-eighth mile southeast of the center of the town. It is 209.6 feet southeast of the southeast corner of the courthouse; 146.6 feet south of the southeast corner of the jail; 41 feet west of an irrigation ditch, and 35.9 feet north of the walk south of the courthouse. It is marked by a round concrete post 14 by 30 inches, with bronze disk in the center of the top, the post projecting 4 inches above ground. The following true bearings were determined:

West gable of hospital (mark).....	86 11.9 east of south
Right edge of high-school building.....	47 00.3 east of south
Right edge of grammar-school building.....	20 09.5 east of south
Left edge of the Thomas store.....	79 13.2 west of north
Right edge of courthouse.....	34 02.8 west of north

*Endee, Quay County.*—The station is on the prairie north of the hotel and one-tenth mile north of the center of the town. It is 500 feet southeast of the Chicago, Rock Island & Gulf Railroad and 150 feet northeast of the east corner of the N. D. Hotel. It is not marked. The following true bearings were determined:

Cupola on school building.....	4 52.6 west of south
North corner of depot.....	87 10.7 west of north
Distant windmill.....	54 11.8 west of north

*Mills, Mora County.*—The station is on a bench one-eighth mile northwest of the center of the town. It is 255 feet northwest of the northwest corner of the Lebert Hotel; 220 feet west of the fence along the west side of the road to the east, and 125 feet south of the fence along the south side of the road to the north. It is not marked. The following true bearings were determined:

Right edge of cement elevator (mark).....	18 40.3 east of south
Apex of cupola on Methodist Episcopal Church.....	56 28.9 east of south
Apex of distant mountain peak.....	73 45.6 east of north
Windmill at ranch house.....	33 02.6 east of north

In addition to the above primary station, five auxiliary stations were occupied as follows: Auxiliary station A is 300 feet west of the primary. No. 1 is on the prairie 5 miles due east of the primary station. No. 2 is on the prairie 1 mile north and 4 miles west of the primary station. No. 3 is on the prairie 5 miles south and 1 mile east of the primary station. No. 4 is on the prairie 4 miles due north of the primary station.

*Mora, Mora County.*—The station is in a pasture 1 mile east and one-half mile south of Mora. It is near the southeast edge of a rocky hill; 15 feet east of a very large granite boulder which stands alone; 482 feet north of the pasture fence; 271 feet west of the pasture fence, and one-sixth mile west of the road leading to Mora. Observations were made over a small granite boulder which projects 4 inches above ground and is marked by a cross and drill hole. The following true bearing was determined:

West gable of frame house at cross roads (mark).....	7 24.5 east of north
------------------------------------------------------	----------------------

*Mosquero, Union County.*—The station is on the prairie one-tenth mile south of the center of the town. It is 220 feet southeast of the southeast corner of the depot; 137 feet east of the railroad track, and 238 feet north of the grand stand at the ball diamond. It is not marked. The following true bearings were determined:

Spire on schoolhouse cupola (mark).....	65 37.9 east of north
Southwest corner of Mesa Hotel.....	2 43.0 east of north
Southwest corner of grain elevator.....	30 11.2 west of north
Spire on railroad section house.....	56 49.0 west of south

NEW MEXICO—continued.

*Shiprock, San Juan County.*—The station is about 500 feet north of the San Juan River and about one-eighth mile southwest of the agency building. It is about in line with the agency office and Ship Rock, and just west of the old ball ground. The station is not marked. The following true bearing was determined:

○ /

Apex of Ship Rock..... 51 22. 6 west of south

*Springer, Colfax County.*—The station of 1900 could not be recovered. The new station is about 800 feet east of the old station, on the high-school grounds, one-fourth mile-northeast of the center of the town. It is 111 feet west of the northwest corner of the school building; 103.7 feet west of the southwest corner of the school building; 187 feet south of the north fence, and 20.3 feet east of the west fence. It is marked by a bronze disk in the top of a round concrete post 12 by 24 inches, projecting 2 inches above ground. The following true bearings were determined:

○ /

Spire on cupola of Reform School (mark)..... 80 35. 6 west of south  
 Right edge of standpipe near Santa Fe depot..... 68 33. 8 west of north  
 Left edge of chimney on Mountain View Hotel..... 18 16. 1 west of south  
 Right edge of tank at old cement plant..... 36 56. 0 west of south

In addition to the above primary station, four auxiliary stations were occupied as follows: Auxiliary station No. 1 is on the prairie north of the depot at Taylor, N. Mex., 3.5 miles south and 7 miles east of primary station. No. 2 is on the prairie near Gato siding. It is 5 miles north and 2 miles east of the primary station. No. 3 is on the prairie near Rayado siding. It is 6 miles south and 1 mile west of the primary station. No. 4 is on the prairie 6 miles west and 1 mile south of the primary station.

*Tierra Amarilla, Rio Arriba County.*—The station is on a wooded hill one-half mile northeast of the center of the town. It is on the highest part of the hill, 550 feet southeast of Joe McWilliam's farmhouse; 49 feet northeast of the fence (produced) passing in front of McWilliam's house, and 19 feet northwest of the fence (produced) on the west side of the road leading into town. The station is marked by a lava post 6 by 8 by 20 inches, center marked, and projecting slightly above the ground. The following true bearings were determined:

○ /

Cupola on school building (mark)..... 35 07. 7 west of south  
 Brick chimney on long adobe house..... 53 50. 2 west of south  
 East gable of Joe McWilliam's farmhouse..... 50 47. 3 west of north  
 Apex of Brazos peak..... 69 02. 2 east of north  
 East gable of Frank Luna's residence..... 5 43. 2 west of south

*Tucumcari, Quay County.*—The station of 1906 was reoccupied. Observations were made over the stake marking the southwest corner of block 30, McGee addition, which is about one-fourth mile southwest of the county courthouse. The stake is 3 by 3½ inches and shows 1 inch above ground. It may be found by reference to the town map. The following true bearings were determined in 1914:

○ /

Tip of city water tower (mark)..... 19 55. 0 west of north  
 Base of cross on Catholic Church..... 14 21. 5 east of north  
 Base of flagstaff on courthouse..... 23 05. 5 east of north  
 Point of cupola on grammar-school building..... 53 32. 8 east of north  
 Base of flagstaff on high school..... 32 28. 1 east of south

*Ute Park, Colfax County.*—The station is in a lot belonging to Mr. T. S. Faris, one-sixth mile northwest of the depot. It is 88 feet northeast of the northeast corner of the house; 35 feet southwest of a fence corner, and 90 feet north of the fence south of the main road. It is not marked. The following true bearing was determined:

○ /

Spire on west gable of house (mark)..... 24 14. 6 east of south

## NORTH CAROLINA.

*Aberdeen, Moore County.*—The station is on the grounds of Mr. J. R. Page, one-fourth mile west of the center of the town. It is 328 feet south by west from Mr. Page's house on the north side of the driveway; 5.9 feet from its north edge; 131.2 feet west of a three-room cabin next to a tennis court; about 164 feet east of a group of barns and sheds, and exactly opposite a clump of large trees about 98.4 feet back of the driveway. The point is marked by a 2-foot length of 8 by 8 terra-cotta flue lining set with its top even with the ground, and having the upper part filled with cement mortar, in which is bedded the regular magnetic station mark, stamped 1917. The following true bearings were determined:

Steeple of Baptist Church, three-fourths mile distant	o /
(mark).....	86 05.3 east of south
West edge of chimney of two-story house on hill.....	12 05.4 east of south
Southeast corner of brickwork of foundation of Mr. Page's house.....	23 46.0 west of north
Peak of water tank.....	89 39.5 east of south

*Goldsboro, Wayne County.*—The station of 1908 was reoccupied. It is in the southern part of the city park, about 1 mile east by north from the center of the town and about 255 feet a little south of east of the park shelter house. It is 50.3 feet from the edge of the north brick border of the road to the south which runs east from the main gate, and 134.7 feet from the fence on the east border of the park. The station is marked by a limestone post 6 by 6 by 30 inches, projecting 4 inches above the ground and lettered U. S. C. & G. S., 1908. The following true bearings were determined in 1908:

Northeast corner of tower of Wayne cotton mill.....	o /
North cupola of Dawson home.....	42 53.1 west of north
	50 04.5 west of south

*Raleigh, Wake County.*—The station of 1913 was reoccupied. It is on the fairgrounds about one-fourth mile from the nearest trolley line and about 2 miles from the center of Raleigh past the Agricultural and Mechanical College property and fairgrounds. The station is 78.1 feet from the nearest corner of the house occupied by Mr. Ross; 46.5 feet east of the west fence on the fairground property; 84 feet south of a fence running east and west, and about 250 feet north of the highway. It is marked by a marble post 6 inches square, projecting about 2 inches above the ground, and lettered C. & G. S. The following true bearings were determined in 1913 and 1917:

Northeast edge of cross on Catholic Church.....	o /
Northwest edge of chimney on end of Catholic Orphanage.....	1 17.7 west of south
Spire on glass turret of hospital.....	13 12.8 east of south
Top of water tank next to experiment-station building.	32 39.8 east of south
Top of floral building on fairgrounds, center of base of flagpole.....	40 04.1 east of south
	68 07.9 east of south

*Rockingham, Richmond County.*—The station of 1899 could not be conveniently reoccupied, so a new station was established in the new cemetery, about 1½ miles east by north from the center of the town, on the south side of the road to Hoffman. The point is in a vacant space between several driveways at the entrance to the cemetery. Measurements were taken to five small poplar trees which stand on the edge of the driveways in the form of a semicircle on the east and south sides of the station. The distances from the station to the trees are 64, 62.6, 40.9, 35.6, and 59.4 feet, beginning with the tree to the northeast and taking them in a clockwise order. The station is marked by a bronze disk set in the top of an 8 by 8 inch terra-cotta flue lining, filled

NORTH CAROLINA—continued.

with cement, and projecting 2 inches above the ground. The following true bearings were determined:

	°	'	
Southeast gable of fairgrounds building (mark).....	76	21.3	west of south
Northeast gable of the same.....	84	57.8	west of south
Southwest gable of white one-story frame house.....	10	01.6	east of north
Top of central monument in cemetery.....	37	34.3	east of south

Four auxiliary stations were also occupied. Auxiliary No. 1 is near Blewett Falls Ferry, about 7 miles west of Rockingham on the road to Wadesboro, one-fourth mile west of the bottom of the long hill sloping down to the lowland along the Pee Dee River. No. 2 is on the east side of the road to Cheraw, about 7 miles south of Rockingham and just south of a ford, 65 feet east of the road. No. 3 is at a point 7½ miles east of Rockingham, 49 feet north of the road to Hoffman. No. 4 is about one-eighth mile beyond the 7-mile post on the highway to Pinehurst and Raleigh, about 65 feet east of the road. It is about 7 miles north of Rockingham.

*Wadesboro, Anson County.*—The station of 1904 could not be conveniently recovered, so a new station was occupied. It is about one-fourth mile southwest of the center of the town, in the southwest corner of the ball grounds back of and belonging to the public school. It is 269 feet southwest of the southwest corner of the west school building; 41.9 feet east of the west fence of the grounds; about 55 feet north of the south fence, and 48.8 feet west of the center of a manhole belonging to a line of drain-pipe. The station is marked by a bronze disk set in the top of a marble stone 8 by 8 by 18 inches, set with its top flush with the ground. The following true bearings were determined:

	°	'	
Steeple of Baptist Church (mark).....	42	27.2	east of north
Peak of city water tower.....	62	39.4	east of north
Point of tower of public-school building.....	83	47.1	east of south

Five auxiliary stations were also occupied. Auxiliary station A is 300 feet north west of the primary. Auxiliary No. 1 is about 1 mile east of Lilesville on the north side of the main highway and about 7 miles east of the primary. No. 2 is about one-eighth mile southeast of Pinkston, 50 feet east of the road and 200 feet south of a cottage. It is about 5 miles north of the primary. No. 3 is at Polkston, on the south side of the main highway, and 328 feet west of Browns Creek. It is about 7 miles west of the primary. No. 4 is about 6 miles south of the primary on the west side of the Chesterfield Road.

OKLAHOMA.

*Jay, Delaware County.*—The station is near the center of the town in the center of the road on the south side of the courthouse grounds and near to the southwest corner of the courthouse fence. It is 42.6 feet southeast from the southwest corner of the courthouse fence; 38.5 feet south from the courthouse south fence, and 182 feet southwest from the southwest corner of the courthouse. It is marked by a limestone post 6 by 6 by 24 inches, with a bronze disk cemented in the top, which is set 3 inches below the ground. The following true bearings were determined:

	°	'	
Lower southeast corner of courthouse.....	48	01.0	east of north
Upper northeast corner of Judge H. L. Marshall's house under porch roof.....	18	25.3	west of south
Lower northwest corner of the courthouse.....	21	26.4	east of north

An iron bolt 1 foot long and with a three-fourths-inch head was driven 1 inch below the ground to mark the north end of a meridian line. It is distant about 338 feet from

## OKLAHOMA—continued.

the magnetic station; 5.1 feet east from the second fence post east from the north west corner of the courthouse fence, and 2.5 feet west from the third fence post east of the same. It is on the line of the north courthouse fence.

*Stillwell, Adair County.*—The station is about one-fourth mile northwest from the center of the town, in the northern part of the town picnic park belonging to G. S. Fowler, and between a drainage ditch and the south fence of the baseball park. It is 13.5 feet south from the south fence of the baseball park; 192 feet southwest from the southeast corner of the baseball park, and 120.8 feet east from a wire fence. It is marked by a limestone post 6 by 6 by 25 inches, with a bronze disk set in the top, which is about 2 inches above the ground. The following true bearings were determined:

East gable of J. W. Patton's house (mark).....	79 18.7	west of south
South gable of the Christian Church.....	82 15.2	west of south
North gable of George S. Fowler's house under shingles.....	1 05.9	west of south

*Vinita, Craig County.*—The old station in the southwest corner of North Park was found to be no longer suited for magnetic observations and a new station was therefore established in the northwest corner of the park about 350 feet a little east of north of the old station. The station is about one-half mile northwest from the town's center in the northwest corner of North Park. It is 83.8 feet east from the east curb of the road on the west side of the park; 180.5 feet south from the road ditch on the north side of the park, and 49.5 feet southwest from the center of the path extending from the southeast corner to the northwest corner of the park. It is marked by a limestone post 6 by 6 by 30 inches, with a bronze plate set in the top, which is about 6 inches above the ground. The following true bearings were determined:

Upper southwest corner of Sacred Heart Institute, under eaves (mark).....	43 02.0	east of south
Top of town water tank.....	51 01.0	east of south
Top of Catholic Church steeple.....	33 35.7	east of south
Upper southwest corner of North Ward school building, under eaves.....	24 26.9	east of south

## OREGON.

*Bend, Deschutes County.*—The station is near the southwest corner of the Reid school grounds, one-fourth mile south of the center of the town. It is 94.1 feet from the southwest corner of the school building; 99.7 feet from the southeast corner, and 32.8 feet east from the walk along the west side of the grounds. It is marked by a bronze disk set in a concrete monument 12 by 12 by 36 inches, projecting 10 inches above the ground. The following true bearings were determined:

Southwest corner of foundation of the athletic club building (mark).....	8 23.2	east of north
Northeast corner of brick store east of schoolhouse....	93 39.0	east of south
Tip of north gable of house, one block to southeast....	45 25.3	east of south
Tip of north gable of residence to southwest.....	33 34.2	west of south
Left edge of Mr. Sather's residence.....	51 18.9	west of north

*Brogan, Malheur County.*—The station is on a low hill, about 250 feet southwest of depot. It is also 125 feet south of the walk leading west from depot and 290 feet east of the Brogan Trading Co.'s store. It is not marked. The following true bearing was determined:

Spire on railroad water tank.....	10 24.8	west of north
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OREGON—continued.

*Coquille, Coos County.*—The station is near the southwest corner of the courthouse square, one-fourth mile east of the center of the town. It is 116.3 feet southwest of the southwest corner of the old courthouse; 68 feet west of the walk leading into the courthouse; 40.5 feet north of the walk on the south side of the grounds, and 26 feet east of the walk on the west side. The station is marked by a bronze disk set in the top of a concrete monument 12 by 12 by 30 inches, projecting 10 inches above the ground. The following true bearings were determined:

Left edge of capstone on north side of new courthouse steps (mark).....	4	49.8	east of north
U. S. Geological Survey bench mark (iron post on courthouse square).....	3	09.9	west of north
Seventh Day Adventist's Church spire.....	83	53.4	east of south
Flagpole on city hall.....	72	22.9	west of south
Right edge of capstone of left-hand pilaster at city hall entrance.....	71	55.1	west of south

*Culver, Jefferson County.*—The station is near the northwest corner of the school grounds, one-tenth mile south of the center of the town. It is 71 feet northwest of the northwest corner of the school building; 17 feet east of the row of trees on the west side of the grounds and 12 feet south of the row on the north. It is marked by a bronze disk set in the top of a concrete monument 12 by 12 by 36 inches, projecting 10 inches above ground. The following true bearings were determined:

North gable of Eberalls Sisters' ranch house (mark).....	42	24.3	west of south
Center of apex of Mount Jefferson.....	69	51.6	west of north
South gable of Mr. Osborn's residence.....	21	23.0	west of north
Southwest corner of a church.....	10	30.5	west of north
Center of a brick chimney on hill in northeast part of town.....	24	23.9	east of north

*Dallas, Polk County.*—The station is in the western part of the city park, one-fourth mile northwest of the center of the town. It is 97 feet west of a large spruce tree at the northwest corner of the band stand; 103 feet northwest of the southwest corner of the band stand; 190 feet northwest of a very large cottonwood tree, and 130 feet east of the bank of the small stream encircling the park on three sides. It is marked by a bronze disk set in the top of a concrete monument 12 by 12 by 40 inches, projecting 10 inches above the ground. The following true bearing was determined:

Left edge of drinking fountain.....	83	01.2	east of south
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*Elkton, Douglas County.*—The station is on the grounds of the Weatherly Hotel, near the center of the town. It is 80 feet south of the south side of the hotel and 50 feet from the fence along the road east of the hotel. It is not permanently marked.

*Enterprise, Wallowa County.*—The station is on the fairgrounds, one-half mile northwest of the center of the town. It is within the race course near the northeast section; 31.9 feet south of the fence on the inside of the track; 280 feet west of the northwest corner of the poultry building, and 450 feet north of the grand stand. It is marked by a bronze disk in the top of a round concrete post 14 inches in diameter by 24 inches long, projecting 4 inches above ground. The following true bearings were determined:

Flagpole on courthouse tower (mark).....	22	11.6	east of south
East gable of barn on hillside.....	71	15.7	west of south
Chimney on house on distant hill.....	31	57.5	west of north
Methodist Church spire.....	36	07.9	east of south
Federated Church spire.....	34	24.8	east of south

OREGON—continued.

*Eugene, Lane County.*—The station of 1908 and 1914 was reoccupied. It is near the eastern end of the top of Skinners Butte, one-half mile north of the center of the city. It is 37 feet northwest of the northwest corner of an old foundation; 43 feet south of the edge of the road on the north edge of the butte; 65 feet east of the east side of Main Street produced northward, and 450 feet east of the east side of the concrete reservoir. It is marked by a marble post 5 by 5 by 18 inches, projecting 4 inches above the ground, center marked and lettered U. S. The following true bearings were determined:

	o /
Methodist Episcopal Church spire . . . . .	2 52.6 west of south
Spire on Patterson school . . . . .	35 31.5 east of south
Baptist Church spire . . . . .	16 25.1 east of south
Tip of dome on opera house . . . . .	2 43.7 east of south
Church spire in western part of town . . . . .	74 38.3 west of south
Southeast corner of top of concrete reservoir . . . . .	80 06.8 west of north

Seven auxiliary stations were also occupied. Auxiliary A is 250 feet west of the primary. Auxiliary B is 350 feet west of the primary. Auxiliary No. 1 is one-half mile north and 4 miles west of the primary. No. 2 is one-half mile north and 10 miles west of the primary. No. 3 is 9 miles east of the primary and one-half mile west of Thurston. No. 4 is 12 miles south and 4 miles east of the primary and 2.1 miles south of Cresswell. No. 5 is 5 miles north and 2.5 miles east of primary and two-tenths mile south of Armitage.

*Gold Beach, Curry County.*—The station is near the northeast corner of the courthouse square near the center of the town. It is 61 feet south of the north fence around the grounds; 16 feet west of the east fence, and 85 feet northeast of the northeast corner of the courthouse. It is marked by a bronze disk set in the top of a concrete monument 9 by 9 by 30 inches, projecting 6 inches above the ground. The following true bearings were determined:

	o /
Right edge of a large house in the south part of town . . . . .	15 09.3 west of south
Southeast corner of courthouse foundation near ground . . . . .	67 03.4 west of south
Right edge of chimney on bank building, near roof . . . . .	40 42.2 west of north
Southwest corner of house on hill . . . . .	29 01.3 east of south
Tack in corner of courthouse fence . . . . .	59 11.7 west of north

*Homestead, Baker County.*—The station is in a small pasture near the Snake River and about one-fourth mile north of the center of the town. It is 400 feet south of the railroad bridge; 86.7 feet east of the east rail of the track; 166.9 feet southeast of mile-post 57; 85.2 feet northwest from the center of a large pine tree (blazed), and 86 feet from a rock pile which marks a property corner. It is marked by a bronze disk in the top of a concrete post 12 by 12 by 24 inches, projecting 1 inch above the ground. (Rocks were piled around the marker so that it might be located more easily.) The following true bearings were determined:

	o /
Flagpole on schoolhouse cupola (mark) . . . . .	26 16.7 east of north
South gable of Homestead Iron Dike Mines Co.'s rooming house . . . . .	19 40.2 west of north
Flagpole on north end of above house . . . . .	16 23.4 west of north
Pinnacle of rocks at apex of Mount Mack . . . . .	6 41.8 east of north

*Hood River, Hood River County.*—The station is on the east side of the courthouse square near the center of the town. It is 68.2 feet east of the northeast corner of the courthouse; 67.8 feet southeast from the center of a large oak tree; 82 feet south of the cement walk along the street, and 42.3 feet west of the east property line. It is marked

OREGON—continued.

by a bronze disk set in the top of a concrete monument 10 by 10 by 30 inches, projecting 10 inches above the ground. The following true bearings were determined:

	° /	
Iron flagpole on the First National Bank (mark) . . . . .	24	11.5 west of north
Northwest corner, near walk, of Clarke's drug store . . . . .	8	32.0 east of north
West or left-hand gable of large house on north bank of Columbia River . . . . .	48	58.4 east of north
Left edge of capstone on library steps about in line with right edge of Catholic Church . . . . .	72	16.0 west of north

Six auxiliary stations were also occupied. Auxiliary A is 250 feet north 71° 03' west of primary. No. 1 is 4.5 miles west and 1 mile south of the primary. No. 2 is 5 miles south and 3 miles east of the primary. No. 3 is 3 miles south and 5 miles east of the primary. No. 4 is 8 miles south of the primary near Odell. No. 5 is 15 miles south of the primary and 1 mile south of Parkdale.

*Huntington, Baker County.*—The station is on the school grounds, one-tenth mile south of the center of the town. It is 168 feet south of the south side of the school building; 58 feet east of the fence on the west side of the grounds; 43.5 feet north of the fence on the south side, and 86.5 feet west of the concrete wall on the east side. It is marked by a bronze disk set in the top of a concrete post 10 by 12 by 36 inches, projecting 3 inches above the ground. The following true bearings were determined:

	° /	
Methodist Church spire (mark) . . . . .	30	10.6 east of north
Chimney on square cottage southeast of town . . . . .	86	24.4 east of south
Congregational Church spire . . . . .	38	59.8 west of north
East gable (top) of Oregon Short Line coal house . . . . .	10	27.8 west of north
West end of concrete wall north of schoolhouse . . . . .	16	51.3 west of north

*Juntura, Malheur County.*—The station is in an open lot 400 feet southwest of the depot and 450 feet southwest of the hotel. It is in line with the walk in front of the hotel and near the intersection of the second street south of the depot and the first street west. It is not marked. The following true bearing was determined:

	° /	
Flagpole on high-school cupola . . . . .	63	09.4 west of north

*La Grande, Union County.*—The station is on the fairgrounds, one-half mile northeast from the center of the town. It is within the race course near the east end; 290 feet southeast from the southeast corner of the grand stand; 208 feet south of the fence inside the track; 300 feet north of the board fence along the south side of the grounds; 600 feet east of the exhibition hall, and on a slightly elevated point between two ravines. It is marked by a bronze disk in the center of a round concrete post 12 inches in diameter by 18 inches long, projecting 3 inches above ground. The following true bearings were determined:

	° /	
Flagpole on courthouse tower (mark) . . . . .	52	36.2 west of south
Flagpole on cupola of high school . . . . .	57	44.5 west of south
Cupola on grammar school . . . . .	39	09.8 west of north
Prominent perpendicular cliff near top of Mount Emily . . . . .	1	57.3 west of north
South gable of Red Crown gasoline storehouse . . . . .	63	46.7 east of north

*Langlois, Curry County.*—The station is in the woods 475 feet northeast of the post office; 40 feet east of the main road to Bandon and 300 feet north of a large residence. It is not marked.

*Mohler, Tillamook County.*—The station is on a wooded hillside, one-eighth of a mile northwest of the depot. It is 200 feet west of the fence along the road and 200 feet northwest of the northwest corner of the post office. It is not marked.

## OREGON—continued.

*Oakridge, Lane County.*—The station is in the large open space about 400 feet northwest of the depot and 700 feet west of the Wood Hotel. It is just south of an oak grove and is not permanently marked.

Two auxiliary stations were also occupied. Auxiliary A is 300 feet southwest from the primary station. Auxiliary B is 400 feet northwest from the primary station.

*Ontario, Malheur County.*—The station is on the fairgrounds, one-half mile north and one-half mile west of the center of the town. It is 99.2 feet northeast of the northeast corner of a long shed; 125 feet northwest of the northwest corner of the grand stand; 175 feet west of the fence along the track, and the comb of the roof of the exhibition hall extended 500 feet north passes 9 feet east of the station. It is marked by a cedar post 4 by 6 by 24 inches with cross on top, and projecting 1 inch above ground. The following true bearings were determined:

	° /
Flagpole on cupola of grammar-school building (mark)	17 46.1 east of south
Right edge of brick high-school building.....	15 02.5 east of south
Cross on the Holy Rosary Hospital.....	10 19.7 west of south
Right edge of elevated tank at fairgrounds.....	2 23.6 east of south
Center of brick chimney on house.....	68 38.8 west of north

*Oregon City, Clackamas County.*—The station is on the Eastham school grounds, 1 mile east of the center of the town. It is 120 feet south of the southeast corner of the school building; 94 feet northwest of the edge of a walk on the south side of the street to the south; 22.5 feet east of the center of a large oak tree; 45.5 feet southwest of the center of another large oak. It is marked by a bronze disk set in the top of a concrete monument 12 by 12 by 36 inches, projecting 10 inches above the ground. The following true bearings were determined:

	° /
Southwest corner of foundation of house north of schoolhouse (mark).....	31 27.4 east of north
Northwest or nearest corner of foundation of house to the southeast.....	50 27.2 east of south
Right edge of a house to southwest, across street.....	62 28.3 west of south
Right edge of north chimney on house just west of schoolhouse.....	32 37.7 west of north
Congregational Church spire.....	20 35.4 west of north

*Pacific City, Tillamook County.*—The station is near the southwest corner of the camp grounds, one-fourth mile southwest of the store and post office. It is on a bench 40 feet from the foot of a wooded hill; 400 feet east of a house, and about one-fourth mile from the shore of the Pacific Ocean. It is not marked.

*Pendleton, Umatilla County.*—The station of 1914 was reoccupied. It is one-half mile southeast of the center of the town, on the hill north of the city reservoir. It is 260 feet north of the northwest corner of the reservoir; 240.2 feet northwest of the northeast corner; 106.1 feet east of the row of trees on the west side of the grounds, and 124.2 feet west of the row of trees on the east side. It is marked by a bronze disk set in the top of a concrete post 18 by 18 by 40 inches, projecting 12 inches above ground. The following true bearings were determined:

	° /
Smokestack at asylum.....	84 15.4 west of north
Methodist Episcopal Church spire.....	56 01.0 west of north
Center of clock on county courthouse.....	36 04.4 west of north
Block on point of roof of east reservoir.....	19 35.0 east of south
South gable of public-school building.....	19 48.2 east of north

OREGON—continued.

*Portland, Multnomah County.*—The station of 1910 and 1914 in the city park, 2 miles west of the center of the city, was reoccupied. It is on a steep hillside 180 feet west of the west side of the concrete tennis courts (produced); 200 feet south of a fence marking the north boundary of the park, in line with the southeast and northwest corners of tennis court No. 2 counting from the south, and 140 feet north of the north end of No. 3 (produced). It is marked by a sandstone post 6 by 6 by 14 inches, pyramid top, projecting 3 inches above the ground. The intersection of the edges of the pyramid is the precise spot. The following true bearings were determined:

Center of top of high brick tower in the city (mark) ..	78 26.1	east of south
Northern tower of Jewish Synagogue.....	81 59.1	east of south
High church steeple midway between towers on synagogue.....	81 44.2	east of south
Church steeple on black-topped church on distant hill.....	51 07.0	east of north
Gilt tip of another church steeple.....	49 57.7	east of north
Apex of watch tower on edge of brick building across canyon.....	27 56.9	east of south

*Reedsport, Douglas County.*—The station is on the flats 200 feet southwest of the depot and 100 feet south of the Southern Pacific Railroad track. It is not permanently marked.

*St. Helens, Columbia County.*—The station is in the city park, two-tenths mile north and four-tenths mile west of the courthouse and about one-half mile west of the Columbia River. It is 405 feet north of the walk on the south side of the street south of the park; 211 feet east of the walk on the west side of the street west of the park, and 23 feet west of the edge of the canyon running through the park. It is marked by a bronze disk set in a concrete monument 10 by 10 by 30 inches, projecting 10 inches above the ground. The following true bearings were determined:

Southwest corner of cement foundation of Mr. Kegel's residence (mark).....	81 56.7	west of north
Right edge of Mr. Woodage's residence.....	51 20.1	west of south
North gable of Dr. Ross's residence.....	73 24.1	east of south
West gable of Mr. Beakely's residence.....	86 12.9	east of north
Flagpole on courthouse tower.....	50 54.9	east of south

Seven auxiliaries were also occupied. Auxiliary No. 1 is 2 miles north and one-half mile west of the courthouse near Columbia City. No. 2 is 3 miles west and one-half mile north of the courthouse. No. 3 is 6 miles south and 3 miles west of the courthouse. No. 4 is 10.5 miles south and 5.5 miles west of the courthouse and about 3 miles south of Scappoose. No. 5 is one-half mile north and 4.5 miles west of the courthouse and 1 mile west of Yankton. No. 6 is 3 miles north and 10 miles west of the courthouse near Trenholm. No. 7 is 0.7 mile north and 0.2 mile west of the courthouse identical with triangulation station, Lemont, 1878.

*Tillamook, Tillamook County.*—The station is near the center of the fairgrounds, one-half mile east of the center of the town. It is 302 feet west of the east fairground fence; 47 feet west of the fence on the west side of the track; 277 feet south of the board fence on the north side of the grounds, in line with the west side of the main exhibition hall, and 133 feet south of its southeast corner. It is marked by a concrete monument 12 by 12 by 30 inches, center marked and lettered U. S. C. & G.

## OREGON—continued.

Survey, 1917, projecting 10 inches above the ground. The following true bearings were determined:

	°	'	
Flagpole on courthouse cupola (mark).....	75	49.3	west of north
Lutheran Church spire.....	86	32.8	west of south
Cross on Catholic Church dome.....	82	14.2	west of south
Tip of north dormer gable of John Hathaway's residence.....	59	24.3	east of south
South gable of house opposite northeast corner of fairgrounds.....	35	12.0	east of north

*Vale, Malheur County.*—The station is near the southwest corner of the city park, one-tenth mile west of the center of the town. It is 37.5 feet north of the fence on the south side of the park; 49 feet east of the fence on the west side; 155 feet south of the fence on the north side, and 68 feet southeast of the southeast corner of a small frame pump house. It is marked by a bronze disk set in the top of a round concrete post 12 by 36 inches, projecting 4 inches above ground. The following true bearings were determined:

	°	'	
South gable of Christian Church (mark).....	3	25.3	west of north
Southwest corner of vestibule of above church.....	5	55.1	west of north
Extreme left edge of point of rocks on cliff east of town.....	72	39.8	east of south
Apex of sharp pinnacle of rock to right of cliff southeast of town.....	44	47.2	east of south
Right edge of Mr. Robert's concrete house.....	65	23.1	west of south

## SOUTH CAROLINA.

*Barnwell, Barnwell County.*—The station of 1904 could not be recovered, so a new station was established in the southeast part of the public-school grounds, about 290 feet south of the south edge of the street, and about 288 feet southeast of the northeast corner of the school building. It is 82.3 feet north of the south fence of the grounds; 67.3 feet north of the north edge of the race track; 87.9 feet west of the east property line; 67.6 feet west of the west edge of the race track, and 110.6 feet south of southwest from a young oak tree, being the last living tree of a row in which several have died. The station is marked by a bronze disk set in cement in the top of a 2-foot length of 4-inch clay drainpipe buried with bell end down and flush with the ground. The following true bearings were determined:

	°	'	
Railroad water tower (mark).....	9	42.8	east of north
South end of west girder of railroad culvert.....	36	50.5	east of south
Outside edge of capstone at south side of steps at southwest corner of school building.....	69	48.0	west of north
Northeast corner of foundation of school building....	44	10.2	west of north

Eight auxiliary stations were also occupied. Auxiliary No. 1 is about 4 miles south of Barnwell, one-fourth mile southwest of Yonome Railroad station, in a field on the west side of the highway, and 49 feet back from the road. No. 2 is about 1 mile south of a place where the highway crosses the Southern Railroad at a siding marked Mathis. The siding is about 1 mile south of Cave Station and 11 miles south of Barnwell. The point is in a field on the east side of the highway, about 984 feet south of a church and cemetery, and 50 feet back from the edge of the highway. No. 3 is about 5 miles north of Barnwell at Ashleigh, on the east side of the main highway, at a point one-fourth mile south of the 5-mile post, 49 feet east of the road

SOUTH CAROLINA—continued.

and 492 feet west of the railroad. No. 4 is about 9 miles north-northeast of Barnwell; one-half mile south of the railroad station at Blackville, in a field on the west side of the highway, 49 feet from the road and 656 feet east of the Southern Railroad track. No. 5 is about 5 miles west of Barnwell, three-fourths mile northeast of the railroad station at Snelling and about one-fourth mile east of the 5-mile post, in a field north of the highway, about 49 feet from it and 328 feet east of the top of a hill. No. 6 is about 11 miles west of Barnwell, about 1 mile east of the town of Dunbarton, on the south side of the highway at a bend with some pine trees. No. 7 is about 5 miles east-southeast of Barnwell, at a point about 1 mile west of Friendship Church, just east of the 5-mile post on the road leading from Barnwell to Olar and Schofield, on high ground 49 feet southwest of the road. No. 8 is about 10 miles east-southeast of Barnwell, at a point 2 miles west of Olar, one-fourth mile south of the fork in the road where one branch goes to Olar and one to Schofield. The point is 49 feet west of the road to Schofield, on high ground.

*Cheraw, Chesterfield County.*—The station is at a point a little less than 1 mile north-northwest of the center of the town, on the northeast side of the road to Wadesboro, near the top of a hill and about 984.2 feet east of a creek, on some waste ground just west of a crossroad. It is 73 feet northeast of the fence along the Wadesboro Road and 210 feet west-northwest from the gate on the crossroad. The station is not marked.

*Chester, Chester County.*—The station of 1912 was reoccupied. It is on the fairgrounds, about one-half mile north of the center of the city. It is on the area inclosed by the race track; 170 feet from the fence on the west end; 381 feet from the fence on the north side; 146.5 feet from the fence on the south side; 237 feet from the northwest corner of the grand stand, and 107 feet from a tree which bears about north by west. The station is marked by a Bedford limestone post 6 by 6 by 30 inches, projecting about 1 inch above the ground, and having a brass magnetic station marker in the top. The following true bearings were determined:

Spire of Colored Methodist Church (mark).....	66 04.7 east of south
South side of tank of Eureka cotton mill.....	84 43.8 east of north
Southwest corner of F. D. Gregor's barn.....	24 40.8 west of north
Southeast column of G. W. Ferguson's residence.....	7 16.1 west of south

Nine auxiliary stations were also occupied. Auxiliary station A is a stake about 200 feet northeast of the primary station. Auxiliary No. 1 is about 5 miles south of Chester, at a point 2 miles south of Evans Station on the Southern Railroad. It is about 656 feet south of the 5-mile post, on the west side of the highway, and about 32 feet back from the highway. No. 2 is about 12 miles south of Chester at Blackstock, at a point one-fourth mile east of the railroad station and about 328 feet northwest of a schoolhouse. No. 3 is about one-fourth mile northeast of the railroad station at Dinber, at the southeast side of the road and 5 miles north of Chester. No. 4 is about 10 miles north of Chester, about 1 mile south of the town of McConnellsville. It is on a hilltop between the highway from Chester and a road which branches to the southwest from it, at a point about 60 feet east of that road. No. 5 is 30 feet south of the highway, 3 miles east of Chester, where there is an outcrop of rocks. No. 6 is about 3 miles west of Chester, on the north side of the highway to Union, just beyond a double curve in the road, the point being about 60 feet uphill from the road. No. 7 is at a point about 6 miles east of Chester and about 2 miles southwest of Rodman, on the north side of the highway, on level, stony ground. No. 8 is about 4 miles northeast of Chester, at the edge of some woods where a road leads off to the southeast. It is 500 feet northeast of Rocky Creek, 500 feet southeast of the Southern Railway track, and 80 feet southeast of the highway.

*Columbia, Richland County.*—The station of 1905 was found to be no longer suitable, so a new station was established. It is on the Ridgewood golf grounds, about 4 miles

## SOUTH CAROLINA—continued.

north-northwest of the center of the town, at a point in the southern part of the grounds, about 700 feet south-southwest of the clubhouse and across a ravine from it. It is 130 feet north-northeast of the edge of a road; 100 feet west of an oak tree nearly 3 feet in diameter, at the edge of the woods; 30 feet south and uphill from a golf tee, and 140 feet east of hole 14 of the golf course. The station is marked by a bronze disk set in the top of a marble post 8 by 8 by 18 inches, set flush with the ground. The following true bearings were determined:

	o /	
Southwest gable of clubhouse (mark).....	20 30.5	east of north
Center gable of clubhouse.....	24 57.3	east of north
Peak of large frame house.....	43 03.6	east of south

*Laurens, Laurens County.*—The station of 1912 was found unsuitable for magnetic observations, so a new station was established 110 feet due north. It is about  $\frac{1}{3}$  mile northwest of the center of the city, on the grounds of the graded school, corner of Church and Laurens Streets. It is about 35 feet north of the bottom of an embankment; 120 feet south of the south side of a road; 102.3 feet southeast of a cedar tree 6 inches in diameter; 76.9 feet east-southeast of a cedar tree 9 inches in diameter, and 145 feet southwest by west from a forked cedar tree 10 inches in diameter. This point is marked by a bronze disk set in the top of a Bedford limestone post 6 by 6 by 30 inches and with its top flush with the ground. The following true bearings were determined:

	o /	
Center of meridian stone (mark).....	0 00.0	due north
Tower of African Methodist Church.....	78 29.0	east of south
Northeast edge of top of business building on north side of square in which Enterprise Bank is located.	69 34.4	east of south
Southeast gable of one-story red frame house.....	73 07.3	west of north
Southeast gable of two-story white frame house.....	69 11.9	west of north

A meridian stone is about 890 feet north of the magnetic station.

*McBee, Chesterfield County.*—The station is at a point about one-half mile west of the town, on the north side of the main highway leading to the west, and just beyond a graveyard, in sandy, unfenced, cut-over land. It is 108 feet north of the north edge of the road. It is not marked.

*Salley, Aiken County.*—The station is one-fourth mile northwest of the center of town, in the northwest part of the public-school grounds. It is 216 feet west-northwest of the northwest corner of the school building; 207 feet north of the north side of the street; 19 feet southwest of an oak tree; 41 feet west by south from a pine tree, and 41 feet east by south from a leaning twisted tree. The station is marked by a bronze disk set in the top of a 2-foot length of 4-inch tile pipe and is flush with the ground. The following true bearings were determined:

	o /	
West gable of small barn.....	31 08.7	east of north
North gable of church next to school building.....	79 52.0	east of south
East gable of small barn with galvanized iron roof....	11 24.7	west of south
East gable of shed, three-eighths mile distant.....	78 43.9	west of south

## TENNESSEE.

*Athens, Mc Minn County.*—The station of 1914 was reoccupied. It is on a hill north of the town; about 600 feet northeast of the railroad station and about 800 feet south of the standpipe; 118 feet southeast of the lower road from Athens to Sweetwater, and 55.3 feet and 50.6 feet, respectively, from the northeast and southeast corners of the building of the Athens Collegiate and Industrial Institute, a colored

TENNESSEE—continued.

institution. The station is marked by a stone 3 by 8 by 16 inches, lettered U. S. C. & G. S., 1903, on top, in the center of which there is a drill hole. The following true bearings were determined in 1903:

	o /
Spire on Baptist Church (mark).....	35 06.3 east of south
Cupola of Bandfield Memorial Hall.....	28 05.6 east of south

*Knoxville, Knox County.*—The station of 1914 was reoccupied. It is on the University of Tennessee experiment farm, about 1½ miles from the courthouse in a south-westerly direction. It is about 3 feet from the eastern edge of the lawn east of the dwelling house; 42.7 feet from the northeast corner of the house, and 62.7 feet from the east post of the south piazza. On account of changed conditions in regard to iron in the vicinity, a new station was established about 1,000 feet to the southwest in the central part of the experiment farm. It is on the southwest edge of an Indian mound; about 1,000 feet a little west of south from a dwelling house, and 84 feet west from the center of the road through the center of the farm. It is marked by a marble post 6 by 6 by 28 inches, lettered U. S. C. & G. S., projecting about 2 inches above the ground. The following true bearings were determined:

Upper northwest corner above piazza of the Cox house	o /
(mark).....	75 48.5 west of north
South gable of the southwest cattle barn.....	44 00.5 west of north
Southwest gable of J. B. Jones's house.....	87 00.6 west of north

*Memphis, Shelby County.*—The station of 1914 was reoccupied. It is in the southeastern part of Overton Park, about 185 feet north of a line between the seventh and eighth golf hole, and about 1½ miles northeast from the town's center. It is 155.3 feet northeast from the northeast corner of the nearest rustic bridge and 203.5 feet northeast from the northeast corner of a rustic bridge constructed from a single log. The station is marked by a limestone post 6 by 6 by 30 inches, projecting about 6 inches above the ground. The following true bearing was determined:

Top of steeple of Baptist Church on Union Avenue	o /
(mark).....	8 14.6 east of south

TEXAS.

*Amarillo, Potter County.*—The station of 1910 was reoccupied. It is in the cemetery southeast of town, in the middle of the third driveway running east and west, counting from the north side of the cemetery, and 84.5 feet east of the center of the drive running south from the gateway. It is also 43.5 feet east and a little south of the base of the Kecton monument. The station is marked by a marble post 6 by 6 by 18 inches, lettered U. S. C. & G. S., and projecting 1 inch above the ground. The following true bearings were determined:

	o /
Steeple of Congregational Church (mark).....	4 13.0 west of north
Cupola of high-school building.....	17 45.6 west of north
Gable end of cupola of Amarillo Mill & Elevator Co..	4 48.3 east of north
Steeple of Glenwood Christian Church.....	42 08.4 east of north
Base of flagstaff on pavilion in fairgrounds.....	66 28.1 east of north

UTAH.

*Green River, Emery County.*—The station of 1905 was reoccupied. It is on land owned by the Denver & Rio Grande Railroad, about one-fourth of a mile southwest of the center of the town, and about 700 feet south of the railroad station. It is about 600 feet southeast of the longitude station of 1898 and south of the Palmer Hotel. It is 348.2 feet south of the southeast corner of the fence surrounding the Palmer Hotel

## UTAH—continued.

and 389 feet southeast of the southwest corner of the same fence. The station is marked by a redwood post 7 by 5 by 30 inches, projecting 6 inches above the ground. The following true bearings were determined:

Spire on western water tank (mark).....	5 44.2 east of north
Flagpole on Palmer Hotel.....	26 34.2 east of north
Spire on eastern water tank.....	89 14.2 east of north
Apex of pointed hill about 3 miles away.....	47 50.8 east of south
Left edge of brick chimney on frame house.....	8 18.8 east of south

*Ogden, Weber County.*—The station of 1905 was reoccupied. It is about one-half mile west of the west bank of Weber River, west of the Southern Pacific Railroad station, and just south of two piers. These piers form part of an observatory which has disappeared. They are 5 feet high and 1½ feet square, and the eastern pier is inscribed with the latitude, longitude, and elevation. It is also marked with the name Wheeler, U. S. A., 1873. The station is 45.4 feet south of the southeast corner of the east pier and 46 feet from the southwest corner of the west pier. The station is also 99 feet from a fence corner to the south. It is marked by a cement post 12 by 12 by 30 inches, projecting 2 inches above ground and having a bronze disk in the top. The following true bearings were determined in 1913 and 1917:

Spire on Union Station tower (mark).....	84 38.0 east of north
Catholic Church spire.....	81 10.6 east of north
Center of high brick smokestack.....	58 02.4 east of north
East gable of brick church.....	35 01.2 west of north
Center of high brick smokestack in south part of town..	70 33.0 east of south

## WASHINGTON.

*Berlin, King County.*—The station is about 300 feet south of the flag station and 150 feet west of the Great Northern Railway. It is not marked. The following true bearings were determined:

Right edge of chimney on post office (mark).....	43 29.7 west of north
Gunn Peak (approximate).....	17 30.2 west of north
Center of railroad bridge.....	70 25.2 east of south
Lennox Mountain (approximate).....	39 49.8 west of south
Crosby Mountain (approximate).....	88 29.8 west of south

*Cathlamet, Wahkiakum County.*—The station is near the middle of the first street east of the main street of the town and one block due east of the courthouse. It is 74 feet southwest of a stairway leading down the steep cliff to the north. It is also 163 feet northwest of the southwest corner of the high school; 26 feet west of a board walk; 20.5 feet east of a wooden fence, and 65 feet northwest of a fence corner. It is marked by a concrete monument 13 by 13 by 30 inches, with bronze disk set in the top, projecting 5 inches above the ground. The following true bearings were determined:

Congregational Church spire (mark).....	12 19.7 west of south
North gable of old hotel.....	19 38.6 west of south
Southeast corner of Columbia Hotel.....	59 41.4 west of south
Center of brick chimney on long cottage at foot of opposite hill.....	9 30.7 east of north
Flagpole on cupola of Carrenden's house.....	21 49.3 east of south

Five auxiliaries were also occupied. Auxiliary A is 200 feet east of the primary. No. 1 is 2 miles south and 2 miles east of the primary. No. 2 is 3 miles east and 2 miles

WASHINGTON—continued.

north of the primary in school district No. 12. No. 3 is 4 miles east and 5 miles north of the primary. No. 4 is 4 miles north and 3 miles west of the primary and 1.5 miles east of Shamokawa.

*Cle Elum, Kittitas County.*—The station is on the bench at the north end of Pennsylvania Avenue, about one-tenth mile north of the center of the town. It is 20 feet west of the walk on the west side of Pennsylvania Avenue and 45 feet east of a large pine tree. The station is not permanently marked. The following true bearings were determined:

U. S. C. & G. S. bronze bench mark in northwest corner of Travelers' Hotel (mark).....	4	11.4	west of south
Apex of Northern Pacific water tank.....	7	42.7	west of south
Southeast corner of church, one block west of city hall.....	43	28.5	west of south
Cross on Catholic Church spire.....	46	28.8	east of south
Southwest corner of the Cle Elum State Bank.....	19	48.2	east of south

*Connell, Franklin County.*—The station is one-fourth mile northwest of the center of the town. It is on the hillside about 350 feet west of the depot and just west of a large coulee. It is also 200 feet north of the north side of the street crossing the track just south of the depot. It is not marked. The following true bearings were determined:

Spire on Northern Pacific water tank (mark).....	8	09.2	east of north
Methodist Episcopal Church spire.....	63	19.5	east of south
Flagpole on high school.....	53	40.2	east of south
Presbyterian Church spire.....	15	35.1	west of south

*Davenport, Lincoln County.*—The station is near the southeast corner of the county courthouse square, one-tenth mile northeast of the center of the town. It is 84.1 feet southeast of the southeast corner of the courthouse; 33.5 feet west of the fence on the east side of the square, and 31.8 feet north of the south fence. It is marked by a bronze disk set in the top of a concrete post 12 inches in diameter and 24 inches long, projecting 1 inch above the ground. The following true bearings were determined:

Cross on Catholic Church spire (mark).....	34	43.0	west of south
Flagpole on cupola of grammar school.....	28	57.5	west of south
Left edge of high school.....	23	18.0	west of south
Ball at apex of cupola on hospital.....	67	35.8	west of south
Northeast corner of courthouse, on bricks.....	16	02.1	west of north

*Eagle Gorge, King County.*—The station is in an old river bed 500 feet south of the depot and 100 feet west of the Northern Pacific Railroad. It is not marked.

*Ephrata, Grant County.*—The station is near the southeast corner of the high-school grounds, one-fourth mile north of the center of the town. It is 40.2 feet from the fence on the south side of the grounds and 67.6 feet west of the fence on the east side. It is marked by a bronze disk in the top of a concrete post 12 by 12 by 40 inches, projecting 12 inches above ground. The following true bearings were determined:

Left edge of top of concrete elevator (mark).....	21	59.7	east of south
Right edge of same elevator.....	20	54.8	east of south

A similar post 449 feet to the north marks the true meridian. This post is 5.5 feet south of the north fence of the school grounds and 65 feet west from the east fence.

*Okanogan, Okanogan County.*—The station is in the courthouse yard near the center of the town. It is 158 feet south of the south corner of the courthouse and 23 feet from

## WASHINGTON—continued.

the inner edge of the top of the retaining wall in front of the courthouse. It is marked by a concrete monument 12 by 12 by 36 inches, projecting 10 inches above ground, and having a bronze disk in the center of the top. The following true bearings were determined:

Left edge of chimney on First National Bank Building	° /	
(mark).....		8 22.0 west of south
East gable of farmhouse on distant hill in line with high mountain.....		89 32.0 west of north
Right edge of courthouse, first floor.....		18 27.5 east of north
West gable of house on distant hill in line with the Bureau Hotel.....		48 24.7 east of south
Tip of a very large solitary rock on high hill.....		13 28.9 east of south

*Pasco, Franklin County.*—The station is in the county courthouse yard, one-half mile north of the center of the town. It is near the west side of the grounds about in line with the south side of the jail and 102.5 feet west of its southwest corner; 129.6 feet north of the curb on north side of the street to the south, and 79 feet east of the curb on the east side of the street to the west. It is marked by a bronze disk set in the top of a concrete post 12 by 12 by 40 inches, projecting 10 inches above ground. The following true bearings were determined:

Cross on Catholic Church spire (mark).....	° /	32 57.9 east of south
Left edge of vestibule of Catholic Church.....		33 24.4 east of south
Southwest (nearest) corner of concrete ice plant.....		19 11.1 east of north
Northwest corner of courthouse foundation.....		67 27.0 east of north
Southwest corner of courthouse second floor.....		77 34.4 east of south

*Pateros, Okanogan County.*—The station is near the roadside 325 feet northeast of the depot and 170 feet west of the city pumping station. It is not marked. It is about one-half mile northeast of the center of the town. The following true bearings were determined:

North gable of house on point of land across Columbia	° /	
River (mark).....		19 01.4 east of south
Apex of water tank on hillside.....		87 40.8 west of north
Right edge of house across river near ferry terminal....		79 26.4 east of south

*Prosser, Benton County.*—The station is near the east corner of the city park, about one-tenth mile east of the center of the town. It is 178.8 feet northeast of the walk in front of the park and school grounds, 30.6 feet southwest of the row of trees in the rear of the park and school grounds; and 120.1 feet southeast of the walk on the northwest side of the park. It is marked by a bronze disk set in the top of a concrete monument, 12 by 12 by 36 inches, projecting 8 inches above ground. The following true bearings were determined:

Center of chimney on house on hill (mark).....	° /	55 36.0 east of north
East corner of Christian Church foundation.....		26 58.0 east of south
East corner of foundation of Mr. H. Osterlie's concrete house.....		41 05.5 west of south
West corner of foundation of Mr. H. Osterlie's concrete house.....		62 00.9 west of south
Tip of south gable of Mr. Somer's bungalow.....		35 20.3 east of north

*Republic, Ferry County.*—The station is near the southwest corner of the courthouse square, one-tenth mile east of the center of the town. It is 99 feet southwest of the southwest corner of the jail; 17.3 feet from the fence on the west side of the grounds,

WASHINGTON—continued.

and 21 feet from the fence on the south side. It is marked by a round concrete post 12 inches in diameter, 36 inches long, projecting 2 inches above ground. A cross and drill hole in the center of the top mark the precise location. The following true bearings were determined:

	°	/	
Catholic Church spire (mark).....	11	43.9	west of south
East edge of brick chimney on cottage north of court-house.....	17	44.3	east of north
Flagpole on mountain top.....	49	38.3	east of south
South edge of a very large frame building in north end of town.....	84	30.2	west of south

*Restoration Point, Kitsap County.*—The station is identical with the triangulation station of the same name. It is located on the southeast point of Bainbridge Island, called Restoration Point, by Vancouver in 1792. At the place where the station is situated, which is about 18 paces from the extreme point, the point is about 8 yards wide. The station is marked by a brass triangulation mark in concrete 10 inches below the surface of the ground, and above this another triangulation mark in a slab of concrete 3 feet in diameter and 4 inches thick.

*Seattle, King County.*—The station is on Bailey Peninsula or Seward Park, near the south end of Andrews Bay. To find the station follow the footpath around the shore of the peninsula after leaving the road. Just before reaching a perpendicular rock exposure (facing the north) a trail leads up the cliff about 40 feet. In this trail and about 10 feet from the edge of the cliff among high trees is the station. It is marked by a bronze disk set in a round concrete post 12 inches in diameter by 24 inches long, projecting one-half inch above the ground. The following true bearings

were determined:

	°	/	
Plymouth Church steeple.....	28	26.3	west of north
Dome on horizon.....	23	23.1	west of north
South dome on Church of Immaculate Conception....	31	03.9	west of north
South gable of house on top of hill across bay.....	58	48.0	west of north

*Spokane, Spokane County.*—The station of 1906 was reoccupied. It is on an unused portion of ground in the northwest part of Fairmount cemetery and 315.6 feet from the board fence bounding the cemetery on the north. The station is marked by a sandstone post 4 by 6 by 26 inches, projecting about a foot above the surface of the ground. (Rocks prevented post being planted deeper.) The post is lettered on top U. S. C. & G. S., 1906, and has a hole in the center to mark the exact spot. The following true bearings were determined in 1906 and 1917:

	°	/	
South edge of top of brick smokestack at smelter . . .	45	33.9	west of north
North edge of top of brick smokestack at smelter.....	45	13.2	west of north
Pinnacle on water tank.....	6	15.3	west of south
Right edge of water tank.....	6	49.1	west of south

*Springdale, Stevens County.*—The station is about 100 feet west of the foot of a high hill and about 400 feet southeast of the depot. It is also 280 feet east of the main road leading south from town. It is not marked. The following true bearings were determined:

	°	/	
Baptist Church spire (mark).....	2	49.6	west of north
Chimney on large house on hill.....	16	56.5	west of north
Cross on Catholic Church spire.....	49	47.0	west of south

## WASHINGTON—continued.

*Waterville, Douglas County.*—The station is near the northwest corner of the courthouse square, one-fourth mile east of the center of the town. It is 77.4 feet west of the northwest corner of the courthouse; 19.5 feet east of the row of trees on the west side of the yard; 20.7 feet south of the row of trees on the north side, and 41.4 feet north of the row of trees north of the walk leading to the courthouse. It is marked by a bronze disk set in the top of a concrete monument 12 by 12 by 36 inches, projecting 10 inches above ground. The following true bearings were determined:

	°	'	
Presbyterian Church spire (mark).....	72	31.7	west of south
Northeast gable of Waterville Hotel.....	79	25.8	west of north
Cross on Catholic Church spire.....	31	18.4	west of north
Left edge of brick chimney on house just east of court- house.....	88	22.7	east of south
Left edge of standpipe.....	1	17.6	west of south

*Wenatchee, Chelan County.*—The station is on the high-school grounds, one-half mile west of the center of the town. It is 311.8 feet west of the south corner of the school building; 343.7 feet west and a little north from the walk on the southeast side of the grounds, and 14 feet northeast from the outer row of trees on the southwest side of the grounds. It is marked by a bronze disk set in the top of a concrete post 12 by 12 by 36 inches, projecting 10 inches above the ground. The following true bearings were determined:

	°	'	
Right edge of high school on rain table (mark).....	74	35.8	east of south
Left edge of large brick chimney on high school.....	86	15.7	east of north
Left edge of high school on rain table.....	62	55.1	east of north
Central (highest) pinnacle on Castle Rock.....	50	30.0	west of south

*Wilbur, Lincoln County.*—The station is on a meadow across the creek east from the east end of Main Street, about one-tenth mile east of the center of the town. It is 350 feet east of the road running north and south and 350 feet west of a pasture fence, and 180 feet south of the east and west road. It is not marked. The following true bearings were determined:

	°	'	
Presbyterian Church spire (mark).....	36	10.0	west of north
Left edge of east concrete elevator.....	9	03.6	east of south
Spire on elevated tank at farmhouse.....	88	55.6	east of north
Spire on cupola of residence.....	56	55.8	east of north

In addition to above primary station six auxiliary stations were occupied. Auxiliary station No. 1 is near crossroads, 4.1 miles east of the primary station. No. 2 is near the road, 4.3 miles west of the primary. No. 3 is near crossroads, 4 miles due north of the primary. No. 4 is near the crossroads, 4 miles south and 0.3 mile west of the primary. Auxiliary station A is 300 feet southeast of the primary. Station B is 300 feet east of primary. The auxiliary stations were not marked.

## WISCONSIN.

*Delavan, Walworth County.*—The station is located on the dividing line between Spring Grove and St. Andrew's Cemeteries; 57.8 feet from the north fence; 53.9 feet from a large black-oak tree a few feet east of the dividing line; 83 feet from a silver-birch tree to the southwest, and 48.3 feet from a box-elder tree to the south. The station is marked by a bronze disk set in the top of a white stone post. The following true bearings were determined:

WISCONSIN—continued.

Center of chimney of Bradley Knitting Co. (mark)...	10 08. 0 east of south
Center of chimney at Orphan's Home.....	68 00. 0 west of south
Center of silo at Johnson's farm.....	48 16. 4 west of north
Center of north one of two silos at I. F. Dunwiddie's..	54 42. 0 east of north
North gable of red barn at W. Austin's.....	53 35. 6 east of south

In addition to the above, six auxiliary stations were occupied in the vicinity of Delavan. Auxiliary No. 1 is at Woodlawn Bay, in the field north of the water tank of the Woodlawn Bay Hotel. It is 2 miles east and 2 miles south of Delavan. It is 51 feet north of the fence and 72 feet northwest of the west gatepost at the wide gate opening into the field. Auxiliary No. 2 is 1½ miles south and 6 miles east of Delavan, and is located 48 feet south of the southeast corner of the schoolhouse in section 20, Geneva Township. Auxiliary No. 3 is about 2½ miles northwest of the cemetery at Delavan and located about 61 feet east of the southeast corner of the schoolhouse on the road leading to Richmond. Auxiliary No. 4 is in the back yard of the schoolhouse, about 2½ miles southwest of the primary station. Auxiliary No. 5 is on the grounds of the Yerkes Observatory, about 600 feet north of the meridian room and 5.5 feet east of the meridian of the transit instrument. Auxiliary No. 6 is in the northeast corner of a pasture to the south of the schoolhouse in the northeast corner of section 2, Sharon Township. It is also 4 miles south and 2½ miles west of Delavan.

*Drummond, Bayfield County.*—The station is in the east middle side of the school yard, which is about one-eighth mile east of the railroad depot at Drummond. The station selected is over a rock which projects slightly above the surface of the ground. A small hole drilled in the rock marks the point. The station is 16 feet from the east fence around the school yard; 109.1 feet southeast from the southeast corner of the school building; 102.4 feet northeast of the northeast corner of the town hall building, and 16.2 feet east by south from the crown of a large rock which protrudes above the ground in the east side of the school yard. The following true bearings were determined:

Near edge on chimney at house 500 feet distant.....	23 02. 4 west of south
Peak of water tank.....	84 39. 6 west of north
Near gable on house 250 feet distant.....	18 13. 4 west of north
Near gable on barn.....	23 27. 4 east of north
Center of south gatepost at cemetery.....	45 02. 6 east of south

*Eland, Shawano County.*—The station is located in the eastern part of the rear school yard of the new public school, about one-eighth mile south and one-half mile east of the depot. It is 141.7 feet south of the southeast corner of the school building, 121 feet west of the present fence along the east side of the school yard. The station is marked by a bronze disk set in the top of a large red-granite boulder and dated 1917. The following true bearings were determined:

Chimney on house three-fourths mile distant.....	15 30. 8 west of south
Lutheran Church spire.....	67 54. 6 west of south
Congregational Church spire.....	72 17. 4 west of north
Most eastern point on dressed stone border on school building.....	1 51. 6 east of north
Near gable on Smerling's house.....	67 30. 6 east of north

*Fairchild, Eau Claire County.*—The station is about 1 mile east of the railroad depot in the city cemetery in an east and west alleyway which is about 66 feet south of the flagpole and well. The station is about 125 feet east of the well; 79.7 feet west of

## WISCONSIN—continued.

the east fence of the cemetery grounds; 42.7 feet southeast of the southeast corner of the base of the Kennedy monument; 66.3 feet northeast of the northeast corner of the base of the Rabensdorf monument, and 3.8 feet southeast of a lot corner stone. The station is marked by a bronze disk dated 1917, set in the top of a 6-inch cylindrical concrete post flush with the ground. The following true bearings were determined:

	°	'	
Center of H. E. Neusbaum's silo (mark).....	19	59.1	west of south
Cupola on high-school building.....	84	48.8	west of north
East gable of white house 1 mile distant.....	47	19.8	west of north
South gable of white house three-fourths mile distant.	42	03.5	east of north
Base of power-line pole.....	40	19.6	east of south

*Hudson, St. Croix County.*—Observations were made about 300 feet northeast of the station of 1908 on the old fairgrounds now used as a farm by S. W. Fradenburg. This point is marked by a large stone with a notch cut in the top and is 126.3 feet southwest of the southwest corner of the new barn; 161.8 feet southeast of the center of the pump at the windmill, and 275 feet east of the house. A new station was established near the middle of the new addition to the city cemetery about one-half mile east-southeast from the center of the town. The station is 2 feet northeast of the corner tile which marks the northeast corner of lot 26 in section 5 of the cemetery, and is marked by a 6 by 6 inch marble post set flush with the ground and lettered U. S. C. & G. S. 1908. The following true bearings were determined:

	°	'	
Tip of Mr. Penfield's silo (mark).....	11	22.8	west of south
Center of east dormer window at Mr. Crosby's.....	88	49.5	west of north
Letter A on Sunderland monument.....	1	04.6	east of north
Tip of Mr. Dowling's silo.....	53	55.3	east of north
Near corner (edge) of Mr. Gridley's house.....	48	34.0	east of south

Six auxiliaries were also occupied. Auxiliary No. 1 is in the northeast corner of the yard of schoolhouse No. 19 in Minnesota; it is about 3 miles west of the primary station. No. 2 is in the southwest part of Lakeland, Minn., and about 2.7 miles southwest of the primary. No. 3 is behind the Glover Station schoolhouse; it is 5.7 miles southeast of the primary. No. 4 is in the southeast corner of the school yard at Joint Township school No. 2, which is about 5.2 miles east by south from the primary. No. 5 is in the southeast corner of the North Line school yard, which is about 2.6 miles northeast of the primary. No. 6 is in the west middle part of the school yard at Burkhart, 5.3 miles northeast of the primary.

*Marengo, Ashland County.*—The station is on the rear grounds of the small Catholic Church, about one-fourth mile north and one-fourth mile west of the Soo Line Railway depot. It is directly behind the church and in line with the south side of the building. It is 49.2 feet west of the southwest corner of the church, 46.9 feet south of the north fence around the church lot, and 102.6 feet east of the west fence. The station is not marked.

*Mercer, Iron County.*—The station is about three-eighths mile north of the depot on a vacant lot owned by Mr. Hobbs just southwest of his house. It is 86 feet northeast of the west fence, 70 feet from the near edge of the board sidewalk in front, and 58 feet south-southeast of a large pine tree which stands in the lot near the sidewalk. The station is not marked.

*Milwaukee, Milwaukee County.*—The station of 1908 in Lake Park was reoccupied. It is near North Point Lighthouse, 74.25 feet from the stone at northwest corner of lightkeeper's grounds, and 76.5 feet from the northwest corner of the lightkeeper's

WISCONSIN—continued.

toolhouse. The station is marked by a marble post 6 by 6 by 21 inches, lettered U. S. C. & G. S. The following true bearings were determined in 1908 and 1917:

	° /	
Flag pole on streetcar pavilion (mark).....	0 14 2	east of north
Tower of Mr. Middleton's residence.....	21 03. 2	west of north
Lamp-post along front driveway 500 feet distant.....	5 01. 7	east of south

*Mondovi, Buffalo County.*—The station is located in the northwest portion of the fairgrounds, which is about three-fourths of a mile northwest of the center of the town. It is inside the race track 138.9 feet from the north fence; 230.5 feet from the west fence; 82.9 feet from the present inside of the track. It is marked by a bronze disk, dated 1917, set in the top of a marble stone 7 by 8 inches, set down almost flush with the ground. The following true bearings were determined:

	° /	
Catholic Church steeple (mark).....	37 33. 8	east of south
East gable of big red barn on Mr. Farrington's farm...	72 56. 4	west of south
Peak of city water tank.....	4 35. 3	west of north
Center of chimney on Mrs. Howard's house.....	50 45. 8	east of north
Cupola on Whelan school building.....	82 50. 5	east of south

*Moore, Iron County.*—The station is located in the rear yard of the public school which is about 800 feet east of the depot. It is 43.5 feet east by north from the southeast corner of the schoolhouse; 69.1 feet north of the south fence around the school yard; 82.3 feet south of the north fence. The station is not marked.

*New London, Waupaca County.*—The station is located in the Protestant cemetery, which is about 1½ miles southwest of the center of the town. It is in the east side of the cemetery and would be in the second, wide, sodded east and west avenue from the north side of the cemetery were it continued. It is on a sandy hill 20.2 feet south by west from the southwest corner of the base of Chester Hamilton's tombstone, 85 feet from the east fence around the cemetery, and 52 feet east of the center of a large pine tree that now stands near the middle of the east end of the above-mentioned east and west wide avenue. It is also 70.1 feet north by east from the Lloyd monument. The following true bearings were determined:

	° /	
Catholic Church spire.....	33 26. 8	east of north
Center of gable windows in house.....	68 03. 4	east of north
North one of two silos at farm 1½ miles distant.....	51 21. 5	east of south
Near edge on base of Koehn-Steinke monument.....	53 57. 2	west of south
Near edge of base of Allie R. Westphal's monument..	24 45. 0	west of north

*Pecks Station, Walworth County.*—The station is located in the northwest corner of a field, about three-eighths mile northwest of the railway station. The point occupied is 68 feet south of the north fence and 118.5 feet east of the west fence. It is not marked. The following true bearings were determined:

	° /	
Cupola on barn at Peck's farm (mark).....	7 19. 9	east of south
Cupola on barn at Dumphey's farm.....	13 36. 2	west of south
Silo cap at Rechnagel's farm.....	82 05. 2	west of north
Center of base of trunk of a large tree in pasture north-east ¼ mile.....	41 54. 1	easy of north
Center of chimney at milk factory at Pecks Station...	42 20. 3	east of south

In addition to the above primary station, five auxiliary stations were occupied. Auxiliary No. 1 is 2½ miles north and 2 miles west of Pecks Station. It is in the

## WISCONSIN—continued.

Lauderdale school yard, 56 feet north of the fence on the south side of the school yard and about 35 feet from the center of the road in front of the schoolhouse. Auxiliary No. 2 is three-eighths mile south and 6 miles west of Pecks Station. It is near the middle of the north side of the Millard school yard, 25 feet from the north fence and 77 feet from the east fence. Auxiliary No. 3 is  $6\frac{3}{8}$  miles north and  $5\frac{1}{2}$  miles east of Pecks Station. It is in the Troy Lake school yard, 48 feet west of the southwest corner of the schoolhouse and 19 feet from an oak tree to the northwest. Auxiliary No. 4 is one-half mile north and  $5\frac{1}{2}$  miles east of Pecks Station. It is in the school yard located in the middle of section 6 of Spring Prairie Township, 35 feet from the northeast corner of the school building and 18 feet from the northwest corner of the pasture fence to the east. Auxiliary No. 5 is  $5\frac{1}{2}$  miles south and 5 miles east of Pecks Station. It is on the schoolhouse grounds near the middle of section 6 of Lyons Township, 42 feet from the northeast corner of the schoolhouse and 15 feet from the north fence. The auxiliary stations are not permanently marked.

*Port Washington, Ozaukee County.*—The station of 1908 was reoccupied. It is in the southwest corner of the grounds owned by Mr. John Kaiser and formerly used as a baseball park. These grounds are in the northwest part of the portion of town which is east of the Chicago & North Western Railway tracks, just north of the Catholic cemetery. The station is 49 feet east of the west fence and 90.8 feet north of the south fence. It is marked by a bronze disk, dated 1917, set in the top of a marble post 6 by 6 inches. The following true bearings were determined in 1903 and 1917:

Center of north cupola window in elevator (mark).....	28 07.0 west of south
Tip of tile silo at farm 1 mile distant .....	59 52.7 west of north
Center of chimney on house one-quarter mile distant..	22 00.3 east of north
St. Mary's Church spire.....	61 58.8 east of south
Spire of Lutheran Church .....	51 34.2 east of south

Five auxiliary stations were also occupied. Auxiliary No. 1 is in the front yard of the Ulao school,  $5\frac{1}{8}$  miles south and  $1\frac{1}{2}$  miles west of the primary. No. 2 is in the south side of the school grounds of the school, 2 miles west of Saukville and seven-eighths mile south and  $5\frac{1}{8}$  miles west of the primary. No. 3 is in the south side of the school yard at the school, three-fourths mile east of Fredonia and about  $5\frac{1}{8}$  miles north and  $3\frac{1}{8}$  miles west of the primary. No. 4 is in the orchard just back of the schoolhouse about  $5\frac{1}{8}$  miles north and  $2\frac{3}{8}$  miles east of the primary. No. 5 is in the west front yard of the Catholic Church, which is about  $2\frac{3}{8}$  miles south and  $10\frac{1}{8}$  miles west of the primary.

*Rhineland, Oneida County.*—The station of 1905 in the Protestant cemetery, about three-fourths mile southeast of the courthouse was reoccupied. It is on the west side of the north and south driveway from the north gate of the cemetery and near the middle of the second east and west driveway from this north gate. It is 32 feet southwest of the Paysee monument; 37.4 feet south of southwest of the Bronstead monument; 15.2 feet northeast of the Clark monument, and 52.7 feet west of northwest of the Douglass monument. The station is marked by a Bedford limestone post 6 by 6 by 30 inches, set flush with the surface of the ground, and lettered U. S. C. & G. S., 1905. The following true bearings were determined:

Center of lower trunk on birch tree one-eighth mile	o /
distant (mark).....	2 16.1 east of south
Tiptop of Alban monument .....	85 47.4 west of south
Cupola on new courthouse.....	42 17.4 west of north
Center of iron smokestack at mill 2 miles distant.....	0 57.6 west of north
Peak of roof on judges' stand at fairgrounds.....	85 44.6 east of south

WISCONSIN—continued.

Four auxiliary stations were also occupied. Auxiliary No. 1 is located at the Tamarack school, which is about 8½ miles north and 2¼ miles east of the primary station. No. 2 is in the south front yard of the John Lyons school, 3½ miles north and 3¼ miles west of the primary. No. 3 is in the east side of the school yard of the Lake George school, about 2½ miles south and 2¼ miles east of the primary. No. 4 is in the northeast part of the rear school yard at the Charles Goss school, about 4 miles south and 2¼ miles west of the primary.

*Spooner, Washburn County.*—The station is located in the northeast corner of the high-school grounds, about three-fourths of a mile west of the depot. It is 17 feet south of a line of trees along the north side of the school yard; 21 feet east of the line of trees along the west side of the yard; 26.5 feet southeast of the northwest corner tree, and about 165 feet northwest of the northwest corner of the high-school building. The station is marked by a large rock set down almost flush with the ground. The uppermost point on the rock marks the center. The following true bearings were determined:

Middle of upper windows at Tony Paffle's house.....	27 09.9 east of south
Gable of Charles Marks large barn.....	20 05.7 west of south
East gable of Sam Larson's house.....	59 00.8 west of north
Near edge of chimney on Brook's house one-fourth mile distant.....	49 23.8 east of north
Pinnacle on grade-school building.....	80 43.8 east of south

Eight auxiliaries were also occupied. Auxiliary No. 1 is on the west side of the Evergreen Valley schoolhouse grounds, about 4½ miles west of Spooner. No. 2 is on the grounds of the public school on section 18, Beaver Township, about 4 miles south of Spooner. No. 3 is on the west side of the grounds of the public school on section 31, Crystal Township, about 6¼ miles east of Spooner. No. 4 is located just west of the Tadpole schoolhouse, about 5 miles north and three-eighths mile east of Spooner in section 31, Trego Township. No. 5 is at the Aaron schoolhouse, about 11 miles west and one-half mile north of Spooner. No. 6 is at the Island Lake schoolhouse, about 10 miles north and 2¼ miles west of Spooner in section 10, Casey Township. No. 7 is in the school yard at Sarona, 8¼ miles south and 4½ miles east of Spooner in section 1, Sarona Township. No. 8 is at an old school site, 5½ miles north and 7¼ miles east of Spooner, section 33, Springbrook Township.

*Valley Junction, Monroe County.*—The station is on the farm of Mr. Fell, which is just east of the Adventist Church 100 yards. It is in a hay field just east of the cattle pasture opposite his house. It is 70.8 feet east of the east fence and 24.4 feet north of the line of the front fence of this pasture. It is also 90 feet north of the road. The station is not marked.

*West Bend, Washington County.*—The station of 1908 was reoccupied. It is in the fairgrounds, about one-half mile north-northeast of the Chicago & North Western Railway depot. It is 94.3 feet south of the outside fence around the race track; 189.6 feet west by north from the southwest corner of the art gallery building, and 240.5 feet north of the south fence around the grounds at a point beside the old well. The station is marked by a bronze disk, dated 1917, set in the center of the top of a marking stone. The following true bearings were determined in 1908 and 1917:

Courthouse spire.....	19 45.6 west of south
Tip of water tank.....	89 51.2 west of south
Church spire in town of Barton.....	18 33.0 west of north
Near edge of chimney at county hospital.....	54 15.2 east of south

## WISCONSIN—continued.

Four auxiliary stations were also occupied. Auxiliary station No. 1 is in the west side of the rear yard of the Nabob school, about 5 miles west and one-fifth mile south of the primary. No. 2 is in the front yard of the Kuester school, district No. 5, about  $4\frac{1}{2}$  miles south and  $1\frac{1}{4}$  miles west of the primary. No. 3 is on the east side yard of the brick school building, district No. 9, on the Boltonville Road, about 6 miles northeast of West Bend and about  $4\frac{1}{4}$  miles north and  $1\frac{1}{4}$  miles east of the primary. No. 4 is located in the east side yard of the school, district No. 2, about  $1\frac{1}{2}$  miles south and 5 miles east of the primary.

*Woodruff, Oneida County.*—The station is in the Protestant cemetery, about one-half mile south of the railroad depot. It is in the south side of the cemetery, about 60 feet northeast of the south gate; 18.8 feet east of the line of the fronts of the lots along the north and south driveway; 42.5 feet north of the south fence; 53.9 feet northeast of a large pine tree standing just outside the fence of the east side of the south gate of the cemetery, and 13.9 feet south of the center of Louie Thibert's monument. The station is marked by a bronze disk, dated 1917, set in the top of a round concrete post 7 inches in diameter and 26 inches in length, set flush with the ground. The following true bearings were determined:

Center of gable window at M. H. Bradley's.....	42	39.6	east of south
Center of near window in small house of Mr. Zentner..	58	28.9	west of south
Center of turnstile at cemetery gate.....	34	34.5	west of north
Center of Joseph T. Holliday's red granite monument..	1	32.2	west of north
Near edge of the Chicago, Milwaukee & St. Paul switch tower.....	65	57.6	east of north

*Woodville, St. Croix County.*—The station is located in the southeast corner of the yard of the public school, which is about one-half mile east of the center of the town. It is 29 feet north of the south fence; 19.4 feet south of the crown of a rock which protrudes above the ground; 138.8 feet southeast of the southeast corner of the school building; 66.2 feet southwest of an elm tree, and 54 feet west of a hard maple tree. The station is marked by a bronze disk, dated 1917, set in the top of a concrete post 8 by 8 by 30 inches, set down flush with the ground. The following true bearings were determined:

Joe Laundry's windmill (mark).....	15	30.0	west of south
Steeple of Lutheran Church.....	59	18.3	west of south
Steeple of Lutheran Church 1 mile distant.....	45	18.3	west of north
Center of front window on house across road.....	8	00.9	east of north
Near edge of chimney on house 600 feet distant.....	65	52.6	east of north

