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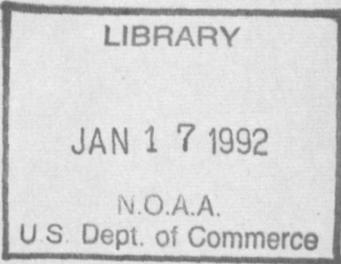
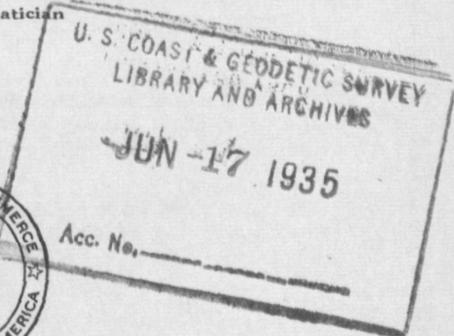
Special Publication No. 190

FIRST-ORDER TRIANGULATION IN OKLAHOMA

(1927 DATUM)

By

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TRIANGULATION IN OKLAHOMA

GENERAL STATEMENT

This publication contains the results of the first-order triangulation in Oklahoma that has been executed by the Coast and Geodetic Survey. The geographic positions herein are on a new datum (North American 1927) and those along the ninety-eighth meridian supersede the positions in Oklahoma which appear in Special Publication No. 88. The positions along the other arcs have not previously been published.

This volume is one of a series of publications each of which will contain the geographic positions on the North American datum of 1927, and the descriptions and the other data for all first- and second-order triangulation of a State or occasionally of two States.

READJUSTMENT OF THE TRIANGULATION NET

The triangulation of the United States has been built up by continually adding new arcs to those already measured, and for many years in adjusting this triangulation the plan had to be followed of fitting the new arcs of triangulation to the old ones which had been previously adjusted. This method was the only one that could be followed until a comprehensive net had been built up and it led to no serious difficulty until the point was reached where the new arcs formed closed loops with the old arcs. It then developed that the last arc to close the loop received excessive corrections when adjusted to the previous triangulation because the entire error of closure of the loop had to be absorbed by it.

It was realized that the only way to overcome this difficulty was to adjust the entire network at one time. It was impracticable, however, to readjust the network each time a new arc was added or an additional loop was closed, as the time required to do so was too great and, if this were done, the geographic positions of the triangulation stations would be in a continual state of change, a condition very disturbing to those using the data.

In 1926 the triangulation net west of the ninety-eighth meridian had become so extended that it could serve as a framework for all future triangulation in that area, and it was found desirable to adjust this portion of the United States net in one piece. In preparation for this adjustment, a method was devised, in 1924, at the office of the Coast and Geodetic Survey,¹ by means of which a large network of triangulation could be adjusted within a reasonable time and at a comparatively small cost. This method was applied first to the triangulation west of the ninety-eighth meridian involving 12,500

¹ For a description of the method used see Special Publication No. 159.

miles of arcs in 16 closed loops. Later it was applied to the eastern half of the net involving 13,000 miles of arcs forming 26 loops. The adjusted net of the country is now of such extent and strength that all new arcs hereafter can be fitted to it without having to disturb the old work and without causing excessive corrections to the new work.

ARCS INCLUDED IN THIS PUBLICATION

The triangulation included in this publication consists of seven first-order arcs. The arcs are as follows:

1. Ninety-eighth meridian—Oklahoma-Kansas boundary to Alice, Tex. (Oklahoma portion).
- 2a. El Reno, Okla., to Needles, Calif. Thirty-fifth parallel (Oklahoma portion).
- 2b. Little Rock, Ark., westward. Thirty-fifth parallel (Oklahoma portion).
3. Ninety-fourth meridian (Fort Smith, Ark., to the Texas boundary).
4. Oklahoma-Texas boundary (Red River and one-hundredth meridian).
5. One-hundredth meridian boundary (Texas-Oklahoma).
6. One-hundred-and-fourth meridian, south. (Part along Oklahoma Panhandle).³
7. Oklahoma-Texas boundary (parallel of 36°30').

The triangulation just over the boundary in adjoining States has been included in this publication in order that all data required for the surveys in Oklahoma, even near the boundaries, might be available in one volume.

STATEMENT OF ADJUSTMENTS

The ninety-eighth meridian and the part of the thirty-fifth parallel west of the ninety-eighth meridian were adjusted as part of the general readjustment of the first-order triangulation in the western part of the United States.

The thirty-fifth parallel east of the ninety-eighth meridian was adjusted in the general readjustment of the eastern part of the United States.

The other arcs of triangulation in Oklahoma were adjusted to the arcs fixed by the readjustment of the western part of the United States.

All of the adjustments were made by the direction method under the direction of Dr. O. S. Adams. The descriptions were compiled under the direction of H. C. Mitchell. The sketches were prepared under the direction of Lt. R. L. Pfau.

NORTH AMERICAN DATUM OF 1927

The original adjustment of the triangulation included in this publication was computed upon the Clarke spheroid of 1866, on what was called at that time the North American datum. In the readjustment of the triangulation in the western part of the United States the same spheroid was used as surface of reference, but only one station was held in position. The station, Meades Ranch, in Kansas,

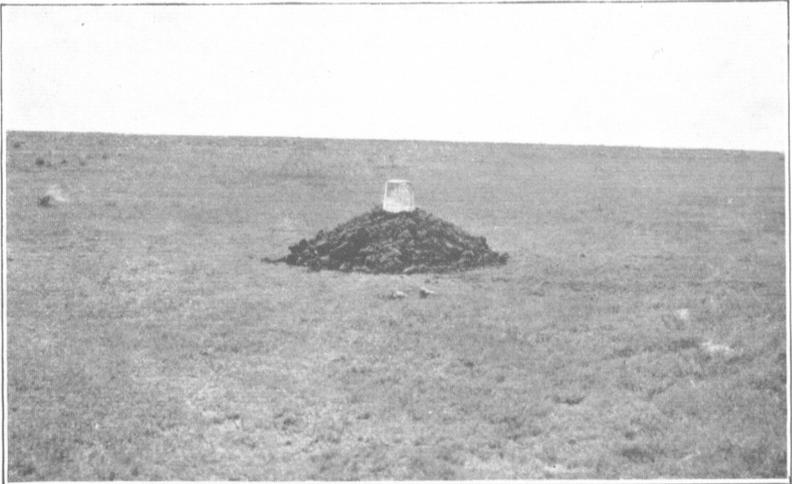
³ This arc of triangulation is in the State of Arkansas but runs close to the Oklahoma-Arkansas boundary.

⁴ This arc of triangulation is in New Mexico and Colorado but runs close to the Oklahoma boundary and is used as control for boundary marks.



Courtesy of Hugh B. Crawford, General Land Office.

FIGURE 1.—CLARK MONUMENT NO. 7, BEFORE REBUILDING.



Courtesy of Hugh B. Crawford, General Land Office.

FIGURE 1A.—CLARK MONUMENT NO. 7, AS REBUILT.

was assigned the same position that it had in the original United States standard datum, later called the North American datum. This position of Meades Ranch is as follows:

$$\begin{aligned}\phi &= 39^{\circ} 13' 26''.686 \\ \lambda &= 98\ 32\ 30\ .506\end{aligned}$$

This position was held in the new datum because it had been found to be best in accord with the country as a whole in the extensive investigation that was carried out at the time of the adoption of the original datum. If any are interested in the procedure followed in the establishment of this former datum, an account of it can be found in any one of the following publications, which contain triangulation and traverse data based on the datum in use prior to 1927: Special Publications Nos. 11, 13, 16, 17, 19, 24, 30, 31, 43, 46, 54, 62, 70, 74, 76, 78, 79, 86, 88, 101, and 114.

The orientation in the new adjustment is controlled by the various Laplace azimuths distributed throughout the network of arcs. The position of Meades Ranch, together with the Laplace azimuths included in the arcs, serve to define the North American datum of 1927. The date is appended to the name of the new datum to distinguish it from the old North American datum. A station is said to be on this North American datum of 1927 when it is rigidly adjusted to the scheme of the readjusted triangulation.

GENERAL DESCRIPTION OF TABLES AND SKETCHES

The tables of geographic positions, on pages 14 to 56, also contain the distances between contiguous triangulation stations in meters and feet, the logarithms of the distances in meters, and the azimuths of the lines joining these stations. The distances are corrected for elevation above mean sea level, and the azimuths are referred to the true south. Anyone who wishes to obtain the actual distances between the triangulation stations should use the formula given on page 12 by which the true distance at the mean elevation of the stations can be derived from the distance at sea level. The descriptions of the stations, given on pages 66 to 119 are designed to enable the engineer to recover and identify the station mark after he has visited the general locality of the station. There will be times when the description, so far as witness and other marks are concerned, will have become out of date from changes by nature or by the work of man. Any engineer who may visit a station and find that the description does not truly represent the present conditions, or who finds the mark destroyed or mutilated, should report the facts to the Director of the Coast and Geodetic Survey, at Washington, D.C., in order that the files of this office may be kept up to date. The engineer should realize that the triangulation extended over the country by the Coast and Geodetic Survey is a public survey, made for the use of the people. The stations really belong to the States in which they are located, and the engineer who is so fortunate as to find one of these stations located near his work should help to perpetuate the monuments in order that they may be of continuous service and value to his locality. The Coast and Geodetic Survey officials will, from time to time, visit the stations established and will re-mark and re-describe them if necessary.

At most of the stations there are reference and witness marks that were established to assist in locating the station. The distance and azimuth from the station to each of these additional marks are usually given in the description of the station, and the measurements are supposed to be so carefully made, at least to the reference marks, that if the station mark becomes lost or destroyed the station can be relocated accurately enough for use in third-order and local surveys.

Near the back of this publication will be found a number of sketches which show graphically the approximate locations of the stations, especially with reference to State and county boundaries, and the lines over which the main-scheme observations were made. It is suggested that if one should wish to learn whether there are triangulation stations in the vicinity of his work he should first consult the sketches. He can obtain from them the names of stations that may be of help to him; then he should turn to the index on page 135 of this volume, from which he can find the pages upon which the descriptions and geographic positions of the stations appear.

OTHER PUBLICATIONS OF VALUE TO THE ENGINEER

If an engineer wishes to compute geographic positions for the stations of any triangulation that he may execute, he should procure a copy of Coast and Geodetic Survey Special Publication No. 8 from the Superintendent of Documents, Washington, D.C. The cost of this publication is 25 cents. If he is interested in knowing the length in meters of the degrees, minutes, and seconds of latitude and longitude in the region in which he is working, he can obtain them from Special Publication No. 5, which can be purchased at a cost of 20 cents from the Superintendent of Documents. Condensed tables for the latitude of Oklahoma are shown on pages 10 and 11.

There are occasions, especially in cities, when the engineer wishes to use plane coordinates for his triangulation stations rather than spherical coordinates. In such cases he should procure from the Superintendent of Documents Special Publication No. 71, entitled "Relation between Plane Rectangular Coordinates and Geographic Positions", which costs 15 cents. This publication also describes the methods of transforming plane coordinates to spherical ones.

In order to make geodetic control data of greater use to engineers and surveyors, one or more plane-coordinate systems have been established in each of the 48 States. It is planned that the data for each triangulation station in a State will include its x and y coordinates as well as its latitude and longitude. A brief explanation of plane-coordinate systems is contained in Serial No. 562 of this Bureau. A more detailed publication (Special Publication No. 193, entitled Manual of Plane Coordinate Computation) is now in press.

The Coast and Geodetic Survey has issued a number of manuals on the various classes of its work. The ones that would be of value to an engineer in connection with triangulation, including base measurements, are Special Publication No. 120, Manual of First-Order Triangulation, cost 40 cents; Special Publication No. 145, Manual of Second and Third Order Triangulation and Traverse, cost 60 cents; and Special Publication No. 137, Manual of First-Order Traverse, cost 30 cents. An engineer, interested in the deter-

mination of azimuth to a high degree of accuracy, should procure a copy of Special Publication No. 14, Determination of Time, Longitude, Latitude, and Azimuth, cost 35 cents. If he is interested only in the determination of approximate azimuths, he should secure a copy of Serial No. 166, Directions for Magnetic Measurements, cost 15 cents.

In computing his triangulation the engineer will find that Special Publication No. 138, Manual of Triangulation Computation and Adjustment, cost 50 cents, will be of great assistance to him.

The reader can secure from the Director of the United States Coast and Geodetic Survey, free of charge, several leaflets which describe geodetic surveying and which also show how triangulation can be used in connection with the boundary surveys of private and public property.

CLASSIFICATION OF TRIANGULATION

Triangulation is divided into different classes according to accuracy. Four classes of triangulation are now defined by the Federal Board of Surveys and Maps, viz, first, second, third, and fourth orders. The first three of these are, respectively, equal in accuracy to the classes primary, secondary, and tertiary as formerly defined and used by the Coast and Geodetic Survey.

The ultimate criterion applied in classifying the different grades of triangulation is the actual error in the length of any line. This is indicated by the discrepancy between the measured length of a base line and its length as computed through the triangulation from the last preceding base. In first-order triangulation such discrepancies must not exceed 1 part in 25,000, in second-order triangulation 1 part in 10,000, and in third-order triangulation 1 part in 5,000. Before making the comparison between the computed and measured lengths the adjustment of the triangulation should be carried to the point where the side and angle equations have been satisfied. It is also necessary to take into consideration the maximum actual error in the measurement of the base lines.

To secure the accuracy indicated above, certain standards are adopted for the field work, the most important one of which relates to the closing errors of the triangles or the discrepancy between the sum of the measured angles in a triangle and 180° plus the spherical excess of the triangle. In first-order triangulation the average closing error of the triangles must not be greatly in excess of 1 second, in second-order it should not be more than 3 seconds, and in third-order not more than about 5 seconds. The shape of the figures in the triangulation scheme, the frequency of bases, the size and type of instrument, and the number and kind of observations are all selected with due regard to the accuracy desired.

Under certain conditions the proportionate error in the length of a line as specified above may be found to be exceeded in any class of triangulation. Where two points are fairly close together as compared with the size of the triangulation scheme, the distance between those points may be in error in excess of that indicated by the class of triangulation of the scheme. The accuracy of the computed length of any line can be estimated by computing the ΣR_1 in accordance with the formula for the strength of figures as given in Coast

and Geodetic Survey Special Publication No. 145. In any class of triangulation the subsidiary stations will be located with a less degree of accuracy than the main-scheme stations.

CHARACTERISTICS OF FIRST-ORDER TRIANGULATION

The triangulation contained in this volume is of the first order. First-order triangulation is done with such accuracy that the average closing error of the triangles is about 1 second or less. In order that the angles may have this high degree of accuracy, large theodolites are used. The theodolite, as is well known, is similar in its appearance to the surveyor's transit. The main differences are in the excellence of the workmanship, the accuracy of graduation of the circle, in having micrometer microscopes for reading this circle, and in having a telescope with a high resolving power. Observations are made either on heliostopes, by which the light of the sun is reflected toward the observer, or on acetylene or electric signal lamps. The heliostope, or lamp, and the theodolite must be centered directly over the station marks.

At certain intervals, depending upon the shape of the triangles, base lines are measured. A base is necessarily a side of one of the triangles. The ends of the base must be intervisible from the ground or from towers that may be erected over them. In the early years of the Coast and Geodetic Survey's existence the base lines were measured with metal bars, but near the beginning of the present century steel tape lines began to be used in the measurements. Since 1907 all of the bases of the Survey have been measured with invar tapes. The probable error of a measured base is about 1 part in 1,000,000 of its length. This accuracy meets all the requirements of engineering and science.

The azimuths of the triangulation depend upon what are called Laplace azimuths, or azimuths determined by observations on Polaris, which have been corrected for the deflection of the vertical at each Laplace station. These deflections are due to the attraction of mountain or plateau masses that are comparatively near the place at which the observations are made. The probable error of a Laplace azimuth is about ± 0.3 second.

If one is interested in the accuracy with which the triangulation of the Coast and Geodetic Survey is done and the reliability of the geographic positions which are given in this publication, he should refer to Special Publication No. 159, The Bowie Method of Triangulation Adjustment as Applied to the First-Order Net in the Western Part of the United States.

SECONDARY STATIONS

In addition to the stations which form the main network of triangles in Oklahoma, a number of objects, such as church spires, and schoolhouse cupolas, were observed upon from stations of the main scheme. The geographic positions of these secondary stations have been computed and the data are included in the tables on pages 14 to 56. These stations are shown on the sketches and in the index, but only a few of them are given in the descriptions of stations, as in most cases the name of the object is all the description that is

available. Ordinarily the name of the secondary station is sufficient for its accurate identification by the engineer who may wish to use it.

USE OF HORIZONTAL CONTROL DATA

The plan or map for any extensive engineering project, whether or not map construction is the primary object, should have all of its parts properly correlated and should be on the same datum as adjacent surveys. Federal and State mapping organizations have long been aware of the necessity for having all surveys based upon a common datum, but local engineers and surveyors in this country have too often in the past been content, and in many cases compelled, to use a local datum for their surveys. The future economic disadvantage of such a system is now becoming recognized, with the result that city and county surveys are being more generally placed upon a permanent basis by connecting them to stations on the North American datum of 1927.

One other factor must be taken into consideration by the engineer of today. As the States develop industrially, they will undoubtedly follow the lead of one of the Eastern States, Massachusetts, which with splendid foresight has extended its triangulation control over the entire State for the purpose of defining property boundaries in terms of latitude and longitude. The advantage of such a system is well stated in the following extract from the report on the Maryland oyster survey:

The difficulties of accurately locating and permanently defining the boundaries of a farmer's plantation on land, even with the aid of monuments, public roads, streams of water, and other points of reference, are often great, judging from the disputes frequently arising in connection with boundaries. * * *

There is only one point on the earth's surface at the intersection of any one parallel of latitude and any one meridian of longitude, and therefore there can be no dispute as to the meaning of such a geographic definition of the location of a point, even though all the original triangulation station marks used in its determination, together with the chart on which its position was originally plotted, have been totally destroyed.

In the case of the destruction of an original triangulation station mark, or any other point defined by a geographic position, a competent geodetic engineer can reestablish its exact location by means of a new system of triangulation connecting with other distant triangulation marks which have not been destroyed.

There is a number of instances where corporations owning large tracts of land have attempted to make surveys of their boundaries and of subdivisions of property by means of traverse. This method can be used if certain precautions are taken, but most of these corporations have found it advisable to use the method of triangulation for the determination of relative positions of their boundary monuments and of other points which lie within those boundaries. If the triangulation in question is connected with the triangulation system of the Coast and Geodetic Survey, then true geographic positions can be obtained as well as the relative ones.

In a section of the country covered by adequate geodetic control the data are available to the engineer for any of the following operations, in addition to their possible future use as a basis for cadastral surveys:

1. Extensive mapping.—The topographer needs as initial data for beginning a topographic survey the distance and direction between

two points and the geographic position of one of them in latitude and longitude. His local triangulation or traverse, based on this control, will prevent the accumulation of excessive errors as he carries on his mapping operations. In the event that the available first-order triangulation in that region has lines of too great length to join to conveniently, he can measure a base and azimuth at some place visible from a first- or second-order triangulation station and connect his base to the station by triangulation, thus obtaining proper geographic positions for his local surveys. On recent triangulation special azimuth marks have been set. (See p. 13.)

2. Boundary lines.—If it is desired to locate or to delimit accurately and permanently the boundaries of political subdivisions, such as States, counties, or cities, the methods indicated in the preceding paragraph may be followed. Whenever possible, a line of the adjusted triangulation or traverse should be used as a basis for local surveys rather than a point, since a line gives the three essentials of position, length, and direction.

3. Local intensive surveys.—The necessity for such surveys arises most frequently in connection with extensive improvements over a considerable area or as a basis for city planning, where the needs of a city are being anticipated for a number of years. Here the requirements are somewhat different from those in the two preceding operations, for it is often necessary to extend first or second order control in considerable detail over the entire area affected, third order triangulation or traverse then being used to furnish additional points for the survey. Such a control survey should invariably be started from a line of adjusted triangulation or traverse.

While it may be noted in the preceding paragraphs that the azimuth and length of one line and the geographic position of one end of that line constitute the essential data for the complete utilization of old work as a basis for new work, there is always grave danger in depending upon this minimum of data. There may be failure to identify the true station mark, or the mark though genuine, may have been tampered with or otherwise disturbed in position. This will, of course, introduce an error into the new work based on these stations. It is the present practice in this survey unless unusual conditions render it unnecessary, to establish the integrity of the recovered points by using at least three old stations as a basis for new work, the third station serving as a check for the two stations on which the new work may actually depend.

In local surveys where the area is of limited extent it is usually desirable to use a system of plane coordinates, the origin being connected to some point of the first or second order triangulation or traverse scheme. Tables for computing plane coordinates from geographic positions are found in Coast and Geodetic Survey Special Publication No. 71. The Coast and Geodetic Survey will be glad to give advice on any problem arising out of the use of its control points or on any proposed extension of triangulation or traverse from them.

EXPLANATION OF TABLE FOR POLYCONIC MAP PROJECTION

The engineer or surveyor who makes use of the data in this publication may find it desirable to construct a map covering the territory he is surveying. He may wish to show on this map the merid-

ians and parallels so as to be able to plot the positions of the triangulation stations included in the area and show the details of his survey in the correct geographic positions. To enable him to do this with the least possible difficulty, the following table, reprinted in an abbreviated form from Coast and Geodetic Survey Special Publication No. 5, has been inserted. This table may also be used to interpret in terms of degrees, minutes, and seconds of arc any relatively short distance measured along a meridian or parallel. The method of using the table is described below.

To make a projection for a large-scale map (1 to 20,000 and larger), first draw a straight line for a central meridian and a construction line ab perpendicular thereto, each to be as central to the sheet as the selected interval of latitude and longitude will permit. (See fig. 2 below.) On the central meridian lay off, on the desired scale, the distances $m m_2$ and $m m_4$, using the length of 1 minute along the meridian for the latitude of m , as given in the table in the column headed "Arc of the meridian, 1'," and multiplying this length by the number of minutes for the interval between the central parallel and the extreme parallels. Through m_2 and m_4 draw straight lines cd and ef , parallel to the line ab . On the lines ef , ab , and cd lay off to the scale of the map the distances $m_4 x_2$, $m x_2$, and $m_2 x_2$ on both sides of the central meridian, taking the values from the column headed "Arc of the parallel, 1'," corresponding to the latitude of m_4 , m , and m_2 , respectively. The value of 1 minute as taken from the table must be multiplied by the number of minutes out from central meridian. Draw straight lines through the points thus determined for the extreme meridians—that is, through the x_2 points.

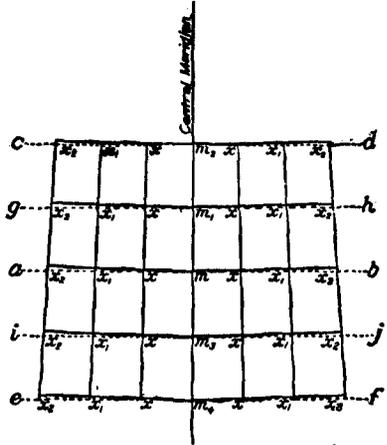


FIGURE 2.—Sketch showing construction of polyconic projection.

NOTE.—In this figure the angles made at the central meridian by the parallels are grossly exaggerated. In an actual projection the parallels appear practically as straight lines.

At the two points designated x_2 on the line ab lay off along the meridians the value of Y as given in the table under "Y coordinate of curvature", using as argument the interval in minutes between the central meridian and the extreme meridian. Draw straight lines from these points to the point m for the middle parallel, and from the points of intersection with the extreme meridians lay off distances along these meridians, above and below, equal to the distances $m m_2$ and $m m_4$ to locate points in the extreme parallels.

Subdivide each of the 3 meridians and 3 parallels already determined into parts corresponding with the projection interval and join the corresponding points of subdivision by straight lines to complete the projection.

The method outlined above may be used for all large-scale maps regardless of the number of meridians and parallels shown. For

small-scale maps the method is somewhat more complicated, and it becomes necessary to make use of Special Publication No. 5, which may be obtained for 20 cents from the Superintendent of Documents, Washington, D.C.

Polyconic map projection table

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 33°
	1"	1'	1"	1'		
° /	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° /	<i>Meters</i>
33 00	25.960	1,557.6	30.806	1,848.35	0 01	0.1
05	25.935	1,556.1	30.806	1,848.38	03	1.1
10	25.911	1,554.7	30.807	1,848.40	05	3.1
15	25.886	1,553.2	30.807	1,848.43	07	6.0
20	25.862	1,551.7	30.808	1,848.45	10	12.3
25	25.837	1,550.2	30.808	1,848.48	15	27.8
30	25.812	1,548.7	30.808	1,848.50	20	49.4
35	25.788	1,547.3	30.809	1,848.53	25	77.1
40	25.763	1,545.8	30.809	1,848.55	30	111.0
45	25.738	1,544.3	30.810	1,848.58	40	197.4
50	25.713	1,542.8	30.810	1,848.60	50	308.4
55	25.688	1,541.3	30.810	1,848.63	1 00	444.2

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 34°
	1"	1'	1"	1'		
° /	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° /	<i>Meters</i>
34 00	25.663	1,539.8	30.811	1,848.65	0 01	0.1
05	25.638	1,538.3	30.811	1,848.68	03	1.1
10	25.613	1,536.8	30.812	1,848.70	05	3.1
15	25.588	1,535.3	30.812	1,848.73	07	6.1
20	25.562	1,533.7	30.813	1,848.75	10	12.5
25	25.537	1,532.2	30.813	1,848.78	15	28.2
30	25.512	1,530.7	30.813	1,848.81	20	50.1
35	25.486	1,529.2	30.814	1,848.83	25	78.3
40	25.461	1,527.6	30.814	1,848.86	30	112.7
45	25.435	1,526.1	30.815	1,848.88	40	200.4
50	25.410	1,524.6	30.815	1,848.91	50	313.1
55	25.384	1,523.0	30.816	1,848.93	1 00	450.8

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 35°
	1"	1'	1"	1'		
° /	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° /	<i>Meters</i>
35 00	25.358	1,521.5	30.816	1,848.96	0 01	0.1
05	25.333	1,520.0	30.816	1,848.99	03	1.1
10	25.307	1,518.4	30.817	1,849.01	05	3.2
15	25.281	1,516.9	30.817	1,849.04	07	6.2
20	25.255	1,515.3	30.818	1,849.06	10	12.7
25	25.229	1,513.7	30.818	1,849.09	15	28.6
30	25.203	1,512.2	30.819	1,849.11	20	50.8
35	25.177	1,510.6	30.819	1,849.14	25	79.3
40	25.151	1,509.1	30.819	1,849.17	30	114.2
45	25.125	1,507.5	30.820	1,849.19	40	203.1
50	25.099	1,505.9	30.820	1,849.22	50	317.3
55	25.072	1,504.3	30.821	1,849.24	1 00	456.9

Polyconic map projection table—Continued

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 36°
	1"	1'	1"	1'		
° ' /	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' /	<i>Meters</i>
36 00	25.046	1,502.8	30.821	1,849.27	0 01	0.1
05	25.020	1,501.2	30.822	1,849.30	03	1.2
10	24.993	1,499.6	30.822	1,849.32	05	3.2
15	24.967	1,498.0	30.822	1,849.35	07	6.3
20	24.940	1,496.4	30.823	1,849.37	10	12.8
25	24.914	1,494.8	30.823	1,849.40	15	28.9
30	24.887	1,493.2	30.824	1,849.43	20	51.4
35	24.860	1,491.6	30.824	1,849.45	25	80.3
40	24.834	1,490.0	30.825	1,849.48	30	115.6
45	24.807	1,488.4	30.825	1,849.51	40	205.6
50	24.780	1,486.8	30.826	1,849.53	50	321.2
55	24.753	1,485.2	30.826	1,849.56	1 00	462.5

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature	
	1"	1'	1"	1'		Latitude 37°	Latitude 38°
° ' /	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	<i>Meters</i>	° ' /	<i>Meters</i>	<i>Meters</i>
37 00	24.726	1,483.6	30.826	1,849.58	0 01	0.1	0.1
05	24.699	1,481.9	30.827	1,849.61	03	1.2	1.2
10	24.672	1,480.3	30.827	1,849.64	05	3.3	3.3
15	24.645	1,478.7	30.828	1,849.66	07	6.4	6.4
20	24.618	1,477.1	30.828	1,849.69	10	13.0	13.1
25	24.590	1,475.4	30.829	1,849.72	15	29.2	29.5
30	24.563	1,473.8	30.829	1,849.74	20	51.9	52.4
35	24.536	1,472.2	30.829	1,849.77	25	81.2	81.9
40	24.509	1,470.5	30.830	1,849.80	30	116.9	118.0
45	24.481	1,468.9	30.830	1,849.82	40	207.8	209.8
50	24.454	1,467.2	30.831	1,849.85	50	324.6	327.7
55	24.426	1,465.6	30.831	1,849.88	1 00	467.5	471.9

CONVERSION TABLE

In a number of triangulation publications of this bureau complete tables have been printed for the conversion of feet to meters and meters to feet. As these tables require eight pages, it seemed advisable in the interests of economy to substitute for them the condensed table shown below. This table can be used readily for converting a rather large number of one unit to the corresponding number in the other unit by simply taking the conversion value for each digit of the first number, moving the decimal point if necessary, and adding the values together. For example, to convert 24.6 feet to meters we take from the table the value in meters corresponding to 2 feet and move the decimal point one number to the right. We then take the value for 4 feet as given in the table, and next the value for 6 feet, and move the decimal point one number to the left. This gives, by rounding off the third decimal place, $6.096 + 1.219 + 0.183 = 7.498$ meters.

Meters	Feet	Feet	Meters
1	3. 280833	1	0. 3048006
2	6. 561667	2	0. 6096012
3	9. 842500	3	0. 9144018
4	13. 123333	4	1. 2192024
5	16. 404167	5	1. 5240030
6	19. 685000	6	1. 8288037
7	22. 965833	7	2. 1336043
8	26. 246667	8	2. 4384049
9	29. 527500	9	2. 7432055
10	32. 808333	10	3. 0480061

EXPLANATION OF TABLE OF POSITIONS

In the tables of positions the latitude and longitude of each point are given on the North American datum of 1927, and there are also given the length and azimuth of each line observed over, whether in one or both directions. No lengths and azimuths are repeated, and for a given line the length and azimuth will be found opposite the position of one or the other of the two stations involved.

To aid in the use of the tables, a column of the logarithms of the lengths in meters is given. It must be remembered that it is the logarithm which is derived first from the computation, the lengths given in the table being then derived from the corresponding logarithms. A final column gives these lengths reduced to feet, the reduction being made from the lengths in meters.

The rule followed in recent publications of this Office has been to give the latitudes and longitudes of the stations to thousandths of seconds for all points, the positions of which are fixed by fully adjusted triangulation. Points the positions of which are given to hundredths of seconds only are marked by footnotes as being without check (not occupied and observed from two stations only) or checked by vertical angles only.

In the columns giving azimuths, distances, and logarithms of distances the accuracy is indicated to a certain extent by the number of decimal places given, it being understood that in each case some of the final figures are doubtful. In some cases there is very little doubt of the correctness of the second figure from the right, while in a few cases some doubt may exist as to the correctness of even the third figure from the right.

The tables may be conveniently consulted by using as finders the sketches and the index at the end of this publication. In the third column of the index will be found for each point a reference to the page on which its description is given, in the fourth column the page on which the elevation of the station is given, and finally in the fifth column the number of the sketch on which it appears.

EXPLANATION OF LENGTHS

The lengths as given in the tables are all reduced to sea level. If the actual length of a line on the ground reduced only to the horizontal is desired—that is, its length in its actual elevation on the surface of the earth—it may be obtained by adding to the sea-level length as given in meters the following correction,

$$\text{Cor.} = \frac{Sh_m}{6,370,000}$$

in which S is the length of the line in meters and h_m is the mean elevation of the two ends of the line in meters. The correction for the length in feet can also be found by the same formula if S is taken in feet, but h_m must still be kept in meters, since the denominator is the approximate length of the radius of the earth in meters.

AZIMUTH AND BACK AZIMUTH

The azimuth of a line of triangulation is its true direction reckoned clockwise from true south. The cardinal points of the compass on this system are as follows: South is 0° (or 360°), west 90° , north 180° , and east 270° .

Because of the convergence of the meridians, the azimuth and the back azimuth of a line do not differ by exactly 180° , the amount of the divergence varying with the latitude and the difference of longitude of the two ends of the line. To illustrate from the tables on page 15, the azimuth from Caddo to Edmonds is $263^\circ 15' 11''.18$ while the back azimuth, or the azimuth from Edmonds to Caddo, is $83^\circ 33' 35''.01$.

The azimuths of the triangulation lines offer a very convenient and accurate means of testing the deflection of the magnetic needle on a surveyor's transit, and even the azimuth over such short distances as those between a station mark and its reference mark may be used for this purpose with fair accuracy, provided the distance is greater than 100 feet. On all recent triangulation, a special azimuth mark has been set for each station at a distance of not less than one-fourth mile. The azimuth of the line from the station to this mark has been very accurately determined and may be used as the starting azimuth for traverse lines and other local surveys.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>													
Table Hill (U.S.G.S.), 1902.....	34 40 18.059	93 59 48.51	273 45 51.23	Osaria.....	4.5745132	37,541.64	123,167.9						
	97 29 41.207	161 11 11.13	341 05 33.47	Lanier.....	4.6665561	46,404.07	152,244.0						
Purcell (U.S.G.S.), 1902.....	35 00 37.644	6 38 24.71	186 36 46.54	Table Hill (U.S.G.S.).....	4.5778879	37,834.49	124,128.7						
	97 26 49.367	108 11 57.02	288 04 39.27	Lanier.....	4.3082659	20,336.02	66,719.1						
		174 00 46.97	353 59 08.56	Smith.....	4.6161529	41,319.30	135,561.7						
Arbuckle-Velma (U.S.G.S.), 1902.....	34 26 02.003	145 20 29.41	325 13 03.43	Osaria.....	4.5463410	35,183.66	115,431.7						
	97 41 06.494	213 27 53.34	33 34 22.01	Table Hill (U.S.G.S.).....	4.5002332	31,639.76	103,804.8						
Arbuckle Mountain-Mounds (U.S.G.S.), 1902.....	34 26 08.358	89 46 57.84	269 34 10.46	Arbuckle.....	4.5396829	34,648.38	113,675.6						
	97 18 29.434	146 51 44.59	326 45 23.57	Table Hill (U.S.G.S.).....	4.4953591	31,286.65	102,646.3						
Duncan, 1902.....	34 28 30.557	208 13 12.43	28 18 03.86	Osaria.....	4.4414681	27,635.55	90,667.6						
	98 02 46.027	277 45 16.99	97 57 32.20	Arbuckle.....	4.5248578	33,485.58	109,860.6						
Monument, 1902.....	34 14 23.278	155 12 10.51	335 07 43.69	Duncan.....	4.4588962	28,767.11	94,380.1						
	97 54 53.244	224 24 08.94	44 31 55.27	Arbuckle.....	4.4795477	30,168.08	98,976.4						
Lone Tree, 1902.....	34 14 08.327	90 53 09.37	270 40 48.32	Monument.....	4.5277603	33,710.12	110,597.3						
	97 32 56.117	150 21 14.96	330 16 38.37	Arbuckle.....	4.4033252	25,311.92	83,044.2						
		224 53 26.13	45 01 34.98	Arbuckle Mountain.....	4.4962795	31,353.03	102,864.1						
Benton, 1902.....	34 05 35.144	171 08 33.81	351 07 38.16	Monument.....	4.2166798	16,469.48	54,033.6						
	97 53 14.150	243 01 40.43	63 13 04.44	Lone Tree.....	4.5437734	34,976.26	114,751.3						
Grady, 1902.....	34 02 51.904	106 07 38.33	286 01 16.98	Benton.....	4.2592363	18,165.04	59,596.5						
	97 41 53.433	213 24 12.29	33 29 13.85	Lone Tree.....	4.3975517	24,977.66	81,947.5						
Blue (Tex.), 1902.....	33 48 00.491	155 20 05.43	335 14 40.26	Benton.....	4.5535169	35,769.83	117,354.8						
	97 43 31.852	185 15 04.73	5 15 59.66	Grady.....	4.4406098	27,580.99	90,488.6						
Cube (Tex.), 1902.....	33 55 37.369	208 35 29.90	28 42 24.17	Monument.....	4.5969307	39,530.35	129,692.5						
	98 07 12.485	229 21 54.71	49 29 43.62	Benton.....	4.4520804	28,319.16	92,910.4						
		290 58 15.89	111 11 27.49	Blue.....	4.5925665	39,135.11	128,395.8						

Supplementary points

T. 34 S., R. 6 W., sec. 36, southwest corner (Kans.), 1902 ¹	37 02 14.24	186 08 34	6 08 35	Miller.....	2.322674	210.22	689.7
	97 55 44.60						
Miller eccentric (Kans.), 1902.....	37 02 19.505	42 50 54.4	222 44 02.9	Sand Hill.....	4.3966888	24,928.0	81,785
	97 55 44.530	204 06 08.1	24 06 08.5	Miller.....	1.708013	51.052	167.49
		306 31 33.3	126 39 36.5	Renrow.....	4.393603	24,751.6	81,206
T. 29 N., R. 7 W., sec. 13, northwest corner, 1902.....	36 59 54.953	53 07 29.5	233 00 02.6	Sand Hill.....	4.362210	23,025.6	75,543
	97 54 45.313	161 49 10.1	311 48 34.5	Miller eccentric.....	3.671203	4,690.3	15,388
		299 09 28.1	119 16 55.5	Renrow.....	4.324231	21,097.5	69,217
Kansas-Oklahoma boundary stone 160, 1902.....	36 59 55.030	89 52 39.0	269 52 12.8	T. 29 N., R. 7 W., sec. 13, north-west corner.....	3.032294	1,077.2	3,534
	97 54 01.749	150 18 17.0	330 17 15.2	Miller eccentric.....	3.709900	5,127.4	16,822
Red barn near sec. 13, south gable (Kans.), 1902.....	37 01 00.850	1 36 28.0	181 36 26.6	Kansas-Oklahoma boundary stone 160.....	3.307456	2,029.8	6,659
	97 53 59.446	29 10 33.4	209 10 05.8	T. 29 N., R. 7 W., sec. 13, north-west corner.....	3.366699	2,326.5	7,633
		133 02 21.6	313 01 18.4	Miller eccentric.....	3.550620	3,553.2	11,657
First auxiliary (Kans.), 1902.....	36 59 54.875	198 26 19.5	18 26 55.7	Miller eccentric.....	3.672066	4,699.9	15,420
	97 56 44.680	269 56 35.8	89 57 47.6	T. 29 N., R. 7 W., sec. 13, north-west corner.....	3.470045	2,951.5	9,683
Livingood's house, chimney (Kans.), 1902.....	37 00 10.594	2 07 09.6	182 07 09.2	First auxiliary.....	2.685652	484.9	1,591
	97 56 43.955	200 16 54.6	20 17 30.4	Miller eccentric.....	3.627028	4,236.7	13,900
		279 19 26.2	99 20 37.6	T. 29 N., R. 7 W., section 13, north-west corner.....	3.473175	2,972.9	9,754
Second auxiliary (Kans.), 1902.....	37 00 02.335	252 09 13.4	72 09 32.6	Livingood's house, chimney.....	2.919550	830.9	2,726
	97 57 15.943	286 33 51.5	106 34 10.3	First auxiliary.....	2.906606	806.5	2,646
Kansas-Oklahoma boundary stone 163, 1902.....	36 59 54.775	181 45 39.5	1 45 39.7	Second auxiliary.....	2.367620	233.1	765
	97 57 16.233	238 34 21.8	58 34 41.2	Livingood's house, chimney.....	2.970946	935.3	3,069
		269 46 19.2	89 46 38.2	First auxiliary.....	2.892209	780.2	2,560
Camchester schoolhouse, belfry, 1902 ¹	37 00 04.05	245 54 09	65 58 00	Miller.....	4.015121	10,354.3	33,971
	98 02 06.15	27 59 20	207 56 18	Sand Hill.....	4.203674	15,983.6	52,440
Manchester schoolhouse, belfry, 1902 ¹	36 59 37.19	241 01 10	61 04 52	Miller.....	4.018429	10,433.5	34,231
	98 01 53.00	30 30 09	210 26 59	Sand Hill.....	4.188079	15,419.8	50,590
Sand Hill auxiliary, 1902 ¹	36 52 09.02	208 25 43	28 25 50	Sand Hill.....	2.776657	597.9	1,962
	98 07 20.51						
T. 28 N., R. 9 W., secs. 25 and 36, ¼-section corner, stone, 1902.....	36 52 09.177	89 13 30.5	269 13 21.9	Sand Hill auxiliary.....	2.550182	354.962	1,164.57
	98 07 06.181	172 19 16.1	352 19 14.4	Sand Hill.....	2.720768	325.7	1,725

¹No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>													
Sand Hill reference mark, 1902.....	36 52 08.830	90 58 01.0	270 57 52.5	Sand Hill auxiliary.....	2.546570	352.0	1,155						
	98 07 06.300	172 47 16.5	352 47 14.9	Sand Hill.....	2.729166	536.0	1,759						
Wakita, low elevator, east gable, 1902 ¹	36 53 06.70	85 59 09	265 52 03	Sand Hill.....	4.246220	17,628.7	57,837						
	97 55 18.98	177 57 12	357 56 57	Miller.....	4.232954	17,088.3	56,097						
Wakita Church, white spire, 1902 ¹	36 52 59.35	86 41 13	266 34 12	Sand Hill.....	4.241509	17,438.5	57,213						
	97 55 26.09	178 33 40	358 33 29	Miller.....	4.238537	17,319.6	56,823						
Wakita, high elevator, east gable, 1902 ¹	36 53 06.16	86 03 48	265 56 39	Sand Hill.....	4.248704	17,729.8	58,169						
	97 55 14.84	177 36 48	357 36 30	Miller.....	4.233477	17,118.9	56,164						
Renfrow Christian Church, center spire, 1902 ¹	36 55 35.16	63 30 35	243 28 43	Renfrow.....	3.710352	5,132.8	16,840						
	97 39 15.54	117 11 32	297 01 38	Miller.....	4.438618	27,454.8	90,075						
Renfrow, low elevator, east gable, 1902 ¹	36 55 26.25	82 31 09	262 14 23	Sand Hill.....	4.622032	41,882.4	137,409						
	97 39 12.34	117 37 25	297 27 28	Miller.....	4.441719	27,651.5	90,720						
Renfrow, high elevator, east gable, 1902 ¹	36 55 23.97	82 36 29	262 19 43	Sand Hill.....	4.621556	41,836.6	137,259						
	97 39 13.84	117 47 18	297 37 22	Miller.....	4.441719	27,651.5	90,720						
Numa elevator, center shaft, 1902 ¹	36 48 12.43	3 30 50	183 30 14	Hahn.....	4.394481	24,801.7	81,370						
	97 36 17.67	141 37 27	321 33 49	Renfrow.....	4.161150	14,492.7	47,548						
T. 28 N., R. 5 W., sec. 14, southeast corner, 1902 ¹	36 53 51.89	135 13 47	315 13 26	Renfrow.....	3.099577	1,257.7	4,126						
	97 41 45.32												
Antioch Church, center spire, 1902 ¹	36 46 01.18	16 51 36	196 49 05	Hahn.....	4.335202	21,637.2	70,988						
	97 33 06.40	138 18 03	318 12 31	Renfrow.....	4.314789	20,643.8	67,729						
Medford, school, cupola, 1902 ¹	36 48 34.57	145 57 26	325 50 28	Miller.....	4.488072	30,766.1	100,938						
	97 44 06.77	193 46 12	13 47 15	Renfrow.....	4.041017	10,990.5	36,058						
Medford, mill, center of tower, 1902 ¹	36 48 11.28	192 40 16	12 41 18	Renfrow.....	4.067330	11,677.0	38,310						
	97 44 04.56	337 47 47	157 51 49	Hahn.....	4.426404	26,693.4	87,577						
Pond Creek, standpipe, 1902.....	36 40 08.705	93 57 43.5	273 54 13.6	Vicar.....	3.941877	8,747.4	28,699						
	97 47 53.100	197 22 20.8	17 25 39.6	Renfrow.....	4.439764	27,527.3	90,312						

Pond Creek, roller mill, 1902 ¹	36 40 11.45	301 32 33	121 39 01	Hahn.....	4.277630	18,950.9	62,175
	97 48 08.46	57 42 39	237 33 30	McCoy.....	4.432698	27,083.1	88,855
Pond Creek, schoolhouse, dome, 1902.....	36 40 15.708	302 25 01.2	122 31 20.8	Hahn.....	4.272754	18,739.3	61,481
	97 47 55.113	57 51 03.6	237 41 46.8	McCoy.....	4.438281	27,433.5	90,005
Pond Creek astronomical station, 1906.....	36 40 07.64	126 47 25.5	306 47 24.4	Pond Creek, standpipe.....	1.738813	54.80	179.8
	97 47 51.33	159 19 03.5	339 19 01.2	Pond Creek, schoolhouse, dome...	2.424397	265.70	871.7
Friend's College, church spire, 1902.....	36 39 30.778	144 38 40.7	324 31 50.5	Sand Hill.....	4.467216	29,323.5	96,206
	97 55 43.910	239 09 53.2	59 11 04.4	Vicar.....	3.538106	3,452.3	11,326
Tps. 25 and 26 N., Rs. 6 and 7 W., township corner, 1902 ¹	36 40 49.74	18 19 09	198 19 03	Vicar.....	2.845376	700.4	2,298
	97 53 35.67	136 50 58	316 42 52	Sand Hill.....	4.469147	29,454.2	96,634
Kremlin, elevator, east gable, 1902.....	36 32 47.683	351 56 02.3	171 56 33.8	Enid.....	3.972433	9,385.0	30,791
	97 50 02.821	87 43 36.3	267 35 36.4	McCoy.....	4.302463	20,066.1	65,834
Kremlin, schoolhouse, belfry, 1902.....	36 32 45.353	353 25 28.1	173 25 53.5	Enid.....	3.967616	9,281.5	30,451
	97 49 52.620	158 01 15.3	337 58 57.1	Vicar.....	4.187132	15,386.2	50,480
Hunter, elevator, center, 1902 ¹	36 33 46.18	242 22 37	62 24 06	Hahn.....	3.623309	4,200.6	13,781
	97 39 48.52	51 35 19	231 29 45	Enid.....	4.251387	17,839.7	58,529
T. 24 N., R. 4 W., section 3, southwest corner, stone, 1902 ¹	36 34 41.52	181 45 17	1 45 17	Hahn.....	2.381873	240.92	790.4
	97 37 19.11						
Garber, church, white spire, 1902.....	36 26 12.815	97 49 45.4	277 41 21.3	Enid.....	4.328875	21,324.3	69,961
	97 35 01.480	167 53 47.0	347 52 25.3	Hahn.....	4.211754	16,283.7	53,424
Garber, elevator, center shaft, 1902.....	36 26 25.470	166 32 56.6	346 31 27.7	Hahn.....	4.203301	15,969.9	52,395
	97 34 49.392	240 36 49.5	60 36 51.5	Garber.....	1.994905	98.8	324
T. 23 N., R. 4 W., section 25, center, 1902 ¹	36 26 26.74	92 37 07	272 37 02	Garber.....	2.303908	201.33	660.5
	97 34 37.86						
Cropper, east elevator, north gable, 1902.....	36 26 27.005	101 52 13.8	281 47 35.7	Enid.....	4.075845	11,908.2	39,069
	97 41 21.900	201 19 06.7	21 21 31.3	Hahn.....	4.220716	16,623.3	54,538
Breckenridge, Methodist Episcopal Church, spire, 1902.....	36 26 17.339	211 17 36.0	31 21 25.7	Hahn.....	4.266576	18,474.6	60,612
	97 43 44.799	268 40 43.8	88 46 03.9	Garber.....	4.127897	13,424.5	44,044
Breckenridge, highest elevator, east gable, 1902 ¹	36 26 15.68	42 40 12	222 33 59	Waukomis.....	4.364602	23,152.7	75,960
	97 44 06.18	110 16 32	290 13 32	Enid.....	3.906482	8,062.7	26,452
North Enid, Congregational Church, spire, 1902 ¹	36 26 28.91	234 44 42	54 46 02	Enid.....	3.615911	4,129.6	13,549
	97 51 25.37	15 10 37	195 08 44	Waukomis.....	4.257067	18,074.5	59,299
Enid, schoolhouse, cupola, 1902 ¹	36 24 31.81	220 28 39	40 30 41	Enid.....	3.896521	7,879.9	25,853
	97 52 35.37	12 10 28	192 09 17	Waukomis.....	4.150874	14,153.8	46,436

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
	°	'	"	°	'	"	°	'	"		Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>													
Enid, Catholic Church, spire, 1902 ¹	36	23	48.88	218	49	36	38	51	56	Enid.....	3.972804	9,393.0	30,817
	97	53	06.45	10	00	47	189	59	55	Waukomis.....	4.104013	12,706.1	41,687
Enid, Big 4 Elevator, east gable, 1902 ¹	36	23	14.15	212	16	06	32	18	12	Enid.....	3.996494	9,919.6	32,545
	97	52	42.63	13	46	07	193	45	00	Waukomis.....	4.071166	11,780.6	38,650
Enid, ice plant, stack, 1902.....	36	23	19.896	212	11	11.5	32	13	14.7	Enid.....	3.986839	9,701.5	31,829
	97	52	37.483	14	09	49.8	194	08	40.2	Waukomis.....	4.078576	11,983.3	39,315
Waukomis, schoolhouse, belfry, 1902.....	36	16	40.015	276	23	32.6	96	38	24.8	Mitchell.....	4.578684	37,903.9	124,356
	97	53	53.494	339	24	41.6	159	27	34.9	Parnell.....	4.319592	20,873.3	68,482
T. 21 N., R. 7 W., secs. 23 and 24, ¼-section corner, 1902.....	36	16	55.852	135	38	57.5	315	38	52.4	Waukomis.....	2.483787	304.6	999
	97	54	26.446	300	41	22.1	120	41	41.6	Waukomis, schoolhouse, belfry.....	2.980601	956.3	3,137
Bison, highest elevator, center shaft, 1902.....	36	11	43.871	328	12	12.0	148	14	44.3	Parnell.....	4.088194	12,251.6	40,195
	97	53	18.125	13	13	42.7	193	10	57.7	Burson.....	4.487437	30,721.1	100,791
Bison, lower elevator, 1902 ¹	36	11	49.22	168	41	13	348	40	27	Waukomis.....	3.993908	9,860.7	32,351
	97	53	17.47	328	40	13	148	42	45	Parnell.....	4.092848	12,383.6	40,629
Hennessey, windmill at railroad, 1902.....	36	06	29.560	177	37	13.7	357	36	54.5	Waukomis.....	4.290874	19,537.7	64,100
	97	54	02.475	275	28	29.3	95	31	27.5	Parnell.....	3.880784	7,599.5	24,933
Hennessey, schoolhouse, dome, 1902.....	36	06	14.530	272	02	20.1	92	05	13.0	Parnell.....	3.866022	7,345.5	24,099
	97	53	53.521	17	16	20.2	197	13	56.1	Burson.....	4.315730	20,688.5	67,876
Hennessey, roller mill, stack, 1902 ¹	36	06	49.66	177	42	15	357	41	57	Waukomis.....	4.276856	18,917.2	62,064
	97	54	04.62	260	00	17	100	03	16	Parnell.....	3.888516	7,736.0	25,381
Hennessey, elevator, center, square top, 1902.....	36	06	34.879	177	35	25.6	357	35	06.3	Waukomis.....	4.287235	19,374.7	63,565
	97	54	02.341	276	42	03.6	96	45	01.7	Parnell.....	3.881582	7,613.5	24,979
T. 17 N., R. 7 W., section 29, southwest corner, 1902.....	35	54	46.655	217	24	54.5	37	25	20.3	Burson.....	3.259435	1,817.3	5,962
	97	58	42.594	335	00	22.4	155	04	43.0	Eichoff.....	4.423169	26,495.3	86,927
Kingfisher College, belfry, 1902.....	35	52	03.652	345	34	20.8	165	36	14.4	Eichoff.....	4.292579	19,614.6	64,352
	97	54	31.709	141	17	03.2	321	15	01.8	Burson.....	3.918579	8,290.5	27,200

Kingfisher, standpipe, 1902.....	35	51	43.672	338	49	45.7	158	52	31.2	Eichoff.....	4.294661	19,708.8	64,661
	97	56	00.433	10	40	44.2	190	38	41.5	Caddo.....	4.455562	28,547.1	93,658
Kingfisher, courthouse dome, 1902.....	35	51	37.808	339	01	41.7	159	04	23.9	Eichoff.....	4.289791	19,489.1	63,940
	97	55	54.766	11	01	45.8	190	59	39.8	Caddo.....	4.453262	28,396.3	93,164
Guthrie, St. Joseph Church, east spire, 1902.....	35	52	15.203	61	29	49.5	241	16	03.7	Eichoff.....	4.606454	40,406.8	132,568
	97	27	44.961	164	11	00.4	344	10	04.8	Wingard.....	3.940687	8,723.4	28,620
Guthrie, standpipe, 1902 ¹	35	52	38.24	11	30	29	191	28	35	Edmonds.....	4.393072	24,721.3	81,106
	97	24	39.89	137	36	29	317	33	45	Wingard.....	4.017302	10,406.4	34,142
Okarche, Catholic Church, spire, 1902.....	35	43	44.682	288	12	20.9	108	16	35.9	Eichoff.....	4.063022	11,561.7	37,932
	97	58	34.169	6	06	00.8	186	05	27.9	Caddo.....	4.126045	13,367.3	43,856
Okarche, center elevator, top, 1902.....	35	43	30.059	286	26	19.1	106	30	27.9	Eichoff.....	4.048175	11,173.1	36,657
	97	58	23.569	7	29	09.5	187	28	30.4	Caddo.....	4.112313	12,951.3	42,491
T. 14 N., R. 6 W., section 17, southeast corner, 1902 ¹	35	40	54.75	57	40	41	237	35	46	Caddo.....	4.177465	15,047.5	49,368
	97	51	05.38	169	29	14	349	29	07	Eichoff.....	3.216357	1,645.7	5,399
Caddo, school, center water tank, 1902.....	35	36	52.079	234	25	45.2	54	30	40.4	Eichoff.....	4.194635	15,654.4	51,359
	97	59	43.786	330	02	52.2	150	02	59.9	Caddo.....	2.822342	664.3	2,179
Caddo, reference mark, 1902 ¹	35	36	41.54	233	05	39	53	10	30	Eichoff.....	4.196027	15,704.6	51,524
	97	59	36.81	328	07	59	148	08	03	Caddo.....	2.470504	295.5	969
Edmonds College, dome, 1902.....	35	39	24.186	177	31	28.7	357	30	56.3	Wingard.....	4.507663	32,185.7	105,596
	97	28	24.361	250	55	14.9	70	55	31.5	Edmonds.....	2.878316	755.6	2,479
Darlington, water tank, center, 1902.....	35	34	36.195	336	47	10.2	156	49	35.0	El Reno east base.....	4.202924	15,956.0	52,349
	98	00	33.451	29	35	37.8	209	33	23.8	El Reno west base.....	4.070688	11,767.6	38,608
El Reno, standpipe, 1902.....	35	32	15.178	157	28	24.7	337	27	08.4	Caddo.....	3.935317	8,616.2	28,288
	97	57	19.456	289	09	23.3	109	16	20.6	Yukon.....	4.282659	19,171.6	62,899
El Reno, Kerfoot Hotel, cupola, 1902.....	35	32	02.992	352	55	57.4	172	56	25.8	El Reno east base.....	4.000908	10,020.9	32,877
	97	57	12.966	63	06	30.5	243	03	20.2	El Reno west base.....	4.085675	12,180.8	39,963
El Reno, Catholic Church, spire, 1902.....	35	31	55.549	351	34	14.5	171	34	47.7	El Reno east base.....	3.992177	9,821.5	32,223
	97	57	21.164	63	39	34.5	243	35	29.0	El Reno west base.....	4.075306	11,893.4	38,020
El Reno, fire department belfry, 1902.....	35	31	55.347	352	25	52.1	172	26	21.8	El Reno east base.....	3.990982	9,794.5	32,134
	97	57	15.232	64	00	11.4	243	56	02.4	El Reno west base.....	4.080077	12,024.8	39,451
El Reno, Canadian Milling Co. elevator, east gable, 1902.....	35	31	30.466	67	22	28.7	247	18	19.8	El Reno west base.....	4.068464	11,707.5	38,410
	97	57	15.295	159	57	36.6	339	56	17.9	Caddo.....	3.997325	9,938.6	32,607
Fort Reno, high water tank, center, 1902 ¹	35	33	50.90	326	43	01	146	46	21	El Reno east base.....	4.200561	15,869.4	52,065
	98	02	09.38	21	00	11	200	58	53	El Reno west base.....	3.976206	9,466.9	31,059

¹ No check on this position.

Station	Latitude and longitude			Azimuth	Back azimuth	To station	Distance			
	°	'	"				Logarithm (meters)	Meters	Feet	
<i>Supplementary points—Continued</i>										
Fort Reno, flagpole, 1902 ¹	35	33	44.42	326	28	16	El Reno east base.....	4.195204	15,674.9	51,427
	96	02	07.38	21	44	08	El Reno west base.....	3.968451	9,299.3	30,509
Fort Reno, low water tank, 1902 ¹	35	33	49.88	218	34	51	Caddo.....	3.809420	6,447.9	21,154
	98	02	10.37	20	55	50	El Reno west base.....	3.974447	9,428.6	30,934
House with square roof, chimney, 1902 ¹	35	29	31.41	17	00	17	Smith.....	4.110606	12,900.5	42,324
	97	27	10.64	176	28	33	Edmonds.....	4.268361	18,550.7	60,862
Oklahoma City, church, highest spire, 1902 ¹	35	28	34.08	356	26	46	Smith.....	4.024922	10,590.6	34,746
	97	30	06.12	91	19	35	Yukon.....	4.363070	23,071.2	75,693
Midland, schoolhouse, belfry, 1902.....	35	29	37.832	296	33	19.7	El Reno east base.....	4.087186	12,223.2	40,102
	98	03	37.604	339	18	15.4	Carson.....	4.416913	26,116.4	85,684
T. 11 N., R. 7 W., sec. 9, southeast corner, 1902.....	35	26	07.238	6	23	01.9	Carson.....	4.256656	18,057.4	59,243
	97	56	12.974	113	48	06.2	El Reno west base.....	4.131237	13,528.1	44,383
Union, Catholic Church, spire, 1902.....	35	23	39.470	7	02	09.1	Carson.....	4.130116	13,493.2	44,269
	97	56	27.020	129	47	13.2	El Reno west base.....	4.194425	15,646.8	51,335
Union, red elevator, center, top, 1902.....	35	23	38.472	7	40	50.1	Carson.....	4.129747	13,481.8	44,232
	97	56	21.123	129	31	41.2	El Reno west base.....	4.198134	15,781.0	51,775
Union, Methodist Church, spire, 1902 ¹	35	23	37.40	129	57	25	El Reno west base.....	4.195634	15,690.4	51,478
	97	56	26.88	180	42	59	El Reno east base.....	3.751040	5,636.9	18,494
Boundary mark, Indian Territory and Oklahoma, 1902.....	35	20	01.138	158	08	15.9	El Reno west base.....	4.256062	18,032.8	59,163
	97	59	57.606	203	38	23.9	El Reno east base.....	4.128075	13,429.9	44,061
Minco, Elmets Bond College, belfry, 1902.....	35	18	58.380	148	13	48.8	El Reno west base.....	4.341752	21,966.1	72,067
	97	56	45.194	182	08	32.6	El Reno east base.....	4.153675	14,245.4	46,737
Minco, red elevator, center, top, 1902.....	35	19	00.500	19	07	54.8	Carson.....	3.705413	5,074.7	16,649
	97	56	26.608	180	15	28.4	El Reno east base.....	4.151375	14,170.2	46,490
Old boundary post, Oklahoma-Indian Territory, 1902 ¹	35	16	34.12	315	23	20	Carson.....	2.600087	398.19	1,306.4
	97	57	43.48							
Carson reference mark, 1902 ¹	35	16	33.87	359	42	34	Carson.....	2.440556	275.776	904.78
	97	57	32.47	91	35	09	Old boundary post, Oklahoma-Indian Territory.....	2.444577	278.34	913.2
T. 9 N., R. 7 W., secs. 5 and 8, ¼-section corner, 1902 ¹	35	16	34.29	272	31	44	Carson reference mark.....	2.463219	290.6	953
	97	57	43.96	314	41	45	Carson.....	2.613118	410.3	1,346
Moore, elevator, west end of ridge, 1902 ¹	35	18	52.52	126	17	26	Yukon.....	4.494049	31,192.4	102,337
	97	28	43.73	169	02	46	Smith.....	3.874415	7,488.8	24,570
Norman, standpipe, 1902 ¹	35	13	27.32	2	51	27	Purcell.....	4.375630	23,748.2	77,914
	97	26	02.68	162	28	17	Smith.....	4.260596	18,222.0	59,783
Norman, college belfry, 1902 ¹	35	12	33.30	0	07	51	Purcell.....	4.343491	22,054.2	72,356
	97	26	47.38	167	06	09	Smith.....	4.290761	19,532.6	64,083
T. 6 N., R. 2 W., secs. 7 and 8, ¼-section corner, 1902 ¹	35	00	28.34	119	07	43	Purcell.....	2.770314	589.27	1,933.3
	97	26	29.07							
Noble, elevator, 1902.....	35	08	16.652	17	54	07.7	Purcell.....	4.172120	14,863.5	48,765
	97	23	49.172	71	57	07.1	Lanier.....	4.400028	25,120.5	82,416
Marlow secondary, 1902.....	34	42	46.661	301	48	15.6	Osaria.....	3.587340	3,866.7	12,696
	97	56	21.715	20	23	51.1	Duncan.....	4.449310	28,139.1	92,320
Marlow, Baptist Church, spire, 1902.....	34	38	59.340	193	31	32.8	Marlow secondary.....	3.857617	7,204.7	23,637
	97	57	27.935	225	01	20.3	Osaria.....	3.846839	7,028.1	23,058
Marlow, National Bank, flagpole, 1902.....	34	38	51.775	193	03	37.7	Marlow secondary.....	3.871002	7,430.2	24,377
	97	57	27.700	223	40	28.5	Osaria.....	3.856766	7,190.6	23,591
Marlow, Methodist Church, spire, 1902.....	34	38	43.717	192	44	12.6	Marlow secondary.....	3.885089	7,675.2	25,181
	97	57	28.216	222	25	00.9	Osaria.....	3.868118	7,381.0	24,216
Marlow longitude station, 1899 ¹	34	38	50.62	223	48.3		Marlow, Baptist church.....	2.57092	372.3	1,221
	97	57	38.05	310	20.5		Marlow, Methodist church.....	2.51646	328.4	1,077
Marlow latitude station, 1899 ¹	34	38	50.62	270			Marlow longitude station.....	0.49262	3.109	10.20
	97	57	38.17							
Marlow azimuth station, 1899 ¹	34	38	47.35	180			Marlow longitude station.....	2.00430	101.00	331.4
	97	57	38.05							
Boundary, mile 45, 1902.....	34	39	50.757	298	47	12.7	Marlow, National Bank, flagpole.....	3.638343	4,348.5	14,267
	97	59	57.352	250	29	27.6	Osaria.....	3.968902	9,309.0	30,541
T. 2 N., R. 3 E., sec. 3, southeast corner, 1902 ¹	34	39	50.89	159	41	20	Table Hill.....	2.775974	597.0	1,958.7
	97	29	33.07							

¹ No check on this position.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
Duncan, Baptist Church, spire, 1902 ¹	34 30 16.95 97 57 21.20	287 26 58 68 26 42	107 36 10 248 23 38	Arbuckle..... Duncan.....	4.416412 3.950016	26,086.3 8,912.8	85,585 29,241
T. 1 S., R. 8 W., secs. 9 and 16, ¼-section corner, 1902 ¹	34 28 41.88 98 02 35.55	37 29 01	217 28 55	Duncan.....	2.642969	439.51	1,442.0
T. 1 S., R. 5 W., sec. 25, southwest corner, 1902 ¹	34 26 03.42 97 41 03.74	58 12 21	238 12 19	Arbuckle.....	1.917243	82.65	271.2
T. 1 S., R. 1 W., sec. 21, southeast corner, 1902 ¹	34 26 03.19 97 17 58.68	101 27 43	281 27 26	Arbuckle Mountain.....	2.903768	801.25	2,628.8
T. 4 S., R. 7 W., sec. 2, northeast corner, 1902 ¹	34 14 43.83 97 54 43.60	21 17 10	201 17 05	Monument.....	2.832298	679.67	2,229.9
Tps. 3 and 4 S., Rs. 3 and 4 W., township corner, 1902 ¹	34 14 17.49 97 33 11.80	305 07 07	125 07 16	Lone Tree.....	2.690931	490.83	1,610.3
T. 5 S., R. 7 W., sec. 25, center, 1902 ¹	34 05 34.30 97 53 09.42	102 07 46	252 07 43	Benton.....	2.093176	123.93	406.6
Section corner near station Grady, 1902 ¹	34 02 31.36 97 42 00.74	196 29 06	16 29 10	Grady.....	2.819544	660.00	2,165.3
House east of station Grady, north gable, 1902.....	34 00 30.971 97 37 53.041	111 42 36.4 196 47 18.5	291 34 00.7 16 50 05.1	Benton..... Lone Tree.....	4.405095 4.420093	25,415.3 26,306.3	83,383 86,313
Ringgold, Presbyterian Church, spire (Tex.), 1902 ¹	33 49 11.62 97 56 33.42	125 56 22 276 09 40	305 50 26 96 16 55	Cube..... Blue.....	4.306931 4.305805	20,273.6 20,221.1	66,514 66,342

Thirty-fifth parallel arc (east)

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Logarithm (meters)	Meters	Feet
Rosedale, 1920.....	34 52 07.684 97 10 38.278	14 03 27.07 53 08 00.58 122 36 08.42	193 58 59.17 232 57 08.78 302 26 52.26	Arbuckle Mountain..... Table Hill (U.S.G.S.)..... Purcell (U.S.G.S.).....	4.6948218 4.5607567 4.4657922	49,524.69 36,371.12 29,227.54	162,482.2 119,327.6 95,890.7

Turkey, 1920.....	34 40 04.822 96 59 24.144	48 39 21.58 90 38 55.34 142 28 15.80	228 28 32.03 270 21 41.71 322 21 51.37	Arbuckle Mountain..... Table Hill (U.S.G.S.)..... Rosedale.....	4.5904891 4.6652422 4.4488272	38,948.35 46,263.89 28,107.83	127,783.0 151,784.1 92,217.1
Byars, 1920.....	34 51 45.748 97 00 56.756	353 46 10.71 92 39 59.15	173 47 03.52 272 34 26.72	Turkey..... Rosedale.....	4.3369960 4.1698498	21,726.91 14,785.97	71,282.4 48,510.3
McGee, 1920.....	34 52 35.094 96 57 53.001	5 43 54.43 71 58 05.90 87 34 20.66	185 43 02.45 251 56 20.84 267 27 03.11	Turkey..... Byars..... Rosedale.....	4.3661496 3.6909573 4.2890218	23,235.37 4,908.60 19,454.58	76,231.4 16,104.3 63,827.2
Mound, 1920.....	34 40 54.274 96 45 24.203	85 59 24.96 138 39 33.11	265 51 27.10 318 32 25.98	Turkey..... McGee.....	4.3311780 4.4592414	21,437.69 28,789.98	70,333.5 94,455.1
Konawa, 1920.....	34 53 00.126 96 43 52.316	5 58 12.93 44 50 12.47 87 59 51.00	185 57 20.51 224 41 20.98 267 51 50.24	Mound..... Turkey..... McGee.....	4.3519651 4.5269572 4.3296714	22,488.74 33,647.84 21,363.45	73,781.8 110,393.0 70,089.9
Francis, 1920.....	34 51 08.009 96 33 00.073	45 04 33.20 101 49 55.20	224 57 28.86 281 43 42.32	Mound..... Konawa.....	4.4273833 4.2284730	26,753.67 16,922.83	87,774.3 55,521.0
Hawkins, 1920.....	34 56 32.818 96 24 55.325	47 17 55.59 50 55 09.29 77 17 47.67	227 06 14.04 230 50 31.97 257 06 56.94	Mound..... Francis..... Konawa.....	4.6290747 4.2004105 4.4712565	42,567.17 15,863.92 29,597.60	139,655.8 52,046.9 97,104.8
Sulser, 1920.....	34 42 26.083 96 21 54.759	85 36 08.43 133 36 22.11 170 02 24.75	265 22 46.17 313 30 02.60 350 00 41.63	Mound..... Francis..... Hawkins.....	4.5561208 4.3681302 4.4231249	35,984.94 23,341.58 26,492.62	118,060.6 76,579.8 86,917.9
Allen, 1920.....	34 53 26.662 96 25 03.973	182 11 27.25 346 41 25.20	2 11 32.20 166 43 13.19	Hawkins..... Sulser.....	3.7589658 4.3204838	5,740.71 20,916.25	18,834.3 68,622.7
Gerty, 1920.....	34 52 29.182 96 17 10.107	21 17 53.13 98 24 39.84 122 28 51.66	201 15 10.72 278 20 08.84 302 24 25.43	Sulser..... Allen..... Hawkins.....	4.2998050 4.0450504 4.1459614	19,943.67 12,163.27 13,994.63	65,431.9 39,905.7 45,914.0
Non, 1920.....	34 44 28.606 96 13 51.374	72 58 22.28 142 58 02.13 161 10 53.00	252 53 46.93 322 51 42.80 341 08 59.55	Sulser..... Hawkins..... Gerty.....	4.1094197 4.4467701 4.1944237	12,865.29 27,975.00 15,646.73	42,208.9 91,781.3 51,334.3
Shawnee, 1920.....	34 55 39.674 96 07 24.652	25 26 49.23 68 29 47.09 93 35 53.20	205 23 08.33 248 24 12.11 273 25 51.53	Non..... Gerty..... Hawkins.....	4.3597405 4.2036080 4.4267495	22,894.99 15,981.15 26,714.65	75,114.6 52,431.5 87,646.3
Hickory, 1919.....	34 45 59.300 95 49 21.689	85 50 26.24 123 06 39.08	265 36 28.43 302 56 20.29	Non..... Shawnee.....	4.5738506 4.5160724	37,484.41 32,815.00	122,980.1 107,660.5
Buckhorn, 1919.....	34 58 46.837 96 01 41.554	321 28 30.46 35 05 15.00 56 30 05.59	141 35 33.48 214 58 17.84 236 26 49.02	Hickory..... Non..... Shawnee.....	4.4801169 4.5091620 4.0188074	30,207.65 32,296.99 10,442.57	99,106.3 105,961.0 34,260.3

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>													
Whaleback, 1919.....	34	50	44.853	161	02	05.53	341	00	10.35	Buckhorn.....	4.1960830	15,706.63	51,530.8
	95	58	20.308	302	41	13.52	122	46	20.96	Hickory.....	4.2115094	16,274.57	53,394.2
Last, 1919.....	34	52	05.150	20	21	45.49	200	20	11.55	Hickory.....	4.0600534	12,024.12	39,449.1
	95	46	37.164	82	10	07.71	262	03	25.85	Whaleback.....	4.2560479	18,032.17	59,160.5
Savanna north base, 1919.....	34	50	20.535	239	43	10.56	59	45	14.85	Buckhorn.....	4.4163044	26,079.81	85,563.5
	95	50	14.649	350	30	07.61	170	30	37.84	Last.....	3.8059502	6,396.61	20,986.2
Savanna south base, 1919.....	34	46	56.927	213	42	48.89	33	44	22.97	Hickory.....	3.9117831	8,161.75	26,777.3
	95	52	59.446	225	36	57.44	45	40	35.76	Savanna north base.....	3.8775926	7,543.842	24,750.09
Hartshorne, 1919.....	34	47	38.590	82	30	25.79	262	21	48.90	Last.....	4.1330968	13,586.16	44,573.9
	95	34	15.566	113	36	38.90	293	29	35.22	Hickory.....	3.7645383	5,814.85	19,077.6
Gaines, 1919.....	35	05	27.334	287	45	51.06	107	47	55.26	Buckhorn.....	4.3662618	23,241.37	76,251.1
	95	34	52.721	116	21	32.00	296	05	50.55	Last.....	4.3129540	20,556.73	67,443.2
Panther, 1919.....	35	05	27.334	358	21	26.00	178	21	47.28	Buckhorn.....	4.6683325	46,594.27	152,868.0
	95	34	52.721	31	33	59.86	211	25	42.31	Hartshorne.....	4.5178237	32,947.59	108,095.6
Wilburton, 1919.....	34	50	39.269	113	36	38.90	293	29	35.22	Hickory.....	4.6254485	42,213.22	138,494.5
	95	22	35.107	35	54	58.05	215	48	14.19	Last.....	4.4843220	30,501.56	100,070.5
Blue, 1919.....	35	01	56.682	73	17	24.83	253	02	01.22	Buckhorn.....	4.6294765	42,606.56	139,785.0
	95	10	06.506	31	22	38.64	211	15	51.86	Hartshorne.....	4.5401982	34,689.51	113,810.5
Winding Stair, 1919.....	34	46	32.209	99	56	32.21	279	49	22.57	Gaines.....	4.2839054	19,226.73	63,079.7
	94	53	50.662	72	41	11.18	252	34	31.26	Hartshorne.....	4.2706886	18,650.42	61,188.9
Cavanal, 1919.....	34	50	39.269	145	41	53.11	325	34	50.41	Gaines.....	4.5205001	33,151.27	108,763.8
	94	40	45.134	180	36	30.73	36	36	36.51	Panther.....	4.3814387	24,067.93	78,962.9
Sugar Loaf, 1919.....	35	01	56.682	42	21	58.03	222	14	49.28	Wilburton.....	4.4506545	28,226.34	92,605.9
	94	28	05.723	99	44	06.94	279	37	02.82	Panther.....	4.2794908	18,988.51	62,298.1
Black, 1919.....	34	43	18.693	99	59	24.44	279	42	59.99	Wilburton.....	4.6482407	44,487.78	145,957.0
	94	28	45.973	126	11	22.32	305	55	00.96	Panther.....	4.7310048	53,827.58	176,599.3
Poteau (Ark.), 1919.....	34	57	46.762	139	03	55.98	318	54	37.57	Blue.....	4.5769613	37,753.85	123,864.1
	94	22	29.778	31	24	54.14	211	17	24.44	Winding Stair.....	4.5834336	38,320.72	125,723.9
Hartford (Ark.), 1917.....	34	58	43.770	84	43	04.96	264	26	13.37	Blue.....	4.6516483	44,838.22	147,106.7
	93	56	39.269	54	47	42.65	234	32	58.69	Winding Stair.....	4.6819406	48,077.36	157,733.8
Oklahoma, 1919.....	34	55	28.046	90	49	01.42	270	24	54.48	Blue.....	4.8055267	63,903.81	209,657.7
	94	29	28.714	104	24	44.69	284	17	28.58	Cavanal.....	4.2981120	19,866.07	65,177.3
White Oak (Ark.), 1916.....	34	43	18.693	98	58	29.76	278	44	12.11	Winding Stair.....	4.5880981	38,734.51	127,081.5
	94	28	45.973	154	47	28.28	334	40	36.84	Cavanal.....	4.6312501	42,780.92	140,357.1
Pinnacle (Ark.), 1917.....	34	57	46.762	181	43	51.46	1	44	14.47	Sugar Loaf.....	4.5286537	33,779.54	110,825.0
	94	22	29.778	19	41	32.11	199	37	57.18	Sugar Loaf.....	4.4534099	28,405.99	93,195.3
Supplementary points	34	57	46.762	129	29	31.79	309	26	19.12	Sugar Loaf.....	4.0427969	11,035.62	36,206.0
	94	22	29.778	350	23	58.46	170	24	22.93	Poteau.....	3.8122141	6,489.54	21,291.1
Purcell, water tank, 1920 ¹	35	01	14.405	94	45	24.91	274	42	36.59	Sugar Loaf.....	3.8727706	7,460.55	24,476.8
	97	21	49.04	190	33	23.33	10	34	10.90	Sugar Loaf.....	4.0600784	11,483.61	37,675.8
Prison farm, water tank, 1920 ¹	34	55	28.046	221	46	32.13	41	50	07.80	Hartford.....	4.1559043	14,318.72	46,977.3
	97	12	25.68	248	03	42.32	68	07	42.28	Poteau.....	4.0591106	11,458.05	37,592.0
Byars, schoolhouse, cupola, 1920 ¹	34	52	08.37	357	13	47.22	177	14	11.63	Black.....	4.3522075	22,501.30	73,823.0
	97	03	01.01	59	56	12.53	239	37	51.54	Black.....	4.7531445	56,642.78	185,835.5
Pauls Valley, water tank, 1920.....	34	44	20.811	87	33	57.81	267	19	09.13	Poteau.....	4.5951823	39,371.53	129,171.4
	97	13	13.031	96	25	20.68	276	07	18.59	Sugar Loaf.....	4.6823618	48,124.01	157,886.9
Wanette, water tank, 1920.....	35	12	48.784	339	07	43.91	159	11	28.92	White Oak.....	4.4450312	27,863.21	91,414.5
	96	49	11.485	46	39	41.49	226	28	35.17	Poteau.....	4.6067379	40,433.18	132,654.5
Stone building, center, cupola, 1920.....	35	00	56.80	61	21	15.33	241	06	55.22	Sugar Loaf.....	4.6353557	43,187.27	141,690.2
	97	21	49.04	313	42	54	133	49	19	Rosedale.....	4.372373	23,570.7	77,332
McGee.....	34	41	28.37	85	35	30	265	32	38	Purcell.....	3.882949	7,637.5	25,067
	97	12	25.68	187	52	59	7	54	00	Rosedale.....	4.298605	19,888.6	65,251
Table Hill (U.S.G.S.).....	34	52	08.37	222	35	01	42	41	34	Byars.....	4.412640	25,860.7	84,845
	97	03	01.01	282	26	37	102	27	48	Byars.....	3.509475	3,232.0	10,604
Turkey.....	34	44	20.811	89	55	57	269	51	36	Rosedale.....	4.064986	11,614.1	38,104
	97	13	13.031	73	30	47.4	253	21	24.7	Table Hill (U.S.G.S.).....	4.418914	26,237.0	86,079
Mound.....	34	57	43.654	195	16	47.7	15	18	16.0	Rosedale.....	4.173617	14,914.8	48,933
	96	49	11.485	290	26	13.6	110	34	05.5	Turkey.....	4.352594	22,521.3	73,889
Konawa.....	34	57	43.654	328	47	51.2	148	50	01.1	McGee.....	4.045887	11,114.4	36,464
	96	49	11.485	354	20	54.4	174	21	19.0	Byars.....	4.044652	11,082.9	36,361
Tribulation in Oklahoma	34	48	12.968	52	54	21.2	232	49	13.0	Rosedale.....	4.234233	17,148.8	56,262
	96	49	11.485	46	03	56.4	225	58	07.3	Turkey.....	4.335670	21,660.6	71,065
			222	28	35.9	42	31	38.2	Konawa.....	4.079270	12,002.5	39,378	
			336	49	35.0	156	51	44.6	Mound.....	4.167395	14,702.6	48,237	

¹ No check on this position.

Station	Latitude and longitude			Azimuth	Back azimuth			To station	Distance				
									Logarithm (meters)	Meters	Feet		
<i>Supplementary points—Continued</i>													
Roff, water tank, 1920.....	34	37	35.632	108	40	29.6	288	35	25.2	Turkey.....	4.158020	14,388.6	47,207
	96	50	28.759	199	27	34.3	19	31	20.2	Konawa.....	4.480291	30,219.8	99,146
				231	41	36.7	51	44	29.9	Mound.....	3.994753	9,879.9	32,414
Stratford, water tank, 1920.....	34	47	41.675	10	03	29.2	190	02	33.3	Turkey.....	4.155249	14,297.1	46,906
	96	57	46.072	178	53	06.8	358	53	02.8	McGee.....	3.956335	9,043.5	29,670
				303	34	23.5	123	41	26.3	Mound.....	4.355382	22,666.4	74,365
Sacred Heart, stone church, gable, 1920.....	34	59	55.430	304	16	44.5	124	25	40.9	Francis.....	4.459419	28,801.8	94,494
	96	48	36.899	330	32	29.9	150	35	12.9	Konawa.....	4.167166	14,694.9	48,213
				352	03	30.5	172	05	20.6	Mound.....	4.550279	35,504.1	116,483
Konawa, water tank, 1920.....	34	57	37.226	302	45	22.9	122	52	22.2	Francis.....	4.345024	22,132.2	72,612
	96	45	12.744	346	32	52.9	166	33	38.9	Konawa.....	3.943477	8,779.6	28,804
				0	32	26.9	180	32	20.4	Mound.....	4.490062	30,907.4	101,402
Konawa, school building, 1920 ¹	34	57	23.55	343	09	18	163	10	13	Konawa.....	3.928459	8,481.2	27,825
	96	45	29.10	359	45	57	179	46	00	Mound.....	4.484086	30,485.0	100,016
Francis, water tank, 1920.....	34	52	54.544	311	38	23.7	131	39	46.8	Francis.....	3.693703	4,939.7	16,206
	96	35	25.390	34	29	47.1	214	24	05.5	Mound.....	4.429996	26,915.1	88,304
				90	48	20.8	270	43	30.9	Konawa.....	4.109724	12,874.3	42,238
Ada, cement plant, chimney, 1920.....	34	46	10.197	29	42	37.3	209	40	33.0	Mound.....	4.049473	11,206.6	36,767
	96	41	46.018	165	45	15.4	345	44	03.3	Konawa.....	4.115056	13,033.3	42,760
				235	29	18.2	55	34	18.5	Francis.....	4.209908	16,214.7	53,198
Ada, water tank, 1920.....	34	45	54.154	37	23	45.8	217	21	07.7	Mound.....	4.065506	11,628.0	38,150
	96	40	46.788	160	15	26.9	340	13	40.9	Konawa.....	4.144494	13,947.4	45,759
				230	46	23.1	50	50	49.5	Francis.....	4.184848	15,305.5	50,215
Allen, water tank, 1920.....	34	52	40.318	163	09	48.6	343	09	38.8	Allen.....	3.173786	1,492.1	4,895
	96	24	46.954	178	18	06.1	358	18	01.3	Hawkins.....	3.855383	7,167.8	23,516
				271	39	28.5	91	43	49.8	Gerty.....	4.064734	11,607.4	38,082
Byng, power plant, chimney, 1920 ¹	34	51	23.38	17	57	25	197	55	04	Mound.....	4.309122	20,376.1	66,851
	96	41	17.43	127	10	07	307	08	38	Konawa.....	3.693373	4,936.0	16,194
Francis, schoolhouse, 1920 ¹	34	52	13.64	294	57	15	114	58	53	Francis.....	3.680421	4,790.9	15,718
	96	35	51.06	96	43	25	276	38	50	Konawa.....	4.090112	12,305.9	40,374
Holdenville, water tank, 1920 ¹	35	04	50.86	6	04	16	186	03	38	Hawkins.....	4.196261	15,713.1	51,552
	96	23	49.84	28	36	48	208	31	33	Francis.....	4.465208	29,188.2	95,762
McAlester, standpipe, 1919.....	34	56	06.118	8	52	09.7	188	51	43.6	Last.....	3.875048	7,515.3	24,656
	95	45	51.543	15	57	02.7	195	55	02.7	Hickory.....	4.288838	19,446.3	63,800
				62	33	13.0	242	26	04.7	Whaleback.....	4.331140	21,435.8	70,327
Savanna, school, 1919.....	34	49	33.067	38	30	32.0	218	29	06.1	Savanna south base.....	3.788712	6,147.7	20,170
	95	50	28.896	193	53	58.8	13	54	06.9	Savanna north base.....	3.178077	1,506.9	4,944
				345	27	17.1	165	27	55.5	Hickory.....	3.832839	6,805.2	22,327
Arkansas-Oklahoma boundary, milepost no. 26, 1919.....	35	00	45.002	310	46	01.5	130	48	25.4	Poteau.....	3.924703	8,408.2	27,586
	94	26	40.790	23	34	39.1	203	33	02.8	Oklahoma.....	4.027587	10,655.8	34,960
				125	15	20.7	305	14	31.9	Sugar Loaf.....	3.421063	2,636.7	8,651
Arkansas-Oklahoma boundary, milepost no. 27, 1919 ¹	34	59	53.35	145	56	29	325	55	42	Sugar Loaf.....	3.574982	3,758.2	12,330
	94	26	42.70	301	17	02	121	19	27	Poteau.....	3.875533	7,508.2	24,633
Fort Smith (Ark.), 1916.....	35	23	09.729	5	26	29.3	185	25	02.8	Sugar Loaf.....	4.603130	40,098.7	131,557
	94	25	35.727	33	23	03.1	213	14	18.5	Cavanal.....	4.621945	41,874.3	137,383
Stake 5 (Ark.), 1919 ¹	35	23	12.59	282	03	23	102	03	33	Fort Smith.....	2.625227	421.9	1,384
	94	25	52.08										
Stake 0 (Ark.), 1919 ¹	35	23	17.42	301	05	38	121	05	47	Fort Smith.....	2.661940	459.1	1,506
	94	25	51.30	7	26	07	187	26	07	Stake 5.....	2.176817	150.251	492.95
Arkansas-Oklahoma boundary, initial point, 1919 ¹	35	23	17.58	301	06	11	121	06	12	Stake 0.....	0.962701	9.177	30.11
	94	25	51.62										
Fort Smith longitude (Ark.), 1885.....	35	23	17.64										
	94	25	51.16										

¹ No check on this position.

75174-35-3

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points</i>													
Mena (Ark.), 1930.....	34 41 16.432	115 17 08.85	295 14 10.24	Black.....	3.9458754	8,828.27	28,964.1						
	94 23 32.247	231 39 12.87	51 54 34.20	White Oak.....	4.7173949	52,166.88	171,150.8						
Blue (Ark.), 1930.....	34 41 10.334	90 26 20.71	270 14 34.98	Mena.....	4.4992250	31,566.39	103,564.1						
	94 02 52.161	196 14 32.28	16 18 05.27	White Oak.....	4.5291263	33,816.32	110,945.7						
Rich (Ark.), 1930.....	34 40 26.989	104 40 42.50	284 38 32.32	Mena.....	3.7795812	6,019.79	19,749.9						
	94 19 43.472	111 00 34.61	290 55 25.79	Black.....	4.1698609	14,786.35	48,511.5						
		226 02 04.83	46 15 15.34	White Oak.....	4.6882467	48,780.55	160,040.9						
		266 57 00.82	87 06 36.25	Blue.....	4.4012697	25,192.41	82,652.1						
Eagle (Ark.), 1930.....	34 27 21.092	139 04 56.64	318 56 38.76	Mena.....	4.5327404	34,098.91	111,872.8						
	94 06 54.839	199 51 41.02	19 55 06.82	Blue.....	4.4341378	27,173.01	89,150.1						
Whiskey (Ark.), 1930.....	34 20 45.412	183 17 10.94	3 17 59.43	Mena.....	4.5797238	37,994.77	124,654.5						
	94 24 57.816	221 45 05.32	41 57 36.50	Blue.....	4.7047926	50,674.86	166,255.8						
		243 33 26.69	63 42 30.76	Eagle.....	4.4385757	27,452.11	90,065.8						
Hanna (Ark.), 1930.....	34 25 15.388	70 07 41.01	249 59 14.19	Whiskey.....	4.3872073	24,389.75	80,018.7						
	94 10 00.367	203 21 19.09	23 21 56.15	Eagle.....	3.6252266	4,219.17	13,842.4						
Hope (Ark.), 1930.....	34 09 50.031	129 51 59.24	309 43 05.89	Whiskey.....	4.4990301	31,552.23	103,517.6						
	94 09 10.280	177 25 53.67	357 25 25.45	Hanna.....	4.4554722	28,541.20	93,638.9						
		180 41 50.20	0 41 58.91	Eagle.....	4.5103863	32,388.16	106,260.2						
Gillham (Ark.), 1930.....	34 10 36.951	152 53 06.78	332 49 35.27	Whiskey.....	4.3236326	21,068.45	69,122.1						
	94 18 42.111	206 12 00.08	26 16 54.10	Hanna.....	4.4796707	30,176.62	99,004.5						
		275 35 34.55	95 40 55.73	Hope.....	4.1678110	14,716.72	48,283.1						
De Queen (Ark.), 1930.....	33 59 19.425	183 19 57.49	3 20 24.06	Gillham.....	4.3203725	20,910.89	68,605.1						
	94 19 29.578	219 12 32.38	39 18 19.37	Hope.....	4.3995501	25,092.86	82,325.5						
Falls (Ark.), 1930.....	33 51 38.825	133 58 03.68	313 52 43.51	De Queen.....	4.3108551	20,457.62	67,118.0						
	94 09 55.910	158 59 01.85	338 54 07.44	Gillham.....	4.5749101	37,575.97	123,280.5						
		181 59 27.39	1 59 52.91	Hope.....	4.5268748	33,641.46	110,372.0						
Winthrop (Ark.), 1930.....	33 48 01.969	196 07 04.46	16 09 15.52	De Queen.....	4.3370334	21,728.68	71,288.2						
	94 23 24.600	252 07 30.54	72 15 00.77	Falls.....	4.3392830	21,841.53	71,668.4						
Wilton (Ark.), 1930.....	33 44 30.816	107 34 35.01	287 27 09.67	Winthrop.....	4.3347922	21,616.84	70,921.2						
	94 10 03.456	152 03 12.97	331 57 57.50	De Queen.....	4.4914305	31,004.91	101,721.9						
		180 50 34.37	0 50 38.57	Falls.....	4.1201892	13,188.31	43,268.6						
Foreman (Ark.), 1930.....	33 40 22.092	162 11 20.37	342 09 42.08	Winthrop.....	4.1726912	14,883.02	48,828.7						
	94 20 27.621	244 27 40.46	64 33 26.85	Wilton.....	4.2505658	17,805.98	58,418.5						
<i>Supplementary points</i>													
Mena Hotel (old), east chimney (Ark.), 1930.....	34 41 03.905	6 36 44.7	186 35 08.2	Whiskey.....	4.577451	37,796.4	124,004						
	94 22 07.527	100 09 19.8	280 08 31.6	Mena.....	3.340606	2,190.8	7,188						
		112 18 18.9	292 14 32.1	Black.....	4.039730	10,958.0	36,951						
Mena Hotel, flagpole, north side (Ark.), 1930 ¹	34 41 04.36	99 49 35	279 48 47	Mena.....	3.338773	2,181.6	7,157						
	94 22 07.80	112 15 05	292 11 18	Black.....	4.039266	10,946.3	35,913						
Oklahoma-Arkansas boundary no. 52 (ecc.), 1930.....	34 38 13.046	226 29 06.6	46 31 19.6	Mena.....	3.914335	8,209.8	26,935						
	94 27 26.146	250 39 25.2	70 43 48.3	Rich.....	4.066342	12,483.7	40,957						
Oklahoma-Arkansas boundary no. 52, 1930.....	34 38 12.198	226 19 42.3	46 21 55.2	Mena.....	3.915089	8,224.1	26,982						
	94 27 25.944	250 32 10.0	70 36 33.0	Rich.....	4.096475	12,487.5	40,969						
		168 45 48	348 45 48	Oklahoma-Arkansas boundary no. 52 (ecc.).....	1.425208	26.62	87.3						
Bee Mountain, U. S. Forest Service lookout tower (Ark.), 1930.....	34 29 25.374	290 43 58.1	110 47 42.1	Eagle.....	4.033506	10,802.0	35,440						
	94 15 30.627	312 23 36.6	132 26 43.4	Hanna.....	4.057635	11,419.2	37,464						
		42 09 33.5	222 04 12.9	Whiskey.....	4.334416	21,598.1	70,860						
Cairn (U.S.G.S.) (Ark.), 1930 ¹	34 42 42.222	319 10 42	139 12 02	Rich.....	3.740613	5,505.7	18,063						
	94 22 04.844	40 05 10	220 04 20	Mena.....	3.538444	3,455.0	11,335						
Eagle Mountain, U. S. Forest Service lookout tower (Ark.), 1930.....	34 27 15.168	64 32 52.1	244 23 35.9	Whiskey.....	4.445071	27,865.8	91,423						
	94 06 33.362	138 35 51.5	318 27 21.5	Mena.....	4.539041	34,597.2	113,508						
		198 38 46.2	18 42 00.0	Blue.....	4.434003	27,164.6	89,123						
Horatio, municipal water tank (Ark.), 1930 ¹	33 56 20.29	208 47 30	28 48 36	De Queen.....	3.799236	6,298.5	20,664						
	94 21 27.77	11 04 32	191 03 26	Winthrop.....	4.194353	15,644.2	51,326						

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points</i>													
Packer, 1921	35 15 46.438 98 09 20.593	266 09 08.80 356 59 39.89	86 15 57.70 177 00 23.30	Carson Kechi	4.2537910 4.5627206	17,938.70 36,535.97	58,853.9 119,868.4						
Edwards, 1921	34 56 50.140 98 12 21.078	187 25 21.83 211 47 43.70 282 43 26.61	7 27 05.62 31 56 14.81 102 45 53.21	Packer Carson Kechi	4.5479448 4.6296893 3.8234568	35,313.83 42,627.44 6,659.73	115,858.8 139,853.5 21,849.5						
Albert, 1921	35 15 28.585 98 24 36.007	268 33 52.62 331 34 13.51	88 42 41.08 151 41 16.13	Packer Edwards	4.3644799 4.5929693	23,146.21 39,171.42	75,938.9 128,514.9						
Alden, 1921	34 57 33.847 98 40 11.898	215 30 49.52 234 10 02.55 271 41 12.30	35 39 47.78 54 27 47.36 91 57 09.53	Albert Packer Edwards	4.6098792 4.7613278 4.6275167	40,726.70 57,720.20 42,414.73	133,617.5 189,370.4 139,155.7						
Grebe, 1921	35 14 51.245 98 39 57.071	267 05 49.03 40 26.84	87 14 40.65 180 40 18.31	Albert Alden	4.3676001 4.5047592	23,313.10 31,971.22	76,486.4 104,892.2						
Sturm, 1921	35 15 25.412 98 28 48.852	269 06 11.22 27 42 06.69 86 29 13.15	89 08 37.17 207 35 33.85 266 22 47.47	Albert Alden Grebe	3.8056593 4.5714561 4.2285443	6,392.33 37,278.30 16,925.61	20,972.2 122,303.9 55,530.1						
Dill, 1921	35 17 24.427 99 07 40.122	276 16 27.94 311 11 19.10	96 32 28.22 131 27 07.43	Grebe Alden	4.6263212 4.7448208	42,298.14 55,567.49	138,773.1 182,307.7						
Tepee, 1921	34 52 39.884 99 12 15.651	188 39 09.97 229 58 34.31 259 20 16.19	8 41 48.34 50 17 07.99 79 38 37.38	Dill Grebe Alden	4.6653716 4.8061900 4.6960474	46,277.68 64,001.48 49,664.66	151,829.4 209,978.2 162,941.5						
Folks, 1921	35 12 22.879 99 26 28.415	251 51 54.08 329 16 08.70	72 02 45.24 149 24 18.34	Dill Tepee	4.4771296 4.6271705	30,000.58 42,380.93	98,426.9 139,044.8						
Walsh, 1921	34 58 34.923 99 24 37.301	173 42 50.34 216 24 52.01 300 06 25.25	353 41 46.46 36 34 37.38 120 13 29.87	Folks Dill Tepee	4.4094163 4.6364700 4.3379040	25,669.44 43,298.22 21,772.28	84,217.2 142,054.2 71,431.2						
Self, 1921	35 07 58.773 99 48 50.692	256 25 05.34 295 08 25.29	76 37 58.49 115 22 20.06	Folks Walsh	4.5431871 4.6098509	34,929.07 40,724.05	114,596.5 133,608.8						
Vinson, 1921	34 54 42.551 99 53 41.317	196 41 26.68 260 40 13.17	16 44 13.47 80 56 52.11	Self Walsh	4.4085580 4.6515790	25,618.75 44,831.06	84,050.8 147,083.2						
Haystack, 1921	35 04 52.686 99 37 32.985	52 38 14.35 108 31 46.69 230 26 06.83 300 33 53.50	232 28 58.98 288 25 16.93 50 32 29.37 120 41 18.73	Vinson Self Folks Walsh	4.4903483 4.2575786 4.3385677 4.3589013	30,927.75 18,005.83 21,805.58 22,850.79	101,468.8 59,369.4 71,540.5 74,969.6						
Branson (Tex.), 1921	34 55 14.329 100 12 29.493	236 39 48.25 271 52 07.42	56 53 22.59 92 02 53.17	Self Vinson	4.6334151 4.4571944	42,994.71 28,654.60	141,058.5 94,011.0						
Coon (Tex.), 1921	34 57 46.607 100 01 06.473	74 54 19.80 224 36 34.02 296 37 26.16	254 47 48.60 44 43 36.55 116 41 41.09	Branson Self Vinson	4.2542225 4.4236622 4.1017782	17,956.53 26,525.41 12,640.91	58,912.4 87,025.4 41,472.7						
Trimmins (Tex.), 1921	35 08 39.998 100 17 15.503	271 32 59.34 309 16 19.47 343 41 56.03	91 49 20.56 129 25 36.03 163 44 40.21	Self Coon Branson	4.6352512 4.5018307 4.4127038	43,176.87 31,756.36 25,864.48	141,656.1 104,187.3 84,857.0						
<i>Supplementary points</i>													
Sentinel, water tank, 1921	35 09 27.507 99 10 15.878	47 24 44.4 102 27 53.5	227 16 29.5 282 18 33.2	Walsh Folks	4.472443 4.401293	29,678.6 25,193.8	97,371 82,657						
Hobart, water tank, 1921	35 01 36.025 99 05 31.922	31 49 56.5 173 40 31.1	211 46 05.2 353 39 17.3	Tepee Dill	4.288688 4.468440	19,439.6 29,406.3	63,778 96,477						
Gotebo, water tank, 1921	35 04 13.502 98 52 40.458	224 27 00.8 302 55 14.4	44 34 20.4 123 02 23.9	Grebe Alden	4.440276 4.354582	27,559.8 22,624.7	90,419 74,228						
Saddle Mountain, 1921	34 48 18.142 98 46 25.704	191 18 58.8 208 58 18.4	11 22 41.9 29 01 52.2	Grebe Alden	4.699595 4.291800	50,072.0 19,579.4	164,278 64,237						
Mangum, water tank, 1921 ¹	34 52 26.74 99 30 11.79	154 04 35 216 46 49	334 00 22 36 50 00	Haystack Walsh	4.407669 4.151388	25,566.4 14,170.6	83,879 46,491						
Lone Wolf, water tank, 1921 ¹	34 59 23.17 99 15 11.48	340 14 03 84 07 51	160 15 44 264 02 26	Tepee Walsh	4.120715 4.159208	13,204.3 14,428.1	43,321 47,336						
Signal Mountain, 1921 ¹	34 45 45.86 98 35 19.56	161 13 36 172 34 07	341 10 49 352 31 28	Alden Grebe	4.362595 4.734354	23,046.0 54,244.3	75,610 177,967						
Wellington, water tank (Tex.), 1921	34 51 32.428 100 12 50.327	168 01 56.0 184 25 19.9	347 59 23.9 4 25 31.9	Trimmins Branson	4.510166 3.836226	32,371.7 6,858.5	106,206 22,502						
Shamrock, water tank (Tex.), 1921	35 12 51.094 100 14 56.365	353 28 08.9 24 28 31.5	173 29 33.3 204 27 11.3	Branson Trimmins	4.515577 3.929483	32,777.6 8,501.3	107,538 27,891						

¹ No check on this position

Oklahoma-Texas boundary (Red River) arc

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
	°	'	"	°	'	"	°	'	"		Logarithm (meters)	Meters	Feet
<i>Principal points</i>													
Keele, 1923	34	05	51.275	218	38	11.15	38	42	48.04	Monument	4.3055025	20,207.03	66,295.9
	98	03	06.266	271	49	45.65	91	55	17.57	Benton	4.1814609	15,186.61	49,824.7
				18	29	20.44	198	27	02.71	Cube	4.2997742	19,942.25	65,427.2
Hastings, 1923	34	10	46.179	251	26	28.82	71	33	47.94	Monument	4.3239547	21,084.08	69,173.4
	98	07	54.297	320	53	42.66	140	56	24.30	Keele	4.0683979	11,705.71	38,404.5
				357	48	13.17	177	48	36.58	Cube	4.4474993	28,022.01	91,935.5
Byers (Tex.), 1923	34	02	50.742	204	39	05.27	24	41	32.52	Hastings	4.2073788	16,120.51	52,888.7
	98	12	16.855	248	27	08.84	68	32	17.30	Keele	4.1811013	15,174.04	49,783.5
				329	38	44.69	149	41	34.83	Cube	4.1894906	15,470.01	50,754.5
Lee, 1923	34	11	08.482	271	36	58.64	91	45	30.43	Hastings	4.3680474	23,337.13	76,565.2
	98	23	05.225	312	39	17.89	132	45	21.55	Byers	4.3543376	22,611.93	74,186.0
Bailer, 1923	34	09	11.185	123	31	14.98	303	29	15.26	Lee	3.8160651	6,547.34	21,480.7
	98	19	32.064	260	38	40.58	80	45	12.45	Hastings	4.2579164	18,109.91	59,415.6
				316	23	03.08	136	27	07.08	Byers	4.2090287	16,181.87	53,090.0
Thornberry (Tex.), 1923	34	03	30.476	187	27	48.96	7	28	29.46	Lee	4.1532845	14,232.61	46,694.8
	98	24	17.422	214	50	37.80	34	53	17.81	Bailer	4.1070212	12,794.44	41,976.4
				273	44	02.57	93	50	46.06	Byers	4.2676634	18,520.96	60,764.2
Willis, 1923	34	05	28.738	223	59	55.03	44	03	36.68	Lee	4.1631466	14,559.51	47,767.3
	98	29	40.180	293	44	20.17	113	47	21.01	Thornberry	3.9562804	9,042.33	29,666.4
Gammill, 1923	34	10	47.047	266	58	54.42	87	03	32.81	Lee	4.1040071	12,705.95	41,686.1
	98	31	20.726	321	04	55.38	141	08	52.82	Thornberry	4.2375598	17,280.64	56,694.9
				345	16	27.85	165	17	24.27	Willis	4.0060510	10,140.30	33,268.6
Cashion (Tex.), 1923	34	01	16.974	178	56	20.14	358	56	13.01	Gammill	4.2447161	17,567.75	57,636.9
	98	31	08.023	196	11	15.09	16	12	04.27	Willis	3.9072850	8,077.65	26,501.4
				248	38	06.80	68	41	56.64	Thornberry	4.0533491	11,307.04	37,096.5
Sullivan (Tex.), 1923	34	05	48.364	223	35	22.15	43	38	34.21	Gammill	4.1041988	12,711.56	41,704.5
	98	37	02.968	312	32	36.14	132	35	54.93	Cashion	4.0920324	12,360.40	40,552.4
Miller, 1923	34	09	38.008	245	41	25.80	65	43	09.13	Gammill	3.7135063	5,170.19	16,962.5
	98	34	24.716	341	53	45.87	161	55	36.12	Cashion	4.2105901	16,240.15	53,281.2
				29	49	46.69	209	48	17.90	Sullivan	3.9114406	8,155.31	26,756.2
Grandfield, 1923	34	13	15.000	287	26	33.38	107	31	51.06	Gammill	4.1810197	15,171.19	49,774.1
	98	40	45.904	304	22	52.19	124	26	26.41	Miller	4.0730175	11,830.89	38,815.2
				337	26	45.50	157	28	50.68	Sullivan	4.1731686	14,899.39	48,882.4
Sunshine (Tex.), 1923	34	03	41.273	211	24	08.10	31	28	04.79	Grandfield	4.3163520	20,718.20	67,973.0
	98	47	47.645	256	37	18.66	76	43	19.90	Sullivan	4.2301045	16,986.52	56,729.9
Tipton, 1923	34	09	13.567	226	29	58.41	46	32	50.57	Grandfield	4.0338897	10,811.59	35,471.0
	98	45	52.290	294	57	01.27	115	01	58.23	Sullivan	4.1750639	14,965.25	49,098.5
				16	06	59.19	196	05	54.51	Sunshine	4.0276258	10,656.77	34,963.1
Burke, 1923	34	12	27.135	264	08	19.00	84	13	36.97	Grandfield	4.1628849	14,550.73	47,738.5
	98	50	11.400	311	55	49.30	131	58	14.87	Tipton	3.9504578	8,921.91	29,271.3
				347	10	52.95	167	12	13.62	Sunshine	4.2205270	16,616.02	54,514.4
Harrold (Tex.), 1923	34	06	05.554	234	34	55.18	54	40	58.20	Burke	4.3077580	20,312.25	66,641.1
	99	00	58.005	282	18	43.64	102	26	06.54	Sunshine	4.3169243	20,745.52	68,062.6
Hickerson, 1923	34	13	46.939	283	33	27.22	103	37	10.71	Burke	4.0197758	10,465.88	34,336.8
	98	56	48.825	323	20	50.61	143	25	54.37	Sunshine	4.3663898	23,248.22	76,273.5
				24	11	49.34	204	09	29.40	Harrold	4.1926519	15,583.03	51,175.3
Red Bluff (Tex.), 1923	34	12	58.487	266	12	44.70	86	21	09.59	Hickerson	4.3622206	23,026.11	75,544.8
	99	11	46.538	307	23	51.09	127	29	55.24	Harrold	4.3206606	20,924.76	68,650.6
Frederick, 1923	34	24	04.324	339	48	59.74	159	51	33.75	Hickerson	4.3067451	20,264.93	66,485.9
	99	01	22.014	358	56	21.60	178	56	35.11	Harrold	4.5217251	33,244.91	109,071.0
				37	56	41.41	217	50	49.39	Red Bluff	4.4149465	25,998.40	85,296.4
Harrison (Tex.), 1923	34	19	31.996	252	57	22.89	73	07	30.70	Frederick	4.4588974	28,767.19	94,380.4
	99	19	18.832	316	18	20.09	136	22	34.78	Red Bluff	4.2242635	16,759.59	54,985.4
Cunningham, 1923	34	24	29.636	276	28	39.75	96	31	11.23	Frederick	3.8382985	6,891.26	22,609.1
	99	05	50.095	23	11	48.51	203	08	27.58	Red Bluff	4.3648181	23,164.24	75,996.0
				66	07	54.44	246	00	17.91	Harrison	4.3542743	22,608.63	74,175.1
Hess, 1923	34	28	24.110	288	07	54.19	108	16	53.27	Frederick	4.4085789	25,619.99	84,054.9
	99	17	15.269	292	23	17.97	112	29	45.48	Cunningham	4.2770501	18,925.62	62,091.8
				10	54	19.14	190	53	09.33	Harrison	4.2226379	16,696.98	54,780.0
Butte, 1923	34	29	18.237	274	47	36.77	94	54	52.49	Hess	4.2946877	19,710.05	64,665.4
	99	30	04.912	317	32	17.83	137	38	22.91	Harrison	4.3885610	24,465.89	80,268.5
Whittle (Tex.), 1923	34	21	31.803	191	09	43.49	11	10	46.32	Butte	4.1658313	14,649.79	48,063.5
	99	31	56.060	240	28	20.63	60	36	38.45	Hess	4.4121716	25,832.81	84,753.1
				280	44	21.37	100	51	28.55	Harrison	4.2945414	19,703.41	64,643.6

U. S. COAST AND GEODETIC SURVEY

TRIANGULATION IN OKLAHOMA

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>													
Green (Tex.), 1923	34 22 52.206	241 50 28.07	61 58 41.66	Butte	4.4024627	25,261.71	82,879.5						
	99 44 37.795	277 11 39.29	97 18 49.32	Whittle	4.2927052	19,620.28	64,370.9						
Eldorado, 1923	34 28 59.994	266 33 21.53	86 36 50.56	Butte	3.9748231	9,436.76	30,960.4						
	99 36 14.092	334 28 23.37	154 30 49.23	Whittle	4.1847325	15,301.45	50,201.5						
		48 39 12.35	228 34 27.54	Green	4.2340459	17,141.38	56,238.0						
Campbell, 1923	34 32 09.779	285 55 11.92	106 02 45.38	Eldorado	4.3271136	21,238.00	69,678.3						
	99 49 34.486	336 11 23.62	156 14 11.49	Green	4.2735926	18,775.55	61,599.4						
Gould, 1923	34 40 22.747	325 41 44.71	145 47 03.79	Eldorado	4.4057700	25,454.82	83,513.0						
	99 45 36.311	357 21 20.97	177 21 54.14	Green	4.5106161	32,405.31	106,316.4						
		21 47 45.27	201 45 30.01	Campbell	4.2137218	16,357.68	53,666.8						
Hollis, 1923	34 37 35.601	253 10 17.73	73 16 39.18	Gould	4.2515187	17,845.09	58,546.8						
	99 56 47.232	312 16 36.84	132 20 42.45	Campbell	4.1736111	14,914.58	48,932.3						
Snider, 1923	34 33 18.048	131 25 16.10	311 21 55.52	Hollis	4.0792636	12,002.28	39,377.5						
	99 50 53.914	211 42 12.96	31 45 13.37	Gould	4.1871302	15,386.16	50,479.4						
		316 04 53.57	136 05 38.61	Campbell	3.4653939	2,920.07	9,580.3						
Day, 1923	34 46 59.711	326 23 50.50	146 26 52.32	Gould	4.1667898	14,682.16	48,169.7						
	99 50 55.474	27 16 32.79	207 13 12.52	Hollis	4.2912006	19,552.42	64,148.2						
		142 08 58.15	322 03 08.80	Coon	4.4024717	25,262.23	82,881.2						
		163 33 19.37	343 31 44.61	Vinson	4.1723645	14,871.83	48,792.0						
Henry, 1923	34 47 30.356	124 35 56.28	304 28 08.83	Branson	4.4017548	25,220.56	82,744.5						
	99 58 51.610	169 47 12.45	349 45 55.33	Coon	4.2854760	19,296.39	63,308.2						
		210 35 44.02	30 38 41.34	Vinson	4.1896630	15,476.15	50,774.7						
		274 25 22.16	94 29 53.81	Day	4.0842892	12,141.97	39,835.8						
		303 00 39.48	123 08 12.59	Gould	4.3828327	24,145.31	79,216.7						
		350 11 29.73	170 12 40.55	Hollis	4.2694753	18,598.39	61,018.2						
<i>Supplementary points</i>													
Ryan, city water tank, 1923	34 01 31.896	95 56 48.9	275 48 13.8	Byers	4.375329	23,731.7	77,860						
	97 56 59.575	130 09 30.4	310 06 03.4	Keele	4.093407	12,399.6	40,681						
		217 15 23.9	37 17 28.6	Benton	3.973982	9,418.5	30,901						
Ryan, high-school cupola, 1923	34 01 29.344	96 08 35.3	276 00 00.8	Byers	4.374947	23,710.8	77,791						
	97 56 57.717	130 31 21.2	310 27 54.8	Keele	4.094407	12,428.2	40,775						
		217 06 35.8	37 08 41.1	Benton	3.977673	9,498.9	31,164						
Waurika, city water tank, 1923	34 09 47.242	222 01 02.8	42 08 51.3	Monument	4.058890	11,452.2	37,573						
	97 59 52.791	307 13 06.8	127 16 50.5	Benton	4.108320	12,832.8	42,102						
		34 18 14.3	214 16 25.7	Keele	3.944476	8,799.9	28,871						
Byers, city water tank (Tex.), 1923	34 04 10.226	31 31 10.2	211 30 37.4	Byers	3.458297	2,872.7	9,425						
	98 11 18.300	203 10 45.9	23 12 40.3	Hastings	4.122962	13,272.8	43,546						
		338 13 03.1	158 15 20.5	Cube	4.230814	17,014.3	55,821						
Hastings, high-school cupola, 1923	34 13 50.005	266 39 19.0	86 45 51.0	Monument	4.251949	17,862.8	58,605						
	98 06 30.073	340 29 42.7	160 31 37.1	Keele	4.194431	15,647.0	51,335						
		20 50 51.7	200 50 04.3	Hastings	3.782516	6,060.6	19,884						
		79 01 26.2	258 52 06.7	Lee	4.414263	25,957.7	85,163						
Hastings, city water tank, 1923	34 13 52.158	266 52 22.6	86 58 55.3	Monument	4.252607	17,889.9	58,694						
	98 06 31.281	340 28 10.2	160 30 05.3	Keele	4.196448	15,719.8	51,574						
		20 21 19.7	200 20 33.0	Hastings	3.786169	6,111.8	20,052						
		78 52 01.1	258 42 42.3	Lee	4.413971	25,940.1	85,105						
Temple, city water tank, 1923	34 16 26.525	316 39 27.1	136 43 04.4	Hastings	4.158733	14,412.3	47,284						
	98 14 20.568	352 48 17.8	172 49 27.3	Byers	4.403715	25,334.7	83,119						
		30 45 14.2	210 42 19.1	Bailer	4.193258	15,604.8	51,197						
	53 55 09.4	233 50 14.4	Lee	4.220722	16,623.5	54,539							
Petrolia, high-school cupola (Tex.), 1923	34 00 38.678	150 03 02.4	329 59 43.7	Bailer	4.260778	18,229.6	59,808						
	98 13 36.796	206 44 53.6	26 45 18.3	Byers	3.658644	4,556.6	14,949						
		313 13 39.2	133 17 13.9	Cube	4.131848	13,547.2	44,446						
Walters, city water tank, 1923	34 21 23.994	3 06 04.8	183 05 37.9	Bailer	4.354348	22,612.5	74,188						
	98 18 44.307	19 24 33.2	199 22 06.3	Lee	4.308316	20,105.6	65,963						
		44 39 17.9	224 32 11.9	Gammill	4.440299	27,561.3	90,424						
Iowa Park, city water tank (Tex.), 1923 ¹	33 57 04.00	135 31 49	315 27 26	Sunshine	4.234598	17,163.2	56,310						
	98 39 58.80	240 11 02	60 15 59	Cashton	4.195777	15,095.6	51,495						
Wichita Falls, City Power & Electric Co., stack (Tex.), 1923	33 53 48.546	122 31 59.8	302 21 34.4	Sunshine	4.531979	34,039.2	111,677						
	98 29 08.589	167 29 43.9	347 28 37.2	Cashion	4.150836	14,152.6	46,432						
		177 51 00.8	357 50 43.1	Willis	4.334228	21,588.9	70,829						
		202 36 24.1	22 39 06.8	Thornberry	4.288365	19,425.2	63,731						
Wichita Falls, State Hospital, water tank (Tex.), 1923	33 50 39.566	133 48 29.4	313 39 21.7	Sunshine	4.542066	34,840.6	114,306						
	98 31 27.198	185 43 06.7	5 44 06.5	Willis	4.439861	27,533.5	90,333						
		204 53 12.9	24 57 12.9	Thornberry	4.418147	26,190.7	85,927						

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>													
Wichita Falls, Call Aviation Field, water tank (Tex.), 1923.....	33 52 20.174 98 33 04.816	132 51 52.9 192 11 00.0 213 12 30.2	312 43 39.6 12 12 54.4 33 17 24.8	Sunshine..... Willis..... Thornberry.....	4.489791 4.395459 4.392614	30,888.1 24,857.6 24,695.3	101,339 81,554 81,021						
Burkburnett, city water tank (Tex.), 1923.....	34 05 52.990 98 34 21.467	179 18 43.5 207 03 27.7 275 53 40.2 285 46 56.1 329 43 42.4	359 18 42.3 27 05 09.1 95 56 17.9 105 52 34.6 149 45 31.0	Miller..... Gammill..... Willis..... Thornberry..... Cashion.....	3.840961 4.007542 3.860294 4.206767 3.993240	6,933.6 10,175.2 7,249.3 16,097.8 9,845.6	22,748 33,383 23,784 52,814 32,302						
Devol, city water tank, 1923.....	34 11 27.261 98 35 21.706	271 41 59.5 281 20 05.4 336 33 18.9 13 57 38.1	91 48 53.4 101 22 20.8 156 33 51.0 193 56 41.3	Lee..... Gammill..... Miller..... Sullivan.....	4.275712 3.798926 3.564555 4.031788	18,867.4 6,294.0 3,669.1 10,759.4	61,901 20,650 12,038 35,300						
Sunshine (U.S.G.S.) (Tex.), 1923 ¹	34 03 41.37 98 47 47.48	54 27 07	234 27 07	Sunshine.....	0.706376	5.086	16.69						
Sullivan (U.S.G.S.) (Tex.), 1923 ¹	34 05 48.11 98 37 02.10	109 18 14	289 18 14	Sullivan.....	1.374748	23.700	77.76						
Grandfield, city water tank, 1923.....	34 13 28.570 98 41 03.786	312 24 39.8 43 15 27.8 82 21 07.8	132 24 49.9 223 12 45.7 262 15 59.9	Grandfield..... Tipton..... Burke.....	2.792358 4.032806 4.150602	620.0 10,784.6 14,145.0	2,034 35,382 46,407						
Grandfield, city high school, 1923.....	34 13 41.117 98 41 00.939	334 26 25.3 42 09 59.4 80 51 12.5	154 26 33.8 222 07 15.7 260 46 03.0	Grandfield..... Tipton..... Burke.....	2.950353 4.046032 4.154531	892.0 11,118.1 14,273.5	2,927 36,477 46,829						
Oklahoma-Texas boundary, reference mark no. 12 (Tex.), 1923.	34 08 04.914 98 40 40.999	104 52 45.4 179 14 49.5 253 23 59.9 306 57 39.4	284 49 50.6 359 14 46.7 73 27 31.1 126 59 41.6	Tipton..... Grandfield..... Miller..... Sullivan.....	3.916503 3.980237 4.002492 3.844761	8,250.9 9,555.1 10,057.5 6,994.6	27,070 31,349 32,997 22,948						
Oklahoma-Texas boundary, north range line 15/14, 1923.....	34 08 41.244 98 42 50.506	39 30 47.7 102 05 06.4 200 42 40.1 262 16 22.8 288 37 57.7	219 28 01.1 282 03 24.4 20 43 50.1 82 21 06.8 108 39 10.4	Sunshine..... Tipton..... Grandfield..... Miller..... Oklahoma-Texas boundary, refer- ence mark no. 12.	4.078322 3.677813 3.955122 4.116421 3.544296	11,976.3 4,762.3 9,018.2 13,074.4 3,501.8	39,292 15,624 29,587 42,895 11,489						
Oklahoma-Texas boundary, reference mark no. 15 (Tex.), 1923.	34 06 47.474 98 43 41.913	143 25 47.1 200 35 27.7 200 40 12.9 242 45 08.3 280 04 04.0	323 24 33.9 20 35 56.5 20 41 51.7 62 46 49.8 100 07 47.6	Tipton..... Oklahoma-Texas boundary, north range line 15/14. Grandfield..... Oklahoma-Texas boundary, refer- ence mark no. 12. Sullivan.....	3.748618 3.573429 4.105954 3.717175 4.016467	5,605.5 3,744.8 12,763.0 5,214.0 10,386.4	18,391 12,286 41,873 17,106 34,076						
Oklahoma-Texas boundary, witness corner section 10, 1923.	34 08 33.756 98 45 53.117	18 03 07.4 137 24 35.5 180 59 20.6 314 14 11.0	198 02 03.2 317 22 10.4 59 21.1 134 15 24.6	Sunshine..... Burke..... Tipton..... Oklahoma-Texas boundary, refer- ence mark No. 15.	3.976712 3.989915 3.088774 3.671480	9,477.9 9,770.5 1,226.8 4,693.3	31,095 32,055 4,025 15,398						
Oklahoma-Texas boundary, reference mark no. 16 (Tex.), 1923.	34 07 10.503 98 45 56.958	23 45 57.1 182 11 48.3 239 38 54.1 281 34 33.6	203 44 55.1 2 11 50.5 59 40 38.7 101 35 49.4	Sunshine..... Oklahoma-Texas boundary, wit- ness corner section 10. Oklahoma-Texas boundary, north range line 15/14. Oklahoma-Texas boundary, refer- ence mark no. 15.	3.847788 3.409437 3.743155 3.548132	7,043.5 2,567.1 5,535.5 3,532.9	23,109 8,422 18,161 11,591						
Oklahoma-Texas boundary, reference mark no. 2 (Tex.), 1923.	34 05 31.921 98 31 31.708	149 41 56.3 271 57 20.2 355 34 35.0	329 40 19.2 91 58 22.7 175 34 48.2	Miller..... Willis..... Cashion.....	3.943657 3.456480 3.896452	8,783.3 2,860.8 7,878.7	28,817 9,386 25,849						
Oklahoma-Texas boundary, north range line 13/12, section 25-30, 1923.	34 05 57.676 98 30 18.412	8 22 19.9 137 06 24.0 312 17 30.9	188 21 52.1 317 04 05.8 132 17 52.3	Cashion..... Miller..... Willis.....	3.941603 3.967045 3.122204	8,741.8 9,269.3 1,325.0	28,680 30,411 4,347						
Oklahoma-Texas boundary, witness point section 14, 1923.	34 07 36.631 98 31 52.453	133 48 13.7 187 53 03.5 319 16 59.9 354 26 02.8	313 46 48.3 7 53 21.3 139 18 14.1 174 26 27.7	Miller..... Gammill..... Willis..... Cashion.....	3.732718 3.772545 3.715854 4.070151	5,404.0 5,923.0 5,198.2 11,753.1	17,730 19,432 17,054 38,560						
Oklahoma-Texas boundary, reference mark no. 4 (Tex.), 1923.	34 07 00.566 98 33 59.169	172 19 02.9 210 10 22.4 293 03 51.0 337 28 13.6	352 18 48.5 30 11 51.3 113 06 16.2 157 29 49.5	Miller..... Gammill..... Willis..... Cashion.....	3.689754 3.907030 3.858304 4.059186	4,895.0 8,072.9 7,216.1 11,460.0	16,060 26,486 23,675 37,598						
Oklahoma-Texas boundary, reference mark no. 7 (Tex.), 1923.	34 08 13.877 98 36 34.828	145 17 50.3 239 34 51.6 232 07 05.8	325 15 29.2 59 37 48.0 52 08 18.9	Grandfield..... Gammill..... Miller.....	4.052630 3.969781 4.625579	11,288.3 9,327.8 4,222.6	37,035 30,603 13,854						
Oklahoma-Texas boundary, secs. 34/35, quarter corner, 1923.	34 09 58.525 98 38 40.782	275 29 07.6 314 58 14.5	95 31 31.4 134 59 25.2	Miller..... Oklahoma-Texas boundary, refer- ence mark no. 7.	3.818834 3.659110	6,589.2 4,561.5	21,618 14,966						
Oklahoma-Texas boundary, witness corner section 6, 1923.	34 09 31.803 98 48 15.875	120 56 33.7 151 18 13.0 278 40 28.7	300 51 45.5 331 17 08.1 98 41 49.3	Hickerson..... Burke..... Tipton.....	4.184882 3.789530 3.570627	15,306.7 6,159.3 3,720.7	50,219 20,208 12,207						

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
	°	'	"	°	'	"	°	'	"		Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>													
Oklahoma-Texas boundary, reference mark no. 21 (Tex.), 1923.	34	06	33.864	70	34	11.8	250	29	28.8	Harrold.....	4.137045	13,710.2	44,981
	98	52	33.589	320	51	58.7	140	54	39.0	Sunshine.....	4.065155	11,618.6	38,119
Oklahoma-Texas boundary, reference mark no. 18 (Tex.), 1923.	34	07	50.500	104	08	01.9	284	06	05.7	Oklahoma-Texas boundary, reference mark no. 21.	3.738612	5,477.9	17,972
	98	49	06.250	168	55	43.1	348	55	06.5	Burke.....	3.938791	8,685.4	28,495
				242	44	03.1	62	45	52.0	Tipton.....	3.747386	5,589.7	18,339
			345	17	27.6	165	18	11.7	Sunshine.....	3.899764	7,939.0	26,047	
Oklahoma-Texas boundary, witness point section 35, 1923.	34	09	59.901	65	52	06.7	245	46	14.5	Harrold.....	4.246201	17,627.9	57,834
	98	50	30.396	186	06	55.4	6	07	06.1	Burke.....	3.659207	4,562.5	14,969
				284	05	41.0	104	06	56.5	Oklahoma-Texas boundary, witness corner section 6.	3.550530	3,552.5	11,655
			340	18	52.0	160	20	23.3	Sunshine.....	4.093044	12,389.2	40,647	
Oklahoma-Texas boundary, witness point section 29, 1923.	34	10	47.280	53	39	12.7	233	34	54.6	Harrold.....	4.165361	14,633.9	48,011
	98	53	18.163	237	13	41.9	57	15	26.9	Burke.....	3.754829	5,696.3	18,656
				327	08	25.1	147	11	30.5	Sunshine.....	4.193723	15,621.5	51,252
Oklahoma-Texas boundary, north range line 17/16, 1923.	34	11	24.907	41	00	54.8	220	57	47.5	Harrold.....	4.115135	13,035.7	42,768
	98	55	24.255	256	30	50.7	76	33	46.6	Burke.....	3.915734	8,236.3	27,022
				289	44	30.2	109	45	41.1	Oklahoma-Texas boundary, witness point section 29.	3.535384	3,430.7	11,256
			320	38	39.9	140	42	56.1	Sunshine.....	4.266361	18,465.5	60,582	
Chattanooga, city water tank, 1923.	34	25	13.289	335	06	31.0	155	11	03.4	Gammill.....	4.468573	29,415.3	96,507
	98	39	24.185	35	04	49.7	214	58	44.8	Burke.....	4.459836	28,829.4	94,584
				86	29	25.4	266	17	02.2	Frederick.....	4.527926	33,723.0	110,640
Electra, city water tank (Tex.), 1923.	34	01	46.882	131	13	38.4	311	10	19.6	Harrold.....	4.082780	12,099.8	39,697
	98	55	02.975	173	02	17.8	353	01	18.4	Hickerson.....	4.349302	22,351.3	73,331
				225	41	04.9	45	46	13.7	Tipton.....	4.294812	19,715.7	64,684
			252	26	52.3	72	30	56.1	Sunshine (U.S.G.S.).....	4.068518	11,709.0	38,415	
Vernon, city water tank (Tex.), 1923 ¹ .	34	08	55.37	170	33	38	350	32	25	Harrison.....	4.298537	19,885.5	65,241
	99	17	11.26	227	57	40	48	00	42	Red Bluff.....	4.048900	11,191.8	36,718
Frederick, city water tank, 1923.	34	23	22.661	39	31	58.2	219	26	09.0	Red Bluff.....	4.396527	24,918.8	81,754
	99	01	26.902	185	33	21.6	5	33	24.4	Frederick.....	3.110520	1,289.8	4,232
				338	08	10.6	158	10	47.4	Hickerson.....	4.281291	19,111.3	62,701
				358	40	19.7	178	40	36.0	Harrold.....	4.504662	31,964.1	104,869
Olustee, city water tank, 1923.	34	32	53.608	304	08	11.1	124	12	42.8	Hess.....	4.169785	14,783.8	48,503
	99	25	14.763	339	46	24.2	159	49	45.5	Harrison.....	4.420265	26,318.7	86,347
				26	01	28.8	205	57	41.8	Whittle.....	4.368711	23,372.8	76,682
				48	08	20.6	228	05	36.2	Butte.....	3.997400	9,940.3	32,612
Altus, city water tank, 1923.	34	39	07.224	347	31	52.4	167	33	29.8	Hess.....	4.307376	20,294.4	66,583
	99	20	06.968	358	03	13.4	178	03	40.6	Harrison.....	4.559111	36,233.6	118,876
				29	08	22.7	209	01	41.0	Whittle.....	4.570699	37,213.4	122,091
				40	04	16.6	219	58	37.3	Butte.....	4.374750	23,700.1	77,756
Eldorado, U.S. Gypsum Co., water tank, 1923.	34	28	48.206	264	26	02.7	84	27	25.6	Eldorado.....	3.574347	3,752.7	12,312
	99	38	40.468	322	26	39.9	142	30	28.5	Whittle.....	4.229293	16,954.8	55,626
				39	46	44.9	219	43	22.9	Green.....	4.154355	14,267.7	46,810
Quanah, courthouse cupola (Tex.), 1923.	34	17	50.125	177	46	57.5	357	46	49.5	Green.....	3.969178	9,314.9	30,561
	99	44	23.658	211	10	28.3	31	15	04.9	Eldorado.....	4.382630	24,134.0	79,180
				225	54	27.4	46	02	32.5	Butte.....	4.484423	30,508.7	100,094
				250	16	30.9	70	23	32.5	Whittle.....	4.307415	20,296.2	66,588
Quanah, city water tank (Tex.), 1923.	34	17	56.731	135	46	49.2	315	39	41.4	Elroy.....	4.442721	27,715.4	90,930
	99	44	17.454	162	54	20.4	342	51	21.2	Campbell.....	4.439388	27,503.5	90,234
				211	06	03.8	31	10	36.9	Eldorado.....	4.377987	23,877.4	78,338
				225	58	31.5	46	06	32.3	Butte.....	4.480762	30,252.6	99,254
			250	40	10.3	70	47	07.6	Whittle.....	4.302717	20,077.8	65,872	
Elroy (Tex.), 1923.	34	28	40.709	240	08	06.7	60	12	16.2	Campbell.....	4.112300	12,950.9	42,490
	99	56	54.907	268	49	37.9	89	01	20.4	Eldorado.....	4.500623	31,668.2	103,886
				299	38	58.4	119	45	55.2	Green.....	4.335834	21,668.8	71,092
Herg (Tex.), 1923.	34	21	02.401	183	16	51.2	3	17	09.1	Elroy.....	4.150604	14,145.0	46,407
	99	57	26.630	260	10	05.1	80	17	19.1	Green.....	4.299613	19,934.9	65,403
Hardeman (Tex.), 1923.	34	21	59.696	199	27	40.1	19	29	16.8	Elroy.....	4.117478	13,106.2	42,999
	99	59	46.021	296	21	08.5	116	22	27.2	Herg.....	3.599399	3,975.6	13,043
Red River longitude (Tex.), 1923.	34	22	18.267	204	02	07.9	24	04	04.3	Elroy.....	4.110744	12,904.6	42,338
	100	00	20.879	302	43	02.9	122	43	22.6	Hardeman.....	3.024750	1,058.6	3,473
Louis, high-school cupola, 1923.	34	33	41.635	33	49	57.0	213	49	14.8	Campbell.....	3.532632	3,409.0	11,184
	99	48	20.055	79	29	34.4	259	28	07.2	Snider.....	3.600919	3,989.5	13,089
				198	38	20.7	18	39	53.8	Gould.....	4.115390	13,043.4	42,793
Initial (Tex.), 1923.	34	34	39.849	228	34	45.6	48	37	02.4	Hollis.....	3.913225	8,188.9	26,866
	100	00	48.295	279	23	53.9	99	29	31.1	Snider.....	4.186388	15,359.9	50,393

¹ No check on this position.

Oklahoma-Texas boundary (Red River) arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>							
Closky (Tex.), 1923.....	34 34 46.314	224 05 31.8	44 07 24.5	Hollis.....	3.861226	7,264.8	23,835
	100 00 05.676	280 54 03.3	100 59 16.4	Snider.....	4.156114	14,325.6	47,000
		79 36 40.5	259 36 16.4	Initial.....	3.043120	1,104.4	3,623
Kidder monument (1902) (Tex.), 1923.....	34 34 39.797	90 05 03.6	270 04 38.6	Initial.....	3.052020	1,127.2	3,698
	100 00 04.069	168 28 08.2	348 28 07.3	Closky.....	2.311627	204.9	672
Oklahoma-Texas old boundary, T. 1 N., R. 27 W., secs. 2/11, corner (Tex.), 1923. ¹	34 34 46.56 100 00 48.32	359 47 14	179 47 14	Initial.....	2.315698	206.87	678.7
Gould, high school, north chimney, 1923.....	34 39 58.435	74 50 45.2	254 44 43.7	Hollis.....	4.224847	16,782.1	55,059
	99 46 11.323	150 54 28.8	330 51 47.0	Day.....	4.171986	14,858.9	48,750
		229 57 09.0	49 57 29.0	Gould.....	3.066104	1,164.4	3,820
Hollis, city water tank, 1923.....	34 40 47.244	29 46 18.3	209 45 03.1	Hollis.....	3.832676	6,802.6	22,318
	99 54 34.629	139 09 19.8	319 05 52.7	Dodson.....	4.150309	14,135.4	46,376
		152 15 45.1	332 13 18.7	Henry.....	4.147276	14,037.1	46,053
		205 53 31.9	25 55 36.8	Day.....	4.105851	12,760.0	41,863
		273 06 36.6	93 11 42.9	Gould.....	4.137518	13,725.2	45,030
Line (Tex.), 1923.....	34 40 51.452	193 00 40.9	13 01 44.6	Henry.....	4.100936	12,616.4	41,392
	100 00 43.343	232 45 50.8	52 51 25.8	Day.....	4.273548	18,773.6	61,593
		272 07 19.3	92 15 55.4	Gould.....	4.363760	23,107.9	75,813
Dodson (Tex.), 1923.....	34 46 34.114	296 26 01.7	116 34 35.5	Gould.....	4.408952	25,642.0	84,127
	100 00 38.203	340 28 32.0	160 30 43.5	Hollis.....	4.245621	17,604.4	57,757
		0 42 36.9	180 42 34.0	Line.....	4.023655	10,559.8	34,645
Oklahoma-Texas old boundary, Tps. 2/3 N., R. 27 W., secs. 2/35, corner (Tex.), 1923. ¹	34 40 54.05 100 00 43.31	0 40 20	180 40 20	Line.....	1.903307	80.04	262.6
Otex (Tex.), 1923.....	34 57 39.170	76 19 53.9	256 13 01.4	Branson.....	4.274413	18,811.0	61,716
	100 00 29.388	103 41 33.3	283 41 12.0	Coon.....	2.986039	968.4	3,177
		297 41 30.1	117 45 23.7	Vinson.....	4.068155	11,699.2	38,383
		323 27 48.7	143 33 16.7	Day.....	4.389349	24,510.3	80,414
		352 27 08.1	172 28 04.0	Henry.....	4.277023	18,924.4	62,088
Texas-Oklahoma boundary mark (Tex.), 1921.....	34 57 28.421	120 50 31.9	300 50 10.7	Coon.....	3.038704	1,093.2	3,587
	100 00 29.476	180 23 10.4	0 23 10.5	Otex.....	2.520150	331.2	1,067

Oklahoma-Texas boundary (one-hundredth meridian) arc

Principal points													
Fuller (Tex.), 1927	35	09	01.872	274	26	01.22	94	35	21.58	Self	4.3930607	24,720.70	81,104.5
	100	05	04.205	326	46	23.34	146	52	55.34	Vinson	4.5001931	31,636.84	103,795.2
				343	50	06.12	163	52	22.68	Coon	4.3357318	21,663.66	71,074.9
Mayfield, 1927	35	20	02.226	337	42	03.61	157	45	31.92	Self	4.3818704	24,091.86	79,041.4
	99	54	51.764	37	19	00.32	217	13	06.92	Fuller	4.4077580	25,571.61	83,896.2
Wheeler (Tex.), 1927	35	24	33.123	288	30	00.43	108	39	29.98	Mayfield	4.4183386	26,202.25	85,965.2
	100	11	15.659	311	55	30.09	132	08	26.74	Self	4.6605457	45,766.29	150,151.6
				341	51	26.51	161	55	01.05	Fuller	4.4799354	30,195.03	99,064.9
Rankin, 1927	35	33	00.599	353	32	43.76	173	33	46.06	Mayfield	4.3827502	24,140.72	79,201.7
	99	56	39.219	54	46	40.92	234	38	12.22	Wheeler	4.4324843	27,069.75	88,811.3
SocKwell (Tex.), 1927	35	33	08.762	272	14	58.12	92	17	24.63	Rankin	3.8028664	6,351.65	20,838.7
	100	00	51.199	339	27	57.56	159	31	25.99	Mayfield	4.4129533	25,879.35	84,905.8
				44	46	49.33	224	40	46.87	Wheeler	4.3496347	22,368.39	73,387.0
Zyback (Tex.), 1927	35	36	19.400	297	57	30.83	118	01	57.14	Rankin	4.1156900	13,052.39	42,822.7
	100	04	16.946	318	34	47.27	138	36	46.98	SocKwell	3.8939264	7,832.97	25,698.7
				25	53	49.17	205	49	45.98	Wheeler	4.3836237	24,189.32	79,361.1
Provines, 1927	35	40	56.317	357	08	52.62	177	09	09.51	Rankin	4.1667069	14,679.35	48,160.5
	99	57	08.218	51	40	55.77	231	36	45.93	Zyback	4.1384304	13,754.04	45,124.7
Hanna, 1927	35	39	34.983	238	40	29.41	58	42	04.96	Provines	3.6833441	4,823.30	15,824.4
	99	59	52.068	338	12	51.92	158	14	44.20	Rankin	4.1168726	13,087.96	42,939.5
				47	53	41.38	227	51	07.07	Zyback	3.9535784	8,986.25	29,882.4
Hext (Tex.), 1927	35	40	48.254	268	51	19.82	88	56	19.20	Provines	4.1109083	12,909.47	42,353.8
	100	05	41.494	284	22	57.27	104	26	21.02	Hanna	3.9577767	9,073.54	29,768.8
				345	35	43.85	165	36	33.12	Zyback	3.9321972	8,554.55	28,066.1
Gem (Tex.), 1927	35	47	34.115	312	46	15.67	132	51	23.25	Provines	4.2562284	18,039.66	59,185.1
	100	05	54.838	358	27	48.15	178	27	55.94	Hext	4.0973633	12,513.05	41,053.2
Antelope, 1927	35	54	15.561	14	02	02.65	193	59	39.45	Provines	4.4046363	25,388.46	83,295.3
	99	53	03.383	37	28	56.15	217	21	32.77	Hext	4.4959449	31,328.88	102,784.8
				57	28	44.45	237	21	12.65	Gem	4.3612535	22,974.89	75,376.8
Daly, 1927	36	01	07.905	324	20	27.36	144	23	58.95	Antelope	4.1941245	15,635.96	51,299.0
	99	59	06.885	22	13	20.32	202	09	19.20	Gem	4.4327690	27,087.51	88,869.6
Starbuck (Tex.), 1927	36	03	36.698	293	08	10.67	113	12	24.36	Daly	4.0665101	11,654.94	38,237.9
	100	06	14.900	311	01	49.93	131	09	34.97	Antelope	4.4201453	26,311.48	86,323.6
				359	01	37.54	179	01	49.31	Gem	4.4723445	29,671.84	97,348.4

¹ No check on this position.

Oklahoma-Texas boundary (one-hundredth meridian) arc—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
	°	'	"	°	'	"	°	'	"		Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>													
Santa, 1927.....	36	07	58.631	341	02	46.45	161	06	10.72	Antelope.....	4.4284229	26,817.78	87,984.7
	99	58	50.744	1	49	42.86	181	49	35.23	Daly.....	4.1026275	12,665.65	41,553.9
				54	02	01.80	233	57	40.13	Starbuck.....	4.1378012	13,734.13	45,059.4
Corn (Tex.), 1927.....	36	08	45.036	281	47	45.63	101	50	26.86	Santa.....	3.8440723	6,983.49	22,911.7
	100	03	24.141	24	12	54.64	204	11	14.02	Starbuck.....	4.0178357	10,419.23	34,183.8
Moreland (Tex.), 1927.....	36	11	57.585	300	53	57.00	120	58	47.11	Santa.....	4.1561008	14,325.20	46,998.6
	100	07	02.348	317	24	10.57	137	26	19.37	Corn.....	3.9063230	8,059.78	26,442.8
				355	36	05.48	175	36	33.46	Starbuck.....	4.1898771	15,483.78	50,799.7
Apple, 1927.....	36	14	46.202	11	44	01.26	191	42	59.65	Santa.....	4.1082236	12,829.91	42,092.8
	99	57	06.395	40	19	19.55	220	15	36.48	Corn.....	4.1641767	14,594.08	47,880.7
				70	48	04.11	250	42	11.95	Moreland.....	4.1977066	15,765.46	51,723.8
Follett (Tex.), 1927.....	36	25	40.294	321	34	24.06	141	40	43.36	Apple.....	4.4102097	25,716.37	84,371.1
	100	07	46.535	357	30	26.28	177	30	52.45	Moreland.....	4.4045280	25,382.13	83,274.5
Catesby south base, 1927.....	36	25	16.582	2	40	10.78	182	39	49.27	Apple.....	4.2889465	19,451.21	63,816.2
	99	56	30.109	32	41	24.18	212	35	08.79	Moreland.....	4.4660555	29,245.26	95,948.8
				92	32	21.88	272	25	40.24	Follett.....	4.2270220	16,866.39	55,335.8
Larkey (Tex.), 1927.....	36	29	36.054	321	15	47.10	141	18	20.09	Catesby south base.....	4.0107351	10,250.26	33,629.4
	100	00	47.575	55	10	23.43	235	06	14.45	Follett.....	4.1042666	12,713.54	41,711.0
Flat Top, 1927.....	36	34	56.750	336	57	17.11	157	00	18.73	Catesby south base.....	4.2884786	19,430.26	63,747.4
	100	01	35.426	353	07	48.17	173	08	16.66	Larkey.....	3.9981081	9,956.53	32,655.7
				28	19	47.87	208	16	07.10	Follett.....	4.2895963	19,480.33	63,911.7
Catesby north base, 1927.....	36	29	36.236	26	21	57.85	206	20	23.24	Catesby south base.....	3.9509341	8,931.70	29,303.4
	99	53	50.885	70	48	12.31	250	39	55.71	Follett.....	4.3432450	22,041.70	72,315.1
				90	00	12.12	269	56	04.31	Larkey.....	4.0158231	10,371.06	34,025.7
				130	34	04.16	310	29	27.60	Flat Top.....	4.1819299	15,203.02	49,878.6
Martin, 1927.....	35	04	27.970	333	00	31.94	153	03	59.46	Vinson.....	4.3062160	20,240.26	66,404.9
	99	59	43.179	9	41	44.25	189	40	56.45	Coon.....	4.0985551	12,547.44	41,165.1
				136	06	04.70	316	03	00.04	Fuller.....	4.0688913	11,719.02	38,448.2
Breaks, 1927.....	35	10	06.483	342	03	04.58	162	06	33.14	Vinson.....	4.4760153	29,923.70	98,174.7
	99	59	44.571	5	12	25.75	185	11	38.70	Coon.....	4.3597316	22,894.52	75,113.1
				76	11	53.36	256	08	49.29	Fuller.....	3.9207019	8,331.09	27,332.9
Texola, 1927.....	35	14	16.788	137	49	48.16	317	43	13.57	Wheeler.....	4.4090824	25,649.71	84,152.4
	99	59	53.201	215	33	39.50	35	36	33.63	Mayfield.....	4.1169422	13,000.08	42,946.4
Addis, 1927.....	35	20	15.664	0	37	08.86	180	37	06.13	Texola.....	4.0437687	11,060.30	36,287.0
	99	59	48.473	114	38	05.62	294	31	27.81	Wheeler.....	4.2804613	19,074.86	62,581.4
				273	08	22.09	93	11	13.70	Mayfield.....	3.8753316	7,504.67	24,621.6
Dune, 1927.....	35	24	09.059	92	29	59.18	272	23	20.30	Wheeler.....	4.2402504	17,388.03	57,047.2
	99	59	47.175	174	27	45.08	354	27	07.93	Sockwell.....	4.2230005	16,710.93	54,825.8
				196	07	05.10	16	08	54.19	Rankin.....	4.2317958	17,052.80	55,947.4
				315	32	40.49	135	35	31.48	Mayfield.....	4.0274557	10,652.60	34,949.4
Lake, 1927.....	35	32	02.167	144	02	48.73	324	02	14.37	Sockwell.....	3.4040665	2,535.52	8,318.6
	99	59	52.094	249	38	50.23	69	40	42.35	Rankin.....	3.7144586	5,181.54	16,999.8
Locust, 1927.....	35	42	46.074	67	29	14.75	247	25	51.71	Hext.....	3.9764604	9,472.41	31,077.4
	99	59	53.515	134	23	22.69	314	19	51.58	Gem.....	4.1037038	12,697.08	41,657.0
				205	49	10.77	25	53	10.73	Antelope.....	4.3731593	23,613.44	77,471.8
Washita, 1927.....	35	49	16.254	70	57	44.77	250	54	12.54	Gem.....	3.9839086	9,636.26	31,615.0
	99	59	52.086	227	59	29.56	48	03	29.00	Antelope.....	4.1396548	13,792.88	45,252.1
				345	01	35.76	165	03	11.50	Provines.....	4.2027213	15,948.55	52,324.5
Canadian, 1927.....	35	56	44.711	28	03	35.22	208	00	04.21	Gem.....	4.2838602	19,224.73	63,073.1
	99	59	54.716	188	23	55.69	8	24	25.67	Daly.....	3.9138123	9,199.97	30,183.6
				293	59	34.49	114	03	35.83	Antelope.....	4.0527025	11,290.22	37,041.3
Stucker, 1927.....	36	02	25.674	102	49	11.73	282	45	24.98	Starbuck.....	3.9951728	9,889.47	32,445.7
	99	59	49.599	188	09	37.73	8	10	12.39	Santa.....	4.0156681	10,367.36	34,013.6
				335	57	06.22	155	57	33.21	Daly.....	3.4190802	2,624.70	8,611.2
Mussetter, 1927.....	36	07	33.504	242	30	00.62	62	30	35.71	Santa.....	3.2246715	1,677.53	5,503.7
	99	59	50.253	354	46	44.19	174	47	11.60	Daly.....	4.0767929	11,934.19	39,154.1
				52	51	03.54	232	47	16.95	Starbuck.....	4.0819752	12,077.45	39,624.1
Higgins astronomical station (Tex.), 1927.....	36	07	20.081	46	36	29.51	226	33	38.17	Starbuck.....	4.0007685	10,017.71	32,866.4
	100	01	24.031	131	05	41.82	311	04	31.00	Corn.....	3.6003645	3,984.41	13,072.2
				252	45	53.28	72	47	23.66	Santa.....	3.6034663	4,012.97	13,165.9
Kelln, 1927.....	36	14	17.867	150	29	54.63	330	25	11.45	Follett.....	4.3834082	24,177.32	79,321.8
	99	59	48.576	193	41	06.69	13	43	04.27	Catesby south base.....	4.2010990	20,898.21	68,593.5
				257	48	57.74	77	50	33.61	Apple.....	3.6172772	4,142.64	13,591.3
Hartman, 1927.....	36	19	24.543	37	55	11.29	217	50	57.33	Moreland.....	4.2419198	17,455.00	57,266.9
	99	59	52.970	204	58	13.23	25	00	13.54	Catesby south base.....	4.0781456	11,971.42	39,276.2
				334	08	02.61	154	09	41.19	Apple.....	3.9792426	9,533.28	31,277.1

761740-35-4

Oklahoma-Texas boundary (one-hundredth meridian) arc—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>													
Ellis (Tex.), 1927.....	36	27	31.375	73	31	10.68	253	26	35.31	Follett.....	4.0807017	12,042.09	39,508.1
	100	00	02.973	170	29	44.39	350	28	49.37	Flat Top.....	4.1436267	13,919.60	45,667.9
				247	24	24.34	67	28	05.54	Catesby north base.....	4.0013334	10,030.75	32,909.2
				308	04	02.71	128	06	09.15	Catesby south base.....	3.8283825	6,735.70	22,098.7
Kidder monument eccentric (Tex.), 1927.....	36	29	59.452	47	03	34.38	227	03	15.87	Larkey.....	3.0247584	1,058.66	3,473.3
	100	00	16.437	167	54	19.33	347	53	32.31	Flat Top.....	3.9718393	9,372.15	30,748.5
				274	13	59.56	94	17	48.88	Catesby north base.....	3.9832788	9,622.30	31,569.2
<i>Supplementary points</i>													
Texola, water tank, center line, 1927 ¹	35	13	09.58	5	32	15.9	185	31	13.4	Coon.....	4.455995	28,575.6	93,752
	99	59	17.78	6	51	08.8	186	50	53.4	Breaks.....	3.754567	5,682.9	18,645
Higgins, water tank (Tex.), 1927.....	36	07	00.391	247	32	20.4	67	33	18.5	Mussetter.....	3.428869	2,672.2	8,767
	100	01	29.010	48	44	52.3	228	42	03.9	Starbuck.....	3.978498	9,517.0	31,224
				138	15	31.6	318	14	23.7	Corn.....	3.635809	4,323.2	14,184
Shattuck, water tank, 1927.....	36	15	56.842	50	21	56.3	230	15	37.1	Corn.....	4.318928	20,841.5	68,377
	99	52	42.111	71	07	26.8	250	58	58.3	Moreland.....	4.356267	22,712.6	74,516
				71	45	30.4	251	42	54.1	Apple.....	3.841947	6,947.8	22,795
				74	02	47.9	253	58	35.7	Kelln.....	4.044367	11,075.6	36,337
				120	48	28.1	300	44	13.0	Hartman.....	4.097353	12,512.8	41,062
Kidder monument (1903), 1927.....	36	30	01.609	79	12	36.72	259	12	28.38	Kidder monument eccentric.....	2.5503189	355.074	1,164.94
	100	00	02.422										
Northeast corner of Texas, old Oklahoma-Texas boundary (Tex.), 1927. ¹	36	29	59.21	39	30	19.6	219	30	05.6	Larkey.....	2.9661591	925.0	3,035
	100	00	23.93	169	01	56.7	349	01	14.2	Flat Top.....	3.9704483	9,342.2	30,650
Follett, railroad water tank (Tex.), 1927.....	36	25	39.574	268	36	39.9	88	37	01.8	Follett.....	2.962390	917.0	3,009
	100	08	23.338	355	26	02.1	175	26	50.1	Moreland.....	4.405114	25,416.4	83,387
				355	29	32.4	175	30	48.4	Starbuck.....	4.611724	40,900.1	134,186

One-hundred-and-fourth meridian arc (south)

Principal points										
Potato (Colo.), 1922.....	37	10	24.656							
	103	06	26.254							
Clayton east base (N. Mex.), 1922.....	36	47	44.160	190	44	00.41	10	47	14.29	Potato.....
	103	11	48.530							4.6303231
New Mexico-Colorado boundary, milepost no. 328 eccentric, 1922.....	36	59	57.333	15	30	01.34	195	27	29.57	Clayton east base.....
	103	07	35.739	185	03	55.73	5	04	37.63	Potato.....
Clayton west base (N. Mex.), 1922.....	36	46	02.869	254	07	43.46	74	12	09.29	Clayton east base.....
	103	19	12.496							4.0585424
Seneca (N. Mex.), 1922.....	36	38	46.512	132	49	46.32	312	43	56.29	Clayton west base.....
	103	09	26.891	168	02	14.93	348	00	50.24	Clayton east base.....
Rabbit (N. Mex.), 1922.....	36	31	56.063	165	28	54.63	345	26	11.93	Clayton west base.....
	103	14	39.932	188	16	22.88	8	18	05.23	Clayton east base.....
				211	34	10.92	31	37	17.52	Seneca.....
										4.4308090
										4.4703004
										4.1718093
Supplementary points										
De Maya (N. Mex.), 1922.....	36	58	12.414	128	26	36.9	308	24	57.7	New Mexico-Colorado boundary, milepost no. 328 eccentric.....
	103	04	50.914							Potato.....
				174	03	05.4	354	02	07.9	4.355934
Collins (Colo.), 1922.....	37	01	01.412	39	44	22.7	219	42	37.4	De Maya.....
	103	01	55.853	158	59	11.7	338	56	28.6	Potato.....
Boundary monument (1900) (Colo.-N. Mex.-Okla.), 1922.....	37	00	00.473	64	40	20.1	244	37	29.1	De Maya.....
	103	00	06.631	124	50	05.8	304	49	00.1	Collins.....
New Mexico-Colorado boundary (old) (M. C. 1881), 1922 ¹	37	00	09.66	359	56	06	179	56	06	Boundary monument (1900).....
	103	00	06.64							2.452155
New Mexico-Colorado boundary, milepost no. 328, 1922 ¹	37	00	00.63	0	02	41	180	02	41	New Mexico-Colorado boundary, milepost no. 328 eccentric.....
	103	07	35.74							2.006594
T. 30 N., R. 35 E., sec. 33, east ¼ corner (N. Mex.), 1922 ¹	36	47	09.76	221	56	26	41	56	49	Clayton east base.....
	103	12	26.97							3.154063
T. 29 N., R. 34 E., sec. 3, southwest corner (N. Mex.), 1922 ¹	36	46	15.45	72	42	58	252	42	28	Clayton west base.....
	103	18	22.26							3.115551

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>													
T. 26 N., R. 34 E., sec. 1, northeast corner (N. Mex.), 1922. ¹	36 31 29.90	103 15 09.08	221 55 57	41 56 14	Rabbit.....	3.035457	1,085.069	3,559.93					
T. 28 N., R. 35 E., sec. 23, southeast corner (N. Mex.), 1922. ¹	36 38 29.76	103 09 46.17	222 51 14	42 51 26	Seneca.....	2.847714	704.23	2,310.5					
Eccentric no. 4 (N.Mex.-Tex.), 1922.....	36 26 38.574	103 02 27.925	97 36 35.18	277 32 12.88	Clay.....	4.0449689	11,091.0	36,388					
			118 18 08.64	298 10 53.34	Rabbit.....	4.3155966	20,682.3	67,855					
			172 45 18.90	352 44 28.02	Hoover.....	4.2266824	16,853.2	55,293					
Northwest corner of Texas—Clarks monument (N. Mex.-Tex.), 1922.	36 30 01.598	103 02 28.272	66 26 35.3	246 22 13.0	Clay.....	4.0785754	11,983.3	39,315					
			101 01 50.3	280 54 34.9	Rabbit.....	4.2682006	18,543.9	60,839					
Milepost no. 1 (N.Mex.-Tex.), 1922.....	36 30 01.606	103 01 07.937	69 45 52.5	249 40 42.5	Clay.....	4.1411113	13,839.2	45,404					
			99 58 26.2	279 50 23.0	Rabbit.....	4.3119598	20,509.7	67,289					
New Mexico-Texas boundary, mile corner 306, 1922 ¹	36 26 21.60	103 02 27.98	180 07 44	0 07 44	Eccentric no. 4.....	2.718672	523.205	1,716.55					
New Mexico-Texas boundary, milepost no. 4, 1922 ¹	36 26 32.78	103 02 27.94	180 04 57	0 04 57	Eccentric no. 4.....	2.251480	178.435	585.42					

Oklahoma-Texas boundary (parallel of 36°30') arc

<i>Principal points</i>												
Eklund (N.Mex.), 1931.....	36 31 24.371	103 10 12.930	98 23 36.85	278 20 57.92	Rabbit.....	3.8269843	6,714.05	22,027.7				
			184 47 47.60	4 48 15.04	Seneca.....	4.1359792	13,676.63	44,870.7				
			197 10 57.2		Azimuth mark (R.M. no. 1).							
Hoover (N.Mex.), 1922.....	36 35 40.959	103 03 53.428	50 04 00.30	230 00 14.25	Eklund.....	4.0903783	12,313.41	40,398.2				
			66 43 46.27	246 37 21.13	Rabbit.....	4.2432138	17,507.08	57,437.8				
			124 38 37.16	304 35 18.24	Seneca.....	4.0029587	10,068.36	33,032.6				
				Azimuth mark.								

Clay (N.Mex.), 1922.....	36 27 25.997	103 09 49.410	139 02 53.05	319 00 00.26	Rabbit.....	4.0424495	11,026.80	36,177.1
			175 26 47.11	355 26 33.13	Eklund.....	3.8675178	7,370.85	24,182.5
			210 06 19.41	30 09 51.29	Hoover.....	4.2465202	17,640.88	57,876.8
		238 31 03.5		Azimuth mark (R.M. no. 1).				
School, 1931.....	36 36 22.829	102 56 57.383	49 18 58.14	229 11 18.57	Clay.....	4.4039928	25,350.87	83,172.0
			82 55 12.84	262 51 04.78	Hoover.....	4.0179077	10,420.96	34,189.4
			49 58 00.1		Azimuth mark (Clayton, water tank).			
Worsham (Tex.), 1931.....	36 26 59.251	103 00 20.038	93 22 28.80	273 16 50.50	Clay.....	4.1523615	14,202.39	46,595.7
			161 44 49.40	341 42 42.41	Hoover.....	4.2287799	16,934.79	55,560.2
			196 10 01.84	16 12 02.47	School.....	4.2574020	18,088.48	59,345.3
		358 23 18.3		Azimuth mark (R.M. no. 1).				
Felt, 1931.....	36 36 35.908	102 46 09.611	50 02 04.85	229 53 38.63	Worsham.....	4.4414157	27,632.22	90,656.7
			88 37 08.61	268 30 42.32	School.....	4.2069261	16,103.71	52,833.6
			167 47 12.5		Azimuth mark (R.M. no. 2).			
X.I.T. (Tex.), 1931.....	36 27 51.452	102 47 30.402	85 15 51.55	265 08 14.21	Worsham.....	4.2840233	19,231.95	63,096.8
			138 13 31.34	318 07 53.81	School.....	4.3253409	21,151.49	69,394.5
			187 04 47.23	7 05 35.33	Felt.....	4.2119278	16,290.25	53,445.6
		0 16 38.2		Azimuth mark (R.M. no. 1).				
Harmer, 1931.....	36 36 44.824	102 36 17.916	45 33 06.69	225 26 26.32	X. I. T.....	4.3702277	23,454.58	76,950.6
			88 58 41.70	268 52 48.83	Felt.....	4.1675246	14,707.02	48,251.3
			131 59 03.0		Azimuth mark (grain elevator, south gable).			
Schellenberg (Tex.), 1931.....	36 29 00.224	102 36 59.784	82 21 44.23	262 15 29.36	X. I. T.....	4.1998082	15,841.93	51,974.7
			135 48 41.54	315 43 14.14	Felt.....	4.2923380	19,603.70	64,316.5
			184 09 19.71	4 09 44.64	Harmer.....	4.1571138	14,358.66	47,108.4
		260 12 37.7		Azimuth mark (R.M. no. 2).				
Rogers, 1931.....	36 36 26.164	102 24 54.560	52 45 05.16	232 37 53.32	Schellenberg.....	4.3556161	22,678.59	74,404.7
			91 59 46.95	271 52 59.42	Harmer.....	4.2302546	16,992.39	55,749.2
			308 21 48.6		Azimuth mark (Kerriek, elevator, southwest gable).			
Sneed (Tex.), 1931.....	36 27 04.530	102 25 52.072	102 09 43.93	282 03 07.06	Schellenberg.....	4.2305137	17,002.54	55,782.5
			139 00 54.05	318 54 41.50	Harmer.....	4.3749982	23,713.64	77,800.5
			134 43 11.53	4 43 45.76	Rogers.....	4.2398198	17,370.80	56,990.7
		260 36 09.9		Azimuth mark (windmill tip).				
Mooney, 1931.....	36 35 03.867	102 13 34.570	51 13 14.74	231 05 55.87	Sneed.....	4.3721560	23,558.95	77,293.0
			98 35 30.67	278 28 45.28	Rogers.....	4.2327762	17,091.34	56,073.8
			6 43 32.4		Azimuth mark (elevator, south-east gable).			

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>													
Kerrick (Tex.), 1931	36	27	00.228	90	30	27.64	270	23	46.67	Sneed	4.2254958	16,807.22	55,141.7
	102	14	37.180	138	41	18.15	318	35	10.67	Rogers	4.3662798	23,242.34	76,254.2
				185	57	38.06	5	58	15.32	Mooney	4.1757665	14,988.79	49,175.7
				184	26	30.2				Azimuth mark (Kerrick, elevator, northwest gable).			
Griggs, 1931	36	35	43.630	45	33	46.88	225	27	14.05	Kerrick	4.3621253	23,021.06	75,528.3
	102	03	37.118	85	19	54.16	265	13	58.03	Mooney	4.1732463	14,902.06	48,891.2
				1	56	21.7				Azimuth mark (Stratford West Texas Utilities Co., water tank).			
O'Brien (Tex.), 1931	36	27	22.092	87	41	10.83	267	34	41.94	Kerrick	4.2125248	16,312.66	53,519.1
	102	03	42.665	134	04	23.76	313	58	31.51	Mooney	4.3113553	20,481.19	67,195.4
				180	30	39.63	0	30	42.93	Griggs	4.1892088	15,459.98	50,721.6
				258	03	28.2				Azimuth mark (Texhoma, Cimarron Utilities Co., water tank).			
Mouse, 1931	36	36	10.123	45	12	39.13	225	06	07.57	O'Brien	4.3632506	23,080.79	75,724.2
	101	52	44.840	87	10	13.96	267	03	45.06	Griggs	4.2104010	16,233.08	53,258.0
				324	46	28				Azimuth mark (Texhoma, Riffe's grain elevator).			
Elliot (Tex.), 1931	36	27	30.613	89	00	16.82	268	54	32.62	O'Brien	4.1591489	14,426.10	47,329.6
	101	54	03.415	136	50	35.37	316	44	53.90	Griggs	4.3190714	20,848.34	68,399.9
				186	57	11.10	6	57	57.88	Mouse	4.2076935	16,132.20	52,927.1
				47	59	15.8				Azimuth mark (Stratford, West Texas Utilities Co., water tank).			
Whorton, 1931	36	36	00.144	44	24	42.29	224	18	34.80	Elliot	4.3417794	21,967.44	72,071.5
	101	43	46.032	91	21	38.28	271	16	17.02	Mouse	4.1269542	13,395.35	43,947.9
				274	51	32.8				Azimuth mark (Goodwell, municipal tank).			
Hardy (Tex.), 1931	36	27	24.121	91	24	17.00	271	20	58.34	Elliot	3.9204820	8,326.88	27,319.1
	101	49	29.107	158	35	47.63	338	33	15.41	Mouse	4.2409728	17,416.98	57,142.2
				203	51	28.98	23	54	17.47	Whorton	4.2404265	17,395.08	57,070.4
				203	55	16.9				Azimuth mark (Texhoma, Cimarron Utilities Co., water tank).			
Camp, 1931	36	36	13.188	48	50	51.05	228	43	25.55	Hardy	4.3935926	24,750.99	81,203.9
	101	36	00.678	88	02	50.74	267	58	13.27	Whorton	4.0634485	11,573.07	37,969.3
				70	54	44.5				Azimuth mark (Goodwell, municipal tank).			
Graham (Tex.), 1931	36	27	33.823	89	11	34.72	269	03	45.93	Hardy	4.2932840	19,646.45	64,456.7
	101	35	20.198	141	09	44.04	321	04	42.95	Whorton	4.3020726	20,048.07	65,774.4
				176	24	14.23	356	23	50.14	Camp	4.2052182	16,040.51	52,628.2
				89	50	52.3				Azimuth mark (R. M. no. 2).			
Bridgeman, 1931	36	36	19.901	43	00	40.47	222	54	39.12	Graham	4.3455357	22,158.26	72,697.6
	101	25	13.167	89	19	00.83	269	12	34.73	Camp	4.2066706	16,094.24	52,802.5
				86	08	51.1				Azimuth mark (Goodwell, municipal tank).			
Chipperfield (Tex.), 1931	36	27	32.312	90	12	53.15	270	06	13.12	Graham	4.2243283	16,762.10	54,993.7
	101	24	07.026	132	11	01.19	312	03	56.39	Camp	4.3790638	23,936.67	78,532.2
				174	13	41.21	354	13	01.84	Bridgeman	4.2133958	16,345.41	53,626.6
				125	31	29.6				Azimuth mark (Goodwell, municipal tank).			
Wall, 1931	36	36	00.236	40	07	31.18	220	02	15.94	Chipperfield	4.3109521	20,462.19	67,133.0
	101	15	17.426	92	23	37.09	272	17	41.87	Bridgeman	4.1708184	14,818.98	48,618.6
				254	58	38				Azimuth mark (Hardesty, grain elevator, north gable).			
Browder (Tex.), 1931	36	28	00.879	85	36	16.04	265	31	44.95	Chipperfield	4.0565835	11,391.57	37,373.8
	101	16	30.881	139	51	26.94	319	46	16.01	Bridgeman	4.3039394	20,134.43	66,057.7
				187	02	37.55	7	03	21.28	Wall	4.1728436	14,888.25	48,845.9
				136	10	19.4				Azimuth mark (Hitchland, railroad tank).			
Barnes, 1931	36	36	06.151	46	46	49.98	226	40	29.75	Browder	4.3368877	21,821.66	71,593.2
	101	05	52.175	89	18	11.80	269	12	34.78	Wall	4.1476861	14,050.32	46,096.8
				99	16	55				Azimuth mark (Hardesty, grain elevator, southwest corner).			
Hogland (Tex.), 1931	36	27	09.412	94	09	40.50	274	00	50.72	Browder	4.3474243	22,254.83	73,014.4
	101	01	39.381	128	51	56.00	308	43	49.11	Wall	4.4168643	26,113.45	85,673.9
				159	12	26.63	339	09	56.17	Barnes	4.2479593	17,699.43	58,068.9
				286	08	26.9				Azimuth mark (Perryton, silver tank).			
Mitchusson, 1931	36	36	10.272	47	03	33.43	226	56	25.70	Hogland	4.3881879	24,444.88	80,199.6
	100	49	40.766	89	46	44.43	269	37	05.23	Barnes	4.3828088	24,143.98	79,212.4
				92	16	21				Azimuth mark (Hardesty, grain elevator, southwest corner).			

Oklahoma-Texas boundary (parallel of 36°30') arc—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Principal points—Continued</i>													
Campbell (Tex.), 1931.....	36	28	10.791	80	01	40.97	259	57	25.08	Hogland.....	4.0369116	10,887.09	35,718.7
	100	54	28.792	130	43	56.14	310	42	09.31	Barnes.....	4.3510773	22,442.81	73,631.1
			205	50	21.30	25	53	12.77	Mitchusson.....	4.2154948	16,424.60	53,886.4	
			309	40	58.6				Azimuth mark (Perryton, silver tank).				
Shadwick, 1931.....	36	36	20.899	46	32	17.67	226	25	56.84	Campbell.....	4.3412506	21,940.71	71,983.8
	100	43	49.138	87	52	57.11	267	49	27.43	Mitchusson.....	3.9417778	8,745.36	28,692.1
			16	16	08.3				Azimuth mark (Perryton, silver tank).				
Morris (Tex.), 1931.....	36	28	21.883	88	56	39.09	268	49	39.35	Campbell.....	4.2450992	17,583.25	57,687.7
	100	42	42.664	144	16	01.78	324	11	52.86	Mitchusson.....	4.2502633	17,793.54	58,377.6
			173	36	56.78	353	36	17.21	Shadwick.....	4.1719453	14,857.48	48,744.9	
			45	56	30.1				Azimuth mark (Perryton, silver tank).				
Pruett, 1931.....	36	36	06.490	49	10	19.27	229	03	43.34	Morris.....	4.3400539	21,880.33	71,785.7
	100	31	37.638	91	27	36.09	271	20	19.91	Shadwick.....	4.2597358	18,185.94	59,665.0
			3	43	17.1				Azimuth mark (Booker, black tank).				
Booker (Tex.), 1931.....	36	27	45.583	94	02	52.58	273	56	30.08	Morris.....	4.2057683	16,060.84	52,692.9
	100	31	59.149	132	01	31.16	311	54	28.49	Shadwick.....	4.3757321	23,753.74	77,932.1
			181	58	59.50	1	59	12.30	Pruett.....	4.1889063	15,449.21	50,686.3	
			74	11	18.3				Azimuth mark (Perryton, silver tank).				
Carbin, 1931.....	36	35	52.174	273	21	31.65	93	32	50.57	Flat top.....	4.4527691	28,364.10	93,057.9
	100	20	34.394	314	33	54.76	134	41	31.64	Follett.....	4.4289010	26,847.32	88,081.6
			48	41	37.63	228	34	50.03	Booker.....	4.3559652	22,696.83	74,464.5	
			91	35	17.97	271	28	42.52	Pruett.....	4.2172433	16,490.86	54,103.8	
			47	31	44.7				Azimuth mark (Booker, black tank).				
Kirschman (Tex.), 1931.....	36	26	45.351	100	37	22.41	280	33	25.47	Booker.....	4.0044132	10,102.13	33,143.4
	100	25	20.377	151	32	40.27	331	28	55.74	Pruett.....	4.2940049	19,679.09	64,563.8
			202	51	46.53	22	54	36.73	Carbin.....	4.2623442	18,295.50	60,024.5	
			274	16	54.59	94	27	20.51	Follett.....	4.4203638	26,324.72	86,367.0	
			94	02	02.5				Azimuth mark (Booker, black tank).				
Ivanhoe, 1931.....	36	33	02.629	67	32	44.77	247	21	35.35	Kirschman.....	4.4818419	30,327.87	99,500.7
	100	06	34.925	104	07	36.34	283	59	16.13	Carbin.....	4.3327662	21,516.23	70,591.2
			244	41	29.28	64	44	27.71	Flat Top.....	3.9157298	8,236.25	27,021.8	
			306	21	13.86	126	24	40.58	Larkey.....	4.0307807	10,734.47	35,218.0	
			7	27	13.89	187	26	31.31	Follett.....	4.1383164	13,750.40	45,112.8	
			10	55	45.9				Azimuth mark (Follett, black tank).				
<i>Supplementary points</i>													
Texhomex—Texas-Oklahoma-New Mexico boundary, 1931.	36	30	01.582	3	20	53.78	183	20	45.93	Worsham.....	3.7504860	5,629.71	18,470.1
	103	00	06.835	71	45	00.15	251	39	13.80	Clay.....	4.1839776	15,274.87	50,114.3
			99	39	13.55	279	33	12.94	Eklund.....	4.1845773	15,265.98	50,183.6	
			151	42	19.16	331	40	04.23	Hoover.....	4.0749076	11,882.49	38,984.5	
			70	02	01.7				Azimuth mark (Clayton, municipal tank).				
Kidder astronomical station (N.Mex.), 1931.....	36	30	03.679	288	49	17.5	108	49	22.0	Texhomex.....	2.3017871	200.349	657.31
	103	00	14.455										
Clayton, municipal water tank (silver), final (N.Mex.), 1931.	36	26	48.814	150	12	03.0	330	09	53.3	Rabbit.....	4.038078	10,916.4	35,815
	103	11	01.857	188	09	20.4	8	09	49.5	Eklund.....	3.933516	8,580.6	28,152
			212	58	57.7	33	03	12.7	Hoover.....	4.291415	19,562.1	64,190	
			229	49	37.5	49	58	00.1	School.....	4.438813	27,467.1	90,115	
			237	33	59.3	57	34	42.4	Clay.....	3.329883	2,137.4	7,012	
			249	55	32.2	70	02	01.7	Texhomex.....	4.239446	17,355.9	56,942	
			268	47	38.0	88	53	59.3	Worsham.....	4.203762	15,986.8	52,450	
Texline, West Texas Utilities Co., water tank, final (Tex.), 1931.	36	22	30.990	125	46	04.0	305	41	02.8	Clay.....	4.192364	15,572.7	51,091
	103	01	21.972	131	18	09.9	311	10	15.8	Rabbit.....	4.422000	26,424.1	86,693
			141	14	07.2	321	08	51.8	Eklund.....	4.324243	21,096.1	69,219	
			171	12	40.9	351	11	10.9	Hoover.....	4.391637	24,639.8	80,839	
			190	33	57.0	10	34	33.8	Worsham.....	3.924870	8,411.4	27,596	
			194	22	58.6	14	25	36.1	School.....	4.422796	26,472.6	86,852	
Booster Station, black water tank, final (N.Mex.), 1931.	36	30	42.209	319	11	55.4	139	14	17.0	Worsham.....	3.957894	9,076.0	29,777
	103	04	18.185	53	45	56.1	233	42	39.2	Clay.....	4.009674	10,225.3	33,548
			98	25	31.1	278	19	21.2	Rabbit.....	4.194120	15,635.8	51,298	
Booster Station, galvanized tank on red platform, center (N.Mex.), 1931. ¹	36	30	45.93	54	12	15	234	08	51	Clay.....	4.022390	10,529.1	34,544
	103	04	06.44	97	51	52	277	45	35	Rabbit.....	4.201638	15,908.8	52,194

¹ No check on this position.

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>													
T. 1 N., R. 4 E., sec. 36, southeast corner, Oklahoma-Texas boundary, 1931.	36	30	05.538	229	50	36.41	49	56	09.95	Rogers	4.2603270	18,210.72	59,746.3
	102	34	14.587	293	59	42.10	114	04	40.84	Sneed	4.1366472	13,697.68	44,939.8
Grain elevator, south gable, 1931 ¹	36	38	50.65	281	44	37	101	53	08	Rogers	4.337495	21,751.8	71,364
	102	39	11.47	311	57	20	131	59	03	Harmer	3.763398	5,799.6	19,028
Rabbit Ear Butte, northernmost peak, tip (N.Mex.), 1931. ¹	36	31	44.38	273	04	26	93	25	48	T. 1 N. R. 4 E. sec. 36, southeast corner.	4.730012	53,704.7	176,196
	103	10	09.42	275	40	13	95	59	57	Schellenberg	4.696980	49,771.4	163,292
Boise City, Cimarron Utilities Co., tank, 1931.	36	43	44.773	301	53	35.9	122	03	54.1	Mooney	4.481699	30,317.9	99,468
	102	30	50.006	326	49	51.8	146	53	24.1	Rogers	4.208073	16,146.3	52,973
Clark monument no. 5, 1931.	36	30	01.188	329	11	29.32	149	12	48.71	Kerrick	3.8124801	6,493.52	21,304.2
	102	16	50.730	68	02	36.49	247	57	14.67	Sneed	4.1624177	14,535.09	47,687.2
Clark monument no. 7, 1931.	36	30	00.277	327	21	10.96	147	22	21.52	Mooney	4.0223707	10,528.60	34,542.6
	101	56	02.099	66	59	58.51	246	55	24.69	Elliot	3.7386372	5,478.19	17,973.0
Stratford, West Texas Utilities Co., water tank, final (Tex.), 1931.	36	20	03.347	153	27	03.8	333	21	32.2	O'Brien	4.0954844	12,459.03	40,876.0
	102	04	16.468	181	55	58.2	1	56	21.7	Griggs	4.1901850	15,494.76	50,835.7
Texhoma, Riffe's grain elevator (Tex.), 1931 ¹	36	29	59.27	144	49	41	324	46	28	Mooney	4.491945	31,041.7	101,843
	101	47	20.62	205	36	52	25	38	59	Griggs	4.462389	28,999.4	95,142
Texhoma, Cimarron Utilities Co., water tank, final, 1931.	36	30	12.732	278	08	25.0	98	21	59.2	O'Brien	4.131931	13,549.7	44,454
	101	46	56.463	285	43	23.8	105	50	17.7	Elliot	4.313404	20,578.0	67,513
Goodwell, municipal water tank, 1931.	36	35	36.997	45	25	52.2	225	19	43.9	Hardy	4.435187	27,238.7	89,366
	101	38	10.305	23	56	12.0	203	55	16.9	Whorton	4.145784	13,988.9	45,895
Hitchland south (Tex.), 1931.	36	23	44.997	150	12	17.15	330	10	41.46	Whorton	4.091231	12,337.6	40,478
	101	21	25.882	222	56	58.38	42	59	53.57	Chipperfield	4.537141	34,446.2	113,012
Hitchland north (Tex.), 1931.	36	29	55.780	314	08	37.70	134	10	04.83	Graham	4.255536	18,010.9	59,091
	101	18	57.416	17	56	21.85	197	54	53.65	Hardy	3.754903	5,685.9	18,654
Guymon, black municipal standpipe, center, 1931.	36	40	53.656	294	20	34.4	114	28	33.3	Elliot	4.069828	11,744.3	38,531
	101	28	39.690	324	26	00.8	144	31	47.9	O'Brien	4.408141	25,594.2	83,970
Hitch (Tex.), 1931.	36	29	58.326	339	23	03.66	159	23	44.06	Mouse	4.146598	14,015.2	45,982
	101	25	15.018	125	47	27.77	305	41	03.25	Whorton	4.068525	11,709.1	38,416
Clark monument no. 9, 1931.	36	29	58.203	90	25	49.6	270	25	36.6	Chipperfield	3.6820036	4,808.43	15,775.7
	101	24	53.198	180	13	27.06	0	13	28.16	Camp	4.2962923	19,783.00	64,904.7
Hitchland, railroad water tank, final (Tex.), 1931.	36	29	59.209	316	08	56.7	136	10	19.4	Bridgeman	4.0704735	11,761.79	38,588.5
	101	18	51.588	60	03	26.8	240	00	18.3	Hitch	2.7348454	543.057	1,781.68
Clark monument no. 10, 1931.	36	29	59.559	175	37	35.05	355	37	14.34	Browder	3.703874	5,056.8	16,591
	101	05	17.403	269	59	20.49	89	59	27.85	Hitchland north	2.253928	179.4	589
Hansford County, northeast corner (Tex.), 1931.	36	29	59.561	313	59	58.17	134	02	07.78	Chipperfield	3.957335	9,064.3	29,738
	101	05	05.027	174	04	45.97	354	04	17.89	Barnes	4.0543411	11,332.90	37,181.4
Hardesty, grain elevator, southwest corner, 1931 ¹	36	36	50.05	272	03	22	92	16	21	Hansford County, northeast corner.	2.4885368	307.990	1,010.46
	101	11	26.37	279	13	36	99	16	55	Hogland	3.8777993	7,547.43	24,761.9
Hardesty, grain elevator, north gable, 1931 ¹	36	36	50.07	75	00	55	254	58	38	Barnes	4.0553969	11,360.49	37,271.9
	101	11	26.81	87	28	33	267	20	20	Hogland	3.8650476	7,329.05	24,045.4
Dower, 1931.	36	30	01.611	70	00	56.36	249	57	12.35	Mitchusson	4.511486	32,470.3	106,530
	100	48	12.074	169	01	19.41	349	00	26.59	Barnes	3.925054	8,415.0	27,608
Hitchland, railroad water tank, final (Tex.), 1931.	36	30	01.611	70	00	56.36	249	57	12.35	Wall	3.773314	5,933.5	19,467
	100	48	12.074	169	01	19.41	349	00	26.59	Bridgeman	4.312969	20,557.4	67,445
Hitchland, railroad water tank, final (Tex.), 1931.	36	30	01.611	70	00	56.36	249	57	12.35	Campbell	3.9991305	9,980.00	32,742.7
	100	48	12.074	169	01	19.41	349	00	26.59	Mitchusson	4.0635480	11,575.72	37,978.0
Hitchland, railroad water tank, final (Tex.), 1931.	36	30	01.611	70	00	56.36	249	57	12.35	Shadwick	4.1269655	13,395.70	43,949.1
	100	48	12.074	169	01	19.41	349	00	26.59	Morris	3.9423415	8,756.72	28,729.3

¹ No check on this position.

Oklahoma-Texas boundary (parallel of 36°30') arc—Continued

Station	Latitude and longitude			Azimuth			Back azimuth			To station	Distance		
											Logarithm (meters)	Meters	Feet
<i>Supplementary points—Continued</i>													
Perryton, municipal water tank (silver), final (Tex.), 1931.	36	24	00.762	106	16	23.7	286	08	26.9	Hogland.....	4.318761	20,833.4	68,351
	100	48	16.286	129	44	39.9	309	40	58.6	Campbell.....	4.081403	12,061.5	39,572
				174	39	55.7	354	39	05.5	Mitchusson.....	4.353807	22,584.3	74,095
				180	32	24.2	0	32	26.7	Dower.....	4.046227	11,123.1	36,493
				196	13	29.3	16	16	08.3	Shadwick.....	4.375897	23,762.8	77,962
				225	53	11.9	45	56	30.1	Morris.....	4.063277	11,568.5	37,954
				254	01	37.9	74	11	18.3	Booker.....	4.403236	25,306.7	83,027
Gaylord, 1931.....	36	30	00.525	351	41	46.40	171	42	07.36	Kirschman.....	3.7838806	6,079.68	19,946.4
	100	25	55.634	65	20	37.87	245	17	01.74	Booker.....	3.9982226	9,959.16	32,674.3
				143	00	38.70	322	57	15.02	Fruett.....	4.1500506	14,128.00	46,351.6
				216	22	03.19	36	25	14.50	Carbin.....	4.1292269	13,465.64	44,178.5
Booker, municipal water tank (black), final (Tex.), 1931.	36	27	09.104	98	17	47.4	278	11	37.0	Morris.....	4.194320	15,643.0	51,322
	100	32	20.901	183	42	51.3	3	43	17.1	Pruett.....	4.220089	16,599.3	54,460
				205	43	03.9	25	43	15.9	Booker.....	3.096225	1,248.0	4,094
				227	24	45.1	47	31	44.7	Carbin.....	4.377521	23,851.8	78,254
				241	07	03.4	61	10	51.5	Gaylord.....	4.039421	10,950.2	35,926
				273	57	53.6	94	02	02.5	Kirschman.....	4.021104	10,497.9	34,442
Follett, municipal water tank (black), final (Tex.), 1931.	36	25	41.940	94	28	58.4	274	18	52.5	Kirschman.....	4.406271	25,484.2	83,609
	100	08	20.223	135	53	50.3	315	46	33.4	Carbin.....	4.418648	26,220.9	86,026
				190	54	43.3	10	55	45.9	Ivanhoe.....	4.140953	13,834.2	45,388
				210	27	59.8	30	32	00.6	Flat Top.....	4.297710	19,847.7	65,117
				273	27	34.3	93	27	54.3	Follett.....	2.924633	840.7	2,758
Northeast corner of Texas, Oklahoma-Texas boundary (1928), 1931.	36	29	59.560	58	32	32.47	238	32	04.18	Larkey.....	3.1424295	1,388.13	4,554.2
	100	00	00.000	119	54	06.72	299	50	13.67	Ivanhoe.....	4.0542472	11,330.45	37,173.3
				165	28	53.17	345	27	56.36	Flat Top.....	3.9760355	9,463.15	31,047.0

¹ No check on this position.

ELEVATIONS

The datum for all elevations is mean sea level.

The elevations given in class 1 are fixed directly by first-order leveling, as determined by the 1929 adjustment of the first-order level net, and are subject to a probable error of ± 0.06 meter. For more exact elevations of the stations fixed by first-order leveling and for an exact description of the point on each station mark to which such elevations are referred, the published results of first-order leveling should be consulted.

The elevations given in class 2 are fixed by reciprocal measures of vertical angles, and are subject to probable errors varying from ± 0.1 to ± 0.7 meter, the accuracy of each elevation depending mainly upon the remoteness of that station from a station whose elevation is given in class 1.

The elevations given in class 3 are for third-order stations, fixed by nonreciprocal measures of vertical angles and are subject to a probable error which may amount to as much as ± 2 meters.

The elevations of classes 2 and 3 are based upon results obtained by adjustments of the level net made previous to 1929. The change in elevations resulting from the 1929 adjustment was so small that it was not considered necessary to readjust the class 2 and 3 elevations to conform to the new values for class 1.

The stations in the following table are arranged alphabetically by classes. The numbers in the third column refer to arcs of triangulation, as follows:

1. Ninety-eighth meridian arc.
2. Thirty-fifth parallel:
 - a. Little Rock westward arc.
 - b. El Reno to Needles, Calif., arc.
3. Oklahoma-Texas boundary (Red River) arc.
4. One-hundredth meridian arc.
5. One-hundred-and-fourth meridian arc, south.

Table of elevations

Station	Point to which elevation refers	Arc to which elevation refers	Elevation	
			Meters	Feet
<i>Class 1</i>				
Carson.....	Square cut in concrete.....	1	435.702	1,429.466
Duncan.....	do.....	1	373.202	1,224.414
El Reno east base.....	Station mark.....	1	440.048	1,443.724
El Reno west base.....	do.....	1	409.785	1,331.444
Enid.....	Square cut.....	1	385.072	1,263.357
Marlow longitude.....	Cross in station mark.....	1	400.038	1,312.458
Waukomis.....	Square cut.....	1	388.722	1,275.332
Waukomis reference mark.....	Concrete near spike.....	1	384.605	1,261.825
<i>Class 2</i>				
Addis.....	Station mark.....	4	625.8	2,050
Albert.....	do.....	2b	487.5	1,600
Alden.....	do.....	2b	579.7	1,902
Allen.....	do.....	2a	297.3	975
Antelope.....	do.....	4	792.4	2,600
Apple.....	do.....	4	743.8	2,440
Arbuckle Mountain-Mound (U.S.G.S.).....	do.....	1	427.6	1,403
Arbuckle-Velma (U.S.G.S.).....	do.....	3	397.3	1,303
Baller.....	do.....	3	313.6	1,029
Benton.....	do.....	1	301.4	989
Black.....	do.....	2a	754.8	2,476

Table of elevations—Continued

Station	Point to which elevation refers	Arc to which elevation refers	Elevation	
			Meters	Feet
<i>Class 2—Continued</i>				
Blue.....	Station mark.....	2a	556.5	1,826
Blue (Tex.).....	do.....	1	312.1	1,024
Boundary monument (1900) Colorado-New Mexico-Oklahoma.....	Top of monument.....	5	1,354.7	4,445
Branson (Tex.).....	Station mark.....	2b	674.3	2,212
Breaks.....	do.....	4	648.5	2,128
Buckhorn.....	do.....	2a	321.7	1,055
Burke.....	do.....	3	362.4	1,189
Burson.....	do.....	1	356.5	1,170
Butte.....	do.....	3	455.0	1,493
Byars.....	do.....	2a	344.5	1,130
Byars (Tex.).....	do.....	3	318.5	1,045
Caddo.....	do.....	1	435.9	1,430
Campbell (Tex.).....	do.....	3	487.7	1,600
Canadian.....	do.....	4	743.5	2,439
Cashion (Tex.).....	do.....	3	324.6	1,065
Catesby north base.....	do.....	4	786.4	2,514
Catesby south base.....	do.....	4	770.7	2,528
Cavanal.....	do.....	2a	722.0	2,369
Clay (N. Mex.).....	do.....	5	1,639.7	5,051
Clayton east base (N. Mex.).....	do.....	5	1,600.9	5,252
Clayton west base (N. Mex.).....	do.....	5	1,658.3	5,441
Coon (Tex.).....	do.....	2b	630.1	2,067
Corn (Tex.).....	do.....	4	791.5	2,597
Cube (Tex.).....	do.....	1	298.8	980
Cunningham.....	do.....	3	417.6	1,370
Daly.....	do.....	4	776.0	2,546
Day.....	do.....	3	671.7	2,206
Dill.....	do.....	2b	678.6	2,228
Dune.....	do.....	4	679.6	2,230
Eccentric no. 4 (N. Mex.-Tex.).....	do.....	5	1,458.8	4,786
Edmonds.....	do.....	1	373.1	1,224
Edwards.....	do.....	2b	610.4	1,999
Eichoff.....	do.....	1	409.4	1,343
Eldorado.....	do.....	3	463.0	1,519
Ellis (Tex.).....	do.....	4	775.9	2,540
Flat Top.....	do.....	4	788.3	2,586
Folks.....	do.....	2b	679.4	2,228
Follett (Tex.).....	do.....	4	802.9	2,634
Fowler (Kans.).....	do.....	1	390.0	1,280
Frederick.....	do.....	3	419.2	1,376
Fuller (Tex.).....	do.....	4	687.1	2,254
Gaines.....	do.....	2a	335.7	1,101
Gammill.....	do.....	3	333.4	1,094
Garber.....	do.....	1	359.9	1,181
Gem (Tex.).....	do.....	4	791.8	2,598
Gerty.....	do.....	2a	305.0	1,001
Gould.....	do.....	3	610.8	1,999
Grady.....	do.....	1	283.0	928
Grandfield.....	do.....	3	351.2	1,152
Grebe.....	do.....	2b	600.4	1,964
Green (Tex.).....	do.....	3	473.7	1,554
Hahn.....	do.....	1	342.4	1,123
Hanna.....	do.....	4	775.6	2,545
Harrison (Tex.).....	do.....	3	438.8	1,440
Harrold (Tex.).....	do.....	3	383.1	1,257
Hartman.....	do.....	4	742.2	2,435
Hartshorne.....	do.....	2a	441.3	1,448
Hastings.....	do.....	3	312.8	1,028
Hawkins.....	do.....	2a	302.5	992
Haystack.....	do.....	2b	598.2	1,963
Henry.....	do.....	3	603.3	1,979
Hess.....	do.....	3	427.7	1,403
Hext (Tex.).....	do.....	4	773.0	2,536
Hickerson.....	do.....	3	396.1	1,291
Hickory.....	do.....	2a	315.2	1,034
Higgins astronomical station (Tex.).....	do.....	4	781.2	2,563
Hollis.....	do.....	3	625.6	2,054
Hoover (N. Mex.).....	do.....	5	1,600.1	5,234

Table of elevations—Continued

Station	Point to which elevation refers	Arc to which elevation refers	Elevation	
			Meters	Feet
<i>Class 2—Continued</i>				
Keechi.....	Station mark.....	1	480.6	1,577
Keele.....	do.....	3	310.4	1,018
Kelln.....	do.....	4	745.0	2,444
Konawa.....	do.....	2a	305.4	1,002
Lake.....	do.....	4	743.6	2,440
Lanier.....	do.....	1	416.0	1,365
Larkey (Tex.).....	do.....	4	775.1	2,543
Last.....	do.....	2a	287.1	942
Lee.....	do.....	3	319.8	1,049
Locust.....	do.....	4	736.5	2,416
Lone Tree.....	do.....	1	325.7	1,069
McCoy.....	do.....	1	429.3	1,406
McGee.....	do.....	2a	342.8	1,125
Martin.....	do.....	4	624.9	2,050
Mayfield.....	do.....	4	665.6	2,184
Milepost no. 328 eccentric, New Mexico-Colorado boundary (N.Mex.).....	do.....	5	1,589.6	5,215
Miller.....	do.....	3	335.1	1,100
Miller (Kans.).....	do.....	1	414.1	1,359
Mitchell.....	do.....	1	386.7	1,269
Monument.....	do.....	1	329.9	1,082
Moreland (Tex.).....	do.....	4	774.8	2,542
Mound.....	do.....	2a	410.1	1,346
Mussetter.....	do.....	4	780.1	2,559
Non.....	do.....	2a	273.3	897
Northwest corner of Texas, Clarks monument (N.Mex.-Tex.).....	Top of monument.....	5	1,440.7	4,727
Oklahoma.....	Station mark.....	2a	724.4	2,377
Osaria-Marlow (U.S.G.S.).....	do.....	1	441.3	1,448
Packer.....	do.....	2b	461.3	1,514
Panther.....	do.....	2a	447.9	1,469
Farnell.....	do.....	1	357.5	1,173
Potato (Colo.).....	do.....	5	1,699.8	5,478
Poteau (Ark.).....	do.....	2a	812.2	2,665
Provinces.....	do.....	4	759.8	2,493
Purcell (U.S.G.S.).....	do.....	1	382.6	1,255
Rabbits (N. Mex.).....	do.....	5	1,847.6	6,062
Rankin.....	do.....	4	783.1	2,569
Red Bluff (Tex.).....	do.....	3	391.3	1,284
Renfrow.....	do.....	1	373.6	1,226
Rosedale.....	do.....	2a	346.1	1,136
Rutherford (Kans.).....	do.....	1	429.3	1,408
Sand Hill.....	do.....	1	444.4	1,458
Santa.....	do.....	4	787.7	2,584
Savanna north base.....	do.....	2a	222.4	730
Savanna south base.....	do.....	2a	223.9	735
Self.....	do.....	2b	648.8	2,128
Seneca (N. Mex.).....	do.....	5	1,554.9	5,101
Shawnee.....	do.....	2a	329.3	1,080
Smith.....	do.....	1	406.0	1,332
Snider.....	do.....	3	493.0	1,618
Snider.....	do.....	4	782.9	2,569
Sockwell (Tex.).....	do.....	4	831.4	2,728
Starbuck (Tex.).....	do.....	4	776.5	2,548
Stucker.....	do.....	2b	473.8	1,554
Sturm.....	do.....	2a	781.6	2,564
Sugar Loaf.....	do.....	3	342.2	1,122
Sullivan (Tex.).....	do.....	3	272.8	895
Sulser.....	do.....	2a	367.7	1,206
Sunshine (Tex.).....	do.....	3	367.7	1,206
Table Hill (U.S.G.S.).....	do.....	1	394.5	1,294
Tepee.....	do.....	2b	688.1	2,258
Texola.....	do.....	4	665.6	2,184
Thornberry (Tex.).....	do.....	3	319.9	1,050
Tipton.....	do.....	3	353.7	1,160
Trimmins (Tex.).....	do.....	2b	787.1	2,484
Turkey.....	do.....	2a	370.5	1,216
Vicar.....	do.....	1	361.9	1,187
Vinson.....	do.....	2b	602.2	1,976

Table of elevations—Continued

Station	Point to which elevation refers	Arc to which elevation refers	Elevation	
			Meters	Feet
<i>Class 2—Continued</i>				
Walsh.....	Station mark.....	2b	701.6	2,302
Washita.....	do.....	4	756.8	2,483
Whaleback.....	do.....	2a	273.3	897
Wheeler (Tex.).....	do.....	4	775.4	2,544
Whittle (Tex.).....	do.....	3	474.8	1,558
Wilburton.....	do.....	2a	457.0	1,499
Willis.....	do.....	3	338.0	1,109
Winding Stair.....	do.....	2a	722.5	2,370
Wingard.....	do.....	1	351.1	1,152
Yukon.....	do.....	1	426.1	1,398
Zybach (Tex.).....	do.....	4	815.6	2,676
<i>Class 3</i>				
Allen, water tank.....	Finial of tank.....	2a	307.1	1,008
Altus, city water tank.....	do.....	3	479.3	1,572
Antioch Church.....	Top of spire.....	1	353.6	1,160
Bison, highest elevator center shaft.....	Top.....	1	393.0	1,289
Bison, lower elevator.....	do.....	1	391.1	1,283
Boundary mark (Tex.).....	Stone.....	3	614.3	2,015
Boundary, mile 45.....	Top of post.....	1	386.8	1,269
Boundary stone 160.....	Top of stone.....	1	382.2	1,254
Boundary stone 163.....	do.....	1	373.2	1,224
Breckenridge, highest elevator.....	Ridge of roof.....	1	381.3	1,251
Breckenridge, M. E. Church.....	do.....	1	379.6	1,245
Burkburnett, city water tank (Tex.).....	Finial of tank.....	3	349.1	1,145
Byers, city water tank (Tex.).....	do.....	3	330.4	1,084
Caddo, schoolhouse water tank.....	Top of tank.....	1	448.2	1,470
Camchester, schoolhouse.....	Ridge of roof.....	1	414.2	1,359
Chattanooga, city water tank.....	Top of tank.....	3	381.3	1,251
Closky (Tex.).....	Station mark.....	3	486.8	1,597
Cropper, east elevator.....	Ridge of roof.....	1	374.6	1,229
Darlington, water tank.....	Top of cylinder.....	1	431.9	1,417
Devol, city water tank.....	Top of tank.....	3	353.3	1,159
Dodson (Tex.).....	Station mark.....	3	567.9	1,863
Edmonds College.....	Top of dome.....	1	396.4	1,301
Eldorado, U. S. Gypsum Co., water tank.....	Top of tank.....	3	477.8	1,568
Electra, city water tank (Tex.).....	do.....	3	404.1	1,326
El Reno, Canadian Milling Co., elevator.....	Ridge of roof.....	1	443.6	1,455
El Reno, Catholic Church.....	Bottom of spire.....	1	428.1	1,405
El Reno, fire department.....	Bottom of belfry.....	1	432.0	1,417
El Reno, Kerfoot Hotel.....	Bottom of cupola.....	1	432.1	1,418
El Reno, standpipe.....	Top.....	1	460.5	1,511
Elroy (Tex.).....	Station mark.....	3	555.4	1,822
Enid, Big Four, elevator.....	Top.....	1	397.1	1,303
Enid, Catholic Church.....	Bottom of spire.....	1	391.4	1,284
Enid, ice plant stack.....	Top of stack.....	1	403.0	1,332
Enid, schoolhouse.....	Bottom of spire.....	1	394.5	1,294
First auxiliary (Kans.).....	Ground.....	1	382.6	1,255
Fort Reno, high water tank.....	Top.....	1	445.7	1,462
Fort Reno, low water tank.....	do.....	1	440.4	1,445
Frederick, city water tank.....	do.....	3	440.4	1,445
Garber, church, white spire.....	Top of spire.....	1	372.4	1,222
Garber, elevator, center shaft.....	Ridge of roof.....	1	374.9	1,230
Gould, red brick school.....	Top of north chimney.....	3	508.3	1,668
Grandfield, city water tank.....	Top.....	3	376.1	1,234
Grandfield, high school.....	Cupola.....	3	364.1	1,194
Guthrie, St. Joseph Church.....	Top of east spire.....	1	350.8	1,151
Guthrie, standpipe.....	Top.....	1	345.9	1,135
Hardeman (Tex.).....	Station mark.....	3	501.0	1,644
Hastings, city water tank.....	Top.....	3	342.0	1,122
Hastings, high school.....	Cupola.....	3	329.2	1,080
Hennessey, elevator.....	Top.....	1	370.5	1,216
Hennessey, roller mill stack.....	Top of stack.....	1	372.0	1,220
Hennessey, schoolhouse.....	Bottom of cupola.....	1	365.7	1,200
Hennessey, windmill.....	Center of wheel.....	1	371.2	1,218

Table of elevations—Continued

Station	Point to which elevation refers	Arc to which elevation refers	Elevation	
			Meters	Feet
<i>Class 3—Continued</i>				
Herg (Tex.)	Station mark	3	505.7	1,659
Hollis, city water tank	Top of tank	3	524.5	1,721
House with square roof	Top of north chimney	1	390.1	1,280
Initial (Tex.)	Station mark	3	495.9	1,627
Iowa Park, city water tank (Tex.)	Top of tank	3	357.2	1,172
Kidder monument eccentric (Tex.)	Ground	4	785.6	2,489
Kingfisher College	Top of dome	1	351.8	1,154
Kingfisher, courthouse	Bottom of dome	1	340.4	1,117
Kingfisher, standpipe	Top	1	367.2	1,205
Kremlin, elevator, east gable	do.	1	357.8	1,174
Kremlin, schoolhouse	Bottom of cupola	1	352.1	1,155
Line (Tex.)	Station mark	3	517.4	1,698
Livingood's house (Kans.)	Top of chimney	1	392.0	1,286
Louis, high school	Cupola	3	478.3	1,569
Manchester, schoolhouse	Ridge of roof	1	398.4	1,307
Marlow Baptist Church	Bottom of spire	1	406.6	1,334
Marlow Methodist Church	Top of spire	1	410.4	1,346
Marlow secondary	Station mark	1	427.5	1,403
Medford, schoolhouse	Center of dome	1	349.8	1,148
Midland, schoolhouse	Ridge of roof	1	445.3	1,461
Miller (eccentric) (Kans.)	Ground	1	413.7	1,357
Minco, Elmata Bond College	Bottom of cupola	1	410.5	1,347
Minco, red elevator	Top	1	417.8	1,371
Moore, elevator	Ridge of roof	1	398.9	1,309
North End Congregational Church	do.	1	395.0	1,296
North range line 17/18	Stone	3	353.5	1,160
Numa, elevator	Ridge of shaft	1	352.2	1,156
Okarche Catholic Church	do.	1	383.6	1,259
Okarche, elevator, center top	Ridge of roof	1	395.5	1,298
Oklahoma City, church, highest spire	Top of spire	1	396.9	1,302
Olustee, city water tank	Top of tank	3	435.8	1,430
Otex (Tex.)	Station mark	3	624.7	2,050
Petrolia, high school (Tex.)	Top of cupola	3	320.9	1,063
Pond Creek, roller mill, east cupola	do.	1	336.2	1,103
Pond Creek, schoolhouse	Top of dome	1	339.1	1,113
Pond Creek, standpipe	Bottom of tank	1	348.5	1,143
Quanah, city water tank (Tex.)	Top of tank	3	520.9	1,709
Quanah, courthouse (Tex.)	Cupola	3	502.5	1,648
Quarter section corner secs. 5 and 8	Stone	1	421.3	1,382
Quarter section corner secs. 25 and 26	do.	1	428.0	1,404
Red barn near sec. 13 (Kans.)	Ridge of roof	1	391.8	1,285
Red River longitude (Tex.)	Station mark	3	491.1	1,611
Reference mark no. 2 (Tex.)	Top of monument	3	338.2	1,110
Reference mark no. 4 (Tex.)	do.	3	315.2	1,034
Reference mark no. 7 (Tex.)	do.	3	317.9	1,043
Reference mark no. 12 (Tex.)	do.	3	344.3	1,129
Reference mark no. 15 (Tex.)	do.	3	341.9	1,122
Reference mark no. 16 (Tex.)	do.	3	325.4	1,078
Reference mark no. 18 (Tex.)	do.	3	330.1	1,083
Reference mark no. 21 (Tex.)	do.	3	345.9	1,135
Renfrow Christian Church	Top of spire	1	386.6	1,265
Renfrow, high elevator	Top	1	385.6	1,265
Renfrow, low elevator	do.	1	381.8	1,253
Ringold Presbyterian Church (Tex.)	Top of tower	1	289.6	950
Ryan, city water tank	Top of tank	3	316.2	1,037
Ryan, high school	Cupola	3	313.7	1,029
Sand Hill reference mark	Top	1	428.6	1,406
Savanna, school building	Cupola	2a	233.0	767
Section 13, northwest corner	Ground	1	385.4	1,264
Section 29, T. 17 N., R. 7 W., SW. corner	Stone	1	354.5	1,163
Sullivan (U.S.G.S.) (Tex.)	Station mark	3	331.6	1,088
Sunshine (U.S.G.S.) (Tex.)	do.	3	368.0	1,207
Temple, city water tank	Top	3	339.0	1,112
Union, Catholic Church	Ridge of roof	1	414.3	1,359
Union, red elevator	Top	1	417.5	1,370

Table of elevations—Continued

Station	Point to which elevation refers	Arc to which elevation refers	Elevation	
			Meters	Feet
<i>Class 3—Continued</i>				
Vernon, city water tank (Tex.)	Top	3	404.7	1,328
Wakita, church	Ridge of roof	1	365.2	1,198
Wakita, high elevator	Top	1	372.8	1,223
Wakita, low elevator	do.	1	369.1	1,211
Walters, city water tank	Top of tank	3	326.8	1,072
Waukomis, schoolhouse	Bottom of cupola	1	398.6	1,308
Waurika, city water tank	Top of tank	3	304.5	999
Wichita Falls, Call Aviation Field, tank (Tex.)	do.	3	355.5	1,166
Wichita Falls, C. P. & E. Co. stack (Tex.)	Top of stack	3	343.4	1,127
Wichita Falls, State Hospital, tank (Tex.)	Top of tank	3	339.4	1,113
Witness corner, section 6	Stone	3	349.1	1,145
Witness corner, section 10	do.	3	349.2	1,146
Witness corner, section 25-30	do.	3	321.6	1,055
Witness point, section 35	do.	3	337.9	1,109
Witness point, section 7-12, North Range 15/14	do.	3	320.1	1,050
Witness point, section 14	do.	3	526.9	1,072
Witness point, section 29	do.	3	356.7	1,170

ELEVATIONS ALONG THE BOUNDARY, PARALLEL OF 36°30'

A least-squares adjustment was not made of the vertical net of this arc. The accuracy of the observations does not justify the work involved in making such an adjustment. This is probably due to the refraction conditions which existed at night where the observations were made on lights. At the western end of the scheme, where there were a few lines observed over in daytime, the checks are good. The quality of the observations is shown by the computations of closures of elevations around triangles. Some such closures are very large, many of them are poor, a few are good. An approximate computation of elevations was made by carrying elevations through those differences which entered into triangles of reasonable closing errors. Weighted means were taken.

The quadrilateral Houghland, Barnes, Mitchusson, and Campbell gave poor closures for all its triangles, so elevations were carried to the stations Barnes and Houghland from the western end of the arc and to the stations Campbell and Mitchusson from the eastern end of the arc. A rough check was then had from the east-and-west differences across this quadrilateral but such differences were used only for purposes of check.

Table of elevations along the boundary, parallel of 36°30'

Station	Point to which elevation refers	Elevation	
		Meters	Feet
Barnes.....	Station mark.....	863.1	2,832
Booker (Tex.).....	do.....	862.0	2,828
Bridgeman.....	do.....	939.5	3,082
Browder (Tex.).....	do.....	936.5	3,072
Camp.....	do.....	1,001.7	3,286
Campbell.....	do.....	906.3	2,973
Carlin.....	do.....	829.5	2,722
Chipperfield (Tex.).....	do.....	968.0	3,176
Clark monument no. 5.....	do.....	1,180.4	3,873
Clark monument no. 10.....	do.....	842.8	2,765
Dower.....	do.....	891.5	2,925
Eklund (N. Mex.).....	do.....	1,619.8	5,314
Elliot (Tex.).....	do.....	1,067.0	3,501
Felt.....	do.....	1,363.0	4,472
Gaylor.....	do.....	845.3	2,773
Graham (Tex.).....	do.....	1,016.6	3,316
Griggs.....	do.....	1,140.6	3,742
Hardy (Tex.).....	do.....	1,078.1	3,537
Harner.....	do.....	1,308.0	4,291
Hitch (Tex.).....	do.....	948.8	3,113
Hitchland north (Tex.).....	do.....	939.7	3,083
Hitchland south (Tex.).....	do.....	954.8	3,132
Hogland (Tex.).....	do.....	917.2	3,009
Ivanhoe.....	do.....	800.4	2,626
Kerrick (Tex.).....	do.....	1,182.0	3,878
Kirschman (Tex.).....	do.....	848.2	2,783
Mitchusson.....	do.....	887.8	2,913
Mooney.....	do.....	1,190.8	3,907
Morris (Tex.).....	do.....	886.8	2,909
Mouse.....	do.....	1,062.4	3,486
Northeast corner Hansford County (Tex.).....	Top of monument.....	839.7	2,755
Northeast corner Texas—Oklahoma-Texas boundary.....	Station mark.....	756.7	2,483
O'Brien (Tex.).....	do.....	1,128.7	3,703
Pruett.....	do.....	849.6	2,787
Rogers.....	do.....	1,250.7	4,103
Schellenberg (Tex.).....	do.....	1,284.0	4,213
School.....	do.....	1,449.7	4,756
Shadwick.....	do.....	884.9	2,903
Sneed (Tex.).....	do.....	1,244.8	4,084
Texhomex—Texas-Oklahoma-New Mexico boundary.....	do.....	1,436.2	4,712
T. 1 N., R. 4 E., section 36, southeast corner, Oklahoma-Texas boundary.....	do.....	1,261.8	4,140
Wall.....	do.....	909.2	2,983
Whorton.....	do.....	1,045.0	3,428
Worsham (Tex.).....	do.....	1,444.6	4,740
X.I.T. (Tex.).....	do.....	1,339.7	4,395

DESCRIPTIONS OF TRIANGULATION STATIONS

The following descriptions of stations may be conveniently consulted by reference to the illustrations at the end of this publication or to the index. All azimuths given in the descriptions are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. Where magnetic azimuths are given they are indicated as such.

In general, except where the contrary is specifically stated, the surface and underground marks are not in contact, so that a disturbance of the surface mark will not necessarily affect the underground mark. The underground mark should be resorted to only in cases where there is evidence that the surface mark has been disturbed.

The name and dates given in each description immediately after the county refer to the chief of party by whom the station was established, the date of the establishment of the station, and the date when the station was last recovered.

Any person who finds that one of the stations herein described has been disturbed or that the description no longer fits the facts is requested to send such information to the Director, United States Coast and Geodetic Survey, Washington, D.C.

MARKING OF STATIONS

The standard disk station and reference marks referred to in the following descriptions and notes consist of a disk and shank of brass cast in one piece, as shown in figure 3. The disk of the station mark is 90 millimeters in diameter, with a hole at the center surrounded by a 20-millimeter equilateral triangle, and has the following inscribed legend: "U.S. Coast and Geodetic Survey Triangulation Station. For information write to the Superintendent, Washington, D.C. \$250 fine or imprisonment for disturbing this mark." On the new marks made since March 1921 the word "Director" replaces the word "Superintendent" in the inscription. The shank is 25 millimeters in diameter and 80 millimeters long, with a slit at the lower end into which a wedge is inserted, so that when it is driven into a drill hole in the rock it will bulge at the bottom and hold the mark firmly in place. The marks used between about 1915 and 1920 have grooves cut around the shank instead of the slit.

The old type of station mark referred to in the following notes and descriptions consists also of a disk and shank made of bronze and cast in one piece. The disk, which is somewhat smaller than the disk of the marks described above, has a polished center with an inscribed triangle. Around the polished part are the letters "U.S.C. & G.S." and a raised flange around the edge.

The standard disk reference mark, shown in figure 3, is the same size and shape as the newer type of station mark, described above, but instead of a triangle it has an arrow at the center of the disk, which, when the mark is properly set, points to the station. The legend is the same as for the station mark except that the words "reference mark" take the place of the words "triangulation station."

The standard notes on the marking of stations which are given below serve as a guide to the field observer in selecting the best type of mark for each particular station. They are also useful to the observer in writing his descriptions, as he need not describe the marking used at a station but simply give the numbers of the standard notes which describe the station, underground, reference, and witness marks. The notes are made as general as possible in order that it might not be necessary in the field to describe small and unimportant details.

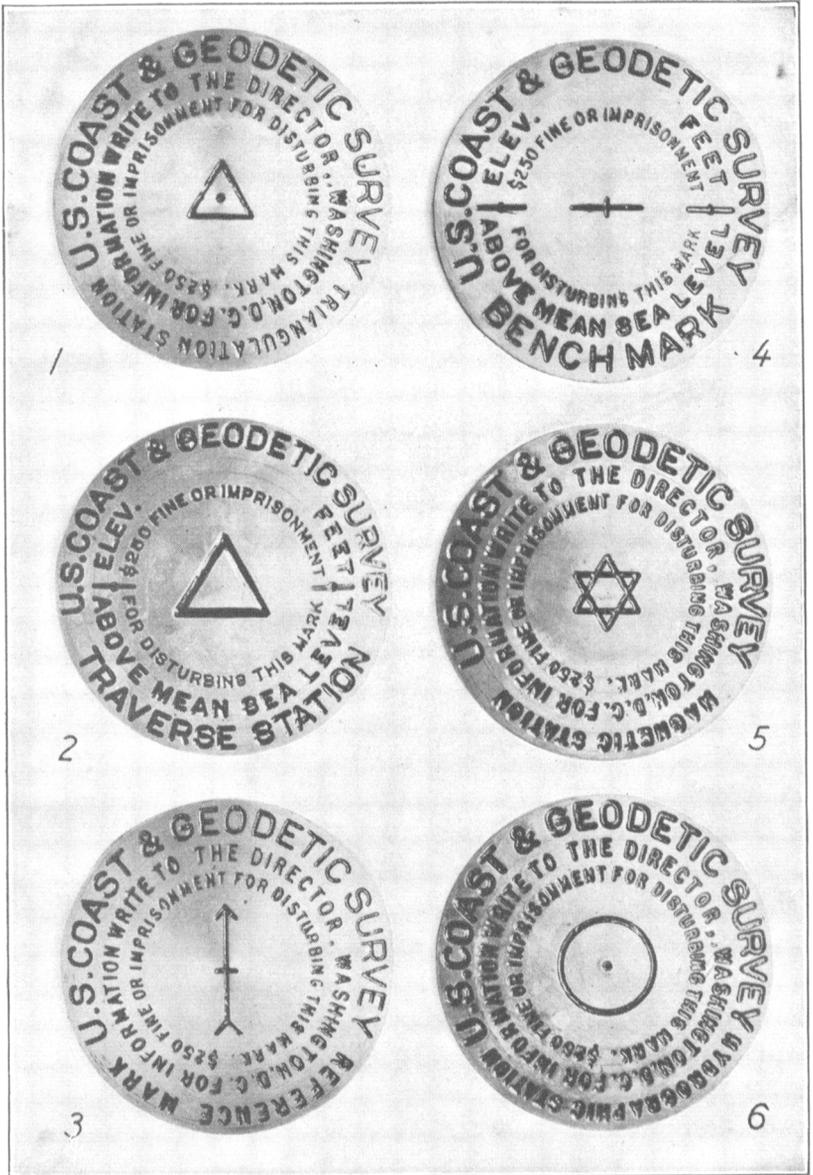


FIGURE 3.—STANDARD MARKS OF THE U.S. COAST AND GEODETIC SURVEY.

- | | |
|--------------------------------|-------------------------------|
| 1. Triangulation station mark. | 4. Bench mark. |
| 2. Traverse station mark. | 5. Magnetic station mark. |
| 3. Reference mark. | 6. Hydrographic station mark. |

At the end of the standard notes are given a number of additional notes, describing marks which were largely used before the adoption of the standard disk station and reference marks. These vary to a great extent with the locality, depending somewhat on the character of the material available for the construction of permanent marks.

For the convenience of the reader a brief description of the marking is given in each of the following descriptions of stations. In addition, the number of the note describing the mark in detail is also given.

STANDARD NOTES ON THE MARKING OF STATIONS

Surface marks

Note 1.—A standard disk triangulation station mark set in the top of (*a*) a square block or post of concrete, (*b*) a concrete cylinder, (*c*) an irregular mass of concrete.

Note 2.—A standard disk triangulation station mark wedged in a drill hole in outcropping bedrock (*a*) and surrounded by a triangle chiseled in the rock, (*b*) and surrounded by a circle chiseled in the rock, (*c*) at the intersection of two lines chiseled in the rock.

Note 2A.—Old-type bronze disk cemented into drill hole in solid rock.

Note 3.—A standard disk triangulation station mark set in concrete in a depression in outcropping bedrock.

Note 4.—A standard disk triangulation station mark wedged in a drill hole in a boulder.

Note 5.—A standard disk triangulation station mark set in concrete in a depression in a boulder.

Note 6.—A standard disk triangulation station mark set in concrete at the center of the top of a tile (*a*) which is embedded in the ground, (*b*) which is surrounded by a mass of concrete, (*c*) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (*d*) which is set in a block of concrete and projects from 12 to 20 inches above the block.

Underground marks

Note 7.—A block of concrete 3 feet below the ground containing at the center of its upper surface (*a*) a standard disk triangulation station mark, (*b*) a copper bolt projecting slightly above the concrete, (*c*) an iron nail with the point projecting above the concrete, (*d*) a glass bottle with the neck projecting a little above the concrete, (*e*) an earthenware jug with the mouth projecting a little above the concrete.

Note 8.—In bedrock (*a*) a standard disk triangulation station mark wedged in a drill hole, (*a a*) old-type station disk, (*b*) a standard bronze tablet set in concrete in a depression, (*c*) a copper bolt set in cement in a drill hole or depression, (*d*) an iron spike set point up in cement in a drill hole or depression.

Note 9.—In a boulder 3 feet below the ground (*a*) a standard disk triangulation station mark wedged in a drill hole, (*b*) a standard bronze tablet set in concrete in a depression, (*c*) a copper bolt set with cement in a drill hole or depression, (*d*) an iron spike set with cement in a drill hole or depression.

Note 10.—Embedded in earth 3 feet below the surface of the ground (*a*) a bottle in an upright position, (*b*) an earthenware jug in an upright position, (*c*) a brick in a horizontal position with a drill hole in its upper surface.

Reference marks

Note 11.—A standard disk reference mark with the arrow pointing toward the station set at the center of the top of (*a*) a square block or post of concrete, (*b*) a concrete cylinder, (*c*) an irregular mass of concrete.

Note 12.—A standard disk reference mark with the arrow pointing toward the station (*a*) wedged in a drill hole in outcropping bedrock, (*b*) set in concrete in a depression in outcropping bedrock, (*c*) wedged in a drill hole in a boulder, (*d*) set in concrete in a depression in a boulder.

Note 13.—A standard disk reference mark with the arrow pointing toward the station, set in concrete at the center of the top of a tile (*a*) which is embedded in the ground, (*b*) which is surrounded by a mass of concrete, (*c*) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (*d*) which is set in a block of concrete and projects from 12 to 20 inches above the block.

Witness marks

Note 14.—A conical mound of earth surrounded by a circular trench.

Note 15.—A tree marked with (*a*) a triangular blaze with a nail at the center and each apex of the triangle, (*b*) a square blaze with a nail at the center and each corner of the square, (*c*) a blaze with a standard disk reference mark set at its center into the tree.

ADDITIONAL NOTES ON THE MARKING OF STATIONS

Surface marks

Note 16A.—Witness points, witness corners, range line stations, and section corners along the Oklahoma bluff of the Red River were marked with monuments constructed of iron posts, 36 inches long and 2 inches diameter, with bronze caps on top, placed full length in concrete in galvanized iron form 36 inches long, 8 inches upper diameter, and 14 inches diameter at base, set 30 inches in the ground. Monuments are appropriately marked according to the standard specifications of the General Land Office.

Note 16B.—State boundary reference points along the Texas bluff of the Red River were marked with concrete monuments, molded in mass at station in galvanized iron forms 36 inches long, 16 inches upper diameter, 24 inches base diameter, set 30 inches in ground. Center of each monument is marked with heavy bronze disk bearing inscription of the Supreme Court of the United States, Texas and Oklahoma Boundary Commission, 1923.

Note 17.—A nail in the center of a terra-cotta pipe 4 inches in diameter and 2 feet long, filled with concrete and set in a block or cylinder of concrete 18 inches in diameter. Top of concrete is sometimes marked with the letters U. S. C. & G. S. and the date.

Note 18.—A nail in the center of an iron pipe 2 inches in diameter and 2 feet long, set flange down, filled with concrete, and surrounded by a block of concrete 18 inches in diameter. The concrete was marked with the letters U. S. C. & G. S. and the date.

Underground marks

Note 19.—A nail in the center of a terra-cotta pipe, 4 inches in diameter and 2 feet long, filled with concrete and set in a concrete block 1 foot in diameter. Mark is 2 feet below surface of ground.

Note 20.—A nail in the center of an iron pipe 2 inches in diameter and 2 feet long, set flange down, filled with concrete and surrounded by a concrete block 12 inches in diameter. The concrete may be marked with the letters U. S. C. & G. S. and the date.

Reference marks

Note 21.—A nail in the center of a terra-cotta pipe filled with concrete and set in a block of concrete 1 foot in diameter.

Note 22.—A nail in the center of an iron pipe 2 inches in diameter and 2 feet long, set flange down, filled with concrete and set in a concrete block 12 inches in diameter.

NINETY-EIGHTH MERIDIAN ARC

Principal points

Fowler (Harper County, Kans., W. Bowle, 1902).—About $3\frac{1}{4}$ miles east and 3 miles north of Bluff City, in SW $\frac{1}{4}$ sec. 36, T. 33 S., R. 5 W., on land belonging (1902) to S. P. Joyner. The following distances and azimuths are from station: Stone at southwest corner of section, 562.98 meters (1,847.0 feet), $68^{\circ}27'46''$; chimney of main house of Mr. Joyner, about 130 meters (427 feet),

329°57'41''; shaft of windmill at north roadside about 80 meters (262 feet) southwest of house, about 190 meters (623 feet), 353°48'51''. Underground mark is point of 60-penny nail, projecting $\frac{1}{4}$ inch, in top of piece of 4-inch terra-cotta pipe 2 feet long filled with concrete with top $2\frac{1}{2}$ feet below surface. Over this is 6 inches of sand. Surface mark is exactly similar except set flush with surface and surrounded with concrete. Reference mark is same as surface mark, in field at corner of fence, 0.35 meter (1.1 feet) north of north road fence and 0.70 meter (2.3 feet) west of north-and-south fence along west side of Mr. Joyner's dooryard, and 193.362 meters (634.39 feet) from station in azimuth 348°17'11''.

Rutherford (Harper County, Kans., A. T. Mosman, 1901; 1902).—About $4\frac{1}{4}$ miles west of Anthony, in NW $\frac{1}{4}$ sec. 29, T. 33 S., R. 7 W., about 400 yards east and 250 yards south of northwest corner of section, on land belonging to a mortgage company (1901) and rented by Mr. Rutherford who lives 1 mile south of station. Underground mark is quart bottle incased in concrete 3 feet below surface. Station mark is a centered 6-inch drain tile pipe 2 feet long filled with concrete with a brass station plate on upper surface marked by a cross which is point of station.

Miller (Harper County, Kans., W. Bowle, 1902).—In sec. 36, T. 34 S., R. 6 W., on low ridge on land belonging to George Miller, 22 meters (72 feet) north of northwest corner of his house. Underground mark is point of 60-penny nail, projecting $\frac{1}{4}$ inch, in top of piece of 4-inch terra-cotta pipe 2 feet long filled with concrete with top $2\frac{1}{2}$ feet below surface. Over this is 6 inches of sand. Surface mark is same except set flush with surface and surrounded with concrete. Reference mark is same as surface mark, in corner of fence in southwest corner of above-mentioned section, and 202.509 meters (664.40 feet) from station in azimuth 3°32'11''. Stone common to secs. 35 and 36 of T. 34, and 1 and 2 of T. 35, is 210.22 meters (689.7 feet) from station in azimuth 6°08'35''. Miller ecc. is 51.052 meters (167.49 feet) from station in azimuth 24°06'11''.

Sand Hill (Alfalfa County, W. Bowle, 1902).—About $9\frac{1}{2}$ miles south and $4\frac{1}{2}$ miles west of Manchester, in SW $\frac{1}{4}$ sec. 25, T. 28 N., R. 9 W., on land belonging to John Blowey (1902), on highest point near north edge of what are known as Sand Hills. Underground mark is point of 60-penny nail, projecting $\frac{1}{4}$ inch, in top of piece of 4-inch terra-cotta pipe 2 feet long filled with concrete with top $2\frac{1}{2}$ feet below surface. Over this is 6 inches of sand. Surface mark is same except set flush with surface and surrounded with concrete. Reference mark is same as surface mark, in fence corner south of quarter section stone common to secs. 25 and 36, and 536.00 meters (1,758.5 feet) from station in azimuth 352°47'08''. Quarter-section corner is 525.75 meters (1,724.9 feet) from station in azimuth 352°19'21''.

Renfrow (Grant County, O. W. Ferguson, 1902).—About $2\frac{3}{4}$ miles west and $1\frac{1}{2}$ miles south of grain elevator in Renfrow, in southeast corner of NW $\frac{1}{4}$ sec. 14, T. 28 N., R. 5 W., on land belonging to Tony Tucker (1902), 91.40 meters (299.9 feet) north of east-and-west fence and 82.78 meters (271.6 feet) west of north-and-south fence. Underground mark is point of 60-penny nail, projecting $\frac{1}{4}$ inch, in top of piece of 4-inch terra-cotta pipe 2 feet long filled with concrete with top $2\frac{1}{2}$ feet below surface. Over this is 6 inches of sand. Surface mark is same except set flush with surface and surrounded with concrete. Reference mark is same as surface mark, 0.60 meter (2.0 feet) west of north-and-south fence and 0.77 meter (2.5 feet) north of east-and-west fence, and 121.770 meters (399.51 feet) from station in azimuth 317°31'17''. Other distances and azimuths are as follows: Southeast corner of sec. 14, 1,257.7 meters (4,126 feet), 315°13'26''; Mr. Zimmerman's house, center of chimney, about $\frac{5}{8}$ mile, 254°49'00''; Elmer Behann's house, center of chimney, about $\frac{3}{8}$ mile, 286°48'48''; Richland schoolhouse, belfry, about $\frac{5}{8}$ mile, 318°17'07''.

Vicar (Grant County, W. Bowle, 1902).—In NE $\frac{1}{4}$ sec. 1, T. 25 N., R. 7 W., 5 miles west and $\frac{1}{2}$ mile north of Pond Creek, on highest point of low ridge running about east and west, on land owned in 1902 by J. F. Vickers. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is iron nail in terra-cotta pipe filled with and set in concrete, note 21, in fence corner, near quarter-section, corner common to sections 1 of R. 7 W. and 6 of R. 6 W., and 261.82 meters (859.0 feet) from

station in azimuth $301^{\circ}58'29''$. *Township corner Tps. 25 & 26 N., Rs. 6 & 7 W., cedar post*, is 700.4 meters (2,298 feet) from station in azimuth $198^{\circ}19'03''$.

Hahn (Garfield County, O. W. Ferguson, 1902).—In sec. 3, T. 24 N., R. 4 W., on land owned in 1902 by J. K. Myers, about 241 meters (791 feet) north of south line of section, 15.85 meters (52.0 feet) (slope distance) east of line of hedge on west side of road, and 0.11 meter (0.4 foot) west of line of posts on east side of road. Surface and underground marks are nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in iron pipe filled with and set in concrete, note 21, just within field at southwest corner of sec. 3, 0.85 meter (2.8 feet) east of road fence, 0.94 meter (3.1 feet) north of east-and-west fence, and 232.694 meters (763.43 feet) from station in azimuth $359^{\circ}49'45''$. Other distances and azimuths from station are: *sec. 3 SW. corner, T. 24 N., R. 4 W., stone*, 240.92 meters (790.4 feet) (slope distance), $1^{\circ}45'17''$; tower of J. A. Meikle's windmill, $\frac{5}{8}$ mile, $7^{\circ}36'26''$; J. K. Myers' windmill, 1 mile, $275^{\circ}31'22''$; tower of A. J. Hahn's windmill, $\frac{3}{8}$ mile, $73^{\circ}46'53''$.

McCoy (Garfield County, W. Bowie, 1902).—About $12\frac{1}{2}$ miles west and $\frac{3}{4}$ mile south of Kremlin, in SE $\frac{1}{4}$ sec. 21, T. 24 N., R. 8 W., on highest point of land which was owned in 1902 by A. S. McCoy. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is iron nail in terra-cotta pipe filled with and set in concrete, note 21, in fence corner on south side of road, opposite quarter-section corner common to sections 21 and 28, and 409.97 meters (1,345.0 feet) from station in azimuth $17^{\circ}36'11''$.

Enid (Garfield County, W. Bowie, 1902).—In sec. 22, T. 23 N., R. 6 W., in line of fence on south side of road, on property owned in 1902 by Mr. Smith. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is iron nail in terra-cotta pipe filled with and set in concrete, note 21, in northeast corner of Mr. Smith's property, very near section corner, and 66.166 meters (217.08 feet) from station in azimuth $271^{\circ}29'$. Section corner common to secs. 14, 15, 22, and 23 is 76.318 meters (250.39 feet) from station in azimuth $264^{\circ}28'$.

Garber (Garfield County, O. W. Ferguson, 1902).—In northeast edge of Garber, in sec. 25, T. 23 N., R. 4 W., on land of Chicago, Rock Island and Pacific Railway, 28.05 meters (92.0 feet) (slope distance) north of center of track, 2.37 meters (7.8 feet) south of wire fence on right-of-way line, 68.40 meters (224.4 feet) (slope distance) from northeast corner of cattle pen, and 75.46 meters (247.6 feet) (slope distance) from center of track at switch block. Surface and underground marks are nails in iron pipes filled with and set in concrete, notes 18 and 20. Reference mark is nail in iron pipe filled with and set in concrete, note 22, 0.45 meter (1.5 feet) south of same right-of-way fence, opposite east window in north face of depot, and 252.176 meters (827.35 feet) from station in azimuth $90^{\circ}40'33''$. Other distances and azimuths from station are: *Center sec. 25, T. 23 N., R. 4 W.*, as identified in 1902 by Mr. S. H. Peters, 201.33 meters (660.5 feet), $272^{\circ}37'02''$; Mr. Schieber's chimney, center of square-topped house, about 175 meters (574 feet), $8^{\circ}06'51''$; M.E. church spire, about 275 meters (902 feet), $15^{\circ}38'50''$; *Garber elevator, center shaft*, 98.8 meters (324 feet), $60^{\circ}37'$.

Waukomis (Garfield County, W. Bowie, 1902).—About $\frac{3}{4}$ mile northwest of town of Waukomis, in sec. 23, T. 21 N., R. 7 W., on property owned in 1902 by J. Crick, about 100 meters (328 feet) northwest of his dwelling. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, in northwest corner of Mr. Crick's garden, alongside public road, 210.050 meters (689.14 feet) from station in azimuth $284^{\circ}07'56''$.

Mitchell (Garfield County, O. W. Ferguson, 1902).—About $1\frac{1}{2}$ miles south and 1 mile east of Ladysmith, in sec. 2, T. 20 N., R. 3 W., on east-and-west half-section line. Land north of station was owned in 1902 by T. J. Mitchell. Surface and underground marks are iron nails in iron pipes filled with and set in concrete, notes 18 and 20. Reference mark is nail in iron pipe filled with and set in concrete, note 22, on west side of north-and-south road between sections 1 and 2, and 70.052 meters (259.83 feet) from station in azimuth $269^{\circ}44'30''$. Other distances and azimuths from station are: chimney of Mr. Mitchell's house, $\frac{1}{2}$ mile, $139^{\circ}54'23''$; chimney of main part of Fred

Frank's house, 1 mile, $291^{\circ}08'14''$; chimney of main part of A. Smith's house, 1 mile, $52^{\circ}19'49''$; stone at quarter-section corner between sections 1 and 2 on east-and-west half-section line, 78.82 meters (258.6 feet), $269^{\circ}55'$.

Parnell (Kingfisher County, W. Bowie, 1902).—About 6 miles east and $\frac{1}{2}$ mile south of Hennessey, in T. 19 N., R. 6 W., 75 yards east of corner common to sections 22, 23, 26, and 27, in fence line on south side of road, and on property owned in 1902 by B. H. Parnell. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, in northwest corner of Mr. Parnell's property, 66.156 meters (217.05 feet) from station in azimuth $90^{\circ}04'$.

Wingard (Logan County, O. W. Ferguson, 1902).—About 5 miles north and $3\frac{3}{4}$ miles west of Guthrie, in SW $\frac{1}{4}$ sec. 14, T. 17 N., R. 3 W., on highest ground, on property owned in 1902 by J. B. Wingard, on gently sloping cultivated land. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, in southwest quarter very near center of section, 0.94 meter (3.1 feet) south of east-and-west fence, 0.50 meter (1.6 feet) west of a north-and-south fence, and 329.096 meters (1,079.71 feet) from station in azimuth $194^{\circ}42'00''$. Other distances and azimuths from station are: stone marking quarter-section corner, sections 14 and 23, 490.9 meters (1,611 feet), $350^{\circ}21'19''$; east end of ridge of James Dodd's house, $\frac{1}{4}$ mile, $56^{\circ}05'33''$; chimney in center of square-roofed house of William Dodd, $\frac{3}{4}$ mile, $67^{\circ}57'15''$; and south end of ridge of John Gooch's house, $\frac{3}{4}$ mile, $121^{\circ}30'12''$. Station identical with Wingard latitude station and Wingard azimuth station.

Burson (Kingfisher County, W. Bowie, 1902).—About 5 miles north and 2 miles west of Kingfisher, in NE $\frac{1}{4}$ sec. 29, T. 17 N., R. 7 W., on property owned in 1902 by Isaac Burson. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, in northwest corner of school lot, 427.66 meters (1,403.1 feet) from station in azimuth $246^{\circ}22'53''$. Southwest corner of section 29 is 1,817.3 meters (5,962 feet) from station in azimuth $37^{\circ}25'20''$.

Eichhoff (Canadian County, O. W. Ferguson, 1902).—About 4 miles west and 2 miles north of Mathewson, on section line between sections 8 and 17, T. 14 N., R. 6 W., about 289 meters (948 feet) west of east corner, 9.75 meters (32 feet) north of fence along south side of road, on highest ground in vicinity, on land owned in 1902 by Gustave Thelen. Surface and underground marks are nails in terra-cotta pipes set in and filled with concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe set in and filled with concrete, note 21, in field at northeast corner of section 17, 0.48 meter (1.6 feet) south from east-and-west fence, 0.30 meter (1 foot) west of north-and-south fence, and 279.835 meters (918.09 feet) from station in azimuth $272^{\circ}43'38''$. Other distances and azimuths from station are: *Southeast corner of section 17*, 1,645.7 meters (5,399 feet), $349^{\circ}29'08''$; east chimney of Mr. Thelen's house, 900 meters (2,953 feet), $351^{\circ}06'15''$; north end of ridge of Mr. Eichhoff's house, about $\frac{3}{4}$ mile, $7^{\circ}25'48''$.

Edmonds (Oklahoma County, O. W. Ferguson, 1902).—At northeast outskirts of Edmonds, near center of sec. 25, T. 14 N., R. 3 W., on land owned in 1902 by Pete Wilderson, at east edge of cultivated land about 100 meters (328 feet) north-northwest of highest ground, and 119.60 meters (392.4 feet) south of east-and-west fence running to the quarter-section corner. Surface and underground marks are nails in terra-cotta pipes set in and filled with concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe set in and filled with concrete, note 21, in north-and-south fence, 79.402 meters (260.50 feet) from station in azimuth $263^{\circ}11'37''$. Other distances and azimuths from station are: center of section 25, 334.83 meters (1,098.5 feet), $110^{\circ}42'50''$. *Edmonds College, dome* 755.6 meters (2,479 feet), $70^{\circ}55'32''$; Catholic Church, cross on spire, $63^{\circ}29'29''$; and windmill at John Enterline's house, $43^{\circ}21'44''$.

Caddo (Canadian County, W. Bowie, 1902).—About 7 miles a little west of north from El Reno, in sec. 17, T. 13 N., R. 7 W., on highest point of land in Cayenne Indian school reservation, and about 600 meters (1,968 feet) from

Caddo school. Surface and underground marks are iron nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, on sand dune at edge of some woods, 295.5 meters (969 feet) from station in azimuth $148^{\circ}08'03''$.

Yukon (Canadian County, O. W. Ferguson, 1902).—About $12\frac{7}{8}$ miles west of Oklahoma City, $1\frac{7}{8}$ miles south and $\frac{1}{2}$ mile west of the school building at Yukon, in SW $\frac{1}{4}$ sec. 29, T. 12 N., R. 5 W., on highest ground in vicinity, on land owned in 1902 by John Olive, about 25 yards west of north-and-south center line through the southwest 40 acres of southwest quarter. Surface and underground marks are nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, 194.677 meters (638.70 feet) from station in azimuth $2^{\circ}16'42''$. Other distances and azimuths from station are: center of north gable of Mrs. Art's house, 243.18 meters (797.8 feet), $14^{\circ}37'10''$; north gable of A. Well's house, $296^{\circ}02'11''$; south gable of Mr. Olive's house, $131^{\circ}28'36''$; center of chimney of George Thompson's house, $141^{\circ}41'17''$; southwest corner of section 29, 417.3 meters (1,369 feet), $61^{\circ}21'57''$.

El Reno east base (Canadian County, A. L. Baldwin, 1900; 1902).—In sec. 9, T. 11 N., R. 7 W., on land owned in 1902 by G. L. Newman. Surface mark is standard station disk in red sandstone block. Underground mark is copper bolt in limestone block about 4 feet below surface. Reference mark is 60-penny nail in terra-cotta pipe filled with and set in concrete, in northeast corner on Mr. Newman's peach orchard, on west side of road, and 277.20 meters (909.4 feet) from station in azimuth $270^{\circ}46'19''$. Section corner common to sections 9, 10, 15 and 16 is about 1,057 meters (3,468 feet) from station in azimuth $344^{\circ}37'46''$.

El Reno west base (Canadian County, A. L. Baldwin, 1900; 1902).—About $2\frac{1}{2}$ miles south and $6\frac{3}{4}$ miles west of the Chicago, Rock Island and Pacific depot at El Reno, on land owned in 1902 by J. T. Seawell, and on summit of prominent hill. Surface mark is standard station disk in block of red sandstone. Underground mark is hole in copper bolt in limestone block about 4 feet below surface. Reference mark is 60-penny nail in 4-inch terra-cotta pipe, filled with and set in concrete, 226.731 meters (743.87 feet) from station in azimuth $114^{\circ}25'57''$.

Carson (Grady County, W. Bowie, 1902; 1921).—About 3 miles south and 1 mile west of Minco, in sec. 8, T. 9 N., R. 7 W., on property owned in 1902 by Kit Carson of Minco, on highest point of ridge $\frac{3}{4}$ mile west of Chicago, Rock Island & Pacific Railway. Surface and underground marks are nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with, and set in concrete, note 21, near fence line, and 275.776 meters (904.78 feet) from station in azimuth $179^{\circ}42'34''$. Other distances and azimuths from station are as follows: *Old boundary post* of Oklahoma-Indian Territory boundary line, 392.2 meters (1,306 feet), $135^{\circ}23'27''$; stone at *Quarter section corner, sections 5 & 8, T. 9 N., R. 7 W.*, 410.3 meters (1,346 feet), $134^{\circ}41'51''$. Old boundary post is 8-inch cottonwood post with top squared, projecting 3 or 4 feet and surrounded by mound of earth. Station identical with Carson azimuth station and Carson latitude station.

Smith (Oklahoma County, O. W. Ferguson, 1902; 1921).—About $6\frac{1}{2}$ miles south and 1 mile east of Oklahoma City, 3 miles north and $\frac{1}{4}$ mile west of Moore, in SE $\frac{1}{4}$ sec. 34, T. 11 N., R. 3 W., on land owned in 1902 by N. H. Smith, at fence line on west side of highway. Surface and underground marks are nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, on west side of road, just north of driveway to Smith's house, 1.02 meters (3.3 feet) north of line of black locust trees, 0.71 meter (2.3 feet) east of wire fence on west side of road, and 130.154 meters (427.01 feet) from station in azimuth $178^{\circ}44'33''$. Other distances and azimuths from station are: south gable of main part of Smith's house, 101.22 meters (332.1 feet), $166^{\circ}23'33''$; corner common to sections 2, 3, 34, and 35, 406.10 meters (1,332.3 feet), $357^{\circ}56'26''$.

Kechi (Cado County, W. Bowie, 1902; 1921).—In sec. 3, T. 5 N., R. 9 E., on town site of Cement, about $\frac{1}{2}$ mile east of branch of St. Louis, San Francisco Railway extending from Chickasha to Lawton, on prominent rocky peak among

what are known as Kechi Hills. Station marked by a 60-penny nail set in drill hole in solid rock. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, placed in street corner in town, 288.813 meters (947.55 feet) from station in azimuth $36^{\circ}11'43''$. In 1921 station recovered and nail replaced with standard station disk, and standard reference disk was set in native rock, note 12, 23.60 meters (77.4 feet) from station in azimuth $337^{\circ}27'$.

Lanier (McClain County, W. Bowie, 1902).—About 16 miles east and 1 mile north of Chickasha, and $2\frac{3}{4}$ miles northwest of the village of Dibble, in sec. 19, T. 7 N., R. 4 W., on highest point of prominent ridge on which are some scattered blackjack oak trees. Surface and underground marks are nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, placed within a few meters of three large oak trees, each blazed with triangle on side facing mark which is 136.408 meters (447.53 feet) from station in azimuth $327^{\circ}17'54''$.

Osaria-Marlow (U.S.G.S.) (Garvin County, W. Bowie, 1902).—Three miles north and 3 miles east of Marlow, on sand hill covered with small blackjack trees, in sec. 35, T. 3 N., R. 7 W. Four trees within 15 meters (49 feet) of station were marked with triangles cut into bark on sides facing station. U.S. Geological Survey mark found in good condition and undisturbed, and was removed, and station re-marked with nails in terra-cotta pipes filled with and set in cement, notes 17 and 19. Reference mark is cross on copper bolt in center of brown sandstone, 1 foot square and 18 inches deep, projecting about 4 inches above ground 1.4 meters (5 feet) south of oak tree with triangular blaze, and 9.304 meters (30.52 feet) from station in azimuth $164^{\circ}03'$. In 1919 station reported lost.

Table Hill (U.S.G.S.) (Garvin County, O. W. Ferguson, 1902; 1920).—About $4\frac{1}{2}$ miles north of village of Foster, 2 miles south 80° west of highest and most table-like of hills locally known as Table Hills, about 600 yards east of wagon road, on timbered tract of land owned by John W. Hunter. Original surface mark was copper bolt in top of stone post bearing the letters U.S.G.S. and small triangle. Stone cemented in place and cement had inscribed: U. S. C. & G. S. 1902. Underground mark is nail in top of 4-inch terra-cotta pipe, filled with and set in concrete with top surface 20 inches below surface of ground. In 1920 reported that surface mark had been dug up and broken, but underground mark was undisturbed. Standard station disk was set in concrete for new surface mark. Original reference marks were probably nails in concrete in terra-cotta pipe set in concrete. One was 126.440 meters (414.83 feet) from station in azimuth $179^{\circ}28'30''$. Other was 124.873 meters (409.69 feet) from station in azimuth $348^{\circ}10'45''$. In 1920 reference marks were reported dug up and broken, and standard reference disk was set in concrete 33.69 meters (110.5 feet) from station in azimuth $187^{\circ}27'$. The following distances and azimuths are from station: *Paul's Valley, water tank*, 16 miles, $253^{\circ}21'25''$; T. 2 N., R. 3 E., sec. 3, S. E. corner, 0.4 mile, $339^{\circ}41'15''$; east gable of roof of home owned in 1902 by J. M. Hunter, 641.9 meters (2,106 feet), $187^{\circ}24'02''$. From an unmarked eccentric point 0.223 meter (0.73 foot) from station in azimuth 277° , southwest corner of stone chimney was observed about $\frac{1}{2}$ mile away in azimuth $186^{\circ}13'56''$.

Purcell (U.S.G.S.) (McClain County, O. W. Ferguson, 1902; 1920).—About 5 miles west of Purcell, 1 mile north of Purcell-Chickasha road, on land owned in 1902 by J. E. Givens. Original surface mark was copper bolt in top of stone post bearing letters "U.S.G.S." and small triangle. Post was set in concrete. Underground mark is nail in top of 4-inch terra-cotta pipe, filled with and set in concrete, with top surface 23 inches below surface of ground. In 1920 reported that surface mark had been dug up and broken, but underground mark was undisturbed. Standard station disk was set in concrete for new surface mark. Original reference marks were probably nails in concrete in terra-cotta pipe set in concrete. One was in north-and-south fence line 292.138 meters (958.46 feet) from station in azimuth $74^{\circ}17'05''$. Other was about half-way from station to break of bank to deep ravine, and 122.620 meters (402.30 feet) from station in azimuth $253^{\circ}13'41''$. In 1920 reference marks were reported dug up and broken, and standard reference disk was set in concrete 11.06 meters (36.3 feet) from station in azimuth $261^{\circ}41'$. Following distances and azimuths are from station: T. 6 N., R. 2 W., secs. 7 & 8, $\frac{1}{4}$ corner, 0.4 mile, $299^{\circ}07'31''$; *Purcell, water tank*, about 5 miles, $265^{\circ}32'38''$.

Arbuckle—Velma (U.S.G.S.) (Stephens County, O. W. Ferguson, 1902).—About 9 miles north from Loco, 2 miles S. 19° W. from Velma, on northwest

quarter of high, timbered, rocky ridge, and 75 yards south of wire fence on south side of tract leased in 1902 by J. B. Frensley and J. M. Fitzhue. Station is identical with U.S. Geological Survey station "Velma." Originally marked by stone 15 by 10 by 12 inches which was found disturbed. Station was recovered and re-marked as follows: underground mark is 60-penny nail in concrete, about 2 feet below surface. Surface mark is copper bolt in original Geological Survey stone which was embedded in concrete, and concrete marked "U. S. C. & G. S., 1902." Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, 0.46 meter (1.5 feet) south of Frensley's and Fitzhue's south fence, and 77.210 meters (253.3 feet) from station in azimuth 187°29'. Other distances and azimuths from station are: Corner stone common to sections 25, 26, 35 and 36, T. 1 S., R. 5 W., 82.65 meters (271.2 feet), 238°12'; north end of ridge beam of unoccupied house, 285.90 meters (938.0 feet), 345°02'.

Arbuckle Mountain—Mounds (U.S.G.S.) (Murray County, O. W. Ferguson, 1902; 1920).—About 6½ miles east by north of village of Elk, 6½ miles south of village of Hennepin, ½ mile west of road from Elk and Woodford intersecting the Hennepin and Davis road, 1½ miles southwest of home owned in 1902 by J. F. Copeland, 3 miles south of spring forming head of Five-Mile Creek, ¾ mile southwest of head of Zanders Creek, on high point of Arbuckle Mountain, on south side of head of valley or draw forming creek that runs into Eight-Mile Creek, on land occupied in 1902 by L. Johnson but claimed by J. F. Copeland. Station is U.S. Geological Survey station *Mounds*, described as stone post 26 by 7 by 7 inches set 24 inches in ground with copper bolt marked with letters U.S.G.S. sunk in center of top. Reference mark is center of ½-inch hole drilled 1½ inches into prominent outcropping rock, circumscribed by triangle 6 inches on side cut into surface with one apex pointing to station, 47.034 meters (154.31 feet) from station in azimuth 250°16'. In 1920 this reference mark could not be found. A new ¾-inch drill hole was cut 2 inches deep in rock 41.94 meters (137.6 feet) from station in azimuth 227°45'. Stone marking T. 1 S., R. 1 W., sec. 21, S.E. Corner; is 801.25 meters (2628.8 feet) from station in azimuth 281°27'26''.

Duncan (Stephens County, W. Bowie, 1902; 1919).—About 5 miles west and 1½ miles south of Duncan, in school section 16, T. 1 S., R. 8 W., on flat-topped hill with woods to east and north. Surface and underground marks are nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, and is on edge of woods, 189.320 meters (621.13 feet) from station in azimuth 297°09'35''. Stone at *Quarter-section corner secs. 9 & 16, T. 1 S., R. 8 W., ts* 439.51 meters (1,442.0 feet) from station in azimuth 217°28'55''.

Monument (Jefferson County, O. W. Ferguson, 1902; 1923).—About 3 miles east of Addington, on what is known as Monument Hill, 35 meters (115 feet) N. 8° E. of and 4.8 feet lower than highest rock on hill, 146.3 meters (480 feet) N. 80° E. of highest rock in ledge forming western support of hill, and 4.85 meters (15.9 feet) east of prolongation of north-and-south fence that joins the east-and-west fence at station, on land owned in 1923 by Henry Price of Addington. Surface and underground marks were nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. In 1923 standard station disk was substituted for nail in surface mark, note 6b. Reference mark is nail in terra-cotta pipe filled with and set in concrete, note 21, 2.03 meters (6.7 feet) west of north-and-south fence, 2.06 meters (6.8 feet) north of east-and-west fence, and 180.76 meters (593.0 feet) from station in azimuth 176°03'43''. Northeast corner of sec. 2, T. 4 S., R. 7 W., is 679.67 meters (2,229.9 feet) from station in azimuth 201°17'05''.

Lone Tree (Carter County, W. Bowie, 1902).—About 6 miles north and 2 miles east of Cornish, in sec. 6, T. 4 S., R. 3 W., on bare prominent ridge called Lone Tree Hill, and on land claimed in 1902 by James Kelly. Surface and underground marks are nails in terra-cotta pipes filled with and set in concrete, notes 17 and 19. Reference marks are nails in terra-cotta pipes filled with and set in concrete, note 21, in line with and on opposite sides of station, one within a few feet of the only two trees on hill. No. 1 is 295.443 meters (969.30 feet) from station in azimuth 141°57'03''. No. 2 is 106.587 meters (349.69 feet) from station in azimuth 322°22'16''. *Township corner, Tps. 3 & 4 S., Rs. 3 & 4 W., is* 490.83 meters (1,610.3 feet) from station in azimuth 125°07'16''

Benton (Jefferson County, W. Bowie, 1902; 1923).—About 5 miles east and 1 mile north of Sugden, in sec. 25, T. 5 S., R. 7 W., at the highest point of a ridge running north and south on land belonging (in 1923) to Mr. W. A. Paddock. The stone marking center of section is 123.93 meters (406.6 feet) from station in azimuth 282°07'43". Surface mark is a standard disk station mark in top of tile, note 6b; disk is stamped "Benton 1902." Underground mark is a bottle set in concrete, top of bottle being 2½ feet below surface. Reference mark (1902) is a stone, 9 by 11 by 21 inches, set in concrete in the southwest corner of Jackson's yard, the center mark being a cross cut in stone, 23.10 meters (75.8 feet) from the station in azimuth 233°25'. In 1923 an additional reference mark no. 2 was set, consisting of a standard reference disk set in the fence line near the stone marking center of section; it is 125.43 meters (411.5 feet) from the station in azimuth 255°19'27".

Grady (Jefferson County, W. Bowie, 1902).—About 2 miles north and 1 mile west of the village of Grady, 4 miles north of the Red River, on the highest and most northerly part of a bare ridge ¾ mile long running north and south in an open prairie, on land claimed by Thomas Gardiner and leased by Calvin Duger. Surface mark is nail in terra-cotta pipe set in concrete, note 17. Underground mark is forty penny wire nail in a block of cement 8 inches in diameter and 5 inches deep placed 2½ feet below the surface mark. Reference mark is a nail in terra-cotta pipe set in concrete, note 21. It is 179.06 meters (587.5 feet) from the station in azimuth 97°00'31". The section corner west of the station, is distant 660.0 meters (2,165 feet) in azimuth 16°29'10".

Blue (Montague County, Tex., W. Bowie, 1902).—About ½ mile north of the town of Nocona, on the Missouri, Kansas and Texas Railway, on a prominent hill known as Blue Mound, on land of D. R. Skeen, 7 yards north of a road fence. Surface mark is nail in terra-cotta pipe set in concrete, note 17. Underground mark is similar to the surface mark, and is described in note 19. Reference mark also is of same type as surface mark, and is described in note 21. It is at a fence corner east of the station, and 128.958 meters (423.09 feet) from the station in azimuth 273°34'04". The Nocona School cupola is 962.2 meters (3,157 feet) from the station in azimuth 4°03'51".

Cube (Clay County, Tex., O. W. Ferguson, 1902; 1923).—About 9½ miles north and 2½ miles east of Henrietta, 1 mile north of a schoolhouse on the Henrietta and Riverdale road, near the southeast corner of a tract of land designated as "abstract no. 307, Montague County School Survey No. E", on the highest part of the hill owned by Mr. Cueba, 22 paces east and 6 paces south of the northeast corner of Mr. Cueba's barn, and 49 paces west and 17 paces south of the southwest corner of his house. Station marked underground by a nail in terra-cotta pipe filled with and surrounded by concrete, 2 feet below surface of ground, note 19. Surface mark originally was similar to underground mark, note 17. In 1923 a standard disk was substituted for nail, note 6b. Disk is stamped "Cube 1902." The reference mark is a nail in concrete, in center of a terra-cotta pipe filled with and set in concrete block, note 21. It is in the field at southeast corner of Mr. Cueba's land, 9,537 meters (31,29 feet) west of a stone marking his property corner, and 1 foot north of center line of posts of his south fence, and is 223.174 meters (732.20 feet) from the station in azimuth 333°16'33". Other distances and azimuths are as follows: East end of ridge of barn, 47.66 meters (156.4 feet), 21°42'; southwest corner (near ground) of stone chimney of house (corner extends 1 to 7 feet above ground), 52.40 meters (171.9 feet), 236°22'.

Supplementary points

T. 29 N., R. 7 W., sec. 13, northwest corner (Oklahoma and Kansas, W. Bowie, 1902).—Station is center of stone at corner of secs. 13 and 14, T. 29 N., R. 7 W., approximately in boundary line between Oklahoma and Kansas.

Boundary stone 160 (Kansas and Oklahoma, W. Bowie, 1902).—In fence line on south side of boundary road, on northern line of school, sec. 13, T. 29 N., R. 7 W., and 1,077.1 meters (3,534 feet) east of northwest corner of said section. Stone was found loose and reversed but was placed in position. It is white sandstone, 12 by 5 by 20 inches deep, projecting about 9 inches, and marked on top "160", on north side "K", and on south side "I.T."

Boundary stone 163 (Kansas and Oklahoma, W. Bowie, 1902).—In fence line on north side of boundary road, on southern edge of sec. 15, T. 35 S., R. 6 W.,

670 meters (2198 feet) west of southeast corner of section, and 157.3 meters (516 feet) east of fence corner on eastern side of entrance to house of Mr. Ira Livingood. Stone was found in good condition and solidly set in ground. It is white sandstone, 12 by 5 by 20 inches deep, projecting about 6 inches, and marked on top "163", on north side "K", and on south side "I.T."

T. 28 N., R. 9 W., secs. 25 and 36, quarter cornerstone (Woods County, W. Bowie, 1902).—A stone (see description of station *Sand Hill*).

T. 28 N., R. 5 W., sec. 14, southeast corner (Grant County, O. W. Ferguson, 1902).—(See description of station *Renfrow*.)

Pond Creek astronomical station (Grant County, W. H. Burger, 1906; 1920).—In town of Pond Creek, in courthouse square, 15,468 meters (50.75 feet) due west of a reference cross in brick work on west side of courthouse. In 1909 courthouse burned down and in 1920 grounds were used for high school. Marked by tile 26 inches by 4 inches set flange down with top 2 inches below surface of ground. In 1906 the following distances and azimuths were observed from station: *Pond Creek, standpipe*, small ball and spire on top of water tower in northwest corner of courthouse grounds 54.80 meters (179.8 feet), $126^{\circ}47'$; *Pond Creek schoolhouse dome*, one block north and a little west of water tower, 265.70 meters (871.7 feet), $159^{\circ}19'$. In 1920 the following distances and azimuths were observed from station: center pipe of water tower, 56.23 meters (184.5 feet), $127^{\circ}56'$; one corner of schoolhouse, 51.48 meters (168.9 feet), $225^{\circ}52'$; another corner of schoolhouse, 39.20 meters (128.6 feet), $255^{\circ}28'$; northeast corner of south vault, 30.30 meters (99.4 feet), $286^{\circ}00'$; northwest corner of south vault, 31.64 meters (103.8 feet), $293^{\circ}12'$. Pond Creek longitude station (1907) was 0.72 meter (2.4 feet) due north of station mark, and Pond Creek longitude station (1920) was 2.78 meters (9.1 feet) due south of station mark. Pond Creek latitude station, a concrete pier, is 1.79 meters (5.9 feet) due west of station mark.

Township corner, Tps. 25 and 26 N., Rs. 6 and 7 W. (Grant County, W. Bowie, 1902).—Cedar post (see description of station *Vicar*).

T. 24 N., R. 4 W., sec. 3, southwest corner (Garfield County, O. W. Ferguson, 1902).—A stone (see description of station *Hahn*).

T. 23 N., R. 4 W., center, section 25 (Garfield County, O. W. Ferguson, 1902).—(See description of station *Garber*.)

T. 21 N., R. 7 W., secs. 23 and 24, quarter-section corner (Garfield County, W. Bowie, 1902).—A stone 304.6 meters (999 feet) in azimuth $315^{\circ}38'52''$ from station *Waukomis* (see description thereof).

T. 17 N., R. 7 W., sec. 29, southwest corner (Kingfisher County, W. Bowie, 1902).—(See description of station *Burson*.)

T. 14 N., R. 6 W., sec. 17, southeast corner (Canadian County, O. W. Ferguson, 1902).—A stone (see description of station *Eichoff*).

T. 11 N., R. 7 W., sec. 9, southeast corner (Canadian County, W. Bowie, 1902).—A stone (see description of station *El Reno east base*).

Boundary mark, Indian Territory and Oklahoma (Canadian County, W. Bowie, 1902).—About $1\frac{1}{2}$ miles north and 3 miles west of Minco. Mark is boundary monument established by the U.S. Geological Survey, and is an iron post about 4 inches in diameter, projecting about 6 inches above ground, surrounded by small mound of earth, with brass cap on top inscribed as follows: "U.S. Geological Survey, Boundary line, Indian Ter., Elevation 1402 ft., mile 91, T. 10 N., R. 8 W., S. 24."

Old boundary post (Grady County, W. Bowie, 1902).—A cottonwood post (see description of station *Carson*).

T. 9 N., R. 7 W., secs. 5 and 8, quarter-section corner (Grady County, W. Bowie, 1902).—A stone (see description of station *Carson*).

T. 6 N., R. 2 W., secs. 7 and 8, quarter-section corner (McClain County, O. W. Ferguson, 1902).—A stone (see description of station *Purcell (U.S.G.S.)*).

Marlow secondary (Grady County, W. Bowie, 1902).—About $4\frac{1}{2}$ miles north and $\frac{1}{2}$ mile east of Marlow, $\frac{1}{2}$ mile east of Chicago, Rock Island & Pacific Railway, on bare hill, in sec. 21 T. 3 N., R. 7 W. Marked by 40-penny nail with point projecting $\frac{1}{4}$ inch in top of iron pipe, 2 inches in diameter and 24 inches long, projecting about 6 inches above ground, and surrounded by concrete 20 inches deep and 18 inches in diameter.

Marlow longitude station (Stephens County, Edwin Smith, 1899; 1907).—In town of Marlow, in northeast corner of public school lot, at southwest corner

of 5th Street and Brummett Avenue. Marked by copper bolt marked "U. S. C. & G. S." in top of pier constructed of red sandstone and concrete, cemented over smooth. Following distances and azimuths are from station: *Marlow Baptist Church, spire*, at corner of Comanche Avenue and 3rd Street, 372.3 meters (1,221 feet), $223^{\circ}48.3'$; *Marlow Methodist Church, spire*, near corner of Cherokee Avenue and 3rd Street, 328.4 meters (1,077 feet), $310^{\circ}20.5'$; *Marlow latitude station* (see description thereof), 3.109 meters (10.20 feet), 90° ; *Marlow azimuth station* (see description thereof), 101.00 meters (331.4 feet), $00^{\circ}00'$. In 1907 it was reported that Methodist Church had been destroyed, but the Baptist Church was standing. In 1907 *Marlow azimuth station* not found. Possibly covered up.

Marlow latitude station (Stephens County, Edwin Smith, 1899).—Rough stone pier 3.109 meters (10.20 feet) in azimuth 90° from *Marlow longitude station* (see description thereof).

Marlow azimuth station (Stephens County, Edwin Smith, 1899).—Stone with copper bolt 101.00 meters (331.4 feet) in azimuth $00^{\circ}00'$ from *Marlow longitude station* (see description thereof). In 1907 stone not found. Possibly covered up.

Boundary mile 45 (Grady County, W. Bowie, 1902).—About $2\frac{1}{4}$ miles west and $1\frac{1}{4}$ miles north of Marlow. Established by the U.S. Geological Survey. An iron post, surrounded by brick and cement pier, with copper or brass cap, inscribed as follows: "U.S. Geol. Survey, Oklahoma Boundary Line, Indian Territory, Mile 45, Elevation 1269 feet, T. 2 N., R. 8 W., S. 1."

T. 2 N., R. 3 E., sec. 3, southeast corner (Garvin County, O. W. Ferguson, 1902).—A stone (see description of station *Table Hill* (U.S.G.S.)).

T. 1 S., R. 8 W., secs. 9 and 16, quarter-section corner (Stephens County, W. Bowie, 1902).—A stone (see description of station *Duncan*).

T. 1 S., R. 5 W., sec. 25, southwest corner (Stephens County, O. W. Ferguson, 1902).—A stone (see description of station *Arbuckle—Velma* (U.S.G.S.)).

T. 1 S., R. 1 W., sec. 21, southeast corner (Murry County, O. W. Ferguson, 1902).—A stone (see description of station *Arbuckle Mountain—Mounds* (U.S.G.S.)).

T. 4 S., R. 7 W., sec. 2, northeast corner (Jefferson County, O. W. Ferguson, 1902).—A stone (see description of station *Monument*).

Township corner, Tps. 3 and 4 S., Rs. 3 and 4 W. (Carter County, W. Bowie, 1902).—(See description of station *Lone Tree*.)

T. 5 S., R. 7 W., sec. 25, center (Jefferson County, W. Bowie, 1902; 1923).—About 5 miles east and 1 mile north of Sugden, near highest point of ridge running north and south on land belonging (in 1923) to W. A. Paddock. Marked by stone post. Station *Benton* (see description thereof) is 123.93 meters (406.6 feet) distant in azimuth $102^{\circ}07'48''$. In the original records this point was incorrectly described as T. 5 S., R. 7 W., sec. 24, southwest corner.

Section corner near station Grady (Jefferson County, W. Bowie, 1902).—(See description of station *Grady*.)

THIRTY-FIFTH PARALLEL ARC, EAST

Principal points

Rosedale (McClain County, R. L. Schoppe, 1920).—One mile east and 3 miles south from Rosedale, in northeast corner of sec. 34, T. 5 N., R. 1 E., in cultivated field, on what is known locally as Signal Hill, on land owned by Julius Yakum, about 75 yards south of tenant house and 39 feet west of section line. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in concrete, note 11a, 7.20 meters (23.6 feet) from station in azimuth 259° . Azimuth from station to church cupola, distant 1 mile, is $224^{\circ}33'28''$ and to Byars high school flagpole, $269^{\circ}51'36''$. Station identical with Rosedale azimuth station.

Turkey (Garvin County, R. L. Schoppe, 1920).—About 9 miles south and $1\frac{1}{2}$ miles west from Stratford, in cultivated field on top of knoll near Turkey Springs, 175 meters (574 feet) from half-section corner between sections 4 and 9, T. 2 N., R. 3 E. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in concrete, note 11a, 123.55 meters (405.3 feet) from station in azimuth $108^{\circ}31'$. Azimuth from station to Stratford water tank is $190^{\circ}02'33''$; and to Sulphur water tank, $349^{\circ}09'38''$.

Byars (McClain County, R. L. Schoppe, 1920).—In cultivated field on land belonging to Charles Willard, 2 miles east and $\frac{1}{2}$ mile south from Byars, on highest point of NW $\frac{1}{4}$ sec. 32, T. 5 N., R. 3 E., about 80 meters (262 feet) north of wire fence, and 380 meters (1,247 feet) east of section line. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in concrete, note 11a, 107.05 meters (351.2 feet) from station in azimuth $46^{\circ}13'$. Azimuth from station to prison farm water tank, distant 16 miles is $42^{\circ}41'34''$.

McGee (McClain County, R. L. Schoppe, 1920).—Half mile west and $3\frac{1}{2}$ miles north from old village of McGee, on west side center of sec. 26, T. 5 N., R. 3 E., in edge of woods with cultivated field to south, 125 meters (410 feet) east from wagon road, on land owned by Indian named Charley Taylor and leased by G. W. Merrill of Norman. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in concrete, note 11a, 16.32 meters (53.5 feet) from station in azimuth $89^{\circ}08'$. Azimuth from station to Stratford water tank is $358^{\circ}53'03''$.

Mound (Pontotoc County, R. L. Schoppe, 1920).—Four miles west and 7 miles south from Ada, 1 mile north and 1 mile east from Fitzhugh, on summit of highest grass-covered hill in the locality, 75 meters (246 feet) east of Ada-Fitzhugh road, and $\frac{1}{2}$ mile southwest from old Webster Stone Crusher. Station marked by standard station disk in outcropping bedrock, note 3. Reference mark is standard reference disk in outcropping bedrock, note 12b, 4.910 meters (16.11 feet) from station in azimuth $252^{\circ}57'$. Following azimuths are from station: Ada, center of tallest water tank, $217^{\circ}21'08''$; center large stone building, cupola, $156^{\circ}51'46''$.

Konawa (Seminole County, R. L. Schoppe, 1920).—Four miles south and $1\frac{1}{2}$ miles east from Konawa, in SW $\frac{1}{4}$ sec. 25, T. 5 N., R. 5 E., 15 yards southwest of half-section corner between sections 24 and 25, on edge of cultivated field on land belonging to Ramsey Bruno. Station marked by standard station disk in concrete, note 1a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 29.37 meters (96.4 feet) from station in azimuth $229^{\circ}03'$. No. 2 is 19.07 meters (62.6 feet) from station in azimuth $268^{\circ}46'$. Following azimuths are from station: Konawa, center of water tank $166^{\circ}33'39''$; Byng, power plant smokestack, is $307^{\circ}08'38''$.

Francis (Pontotoc County, R. L. Schoppe, 1920).—About 3 miles southeast from Francis, $\frac{1}{2}$ mile south of Francis-Allen road, in sec. 3, T. 4 N., R. 7 E., on highest point of timbered hill belonging to Mr. Holden, of Ada. Station marked by standard station disk in concrete, note 1a. Reference marks are standard reference disks in outcropping bedrock, note 12b. No. 1 is approximately 20.18 meters (66.2 feet) from station in azimuth $251^{\circ}32'$. No. 2 is 18.23 meters (59.8 feet) from station in azimuth $202^{\circ}38'$. Following azimuths are from station: Allen, center of city water tank, $257^{\circ}09'59''$; Ada, center of highest city water tank, $50^{\circ}50'50''$; Ada cement plant, north concrete smokestack, $55^{\circ}34'18''$; Francis, schoolhouse, north chimney, $114^{\circ}58'53''$; Konawa, center of city water tank, $122^{\circ}52'22''$; Francis, Sacred Heart Church, gable, $124^{\circ}25'41''$; Francis, center of water tank, $131^{\circ}39'47''$; Holdenville, center of water tank, $208^{\circ}31'33''$.

Hawkins (Hughes County, R. L. Schoppe, 1920).—About 5 miles north from Allen, in cultivated field north of the Oakdale schoolhouse, on north side of the Canadian River, on south side center of sec. 36, T. 6 N., R. 8 E. Station marked by standard station disk in concrete, note 1a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 33,550 meters (110.07 feet) from station, in azimuth $355^{\circ}25'$. No. 2 is 88.74 meters (291.1 feet) from station in azimuth $359^{\circ}23'$. Following azimuths are from station: Oakdale schoolhouse chimney, 50 meters (164 feet) distant, $346^{\circ}40'$; Holdenville, water tank, $186^{\circ}03'38''$; Allen city water tank, $358^{\circ}18'01''$.

Sulser (Coal County, R. L. Schoppe, 1920).—On top of timbered ridge in NW $\frac{1}{4}$ sec. 28, T. 3 N., R., 9 E., on land owned by Mrs. D. E. Badley of Oklahoma City. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in outcropping bedrock, note 12b, 13.97 meters (45.8 feet) from station in azimuth $130^{\circ}08'$. Following azimuths are from station: Ada, center of water tank, $102^{\circ}38'26''$; Ada cement works, tall smoke stack, $102^{\circ}55'55''$; Allen center of city water tank, $166^{\circ}59'29''$.

Allen (Pontotoc County, R. L. Schoppe, 1920).—On top of prominent timbered knoll $\frac{3}{4}$ mile north of railroad station at Allen, near center of sec. 24, T. 5 N., R. 8 E. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in outcropping bedrock, note 12b, 52.515 meters (172.29 feet) from station in azimuth $359^{\circ}19'$. Azimuth from station to Allen city water tank center, is $343^{\circ}09'39''$. Station identical with Allen azimuth station. Allen latitude station and Allen longitude station are distant 3.18 meters (10.4 feet) or $0''.12$ of longitude east from station.

Gerty (Hughes County, R. L. Schoppe, 1920).—In SW $\frac{1}{4}$ sec. 30, T. 5 N., R. 10 E., $2\frac{1}{2}$ miles from Gerty, north along road to Calvin, and on top of timbered ridge on land owned by Dr. Taylor of Gerty. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in concrete, note 11a, 31.68 meters (103.9 feet) from station in azimuth $322^{\circ}46'$. Azimuth from station to Allen railroad coal chute is $91^{\circ}41'44''$; and to Allen city water tank, $91^{\circ}43'50''$.

Non (Coal County, R. L. Schoppe, 1920).—In SW $\frac{1}{4}$ sec. 11, T. 3 N., R. 10 W., $2\frac{1}{2}$ miles southeast from post office at Non, on top of timbered ridge on land owned by Mrs. Callaway, and about 200 yards east from her house. Station marked by standard station disk in concrete, note 1a. Reference mark is standard reference disk in outcropping bedrock, note 12b, 45.040 meters (147.77 feet) from station in bearing S. 10° E.

Shawnee (Hughes County, R. L. Schoppe, 1920).—On high timbered ridge $2\frac{1}{2}$ miles northwest from Stuart, in southwest corner of sec. 2, T. 5 N., R. 11 E., 200 yards north of traveled road that runs along top of ridge. Station marked by standard station disk in concrete, note 1a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 21.350 meters (70.05 feet) from station in azimuth $222^{\circ}30'$. No. 2 is 11.332 meters (37.18 feet) from station bearing S. 56° E. (mag.).

Hickory (Pittsburg County, C. L. Garner, 1919; 1920).—About 4 miles airline S. 15° E. from Savanna, 4 miles north-northeast from Pittsburg, on western end and highest point of prominent timbered ridge, about 30 meters (98 feet) from sharp decline to west, about 7 meters (23 feet) north of old road leading across hill, and $\frac{1}{4}$ mile east of Mr. A. B. Bright's house. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 20.790 meters (68.21 feet) from station in azimuth $101^{\circ}41'$. No. 2 is 23.060 meters (75.66 feet) from station in azimuth $295^{\circ}11'$. Station Hickory (U.S.G.S.) was found loose on the surface 8.85 meters (29.0 feet) from station in azimuth $110^{\circ}08'$.

Buckhorn (Pittsburg County, C. L. Garner, 1919; 1920).—About 3 miles by trail north from Cabaniss post office, 10 miles airline northeast of Stuart, on top of long flat-topped ridge running northeast and southwest, locally known by a few people as Buckhorn Ridge or Mountain. Station is about 1 mile northwest of house rented by J. B. Cotton, and is on level ground, about 75 meters (246 feet) west of fault lines and rocky ledges on east side of hill. Best reached by way of Cabaniss post office. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in outcropping bedrock, note 12a. No. 1 is 75.96 meters (249.2 feet) from station in magnetic bearing N. 86° W. No. 2 is 79.55 meters (261.0 feet) from station in magnetic bearing S. $71^{\circ}30'$ W. These bearings may be in error by 180° .

Whaleback (Pittsburg County, C. L. Garner, 1919).—About 1 mile airline or 9 miles by road west of Savanna, 13 miles west-southwest of McAlester, $\frac{1}{2}$ mile south of road leading west from Savanna, sometimes called Savanna-Stuart road, on top of bare hill, $\frac{1}{4}$ mile west-northwest from Celestine at one time a post office. Station is best reached by way of Savanna. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 8.050 meters (26.41 feet) from station in azimuth $94^{\circ}23'$. No. 2 is 8.820 meters (28.94 feet) from station in azimuth $357^{\circ}18'$. Station Whaleback (U.S.G.S.) is 4.460 meters (14.63 feet) from station in azimuth $337.15'$.

Last (Pittsburg County, C. L. Garner, 1919).—About $3\frac{1}{2}$ miles airline south of McAlester, $1\frac{1}{2}$ miles east of McAlester-Savanna road, on top of long

wooded ridge owned by Mr. Melvin Cornish, and about $\frac{3}{4}$ mile northeast of Mr. J. R. Turner's house. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 27.166 meters (89.13 feet) from station in azimuth $130^{\circ}12'$. No. 2 is 29.800 meters (97.77 feet) from station in azimuth $312^{\circ}06'$. Station Last (U.S.G.S.) is 3.575 meters (11.73 feet) from station in azimuth $41^{\circ}06'$.

Savanna north base (Pittsburg County, C. L. Garner, 1919; 1920).—About 8 miles by road south from McAlester, $\frac{1}{2}$ mile north of the Missouri-Kansas-Texas Railroad station at Savanna, and 16.810 meters (55.16 feet) to west rail of railway. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 13.910 meters (45.64 feet) from station in azimuth $101^{\circ}31'$. The U.S.G.S. mark for station Savanna has been destroyed but two reference marks (square stone posts with no markings) are still in place; west mark is 43.051 meters (141.24 feet) from station in azimuth $207^{\circ}01'$; north mark is 45.804 meters (150.23 feet) from station in azimuth $211^{\circ}19'$. Azimuth from station to Savanna, schoolhouse flagstaff is $13^{\circ}54'09''$.

Savanna south base (Pittsburg County, C. L. Garner, 1919; 1920).—About 4 miles south of Savanna, 80 meters (262 feet) west of the Missouri-Kansas-Texas Railroad, 125 meters (410 feet) west of Savanna-Kiowa road, and 50 meters (164 feet) north of the Ashland road which turns into above-mentioned road, and near prolongation of tangent to railway tracks from north. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 93.557 meters (306.94 feet) from station in azimuth $270^{\circ}42'$. No. 2 is 39.311 meters (128.97 feet) from station in azimuth $342^{\circ}49'$. No. 2 is also Bench Mark, elevation 223.078 meters (731.88 feet). Azimuth from station to Savanna, schoolhouse flagstaff is $218^{\circ}29'09''$. Following distances and directions are from station: U.S.G.S. south base, 0.906 meter (2.97 feet), S. $24^{\circ}30'$ E. (mag.); U.S.G.S. reference mark no. 1, 3.775 meters (12.39 feet), S. $54^{\circ}30'$ E. (mag.); U.S.G.S. reference mark no. 2, 3.67 meters (12.0 feet), S. $16^{\circ}30'$ W. (mag.); and U.S.G.S. reference mark no. 3, 2.53 meters (8.3 feet) N. 78° W. (mag.). Station identical with Savanna south base azimuth station.

Hartshorne (Pittsburg County, C. L. Garner, 1919).—About 3 miles airline south-southwest of Hartshorne, and on west end and highest point of prominent ridge extending east and west. Best reached from Hartshorne by going south past cement plant, to J. M. Price's place, from there continue $1\frac{1}{2}$ miles to station site. Surface mark is standard station disk in boulder, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 5.650 meters (18.54 feet) from station in azimuth $297^{\circ}59'$. No. 2 is 11.120 meters (36.48 feet) from station in azimuth $331^{\circ}09'$.

Gaines (Pittsburg County, C. L. Garner, 1919).—About $3\frac{1}{2}$ miles airline north-northwest from Blocker, on highest point of flat ridge covered with oak and hickory, and on east side of bare rock ledge which is about 20 meters (66 feet) long. Best reached by going north from Blocker to coal mine, and thence northwest about $1\frac{1}{2}$ miles to top of ridge. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 10.818 meters (35.49 feet) from station in azimuth $356^{\circ}49'$. No. 2 is 5.520 meters (18.11 feet) from station in azimuth $146^{\circ}34'$.

Panther (Pittsburg County, C. L. Garner, 1919).—On top and south side of prominent hill about $4\frac{1}{2}$ miles south of Quinton, about 30 meters (98 feet) from sharp decline to south and 300 meters (984 feet) east of west end of hill. Lanes cleared through trees to other stations will serve for several years to locate mark. The mountain is nearly flat on top for distance of about $\frac{1}{2}$ mile east and west, and $\frac{1}{4}$ mile north and south. Hill is known locally as Panther Mountain and is also confused with Tucker's Knob, which is about 4 miles east. Trucks can be driven to foot of hill from Quinton by going to Mr. Burn's house. Surface mark is standard station disk in boulder, note 4. Underground mark is standard station disk in concrete, note 7a. Reference mark is standard reference disk in boulder, note 12c, 28.220 meters (92.59 feet) from station in azimuth $359^{\circ}56'$.

Wilburton (Latimer County, C. L. Garner, 1919).—About 6 miles south 30° west from Wilburton on western end and highest point of long and prominent

timbered ridge extending nearly east and west. Crest of ridge for several hundred feet on both sides of station is solid rock. Best reached from Wilburton by taking road which follows section line due south from west edge of town; this road crosses main ridge 4 miles east of station and this point is the nearest practicable approach for trucks. Surface mark is standard station disk in bedrock, note 3. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 6.070 meters (19.91 feet) from station in azimuth $66^{\circ}16'$. No. 2 is 4.060 meters (13.32 feet) from station in azimuth $239^{\circ}39'$.

Blue (Latimer County, C. L. Garner, 1919).—On highest point of Blue Mountain, about 7 miles northwest airline from Red Oak and 7 miles by road from C. E. Noah's house. Mr. Noah lives 4 miles northwest of Red Oak and can give directions for reaching station. Wagon can be driven to within $\frac{1}{2}$ mile of station over rough rocky roads. Surface mark is standard station disk in boulder, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 12.320 meters (40.42 feet) from station in azimuth $1^{\circ}43'$. No. 2 is 6.553 meters (21.50 feet) from station in azimuth $109^{\circ}39'$. Station is identical with Blue azimuth station.

Winding Stair (Le Flore County, C. L. Garner, 1919).—On Winding Stair Mountain, about 10 miles airline from Talihina, 4 miles east of the Talihina-Poteau road, and about 15 meters (49 feet) east-southeast of highest point of mountain. Best reached from point on Talihina-Poteau road where it crosses mountain. Surface mark is standard station disk in boulder, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 6.506 meters (21.35 feet) from station in azimuth $95^{\circ}50'$. No. 2 is 12.056 meters (39.55 feet) from station in azimuth $87^{\circ}50'$.

Cavanal (Le Flore County, C. L. Garner, 1919).—On highest point of north-east spur of Cavanal Mountain, about $2\frac{1}{2}$ miles airline west of Poteau, about $\frac{1}{4}$ mile east-northeast from some old buildings at head of only good trail up mountain, and at central point of several lanes cut through the trees to other stations. Good trail leads to top of mountain from southeast side. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 17.697 meters (58.06 feet) from station in azimuth $33^{\circ}33'$. No. 2 is 22.120 meters (72.57 feet) from station in azimuth $43^{\circ}23'$.

Sugar Loaf (Le Flore County, C. L. Garner, 1919; 1930).—On top of Sugar Loaf Mountain, about 8 meters (26 feet) southwest of large hole which was dug probably by treasure seekers. Best route to station is by trail from Mr. P. E. Mark's house, up east side of mountain. Surface mark was standard disk station mark in outcropping bedrock, note 2. When station was recovered in 1930, disk was missing but portion of boulder with old drill hole with pieces of cement still in hole was found in original position. An eccentric mark was established 0.169 meter (0.55 foot) from station in azimuth $147^{\circ}37'$. Reference marks are standard reference disks in boulders, note 12c. No. 1 is in boulder about 3 by 5 feet by $1\frac{1}{2}$ feet, 4.30 meters (14.1 feet) from station in azimuth $233^{\circ}12'$. No. 2 is 15.17 meters (49.8 feet) from station in azimuth $58^{\circ}03'$. These distances and azimuths are from the position of old original station mark. Elevation of station mark is 781.6 meters (2,564 feet).

Black (Le Flore County, C. L. Garner, 1919; 1930).—About 6 miles east of Page and $1\frac{1}{2}$ miles airline northwest of Fogel's Spur on the Kansas City Southern Railway. Page is most accessible railway station, and from there one should go 7 miles by road, to house of Jim Taylor, first house on north side of Highway No. 8, west of Fogel's Spur, and inquire way to station. Station is on top of easternmost of two knolls on Blackfork Mountain range. Station mark is standard disk station mark in outcropping bedrock, note 2. Reference marks are standard reference disks in outcropping bedrock, note 12a. No. 1 is 6.195 meters (20.32 feet) from station in azimuth $273^{\circ}40'$. Disk has been broken off from this mark but shank still embedded in rock. No. 2 is 2.660 meters (8.73 feet) from station in azimuth $68^{\circ}17'$. Azimuth from station to center of Rich Mountain Hotel is $292^{\circ}15'05''$; and to water tower at Fogel's Spur, $309^{\circ}43'17''$. Elevation of station mark is 754.8 meters (2,476 feet).

Poteau (Sebastian County, Ark., C. L. Garner, 1919).—Station is 45 meters (148 feet) northeast of highest part of Poteau Mountain, and $3\frac{1}{2}$ miles south-southeast of Hartford. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Four trees marked with triangular blazes,

note 15a, are at following distances and azimuths from station: 8.60 meters (28.2 feet), 245°53'; 10.59 meters (34.7 feet), 305°27'; 23.69 meters (77.7 feet), 15°28'; and 8.44 meters (27.7 feet), 93°04'. Station can be reached from all directions, but best trail leads from foot of mountain to west by way of George Jones' house which is on top of spur of mountain. Elevation of station mark is 812.2 meters (2,665 feet).

Hartford (Sebastian County, Ark., E. H. Pagenhart, 1917; 1919).—In town of Hartford, on land owned by Central Coal Company, at present rented by Mrs. Belle Owen, 500 meters (1,640 feet) west of Rock Island Depot, 100 meters (328 feet) north of track, 75 meters (246 feet) east of Central Coal Company dump, 200 meters (656 feet) southeast of public school building, in northeast corner of Mrs. Owen's yard, 1 meter (3 feet) west of back fence and 2.5 meters (8 feet) from division fence to north. Surface mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 1.18 meters (3.9 feet) from station in azimuth 129°15'. No. 2 is 5.86 meters (19.2 feet) from station in azimuth 98°29'. Three witness marks are at the following distances and azimuths from station: No. 1, 15.8 meters (52 feet), 70°29'; no. 2, 18.75 meters (61.5 feet), 145°07'; no. 3, 15.8 meters (52 feet), 183°. Azimuth to northwest one of 4 stacks at mine, 316°42'12''; to ball on southeast corner of Grand View Hotel, 263°19'18''. Elevation of station mark is 200.2 meters (657 feet).

Oklahoma (Le Flore County, C. L. Garner, 1919).—About 6½ miles east of Monroe and 3½ miles west of the Arkansas-Oklahoma boundary line, on highest point of western spur of Poteau Mountains, in center of small grassy spot about 40 feet in diameter which may be located by lanes cut through timber when station was occupied. Surface mark is standard disk station mark in bedrock, note 2. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 11.84 meters (38.8 feet) from station in azimuth 353°45'. No. 2 is 9.37 meters (30.7 feet) from station in azimuth 23°02'. Triangle-blazed 1-foot oak tree is 17.060 meters (55.97 feet) from station in azimuth 326°25'. Elevation of station mark is 724.4 meters (2,377 feet).

White Oak (Scott County, Ark., E. H. Pagenhart, 1916; 1930).—About 15 miles west of south from Booneville, 10 miles northeast from Waldron, 2 miles south from Girard post office, at Frank Milton's place, on highest point of Whiteoak Mountain, 12 meters (39 feet) southwest from Forest Service lookout tower. A good trail leads to lookout from Cold Springs Forestry Station, distance 1.5 miles. Surface mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 4.06 meters (13.3 feet) from station in azimuth 273°57'. No. 2 is 8.59 meters (28.2 feet) from station in azimuth 174°19'. Witness marks are 8.70 meters (28.5 feet) from station in azimuth 277°28' and 19.80 meters (65 feet) from station in azimuth 172°12'. Center of lookout tower is 12.3 meters (40 feet) from station in azimuth 208°15'. In 1930 it was reported that a new Forest Service lookout tower had been built directly over station. Elevation of station mark is 672.1 meters (2,205 feet).

Pinnacle (Franklin County, Ark., E. H. Pagenhart, 1917; 1919).—On highest point of prominent round-topped hill known as Pinnacle Knob, 12 miles northwest from Booneville, 2½ miles north of east from Washburn post office, 1 mile west of road through Bradshaw Narrows, and ⅓ mile north of the Francis place. Surface mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 2.15 meters (7.1 feet) from station in azimuth 289°35'. No. 2 is drill hole in rock outcrop, 3.19 meters (10.5 feet) from station in azimuth 36°19'. Station *Lone Tree* (U.S.G.S.), a post oak tree, is 26.1 meters (86 feet) from station in azimuth 87°49'. A witness mark is 9.13 meters (30 feet) from station in azimuth 185°29'. Elevation of station mark is 369.0 meters (1,211 feet).

Supplementary points

Arkansas-Oklahoma boundary monument, milepost 26 (Sebastian-Le Flore Counties, C. L. Garner, 1919).—About 3 miles west-southwest from Hartford, ½ mile south of Mr. P. E. Mark's house, and 75 meters (246 feet) south of southwest corner of the Mark's farm. Station is a milepost of the Arkansas-Oklahoma boundary survey and consists of hexagonal iron post about 4 feet high with "M.P. 26" stamped on it.

Arkansas-Oklahoma boundary monument, milepost 27 (Sebastian-Le Flore Counties, C. L. Garner, 1919).—Station is 4 miles southwest from Hartford, 7 meters (23 feet) north of the Rock Island Railroad, and 75 meters (246 feet) north of road leading from Hartford to Howe. Mark is hexagonal iron post about 4 inches in diameter and 4 feet high. A large white post on boundary line on opposite side of railroad is readily seen.

Fort Smith (Sebastian County, Ark., E. H. Pagenhart, 1916; 1919).—On the Weather Bureau platform on top of the Fort Smith post office. Marked by small nails driven into the floor to form small triangle with about 2-inch sides and a nail in center to mark exact point. The following distances and azimuths are from station: Northwest corner of Weather Bureau platform, 4.130 meters (13.55 feet), $173^{\circ}30'$; wind register (anemometer), 1.050 meters (3.44 feet), $218^{\circ}21'$; flagstaff (highest), 4.05 meters (13.3 feet), $318^{\circ}15'$; courthouse clock, $303^{\circ}58'37''$.

Arkansas-Oklahoma boundary monument, Initial Point (Sebastian County, Ark., Le Flore County, Okla., C. L. Garner, 1919).—In western edge of Fort Smith, on southwest corner of old fort, about 15 feet north of northwest corner of old stone building known as Colonel Le Flore house, about 150 meters (492 feet) west of south from St. Louis, Iron Mountain & Southern Railway station, and 900 meters (2,953 feet) west of post office. Marked by old monument of Arkansas-Oklahoma boundary survey which is marked: south side, "1858"; west side, "Choctaw"; north side, "Initial Point"; and east side, "Arkansas." It stands about 4 feet high and is 1 foot square. Azimuth from station to *Fort Smith longitude station* (see description thereof), 11.80 meters (38.7 feet) distant, is $261^{\circ}39'$.

Fort Smith longitude station (Sebastian County, Ark., E. D. Preston, 1885; 1915).—In the western edge of Fort Smith, within old walls (now removed) of old fort, 12.80 meters (42.0 feet) north of old stone building known as Colonel Le Flore house, 13.02 meters (42.7 feet) northeast of junction of northwest wall of old fort and northeast side of stone building, and 1 foot west of edge of cut on St. Louis-San Francisco Railway. Marked by bottle, mouth upward, about 1 foot below surface of ground. Azimuth from station to *Arkansas-Oklahoma boundary monument, Initial Point* (see description thereof), 11.80 meters (38.7 feet) distant, is $81^{\circ}39'$.

NINETY-FOURTH MERIDIAN ARC

Principal points

Mena (Polk County, Ark., P. A. Smith, 1930; 1933).—About 14 miles northwest of Mena, 3 miles southwest of Rich Mountain railway station on the Kansas City Southern Railway, on Highway 8, $1\frac{1}{2}$ miles west of old Mena Hotel on Rich Mountain, on eastern end of hill known locally as Bald Hill, 5 meters (16 feet) north of wagon road along top of ridge, in a spot clear of brush. Station mark is standard station disk in boulder with top several inches above ground. Reference marks are standard reference disks in boulders. No. 1 is 18.55 meters (60.9 feet) from station in azimuth $266^{\circ}57'$. No. 2 is 12.23 meters (40.1 feet) from station in azimuth $359^{\circ}23'$.

Blue (Scott County, Ark., P. A. Smith, 1930).—About 13 miles air line, 16 miles by road, northeast of Mena, $2\frac{1}{2}$ miles north of Eureka schoolhouse, on western end of highest point of rocky backbone of mountain locally known as "Blue Knob". To reach from Mena, go north on Route 71 about 8 miles to Posey Hollow road, then east 0.3 mile past Eureka schoolhouse to road turning north into woods, continuing past several houses to Freeman Johnson's place. Truck can be driven $\frac{1}{4}$ mile beyond this point, to within $1\frac{1}{2}$ miles of station. Surface mark is standard station disk in boulder. Reference marks are standard reference disks in boulders. No. 1 is 9.52 meters (31.2 feet) from station in azimuth $39^{\circ}41'$. No. 2 is 19.16 meters (62.9 feet) from station in azimuth $82^{\circ}46'$.

Rich (Polk County, Ark., P. A. Smith, 1930).—About 2 miles southeast of Rich Mountain, a station on the Kansas City Southern Railway, on Highway 8, $2\frac{1}{2}$ miles east of old Mena Hotel on top of Rich Mountain, on highest part of the eastern knoll of this mountain, under center of Rich Mountain forest service lookout tower (steel). Surface mark projects 1 foot, and is standard station disk in concrete, in 5-inch iron pipe. Reference marks are standard reference

disks in anchors for guy wires. No. 1 is 25.54 meters (83.8 feet) from station in azimuth $316^{\circ}55'$. No. 2 is 25.51 meters (83.7 feet) from station in azimuth $52^{\circ}24'$.

Eagle (Polk County, Ark., P. A. Smith, 1930).—About 16 miles by road south-east of Mena, $1\frac{1}{2}$ miles southwest of Shady Forest ranger station, $\frac{1}{4}$ mile west by north of Eagle Mountain Forest Service lookout tower, on continuation of same ridge occupied by lookout tower and about 50 meters (164 feet) southeast of saddle in ridge. Reached from Mena by truck to ranger station, then by trail to lookout tower, and to station by faint trail along top of ridge. Station mark is standard station disk in rock ledge along south side of ridge. Reference marks are standard reference disks in rock ledge. No. 1 is 1.23 meters (4.0 feet) from station in azimuth $312^{\circ}11'$. No. 2 is 12.67 meters (41.6 feet) from station in azimuth $119^{\circ}14'$.

Whiskey (Polk County, Ark., P. A. Smith, 1930).—About 8 miles south by west of Vanderwoort, 3 miles west of Hatton railroad station, on eastern end several feet below highest point of Whiskey Peak, which is highest in vicinity. To reach from Hatton, go south $\frac{1}{2}$ mile to Hatton Hotel, then west on county road 2.2 miles, turning north on woods road, which follows up east slope of peak to within $\frac{1}{4}$ mile of station. Surface mark projects about 1 inch and is standard station disk in boulder. Reference marks are standard reference disks in rock outcrop. No. 1 is 9.67 meters (31.7 feet) from station in azimuth $2^{\circ}27'$. No. 2 is 17.36 meters (57.0 feet) from station in azimuth $64^{\circ}12'$.

Hanna (Polk County, Ark., P. A. Smith, 1930).—About 21 miles by road south-east of Mena, 5.4 miles southwest of Shady Forest ranger station, on west and highest peak of Hanna Range, in rock ledge on top of peak. To reach from Mena, go $7\frac{1}{2}$ miles southeast to schoolhouse on left, then left on Shady Forest road $8\frac{1}{2}$ miles to Shady Forest ranger station, and on 0.9 mile to fork, then right turn off best road 1.0 mile to second fork, turn right 3.5 miles to west side of peak going east up hill to highest peak and station. Surface mark is standard station disk in rock ledge, note 5. Reference marks are standard reference disks in rock ledge, note 12d. No. 1 is 1.638 meters (5.37 feet) from station in azimuth $132^{\circ}21'$. No. 2 is 6.020 meters (19.75 feet) from station in azimuth $316^{\circ}37'$.

Hope (Sevier County, Ark., P. A. Smith, 1930).—About 13 miles airline and 23 miles by road northeast of De Queen, 6 miles north of Green Chapel Church on route 70, 1 mile north of Newhope schoolhouse, on an east-and-west ridge about 200 meters (656 feet) north of John Marsh's house, 120 meters (394 feet) north by east of county crossroads. To reach from Green Chapel Church (17 miles northeast of De Queen), take county road north 5.2 miles to fork $\frac{1}{4}$ mile east of Newhope school, then north 2.5 miles to rail fence along south side of clearing and ridge, then east 0.9 mile to crossroads mentioned above. Station is 33 meters (108 feet) northwest of county road, and 13 meters (43 feet) northwest of 18-inch oak tree near pit. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 8 meters (26 feet) northwest of road and 40.32 meters (132.3 feet) from station in azimuth $356^{\circ}06'$. No. 2 is 15 meters (49 feet) north of top of ridge, and 72.9 meters (239 feet) from station in azimuth $91^{\circ}45'$.

Gillham (Sevier County, Ark., P. A. Smith, 1930).—About 13 miles north of De Queen, 1 mile north and $\frac{1}{4}$ mile east of Gillham railway station, 4 meters (13 feet) west of west side of cemetery, on land owned by E. H. Bond, 4 meters (13 feet) south of fence, 13.7 meters (45 feet) south of center line of road, and 38.1 meters (125 feet) west of north-and-south fence. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark is 18 inches below surface. Reference marks are standard reference disks in concrete, note 11a. No. 1 is north of road in fence line along south side of cemetery, 10 meters (33 feet) east of west fence line of cemetery, and 27.07 meters (88.8 feet) from station in azimuth $213^{\circ}39'$. No. 2 is in fence corner at northeast corner of fork in county road, $\frac{1}{8}$ mile (660 feet) from station in azimuth $87^{\circ}46'10''$.

De Queen (Sevier County, Ark., P. A. Smith, 1930; 1933).—About 4 miles south of De Queen on highway 41, in $SE\frac{1}{4}NW\frac{1}{4}$ sec. 17, T. 9 S., R. 31 W., on land owned by G. B. Pride. To reach from De Queen go south 4 miles on highway 41, then east $\frac{1}{4}$ mile on county road, along top of ridge to top

of knoll midway between two draws, and station site. Station is 25.7 meters (84 feet) south of county road. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark is 18 inches below surface. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in fence line along south side of highway, 33.27 meters (109.2 feet) from station in azimuth $224^{\circ}25'$. No. 2 is 15 meters (49 feet) south of county road, in north-and-south fence line, 20 meters (66 feet) north of small house just east of highway, and about $\frac{1}{8}$ mile (660 feet) from station in azimuth $57^{\circ}24'24''$.

Falls (Sevier County, Ark., P. A. Smith, 1930).—About $8\frac{1}{4}$ miles south of Lockesburg, $\frac{1}{4}$ mile northwest of Falls Chapel schoolhouse, on route 71, and on land owned by W. C. Hopson. Station is along north edge of large tableland, 20.7 meters (68 feet) northeast of highway and 6 meters (20 feet) northeast of hickory tree at northeast corner of old corral facing highway. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 meter (3 feet) west of fence southwest of highway, 4 meters (13 feet) northwest of large pine tree, and about 75 meters (246 feet) from station in azimuth $343^{\circ}28'$. No. 2 is in fence line southwest of highway, 8 meters (26 feet) northwest of forked oak tree, and 23.57 meters (93.7 feet) from station in azimuth $55^{\circ}06'$.

Winthrop (Little River County, Ark., P. A. Smith, 1930).—About 6 miles north of Foreman on highway 41, 3 miles southwest of Winthrop, on land owned by F. O. Dilley, in $SE\frac{1}{4}NE\frac{1}{4}$ sec. 22, T. 11 N., R. 32 W., directly across road to west of tenant house on Dilley's farm, 23.5 meters (77 feet) west of highway, 14.8 meters (49 feet) west of fence, and 11.4 meters (37 feet) north of road leading west through field. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark is 18 inches below surface. Reference marks are standard reference disks in concrete, note 11a. No. 1 is about 15 meters (49 feet) northwest of Dilley's house, in fence line east of highway, and 35.94 meters (117.9 feet) from station in azimuth $253^{\circ}44'$. No. 2 is in fence line west of highway, in northeast corner of barn lot of first farm south of station, and $\frac{1}{4}$ mile from station in azimuth $358^{\circ}34'38''$.

Wilton (Little River County, Ark., P. A. Smith, 1930).—About 7 miles northwest of Ashdown, 1 mile west of Wilton on the Wilton-Allene road, on land owned by J. C. Slusser, in or near sec. 2, T. 12 S., R. 30 W., on highest part of broad knoll. Station is in the southeast corner of patch of timber about $\frac{1}{4}$ mile west of Slusser's house and just west of cultivated field, 20.2 meters (66 feet) north of road, and 12.2 meters (40 feet) west of wire fence. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in fence line north of road about 20 meters (66 feet) east of small house on south side of road, and about 150 meters (492 feet) from station in azimuth $275^{\circ}26'52''$. No. 2 is in fence line south of road, 29.52 meters (96.9 feet) from station in azimuth $0^{\circ}17'$.

Foreman (Little River County, Ark., P. A. Smith, 1930).—About 5 miles by road east of Foreman and $13\frac{1}{4}$ miles west of Ashdown, on Highway No. 32, in a small triangular plot of ground owned by J. A. Wickliss, and on west side of $NW\frac{1}{4}NW\frac{1}{4}$ sec. 5, T. 13 S., R. 31 W. Station is about $\frac{1}{4}$ mile west of house on Wickliss farm, a large unpainted house with outside chimney on west, situated on north side of highway, and is 12.9 meters (42 feet) north of highway, 9.3 meters (31 feet) east of woods road to north, and 5.7 meters (19 feet) southwest of wire fence. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in fence line south of highway, about 30 meters (98 feet) east of barn on south side of road, and approximately $\frac{1}{4}$ mile from station in azimuth $288^{\circ}54'12''$. No. 2 is 18 meters (59 feet) south of highway, 4 meters (13 feet) west of section road to south, and 31.37 meters (102.9 feet) from station in azimuth $19^{\circ}47'$.

Supplementary points

Oklahoma-Arkansas boundary monument no. 52 (1877) (Le Flore County, Okla., Polk County, Ark., P. A. Smith, 1930).—About 15 miles west of Mena,

and $\frac{1}{2}$ mile south of Tallahina Road which leads west from Mena, on State boundary. To reach from Mena, follow Tallahina Road to boundary, turn south onto poor dirt road along boundary, cross two creeks, and continue about $\frac{1}{2}$ mile to station site on east side of road. Mark is 4-inch cast-iron pipe with cap, projecting about 2 feet above ground, and leaning about 10° to east. East side is marked "Arkansas"; west side, "Choctaw Nation"; and date "1877" in raised letters. Station *Oklahoma-Arkansas boundary monument no. 52 (ecc.)* (see description thereof) is 26.62 meters (87.3 feet) from station in azimuth $168^\circ 45' 48''$.

Oklahoma-Arkansas boundary monument no. 52 (ecc.) (Le Flore County, Okla., Polk County, Ark., P. A. Smith, 1930).—About 15 miles west of Mena, and $\frac{1}{2}$ mile south of Tallahina Road which leads west from Mena, on State boundary. To reach from Mena, follow Tallahina Road to boundary, turn south onto poor dirt road along boundary, cross two creeks, and continue about $\frac{1}{2}$ mile to station site in clearing in thick section of pine trees on west side of road. Mark is standard station disk in concrete in top of 4-inch iron pipe. Station *Oklahoma-Arkansas boundary monument no. 52 (1877)* (see description thereof) is 26.62 meters (87.3 feet) from station in azimuth $348^\circ 45' 48''$.

THIRTY-FIFTH PARALLEL ARC, WEST

Principal points

Packer (Caddo County, E. O. Heaton, 1921).—Four miles south and 8 miles east of Binger, 15 miles west and 3 miles south from Minco, $1\frac{1}{8}$ miles N. 20° W. of Packer church, near south side of sec. 6, T. 9 N., R. 9 W., on highest point of sand ridge covered with small jack oak, on land owned by an old Indian woman. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 70.61 meters (231.7 feet) from station in azimuth $92^\circ 34'$.

Edwards (Caddo County, E. O. Heaton, 1921).—Three miles west and $\frac{1}{2}$ mile north of Cement, near center of sec. 36, T. 6 N., R. 9 W., on highest point of most northwestern and largest of the Kechi Hills, and $1\frac{1}{2}$ miles north of the Anadarko-Cement wagon road. Station marked by standard station disk in outcropping bedrock, note 2. Reference mark is standard reference disk in outcropping bedrock, note 12a, 27.81 meters (91.2 feet) from station in azimuth $234^\circ 41'$.

Albert (Caddo County, E. O. Heaton, 1921).—One and one-half miles north of Albert post office, $7\frac{1}{2}$ miles southwest of Binger, in NW $\frac{1}{4}$ sec. 18, T. 9 N., R. 11 W., on point of cleared ridge, about 50 meters (164 feet) north of line of black jack timber, on land owned by David Jackson, who lives about $\frac{1}{4}$ mile south of station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is a standard reference disk in outcropping bedrock, note 12a, 51.67 meters (169.5 feet) from station in azimuth $137^\circ 15'$.

Alden (Kiowa County, E. O. Heaton, 1921).—About $4\frac{3}{4}$ miles west and $\frac{3}{4}$ mile south of Alden post office, 10 miles south and $3\frac{1}{2}$ miles west of Carnegie, in SW $\frac{1}{4}$ sec. 27, T. 6 N., R. 14 W., on high rocky hill known locally as Bally Mountain, the highest point in vicinity, on land owned by Harry Kindblade. Station marked by standard station disk in boulder, note 4. Reference mark is standard reference disk in outcropping bedrock, note 12a, 24.67 meters (80.9 feet) from station in azimuth $312^\circ 34'$.

Grebe (Washita County, E. O. Heaton, 1921; 1933).—Ten miles north and $3\frac{1}{2}$ miles west of Carnegie, 2 miles north and $3\frac{1}{2}$ miles west of Alfalfa post office, in SE $\frac{1}{4}$ sec. 15, T. 9 N., R. 14 W., on small rocky knoll, on land owned by J. B. Grebe, about 300 meters (984 feet) west of Mr. Grebe's house, 150 meters (492 feet) east of half-section corner, and just north of south section-line fence. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in outcropping bedrock, note 12a, 25.38 meters (83.3 feet) from station in azimuth $22^\circ 04'$. In 1933 it was reported that disk was gone from station mark and part of concrete had been broken away.

Sturm (Caddo County, E. O. Heaton, 1921).—Two miles west and 11 miles north of Fort Cobb, 3 miles north of Sturm post office, in NW $\frac{1}{4}$ sec. 16, T.

9 N., R. 12 W., on highest point of sandy hill covered by black jack bushes, and on land owned by J. J. Willets. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 27.675 meters (90.80 feet) from station in azimuth 243°18'.

Dill (Washita County, E. O. Heaton, 1921).—One mile north and $\frac{1}{4}$ mile east of Dill City, a small town on the Atchison, Topeka and Santa Fe Railway, near north side of NW $\frac{1}{4}$ of section 32 or 33, T. 10 N., R. 18 W., on land owned by J. E. Yarborough, on sand ridge about 90 meters (295 feet) west of railway, and about 135 meters (443 feet) south of road on north side of section. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 78.90 meters (258.9 feet) from station in azimuth 292°18'. Station identical with Dill azimuth station. Dill latitude station and Dill longitude station are distant 10.47 meters (34.4 feet) 0''41 of longitude west from station.

Tepee (Kiowa County, E. O. Heaton, 1921).—About 8 miles south and 3 miles east from Lone Wolf, a town on the Atchison, Topeka and Santa Fe Railway, and the Chicago, Rock Island and Pacific Railway, on highest point of most eastern of three highest peaks of Tepee Mountains, in north half of sec. 27, T. 5 N., R. 19 W. Station marked by standard station disk in outcropping bedrock, note 2. Reference mark is standard reference disk in outcropping bedrock, note 12a, 27.97 meters (91.8 feet) from station in azimuth 216°30'.

Folks (Beckham County, E. O. Heaton, 1921).—About 1 mile south and 4 miles east of Carter, a town on the Missouri-Kansas-Texas Railroad, in SE $\frac{1}{4}$ sec. 32, T. 9 N., R. 21 W., about 250 meters (820 feet) north of wagon road on south side of section, and on land owned by J. M. Wolfe. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 43.26 meters (141.9 feet) from station in azimuth 7°31'.

Walsh (Greer County, E. O. Heaton, 1921).—About 3 miles northwest of Granite, town on Chicago, Rock Island and Pacific Railway, on highest peak of Headquarter Mountains, locally known as "Walsh Mountains", in SE $\frac{1}{4}$ sec. 21, T. 6 N., R. 21 W., on land owned by D. J. Haynes, who lives at foot of west side of mountain. Station marked by standard station disk in boulder, note 4. Reference mark is standard reference disk in outcropping bedrock, note 12a, 27.60 meters (90.6 feet) from station in azimuth 240°43'.

Self (Beckham County, E. O. Heaton, 1921; 1927).—Two and three-fourths miles east and 5 $\frac{1}{2}$ miles south of Erick, in the S.W. $\frac{1}{4}$ sec. 26, T. 8 N., R. 25 W., on land belonging to J. R. Self, about 200 meters (656 feet) south of east from his house (on the same quarter section), about 300 meters (984 feet) east of the southwest corner of sec. 26, and 200 meters (656 feet) north of a road on the south side of that section. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 172.09 meters (567.6 feet) from station in azimuth 7°37'56''. In 1927 station recovered in good condition, land belonging to heirs of J. R. Self, and rented and occupied by Jack Teel.

Vinson (Harmon County, E. O. Heaton, 1921; 1927).—One and one-half miles west and $\frac{3}{4}$ mile north of the Vinson post office, in the NE $\frac{1}{4}$ sec. 18, T. 5 N., R. 25 W., on property belonging (in 1927) to Mr. Reynolds and rented by J. B. Shirley, on top of a high knoll on line between cotton patch and corn patch, about $\frac{1}{2}$ mile northwest of Shirley's house. Reached from Vinson 1 $\frac{1}{2}$ miles west on Highway No. 9, thence north $\frac{3}{4}$ mile to Shirley's house. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 28.69 meters (87.6 feet) from station, in azimuth 267°20'.

Haystack (Greer County, E. O. Heaton, 1921).—About 6 miles west and 2 miles north of Willow, town on the Missouri-Kansas-Texas Railroad, in NW $\frac{1}{4}$ sec. 15, T. 7 N., R. 23 W., on highest hill on east end of high ridge to southward of Haystack Creek, about 1 mile west of small flat-topped butte, well known as Haystack Mountain, and about 1 mile northeast of Mr. J. F. Christain's ranch house. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in outcropping bedrock, note 12a, 25.54 meters (83.8 feet) from station, in azimuth 172°15'.

Branson (Collingsworth County, Tex., E. O. Heaton, 1921; 1927).—Four miles north and $\frac{1}{2}$ mile east of Wellington, on a sandy ridge, on land belonging to Mrs. Lucy B. Wells of Wellington and in charge of Mr. Price Sullivan, and about $\frac{1}{2}$ mile east of the Wellington-Shamrock wagon road. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Two reference marks were set, standard reference disks in concrete, note 11a. No. 1 is 38.13 meters (125.1 feet) from station in azimuth $182^{\circ}48'$. No. 2, 6.79 meters (22.3 feet), $107^{\circ}34'$. The station was recovered in 1923, and the marks found in poor condition, the underground mark $1\frac{1}{4}$ inches off center. New marks were put in of the same general types as above, but full size and good quality. A reference mark was also added in 1923 consisting of standard reference disk in concrete block, note 11a, 114.92 meters (377.0 feet) north of station, in east-and-west fence line. Station recovered in 1927 in good condition. It was reached at that time from Wellington by going west $\frac{1}{2}$ mile to main road leading north to Shamrock, following this main road north about $4\frac{1}{2}$ miles to road leading east, thence east $\frac{1}{2}$ mile to end of road at farmhouse. Station was on a high knoll in pasture a short distance east of this house. All marks were stamped with name of station and date.

Coon (Collingsworth County, Tex., E. O. Heaton, 1921; 1927).—About 9 miles west and $4\frac{1}{2}$ miles north of Vinson, Oklahoma, and about 3 miles east of the Salt Fork of the Red River, in the Coon pasture, on a grassy knoll, about $\frac{3}{4}$ mile northwest of the Texas-Oklahoma boundary post which is common to secs. 25 and 36, T. 6 N., R. 27 W. In 1927 reached from Wellington by going east on the road to Vinson, to State line, or from Vinson west on Highway No. 9 to State line, and thence along road leading north along State line for $\frac{1}{2}$ mile, then west $\frac{1}{2}$ mile, then turning north again and following main traveled road in a northerly direction for 3 miles to gate at north side of road. Go through gate and proceed $\frac{1}{2}$ mile to another gate with iron posts. Station is on high point 1 mile north of this gate. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. The 1921 marks were replaced in 1923 with more substantial marks of same type. Reference mark is a standard reference disk in concrete, note 11a, 48.53 meters (159.2 feet) from station in azimuth $182^{\circ}49'$.

Trimmins (Collingsworth County, Tex., E. O. Heaton, 1921).—About 4 miles south and 2 miles west of Shamrock, a town on the Chicago, Rock Island & Gulf Railway, on the highest point of the southernmost of two mesas, in pasture land belonging to the Will Iron Cattle Company of Denver, Colo. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Two reference marks were set, standard reference disks in concrete, note 11a. No. 1 is 18.73 meters (61.4 feet) from station in azimuth $181^{\circ}48'$; no. 2, 14.01 meters (46.0 feet), $88^{\circ}11'$.

Supplementary points

Sentinel, water tank (Washita County, E. O. Heaton, 1921).—High, black, municipal water tank of the town of Sentinel, Okla.

Hobart, water tank (Kiowa County, E. O. Heaton, 1921).—High, black, municipal water tank of the town of Hobart, Okla.

Gotebo, water tank (Kiowa County, E. O. Heaton, 1921).—High, black, municipal water tank of the town of Gotebo, Okla.

Saddle Mountain (Comanche County, E. O. Heaton, 1921).—The westernmost spirt on Saddle Mountain, which lies in the northern range of Wichita Mountains. As viewed from the north it is a prominent, sharp peak lying to the right of saddle connecting it with higher, rounder mountain on left.

Lone Wolf, water tank (Kiowa County, E. O. Heaton, 1921).—High, black, municipal water tank of the town of Lone Wolf, Okla.

Signal Mountain (Comanche County, E. O. Heaton, 1921).—A prominent, isolated peak lying in Fort Sill Military Reservation. Top is well-defined, flat plateau about one hundred yards in width. From north there appear to be two cairns on this plateau.

OKLAHOMA-TEXAS BOUNDARY (RED RIVER) ARC

Principal points

Keele (Jefferson County, E. O. Heaton, 1923).—About three miles west and $4\frac{1}{2}$ miles south of town of Waurika, at east side of roadway on section lines between secs. 28 and 29, about $\frac{1}{3}$ mile south of the northwest corner of sec. 28, T. 5 S., R. 8 W., and about 60 meters (197 feet) due east from J. W. Keele's farmhouse. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed in the southeast corner of Keele's yard, and 21.06 meters (69.1 feet) from station in azimuth $63^{\circ}38'$.

Hastings (Jefferson County, E. O. Heaton, 1923).—About 8 miles west and $1\frac{1}{2}$ miles north of Waurika, 3 miles south and 1 mile west of the town of Hastings, $\frac{1}{2}$ mile east of the Jefferson-Cotton County line, in the northeast corner of SW $\frac{1}{4}$ sec. 27, T. 4 S., R. 9 W., on land belonging to W. J. Johnson, and rented by Bill Hall, on the east end of a rather prominent ridge and about 600 meters (1,968 feet) north of Hall's house. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, in fence line, 174.27 meters (571.8 feet) from station in azimuth $8^{\circ}48'36''$.

Byers (Clay County, Tex., E. O. Heaton, 1923).—One and one-half miles southwest of the town of Byers, 200 meters (656 feet) west of the Byers-Wichita Falls highway, 225 meters (738 feet) west of the Wichita Valley Railroad, and about 40 meters (131 feet) north of a road running east and west, on the highest point of land in the vicinity. Land belongs to G. W. Byers, who lives about $\frac{1}{2}$ mile north of the town of Byers. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, set in fence line at south edge of road, 67.28 meters (220.7 feet) from station in azimuth $317^{\circ}37'$.

Lee (Cotton County, E. O. Heaton, 1923).—Five miles east and 1 mile north of Randlett, 3 miles west and 1 mile north of Taylor, in the NE $\frac{1}{4}$ sec. 30, T. 4 S., R. 11 W., 175 meters (574 feet) west of road, on land belonging to J. R. Lee, 30 meters (98 feet) south and $\frac{1}{2}$ meter (2 feet) east of southeast corner of his house. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference mark is a brass bolt with arrow cut in it, set in concrete, in corner of fence, 163.83 meters (537.5 feet) from station in azimuth $279^{\circ}42'55''$.

Bailer (Cotton County, E. O. Heaton, 1923).—About 8 miles east and $1\frac{1}{2}$ miles south of Randlett, 7 miles south and 5 miles west of Temple, $1\frac{1}{2}$ miles south and $\frac{1}{2}$ mile east of Taylor. Blacksmith shop and store at crossroads. In SW $\frac{1}{4}$ sec. 2, T. 5 S., R. 11 W., on the north bluff of the Red River, on excess land about 2.5 meters (8 feet) south of fence at south side of property belonging to J. A. Bailey, and $\frac{1}{2}$ mile southeast of his house. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, in corner of fence near Bailey's house, and 515.23 meters (1,690.4 feet) from station in azimuth $115^{\circ}48'16''$.

Thornberry (Wichita County, Tex., E. O. Heaton, 1923).—About 12 miles by road east of Burkburnett, 6 miles northeast of Freeburg church and school, 1 mile west of the Thornberry church and school, $\frac{1}{4}$ mile north of graded highway leading from Thornberry to Freeburg school and Wichita Falls, and 150 meters (492 feet) east of a north and south road. It is about 150 meters (492 feet) west and 35 meters (115 feet) north of the only oil derrick in the vicinity, and a few meters northwest of the northernmost of two tanks used to supply water to boilers for use with the derrick. Surface and underground marks are recorded as being standard disk station marks in concrete, notes 1a and 7a, but an additional note records standard surface mark being in concrete 18 inches below surface of ground. Two reference marks were set, standard reference disks in concrete, note 11a. No. 1 is at north side of graveled highway, and 468.05 meters (1,535.6 feet) from station in azimuth $3^{\circ}12'09''$. No. 2 is in fence line at east side of road, 144.02 meters (472.5 feet) from station in azimuth $86^{\circ}41'59''$.

Willis (Cotton County, E. O. Heaton, 1923).—Five and one-half miles south and $1\frac{1}{2}$ miles west of Randlett, on highest point of the bluff on north bank of Red River, in SE $\frac{1}{4}$ sec. 30, T. 5 S., R. 12 W., on excess land claimed by A. L. Willis, about $\frac{1}{2}$ mile nearly due west of his house, about 25 feet southwest of the corner of fence along top of bluff at point where the fence from the south makes a turn of 90° to west. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed at intersection of fences, and 124.50 meters (408.5 feet) from station in azimuth 169°23'54''.

Gammill (Cotton County, E. O. Heaton, 1923).—Three miles west of Randlett, 4 miles east and $\frac{1}{2}$ mile south of Devol, on east side of roadway, between secs. 25 and 26, T. 4 S., R. 13 W., 120 meters (394 feet) south of the quarter section corner, about 40 meters (131 feet) northwest of C. B. Gammill's house, 7 feet west of the east fence line of roadway, and 10 feet northwest of northwest corner of Gammill's yard. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed at quarter section corner, on west side of road, and 121.02 meters (397.0 feet) from station in azimuth 173°51'38''.

Cashion (Wichita County, Tex., E. O. Heaton, 1923).—About 7 miles north of Wichita Falls, 6 miles southeast of Burkburnett, and 1 mile south of the Cashion schoolhouse, on the highest point of the ridge, 9 meters (30 feet) west of the Burkburnett-Wichita Falls concrete highway and about 15 meters (49 feet) north of a house which is on the east side of the road. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark no. 1 is a standard reference disk in concrete, note 11a, placed in a fence corner on east side of road, 54.35 meters (178.3 feet) from station in azimuth 339°59'. Reference mark no. 2 is not described, but is probably a disk reference mark, being set in the concrete highway about 2 $\frac{1}{2}$ feet east of the west edge of the concrete, 20.72 meters (68.0 feet) from the station in azimuth 340°10'.

Sullivan (Wichita County, Tex., E. O. Heaton, 1923).—About 2 miles west of Burkburnett, 75 meters (246 feet) north of the concrete highway (Electra Road), on land belonging to Mr. J. Sullivan, and 200 meters (656 feet) west of his house. Station *Sullivan* (U.S.G.S.), established in 1914, marked by iron pipe, is 23.700 meters (77.76 feet) from station in azimuth 289°18'. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Two reference marks were set. No. 1 is a standard reference disk in concrete, note 11a, in fence line, and 72.766 meters (238.73 feet) from station in azimuth 1°39'. No. 2 is a standard reference disk set in the pavement about 3 feet from north edge, and 80.611 meters (264.47 feet) from station in azimuth 1°41'.

Miller (Cotton County, E. O. Heaton, 1923).—One mile east and 2 miles south of Devol, in the SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 33, T. 4 S., R. 13 W., on land belonging to Mrs. Jake Miller, whose house is about 300 meters (984 feet) to the northward. Station is about 250 meters (820 feet) northeast of southwest corner of sec. 33, about 100 meters (328 feet) east of the west section line, and about 250 meters (820 feet) southeast of the most southeasterly one of several oil storage tanks, and is on the highest knoll in the vicinity, overlooking the Red River to the southward. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed in the east fence line of sec. 33, and 116.68 meters (382.8 feet) from station in azimuth 85°50'04''.

Grandfield (Tillman County, E. O. Heaton, 1923).—About $\frac{1}{2}$ mile south of the town of Grandfield, on west side of the highway leading to the Grandfield bridge over the Red River, about 18 inches east of the road fence near the east side center of the SW $\frac{1}{4}$ sec. 18, T. 4 S., R. 14 W., and directly west of a large red barn on east side of the road on the Mat Hubbard farm. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is a standard reference disk in concrete, note 11a, in east fence of roadway, 19.270 meters (63.22 feet) from station in azimuth 264°32'.

Sunshine (Wichita County, Tex., E. O. Heaton, 1923).—About 12 $\frac{1}{2}$ miles southwest of Burkburnett, about 40 meters (131 feet) southeast of the Sunshine

schoolhouse, in an enclosed lot on the property of the Sanders estate (W. C. Witcher, guardian). Station is 8 meters (26 feet) south of north fence line, 25 meters (82 feet) west of east fence line of lot, and 12.5 meters (41 feet) northwest of water storage tank. Station *Sunshine* (U.S.G.S.), established in 1914 (see description thereof), marked by iron pipe, is 5.086 meters (16.69 feet) from station in azimuth 234°27'. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 1 foot west and 4½ feet south of the southwest corner of the schoolhouse, and 37.725 meters (123.77 feet) from station in azimuth 123°22'.

Tipton (Tillman County, E. O. Heaton, 1923).—About 5 miles west and 5 miles south of the railroad depot at Grandfield, in the NW¼ sec. 3, T. 5 S., R. 15 W., on the most northerly and highest sand hill in the vicinity, about 60 meters (197 feet) east of roadway on west section line, on land belonging to Mr. Pharis and in charge of Mr. Tipton, who lives about ½ mile northwest of the station in the northeast corner of sec. 4. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed in east fence line of roadway, and 152.64 meters (500.8 feet) from station in azimuth 93°50'01".

Burke (Tillman County, E. O. Heaton, 1923).—About 8 miles west and 1¼ miles south of the railway depot in Grandfield, in SE¼ sec. 14, T. 4 S., R. 16 W., on the highest ground in H. L. Burke's yard, midway between his house and barn. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed in fence corner at west side of road, and 56.590 meters (185.7 feet) from station in azimuth 297°10'.

Harrold (Wilbarger County, Tex., E. O. Heaton, 1923).—One mile east and 1 mile north of the town of Harrold, on east side of roadway, 8 meters (26 feet) from center line, on land belonging to P. Vaughn, who lives about ½ mile to eastward, and about 25 meters (82 feet) north and 15 meters (49 feet) west of a house which is vacant at intervals. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is a standard reference disk in concrete, note 11a, placed 1½ feet west of the west fence line of roadway, and 15.409 meters (50.55 feet) from station in azimuth 76°09'.

Hickerson (Tillman County, E. O. Heaton, 1923).—Fifteen miles due west of Grandfield, in NE¼ sec. 11, T. 4 S., R. 17 W., on land owned by C. V. Hickerson, and occupied by Glen Wallis, in a small pasture about 300 meters (984 feet) south of Wallis' house, 20 meters (66 feet) north of south fence line and 45 meters (148 feet) west of east fence line of pasture. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 8 meters (26 feet) south of center line of road, 25 meters (82 feet) west of Wallis' house, and 299.53 meters (982.7 feet) from station in azimuth 179°28'57".

Red Bluff (Wilbarger County, Tex., E. O. Heaton, 1923).—About 8 miles by road northeast of the town of Vernon, 1½ miles east of the Hinds schoolhouse (known locally as the New schoolhouse), on the highest and most northerly point of Red Bluff overlooking the Red River at the bend of the river 3 miles above the mouth of the Pease River, where after flowing down from the northwest for a distance of 25 miles, it turns to eastward for a distance of 15 miles. Red Bluff is a well known point in this vicinity, and the land on which the station is located is owned by a Mr. Allison and occupied by W. L. Hendricks, who lives about ¾ mile west of station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Azimuth of *Vernon, City Water Tank*, 48°00'42".

Frederick (Tillman County, E. O. Heaton, 1923; 1927).—On ridge just north of town of Frederick in prolongation of Fifth Street, on property leased by Mr. Frank Thompson, about 175 meters (574 feet) northwest of his house, and 8 feet east of the west fence line leading north from his barn. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed in fence line about 18 meters (59 feet) north of house, 1½ feet east of west edge of same, and 142.805 meters (468.52 feet) from station in azimuth 350°09'33".

Harrison (Wilbarger County, Tex., E. O. Heaton, 1923).—About 11 miles north of the town of Vernon, about 6 miles east and 5 miles south of Odell,

and 2 miles north of the D. L. Green farm, a farm having buildings and 2 large silos on east side of road. Station is 85 meters (279 feet) east of road leading north from the Green farm, on the most northerly high hill of a range of sand hills, on land belonging to J. S. Harrison who lives 1 mile to the east. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed in east fence line of roadway, 73.15 meters (240.0 feet) from station in azimuth $71^{\circ}55'$.

Cunningham (Tillman County, E. O. Heaton, 1923).—About 4 miles west and 1 mile north of Frederick, $6\frac{1}{2}$ miles south and $2\frac{1}{2}$ miles east of Tipton, $\frac{3}{4}$ mile south of the Bethel Church, at east side of roadway, 3 feet west of fence line along west side of sec. 4, T. 2 S., R. 18 W., 200 meters (656 feet) north of the southwest corner of said section, about $\frac{1}{4}$ mile west of the home of A. C. Cunningham, and in line with the center line of roadway leading out from house on farm of Robert Cole. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, at west edge of road, and 16.542 meters (54.27 feet) from station in azimuth $125^{\circ}44'$.

Hess (Jackson County, E. O. Heaton, 1923).—About 3 miles east and $\frac{1}{2}$ mile south of the town of Elmer, 1 mile west and $\frac{1}{2}$ mile north of Hess, in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 15, T. 1 S., R. 20 W., on land owned by C. A. Baker, and occupied by C. L. Lovett, on the highest point in a cultivated field about 175 meters (574 feet) N. 25° W. of Lovett's house, 190 meters (623 feet) north of the east-and-west wagon road on the half section line, and 140 meters (459 feet) east of a north-and-south road. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot north of the south fence line of roadway, and 201.38 meters (660.7 feet) from station in azimuth $359^{\circ}26'34''$. No. 2 is at east edge of roadway, and 146.11 meters (479.4 feet) from station in azimuth $92^{\circ}46'37''$.

Butte (Jackson County, E. O. Heaton, 1923).—About 9 miles east and 1 mile north of Eldorado, near east side center of sec. 9, T. 1 S., R. 22 W., near the north end of a flat-topped butte, which is 200 meters (656 feet) long in a north-and-south direction and 70 meters (230 feet) wide, and about 350 meters (1,148 feet) northwest of a round-topped butte which is the farthest southeast of all the buttes. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in rock outcrop, note 12a. No. 1 is 17.87 meters (58.6 feet) from station in azimuth $293^{\circ}00'$. No. 2, 22.41 meters (73.5 feet), $149^{\circ}51'$.

Whittle (Hardeman County, Tex., E. O. Heaton, 1923).—About $7\frac{1}{2}$ miles north of Chillicothe, 7 miles west of Odell, and 3 miles north of the Whittle Chapel schoolhouse, on land owned by Mrs. S. B. Smith and occupied by Mr. B. M. Brown. Station is about 250 meters (820 feet) southeast of Brown's house, and on a prominent sand hill which is covered with bushes and sage brush. A small tree with flat top stands on the peak of the hill, and is 6.5 meters (21 feet) southeast of the station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is a standard reference disk in concrete, note 11a, placed 4.4 meters (14 feet) east of the road, 9.94 meters (32.6 feet) southwest of the southwest corner of Brown's house, and 262.36 meters (860.8 feet) from station in azimuth $101^{\circ}51'32''$.

Green (Hardeman County, Tex., E. O. Heaton, 1923).—About 6 miles north of the town of Quanah, 2 miles south of the Quanah-Eldorado highway bridge over the Red River, $\frac{3}{4}$ mile west of that highway, on land belonging to Walter Green, 37.84 meters (124.1 feet) northeast of the northeast corner of his house, 5 meters (16 feet) east and 5.5 meters (18 feet) north of his windmill. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 379.89 meters (1,246.4 feet) from station in azimuth $240^{\circ}04'18''$. It is in the west fence line of the railroad right-of-way, 14.20 meters (46.6 feet) west of the west rail, and at north side of gate for road leading to Mr. Green's house.

Eldorado (Jackson County, E. O. Heaton, 1923).—About $\frac{3}{4}$ mile north and $2\frac{1}{2}$ miles east of the depot at the town of Eldorado, near the east side center of SE $\frac{1}{4}$ sec. 9, T. 1 S., R. 23 W., on highest ground at east side of pasture owned by Joe Wilson, $\frac{1}{2}$ mile northeast of his house, and 32 meters (105 feet) west

of center line of road. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed in fence line at west edge of roadway, and 25.128 meters (82.44 feet) from station in azimuth $247^{\circ}16'$.

Campbell (Harmon County, E. O. Heaton, 1923).—About 10 miles west and 4 miles north of Eldorado, in fence line on north side of roadway, at south side of SE $\frac{1}{4}$ sec. 21, T. 1 N., R. 25 W., on land belonging to C. M. Campbell, who owns the land on both sides of the roadway, and lives about 200 meters (656 feet) east of station at southeast corner of sec. 21. Station is about 1 mile east of Red River and commands a good view of it from southwest to northwest. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, in fence line at south side of roadway, and 107.99 meters (354.3 feet) from station in azimuth $274^{\circ}55'50''$.

Gould (Harmon County, E. O. Heaton, 1923).—About $\frac{1}{2}$ mile northeast of the town of Gould, in the NE $\frac{1}{4}$ sec. 6, T. 2 N., R. 24 W., on land belonging to J. E. Willingham, who lives about $\frac{1}{2}$ mile west of the station in the first house north of the railroad track, and about 100 meters (328 feet) east of the highway. Station is on highest point on the extreme southern end of a ridge with bluff on south and east sides, and is 54 meters (177 feet) east of the north-and-south fence line at point where this fence line turns southwest. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark no. 1 is a standard reference disk in outcropping bedrock, note 12a, 35.15 meters (115.3 feet) from station in azimuth $2^{\circ}30'$. No. 2 is a standard reference disk in concrete, note 11a, in fence line, 167.12 meters (548.3 feet) from station in azimuth $116^{\circ}55'46''$.

Hollis (Harmon County, E. O. Heaton, 1923).—One and one-half miles west and 3 $\frac{3}{4}$ miles south of Hollis, on east side of roadway, near west side center of SW $\frac{1}{4}$ sec. 21, T. 2 N., R. 26 W., across the road from house of L. R. Campbell. Station is 8 feet west of east fence line of roadway, about 75 meters (246 feet) east and 15 meters (49 feet) north of Campbell's house. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, in west fence line of roadway, and 51.465 meters (168.85 feet) from station in azimuth $164^{\circ}47'$.

Snider (Harmon County, E. O. Heaton, 1923).—About 12 miles west and 6 miles north of the town of Eldorado, in the NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 17, T. 1 N., R. 25 W., on land owned by G. W. Snider, and occupied by E. S. Johnson, on the north bluff of the Red River, about $\frac{1}{3}$ mile northwest of Johnson's house, in bluff pasture land just south of a cultivated field, and about 5 feet south of a wire fence which runs along the south side of road leading from Johnson's house. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. No reference mark. Azimuth from station of Louis, Okla., high-school cupola, about 2 $\frac{1}{2}$ miles distance is $259^{\circ}28'07''$.

Day (Harmon County, E. O. Heaton, 1923).—Three and one-half miles east and 7 miles north of Hollis, on the north side of the roadway, on south side of the SE $\frac{1}{4}$ sec. 29, T. 4 N., R. 25 W., on land belonging to William Day, 120 meters (394 feet) west of his house (magnetic bearing of house from station being 75°), and about 125 meters (410 feet) east of southwest corner of the quarter section. Mr. Day's windmill is 112 meters (367 feet) from station in magnetic bearing 80° . Station is on small sand ridge which is covered with small live oak brush. Sand drifts badly and may cover station in short time. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed due south of Day's house, and 120.895 meters (396.64 feet) from station in azimuth $281^{\circ}28'04''$.

Henry (Harmon County, E. O. Heaton, 1923).—Four miles west and 8 miles north of the town of Hollis, 1 $\frac{3}{4}$ miles east of the old State line, in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec. 30, T. 4 N., R. 26 W., on land owned by A. B. Henry, $\frac{1}{2}$ mile southwest of his house, on the northernmost of two small peaks on a sand ridge in the southwest side of Henry's pasture, and 100 meters (328 feet) east of the west section line. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is a standard reference disk in concrete, note 11a, in fence line along west side of section, and 102.03 meters (334.7 feet) from station in azimuth $98^{\circ}21'$.

Supplementary points

Ryan, city water tank (Jefferson County, E. O. Heaton, 1923).—A large black tower tank.

Waurika, city water tank (Jefferson County, E. O. Heaton, 1923).—A large black tower tank to the rear of the Rock Island railway depot.

Byers, city water tank (Clay County, Tex., E. O. Heaton, 1923).—A large gray-colored tower tank at east edge of town.

Hastings, city water tank (Jefferson County, E. O. Heaton, 1923).—A large black tower tank.

Temple, city water tank (Cotton County, E. O. Heaton, 1923).—A large black tower tank.

Petrolia, high-school cupola (Clay County, Tex., E. O. Heaton, 1923).—High school at Petrolia, near east edge of town.

Walters, city water tank (Cotton County, E. O. Heaton, 1923).—A large black tower tank.

Iowa Park, city water tank (Wichita County, Tex., E. O. Heaton, 1923).—A large black tower tank near east side of town.

Wichita Falls, City Power & Electric Company, stack (Wichita County, Tex., E. O. Heaton, 1923).—The large concrete stack of the City Power & Electric Company, near south edge of town.

Wichita Falls, State Hospital water tank (Wichita or Archer County, Tex., E. O. Heaton, 1923).—A large black tower tank at the State hospital about 5 miles south of Wichita Falls.

Wichita Falls, Call Aviation Field, water tank (Wichita or Archer County, Tex., E. O. Heaton, 1923).—Water tank at Call Aviation Field, about 5 miles southwest of Wichita Falls.

Burkburnett, city water tank (Wichita County, Tex., E. O. Heaton, 1923).—A large black tower tank near the center of town.

Devol, city water tank (Cotton County, E. O. Heaton, 1923).—A large black tower tank near the center of town.

Sunshine (U.S.G.S.) (Wichita County, Tex., E. O. Heaton, 1923).—Station established by U.S. Geological Survey in 1914 and marked by iron pipe and bronze cap, 5.086 meters (16.69 feet) in azimuth $234^{\circ}27'$ from station *Sunshine* (see description thereof).

Sullivan (U.S.G.S.) (Wichita County, Tex., E. O. Heaton, 1923).—Station established in 1914 by U.S. Geological Survey, and marked by an iron pipe, 23.700 meters (77.76 feet) in azimuth $289^{\circ}18'$ from station *Sullivan* (see description thereof).

Grandfield, city water tank (Tillman County, E. O. Heaton, 1923).—A large black tower tank in south edge of town.

Grandfield, city high school (Tillman County, E. O. Heaton, 1923).—A large square building with cupola near central part of town.

Texas-Oklahoma boundary, reference mark no. 12 (Wichita County, Tex., E. O. Heaton, 1923).—On a prominent point of the Texas bluff, about $\frac{1}{2}$ mile west of Bridgetown, near an electric power line which serves the oil field within the river bed. It is in the Hrs. of L. Powell Survey No. 820, the northeast corner of which is coincident with Witness Post No. 141. Point is designated "Power Line Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 16b.

Texas-Oklahoma boundary, north range line 15/14 (Tillman County, E. O. Heaton, 1923).—Five miles south and 2 miles west of the town of Grandfield, at top of Oklahoma bluff, on line through T. 5 S., between Ranges 14 and 15 West, at point 30.0 feet south of corner of secs. 1, 6, 7, and 12. Marked by an iron post with bronze cap as described in note 16a.

Texas-Oklahoma boundary, reference mark no. 15 (Wichita County, Tex., E. O. Heaton, 1923).—About 1,000 feet south of the south bluff of Red River, on land owned by Henry Scroeder, and on original survey no. 828. It is about 2 miles west and $1\frac{1}{2}$ miles north of Clara. The house of Henry Scroeder bears S. 36° W., 440 feet distant. The nearest point on a public road bears S. $73^{\circ}45'$ W., distant 1,200 feet. The point is designated "Scroeder Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 16b.

Texas-Oklahoma boundary, sec. 10, witness corner (Tillman County, E. O. Heaton, 1923).—In the NW $\frac{1}{4}$ NW $\frac{1}{4}$ of sec. 10, T. 5 S., R. 15 W., on a high sand hill overlooking the Red River valley. The corner of secs. 3, 4, 9, and 10 bears N. 29°20' W., distant 965.9 feet. This section corner is 4 miles west and 6 miles south of Grandfield. Station marked by an iron post with bronze cap as described in note 16a.

Texas-Oklahoma boundary, reference mark no. 16 (Wichita County, Tex., E. O. Heaton, 1923).—On the Foster and Allen farm, in original survey no. 833, close to the top of the south bluff of the Red River, and about 1,000 feet west of Tenth Cavalry Creek. It is 4 miles west and 2 miles north of Clara. The "Burke-Cameron" oil well no. 1 bears S. 11°30' W., distant 565 feet. The nearest point on a public road bears S. 86°15' W., 1,650 feet distant. The point is designated "Burke-Cameron" Station. Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 16b.

Texas-Oklahoma boundary, reference mark no. 2 (Wichita County, Tex., E. O. Heaton, 1923).—On a prominent knoll overlooking the river valley in the John Deck survey no. 275. It is about 3 miles east and $\frac{1}{2}$ mile south of Burkburnett, on the highest point of the knoll, about 100 feet south of edge of timber growing on steep slope of bluff. It may be conveniently reached from the Texas Company's pump station which is at the nearest point on the public road, and from which the highest part of the Texas bluff may be recognized to the northwest, a little over a mile distant. Monument designated "Holman Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 16b.

Texas-Oklahoma boundary, sec. 14, witness point (Cotton County, E. O. Heaton, 1923).—Three and one-half miles east and 4 miles south of the town of Devol, a short distance west of the main road leading to the Burkburnett wagon bridge, on the Oklahoma bluff, on the north-and-south center line of sec. 14, T. 5 S., R. 13 W. Station marked by iron post with bronze cap as described in note 16a.

Texas-Oklahoma boundary, reference mark no. 4 (Wichita County, Tex., E. O. Heaton, 1923).—About 1 mile north and a short distance east of the town of Burkburnett, in the T. J. Redman Survey No. 816. It is on the Texas bluff, 90 feet south of the top of a steep slope, at a point 630 feet east of the Fowler farmhouse. There is a large red barn and a galvanized iron silo between the monument and the farmhouse. Point is designated "Fowler Station." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete, as described in note 16b.

Texas-Oklahoma boundary, reference mark no. 7 (Wichita County, Tex., E. O. Heaton, 1923).—In the William Rivers Survey, No. 810, about 2 miles west and 3 miles north of Burkburnett, near the Sinclair Pump Station, on a gentle north slope about 1,000 feet south of the top of the Texas bluff, and on the meridional extension of the line between Ranges 13 and 14 West, in Oklahoma. Point is designated "South Range Line Station 14/13." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 16b.

Texas-Oklahoma boundary, secs. 34/35, quarter corner (Tillman County, E. O. Heaton, 1923).—About 3 $\frac{1}{2}$ miles south and 2 miles east of the town of Grandfield, on nearly level ground just south of the top of a steep bluff, in the quarter section corner between secs. 34 and 35, T. 4 S., R. 14 W. Marked by iron post with bronze cap as described in note 16a.

Texas-Oklahoma boundary, sec. 6, witness corner (Tillman County, E. O. Heaton, 1923).—On the site of old Fort Augur, in the NE $\frac{1}{4}$ sec. 6, T. 5 S., R. 15 W., on the Indian allotment, south of Mr. Sharrock's house, on a high bluff overlooking the Red River. The corner of secs. 5, 6, 31, and 32, on north boundary of T. 5 S., R. 15 W., bears N. 71°34'30" from station, distant 1,068.9 feet. Station marked by iron post with bronze cap as described in note 16a.

Texas-Oklahoma boundary, reference mark no. 21 (Wichita County, Tex., E. O. Heaton, 1923).—On the J. D. Bonham farm, in block 278 of the Waggoner Colony subdivision, on a sand hill about 1,000 feet south of the south bluff of the Red River. It is 7 $\frac{1}{2}$ miles north and 2 miles east of Electra. The north end of the Electra Toll Bridge across the Red River bears N. 40° W. A

For notes in regard to marking of stations see p. 65.

church steeple bears S. 48°30' W., distant about 3 miles. The nearest point on the public road bears S. 42° W., 1,900 feet. The station is designated "Cross Station", and is marked by a special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 16b.

Texas-Oklahoma boundary, reference mark no. 18 (Wichita County, Tex., E. O. Heaton, 1923).—On W. E. Palmer's farm in the original James Cole Survey No. 838, about 400 feet south of the river bluff, and 130 feet east of the west line of Palmer's land. It is 7 miles north and 5½ miles east of Electra. The nearest point on the public road is in front of Palmer's house, and bears S. 74°50' E., distant 2,080 feet. The station is on the meridional extension of the line between Ranges 15 and 16 West, in Oklahoma, and is designated "South Range Line 16/15." Marked with special monument, bronze tablet of the Supreme Court of the United States, set in concrete as described in note 16b.

Texas-Oklahoma boundary, sec. 35, witness point (Tillman County, E. O. Heaton, 1923).—On a prominent sand hill in the NW¼SE¼ sec. 35, T. 4 S., R. 16 W., on an Indian allotment. The quarter section corner between secs. 26 and 35 bears N. 16°30'45" W., distant 2,897.7 feet. Said corner is 4 miles south and 8½ miles west of Grandfield. Station marked by iron post with bronze cap as described in note 16a.

Texas-Oklahoma boundary, sec. 29, witness point (Tillman County, E. O. Heaton, 1923).—Eleven miles west and 3½ miles south of Grandfield, in the NE¼SE¼ sec. 29, T. 4 S., R. 16 W., on a very high, prominent sand hill. The quarter section corner between secs. 28 and 29 bears N. 10°18'30" E., distant 617.9 feet. Harrison Clemer's house bears N. 27° E., distant about ¾ mile. Station marked by iron post with bronze cap as described in note 16a.

Texas-Oklahoma boundary, north range line 17/16 (Tillman County, E. O. Heaton, 1923).—Thirteen miles west and 3 miles south of Grandfield, on high sand hill on north bluff of Red River, on line between Ranges 16 and 17 West, about 400 feet in northwesterly direction from the north end of the Electra Toll Bridges over the Red River. The quarter section corner between secs. 19 and 24, T. 4 S., Ranges 16 and 17 W., bears N. 0°08'40" E., distant 2,185.9 feet. Marked by an iron post with bronze cap as described in note 16a.

Chattanooga, city water tank (Comanche County, E. O. Heaton, 1923).—A large black tower tank.

Electra, city water tank (Wichita County, Tex., E. O. Heaton, 1923).—A large black tower tank.

Vernon, city water tank (Wilbarger County, Tex., E. O. Heaton, 1923).—A large black tower tank.

Frederick, city water tank (Tillman County, E. O. Heaton, 1923).—A large black tower tank near west edge of town.

Olustee, city water tank (Jackson County, E. O. Heaton, 1923).—A large black tower tank.

Altus, city water tank (Jackson County, E. O. Heaton, 1923).—A large black tower tank.

Eldorado, U. S. Gypsum Co., water tank (Jackson County, E. O. Heaton, 1923).—A large black tower tank 1 mile north of town.

Quanah, courthouse cupola (Hardeman County, Tex., E. O. Heaton, 1923).—The courthouse of Hardeman County, in the central part of the town of Quanah.

Quanah, city water tank (Hardeman County, Tex., E. O. Heaton, 1923).—A large black tower tank.

Elroy (Hardeman County, Tex., E. O. Heaton, 1923).—About 7 miles north and 6 miles east of the town of Kirkland, 2 miles south of the Hooleyann store, on land belonging to W. H. Jenkins. Station is on highest point in a cultivated field, about ¼ mile southeast of a house occupied by a Mr. McElroy, 132 meters (433 feet) west of a north-and-south fence line, and 107 meters (351 feet) north of section line fence. No surface mark was set because of interference with cultivation of field. Station mark set 18 inches below surface of ground is a standard disk station mark in concrete, note 7a. Reference mark is standard reference disk in concrete, note 11a, set in fence line, 114.24 meters (374.8 feet) from station in azimuth 282°35'37".

Herg (Hardeman County, Tex., E. O. Heaton, 1923).—About 6 miles east of Kirkland, ¼ mile east of the section house at Herg railway station, 40 paces north of the Fort Worth and Denver City Railway, on north side of highway,

60 paces west of gate leading into a stock lot having tank and windmill which is on the property of a Mr. McCreary. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is a standard reference disk in concrete, note 11a, placed in the north fence line of the roadway, 45.21 meters (148.3 feet) from station in azimuth $96^{\circ}29'$.

Hardeman (Hardeman County, Tex., E. O. Heaton, 1923).—About $3\frac{1}{2}$ miles east of the town of Kirkland, 117.2 meters (385 feet) northeast of the Hardeman-Childress County signboard, 84.2 meters (276 feet) north of the north rail of the Fort Worth and Denver City Railway, 60 meters (197 feet) north of the center of the highway, on the north end of a small uncultivated hill of shell rock. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Concrete line post of Hardeman-Childress Counties was used as a reference mark. It is 2 feet south of the south fence of roadway, and 117.90 meters (386.8 feet) from station in azimuth $76^{\circ}11'$. Elevation of station is 1,644 feet.

Red River longitude station (Childress County, Tex., E. O. Heaton, 1923).—About 3 miles east of Kirkland, $\frac{1}{4}$ mile north of the Fort Worth and Denver City Railway, $\frac{1}{4}$ mile north of the Quanah-Childress highway, on land belonging to H. M. Thomas, in a small cultivated field about 100 meters (328 feet) northeast of his house. Station marked by a concrete pier, the lower base of which is 24 by 30 inches, set 30 inches in ground on solid rock. The upper part of pier is 18 by 24 inches and extends 30 inches above the surface of ground. A point on the old meridian boundary between Childress and Hardeman Counties, marked by a standstone 10 by 18 inches above ground, with letters "CC" on west face and "HC" on east face, bears S. $77^{\circ}24'$ E., and is distant 2,610 feet. This station was established astronomically in 1902 by the General Land Office.

Louis, high-school cupola (Harmon County, E. O. Heaton, 1923).—A square frame building with cupola.

Initial (Childress County, Tex., E. O. Heaton, 1923).—On the old State line, about $\frac{1}{4}$ mile north of the Red River, $5\frac{1}{2}$ miles west and 7 miles south of the town of Hollis, on land owned by Frank Closky, about $\frac{3}{4}$ mile west of his house, 2.3 meters (8 feet) north of Initial Point of the Jones and Brown Survey of 1858, and 5.5 meters (18 feet) east of a north and south fence line. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. There are no reference marks. *Texas-Oklahoma old boundary and T. 1 N., R. 27 W., secs. 2/11, corner*, marked by gray stone with cross cut in top, is 206.87 meters (678.7 feet) from station in azimuth $179^{\circ}47'14''$.

Closky (Childress County, Tex., E. O. Heaton, 1923).—About $4\frac{3}{4}$ miles west and 7 miles south of Hollis, about 25 meters (82 feet) south of north line of sec. 11, T. 1 N., R. 27 W., of the Oklahoma Land Survey, in pasture lot of Frank Closky. Station is about 75 meters (246 feet) northeast of his house, and 20 meters (66 feet) east of road leading to it. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Following distances and azimuths are from station: Station *Initial* (see description thereof), 0.7 mile, $79^{\circ}36'40''$; *Kidder monument (1902)* (see description thereof), 204.9 meters (672 feet), $348^{\circ}28'07''$.

Kidder monument (1902) (Childress County, Tex., E. O. Heaton, 1923).—About $4\frac{3}{4}$ miles west and 7 miles south of Hollis, about 120 meters (394 feet) southeast of Frank Closky's house, in north side of cultivated field just south of his pasture. Station marked by stone post 10 by 14 by 45 inches projecting 18 inches above surface of ground. In 1923 a standard disk station mark was set in center of top of stone and stamped "Kidder 1902." Monument was established in 1902 by the General Land Office. Following distances and azimuths are from station: Station *Closky* (see description thereof), 204.9 meters (672 feet), $168^{\circ}28'08''$; station *Initial* (see description thereof), 0.7 mile, $90^{\circ}05'04''$.

Texas-Oklahoma old boundary, and T. 1 N., R. 27 W., secs. 2/11, corner (Childress County, Tex., E. O. Heaton, 1923).—Five and one-half miles west and 7 miles south of Hollis, and 206.87 meters (678.7 feet) in azimuth $179^{\circ}47'14''$ from station *Initial*. A gray stone with cross cut in top common to the old State line, and to secs. 2 and 11, T. 1 N., R. 27 W., of the Oklahoma Land Survey.

Gould, high school, north chimney (Harmon County, E. O. Heaton, 1923).—A large red brick building at southeast edge of town.

Hollis, city water tank (Harmon County, E. O. Heaton, 1923).—A large black tower tank at southeast edge of town.

Line (Childress County, Tex., E. O. Heaton, 1923).—On the old State line, 5½ miles due west of the town of Hollis, and 80 meters (262 feet) south of the highway from Hollis to Buck Creek, and 2 feet east of the old State line fence. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, placed about 2 feet east of a State line sign board, and 88.10 meters (289.0 feet) from the station in azimuth 180°43'.

Dodson (Collingsworth County, Tex., E. O. Heaton, 1923).—On the old State line, ¾ mile northeast of Dodsonville, at the northeast corner of the cemetery. Station is identical with the northeast corner of sec. 40 and southeast corner of sec. 41, lot 10 of the H. & G. N. railroad survey of the State of Texas. This corner was found marked by a stub and stone; the position of the stub was held and remarked with standard station disk station marks in concrete, notes 1a and 7a. No reference mark was set. This point marks the northeast corner of the land of E. H. Dodson who lives ¼ mile west of the station, and owns the north half of sec. 40. Azimuth of *Hollis, city water tank*, 319°05'53''.

Texas-Oklahoma old boundary, and Tps. 2 and 3 N., R. 27 W., secs. 2 and 35, corner (Childress County, Tex., E. O. Heaton, 1923).—Five and one-half miles west of the town of Hollis, in center of road leading from Hollis to Buck Creek, and 90.04 meters (262.6 feet) in azimuth 180°40'20' from station *Line*. Station is on old State line, and on line between secs. 2 and 35, Tps. 2 and 3 N., R. 27 W. of the Oklahoma Land Survey. Marked by a square block of limestone with cross cut in center.

Otex (Collingsworth County, Tex., E. O. Heaton, 1923).—About 9 miles west and 4¼ miles north of Vinson post office, 4¼ miles north of the Wellington-Vinson highway, 3 feet west of the old State line, and about ¾ mile southeast of station *Coon* on a prominent knoll. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. The distance and azimuth of the *Texas-Oklahoma boundary mark* are 1087 feet, 0°23'10''.

Texas-Oklahoma boundary mark (Collingsworth County, Tex., E. O. Heaton, 1921; 1923).—About 8 miles west and 4 miles north of Vinson. A stone with cross common to the old State line and to the southwest corner of sec. 25, and the northwest corner of sec. 36, T. 6 N., R. 27 W. of the Oklahoma Land Survey.

OKLAHOMA-TEXAS BOUNDARY (ONE-HUNDREDTH MERIDIAN ARC)

Principal points

Fuller (Collingsworth County, Tex., W. Mussetter, 1927).—About 9½ miles east and 4½ miles south of Shamrock, on highest point of a ridge, a short distance south of oil pipe and telephone lines, and about 1 mile west of a lone tree. To reach from Shamrock go easterly along U.S. Highway No. 66 about 7 miles to Midway filling station, thence south 3 miles to a ranch house; pass through two gates into pasture and follow fence east 0.7 mile to pipe line; follow pipe line road about 2.5 miles, turn south to top of ridge, and go east 0.1 mile to station. Surface and underground marks are standard disk station marks in concrete. Two reference marks were set, standard reference tablets in concrete. No. 1 is 20.18 meters (66.2 feet) from station in azimuth 143°40'; no. 2, 155.42 meters (509.9 feet), 224°09'35''.

Mayfield (Beckham County, W. Mussetter, 1927).—About 8¼ miles north and about 2¾ miles west of Erick, on highest point of hill at south side of road, on land belonging to A. B. Whipkey. Hill is covered with scrub oak, clumps of which are quite prominent. To reach from Erick go west ½ mile, then north for about 8.3 miles to road which turns west just south of Mayfield; follow this road west for about 2.2 miles to top of hill, when station will be about 400 feet to south. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 14.53 meters (47.7 feet) from station in azimuth 24°05'; no. 2, 152.23 meters (499.4 feet), 211°10'09''.

Wheeler (Wheeler County, Tex., W. Mussetter, 1927).—About 5 miles east and 2½ miles south of Wheeler, about 12 miles north and 4 miles east of

Shamrock, 10 miles west of the old State line, on a high point in a sandy pasture about $\frac{1}{2}$ mile north of the road leading from the Shamrock-Wheeler highway to Kelton, about 0.3 mile west of a half-section corner, and 100 meters (328 feet) north of an east and west wire fence. To reach from the Shamrock-Wheeler highway follow Kelton road 3 miles to gate on north side of road, pass through gate and follow fence one-half mile north to quarter corner, thence 0.3 mile west to station. Surface and underground marks are standard disk station marks set in concrete. Reference marks are standard reference disks set in concrete, in fence line. No. 1 is 121.20 meters (397.6 feet) from station in azimuth $336^{\circ}48'17''$; No. 2, 113.80 meters (373.4 feet), $10^{\circ}38'45''$.

Rankin (Roger Mills County, W. Mussetter, 1927).—About 5 miles south and 1 mile west of Rankin, in NW $\frac{1}{4}$ sec. 3, T. 12 N., R. 26 W., in pasture land, 360 paces southeast of section corner, on a small knoll with green bushes on it, the highest point in the vicinity. About $\frac{1}{3}$ mile southwest of this knoll is a house hidden in a grove, and 300 feet south of knoll is a cluster of bushes. To reach from Rankin go south 1 mile, east 1 mile, then south 3.7 miles to forks of road; take right-hand fork and go about 1.3 miles to gate at right with row of cottonwood trees running west and quite a growth of trees to north of them. Go through gate and follow road 1 mile to forks; take right fork and follow main traveled road in northwesterly direction for about 1.2 miles, when station will be about 300 feet north of road. Station marks are standard disk station marks in concrete.

Sockwell (Wheeler County, Tex., W. Mussetter, 1927).—About 5 miles south and 5 miles west of Rankin, about $\frac{1}{2}$ mile west of old State line, on highest point in sandy pasture, 150 meters (492 feet) south of fence. To reach from Rankin or Sweetwater take road to Meridian Lake; from north end of lake follow east side of fence 1.3 miles to gate, through gate, and 0.6 mile north to old windmill. Station is on top of sand dune $\frac{1}{4}$ mile distant. Surface and underground marks are standard disk station marks set in concrete. Reference mark is standard reference tablet set in concrete, 2,347.9 meters (7,703 feet) from station in azimuth $311^{\circ}42'56''$. It is the same concrete block that was used as a reference mark for station *Lake* (see description thereof).

Zyback (Wheeler County, Tex., W. Mussetter, 1927).—About 6 miles east and 1 mile south of Zyback, about 4 miles west of the old State line, on a prominent hill with sand dunes on its east side, and about 1 mile south of the highway between Rankin and Zyback. Reached from Zyback by going east on highway to Rankin about 6 miles to farm belonging to Chas. Levitt on north side of road, there turning south through gate and continuing south 1 mile to hill with station. Station marked by standard disk station mark in concrete. Not known if underground mark was set. Reference marks are standard reference disks in concrete; No. 1 is 121.32 meters (398.0 feet) from station in azimuth $305^{\circ}45'56''$; no. 2, 72.04 meters (236.4 feet), $10^{\circ}09'$.

Provines (Roger Mills County, W. Mussetter, 1927).—About 4 miles north and $1\frac{1}{2}$ miles west of Rankin, in sec. 22, T. 14 N., R. 26 W., on land owned by R. C. Provines, about 100 feet west of an orchard owned by J. W. Provines, about 130 feet south of road, and about 30 feet southwest of old shack. Reached from Rankin by going north 4 miles on road to Durham, then west on section line road about $1\frac{1}{2}$ miles to station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 59.35 meters (194.7 feet) from station in azimuth $214^{\circ}36'$; and no. 2, 94.25 meters (309.2 feet) in azimuth $50^{\circ}04'$.

Hanna (Roger Mills County, W. Mussetter, 1927).—About 4 miles west and $2\frac{1}{2}$ miles north of Rankin, about 2,075 feet east of old State line in NE. $\frac{1}{4}$ sec. 30, T. 14 N., R. 27 W., on land belonging to J. B. Hanna, at south edge of a cultivated field, 335 feet west of west fence line of road, 30.0 feet north of an east and west fence line, and 18.3 feet southwest of the main trunk of the largest bush in a clump. Station reached from Rankin by going west on Zyback Road for 4 miles and then turning north on a section line road and continuing $2\frac{1}{2}$ miles to point about 700 feet north of house at right of road where a row of cottonwood trees runs east of east side of road, and a fence runs west on west side. Station is just north of this fence. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 121.02 meters (397.0 feet) from station in azimuth $238^{\circ}22'45''$; no. 2, 9.48 meters (31.1 feet), $203^{\circ}53'$.

Hext (Hemphill County, Tex., W. Mussetter, 1927).—About 5 miles east and 4 miles north of Zyback, on land belonging to W. R. Hext, and occupied by Tom Hext, on highest point of hill or swell, about $\frac{1}{4}$ mile east of Tom Hext's house, a short distance east of fence, and 200 meters (656 feet) north of fence corner. Reached from Zyback by following Rankin Road east about 4 miles, 1 mile east of schoolhouse, to gate on north side of road, then following pasture road northerly about 4 miles to Tom Hext's house. Surface and underground marks are standard disk station marks in concrete. Two reference marks were set, standard reference disks in concrete. No. 1 is 66.92 meters (219.6 feet) from station in azimuth $22^{\circ}42'$; no. 2, 45.25 meters (148.5 feet), $148^{\circ}01'$.

Gem (Hemphill County, Tex., W. Mussetter, 1927).—About $1\frac{1}{2}$ miles east and $\frac{1}{2}$ mile north of the village of Gem, on the highest point of a prominent hill which breaks off sharply to the west and north, and has a gradual slope on the east and south. To reach from Gem take Route No. 24 east 1.6 miles to turn, thence north $\frac{1}{2}$ mile to gate at corner, and west 400 meters (1,312 feet) to station. Station and underground marks are standard disk station marks set in concrete. Two reference marks were set, no. 1 is standard tablet set in concrete, 23.10 meters (75.8 feet) from station in azimuth $182^{\circ}03'$; no. 2, standard tablet set in rock outcrop, 39.59 meters (129.9 feet), $273^{\circ}19'$.

Antelope (Roger Mills County, W. Mussetter, 1927).—About $2\frac{1}{4}$ miles east and $4\frac{1}{4}$ miles north of Durham, in sec. 32, T. 17 N., R. 25 W., on highest point of Antelope Hills. To reach from Durham go east on Highway 24, 2 miles, thence north on section line road $2\frac{1}{2}$ miles, through gate and by main pasture road 0.7 mile to forks. Follow right-hand fork $\frac{1}{2}$ mile, then straight north through gate about $\frac{1}{2}$ mile to foot of mesa. Station is about 250 meters (820 feet) northwest of road. Station marks are standard disk station marks set in rock. Reference marks are standard reference disks in rock. No. 1 is 167.36 meters (549.1 feet) from station in azimuth $184^{\circ}27'02''$. No. 2, 54.55 meters (178.97 feet), $262^{\circ}34'$.

Daly (Ellis County, W. Mussetter, 1927).—About $6\frac{3}{4}$ miles south and $2\frac{3}{4}$ miles east of Higgins, Texas, about $1\frac{1}{8}$ miles east of old State line, on a prominent high point in a pasture which slopes up gradually from the west and drops off abruptly on the east side. Pasture is owned by Felix Daly and is about $\frac{1}{4}$ mile northeast of house occupied by Homer Stucker. Station is about 100 meters (328 feet) north of fence line and 200 meters (656 feet) east of section line road. To reach from Higgins post office go south 0.6 mile, jog west, and follow main road south and east 6 miles to old State line; go south on old State line road 1 mile, thence east 1 mile, and south $\frac{3}{4}$ mile, when station will be 200 meters (656 feet) to east. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 83.51 meters (274.0 feet) from station in azimuth $295^{\circ}22'$; no. 2, 98.50 meters (323.2 feet), $30^{\circ}17'$.

Starbuck (Lipscomb County, Tex., W. Mussetter, 1927).—About 4 miles west and $3\frac{1}{2}$ miles south of Higgins, and about $1\frac{3}{4}$ miles due south of the buildings on the Starbuck Ranch, on highest point of a ridge which is 700 feet east of a fence line and just west of a large area where sand holes have been blown in the ground. To reach from Higgins go west along Highway No. 33 (Southwest Trail) 4.9 miles to a gate at south side of road with Starbuck sign at its top; turn south across railroad to ranch buildings owned by Starbuck and rented by Ivan Hale; turn east through barnyard and follow main pasture road 1 mile in southeasterly direction to fence corner with gate; go through gate and turn west along fence line and follow main road 0.6 mile, leave road and go south 0.6 mile to station site. Station marked by standard disk station mark in concrete. Not known if there is an underground mark. Reference marks are standard reference disks in concrete. No. 1 is 25.16 meters (82.5 feet) from station in azimuth $308^{\circ}15'$; no. 2, 51.50 meters (169.0 feet), $10^{\circ}34'$.

Santa (Ellis County, W. Mussetter, 1927).—About $2\frac{1}{2}$ miles east and $\frac{3}{4}$ mile north of Higgins, 1.3 miles east of old State line, on Atchison, Topeka & Santa Fe Railway right-of-way, at south side of tracks on highest point where dirt has been thrown back from cut, about $\frac{1}{2}$ mile north of Highway No. 13, and about 250 feet west of a fence line. Station reached from Higgins by Texas Highway No. 33 to old State line, thence east on Oklahoma Highway No. 13 for 1.3 miles to point opposite station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface.

Reference marks are standard reference disks in concrete. No. 1 is 32.61 meters (107.0 feet) from station in azimuth 239°02'; no. 2, 91.71 meters (300.9 feet), 42°55'.

Corn (Lipscomb County, Tex., W. Mussetter, 1927).—About 1¾ miles north and 1¾ miles west of Higgins, on highest point in a cultivated field, and about 300 meters (984 feet) north of a section line road. To reach from Higgins post office follow road north 0.6 mile, thence west 0.6 mile, turn north 1 mile to gate on section line left, and go west 0.8 mile, when the station will be on high ground 300 meters (984 feet) to north. Surface and underground marks are standard disk station marks set in concrete. Two reference marks were set, standard reference disks in concrete. No. 1 is 303.54 meters (995.9 feet) from station in azimuth 5°15'54"; no. 2, 221.29 meters (726.0 feet), 89°44'18".

Moreland (Lipscomb County, Tex., W. Mussetter, 1927).—About 5¼ miles north and 5¼ miles west of Higgins, on highest point of grassy knoll about 200 feet long on top, in pasture land, about 300 paces south of section line fence, and about 200 feet west of a wire fence and cultivated field. There is a slightly lower hill about 700 feet south which has some rocks on its north side; land belongs to A. E. Moreland, who lives about ¾ mile northeast of the station. To reach from Higgins, go north 0.6 mile, west 0.6 mile, north 2 miles, and west 4 miles to section line fence and gate at right. Turn north through gate and follow main pasture road north 2.3 miles to a dim road leading to left; take dim road and follow it to a gate at a fence corner, go through gate into cultivated field and turn north along fence line 0.4 mile. Station will then be at left about ¼ mile distant, just west of cultivated field and fence line. Surface and underground marks are standard disk station marks set in concrete. Two reference marks were set, standard reference disks set in rock. No. 1 is 42.15 meters (138.3 feet) from station in azimuth 56°05'; No. 2, 10.65 meters (34.9 feet), 123°02'.

Apple (Ellis County, W. Mussetter, 1927).—About 4 miles west and 2 miles south of Shattuck, 3 miles east of the old State line, on a prominent knoll at north side of a section-line road and in north fence line of roadway, about 100 paces east of section corner, on land belonging to L. L. Apple, about ¼ mile southwest of his house, and just south of a large pile of rocks. To reach from Shattuck, go south 0.8 mile on Oklahoma Highway No. 15, west 2½ miles, south 1 mile, and west 1½ miles to section corner and station site. Station marked by standard disk station mark set in rock below surface of ground. Reference marks are standard reference disks set in concrete. No. 1 is 67.69 meters (222.1 feet) from station; no. 2, 40.19 meters (131.9 feet), azimuths unknown. *Shattuck water tank* is 4.3 miles from station, in azimuth 251°42'54".

Follett (Lipscomb County, Tex., W. Mussetter, 1927; 1931).—About ½ mile east of the town of Follett, in cultivated field belonging to O. A. Crump, about ¼ mile southeast of house occupied by M. C. Sharp, about 100 meters (328 feet) east of section-line road, and 400 meters (1,312 feet) north of the Atchison, Topeka & Santa Fe Railway tracks. Reached from Follett by following road east from railroad station 0.6 mile to Sharp's house, thence southeast to station. Surface and underground marks are standard disk station marks set in concrete. Two reference marks, standard reference disks in concrete, were set in the fence line on east side of road. No. 1 is 117.53 meters (385.6 feet) from station, in azimuth 87°06'46"; no. 2, 181.48 meters (595.4 feet), 139°36'42". Other azimuths from the station are: *Follett, water tank* final, 93°27'54"; Follett, church cupola, tip of cross, 115°46'00".

Catesby south base (Ellis County, W. Mussetter, 1927).—About 5 miles south and 1 mile east of Catesby, about 10 miles north and 3¾ miles west of Shattuck, 3½ miles east of old State line, on land belonging to the State of Oklahoma and leased by W. C. Quintd, on a high point, in a cultivated field, 318 feet north of north fence line along the Uncle Sam Highway, 101 feet southwest of southwest corner of grain house, and 126 feet northeast of the trunk of the northernmost of three trees. H. H. Howard lives a short distance southwest of the station, and on opposite side of road. To reach from Shattuck post office, go north along main road to Follett (Uncle Sam Highway, marked with red, white, and blue) 11 miles to sign in northwest corner of roads, "Follett 13 mi.", thence west about 1.8 miles to station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is

294.47 meters (966.1 feet) from station in azimuth $293^{\circ}55'29''$; no. 2, 118.48 meters (388.7 feet), $356^{\circ}07'09''$.

Larkey (Lipscomb County, Tex., W. Mussetter, 1927; 1931).—About 4 miles north and $6\frac{1}{4}$ miles east of Follett, about $\frac{3}{4}$ mile southwest of the northeast corner of Texas, on land belonging to O. L. McClure and occupied in 1927 by W. H. Larkey, on highest point in a field about $\frac{1}{2}$ mile southwest of Larkey's house. To reach station from Follett, go north on Main Street to end of paving, then east 0.5 mile, north 3.0 miles, east 1.0 mile, north 1.4 miles, east 0.5 mile, then north 1.0 mile to trunk-line highway. Follow trunk-line highway east 5.7 miles to turn to south, then south 0.5 mile to a turn to east, where a dim road leads south. Follow dim road south 0.5 mile to turn to west, and go west to a road leading south in front of Larkey's house. A large stone planted at corner of fence will be found here. Continue west from stone about 100 yards to gate in fence on south side of road, going through gate follow road to house, thence through cultivated fields to station on top of rise to southwest. Surface and underground marks are standard disk station marks in concrete. Underground mark is 3 feet underground. Two reference marks were set, standard reference disks in concrete. No. 1 is 192.86 meters (632.7 feet) from station in azimuth $354^{\circ}34'33''$; no. 2, 226.48 meters (743.0 feet) in azimuth $86^{\circ}31'51''$.

Flat Top (Beaver County, W. Mussetter, 1927).—About $1\frac{1}{2}$ miles south and $1\frac{1}{4}$ miles west of Speermore, Oklahoma, and about $10\frac{1}{2}$ miles north and 6 miles east of Follett, Texas, on a hill known locally as "Flat Top." Station is on southeast end of hill, about 0.4 mile south of section-line road, and on land belonging to Clara Covey, who lives about 0.4 mile northeast of station. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 185.00 meters (607.0 feet) from station in azimuth $187^{\circ}04'31''$; no. 2, 100.00 meters (328.1 feet), $79^{\circ}40'38''$. Azimuth from station of black tank at Follett, finial, is $1^{\circ}43'36''$.

Catesby north base (Ellis County, W. Mussetter, 1927).—About $3\frac{1}{2}$ miles east of Catesby, 15 miles north and $1\frac{1}{4}$ miles west of Shattuck, $5\frac{3}{4}$ miles east of old State line, at north side of trunk highway, about $\frac{1}{2}$ mile east of a new house, 24 feet north of north fence line along highway, 344 feet northwest of northwest corner of old vacant house with windmill, and 240 feet east of lone bush at roadside. To reach from Shattuck, go north 11 miles on main road to Follett (Uncle Sam Highway) to point where sign in northwest corner of roads reads "13 mi. to Follett", then straight north 5 miles to sign "Shattuck 16 ml.", and east 0.7 mile to station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 60.39 meters (198.1 feet) from station, in azimuth $275^{\circ}47'$; no. 2, 135.20 meters (443.6 feet), $86^{\circ}16'58''$.

Martin (Beckham County, W. Mussetter, 1927).—About 10 miles south of Texola, about $\frac{1}{2}$ mile east of old State line, on a prominent ridge running in northwesterly and southeasterly direction, on prominent knoll just east of pipe and telephone lines, and of road leading along pipe line through pasture. To reach from Shamrock follow U. S. Highway No. 66 easterly about 7 miles to Midway filling station, thence south 3 miles to ranch house; pass through two gates into pasture; follow fence east 0.7 mile to pipe line; then follow pipe-line road about 10.4 miles to station on knoll about 200 feet east of road. From Texola, Midway filling station is reached by Highway No. 66, west 8 miles. Station marks are standard disk station marks in concrete, underground mark is 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 331.33 meters (1,087.0 feet) from station in azimuth $332^{\circ}44'18''$; no. 2 is 94.10 meters (308.7 feet), $96^{\circ}20'$.

Breaks (Beckham County, W. Mussetter, 1927).—About 3 miles south and $\frac{1}{4}$ mile west of Texola, about 3,000 feet east of old State line, 575 feet west of west fence on old section line road, in pasture land, on a narrow ridge which runs westward from the fence about $\frac{1}{4}$ mile, and then breaks off into creek bottoms. Station is not on highest point of ridge. To reach from Texola city water tank follow U. S. Highway No. 66 east, south and east 1.6 miles to road turning south over plank culvert; follow this road south 1.2 miles to house of T. A. Nay, thence into road into field north of house, and west $\frac{1}{4}$ mile. Go south along west side of fence about 0.3 mile to forks; take right-hand fork

0.3 mile to house; about 100 feet west of house turn south through gate and follow fence in southwesterly direction about $\frac{1}{2}$ mile to ridge, thence 0.6 mile southwest to station. Station marks are standard disk station marks set in concrete. Reference marks are standard reference disks in concrete. No. 1 is 176.93 meters (580.5 feet) from station in azimuth $259^{\circ}36'45''$; no. 2, 342.66 meters (1,124.2 feet), $94^{\circ}34'45''$. Azimuth of *Texola water tank*, $186^{\circ}50'53''$.

Texola (Beckham County, W. Mussetter, 1927).—About 1.3 miles north and $\frac{1}{2}$ mile west of Texola, 1 mile north of the railroad, about 2,100 feet east of old State line, on a small sand hill, on cultivated land belonging to Mr. Cobb about 0.3 mile north of a small lake, and 485 feet east of a road. To reach from Texola go west along U.S. Highway No. 66 about $\frac{1}{2}$ mile, then north 1 mile to point where there is an old gate. Station is about 485 feet to east of gate. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 142.09 meters (466.2 feet) from station in azimuth $89^{\circ}57'38''$; no. 2, 516.02 meters (1,693.0 feet), $164^{\circ}46'37''$.

Addis (Beckham County, W. Mussetter, 1927).—About 8 miles north and $\frac{1}{4}$ mile west of Texola, and 2,200 feet east of the old State line, on highest point of a slight rise in sandy pasture land belonging to Mr. Addis, about $\frac{1}{4}$ mile northwest of a house occupied by W. J. Bass, 700 feet northeast of vacant house at north end of row of cottonwood trees, 318 paces north of fence along south side of section line road, and 170 paces west of a north and south fence. Reached from Texola by following main street due north 6.5 miles, east $\frac{1}{2}$ mile, north 1.5 miles to corner, west through gate at small house, and along sandy road west about 0.9 mile to house at end of cottonwoods, thence northeast 700 feet to station. Station marks are standard disk station marks set in concrete. Reference marks are standard reference disks set in concrete. No. 1 is 279.03 meters (915.5 feet) from station in azimuth $10^{\circ}55'01''$; no. 2, 18.82 meters (61.7 feet), $126^{\circ}18'$.

Dune (Beckham County, W. Mussetter, 1927).—About 5 miles west and $1\frac{1}{2}$ miles south of the town of Sweetwater, about 2,400 feet east of the old State line, on highest point of knoll in pasture land covered with scrub oaks, 845 feet east of east fence along section line and about 900 feet north of a row of cottonwood trees. There is another row of cottonwood trees about $\frac{1}{2}$ mile to the north. Station reached from Sweetwater by going due west for 5 miles on section line road, then turning south through gate on section line and going south $\frac{1}{2}$ mile to station. Station marks are standard disk station marks in concrete, the underground mark being 3 feet below the surface. Reference marks are standard reference disks in concrete. No. 1 is 16.59 meters (54.4 feet) from station in azimuth $145^{\circ}00'$; no. 2, 389.02 meters (1,276.3 feet), $2^{\circ}35'10''$.

Lake (Roger Mills County, W. Mussetter, 1927).—About $6\frac{1}{2}$ miles south and 4 miles west of Rankin, about $\frac{1}{4}$ mile north and $\frac{1}{4}$ mile west of Meridian Lake, about 1,900 feet east of State line in sec. 7, T. 12 N., R. 26 W., on a sand dune, at the south end and near center of a large bare sand spot which is about $\frac{1}{4}$ mile long and about as wide, and about 585 feet west of a fence line which runs along west edge of lake. There are 2 small cottonwood trees on west side of dune, and 1 on east side. Reached from Rankin by going west on the Zyback road 4 miles, then turning south on section line road and going 5 miles to fence corner, thence southwest about 0.3 mile to fence and gate which leads to station *Sockwell*. From this gate follow main road in southeasterly direction about 0.7 mile to fence corner then go south 0.3 mile, and west to station. Station marks are standard disk station marks in concrete. Reference mark is standard reference disk in concrete, 556.3 meters (1,825 feet) from station in azimuth $208^{\circ}17'31''$.

Locust (Roger Mills County, W. Mussetter, 1927).—About 6 miles north and 4 miles west of Rankin, about 1,800 feet east of old State line, in sec. 6, T. 14 N., R. 27 W., on a slight rise in a sandy field which has been cultivated. Station is 430 feet north of section line fence, about 600 feet west of section line road which has a long row of cottonwood trees along its east side, and 700 feet northwest of old shed at section corner. Reached from Rankin by Zyback road west 4 miles, thence north 6 miles to section corner and old shed. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 225.19 meters (738.8 feet)

from station in azimuth $300^{\circ}58'14''$; no. 2, 133.53 meters (438.1 feet), $359^{\circ}28'22''$.

Washita (Roger Mills County, W. Mussetter, 1927).—About 4 miles west and $1\frac{1}{2}$ miles south of Durham, about 2,000 feet east of old State line, $\frac{1}{2}$ mile north of Highway No. 24, on highest point of pasture land, about 100 meters (328 feet) west of section line road, and 70 meters (230 feet) north of fence between pasture and cultivated field to south. To reach from Durham follow Highway No. 24 west and south to first section line road east of old State line; follow this road north $\frac{1}{2}$ mile and station will be at left. Station marks are standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 123.59 meters (405.5 feet) from station in azimuth $299^{\circ}33'59''$; no. 2, 128.40 meters (421.3 feet), $63^{\circ}49'37''$.

Canadian (Ellis County, W. Mussetter, 1927).—About $12\frac{1}{4}$ miles south and $1\frac{1}{2}$ miles east of Higgins, Texas, about 1,945 feet east of the old State line, on a small knoll in pasture land, about $\frac{1}{4}$ mile southwest of A. J. McKesson's house, with small red barn in grove, 335 paces southeast of a windmill, and 140 paces west of a plain pasture road which leads south from red barn. There is a slightly smaller knoll between this road and the station. To reach from Higgins post office go south 0.4 mile, jog west, and follow main road south and east until 6.6 miles from post office, and road turns south at old State line; turn south along old State line road and go 6 miles to where road turns east, towards McKesson's house. Station marks are standard disk station marks in concrete; underground mark is 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 14.095 meters (46.24 feet) from station in azimuth $158^{\circ}19'$; no. 2, 22.10 meters (72.5 feet), $267^{\circ}11'$.

Stucker (Ellis County, W. Mussetter, 1927).—About $5\frac{1}{2}$ miles south and $1\frac{1}{2}$ miles east of Higgins, about 2,200 feet east of old State line, on land belonging to S. S. Stucker, who lives just west of station at State line. To reach from Higgins go south from post office 0.4 mile, jog west, and south again along main road until 6.6 miles from post office. At this point old State line will be reached and road turns south along line. Stucker's house is just east of road at this corner. Go east from State line road through Stucker's barnyard and along north side of fence line 0.4 mile to fence corner on hill; station is 15 paces south of this point. Station marks are standard disk station marks set in concrete. Reference marks are standard reference disks in concrete. No. 1 is 49.17 meters (161.3 feet) from station in azimuth $290^{\circ}33'$; no. 2, 707.12 meters (2,319.9 feet), $94^{\circ}51'06''$.

Mussetter (Ellis County, W. Mussetter, 1927).—About $1\frac{1}{2}$ miles east and $\frac{1}{2}$ mile north of Higgins, about 1,900 feet east of old State line, about $\frac{1}{4}$ mile south of the Atchison, Topeka & Santa Fe Railway, on fence line about 600 feet northeast of white house, and 500 feet north and 63 feet east of a red barn. Station reached from Higgins by going east to old State line on State Highway No. 33, thence south across Atchison, Topeka and Santa Fe Railway tracks about 0.1 mile, then east on road through cultivated field to white house and red barn referred to above. Station marked by standard disk station marks in concrete. Reference marks are standard reference disks in concrete. No. 1 is 231.38 meters (759.1 feet) from station in azimuth $90^{\circ}06'33''$; no. 2, 594.28 meters (1,949.7 feet), $135^{\circ}09'52''$. Azimuth of Higgins water tank, $67^{\circ}33'18''$.

Higgins astronomical station (Lipscomb County, Tex., W. Mussetter, 1927).—Longitude station established in 1903 by U.S. Government Land Office. Located in the town of Higgins, about $\frac{1}{4}$ mile north of the Atchison, Topeka & Santa Fe Railway tracks, on land belonging to H. A. Walker. To reach from Peugh's gasoline station at Higgins, go north 1 block, east a short distance to first alley which leads north, thence 250 feet through alley. Station will be found about 100 feet east of the alley fence and nearly east of an old windmill which has been blackened by fire. Station marked by a concrete pier in the form of frustrum of a pyramid, 18 by 24 inches, 36 inches in ground and 30 inches above ground. Lower base 24 by 30 inches.

Kella (Ellis County, W. Mussetter, 1927).—About 7 miles west and $2\frac{1}{2}$ miles south of Shattuck, about 1900 feet east of old State line, on a grassy knoll in a pasture and 75 paces south of wire fence. A pasture road runs over the top of the knoll to a vacant house about $\frac{1}{4}$ mile to southeast owned by Dave Kellen. Windmill at this house is visible from station on bearing 130° . To reach station from Shattuck go south 0.8 mile on Oklahoma Highway No. 15, then west $2\frac{1}{2}$ miles, south 1 mile, west 4 miles to gate at south side of

road, south through gate and follow pasture road 0.3 mile to fence corner and station. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1, distance not measured, is in azimuth $220^{\circ}05'$ from station, while distance and azimuth of no. 2 are 76.50 meters (251.0 feet), $111^{\circ}40'$.

Hartman (Ellis County, W. Mussetter, 1927).—About $6\frac{3}{4}$ miles west and $3\frac{1}{4}$ miles north of Shattuck, about 2,100 feet east of the old State line, on highest point of a hill with flat top and low rim of rock around south and west sides, on land owned by C. A. Hartman, and about $\frac{1}{2}$ mile north of a house owned and occupied by A. W. Starbuck. Station reached from Shattuck by going north 2 miles from post office, turning west and following main road for 6.3 miles, then north for 1 mile, going through gate in section line fence and continuing north along pasture road for 0.4 mile when station will be on top of hill to east. Station marked by triangular hole in ground. Reference marks are standard reference disks in rock. No. 1 is 587.58 meters (1,927.8 feet), from station in azimuth $74^{\circ}10'46''$; no. 2, 122.90 meters (403.2 feet), $204^{\circ}42'44''$. Azimuth of *Shattuck water tank*, $300^{\circ}44'13''$.

Ellis (Lipscomb County, Tex., W. Mussetter, 1927).—About $7\frac{1}{2}$ miles east and 2 miles north of Follett, about 1,800 feet east of old State line, and about $2\frac{1}{2}$ miles north of main road between Shattuck and Follett (Uncle Sam Highway), on highest point of a grassy hill, 100 paces west of fence line and 185 paces north of another fence. To reach from Follett go east to old State line, on Uncle Sam Highway, continue about 0.2 mile east of line, then north along fence line $2\frac{1}{2}$ miles to point where fences run to north, south, and west, but none to east. Station marks are standard disk station marks in concrete, underground mark being 3 feet below surface. Reference marks are standard reference disks in concrete. No. 1 is 167.90 meters (550.9 feet) from station in azimuth $4^{\circ}33''$; no. 2, 254.92 meters (836.4 feet), $140^{\circ}22'42''$.

Kidder monument eccentric (Lipscomb County, Tex., W. Mussetter, 1927).—An unmarked point, 355.074 meters (1,164.94 feet) in azimuth $79^{\circ}12'37''$ from station *Kidder monument* (1903) (see description thereof).

Supplementary points

Kidder monument (1903) (Ellis County, W. Mussetter, 1927; 1931).—About 1,754 feet east and 243 feet north of old stone at old northeast corner of Lipscomb County, Tex., and east end of Cimarron Base, in T. 23 N., R. 26 W., on land belonging to A. A. Larkey whose home is $\frac{1}{2}$ mile to south. Station is in cultivated field, and is marked by a concrete monument, the frustrum of a cone about 18 inches in diameter projecting 30 inches above the ground, encased in zinc, and marked:

36 30 N.L.
100 W.L.
1903

In 1927 a standard disk station mark was set in monument. Reached from Follett, Texas, by following description given for station *Northeast corner of Texas* (1928).

Old northeast corner of Texas (Lipscomb County, Tex., W. Mussetter, 1927).—About $\frac{3}{4}$ mile northeast of station *Larkey*, (see description thereof) at old northeast corner of Lipscomb County, and about 1,800 feet south of west from *Kidder monument* (1903) (see description thereof). Station reached by following directions for station *Larkey* to home of W. H. Larkey. Marked by a sandstone post 12 by 15 by 48 inches, found broken off at surface of ground. It is marked:

36 30
N.E.Cor. Texas
I. T.

Post replaced approximately in its original position, and center determined. This mark was placed by Chaney and Smith in 1881 to mark the east end of the Cimarron Base. It must not be confused with the *Northeast corner of Texas* (1928) (see description elsewhere) established in 1923 by order of the Supreme Court of the United States.

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC

Principal points

Potato (Las Animas County, Colo., C. M. Durgin, 1922).—About 15 miles southeast of Kim, 25 miles northwest of Kenton, Okla., on highest point of Potato Butte (lone knob on top of lone mesa, Mesa Baquite), and about $1\frac{1}{2}$ miles southeast of McArthur's sheep ranch. Best approach is by road from southeast side of mesa. Station mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in rock, note 12. No. 1 is 10.20 meters (33.5 feet) from station in azimuth $198^{\circ}38'$. No. 2 is 2.88 meters (9.4 feet) from station in azimuth $275^{\circ}39'$.

Clayton east base (Union County, N.Mex., C. M. Durgin, 1922).—About 20 miles north of Clayton, 6 miles east and 2 miles north of Cuates post office, near western end of level-topped knoll at western side of sec. 27, T. 30 N., R. 35 E., on land owned by Orville Moulder, $\frac{1}{4}$ mile north-northeast from stone house, 50 meters (164 feet) back from brow of hill, and on line with Mount Dora and stone house. Surface mark is standard station disk in concrete, note 1a. Underground mark is standard station disk in drill hole in bedrock, note 8a. Reference mark is standard reference disk in concrete, note 11a, on north and south fence line on west line of section, directly on line with *Clayton west base*, and 150.425 meters (493.52 feet) from the station.

New Mexico-Colorado boundary milepost no. 328 eccentric (Union County, N.Mex., C. M. Durgin, 1922).—On Mesa de Maya, about 3 miles east of Sheep Pen Canyon, 1 mile north from Cimarron Valley, 3 miles east from the Steele ranch and stone schoolhouse in Cimarron Valley, on grassy prairie, $\frac{1}{4}$ mile southeast from small lake, and on high land south of milepost no. 328. To reach from Kenton, go up Blacksmith Canyon or from Dalerose go up Owl Roost Canyon and proceed southeast 15 miles across country to station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 16.20 meters (53.1 feet) from station in azimuth $287^{\circ}20'$. *New Mexico-Colorado boundary milepost no. 328* is 101.53 meters (333.1 feet) from station in azimuth $180^{\circ}02'41''$.

Clayton west base (Union County, N.Mex., C. M. Durgin, 1929).—About 23 miles northwest of Clayton, $\frac{1}{4}$ mile south of Cuates post office, on highest point and western end of ridge at western half of sec. 9, T. 29 N., R. 34 E., and on land belonging to First National Bank of Clayton. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, in east and west fence line, on south side of roadway along section line north of station, and 398.92 meters (1,308.8 feet) from station in azimuth $181^{\circ}48'30''$. Distance from station to west section line is 357.8 meters (1,174 feet), and to north section line 406.3 meters (1,333 feet).

Seneca (Union County, N.Mex., C. M. Durgin, 1922; 1931).—Eighteen miles north from Clayton, $2\frac{1}{2}$ miles northwest from Seneca post office, on highest point of ridge, 900 meters (2,953 feet) west of road, about 700 meters (2,297 feet) northeast of corner of secs. 23, 24, 25, and 26, T. 28 N., R. 35 E. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 8.21 meters (26.9 feet) from station in azimuth $295^{\circ}31'$; no. 2, 11.82 meters (38.8 feet), $60^{\circ}46'$. Other azimuths from station are: House, chimney, $\frac{1}{2}$ mile distant, $70^{\circ}55'59''$; stone house, chimney, distant $\frac{3}{4}$ mile, $207^{\circ}24'25''$; large square frame house, chimney, distant 1 mile, $292^{\circ}34'24''$. Station was recovered as described in 1931, and both references and station remarked, presumably as described in original marking. The distance of reference mark no. 2 was reported to be 38.62 feet.

Rabbit (Union County, N.Mex., C. M. Durgin, 1922; 1931).—On highest point of Rabbit Ear Butte, 6 miles northwest from Clayton, in rocky outcrop 12 meters (39 feet) northwest from the southeast edge of the top. Marked with a standard disk station mark in outcropping bedrock, note 2. In 1931 mark was found broken off and was replaced with a new mark. Reference marks are standard reference disks in rock, note 12. No. 1 is 11.315 meters (37.12 feet) from station in azimuth $214^{\circ}57'$; no. 2, 8.205 meters (26.92 feet), $76^{\circ}42'$.

Following azimuths are from station: *Tealine, West Texas Utilities Co., water tank, final*, $311^{\circ}10'16''$; *Clayton, municipal water tank (silver), final*, $330^{\circ}09'53''$. In 1931 station was reached from railroad tracks northwest of Clayton 0.6 mile northwest on U.S. Route No. 385, to point where highway turns left and crosses railroad; continue straight ahead 0.1 mile and turn right along a telephone line and go 7.2 miles to sharp turn to west. The fence on east side of road makes a right angle, turn to west at this point. Go through wire gap in fence and southeast across open pasture toward highest point of butte. Truck can be driven to within 10 minutes walk of station.

Supplementary points

De Maya (Union County, N.Mex., C. M. Durgin, 1922).—About 15 miles northwest of Kenton, on prominent point of Mesa de Maya, and opposite cone-shaped butte which is $2\frac{1}{2}$ miles west of Jack Gillworth's house. Station mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks set according to note 12. No. 1 is 29.80 meters (97.8 feet) from station in azimuth $264^{\circ}43'$. No. 2 is 65.30 meters (214.2 feet) from station in azimuth $316^{\circ}48'$.

Collins (Baca County, Colo., C. M. Durgin, 1922).—About 16 miles northeast of Kenton, on highest point of Mesa de Maya which extends eastward, about 6 miles west by north of Pard Collins' house, and 3 miles west by north of northeast corner of New Mexico. Station mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks, set according to note 12. No. 1 is 33.34 meters (109.4 feet) from station in azimuth $187^{\circ}01'$. No. 2 is 29.37 meters (96.4 feet) from station in azimuth $283^{\circ}39'$.

Boundary monument (1900 Colorado-New Mexico-California) (Union County, N.Mex., C. M. Durgin, 1922).—About 13 miles northwest of Kenton, 3 miles west by north of Pard Collins' house, and 125 meters (410 feet) north of wire gate. Marked by large stone monument surrounded by pile of rocks. *New Mexico-Colorado boundary (old)* (M. C. 1881) is 283.24 meters (929.3 feet) from station in azimuth $179^{\circ}56'06''$.

New Mexico-Colorado boundary milepost no. 328 (Union County, N.Mex., H. B. Carpenter, 1902; 1922).—On Mesa de Maya, about 3 miles east of Sheep Pen Canyon, on a grassy prairie, 1 mile north from Cimarron Valley, 3 miles east from the Steele ranch and stone schoolhouse in Cimarron Valley, and $\frac{1}{4}$ mile southeast from a small lake. The station was originally marked by an iron post firmly set in the ground and surrounded by a small mound of stone. By decree of the Supreme Court of the United States (268 U.S. 108) the boundary marks of Carpenter's survey were declared not to be the true boundary and were ordered destroyed. However, this mark was replaced by a concrete survey monument 8 by 8 by 36 inches, set 24 inches in the ground and with a triangle templet seated in the top. A mound of stone was built around the monument. *New Mexico-Colorado boundary milepost no. 328 eccentric* is 101.53 meters (333.1 feet) north of the station.

Eccentric no. 4 (Union County, N.Mex., Dallam County, Tex., C. M. Durgin, 1922).—On the boundary between Texas and New Mexico, 4 miles south of *Northwest corner of Texas* (see description thereof), at summit of first rise south of that corner, and on east side of section-line road. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is standard reference disk in concrete, note 11a, 21.45 meters (70.4 feet) from station in azimuth $96^{\circ}12'$. *New Mexico-Texas boundary milepost no. 4*, a stone monument, is 178.435 meters (585.42 feet) from station in azimuth $0^{\circ}04'57''$; and *New Mexico-Texas boundary, mile corner no. 306* is distant 523.205 meters (1,716.55 feet) in azimuth $0^{\circ}07'44''$.

Northwest corner of Texas (Dallam County, Tex.-Union County, N.Mex., C. M. Durgin, 1922).—At the northwest corner of Texas, about 6 miles east and 6 miles north of Clayton. Mark is concrete monument known as Clark's monument.

Milepost no. 1 (Dallam County, Tex.-Union County, N.Mex., C. M. Durgin, 1922).—On the Texas-New Mexico boundary, 7 miles east and 6 miles north of Clayton, and 1 mile east of *Northwest corner of Texas* (see description thereof). Mark is a stone monument.

OKLAHOMA-TEXAS BOUNDARY (PARALLEL 36°30') ARC

Principal points

Eklund (Union County, N.Mex., C. I. Aslakson, 1931).—About 6 miles north of Clayton, on highest point of two rocky buttes on top of a big mesa on the Eklund Ranch. A telephone line crosses the butte in a north and south direction. Station marked by a standard disk station mark in outcropping bedrock, note 2. Reference marks are standard reference disks in outcropping bedrock, note 12a. No. 1 is 38.24 meters (125.5 feet) (slope distance) from station, in azimuth 197°11'; no. 2, 62.27 meters (204.3 feet) (slope distance), 76°29'. Other azimuths from station are: *Texline, West Texas Utilities Co., water tank*, 321°08'52"; *Clayton, municipal water tank (silver)*, 8°09'50". Station reached from Clayton east on Main Street one block beyond end of pavement, then left and around end of group of sheds and across new railroad track, through gates in sheep lot onto road along telephone line. Continue along this road keeping to main traveled track 5.1 miles from sheep lot, to point just before reaching ditch across main track and a lone tree where a road leads off to left and up onto the mesa. Follow this road, keeping on left side of ditch to end of track at small shed, windmill, pond and cattle pens. Go through gate at northeast corner of pens at small shed and bear southeast across pasture to highest point of butte. In wet weather go east 3½ miles from Clayton on State Road No. 18 to gate on left; through gate and 1.4 miles to road leading north to small lone tree mentioned above.

Hoover (Union County, N.Mex., C. M. Durgin, 1922; 1931).—About 16 miles northeast of Clayton, 3½ miles east and 2 miles south from Seneca post office, on highest point of hill in western half of sec. 11, T. 27 N., R. 36 E., 120 meters (394 feet) west of fence, on land owned by O. T. Campbell. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. In 1931 the surface mark was found to have been destroyed, and a new surface mark described by note 1a was set. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 9.396 meters (30.83 feet) from station in azimuth 159°11'; no. 2, 10.965 meters (35.97 feet), 256°44'. Following azimuths are from station: *Clayton silver water tank, final*, 33°03'13"; *Texline, West Texas Utilities Co., water tank*, 351°11'11". To reach station from Clayton go south on First Street, then east 3.2 miles on State Highway No. 18 to a turn to north, then north 10.8 miles to road to east at roadway store and filling station, thence east 3.0 miles, through a gate and south along section line 1.0 mile to fence corner just beyond a house, and from fence corner southeast 0.6 mile to highest point of hill and station.

Clay (Union County, N. Mex., C. M. Durgin, 1922; 1931).—One-half mile east of the town of Clayton, on high land 0.2 mile south of Stimson's Dairy, and 0.3 mile north of the Clayton-Texline highway (State Highway No. 18), between which and station, a new railroad cut was reported in 1931, at which time the dairy buildings were reported as having been removed, there no longer being any buildings near the station. A new telephone line (1931) running north and south is about 250 yards east of station. Surface mark is standard disk station mark in bedrock, note 2. Reference marks are standard reference disks in rock, note 12. No. 1 is 22.958 meters (75.32 feet) from station in azimuth 238°31'; no. 2, 27.682 meters (90.82 feet), 356°19'. Following azimuths are from station: *Texline, West Texas Utilities Co., water tank, final*, 305°41'03"; *Clayton, silver water tank, final*, 57°34'42". To reach station from Clayton go east on Main Street to railroad crossing at end of street, cross tracks and onto bank between north edge of cut and fence; continue eastward along fence to lane bearing northward; turn into lane and go to its end, then through gate and bear a little southeast ¼ mile to station, which is about 40 meters (131 feet) west of north-and-south fence and about 100 meters (328 feet) north of an east-and-west fence.

School (Cimarron County, C. I. Aslakson, 1931).—About 10 miles, air line, west by north of the town of Felt, about 2 miles south of the north fork of the Canadian River, 7 miles north and 3 miles east of the old State line, about ¼ mile north and about 0.1 mile west of southeast corner of sec. 28, T. 2 N., R. 1 E., on public-school land, on a small knoll in pasture land, on highest ground in the vicinity. To reach station from Clayton, N.Mex., go south on First Street, one block from post office, turn east on State Highway No. 18,

and go 3.2 miles to where highway turns north, then north on highway 5.0 miles, east 7.0 miles, north along old State line 5.3 miles, east 1.0 mile to where main road turns north and dim road goes east through gate. Follow dim road along south side of fence 1.0 mile, jog through gap and continue east along north side of fence $\frac{3}{4}$ mile, then bear left and go northeast about $\frac{1}{4}$ mile to station on a small knoll. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 4 inches above ground, is 3.64 meters (11.9 feet) north of intersection of fence lines and 0.20 meter (0.7 foot) west of north and south fence line, and approximately $\frac{1}{4}$ mile from station in azimuth $337^{\circ}44'28''$. No. 2 projects about 6 inches above ground, and is 150.98 feet from station in azimuth $62^{\circ}59'$. Other azimuths from the station are: *Texline, West Texas Utilities Co., water tank, final*, $14^{\circ}25'36''$; *Clayton, municipal water tank, final*, $49^{\circ}58'00''$.

Worsham (Sallam County, Tex., C. I. Aslakson, 1931).—About 5 miles (air line) north of Texline, Tex., about 2 miles east of west boundary line of Texas, about $3\frac{1}{2}$ miles south of north boundary of Texas, on land belonging to Carl Worsham of Henrietta, Tex., and occupied by Joe Cluck, in an east-and-west fence line, 287.4 feet southeast of southeast corner of brick foundation to white house, and 11.4 meters (37 feet) west of a north-and-south fence. Station reached from Texline by going westward 2 blocks from flagpole and street light to a road to north; turn right on this road and go northeast and north 4.75 miles to a road to east through a wire gate; go through gate and eastward to a two-story white farm house and station as above. Surface and underground marks are standard disk station marks in concrete, note 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in north-and-south fence line at north end of gate, about 9 feet north of an east-and-west fence, and 0.25 mile (speedometer) from station in azimuth $358^{\circ}23'18''$. No. 2 is in an east-and-west fence line, 25.405 meters (83.35 feet) from station in azimuth $90^{\circ}33'$. Other azimuths from station: *Booster Station, black water tank, final*, $139^{\circ}14'17''$; *Clayton, municipal water tank (silver), final*, $88^{\circ}53'59''$.

Felt (Cimarron County, C. I. Aslakson, 1931).—About 3 miles north and $1\frac{1}{2}$ miles east of town of Felt, about $\frac{1}{2}$ mile north of the north fork of the Canadian River (shown on some maps as the Beaver River), about 0.1 mile west and 0.4 mile north of the southeast corner of sec. 30, T. 2 N., R. 3 E., on a small knoll, the highest point in the vicinity, in pasture land. Station reached from Felt east on road that is south of elevator, 0.35 mile to section line road to north; north $3\frac{1}{2}$ miles to section line road intersection at point where all sections are under cultivation, and only section to southeast is fenced; there turn east on north side of fence and go 0.85 mile to gate and cattle guard to south; go south through fence then bear a little east of south and go 0.6 mile to knoll and station. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. Both project about 2 inches above surface. No. 1 is 89.82 feet from station in azimuth $73^{\circ}48'$. No. 2 is 8.0 meters (26 feet) west of cattle guard, 0.24 meter (0.8 foot) south of fence line, and approximately 0.6 mile from station in azimuth $167^{\circ}47'12''$.

X. I. T. (Dallam County, Tex., C. I. Aslakson, 1931).—About 14 miles northeast of Texline, Texas, on land known as the old X. I. T. Ranch, on a north and south road 6.4 miles south of a small bridge just south of Felt, Oklahoma, 2.4 miles south of the Oklahoma-Texas boundary line, on east side of road, $\frac{1}{4}$ mile east of the old F. D. W. ranch house and buildings. Reached from Texline by going southeast on U.S. Route 385 from Gulf filling station one block to Magnolia filling station, there turning left and going 0.4 mile; turn right and go 7.6 miles, passing a galvanized iron building at 0.3 mile and a small culvert or bridge at 3.3 miles; turn north at T-intersection and go 0.4 mile, then east 5.5 miles, then north 4.0 miles, east $\frac{1}{4}$ mile, and north $1\frac{1}{4}$ miles to station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot west of fence line on east side of road, and 0.2 mile (speedometer) from station in azimuth $0^{\circ}16'38''$. No. 2 is 1 foot east of fence line on west side of road, and 17.765 meters

(58.28 feet) from station in azimuth $92^{\circ}52'$. Azimuth from station of tip of vertical shaft of windmill distant approximately $\frac{1}{4}$ mile is $89^{\circ}13'06''$.

Harmer (Cimarron County, C. I. Aslakson, 1931).—About $3\frac{1}{2}$ miles, air line, southeast of Harmer, a station on the Santa Fe railroad, about $9\frac{1}{2}$ miles southwest of Boise City, about 1 mile south of the north fork of the Canadian River, on a slight rise in uncultivated ground in the northwest corner of sec. 26, T. 2 N., R. 4 E. To reach station from Boise City go west from courthouse square 0.2 mile, south $\frac{3}{4}$ mile, west 2.0 miles, south 5.8 miles to wire gate on west side of road. Go through gate and follow road across prairie southwest and south, west and southwest for $2\frac{1}{2}$ miles to small ranch house. Go through gate to southwest of house and follow road to westward 1.2 miles to wire corral that is about 100 yards south of a section line fence. At corral turn to left and go about 0.35 mile to southwest to station on high ground. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 is flush with ground, 3.4 meters (11 feet) west of west side of wire gate, 0.17 meter (0.6 foot) south of fence line, and approximately 0.5 mile from station in azimuth $207^{\circ}23'40''$. No. 2 projects about 4 inches above ground, and is 99.33 feet from station in azimuth $320^{\circ}57'$. Azimuth from station of *Boise City, Cimarron Utilities Co., tank*, is $212^{\circ}08'39''$; *Grain elevator, south gable*, $131^{\circ}59'03''$.

Schellenberg (Dallam County, Tex., C. I. Aslakson, 1931).—About 23 miles northeast of Texline, Tex., on highest part of ridge, in pasture land belonging to A. L. Schellenberg, 0.3 mile west of section line road, 307.5 feet south of a north-and-south fence. To reach station from Texline, go southeast on route 385 from Gulf filling station one block to Magnolia filling station, turn left and go 0.4 mile, right 7.6 miles, passing galvanized iron building at 0.3 mile and small culvert bridge at 3.3 miles, to T-intersection. From this point continue east for 3.0 miles, turn left and go 0.5 mile, right 7.0 miles to dim road leading north; turn left on dim section line road and go 2.0 miles to a T-intersection with a dim section line road running east and west along south side of fence. Turn west and go 0.3 mile along fence, thence south 307.5 feet to station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is on ridge southwest of station, 30.40 meters (99.7 feet) from station in azimuth $10^{\circ}23'$. No. 2 is 1 foot south of east-and-west fence, north of the north end of a north-and-south fence, and 0.3 mile (speedometer) from station in azimuth $260^{\circ}12'38''$. Other azimuths from station are: *Rabbit Ear Butte, northernmost peak, tip*, $95^{\circ}59'57''$; *chimney, center of brown bungalow, distant approximately 1 mile*, $192^{\circ}21'33''$.

Rogers (Cimarron County, C. I. Aslakson, 1931).—About 10 miles southeast of Boise City, about 1 mile south of the north fork of the Canadian River, in the SE $\frac{1}{4}$ sec. 28, T. 2 N., R. 6 E. Station reached from Boise City by going west 0.2 mile from courthouse square, south $\frac{3}{4}$ mile, west 2.0 miles, south 9.0 miles, to gate to east into land to east at section line, through gate and along section lines on dim road 7.0 miles, then north on west side of wire fence 1.0 mile, east through gate and 0.65 mile along north side of fence, then northward 0.3 mile to station on high ground. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 5 inches above ground, is 0.82 foot north of east-and-west fence line, and is approximately 0.3 mile from station in azimuth $356^{\circ}35'41''$. No. 2 projects about 2 inches above ground, and is 67.44 feet from station in azimuth $113^{\circ}04'$. Other azimuths from the station are: *Elevator, SW. gable, distant 6 miles*, $308^{\circ}21'49''$; *Grain elevator, south gable, distant 13.5 miles*, $101^{\circ}53'08''$; *Boise City, Cimarron Utilities Co., tank*, $146^{\circ}53'24''$.

Sneed (Dallam County, Tex., C. I. Aslakson, 1931).—About 32 miles east by north from Texline, Tex., $3\frac{1}{2}$ miles south of the Texas-Oklahoma State line, on the Sneed Ranch, on a small ridge on which ranch house is located, about 30 paces north of fence line back of chicken house, and 50 paces east of fence along front of ranch house. To reach station from Texline, go south on U.S. Route 385 from Gulf filling station on corner one block to a Magnolia filling station, turn left and proceed as follows: At 0.4 mile jog right; at 0.7 mile road

curves east at a galvanized iron building; at 4.4 miles cross small culvert and continue east to a T-intersection at 8.0 miles; jog north 0.4 mile; turn east and continue on main road to 18.0 miles; jog right $\frac{1}{4}$ mile; go east 3.0 miles and jog north $\frac{1}{2}$ mile, and continue east 7.0 miles to road turning out to north; continue east 4.0 miles to T-intersection; turn south and go 1 mile to road turning out to east; turn into this road and go 3.0 miles to gate and end of fence on north side of road; pass through gate and continue 2.0 miles to road turning out to north; turn left on this road and proceed to windmill and thence east to ranch house and station. Reached also from Boise City, south on U.S. Route 41, 4.5 miles from State line, to road turning out to east and thence as described above. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 0.25 mile from station, in azimuth $279^{\circ}53'54''$. No. 2, 26,825 meters (88.01 feet), $353^{\circ}59'$. Azimuth from station of tip of windmill, distant $\frac{1}{2}$ mile, is $260^{\circ}36'10''$.

Mooney (Cimarron County, C. I. Aslakson, 1931).—About 18 miles, air line, southeast by east of Boise City, about 6 miles, air line, north of Kerrick, in the NW $\frac{1}{4}$ sec. 5, T. 1 N., R. 8 E. Station reached from Griggs post office (about 20 miles west-northwest of Texhoma), by going west 6.0 miles, south 1.0 mile along section line fence, then southeast 0.3 mile to station on high ground. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 12 inches above ground, and is 72.48 feet from station in azimuth $41^{\circ}56'$. No. 2 projects about 6 inches above ground, is 54.2 feet southwest of southwest corner of house, 1.2 feet west of fence line, and approximately 0.5 mile from station in azimuth $159^{\circ}18'03''$. Other azimuths from the station are: *Stratford, West Texas Utilities Co., tank*, $333^{\circ}21'32''$; elevator, S. E. gable, approximately 6 miles S. E. of station Rogers, $6^{\circ}43'31''$; *Boise City, Cimarron Utilities Co., tank*, $122^{\circ}03'54''$.

Kerrick (Dallam County, Tex., C. I. Aslakson, 1931).—About 15 miles north-west of Stratford, 3.1 miles south from the general store (stucco) in the small village of Kerrick, on a small ridge west of the Stratford-Kerrick road, on land belonging to the Dallas News. From Kerrick go south 3.1 miles from store to top of ridge and station in pasture 409 feet west of fence. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot west of fence line, 65 feet west of center line of road, and 556.4 feet from station in azimuth $226^{\circ}58'45''$. No. 2 is 1 foot west of fence line, 65 feet west of center line of road, 45 feet west of west edge of borrow pit, and 0.38 mile (speedometer) from station in azimuth $348^{\circ}00'23''$. Other azimuths from station: Kerrick, northwest gable of grain elevator, $184^{\circ}26'30''$; tip, windmill vertical shaft, distant 1 mile, $257^{\circ}49'22''$.

Griggs (Cimarron County, C. I. Aslakson, 1931).—Three and one-half miles east and $\frac{1}{2}$ mile south of Griggs, $1\frac{1}{2}$ miles west of east boundary of Cimarron County, on the half section line about 100 yards west of center of sec. 35, T. 2 N., R. 9 E. Reached from Griggs east 3.0 miles along section line road, south 0.5 mile, then east 0.4 mile to station on high ground. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 is flush with surface, 30 feet south of center of section line road, and approximately 0.5 mile from station in azimuth $178^{\circ}28'17''$; no. 2 projects about 2 inches above ground, and is 485.8 feet from station in azimuth $270^{\circ}25'36''$. Other azimuths from station are as follows: *Texhoma, Cimarron Utilities Co., water tank, final*, $292^{\circ}12'08''$; *Stratford, West Texas Utilities Co., water tank, final*, is $1^{\circ}56'22''$.

O'Brien (Sherman County, Tex., C. I. Aslakson, 1931).—About 8 miles north of Stratford, Texas, 16 miles west-by-south of Texhoma, Okla., on the south bluff line of the north fork of the Canadian River (Beaver Creek) on land owned by J. C. O'Brien. To reach station from Texhoma go west 16.0 miles from railroad crossing on Main Street; this road follows the State line. At sign "16 miles Texhoma" turn south across cattle guard and follow winding road across river 4.8 miles to cattle guard with red gate on west side; here turn sharply to north along wire fence leading in front of a ranch house, and go 0.9 mile to station on east side of fence near bluff line. Station is 0.1

mile north-northeast of fence corner, 138 feet east of fence and 145 feet south of edge of bluff. Reached from Stratford by going north on Main Street 1 block beyond end of pavement, east 0.7 mile, and north 7.0 miles to cattle guard and red gate. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot east of fence, 0.15 mile south of fence corner, and 0.25 mile (speedometer) from station in azimuth $5^{\circ}45'41''$. No. 2, 1 foot east of fence, 40 yards south of edge of bluff, and 50.11 meters (164.4 feet) from station in azimuth $124^{\circ}45'$. Azimuth from station of *Stratford, West Texas Utilities Co., water tank, final*, $3^{\circ}34'02''$; *Texhoma, Cimarron Utilities Co., water tank, final*, $258^{\circ}03'28''$.

Mouse (Texas County, C. I. Aslakson, 1931).—About 9 miles air line, northwest of Texhoma, 10 miles east and $\frac{1}{2}$ mile north of Station Griggs, in southeast corner of SW $\frac{1}{4}$ sec. 28, T. 2 N., R. 11 E., 1.0 foot west of north-and-south fence line, and 63.63 feet north of east-and-west fence. To reach from Texhoma go west from Texhoma Hotel 0.8 mile, north $1\frac{3}{4}$ miles, west 2.0 miles, north 4.0 miles, west 3.0 miles, north 1.0 mile, then east 0.5 mile to station. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 2 inches above ground, is 1.1 feet west of north-and-south line, and 104.00 feet from station in azimuth $179^{\circ}32'$. No. 2 is flush with surface of ground, 69 feet east of north-and-south section-line road, 45.38 feet east of northwest corner post of fence line, 2.85 feet south of east-and-west fence line, and approximately 0.5 mile from station in azimuth $88^{\circ}36'49''$. Other azimuths from the station are: *Texhoma Cimarron Utilities Co., tank*, $321^{\circ}47'11''$; *Texhoma, Riffe's grain elevator*, $324^{\circ}46'28''$; house chimney, distant 1 mile $11^{\circ}39'22''$.

Elliot (Sherman County, Tex., C. I. Aslakson, 1931).—About 13 miles northeast of Stratford, Tex., 3 miles north-northeast of Stevens, Tex., 3 miles south of the Texas-Oklahoma State boundary, on land belonging to Ezra Elliot of Pratt, Kans., and in an east-and-west fence line, 22.33 meters (73.3 feet) west of the corner. To reach station from Texhoma, go west from the Rock Island depot 6.0 miles along road which follows the boundary; turn south onto dirt road with one-wire phone line along it and go 2.0 miles to ranch house at end of phone line; pass through gate and continue south 1.0 mile to section line fence and station. Station also reached from U.S. Route No. 54 by going through red iron pipe and wire gate and across railroad tracks 1.8 miles northeast of Stevens; then north along the east side of section line fence 0.8 mile, cross over and go 1.0 mile north along west side of fence to station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in fence corner, 56.87 meters (186.6 feet) from station in azimuth $203^{\circ}50'$. No. 2 is 1 foot west of fence line, and 0.3 mile (speedometer) from station in azimuth $357^{\circ}34'28''$. Other azimuths from station are: *Texhoma, Cimarron Utilities Co., water tank, final*, $244^{\circ}46'59''$; *Stratford, West Texas Utilities Co., water tank, final*, $47^{\circ}59'18''$.

Whorton (Texas County, C. I. Aslakson, 1931).—Seven miles north and 3 miles east of Texhoma, $\frac{1}{2}$ mile north and $5\frac{1}{2}$ miles west of Goodwell, about 250 yards southeast of a small abandoned shack which is about $\frac{1}{4}$ mile west of northeast corner of sec. 35, T. 2 N., R. 12 E. To reach station from Texhoma, go 2 blocks south of railroad on main street, to where U.S. Highway 54 goes east, turn east on highway and follow it northeast along railroad 5.2 miles, then on left fork across railroad and north on township line road 4.0 miles, then west along section line 1.3 miles to old shack, then southeast 250 yards to high ground and station. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 2 inches above ground, is on the projection of the east and west fence line, 3.8 feet east of northeast corner of fence, and 543.45 feet from station in azimuth $48^{\circ}09'17''$. No. 2 projects about 2 inches above ground, is 47.8 feet north of center line of section line road, 1.2 feet north of fence line, and approximately 0.25 mile from station in azimuth $159^{\circ}57'02''$. Azimuth from station to *Goodwell, municipal water tank*, is $274^{\circ}51'33''$.

Hardy (Sherman County, Tex., C. I. Aslakson, 1931).—About $3\frac{1}{2}$ miles south-southwest of Texhoma, Okla., 3 miles south of the Texas-Oklahoma

State boundary, on high ground, on land belonging to J. B. and J. T. Hardy of Greensburg, Kans. Station is 0.15 mile south of road, 8.75 meters (28.7 feet) east of a north-and-south fence, and 6.30 meters (20.7 feet) northwest of the northeast corner post of a wheat piling lot. Station is reached from Texhoma as follows: From yellow brick schoolhouse in southwest part of town, go south 2.5 miles, then west 1 mile, to first house on south side of road (a bungalow with chimney in center of peaked roof); continue past house to first fence running south; go through fence at northeast corner of pasture lot and continue on southwest to wheat piling lot and station as described. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in north-and-south fence line, about 75 yards south of a corner, 190 yards south of center line of road, and 0.21 mile (speedometer) from station in azimuth $260^{\circ}40'59''$. No. 2 is in north-and-south fence line, 0.1 mile south of center line of road, and 32.15 meters (105.5 feet) from station in azimuth $164^{\circ}31'$. Azimuth from station of *Texhoma, Cimarron Utilities Co., water tank, final*, is $203^{\circ}55'17''$.

Camp (Texas County, C. I. Aslakson, 1931).—About 2 miles northeast by east of Goodwell, in the southwest corner of sec. 30, T. 2 N., R. 14 E. To reach station from Goodwell railroad station, cross railroad, turn left on highway and go northeast 1.3 miles to section line road to east; go east 0.6 mile to station in farmyard about 100 yards north of road intersection. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 2 inches above ground, is 41 feet east of center line of road, 2.0 feet west of north-and-south fence on projection of east-and-west fence line, and 213.30 feet from station, in azimuth $179^{\circ}23'$. No. 2 projects about 4 inches above ground, is 230 feet east of intersection of Highway No. 54 and section-line road, 111 feet southeast of center line of highway, 33.5 feet north of center line of road and approximately 0.5 mile from station in azimuth $83^{\circ}04'45''$. Other azimuths from the station are as follows: Small black tank, distant approximately $\frac{3}{4}$ mile, $51^{\circ}43'55''$; *Goodwell, municipal water tank*, $70^{\circ}54'45''$; *Guymon, black municipal standpipe, center*, $231^{\circ}41'01''$.

Graham (Hansford County, Tex., C. I. Aslakson, 1931).—About 12 miles east by south of Texhoma, Oklahoma, 2 miles east of the Sherman-Hansford County line, 3 miles south of the Texas-Oklahoma line, on the south bluff of the Frisco Creek, on land owned and occupied by Tom Graham. Station reached from Texhoma as follows: Turn due east off U.S. Route 54 onto road along State line which passes along the north side of the Foxworth-Galbraith Lumber Co.'s buildings; continue due east 10.3 miles to right turn; take turn and continue across Frisco Creek 3.5 miles to left turn, to where a dim unimproved road leads straight ahead. This point is 0.5 mile south of the creek crossing. A mail box and gate with large blunt arrow on board on gate post are located on the right at turn. Follow dim road 1.0 mile to fence corner, turn west along south side of fence and go 0.5 mile to fence corner and northwest corner of cultivated field, then south 0.5 mile along east edge of half section of sod land; west 0.5 mile along south edge of sod land to fence, north along east side of fence, 0.5 mile to corner, and 0.2 mile west of corner to station, 14 meters (46 feet) north of east-and-west fence. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in an east-and-west fence line, 31.32 meters (102.8 feet) from station in azimuth $297^{\circ}38'$. No. 2 is in an east-and-west fence line, 0.3 mile (speedometer) from station in azimuth $89^{\circ}50'53''$. Azimuth from station of *Texhoma, Cimarron Utilities Co., water tank, final*, $105^{\circ}50'18''$.

Bridgeman (Texas County, C. I. Aslakson, 1931).—About 12 miles, air line, east by north from Goodwell, about 6 miles, airline, southeast of Guymon, about 0.8 mile south-southwest of Liberty Schoolhouse, about 75 yards southwest of a 2-story unpainted house, 0.3 mile north of southwest corner of sec. 26, T. 2 N., R. 15 E., 29 feet east of center line of section line road, 122.3 feet south of the northwest corner of pasture, and 0.17 feet west of fence line. Surface mark is standard disk station mark in concrete, note 1a, projecting 1 inch above surface of ground. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 6.0 feet northwest of southeast corner of section line fence, and approximately 0.3 mile from

station in azimuth $3^{\circ}09'41''$. No. 2 is 82 feet west of center line of section line road, 49.2 feet west of northeast corner of pasture, 0.50 foot north of east-and-west fence line, and 117.18 feet from station in azimuth $109^{\circ}32'$. Both marks project about 1 inch above surface of ground. Other azimuths from the station are: *Goodwell, municipal water tank*, $86^{\circ}08'51''$; *Perkins district school, flagpole*, distant 3 miles, $117^{\circ}07'31''$; *Guymon, black municipal standpipe, center*, $148^{\circ}43'08''$. To reach from Guymon, go south to end of Main Street, turn east and go 0.35 mile, turn south on well-traveled road 3 miles, then turn east and go 3 miles, again turn south and go 1.7 miles to station site.

Chipperfield (Hansford County, Tex., C. I. Aslakson, 1931).—Thirteen miles north of Gruber $5\frac{1}{2}$ miles north-northwest of Bernstein, $5\frac{1}{2}$ miles southwest of Hitchland, 3 miles south of the Texas-Oklahoma State line, on land belonging to Clara Chipperfield. To reach station from Texhoma, turn due east off U. S. Route 54 onto road along Texas-Oklahoma line which passes along the north side of the Foxworth-Galbraith Lumber Co.'s buildings, continue due east 10.3 miles; take right turn and continue across Frisco Creek 3.5 miles to left turn, 0.5 mile south of creek crossing; go east on main road 3 miles; south 8 miles; east 6 miles; north 5 miles to schoolhouse; east 1 mile, then north 1 mile to gate; pass through gate and go 0.8 mile to gate just west of ranch house; pass through gate and continue north to corner, then west along an east-and-west fence 0.75 mile to station, which is 1 foot north of fence. This fence has a one-wire telephone line attached to extensions to the fence posts. Station can also be reached from Bernstein (Rock Island railroad station) by going north 2 miles on State Road No. 88, then west 2 miles to point 1 mile east of schoolhouse mentioned above, thence to station as described above. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot north of east-and-west fence line, 73.57 meters (241.4 feet) from station in azimuth $269^{\circ}49'$. No. 2 is in fence corner, near south edge of bluff, and approximately 0.4 mile from station in azimuth $177^{\circ}46'09''$. Azimuths from station: *Goodwell, municipal water tank*, $125^{\circ}31'30''$; *Hitchland railroad water tank, final*, $240^{\circ}00'18''$; *Guymon, black municipal standpipe center*, $164^{\circ}40'29''$.

Wall (Texas County, C. I. Aslakson, 1931).—About 15 miles, air line, east-southeast of Guymon, about $3\frac{1}{2}$ miles southwest by west of Hardesty, about $1\frac{1}{2}$ miles south of Coldwater Creek, on a rise in the ground, in pasture land belonging to Earl Wall, in the central part of sec. 32, T. 2 N., R. 17 E. Station reached from Guymon south on Main Street to end of street, east 11.3 miles, south 4 miles, east 3 miles, south 1 mile, and west through gate and on wagon road along section line 2 miles to gate in fence to south. Go south through gate, turn southeast and go 0.4 mile to rise in ground and station site. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in an east-and-west fence line which passes about 200 yards north of station, and is about 0.4 mile from station in azimuth $255^{\circ}43'36''$. No. 2 is 101.46 feet from station in azimuth $21^{\circ}01'$. Other azimuths from station: *Hardesty, grain elevator, north gable*, $254^{\circ}58'38''$; *Guymon, black municipal standpipe center*, $114^{\circ}28'33''$.

Browder (Hansford County, Tex., C. I. Aslakson, 1931).—About 8 miles north-northeast of Bernstein, Tex., $3\frac{1}{4}$ miles southeast of Hitchland, $2\frac{1}{4}$ miles south of the Texas-Oklahoma State line, on property owned by R. H. Browder. To reach station from Hitchland go east from railroad crossing 1.3 miles to turn, and continue on main road south 0.8 mile; then 0.8 mile east; then 1.5 miles south to station, 9 meters (30 feet) west of center line of road. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11. No. 1 is in north and south fence, 10.25 meters (33.6 feet) east of center line of road, and 19.46 meters (63.8 feet) from station in azimuth $252^{\circ}30'$. No. 2 is 1 foot west of north-and-south fence on east side of road, 5 feet south of a T-intersection of fences (possibly a section corner), and 0.5 mile (speedometer) from station in azimuth $358^{\circ}12'31''$. The azimuth from station of *Hitchland, railroad water tank, final*, is $136^{\circ}10'19''$.

Barnes (Texas County, C. I. Aslakson, 1931).—At the southwest corner of road intersection, on land owned and occupied by Wallace Barnes, 150 feet north

of his house, in sec. 34, T. 2 N., R. 18 E., 60 feet west of center line of north-and-south road, 80 feet south of center line of east-and-west road, and 110 feet southwest of corner stone at intersection of crossroads. From Hardesty go east to point 2.3 miles east of railroad crossing where trunk line turns south; thence south 1 mile, then east 3 miles to road intersection and station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 45 feet northwest of center of crossroads, 5.4 feet from intersection of fence lines, and 119.9 feet from station in azimuth $194^{\circ}03'$. No. 2 is just south of fence line, and about 0.25 mile from station in azimuth $92^{\circ}18'02''$. Azimuth from station of *Hardesty, grain elevator, southwest corner*, is $99^{\circ}16'55''$.

Hogland (Ochiltree County, Tex., C. I. Aslakson, 1931).—About 13 miles northwest of Perryton, Texas, 3 miles east of the Hansford-Ochiltree county line, 3 miles south of the Texas-Oklahoma State line, 39.95 feet west of a north-and-south fence line, 48.4 feet west-southwest of the northwest corner of a cultivated field on east side of the north-and-south fence line. To reach from Perryton, take Main Street (U.S. 83) north 2 miles from point where the highway crosses railroad tracks in Perryton, go west 8 miles, north 1.4 miles, west 2.1 miles, north 0.4 mile, west 2.7 miles to gate and station site. Surface mark consists of standard disk station mark in concrete, note 1a, projecting 8 inches above ground. No underground mark. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 8 inches above ground, is on the south side of road, 2.1 feet west of north-and-south fence line, and 1.4 feet south of east-and-west fence line, and approximately 0.4 mile from station in azimuth $268^{\circ}59'27''$. No. 2 projects about 6 inches above ground, is 1.1 feet west of north-and-south fence line, and 119.77 feet from station in azimuth 340.7° . Azimuth from station to *Perryton, silver water tank, final*, is $286^{\circ}08'27''$.

Mitchusson (Beaver County, C. I. Aslakson, 1931).—About 7 miles east of the Texas-Beaver county line, 7 miles north of the old Texas-Oklahoma State line, 14 miles north and $1\frac{1}{4}$ miles west of Perryton, Texas, 18.2 miles east and 1 mile south of Hardesty, on uncultivated land belonging to J. U. Mitchussen of Goodwell, near the north edge of a small cultivated patch, 44 feet east of the center of U.S. Route 83, and 7 feet east of fence line. Reached from Perryton north 7 miles on U.S. Route 83 to old State line, west 0.4 mile, north 0.4 mile, west 1 mile, then north 3.1 miles to station on east side of road and 0.1 mile north of section line road intersection. To reach station from Hardesty go east 2.3 miles, south 1 mile, east 3 miles, south 4 miles, east 0.7 mile to Range, and continue on east from Range 8.3 miles, then south 1 mile, east 6 miles, and north 5 miles to crossroad and station 0.1 mile north of crossroads. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Surface mark projects 1 inch above ground. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects 2 inches above ground, is 3.25 feet southeast of fence line intersection, 38 feet east of center of U.S. Route 83, and 0.4 mile from station in azimuth $179^{\circ}43'59''$. No. 2 projects 1 inch above ground, 40 feet west of center of U.S. Route 83, 1 foot west of fence line, and 80.95 feet from station in azimuth $89^{\circ}18'$. Other azimuths from station are windmill of farmhouse $\frac{1}{4}$ mile distant, $353^{\circ}27'$; *Perryton, municipal water tank, (silver), final* $354^{\circ}39'05''$; *Hardesty, grain elevator, southwest corner*, $92^{\circ}16'21''$.

Campbell (Ochiltree County, Tex., C. I. Aslakson, 1931).—About $7\frac{1}{2}$ miles northwest of Perryton, 10 miles east of the Hansford-Ochiltree county line, 2 miles south of Texas-Oklahoma State line, on land owned and occupied by H. B. Campbell. To reach station from Perryton go north on U.S. Route 83, 4.6 miles from railroad crossing; turn left (west) on graded dirt road and continue west 5.7 miles to white ranch house with red windmill and shed in barnyard on right of road; station is in southeast corner of pasture land, 37.82 meters (124.1 feet) west of southwest corner of house and 33.25 meters (109.1 feet) north of center line of road. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot north of fence, 9.6 meters (31 feet) north of center line of road, and 23.65 meters (77.6 feet) from station in azimuth $359^{\circ}35'$. No. 2 is north of road, 1 foot north of fence, about 35 feet east of fence corner, and 0.48 mile (speedometer) from station in

azimuth $88^{\circ}22'17''$. Azimuth from station of *Perryton, municipal water tank (silver), final*, is $309^{\circ}40'59''$.

Shadwick (Beaver County, C. I. Aslakson, 1931; 1934).—About $14\frac{1}{2}$ miles north and 4.1 miles east of Perryton, Tex., 3 miles southwest of Balko village, 30.9 feet south of east-and-west fence, and 300 feet west of lane on highest part of low rounded hill in pasture owned by J. R. Shadwick and leased by D. E. Penner. To reach station from Perryton, go north on U.S. Route 83 to old State line 7 miles, east 0.6 mile, north 3 miles, east 3.8 miles, north 4 miles, west 0.5 mile to lane mentioned above. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Surface mark projects 4 inches above ground. Reference marks are standard reference disks in concrete, note 11a. Both marks project about 3 inches. No. 1 is on west edge of lane, in fence line, and 317.7 feet from station in azimuth $299^{\circ}13'$. No. 2 is in fence corner, 0.4 mile from station in azimuth $41^{\circ}39'47''$. Other azimuths from station: Red windmill on farm, distant 2 miles, $342^{\circ}27'47''$; *Perryton municipal water tank (silver), final*, $16^{\circ}18'08''$. In 1934 station reached from Balko village, west 2 miles, south 2 miles, then west 0.5 mile to narrow lane running north, 0.15 mile north on lane, and 300 feet northwest to station site.

Morris (Ochiltree County, Tex., C. I. Aslakson, 1931).—About 9 miles west of Booker, Tex., $7\frac{1}{2}$ miles northeast of Perryton, Tex., 2 miles south of the Texas-Oklahoma State line, on land owned and occupied by Mrs. Ollie Morris, in southwest corner of a pasture lot, 5.50 meters (18.0 feet) south of a yard fence, and 12.60 meters (41.3 feet) east of center line of road. Reached from Perryton northeast on road south of railroad tracks 5.6 miles from U.S. Route No. 83 (Main Street of Perryton) to a road leading north across the railroad tracks; this road is just east of concrete culvert 52A under railroad. Continue north 2.2 miles to a small white house and large red barns on east side of road, and to station as described above. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot north of an east-and-west fence, about 100 feet west of a fence corner, and 0.45 mile (speedometer) from station in azimuth $271^{\circ}47'08''$. No. 2 is 1 foot north of fence, 8.50 meters (27.9 feet) east of center line of road, and 20.96 meters (68.8 feet) from station in azimuth $354^{\circ}19'$. Azimuth from station of *Perryton, municipal water tank (silver), final* $45^{\circ}56'30''$; *Booker, municipal water tank (black) final* $278^{\circ}11'37''$.

Pruett (Beaver County, C. I. Aslakson, 1931; 1934).—Ten miles, airline, north of Booker, Tex., 9 miles east and 2 miles south of Balko, on land owned by Levy Pruett, in SE $\frac{1}{4}$ sec. 25, T. 2 N., R. 23 E., in right-of-way fence, 30 feet north of center line of road, and 41 feet west of fence corner. To reach from Booker, from north end of Main Street east 0.5 mile to where road turns north, north 3 miles to old State line, then along old State line east 0.5 mile, north 7 miles, and then west 0.3 mile to station on north side of road. To reach from Beaver, go south on Route 35, 13 miles to where highway turns east, continue south from this point 1 mile to road leading west and go west on this road 0.25 mile to top of hill and station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Upper mark projects 3 inches above ground. Reference marks are standard reference disks in concrete, note 11a. No. 1 is flush with ground, in north-and-south fence, 115 feet north of fence corner which is east of station, and 120.92 feet from station in azimuth $198^{\circ}40'$. No. 2 projects 6 inches, is in right-of-way fence on south side of the east-and-west road, 35 feet south of center line of this road, and 0.2 mile from station in azimuth $86^{\circ}56'50''$. Azimuth from station of *Booker, municipal water tank (black), final*, is $3^{\circ}43'17''$; school, final (district school no. 25), is $185^{\circ}53'54''$.

Booker (Lipscomb County, Tex., C. I. Aslakson, 1931).—About one-half mile north of railroad station at Booker, $2\frac{1}{2}$ miles south of the Texas-Oklahoma State line, on land belonging to Mr. Kimmel, groceryman in Booker, 1 foot east of a north-and-south fence, 77.50 meters (254.3 feet) south of center line of road, and about 0.15 mile southwest of road intersection. To reach station from Booker go east 0.4 mile from Main Street along road just south of railroad to point where road turns north across tracks; turn north and go 0.5 mile to crossroads; turn west and go 0.1 mile to first north-and-south fence and station

as described above. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is north of road, by first telephone pole east of crossroads, and 0.15 mile (speedometer) from station in azimuth $250^{\circ}57'21''$. No. 2 is one foot south of fence, 8.50 meters (27.9 feet) south of center line of road, 6.35 meters (20.8 feet) west of fence corner, and 69.99 meters (229.6 feet) from station in azimuth $174^{\circ}39'$. Azimuth from station *Booker, municipal water tank (black) final*, is $25^{\circ}43'16''$.

Carbin (Beaver County, C. I. Aslakson, 1931).—Station is $9\frac{3}{4}$ miles north and 11 miles east of Booker, Tex., $1\frac{3}{4}$ miles north and 7 miles west of Logan (store and post office), $\frac{1}{4}$ mile south of northwest corner of sec. 35, T. 2 N., R. 25 E., 27 feet east of center line of road, 1 foot west of fence line, and on property of Mr. Carbin, whose house is about $\frac{1}{4}$ mile to northeast. To reach station from Follett go north 6.6 miles to Trunk Line road, west 11.5 miles to short jog to north; north on narrow road 4.5 miles to station. From Booker go north 3 miles to old State line, east 0.5 mile, north 3 miles, east 5 miles, north 0.75 mile to station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Surface mark projects 3 inches above ground. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects 3 inches above ground, is 27 feet west of center of road, 1 foot east of fence line, and 88.09 feet from station, in azimuth $35^{\circ}58'$. No. 2 projects 4 inches above ground, is 30 feet west of center of road, 0.4 foot west of fence line, and 0.2 mile from station in azimuth $176^{\circ}17'18''$. Other azimuths from station are: *Follett, municipal water tank (black) final*, $315^{\circ}46'33''$; *Booker, municipal water tank (black) final*, $47^{\circ}31'45''$.

Kirschman (Lipscomb County, Tex., C. I. Aslakson, 1931).—About $6\frac{1}{2}$ miles east by south of Booker, $1\frac{1}{4}$ miles east-northeast of Gaylord elevator, 7 miles east of the Ochiltree-Lipscomb County line, $2\frac{1}{2}$ miles south of the Texas-Oklahoma State line, on land owned and occupied by D. O. Kirschman. Reached from Booker east 0.5 mile, left across railroad tracks 0.5 mile to cross-grade east 5.0 miles, south 1.0 mile to crossroads, to point 0.5 mile north of elevator at Gaylord railroad station. From here go east 1.0 mile to pink stucco house on north side of road; at this point power line poles change from north side to south side of road. Turn south along section line road on east side of fence and go 0.15 mile to station, which is about 2 feet east of fence. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 1 foot south of fence south of road, 0.25 mile east of pink stucco house, and 0.3 mile (speedometer) from station in azimuth $237^{\circ}01'37''$. No. 2 is 1 foot east of fence, and 39.98 feet from station in azimuth $0^{\circ}45'$. Azimuth from station of *Follett, municipal water tank (black) final*, $274^{\circ}18'52''$; *Booker, municipal water tank (black) final*, $94^{\circ}02'02''$. In 1934 reference mark no. 1 was reported destroyed by road construction.

Ivanhoe (Beaver County, C. I. Aslakson, 1931).—In the southwest corner of the North Ivanhoe schoolhouse yard, 4 miles south and 6 miles west of Spearman, $1\frac{3}{4}$ miles east and 8 miles north of Follett, Tex., 44 feet north of fence line, 37 feet east of another fence line, and 179 feet west of schoolhouse. Station reached from Follett from second street crossing north of post office, east 0.5 mile, north 3 miles, east 1 mile, north 1.5 miles to old State line, east on old State line 0.3 mile to section line road to north, and north 3.5 miles to schoolhouse on west side of road and station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Surface mark projects 3 inches above ground. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects 3 inches above ground, is 2 feet northwest of fence corner, 36 feet west of center of road, 150 feet north of schoolhouse, and 226.2 feet from station in azimuth $238^{\circ}28'$. No. 2 projects 6 inches above ground, 32 feet west of center of road, 1 foot east of fence line, and 0.2 mile from station in azimuth $350^{\circ}53'16''$. Azimuth from station of *Follett, municipal water tank (black) final*, is $10^{\circ}55'46''$.

Supplementary Points

Texhomex (Texas-Oklahoma-New Mexico boundary, C. I. Aslakson, 1931).—A standard disk station mark set in a red sandstone post projecting about 6

inches above ground at point common to the three States, Texas, Oklahoma, and New Mexico. It is 10.6 meters (34.8 feet) south of center line of road, 13.66 meters (44.8 feet) west of corner of fence, and 0.3 meter (1 foot) north of fence line. To reach station from Texline go westward 2 blocks from flag-pole and street light; turn right and follow road to northeast and north for 8.5 miles to where road turns east along north boundary of Texas; then east 1.1 miles to station. Reference marks are standard reference disks in concrete, note 11a. No. 1 projects about 6 inches above ground, is 8.2 meters (26.9 feet) south of center line of road, 0.35 meter (1.1 feet) north of fence line, and 25.53 meters (83.8 feet) from station in azimuth 89°59'. No. 2 projects about 4 inches above ground, is 15.4 meters (50.5 feet) west of center line of road, 0.23 meter (0.8 foot) east of fence line, and approximately 0.5 mile from station, in azimuth 179°15'34''. Other azimuths from the station are: *Clayton, municipal water tank final*, 70°02'02''; *Kidder astronomical station*, distant 200.349 meters (657.31 feet), 108°49'22''. It is stamped: "36°30' N. Lat/103° W. Long/1903" (see description thereof).

Kidder astronomical station (Union County, N.Mex., General Land Office, 1903; C. I. Aslakson, 1931).—About 200 yards west by north from the corner common to States of Texas, Oklahoma, and New Mexico. Mark is a truncated cone of concrete molded in a zinc form, and resting on a concrete base. Cone is about 15 inches in diameter and 30 inches high, and on its side is stamped: 36°30' N. Lat., 103° W. Long., and 1903. It is 200.349 meters (657.31 feet) from station *Texhoma* (see description thereof) in azimuth 108°49'22''.

T. 1 N., R. 4 E., sec. 36, SE. cor. (Texas-Oklahoma State boundary, C. I. Aslakson, 1931).—On an east-and-west fence line, at west end of a long wire gate and at foot of wire brace on west gate post. Reached from Boise City by going south on Oklahoma Route 41 (road to Dalhart, Tex.) to point where road turns left along State line. Turn right and go 1 mile to station. From Texline, Tex., go east 14 miles on main road from a Magnolia filling station, north 4 miles, east 10½ miles to a T-intersection; thence north 3½ miles to another T-intersection; then west 0.8 mile to where main road turns to right, and continue straight ahead 1 mile to station. Surface mark is standard disk station mark in concrete, note 1a. No underground mark. Reference marks are standard reference disks in concrete, note 11a. One is 0.38 mile from station in azimuth 90°03'55''; the other is 29.568 meters (97.01 feet) from station in azimuth 197°20'. Azimuth from station of *Rabbit Ear Butte, northernmost peak, tip*, 93°25'48''.

Clark monument no. 5 (Texas-Oklahoma State line, C. I. Aslakson 1931).—About 2½ miles west of Kerrick, in a small pasture, about 25 yards east of a north-and-south fence that separates the pasture from a cultivated field, and about 125 yards south of the State line road. To reach station from Kerrick, go northwest on south side of track 0.5 mile from the Magnolia filling station to the State line road, west on State line road 1.7 miles to gate at northeast corner of pasture; through gate and west ¼ mile to station. Station marked by a standard disk station mark set in center of old zinc-covered concrete cone which projects about 30 inches above ground. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 83.5 feet west of northeast corner of pasture, 30 feet south of center line of road, 0.80 feet south of east-and-west fence line, and approximately 0.25 mile from station in azimuth 255°45'37''. No. 2 is 31.6 feet south of center line of road, 2.8 feet southeast of northwest corner of pasture, and 361.62 feet from station in azimuth 167°50'18''. Both reference marks project 12 inches above ground.

Clark monument no. 7 (Texas-Oklahoma State line, C. I. Aslakson, 1931).—This station is the recovered *Clark monument no. 7*, described in the notes of A. D. Kidder, General Land Office. The point is on native sod, on the crest of the west bluff of the east crossing of the North Canadian (or Beaver) River. The bluff is high, but the slope is gentle. Station is opposite sec. 36, T. 1 N., R. 10 E., Cimarron meridian, Okla., and about 8 miles west of the town of Texhoma. The original monument described by Kidder was a limestone 32 by 10 by 6 inches, lying on the ground, well embedded in sod. No marks were on the stone, and there was no surface stone in the vicinity. The monument was reconstructed by Kidder, a concrete monument 8 by 14 by 30 inches being set on a concrete base, a 2-foot cube. The base is 2 feet in ground, and the form projects 24 inches above the base. Two reference marks were set in 1931, standard reference disks in concrete, note 11a. No. 1 projects about

1 inch above the surface, is 31 feet south of center line of road, 3.8 feet south of fence line, and 365.95 feet from station in azimuth $179^{\circ}34'$. No. 2 projects about 2 inches above surface, is about 100 yards south of road, 1.1 feet west of north-and-south fence line, and approximately 0.3 mile from station in azimuth $279^{\circ}43'$. Station is reached from Texhoma by going west on State line road $8\frac{1}{4}$ miles from the southwest corner of railroad station, to point about 0.6 mile west of bridge across the North Canadian (or Beaver) River; the station will then be about 125 yards south of road.

Hitchland south (Hansford County, Tex., C. I. Aslakson, 1931).—In Bernstein, on the right-of-way of the Rock Island Railroad, about 70 yards north of the Bernstein station, 51.75 feet west of the west rail, 36.8 feet east of fence line, and 127.9 feet west of the northeast corner of grain elevator. Bernstein is $7\frac{1}{2}$ miles by rail south of Hitchland. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 125.7 feet east of east rail, 67.9 feet southeast of southeast corner of grain elevator, and 211.3 feet from station in azimuth $316^{\circ}07'$. No. 2 is in fence corner, 75 feet west of west rail, and 0.4 mile from station in azimuth $18^{\circ}46'48''$.

Hitchland north (Hansford County, Tex., C. I. Aslakson, 1931).—On railroad property in the village of Hitchland, Tex., on the extension of the west rail of the Rock Island main track, between spur tracks, west of the section houses, 10.25 meters (33.6 feet) east of east rail of the west spur track, 52.80 meters (173.2 feet) west of west rail of easternmost track, and 28.00 meters (91.9 feet) northwest of northwest corner of concrete scales pit at west end of the Henneman Grain and Seed Co.'s office building. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 3.71 meters (12.2 feet) east of east rail of the Henneman Grain and Seed Co.'s elevator spur track, 29.10 meters (95.5 feet) southwest of the southwest corner of section car shed, and 41.46 meters (136.0 feet) from station in azimuth $298^{\circ}11'$. No. 2 is 3.23 meters (10.6 feet) east of east rail of west spur track, 17.43 meters (57.2 feet) north of northwest corner (concrete pier) of the Phillips Petroleum Co.'s main building at bulk plant, and 0.2 mile (speedometer) from station in azimuth $27^{\circ}04'48''$. Azimuth from station of *Hitchland, railroad water tank, final*, is $233^{\circ}55'23''$.

Hitch (Hansford County, Tex., C. I. Aslakson, 1931).—About 5 miles west of Hitchland, 100 yards south of the Texas-Oklahoma State line, and on top of a flat-topped hill on Hitch's ranch. Station reached from Hitchland by going west on road along State line for about $4\frac{1}{2}$ miles to cattle guard; cross cattle guard and continue on road winding down to large ranch house in grove of trees in valley; go through gate at ranch house and continue south on ranch road to gate just south of the most southerly group of trees on creek. Go through gate and on 0.7 mile along pole line to a General Land Office zinc-covered cone in the fence line. Station is on highest point of hill, 100 yards south of this cone. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 111.1 feet from station in azimuth $304^{\circ}09'$. No. 2 is on top of first hill to westward, 0.3 miles from station in azimuth $40^{\circ}29'28''$. Clark Monument No. 9 (see description thereof) is 543.057 meters (1,781.68 feet) from station in azimuth $270^{\circ}25'37''$. Azimuth from station of final of south cupola of large barn at ranch, about 1 mile distant, is $240^{\circ}41'14''$.

Clark monument no. 9 (Texas-Oklahoma boundary line, C. I. Aslakson, 1931).—About $4\frac{3}{4}$ miles west of Hitchland, in an open pasture, 100 yards south of east-and-west fence line with pole line along it, and 543.057 meters (1,781.68 feet) from station *Hitch* (see description thereof) in azimuth $270^{\circ}25'37''$. Marked by truncated cone of concrete, 3 feet high, moulded in zinc form.

Clark monument no. 10 (Texas-Oklahoma State line, C. I. Aslakson, 1931).—About 0.6 mile east of the southwest corner sec. 35, T. 1 N., R. 18 E., about 100 feet south of an east-and-west fence, in pasture. To reach station from Hardesty, a village on the Trunk Line Highway, go east 2.3 miles from railroad crossing, then south 1.0 mile, east 3.0 miles, and south 7.0 miles to State line fence. Turn east along north side of fence and go 0.4 mile to gate, through gate, and 0.2 mile east to station in pasture. Station marked by a cone-shaped concrete post about 3 feet high placed by the U.S. General Land Office to mark the original position of Clark monument no. 10. Center marked by nail head

flush with surface, near center of post. Reference marks set in 1931 are standard reference disks in concrete, note 11a. No. 1 is in east-and-west fence line, and 55.71 meters (182.8 feet) from station in azimuth $221^{\circ}00'$. No. 2 is 1 foot west of north-and-south fence line, on range with west end of saddle west of a cone-shaped butte on southeast horizon, and 0.2 mile (speedometer) from station in azimuth $330^{\circ}15'04''$. Azimuth from station to *Hansford County, northeast corner* (see description thereof), distant 307.990 meters (1,010.46 feet), is $269^{\circ}59'20''$; tip of vertical shaft of windmill at house, distant about $\frac{1}{2}$ mile, is $17^{\circ}18'10''$.

Northeast corner Hansford County (Hansford County, Tex., C. I. Aslakson, 1931).—A limestone post with cross mark in center, standing about 1 foot above ground. From it *Clark monument no. 10* is distant 307.990 meters (1,010.46 feet) in azimuth $89^{\circ}59'28''$ (see description thereof).

Dower (Beaver County, C. I. Aslakson, 1931).—About 7 miles north of Perryton, Tex. just north of the Texas-Oklahoma State line, in southern part of sec. 33, T. 1 N., R. 21 E., just east of fence marking west boundary of small plat of land belonging to Fred Dower of Perryton, 155.6 feet west of southwest corner of Sinclair filling station at road intersection, 77 feet north of center line of road (U.S. Route No. 83), and 54 feet northeast of fence corner. Reached from Perryton by going north on Main Street and Route No. 83, 6.8 miles from railroad crossing. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is south of road, 1 foot north of fence, and 129.1 feet from station in azimuth $328^{\circ}14'$. No. 2 is south of road, 1 foot north of fence on south of road, and 0.25 mile (speedometer) from station in azimuth $85^{\circ}22'19''$. Azimuth from station of *Perryton, municipal water tank (silver)*, *final*, is $00^{\circ}32'27''$.

Gaylord (Beaver County, C. I. Aslakson, 1931).—On or near the State boundary line, at southwest corner of sec. 36, T. 1 N., R. 24 E., about 4 miles north and $\frac{1}{2}$ mile east of Gaylord, about 3 miles north and 6 miles east of Booker, Tex., $1\frac{1}{2}$ feet east of a north-and-south fence on east side of section line road, and 15.00 meters (49.2 feet) north of a fence corner and an east-and-west fence that is supposed to be on the State line. To reach station from Booker, Tex., go east from Main Street 0.5 mile; turn north across railroad tracks and go 0.5 mile to crossroads, east 5.0 miles, north 2.0 miles to lane leading east. Turn into lane and go east 0.4 mile to gate to farmhouse, north of road; pass through gate, through yard and barn lot to farm road leading north through cultivated field, 0.5 mile from barn to fence and station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference mark is a standard reference disk in concrete, note 11a, placed $1\frac{1}{2}$ feet east of fence, 7.5 meters (24.6 feet) east of center line of road, and 35.30 meters (115.8 feet) from station in azimuth $179^{\circ}37'$. Other azimuths from station: Letter "I" in word "Service", on Cities Service Oil Co.'s white tank, distant about 4 miles, $220^{\circ}44'33''$; *Booker municipal water tank (black)*, *final*, $61^{\circ}10'52''$.

Northeast corner of Texas (1928) (Texas-Oklahoma boundary, C. I. Aslakson, 1931).—Established by order of the Supreme Court of the United States in 1928, and not to be confused with station of similar name determined in 1927, which marked the old corner, now superseded. Old station called *Old Northeast Corner of Texas* in this report. In 1928 station described as being in the southwest quarter of sec. 4 T. 23 N., R. 26 W., in a cultivated field, about 10 feet east of remains of old fence which was apparently on line between secs. 4 and 5, on property owned by Mrs. Flossie Teats of Manchester, Okla., and rented by Perry Tice, who lives $\frac{1}{4}$ mile to southeast. Station also $\frac{1}{2}$ mile north of residence of Alphonso A. Larkey. In 1931 reported that fence above mentioned had been moved to east of station. To reach from Follet go north on Main Street to end of paving, then east 0.5 mile, north 3.0 miles, east 1.0 mile, north 1.4 miles, east 0.5 mile, north 1.0 mile to Trunk Highway, thence along Trunk Highway 5.7 miles to turn to south. Continue south 0.5 mile, to turn to east. Here dim road leads south. Follow dim road south 0.4 mile to road leading east. Turn east and go 0.2 mile to turn to south. Station is about 100 yards south of this turn, on east side of road, in head of small wash. Marked by concrete monument, base 30 inches square, set 24 inches in ground, and surmounted by a galvanized iron form 18 inches in diameter at top, 24

inches in diameter at bottom, and 42 inches high, filled with concrete and imbedded 9 inches in the base, so that top of monument projects 33 inches above ground. In top of monument is set a bronze tablet inscribed: "The Supreme Court of the United States, Northeast Corner of Texas, 1928." The disk is further inscribed with the geodetic position of the point. In 1931 two reference marks were set. They are standard reference disks in concrete, note 11a. No. 1 is west of the fence on the east side of the road, approximately 730 yards from station in azimuth $359^{\circ}40'37''$. No. 2 is 1 foot east of fence on west side of road, 16.23 meters (53.2 feet) from station in azimuth $109^{\circ}14'$. *Kidder monument* (1903) (see description thereof) is 250 feet from station in azimuth $136^{\circ}22'$.

For notes in regard to marking of stations see p. 65.

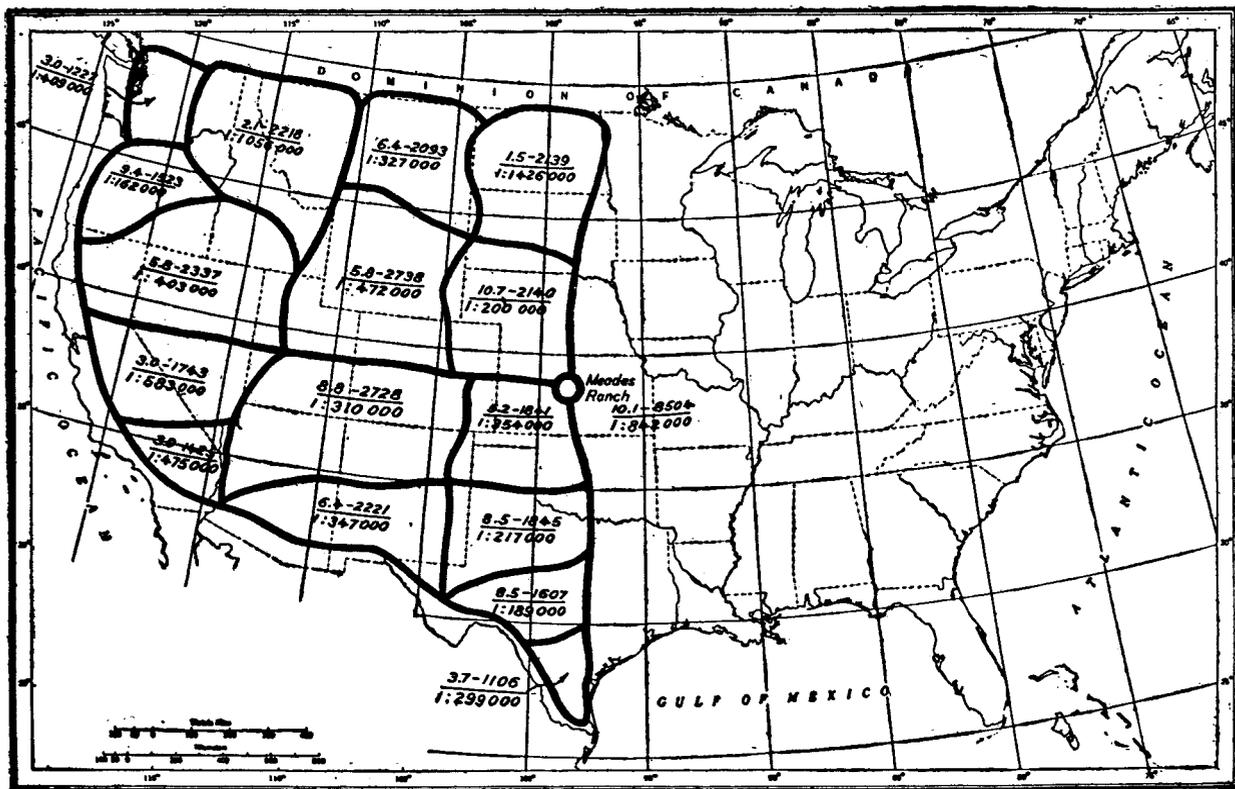


FIGURE 4.—Arcs included in western adjustment and loop closures.

The first number above the line is the total closure of the loop in meters and the second number is the approximate length of the loop in kilometers. Below the line is the approximate proportional part of the whole circuit represented by the closure.



FIGURE 5.—Arcs included in eastern adjustment and loop closures.

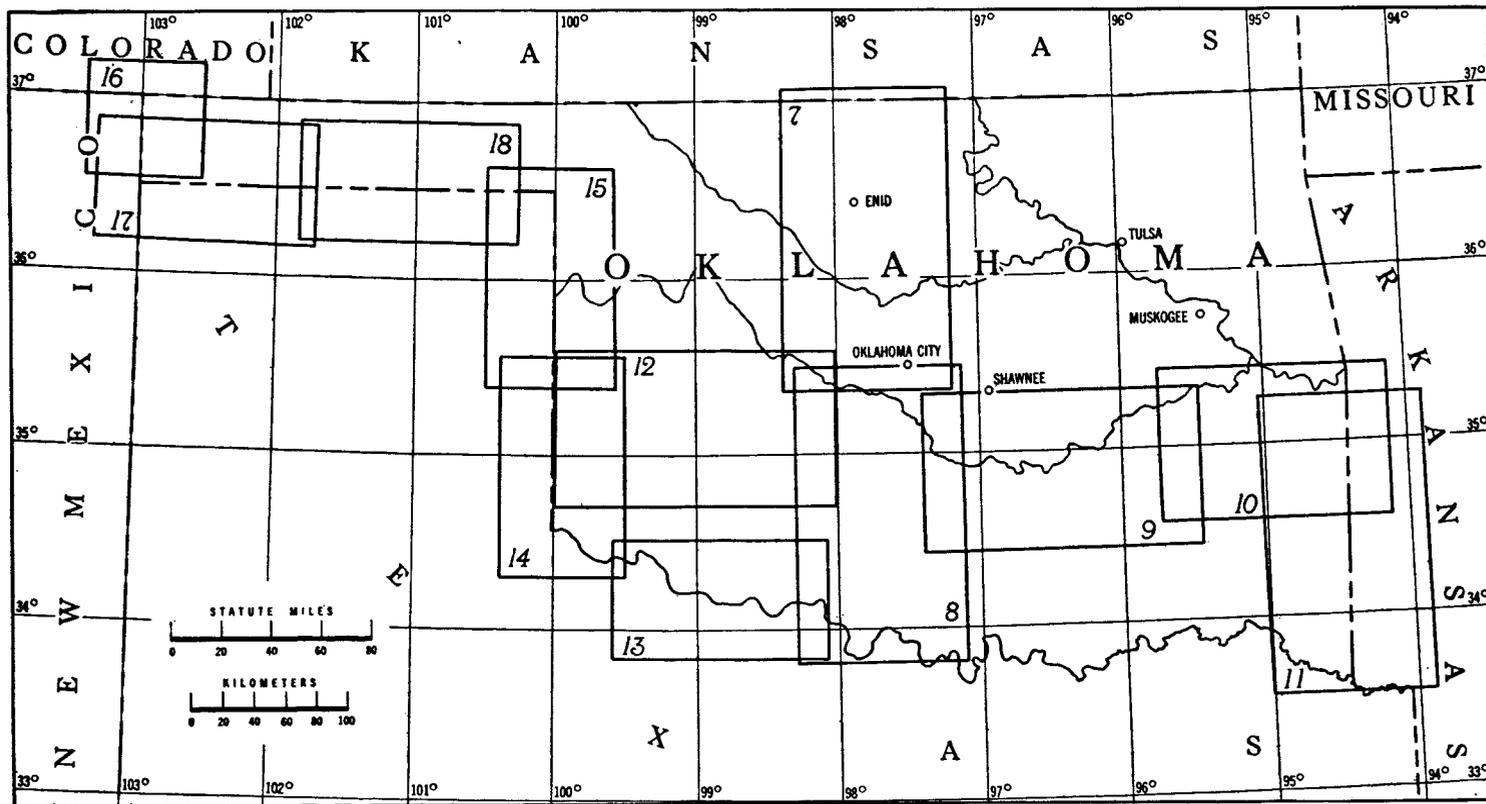


FIGURE 6.—Index map of Oklahoma showing areas covered by each of the following sketches, figures 7 to 18.

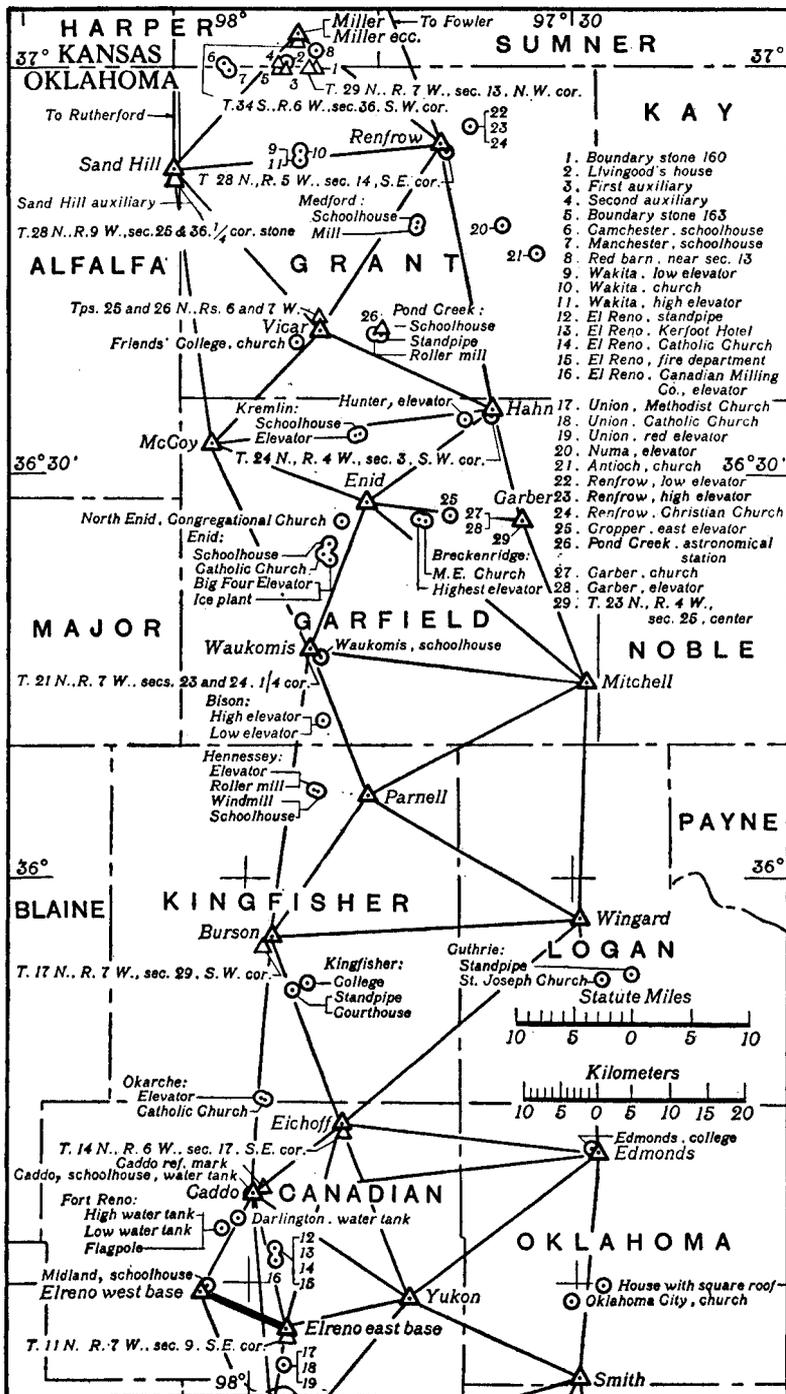


FIGURE 7.—Triangulation along the ninety-eighth meridian arc.

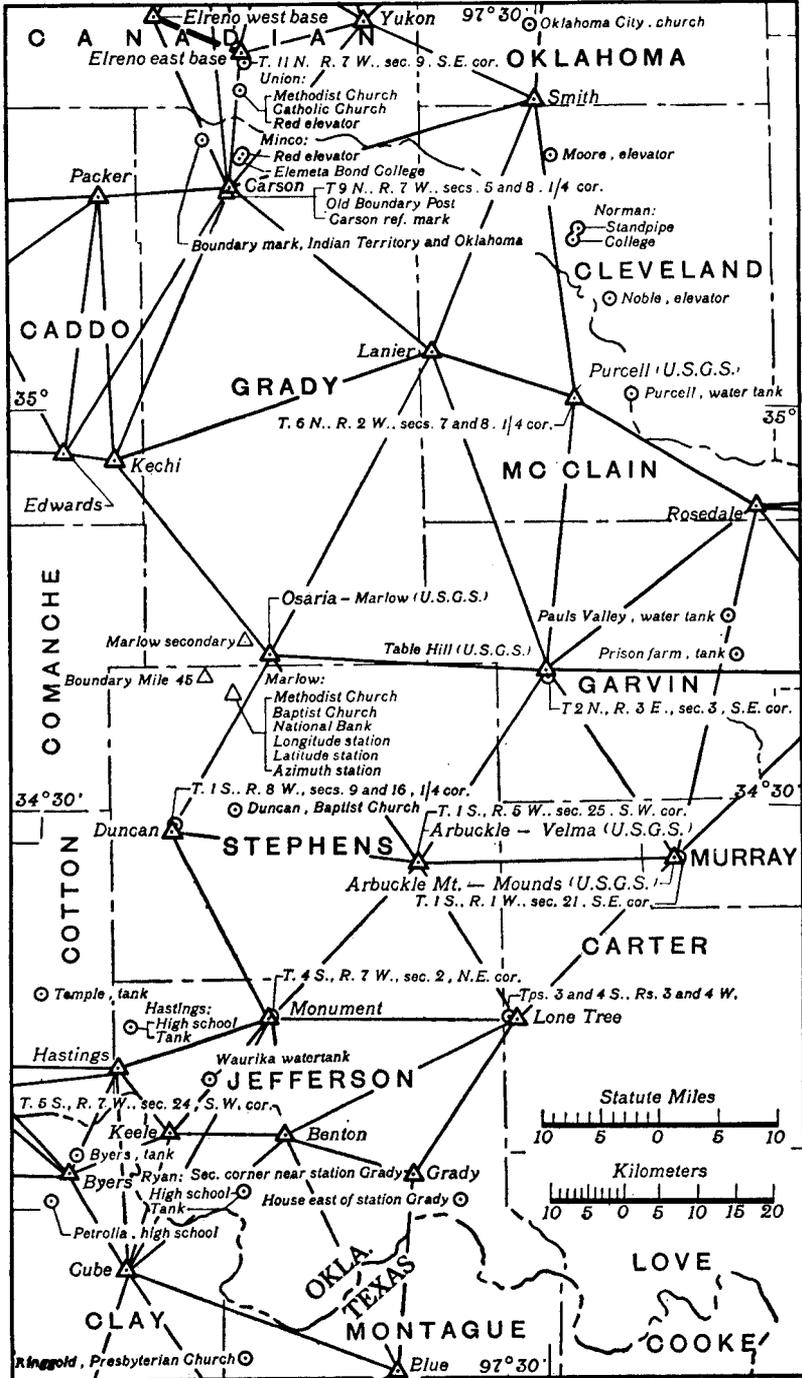


FIGURE 8.—Triangulation along the ninety-eighth meridian arc and junctions with the thirty-fifth parallel and Red River arcs.

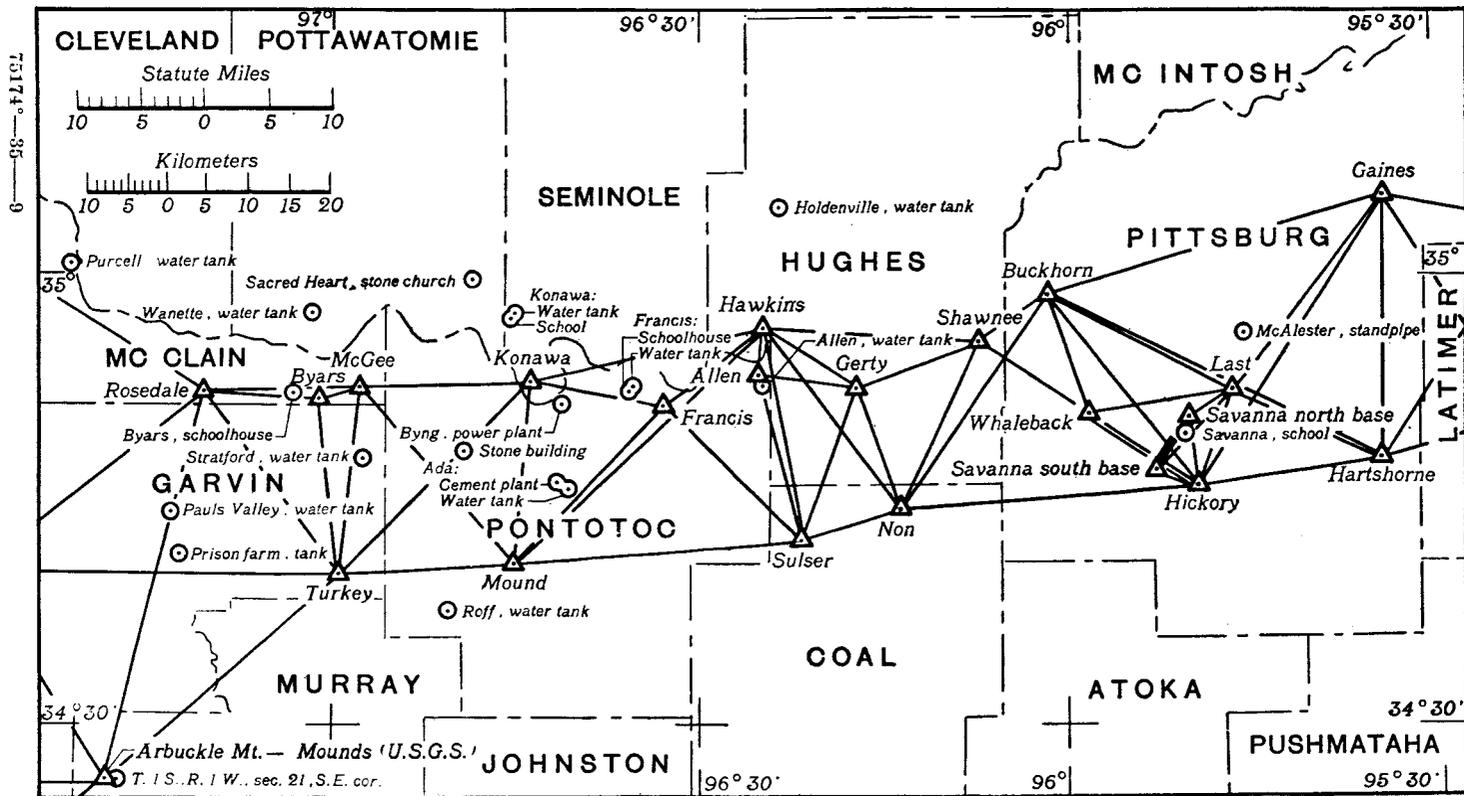


FIGURE 9.—Triangulation along the thirty-fifth parallel arc, east from ninety-eighth meridian.

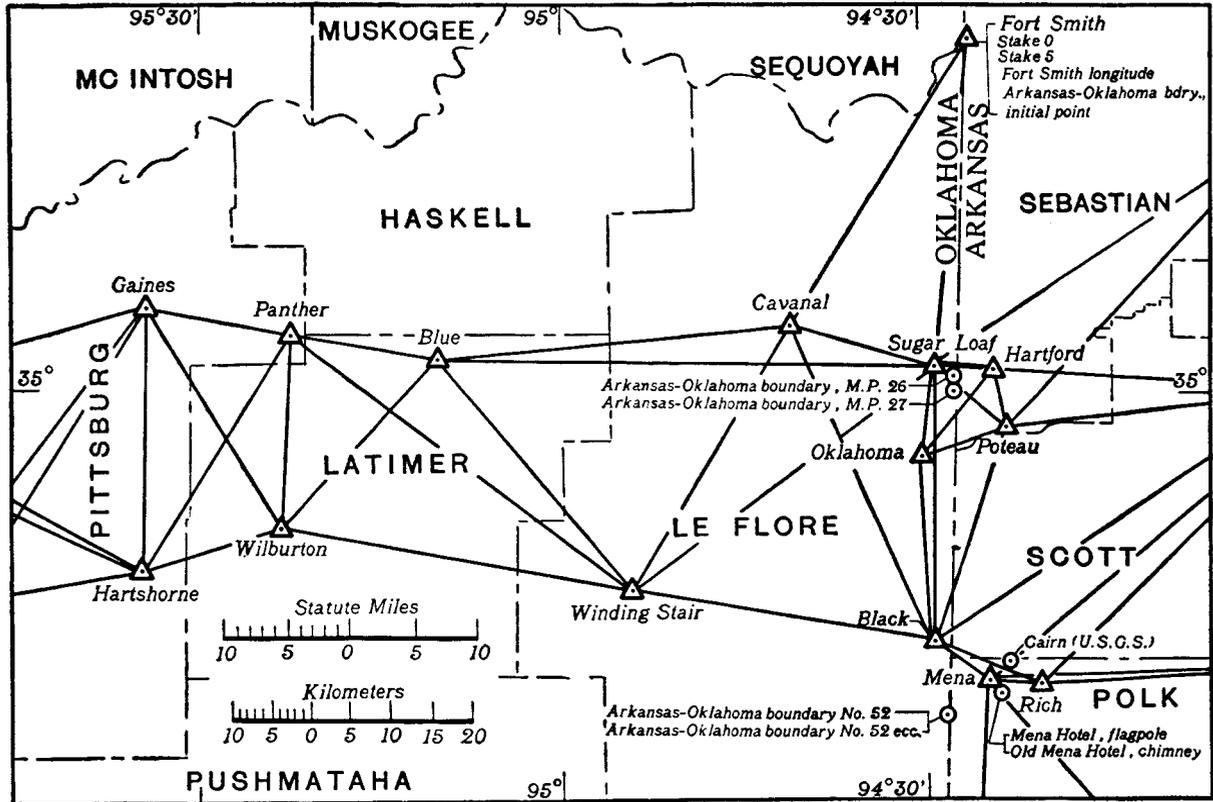


FIGURE 10.—Triangulation along the thirty-fifth parallel arc, junction with ninety-fourth meridian arc.

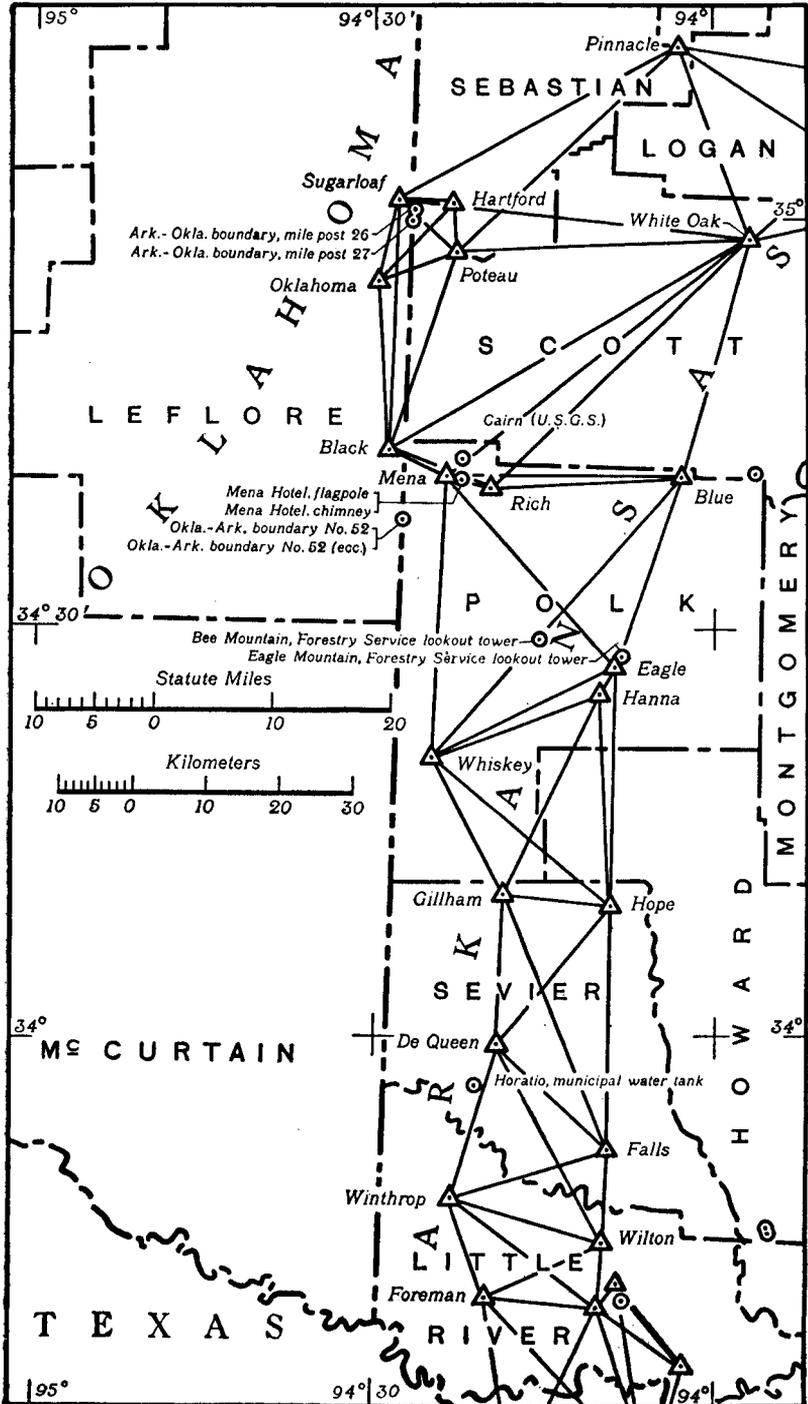


FIGURE 11.—Triangulation along the ninety-fourth meridian arc.

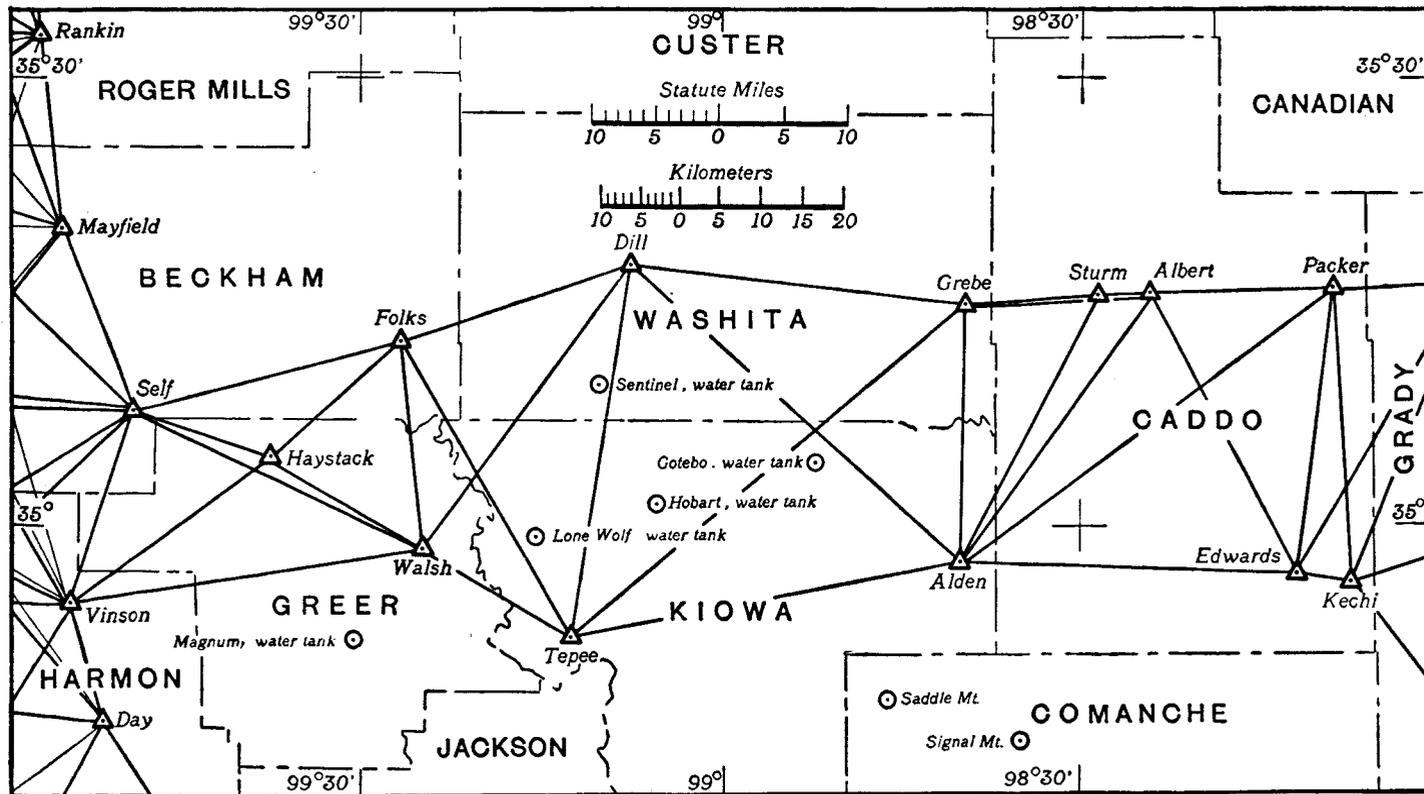


FIGURE 12.—Triangulation along the thirty-fifth parallel arc, west from ninety-eighth meridian, junction with one-hundredth meridian boundary arc.

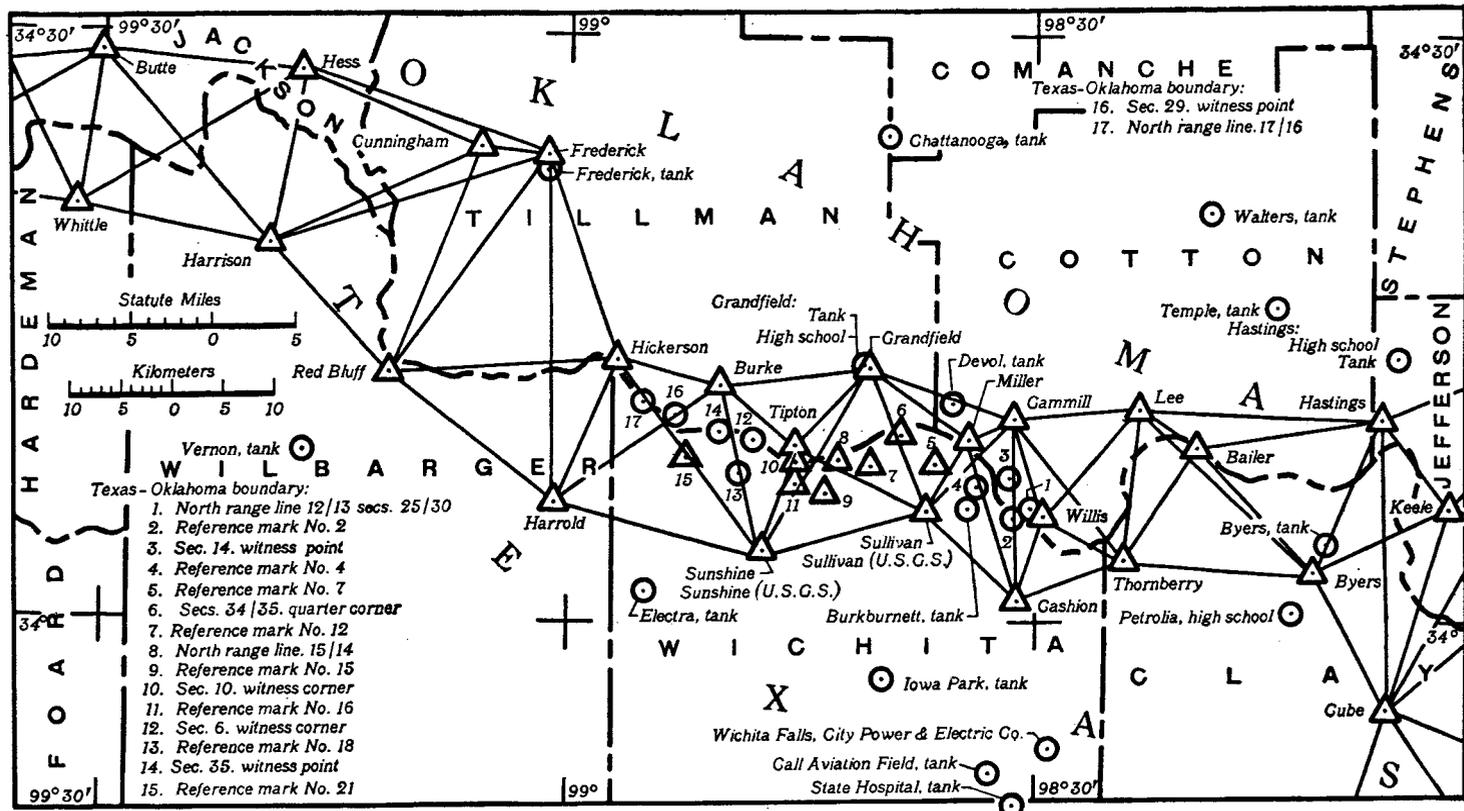


FIGURE 13.—Triangulation along the Oklahoma-Texas boundary (Red River) arc, junction with the ninety-eighth meridian arc.

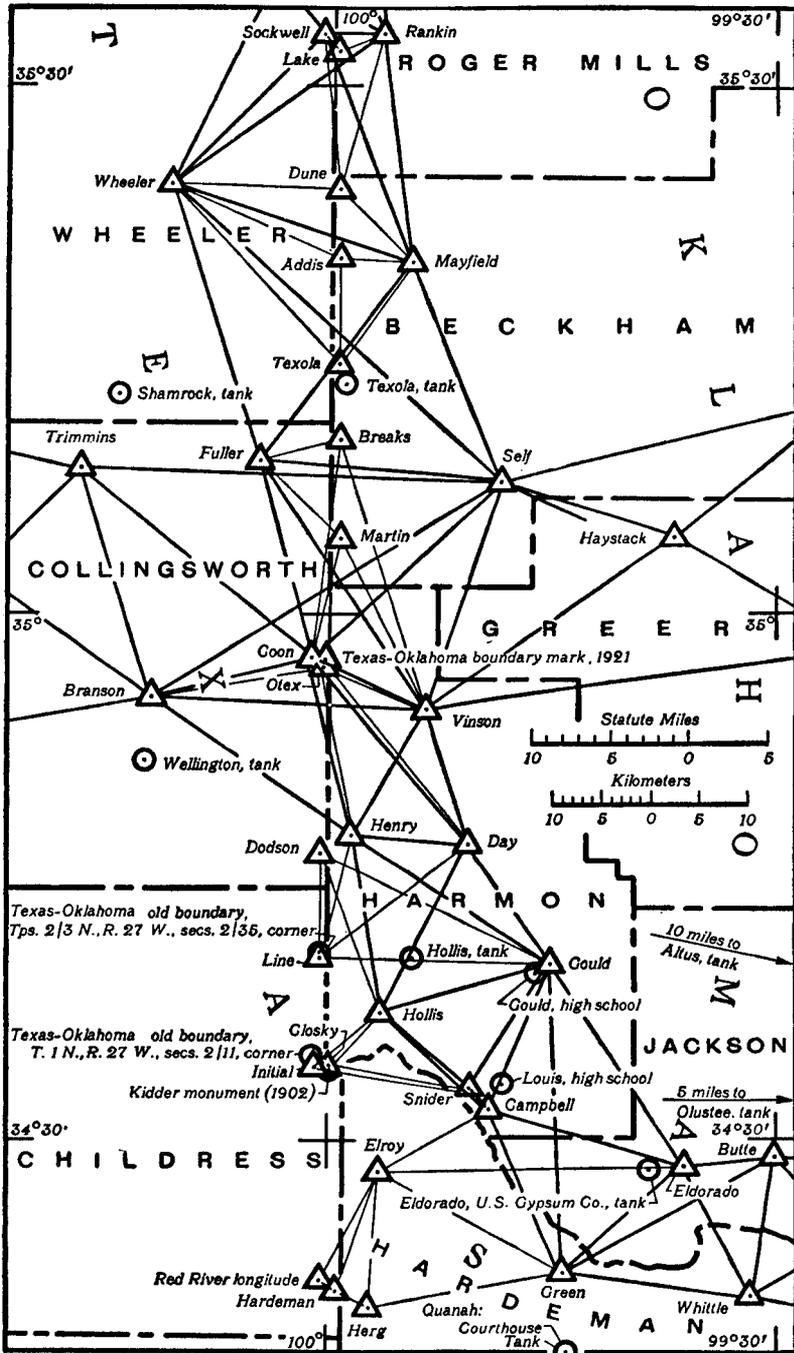


FIGURE 14.—Triangulation along the Oklahoma-Texas boundary (Red River and one-hundredth meridian) arc, junction with the thirty-fifth parallel arc.

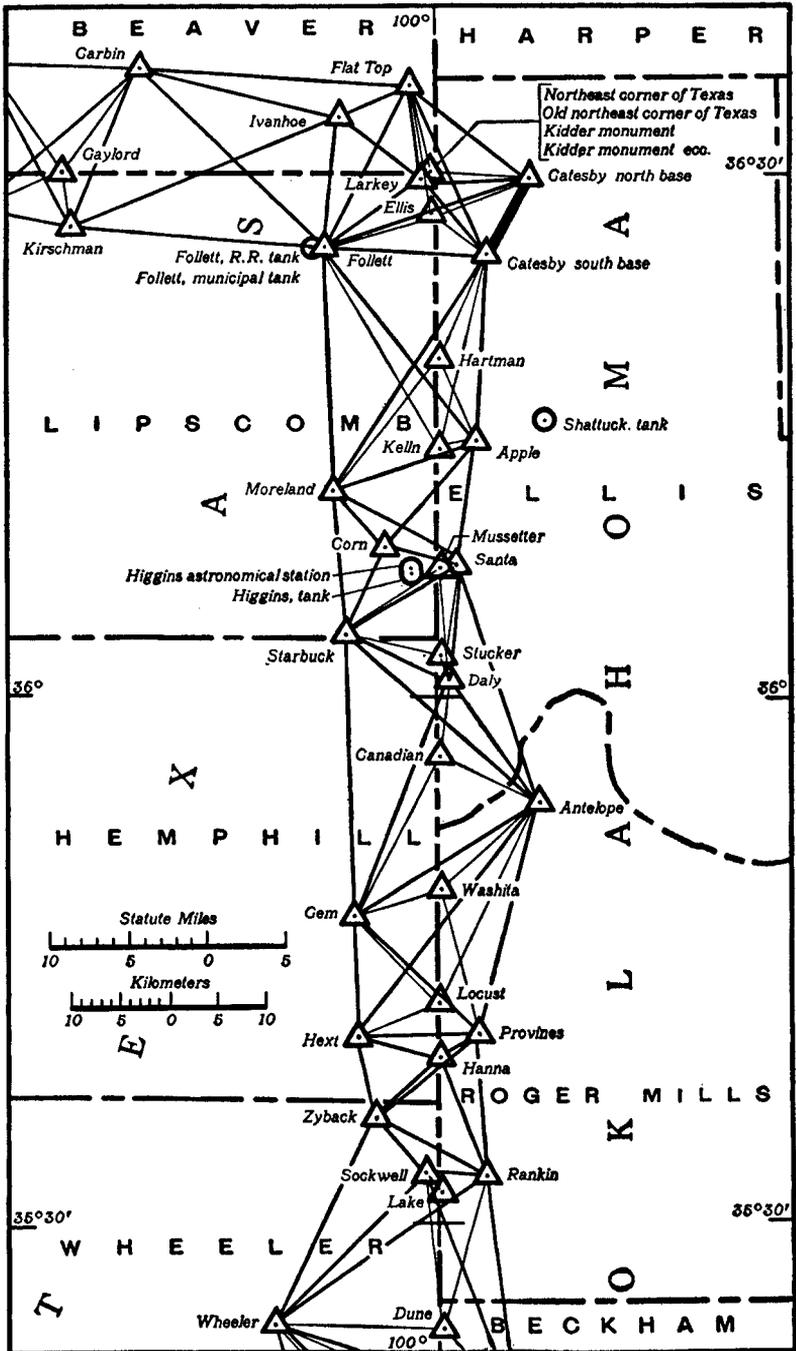


FIGURE 15.—Triangulation along the Oklahoma-Texas boundary (one-hundredth meridian) arc, junction with the Oklahoma-Texas boundary (parallel of 36°30') arc.

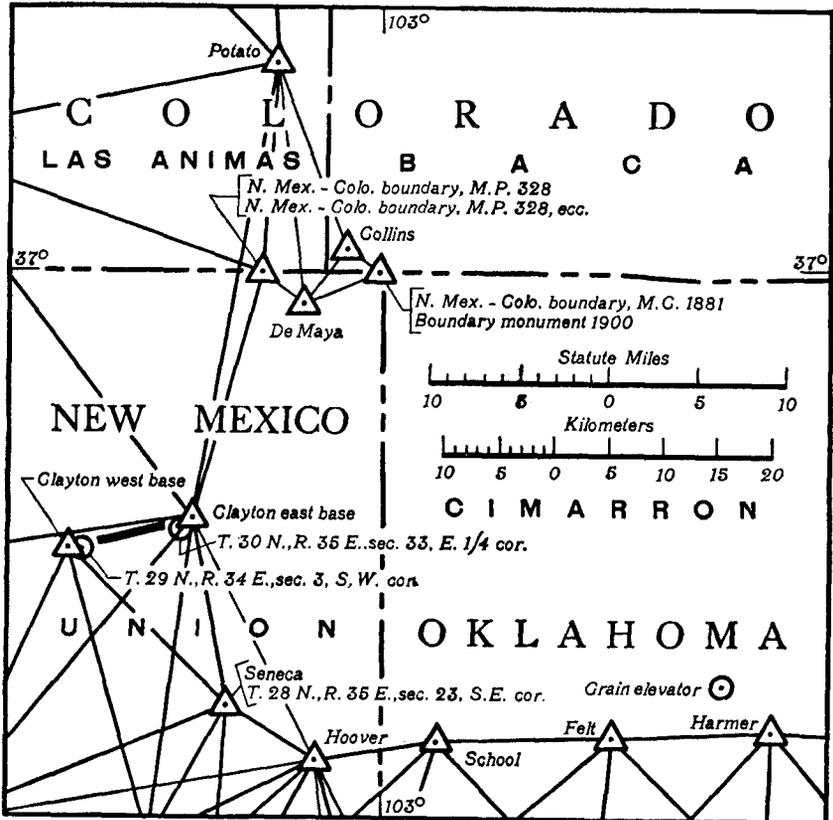


FIGURE 18.—Triangulation along the one-hundredth-and-fourth meridian arc, junction with Oklahoma-Texas boundary (parallel of 36°30') arc.

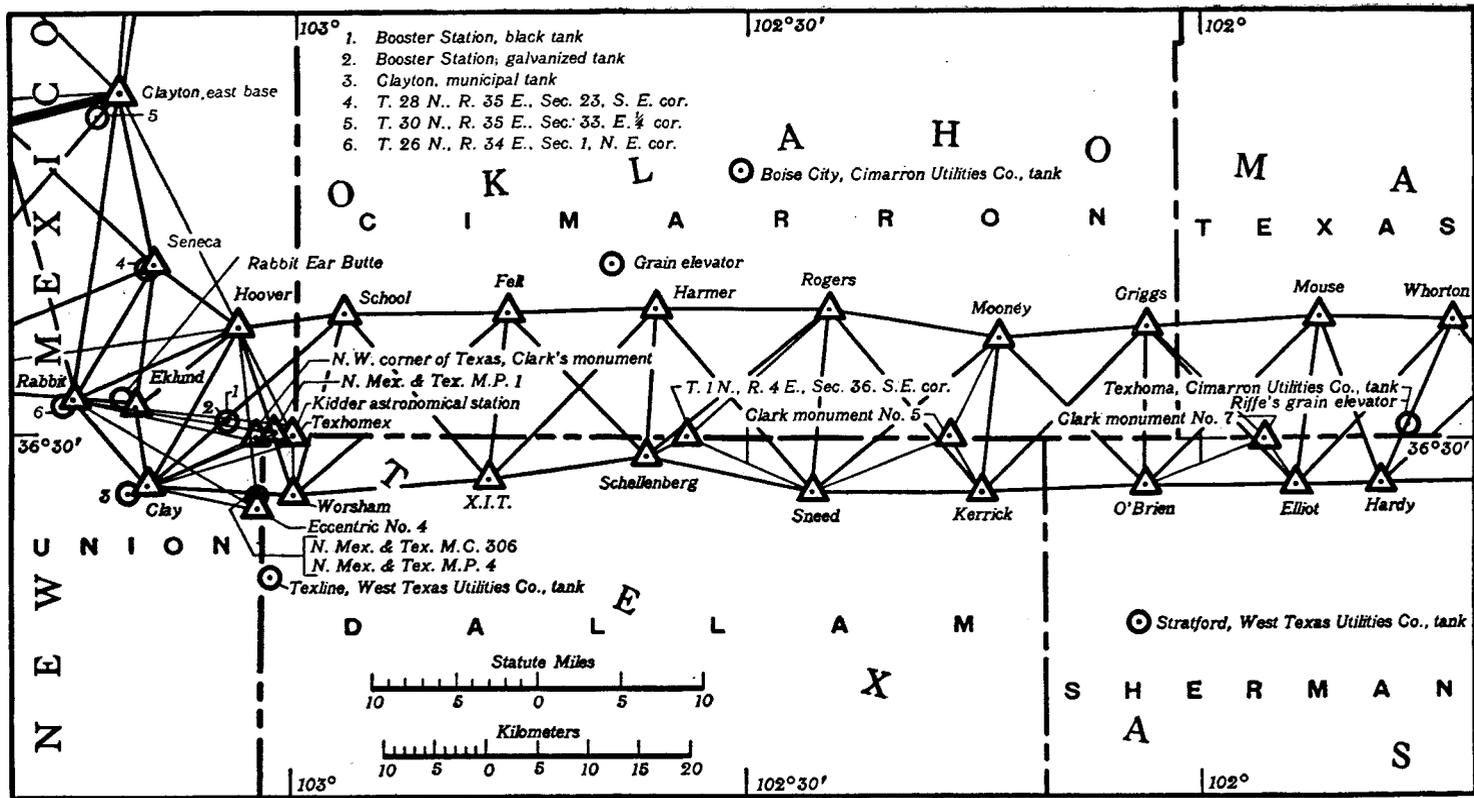


FIGURE 17.—Triangulation along the Oklahoma-Texas boundary (parallel of 36°30') arc, junction with one-hundred-and-fourth meridian arc.

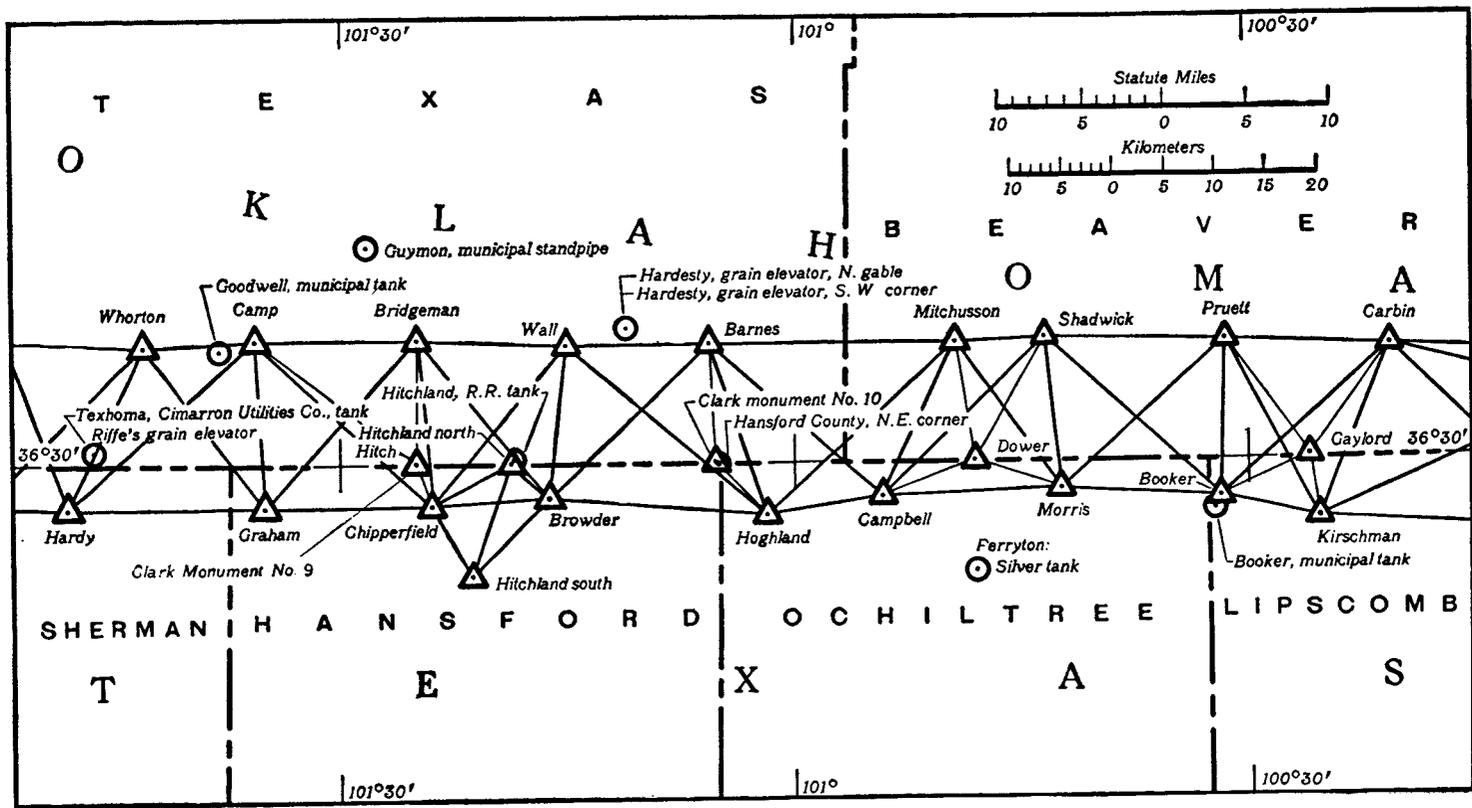


FIGURE 18.—Triangulation along the Oklahoma-Texas boundary (parallel of 36°30') arc.

Index to positions, descriptions, elevations, and sketches

	Position	Description	Elevation	Sketch
	Page	Page	Page	Figure
Ada:				
Cement plant, chimney	28			9
Water tank	28			9
Addis	45	101	57	14
Albert	32	84	57	12
Alden	32	84	57	12
Allen	25	77	57	9
Allen, water tank	28		60	9
Altus, city water tank	41	94	60	14
Antelope	43	98	57	15
Antioch Church, center spire	18		60	7
Apple	44	99	57	15
Arbuckle-Velma (U.S.G.S.)	16	71	57	8
Arbuckle Mountain-Mounds (U.S.G.S.)	16	72	57	8, 9
Arkansas-Oklahoma boundary:				
Initial point	29	81		10
Milepost no. 26	29	80		10, 11
Milepost no. 27	29	81		10, 11
No. 52	31	83		10, 11
No. 52 (eccentric)	31	84		10, 11
Astronomical station:				
Higgins (Tex.)	45	102	58	15
Kidder (N. Mex.)	53	116		17
Pond Creek	19	74		7
Azimuth station, Marlow	23	75		8
Baller	34	87	57	13
Baptist Church:				
Duncan, spire	24			8
Marlow, spire	23		61	8
Barnes	51	112	63	18
Bee Mountain, U.S. Forest Service lookout tower (Ark.)	31			11
Benton	16	73	57	8
Big Four Elevator, Enid, east gable	20		60	7
Bison:				
Highest elevator, center shaft	20		60	7
Lower elevator	20		60	7
Black	27	79	57	10, 11
Blue	26	79	58	10
Blue (Ark.)	30	81		11
Blue (Tex.)	16	73	58	8
Boise City, Cimarron Utilities Co., tank	54			17
Booker (Tex.)	52	114	63	18
Booker, municipal water tank (black), finial (Tex.)	56			18
Booster Station (N. Mex.):				
Black water tank, finial	53			17
Galvanized tank on red platform, center	53			17
Boundary, initial point, Arkansas-Oklahoma	29	81		10
Boundary, mile 45, Oklahoma-Indian Territory	23	75	60	8
Boundary, New Mexico-Colorado:				
Milepost no. 328	47	105		16
Milepost no. 328 eccentric	47	104	59	16
Old (mile corner 1881)	47			16
Boundary, Oklahoma-New Mexico-Texas—Texomex	53	115	63	17
Boundary, Oklahoma-Texas:				
Mark (Tex.)	42	96	60	14
North range line 13/12, secs. 25-30	39		62	13
North range line 15/14	38	92	62	13
North range line 17/16	40	94	61	13
Northeast corner of Texas (1928)	56	118	63	15
Reference mark no. 2 (Tex.)	39	93	61	13
Reference mark no. 4 (Tex.)	39	93	61	13
Reference mark no. 7 (Tex.)	39	93	61	13
Reference mark no. 12 (Tex.)	38	92	61	13
Reference mark no. 15 (Tex.)	39	92	61	13
Reference mark no. 16 (Tex.)	39	93	61	13
Reference mark no. 18 (Tex.)	40	94	61	13
Reference mark no. 21 (Tex.)	40	93	61	13
Secs. 34/35, quarter corner	39	93		13
T. 1 N., R. 4 E., sec. 36, southeast corner	54	116	63	17
Witness corner sec. 6	39	93	62	13
Witness corner sec. 10	39	93	62	13

Index to positions, descriptions, elevations, and sketches—Continued

	Position	Description	Elevation	Sketch
Boundary, Oklahoma-Texas—Continued	Page	Page	Page	Figure
Witness point sec. 14.....	39	93	62	13
Witness point sec. 29.....	40	94	62	13
Witness point sec. 35.....	40	94	62	13
Boundary, old, Oklahoma-Texas:				
T. 1 N., R. 27 W., secs. 2/11, corner.....	42	95		14
T. 2/3 N., R. 27 W., secs. 2/35, corner.....	42	96		14
Boundary, Texas-New Mexico:				
Mile corner 306.....	48			17
Milepost no. 1.....	48	105		17
Milepost no. 4.....	48			17
Boundary mark:				
Oklahoma-Indian Territory.....	22	74		8
Oklahoma-Texas.....	42	96	60	14
Boundary milepost:				
No. 26, Arkansas-Oklahoma.....	29	80		10, 11
No. 27, Arkansas-Oklahoma.....	29	81		10, 11
Boundary monument (1900) Colorado-New Mexico-Oklahoma.....	47	105	58	16
Boundary no. 52, Oklahoma-Arkansas.....	31	83		10, 11
Boundary no. 52 (eccentric), Oklahoma-Arkansas.....	31	84		10, 11
Boundary stone:				
160, Oklahoma-Kansas.....	17	73	60	7
163, Oklahoma-Kansas.....	17	73	60	7
Branson (Tex.).....	33	86	58	14
Breaks.....	45	100	58	14
Breckenridge:				
Highest elevator, east gable.....	19		60	7
Methodist Episcopal Church, spire.....	19		60	7
Bridgeman.....	51	111	63	18
Browder (Tex.).....	51	112	63	18
Buckhorn.....	25	77	58	9
Burkburnett, city water tank (Tex.).....	38	92	60	13
Burke.....	35	89	58	13
Burson.....	15	69	58	7
Butte.....	35	90	58	13, 14
Byars.....	25	76	58	9
Byars, schoolhouse, cupola.....	27			9
Byers (Tex.).....	34	87	58	8, 13
Byers city water tank (Tex.).....	37	92	60	8, 13
Byng, power plant, chimney.....	28			9
Caddo.....	15	69	58	7
Caddo:				
Reference mark.....	21			7
School, center water tank.....	21		60	7
Cairn (U. S. G. S.) (Ark.).....	31			10, 11
Call Aviation Field, water tank, Wichita Falls (Tex.).....	38	92	62	13
Camchester schoolhouse, belfry.....	17		60	7
Camp.....	51	111	63	18
Campbell.....	36	91	63	14
Campbell (Tex.).....	52	113	58	18
Canadian.....	45	102	58	15
Canadian Milling Co., elevator, east gable, El Reno.....	21		60	7
Carbin.....	52	115	63	15, 18
Carson.....	15	70	57	8
Carson reference mark.....	23			8
Cashion (Tex.).....	34	88	58	13
Catesby:				
North base.....	44	190	58	15
South base.....	44	99	58	15
Catholic Church:				
El Reno, spire.....	21		60	7
Enid, spire.....	20		60	7
Okarche, spire.....	21		61	7
Union, spire.....	22		61	7, 8
Cavalan.....	26	79	58	10
Cement plant, chimney, Ada.....	28			9
Center elevator, top, Okarche.....	21		61	7
Chattanooga, city water tank.....	40	94	60	13
Chipperfield (Tex.).....	51	112	63	18
Christian Church, center spire, Renfrow.....	18		61	7
Church:				
Antioch, center spire.....	18		60	7
Friend's College, spire.....	19			7
Garber, white spire.....	19		60	7
Oklahoma City, highest spire.....	22		61	7, 8
Sacred Heart, stone, gable.....	28			9
Wakita, white spire.....	18		62	7
Cimarron Utilities Co.:				
Boise City, tank.....	54			17
Texhoma, water tank, finial.....	54			17, 18

Index to positions, descriptions, elevations, and sketches—Continued

	Position	Description	Elevation	Sketch
	Page	Page	Page	Figure
City high school, Grandfield.....	38	92	60	13
City Power & Electric Co., stack, Wichita Falls (Tex.).....	37	92	62	13
Clark monument:				
No. 5.....	54	116	63	17
No. 7.....	54	116		17
No. 9.....	55	117		
No. 10.....	55	117	63	18
Clarks monument—northwest corner of Texas (Tex.-N.Mex.).....	48	105	59	17
Clay (N.Mex.).....	49	106	58	17
Clayton (N.Mex.):				
East base.....	47	104	58	16, 17
Municipal water tank (silver), final.....	53			17
West base.....	47	104	58	16
Closky (Tex.).....	42	95	60	14
College:				
Edmonds, dome.....	21		60	7
Kingfisher, belfry.....	20		61	7
Norman, belfry.....	23			8
Collins (Colo.).....	47	105		16
Colorado-New Mexico boundary:				
Milepost no. 328.....	47	105		16
Milepost no. 328 eccentric.....	47	104	59	16
Old (mile corner 1881).....	47			16
Colorado-New Mexico-Oklahoma boundary monument (1900).....	47	105	58	16
Congregational Church, North Enid, spire.....	19		61	7
Coon (Tex.).....	33	86	58	14
Corn (Tex.).....	44	99	58	15
Courthouse:				
Kingfisher, dome.....	21		61	7
Quanah, cupola (Tex.).....	41	94	61	14
Cropper, east elevator, north gable.....	19		60	7
Cube (Tex.).....	16	73	58	8, 13
Cunningham.....	35	90	58	13
Daly.....	43	98	58	15
Darlington, water tank, center.....	21		60	7
Day.....	36	91	58	12, 14
De Maya (N.Mex.).....	47	105		16
De Queen (Ark.).....	30	82		11
Devol, city water tank.....	38	92	60	13
Dill.....	32	85	58	12
Dodson (Tex.).....	42	96	60	14
Dower.....	55	118	63	18
Duncan.....	16	72	57	8
Duncan, Baptist Church, spire.....	24			8
Dune.....	45	101	58	14, 15
Eagle (Ark.).....	30	82		11
Eagle Mountain, U.S. Forest Service lookout tower (Ark.).....	31			7
East elevator, Cropper, north gable.....	19		60	7
Eccentric no. 4 (N.Mex.-Tex.).....	48	105	58	17
Edmonds.....	15	69	58	7
Edmonds College, dome.....	21		60	7
Edwards.....	32	84	58	8, 12
Elchoff.....	15	69	58	7
Eklund (N.Mex.).....	48	106	63	17
Eldorado.....	36	90	58	14
Eldorado, U.S. Gypsum Co., water tank.....	41	94	60	14
Electra, city water tank (Tex.).....	40	94	60	13
Elevator:				
El Reno, Canadian Milling Co., east gable.....	21		60	7
Garber, center shaft.....	19		60	7
Hennessey, center square top.....	20		60	7
Hunter, center.....	19			7
Kremlin, east gable.....	19		61	7
Moore, west end of ridge.....	23		61	7
Noble.....	23			8
Numa, center shaft.....	18		61	7
Elliot (Tex.).....	50	110	63	17
Ellis (Tex.).....	46	103	58	15
Elmeta Bond College, belfry, Minco.....	22		61	8
El Reno:				
Canadian Milling Co. elevator, east gable.....	21		60	7
Catholic Church, spire.....	21		60	7
East base.....	15	70	57	7, 8
Fire department belfry.....	21		60	7
Kerfoot Hotel, cupola.....	21		60	7
Standpipe.....	21		60	7
West base.....	15	70	57	7, 8

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Elroy (Tex.)	41	94	60	14
Enid	14	68	57	7
Enid:				
Big 4 Elevator, east gable	20		60	7
Catholic Church, spire	20		60	7
Ice plant, stack	20		60	7
Schoolhouse, cupola	19		60	7
Falls (Ark.)	30	83		11
Felt	49	107	63	16, 17
Fire department, belfry, El Reno	21		60	7
First auxiliary (Kans.)	17		60	7
Flagpole:				
Fort Reno	22			7
Mena Hotel, north side (Ark.)	31			10, 11
Flat Top	44	100	58	15
Folks	32	85	58	12
Follett (Tex.)	44	99	58	15
Follett (Tex.):				
Municipal water tank (black), finial	56			15
Railroad water tank	46			15
Foreman (Ark.)	31	83		11
Fort Reno:				
Flagpole	22			7
High water tank, center	21		60	7
Low water tank	22		60	7
Fort Smith (Ark.)	29	81		10
Fort Smith longitude (Ark.)	29	81		10
Fowler (Kans.)	14	66	58	7
Francis	25	76		9
Francis:				
Schoolhouse	29			9
Water tank	28			9
Frederick	35	89	58	13
Frederick, city water tank	41	94	60	13
Friend's College, church spire	19			7
Fuller (Tex.)	43	96	58	14
Gaines	26	78	58	9, 10
Gammill	34	88	58	13
Garber	14	68	58	7
Garber:				
Church, white spire	19		60	7
Elevator, center shaft	19		60	7
Gaylord	56	118	63	15, 18
Gem (Tex.)	43	98	58	15
Gerty	25	77	58	9
Gillham (Ark.)	30	82		11
Goodwell, municipal water tank	55			18
Gotebo, water tank	33	86		12
Gould	36	91	58	14
Gould, high school, north chimney	42	95	60	14
Grady	16	73	58	8
Graham (Tex.)	51	111	63	18
Grain elevator, south gable	54			16, 17
Grandfield	35	88	58	13
Grandfield:				
City high school	38	92	60	13
City water tank	38	92	60	13
Grebe	32	84	58	12
Green (Tex.)	36	90	58	14
Griggs	50	109	63	17
Guthrie:				
St. Joseph Church, east spire	21		60	7
Standpipe	21		60	7
Guymon, black municipal standpipe, center	55			18
Hahn	14	68	58	7
Hanna	43	97	58	15
Hanna (Ark.)	30	82		11
Hansford County, northeast corner (Tex.)	55	118	63	18
Hardeman (Tex.)	41	95	60	14
Hardesty, grain elevator:				
North gable	55			18
Southwest corner	55			18
Hardy (Tex.)	50	110	63	17, 18
Harmer	49	108	63	16, 17
Harrison (Tex.)	35	89	58	13
Harrold (Tex.)	35	89	58	13
Hartford (Ark.)	27	80		10, 11

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Hartshorne	26	78	58	9, 10
Hastings	34	87	58	8, 13
Hastings:				
City water tank	37	92	60	8, 13
High-school cupola	37	-----	60	8, 13
Hawkins	25	76	58	9
Haystack	33	85	58	12, 14
Hennessey:				
Elevator, center, square top	20	-----	60	7
Roller mill, stack	20	-----	60	7
Schoolhouse, dome	20	-----	60	7
Windmill at railroad	20	-----	60	7
Henry	36	91	58	14
Herg (Tex.)	41	94	61	14
Hess	35	90	58	13
Hext (Tex.)	43	98	58	15
Hickerson	35	89	58	13
Hickory	25	77	58	9
Higgins (Tex.):				
Astronomical station	45	102	58	15
Water tank	46	-----	-----	15
High elevator:				
Renfrow, east gable	18	-----	61	7
Wakita, east gable	18	-----	62	7
High school:				
Gould, north chimney	42	95	60	14
Hastings, cupola	37	-----	60	8, 13
Louis, cupola	41	95	61	14
Petrolia, cupola (Tex.)	37	92	61	8, 13
Ryan, cupola	37	-----	61	8
Highest elevator:				
Bison, center shaft	20	-----	60	7
Breckenridge, east gable	19	-----	60	7
Hitch (Tex.)	55	117	63	18
Hitehland (Tex.):				
North	55	117	63	18
Railroad water tank, finial	55	-----	-----	18
South	55	117	63	18
Hobart, water tank	33	86	-----	12
Hogland (Tex.)	51	113	63	18
Holdenville, water tank	29	-----	-----	9
Hollis	36	91	58	14
Hollis, city water tank	42	96	61	14
Hoover (N. Mex.)	48	106	58	16, 17
Hope (Ark.)	30	82	-----	11
Horatio, municipal water tank (Ark.)	31	-----	-----	11
House east of station Grady, north gable	24	-----	-----	8
House with square roof, chimney	22	-----	61	7
Hunter, elevator, center	19	-----	-----	7
Ice plant, stack, Enid	20	-----	60	7
Indian Territory-Oklahoma:				
Boundary mark	22	74	-----	8
Mile 45 boundary	23	75	60	8
Old boundary post	22	74	-----	8
Initial (Tex.)	41	95	61	14
Initial point, Arkansas-Oklahoma boundary	41	-----	-----	10
Iowa Park, city water tank (Tex.)	37	92	61	13
Ivanhoe	53	115	63	15
Kansas-Oklahoma boundary:				
Stone 160	17	73	60	7
Stone 163	17	73	60	7
Kechi	15	70	59	8, 12
Keele	34	87	59	8, 13
Kelln	45	102	59	15
Kerfoot Hotel, cupola, El Reno	21	-----	60	7
Kerrick (Tex.)	50	109	63	17
Kidder astronomical station (N. Mex.)	53	116	-----	17
Kidder monument (1903)	46	103	-----	15
Kidder monument (1902) (Tex.)	42	95	-----	14
Kidder monument eccentric (Tex.)	46	103	61	15
Kingfisher:				
College, belfry	20	-----	61	7
Courthouse dome	21	-----	61	7
Standpipe	21	-----	61	7
Kirschman (Tex.)	53	115	63	15, 18
Konawa	25	76	59	9

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School building.....	28			9
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Kremlin:				
Elevator, east gable.....	19		61	7
Schoolhouse, belfry.....	19		61	7
Lake.....	45	101	59	14, 15
Lanier.....	15	71	59	8
Larkey (Tex.).....	44	100	59	15
Last.....	26	77	59	9
Latitude station, Marlow.....	23	75		8
Lee.....	34	87	59	13
Line (Tex.).....	42	96	61	14
Livingood's house, chimney (Kans.).....	17		61	7
Locust.....	45	101	59	15
Lone Tree.....	16	72	59	8
Lone Wolf, water tank.....	33	86		12
Longitude station:				
Fort Smith (Ark.).....	29	81		10
Marlow.....	23	74	57	8
Red River (Tex.).....	41	95	61	14
Louis, high-school cupola.....	41	95	61	14
Low elevator:				
Renfrow, east gable.....	18		61	7
Wakita, east gable.....	18		62	7
Lower elevator, Bison.....	20		60	7
Manchester, schoolhouse, belfry.....	17		61	7
Mangum, water tank.....	33			12
Marlow (U.S.G.S.)-Osaria.....	15	71	59	8
Marlow:				
Azimuth station.....	23	75		8
Baptist Church, spire.....	23		61	8
Latitude station.....	23	75		8
Longitude station.....	23	74	57	8
Methodist Church, spire.....	23		61	8
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Secondary.....	23	74	61	8
Martin.....	44	100	59	14
Mayfield.....	43	96	59	12, 14
McAlester, standpipe.....	29			9
McCoy.....	14	68	59	7
McGee.....	25	76	59	9
Medford:				
Mill, center of tower.....	18			7
School, cupola.....	18		61	7
Mena (Ark.).....	30	81		10, 11
Mena Hotel (Ark.):				
Flagpole, north side.....	31			10, 11
Old, east chimney.....	31			10, 11
Methodist Church:				
Marlow, spire.....	23		61	8
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Methodist Episcopal Church, spire, Breckenridge.....	19		60	7
Midland, schoolhouse, belfry.....	22		61	7
Mile corner 1881, New Mexico-Colorado boundary (old).....	47			16
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No. 1 (N.Mex.-Tex.).....	48	105		17
No. 4 (N.Mex.-Tex.).....	48			17
No. 26 (Okla.-Ark.).....	29	80		10, 11
No. 27 (Okla.-Ark.).....	29	81		10, 11
No. 328 (N.Mex.-Colo.).....	47	105		16
No. 328 eccentric (N.Mex.-Colo.).....	47	104	59	16
Mill, center of tower, Medford.....	18			7
Miller.....	35	88	59	13
Miller (Kans.).....	14	67	59	7
Miller (eccentric) (Kans.).....	17		61	7
Minco:				
Elmeta Bond College, belfry.....	22		61	8
Red elevator, center, top.....	22		61	8
Mitchell.....	15	68	59	7
Mitchusson.....	51	113	63	18
Monument.....	16	72	59	8
Mooney.....	49	109	63	17
Moore, elevator, west end of ridge.....	23		61	8
Moreland (Tex.).....	44	99	59	15
Morris (Tex.).....	52	114	63	18
Mound.....	25	76	59	9
Mounds (U.S.G.S.)—Arbuckle Mountain.....	16	72	57	8, 9
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Mussetter.....	45	102	59	15

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New Mexico-Colorado boundary:				
Milepost no. 328	47	105		16
Milepost no. 328 eccentric	47	104	59	16
Old (mile corner 1881)	47			16
New Mexico-Colorado-Oklahoma boundary monument (1900)	47	105	58	16
New Mexico-Texas boundary:				
Mile corner 306	48			17
Milepost no. 1	48	105		17
Milepost no. 4	48			17
Noble, elevator	23			8
Non	25	77	59	9
Norman:				
College belfry	23			8
Standpipe	23			8
North Enid, Congregational Church, spire	19		61	7
Northeast corner of Hansford County (Tex.)	55	118	63	18
Northeast corner of Texas:				
Oklahoma-Texas boundary (1928)	56	118	63	15
Old Oklahoma-Texas boundary (Tex.)	46	103		15
Northwest corner of Texas—Clarks monument (N.Mex.-Tex.)	48	105	59	17
Numa elevator, center shaft	18		61	7
O'Brien (Tex.)	50	109	63	17
Okarche:				
Catholic Church, spire	21		61	7
Center elevator, top	21		61	7
Oklahoma	27	80	59	10, 11
Oklahoma-Arkansas boundary:				
Initial point	29	81		10
Milepost no. 26	29	80		10, 11
Milepost no. 27	29	81		10, 11
No. 52	31	83		10, 11
No. 52 (eccentric)	31	84		10, 11
Oklahoma City, church, highest spire	22		61	7, 8
Oklahoma-Colorado-New Mexico boundary monument (1900)	47	105	58	16
Oklahoma-Indian Territory:				
Boundary mark	22	74		8
Mile 45 boundary	23	75	60	8
Old boundary post	22	74		8
Oklahoma-Kansas boundary:				
Stone 160	17	73	60	7
Stone 163	17	73	60	7
Oklahoma-Texas boundary:				
Mark (Tex.)	42	96	60	14
North range line 13/12, secs. 25-30	39		62	13
North range line 15/14	38	92	62	13
North range line 17/16	40	94	61	13
Northeast corner of Texas (1928)	56	118	63	15
Reference mark no. 2 (Tex.)	39	93	61	13
Reference mark no. 4 (Tex.)	39	93	61	13
Reference mark no. 7 (Tex.)	39	93	61	13
Reference mark no. 12 (Tex.)	38	92	61	13
Reference mark no. 15 (Tex.)	39	92	61	13
Reference mark no. 16 (Tex.)	39	93	61	13
Reference mark no. 18 (Tex.)	40	94	61	13
Reference mark no. 21 (Tex.)	40	93	61	13
Secs. 34/35, quarter corner	39	93		13
T. 1 N., R. 4 E., sec. 36, southeast corner	54	116	63	17
Witness corner sec. 6	39	93	62	13
Witness corner sec. 10	39	93	62	13
Witness point sec. 14	39	93	62	13
Witness point sec. 29	40	94	62	13
Witness point sec. 35	40	94	62	13
Oklahoma-Texas old boundary:				
T. 1 N., R. 27 W., secs. 2/11, corner (Tex.)	42	95		14
Tps. 2/3 N., R. 27 W., secs. 2/35, corner (Tex.)	42	96		14
Old boundary post, Oklahoma-Indian Territory	22	74		8
Old Oklahoma-Texas boundary, northeast corner of Texas (Tex.)	46	103		15
Olustee, city water tank	41	94	61	14
Osaria-Marlow (U.S.G.S.)	15	71	59	8
Otex (Tex.)	42	96	61	14
Packer	32	84	59	8, 12
Panther	26	78	59	10
Parnell	15	69	59	7
Pauls Valley, water tank	27			8, 9
Perryton, municipal water tank (silver), flinal (Tex.)	56			18
Petrolia, high-school cupola (Tex.)	37	92	61	8, 13
Pinnacle (Ark.)	27	80		11

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Schoolhouse, dome.....	19		61	7
Standpipe.....	18		61	7
Potato (Colo.).....	47	104	59	16
Poteau (Ark.).....	27	79	59	10, 11
Power plant, chimney, Byng.....	28			9
Presbyterian Church, spire, Ringgold (Tex.).....	24		61	8
Prison farm, water tank.....	27			8, 9
Provinces.....	43	97	59	15
Pruett.....	52	114	63	18
Purcell (U. S. G. S.).....	16	71	59	8
Purcell, water tank.....	27			8, 9
Quanah:				
Courthouse cupola (Tex.).....	41	94	61	14
City water tank (Tex.).....	41	94	61	14
Rabbit (N. Mex.).....	47	104	59	17
Rabbit Ear Butte, northernmost peak, tip (N. Mex.).....	54			17
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Follett (Tex.).....	46			15
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Rankin.....	43	97	59	12, 14, 15
Red barn near section 13, south gable (Kans.).....	17		61	7
Red Bluff (Tex.).....	35	89	59	13
Red elevator:				
Minco, center, top.....	22		61	8
Union, center, top.....	22		61	7, 8
Red River longitude (Tex.).....	41	95	61	14
Reference mark:				
Caddo.....	21			7
Carson.....	23			8
Sand Hill.....	18		61	
Renfrow.....	14	67	59	7
Renfrow:				
Christian Church, center spire.....	18		61	7
High elevator, east gable.....	18		61	7
Low elevator, east gable.....	18		61	7
Rlch (Ark.).....	30	81		10, 11
Riffe's grain elevator, Texhoma (Tex.).....	54			17, 18
Ringgold, Presbyterian Church, spire (Tex.).....	24		61	8
Roff, water tank.....	28			9
Rogers.....	49	108	63	17
Roller mill:				
Hennessey, stack.....	20		60	7
Pond Creek.....	19		61	7
Rosedale.....	24	75	59	8, 9
Rutherford (Kans.).....	14	67	59	7
Ryan:				
City water tank.....	36	92	61	8
High-school cupola.....	37		61	8
Sacred Heart, stone church, gable.....	28			9
Saddle Mountain.....	33	86		12
St. Joseph Church, east spire, Guthrie.....	21		60	7
Sand Hill.....	14	67	59	7
Sand Hill:				
Auxiliary.....	17			7
Reference mark.....	18		61	
Santa.....	44	98	59	15
Savanna:				
North base.....	26	78	59	9
School.....	29		61	9
South base.....	26	78	59	9
Schellenberg (Tex.).....	49	108	63	17
School.....	49	108	63	16, 17
School:				
Caddo, center water tank.....	21		60	7
Medford, cupola.....	18		61	7
Savanna.....	29		61	9
School building, Konawa.....	28			9
Schoolhouse:				
Byars, cupola.....	27			9
Camchester, belfry.....	17		60	7
Enid, cupola.....	19		60	7
Francis.....	29			9
Hennessey, dome.....	20		60	7
Kramlin, belfry.....	19		61	7

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Manchester, belfry	17		61	7
Midland, belfry	22		61	7
Pond Creek, dome	19		61	7
Waukomis, belfry	30		62	7
Second auxiliary (Kans.)	17			7
Secondary, Mariow	23	74	61	8
Section:				
1, T. 26 N., R. 34 E., northeast corner (N.Mex.)	48			17
2, T. 4 S., R. 7 W., northeast corner	24	75		8
2/11, T. 1 N., R. 27 W., corner, old Oklahoma-Texas boundary	42	95		14
2/35, Tps. 2/3 N., R. 27 W., corner, old Oklahoma-Texas boundary	42	96		14
3, T. 2 N., R. 3 E., southeast corner	23	75		8
3, T. 24 N., R. 4 W., southwest corner, stone	19	74		7
3, T. 29 N., R. 34 E., southwest corner (N.Mex.)	47			16
5/8, T. 9 N., R. 7 W., ¼-section corner	23	74	61	8
7/8, T. 6 N., R. 2 W., ¼-section corner	23	74		8
9, T. 11 N., R. 7 W., southeast corner	22	74		7, 8
9/16, T. 1 S., R. 8 W., ¼-section corner	24	75		7
13, T. 29 N., R. 7 W., northwest corner	17	73	61	8
14, T. 28 N., R. 5 W., southeast corner	18	74		7
17, T. 14 N., R. 6 W., southeast corner	21	74		7
21, T. 1 S., R. 1 W., southeast corner	24	75		7
23, T. 28 N., R. 35 E., southeast corner (N.Mex.)	48			8, 9
23/24, T. 21 N., R. 7 W., ¼-section corner	20	74		16, 17
24, T. 5 S., R. 7 W., southwest corner (see T. 5 S., R. 7 W., sec. 25, center)				7
25, T. 1 S., R. 5 W., southwest corner	24	75		8
25, T. 5 S., R. 7 W., center	24	75		
25, T. 23 N., R. 4 W., center	19	74		7
25/36, T. 28 N., R. 9 W., ¼-sec. corner, stone	17	74	61	7
29, T. 17 N., R. 7 W., southwest corner	20	74	61	7
33, T. 30 N., R. 35 E., east ¼ corner (N.Mex.)	47			16, 17
36, T. 1 N., R. 4 E., southeast corner, Oklahoma-Texas boundary	54	116	63	17
36, T. 34 S., R. 6 W., southwest corner (Kans.)	17			7
Section corner near station Grady				
Self	32	85	59	12, 14
Seneca (N.Mex.)	47	104	59	16, 17
Sentinel, water tank	33	86		12
Shadwick	52	114	63	18
Shamrock, water tank (Tex.)	33			14
Shattuck, water tank	46			15
Shawnee	25	77	59	9
Signal Mountain	33	86		12
Smith	15	70	59	7, 8
Sneed (Tex.)	49	108	63	17
Snider	36	91	59	14
Sockwell (Tex.)	43	97	59	14, 15
Stake 0 (Ark.)	29			10
Stake 5 (Ark.)	29			10
Standpipe:				
El Reno	21		60	7
Guthrie	21		60	7
Guymon, black municipal, center	55			18
Kingfisher	21		61	7
McAlester	29			9
Norman	23			8
Pond Creek	18		61	7
Starbuck (Tex.)	43	98	59	15
State Hospital, water tank, Wichita Falls (Tex.)	37	92	62	13
Stone building, center, cupola	27			9
Stone church, gable, Sacred Heart	28			9
Stratford:				
Water tank	28			9
West Texas Utilities Co., water tank, finial (Tex.)	54			17
Stucker	45	102	59	15
Sturm	32	84	59	12
Sugar Loaf	27	79	59	10, 11
Sullivan (Tex.)	34	88	59	13
Sullivan (U.S.G.S.) (Tex.)	38	92	61	13
Sulser	25	76	59	9
Sunshine (Tex.)	35	88	59	13
Sunshine (U.S.G.S.) (Tex.)	38	92	61	13
Table Hill (U.S.G.S.)	16	71	59	8
Temple, city water tank	37	92	61	8, 13
Tepee	32	85	59	12
Texas-New Mexico boundary:				
Mile corner 306	48			17
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North range line 13/12, secs. 25-30	39		62	13
North range line 15/14	38	92	62	13
North range line 17/16	40	94	61	13
Northeast corner of Texas (1928)	56	118	63	15
Reference mark no. 2 (Tex.)	39	93	61	13
Reference mark no. 4 (Tex.)	39	93	61	13
Reference mark no. 7 (Tex.)	39	93	61	13
Reference mark no. 12 (Tex.)	38	92	61	13
Reference mark no. 15 (Tex.)	39	92	61	13
Reference mark no. 16 (Tex.)	39	93	61	13
Reference mark no. 18 (Tex.)	40	94	61	13
Reference mark no. 21 (Tex.)	40	93	61	13
Secs. 34/35, quarter corner	39	93		13
T. 1 N., R. 4 E., sec. 36, southeast corner	54	116	63	17
Witness corner sec. 6	39	93	62	13
Witness corner sec. 10	39	93	62	13
Witness point sec. 14	39	93	62	13
Witness point sec. 29	40	94	62	13
Witness point sec. 35	40	94	62	13
Texas-Oklahoma old boundary:				
T. 1 N., R. 27 W., secs. 2/11, corner (Tex.)	42	95		14
Tps. 2/3 N., R. 27 W., secs. 2/35, corner (Tex.)	42	96		14
Texhoma:				
Cimarron Utilities Co., water tank, final	54			17, 18
Riffe's grain elevator (Tex.)	54			17, 18
Texhomex, Oklahoma-New Mexico-Texas boundary	53	115	63	17
Texline, West Texas Utilities Co., water tank, final (N.Mex.)	53			17
Texola	45	101	59	14
Texola, water tank, center line	46			14
Thornberry (Tex.)	34	87	59	13
Tipton	35	89	59	13
Township:				
1 S., R. 1 W., sec. 21, southeast corner	24	75		8, 9
1 N., R. 4 E., sec. 36, southeast corner, Oklahoma-Texas boundary	54	116	63	17
1 S., R. 5 W., sec. 25, southwest corner	24	75		8
1 S., R. 8 W., secs. 9/16, ¼-section corner	24	75		8
1 N., R. 27 W., secs. 2/11, corner, old Oklahoma-Texas boundary	42	95		14
2 N., R. 3 E., sec. 3, southeast corner	23	75		8
2/3 N., R. 27 W., secs. 2/35, corner, old Oklahoma-Texas boundary	42	96		14
4 S., R. 7 W., sec. 2, northeast corner	24	75		8
3/4 S., Rs. 3/4 W., township corner	24	75		8
5 S., R. 7 W., sec. 24, southwest corner (see T. 5 S., R. 7 W., sec. 25, center)				8
5 S., R. 7 W., sec. 25, center	24	75		
6 N., R. 2 W., secs. 7/8, ¼-section corner	23	74		8
9 N., R. 7 W., secs. 5/8, ¼-section corner	23	74	61	8
11 N., R. 7 W., sec. 9, southeast corner	22	74		7, 8
14 N., R. 6 W., sec. 17, southeast corner	21	74		7
17 N., R. 7 W., sec. 29, southwest corner	20	74	61	7
21 N., R. 7 W., secs. 23/24, ¼-section corner	20	74		7
23 N., R. 4 W., sec. 25, center	19	74		7
24 N., R. 4 W., sec. 3, southwest corner, stone	19	74		7
25/26 N., Rs. 6/7 W., township corner	19	74		7
26 N., R. 34 E., sec. 1, northeast corner (N.Mex.)	48			17
28 N., R. 5 W., sec. 14, southeast corner	18	74		7
28 N., R. 9 W., secs. 25/36, ¼-section corner, stone	17	74	61	7
28 N., R. 35 E., sec. 23, southeast corner (N.Mex.)	48			16, 17
29 N., R. 7 W., sec. 13, northwest corner	17	73	61	7
29 N., R. 34 E., sec. 3, southwest corner (N.Mex.)	47			16
30 N., R. 35 E., sec. 33, east ¼ corner (N.Mex.)	47			16, 17
34 S., R. 6 W., sec. 36, southwest corner (Kans.)	17			7
Township corner:				
Tps. 3/4 N., Rs. 3/4 W.	24	75		8
Tps. 25/26 N., Rs. 6/7 W.	19	74		7
Trimmins (Tex.)	33	86	59	14
Turkey	25	75	59	9
Union:				
Catholic Church, spire	22		61	7, 8
Methodist Church, spire	22			7, 8
Red elevator, center, top	22		61	7, 8
U.S. Forest Service lookout tower (Ark.):				
Bee Mountain	31			11
Eagle Mountain	31			11
U.S. Gypsum Co., water tank, Eldorado	41	94	60	14

Index to positions, descriptions, elevations, and sketches—Continued

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Vernon, city water tank (Tex.)	40	94	62	13
Vicar	14	67	59	7
Vinson	32	85	59	12, 14
Wakita:				
Church, white spire	18		62	7
High elevator, east gable	18		62	7
Low elevator, east gable	18		62	7
Wall	51	112	63	18
Walsh	32	85	60	12
Walters, city water tank	37	92	62	13
Wanette, water tank	27			9
Washita	45	102	60	15
Waukomis	14	68	57	7
Waukomis reference mark			57	
Waukomis, schoolhouse, belfry	20		62	7
Waurika, city water tank	37	92	62	8
Wellington, water tank (Tex.)	33			14
West Texas Utilities Co.:				
Stratford, water tank, finial (Tex.)	54			17
Texline, water tank, finial (N.Mex.)	53			17
Whaleback	26	77	60	9
Wheeler (Tex.)	43	96	60	14, 15
Whiskey (Ark.)	30	82		11
White Oak (Ark.)	27	80		11
Whittle (Tex.)	35	90	60	13, 14
Whorton	50	110	63	17, 18
Wichita Falls (Tex.):				
Call Aviation Field, water tank	38	92	62	13
City Power & Electric Co., stack	37	92	62	13
State Hospital, water tank	37	92	62	13
Wilburton	26	78	60	10
Willis	34	88	60	13
Wilton (Ark.)	31	83		11
Winding Stair	26	79	60	10
Windmill, Henessey, at railroad	20		60	7
Wingard	15	69	60	7
Winthrop (Ark.)	30	83		11
Worsham (Tex.)	49	107	63	17
X.I.T. (Tex.)	49	107	63	17
Yukon	15	70	60	7, 8
Zyback (Tex.)	43	97	60	15

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