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LEO OTIS COLBERT, Director

Special Publication No. 219

TRIANGULATION IN NEW MEXICO

[1927 DATUM]

BY

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Associate Mathematician

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TRIANGULATION IN NEW MEXICO

GENERAL STATEMENT

This volume contains the results of all triangulation which has been established in New Mexico up to and including the year 1936 with the exception of a few stations in the vicinity of the Southern Ute Indian Reservation along the western end of the Colorado-New Mexico boundary line. The triangulation established in the Southern Ute Indian Reservation area cannot be finally adjusted until further field work has been done in order to make proper ties to triangulation which has already been established. Preliminary data for these stations are now available in manuscript form at the Office of the United States Coast and Geodetic Survey. Data for these stations after the adjustment is made will also be available in manuscript form until the results are published in a succeeding volume.

The geographic positions herein are on the North American datum of 1927 and supersede the positions of the same points on the North American (United States Standard) datum; and, therefore, supersede the positions which appear in Special Publication No. 11, "The Texas-California Arc of Primary Triangulation."

Locations of triangulation stations can be readily seen by referring to the index sketches at the back of this volume, and data for specific stations can be found by referring to the index of stations also at the back of this volume.

This volume is the eighteenth of a series of publications, which contain the results of triangulation surveys on the new datum (North American datum of 1927). The following volumes have been published:

	Special Pub. No.
Triangulation in Colorado	160
First-Order Triangulation in Southeast Alaska	164
First- and Second-Order Triangulation in Oregon	175
First-Order Triangulation in Kansas	179
First-Order Triangulation and Traverse in Louisiana	183
First-Order Triangulation in Missouri	186
First-Order Triangulation and Traverse in Arkansas	187
Triangulation in Texas	189
Triangulation in Oklahoma	190
First- and Second-Order Triangulation and Traverse in North Carolina	192
First- and Second-Order Triangulation in Tennessee	198
First- and Second-Order Triangulation in California	202
First- and Second-Order Triangulation and Traverse in Minnesota	203
Triangulation in Utah	209
Triangulation in Wyoming	212
First- and Second-Order Triangulation in Michigan	214
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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 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 it is thought 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.

NORTH AMERICAN DATUM OF 1927

The original adjustment of the older 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, 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:

Latitude $=39°13'26''.686$
Longitude $=98\ 32\ 30\ .506$

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

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

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, serves 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.

ARCS AND AREAS INCLUDED IN THIS PUBLICATION

The triangulation included in this publication consists of the arcs and areas or parts of arcs and areas that lie within the State of New Mexico or within a few miles thereof in adjoining States. The following list shows the various arcs and areas of triangulation, the chiefs of party by whom they were established, and the years in which the work was done.

Arcs and areas	Chief of party	Year
First order		
Texas-California arc	J. S. Hill	1909–1910
Thirty-fifth parallel arc	C. L. Garner	1920
	E. O. Heaton	1921
One-hundred-and-fourth meridian arc	C. M. Durgin	1922
Oklahoma-Texas boundary (parallel of 36°30′) arc.	C. M. Durgin	1922
	C. I. Aslakson	1931
Hot Wells, Tex., to Santa Rosa, N. Mex., arc.	W. R. Porter	1934
Picacho, N. Mex., to Slaton, Tex., arc	W. R. Porter	1934–1935
Vega, Tex., to Odessa, Tex., arc	W. R. Porter	1934–1935
Las Cruces to Belen arc	L. C. Johnson	1934
Lordsburg, N. Mex., to Grand Junction, Colo., arc.	L. C. Johnson	1934
	E. B. Latham	1934
Lower Rio Grande area	W. R. Porter	1936
Little Colorado River area	C. L. Garner	1920
	J. Bowie, Jr	1936
	J. D. Thurmond	1936
Second order		
Mescalero Indian Reservation area	W. R. Porter	1934
	J. Bowie, Jr	1936
Clayton to Tucumcari arc	W. R. Porter	1935
Tucumcari, N. Mex., to Monahans, Tex.	W. R. Porter	1935
Third order		
Apache National Forest area	U. S. Geological Survey	1913
	U. S. Forest Service	1935

COMPUTATIONS

The Texas-California arc, the thirty-fifth parallel arc, and the one-hundred-and-fourth meridian arc were included in the general adjustment of the western half of the United States.[2] This adjustment was made under the direction of O. S. Adams, who was assisted by W. F. Reynolds, Hugh C. Mitchell, H. S. Rappleye, G. L. Fentress, H. P. Kaufman, and other members of the Division of Geodesy of this Bureau. The remainder of the triangulation was computed under the general supervision of W. F. Reynolds by Hugh C. Mitchell, O. P. Sutherland, C. N. Claire, G. L. Fentress, H. P. Kaufman, C. T. Allen, E. S. Belote, B. K. Meade, A. C. Poling, and J. L. Stearn. The plane coordinates were computed in the New York City computing office. Don C. Ritchie rendered valuable assistance in preparing the descriptions of the stations. The sketches were prepared by R. C. Moler.

GENERAL DESCRIPTION OF TABLES AND SKETCHES

The tables of geographic positions, on pages 18 to 87, contain also the distances between contiguous triangulation stations in meters and in feet, the logarithms of the distances in meters, and the azimuths of the lines joining the stations. The distances are corrected for elevations above mean sea level, and are, therefore, very slightly less than the true distances between the points. Anyone who wishes to obtain the actual distances between the triangulation stations should use the formula given on page 17, by which the true distance at the mean elevation of the stations can be derived from the distance at mean sea level. The azimuths are measured in a clockwise direction from the true south.

The descriptions of the stations, given on pages 118 to 276, are designed to enable the engineer to recover and identify a 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 and by the work of man. Any engineer who may visit a station and finds that the description does not truly represent the conditions of the time, or who finds the mark destroyed or mutilated, should report the facts to the Director, U. S. 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 U. S. Coast and Geodetic Survey is a public survey, made for the use of the people. The stations, because of their usefulness in the regions in which they are located, really belong to those regions. The engineer who is so fortunate as to find one of these stations near his work should help to perpetuate the monuments in order that they may be of continuous service and value to that locality. Representatives of the U. S. Coast and Geodetic Survey will, from time to time, visit the established stations and will re-mark and redescribe them if necessary.

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[2] See Oscar S. Adams, The Bowie Method of Triangulation Adjustment as Applied to the First-Order Net in the Western Part of the United States, U. S. Coast and Geodetic Survey Special Publication No. 159.

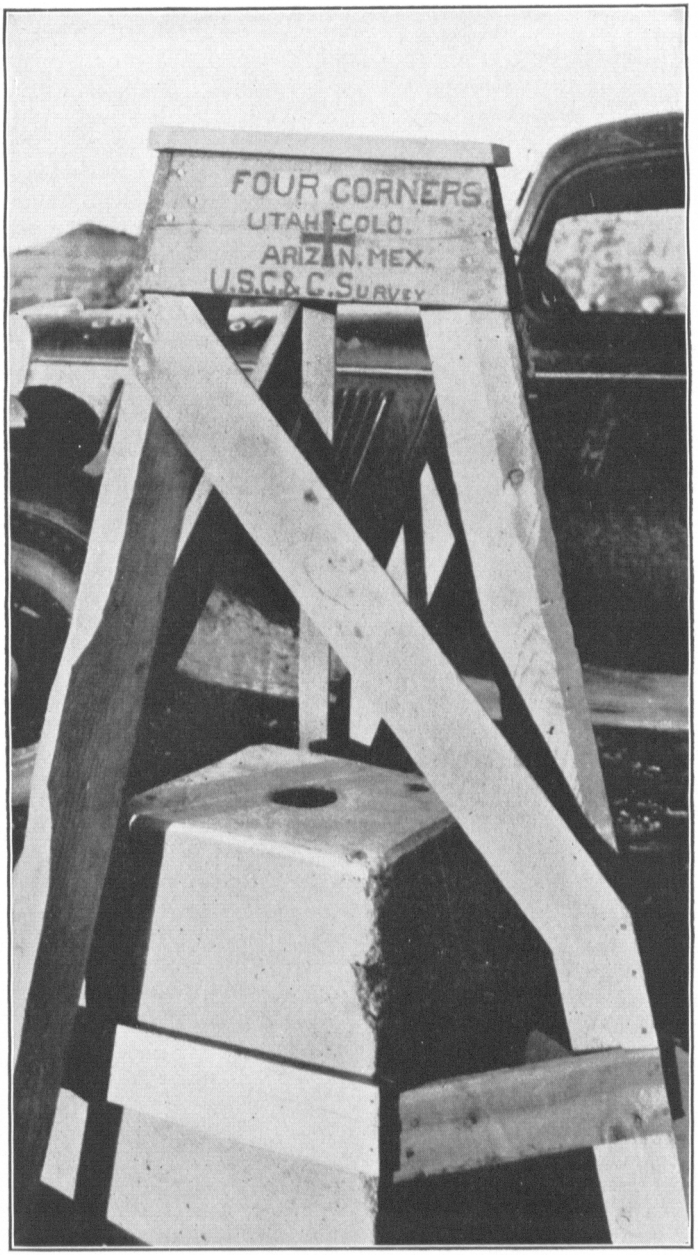

Figure 1.—Monument marking triangulation station Four Corners (G. L. O. Station 1), which is common to the four States: Utah, Colorado, Arizona, and New Mexico.

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 the stations that may be of help to him; then he should turn to the index on page 292 of this volume, from which he can find the pages upon which the descriptions and geographic positions of the stations appear.

Elevations of many triangulation stations are listed at the ends of the descriptions. There is a separate column in the station index to indicate whether the elevation of a triangulation station has been determined.

At the end of each description of a triangulation station, the plane coordinates are given for that station on one or more of the plane-coordinate zones of the State.

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 30 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 30 cents from the Superintendent of Documents.

There are occasions, especially in cities, when the engineer wishes to use plane coordinates for his triangulation stations rather than spherical coordinates. Until the adoption in 1934 of State-wide systems of plane coordinates by the Coast and Geodetic Survey, the engineer was advised to secure a copy of Special Publication No. 71, entitled "Relation Between Plane Rectangular Coordinates and Geographic Positions." This publication is sold by the Superintendent of Documents for 10 cents. In it are described both the reduction of geographical coordinates to plane coordinates, and also the transformation of plane coordinates to geographical coordinates. While the engineer may still find this publication useful in rare cases where his survey is of limited extent and is not rigidly adjusted to the national triangulation survey, its use is largely superseded by the adoption of systems of plane coordinates for the various States, making it possible for the engineer to utilize the formulas and methods of plane surveying across wide areas, and at the same time secure the accuracy that comes from the determination of positions

by geodetic methods. The system of plane coordinates adopted for the State of New Mexico is described further on page 92.

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 20 cents; Special Publication No. 145, Manual of Second- and Third-Order Triangulation and Traverse, cost 35 cents; and Special Publication No. 137, Manual of First-Order Traverse, cost 30 cents. If he is interested in the determination of azimuth to a high degree of accuracy, he should procure a copy of Special Publication No. 14, Determination of Time, Longitude, Latitude, and Azimuth, cost 45 cents. If he is interested only in the determination of approximate azimuths, he should secure a copy of Serial 592, Magnetic Declination in the United States, 1935, cost 20 cents.

In computing his triangulation the engineer will find that Special Publication No. 138, Manual of Triangulation Computation and Adjustment, cost 60 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 trangulation 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, second, and third order. First-order triangulation is done with such accuracy that the average closing error of the triangles is of the order of 1 second. In order that the angles may have this high degree of accuracy, precise 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, in 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 heliotropes, by which the light of the sun is reflected toward the observer, or on acetylene or electric signal lamps. The heliotrope, 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.

CHARACTERISTICS OF SECOND-ORDER TRIANGULATION

In second-order triangulation the same general principles apply as in first-order triangulation, but the details of the work will vary

with the circumstances. The angles are nearly always determined with a smaller number of measures. The accuracy of second-order triangulation is represented by an average closing error of a triangle of not more than 3 seconds of arc.

Second-order triangulation has been used principally for three purposes: First, for the main scheme of an isolated region of moderate extent such as the Philippine Islands; second, to connect third-order with first-order triangulation when the latter lies at a considerable distance from the area requiring the detailed third-order control; and third, as the detailed control over areas of economic importance. The increasing demand for second-order horizontal control, under the last set of conditions, and the growing economic importance of the entire coastal region of the United States, led the Director of the Coast and Geodetic Survey to decide, early in 1928, to make the entire coastal main-scheme triangulation of first- or second-order accuracy.

CHARACTERISTICS OF THIRD-ORDER TRIANGULATION

The accuracy of third-order triangulation is represented by an average closing error of a triangle of not more than 5 seconds of arc.

Third-order triangulation is used for the immediate control of topographic and hydrographic surveys where the desired results do not warrant the cost of control by first- or second-order triangulation.

SUPPLEMENTARY STATIONS

In this volume appear a number of stations established by other survey agencies of the United States Government, namely: U. S. Geological Survey (U. S. G. S.); U. S. Forest Service (U. S. F. S.); General Land Office (G. L. O.); and New Mexico Geodetic Survey (N. Mex. Geod. S.). These stations, except those in the Apache National Forest, have been occupied and/or observed on by the U. S. Coast and Geodetic Survey.

In addition to the stations which form the main network of triangulation in New Mexico, a number of objects, such as water tanks, stacks, church spires, and airway beacons, were observed upon from stations of the main scheme. The geographic positions of these supplementary stations have been computed and the data are included in the tables on pages 18 to 87. Ordinarily the name of the supplementary station is sufficient for its accurate identification by the engineer who may wish to use it.

In the readjustment of the triangulation of the western part of the United States each of the unoccupied or intersection stations was computed by means of a single triangle, even though several additional lines to the station had been observed. If the lengths and azimuths of any of these additional lines are needed at any time, the data may be obtained by writing to the Director, Coast and Geodetic Survey, Washington, D. C.

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 a local 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 extracts 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.

Another Eastern State, New Jersey, early in the year 1935, through legislative enactment,[3] gave legal recognition to the use of its State plane-coordinate system for describing the boundaries of private properties. Similar action was taken by Pennsylvania in 1937, and other States are showing considerable interest in the action of these States with the evident intent of at least considering similar legislation for themselves.

There are 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

[3] Ch. 116, Laws of 1935, State of New Jersey.

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.

2. **Boundary lines.**—If it is desired to locate or 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 such 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.

PLANE-COORDINATE SYSTEMS

It has been the practice of the local cadastral surveyor and the engineer making surveys for public works or for projects of a private character to make the computations as if the region involved were a plane and the results would thus be based on a local plane-coordinate system. This is satisfactory when the work is limited to a very restricted area, but when extensions of the surveys are made to surrounding areas trouble is apt to arise. Two adjoining local systems can be coordinated only with a great deal of extra computation. It seemed advisable, therefore, to give study to the possibility of establishing plane-coordinate systems for more extended areas so as to provide the advantages of plane coordinates and at the same time to

make possible a perfect coordination of the work of different engineers throughout the whole region for which one system is adequate.

As a result of these studies State-wide systems of plane coordinates were devised for the various States, many States being covered by a system of plane coordinates consisting of a single zone, while for the larger States systems having several zones were required. In order to keep to a minimum the errors of scale which arise from projecting from a curved surface onto a plane, it was necessary to establish 3 such zones for New Mexico. (See page 92.)

DIFFICULTIES IN USING SPHERICAL COORDINATES

The surface of the earth is not a plane but is very irregular. For purposes of mapping, an ideal surface is assumed that approaches very nearly to what the earth's surface would be if it were entirely covered with water. This assumed surface is not even a sphere, but is an ellipsoid of revolution of the form that approaches most nearly the sea-level surface. This spheroidal shape introduces complications in the calculations of survey work when it is extended over a large area. Geodetic surveying is such exact and extensive work that all computations arising in it have to take into consideration this assumed spheroidal shape which fits closely the actual shape of the earth. All geodetic stations on the earth have to be located by latitude and longitude; that is, each one is referred to a definite place in the network of meridians and parallels that are assumed to cover the surface of the earth in a definite and standardized way. The longitude and latitude of a place on the curved surface of the earth thus correspond in a general way to the x and y coordinates of a place on the usual system of plane coordinates which presupposes a flat surface. But the x and y coordinates of a local plane system have no relation to anything but the assumed origin and the assumed directions of the X and Y axes. Much has therefore been gained through the establishment of State-wide systems of plane coordinates (see pp. 92 to 117), which not only make unnecessary the further use of local independent systems, but which permit the establishment of a definite relationship, for points over a wide area, between plane coordinates on a single plane and geographic positions referred to the meridians and parallels of the earth.

USEFULNESS OF THE SYSTEMS

The establishment of a plane-coordinate system not only simplifies the use of control data but it gives a permanent general grid for large parts of a State. County boundaries, township boundaries, property boundaries, intersections of roads and streets, and any prominent features of a region can be accurately located with definite x and y coordinates. In the general system these plane coordinates can readily be transformed into latitude and longitude, and the point can thus be definitely located in the network of meridians and parallels that serve to locate points on the earth's surface. If the marker at such a point should in some way be destroyed, it could be definitely relocated on the ground from its relation to other marked points. This is a very important characteristic and one that should be given due consideration by all engineers and surveyors.

IMPORTANCE OF PLANE COORDINATES

The establishment of these general systems of plane coordinates is of the utmost importance to State, city, county, and private engineers. Such systems immediately make the general control network of the country easily available for actual use by the field surveyor. This should convince any who are interested in such matters that they constitute an important advance in the execution of local surveys.

Anyone interested in plane-coordinate systems should refer to Special Publication No. 193, Manual of Plane-Coordinate Computation, and Serial No. 562. The Coast and Geodetic Survey has also published two manuals on coordinate systems dealing particularly with traverse. They are Special Publication No. 194, Manual of Traverse Computation on the Lambert Grid, and Special Publication No. 195, Manual of Traverse Computation on the Transverse Mercator Grid.

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 meridians 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 position. 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.

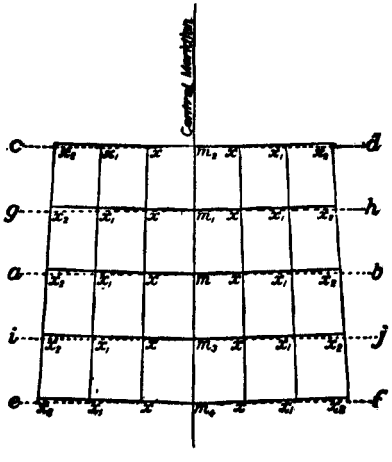

FIGURE 2.—Sketch showing construction of polyconic projection.

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.

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.) On the central meridian lay off, to the desired scale, the distances mm_2 and mm_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_4x_2, mx_2 and m_2x_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 the central meridian. Draw straight lines through the points thus determined for the extreme meridians—that is, through the x_2 points.

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 mm_2 and mm_4 to locate points in the extreme parallels.

Subdivide each of the three meridians and three 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 30 cents from the Superintendent of Documents, Washington, D. C.

161260°—40——2

Polyconic map projection table

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 31°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
31 00	26.530	1,591.8	30.796	1,847.76	0 01	0.1
05	26.506	1,590.4	30.796	1,847.79	03	1.1
10	26.483	1,589.0	30.797	1,847.81	05	3.0
15	26.460	1,587.6	30.797	1,847.83	07	5.8
20	26.437	1,586.2	30.798	1,847.86	10	11.9
25	26.413	1,584.8	30.798	1,847.88	15	26.8
30	26.390	1,583.4	30.798	1,847.91	20	47.7
35	26.367	1,582.0	30.799	1,847.93	25	74.5
40	26.343	1,580.6	30.799	1,847.96	30	107.3
45	26.320	1,579.2	30.800	1,847.98	40	190.8
50	26.296	1,577.8	30.800	1,848.00	50	298.1
55	26.272	1,576.3	30.800	1,848.03	1 00	429.3

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 32°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
32 00	26.249	1,574.9	30.801	1,848.05	0 01	0.1
05	26.225	1,573.5	30.801	1,848.08	03	1.1
10	26.201	1,572.1	30.802	1,848.10	05	3.0
15	26.177	1,570.6	30.802	1,848.13	07	6.0
20	26.153	1,569.2	30.803	1,848.15	10	12.1
25	26.129	1,567.8	30.803	1,848.18	15	27.3
30	26.105	1,566.3	30.803	1,848.20	20	48.6
35	26.081	1,564.9	30.804	1,848.23	25	75.9
40	26.057	1,563.4	30.804	1,848.25	30	109.3
45	26.033	1,562.0	30.805	1,848.28	40	194.2
50	26.008	1,560.5	30.805	1,848.30	50	303.5
55	25.984	1,559.0	30.805	1,848.33	1 00	437.0

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′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
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′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
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

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 35°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
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

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′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
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°
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*	*Meters*
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 TABLES OF GEOGRAPHIC POSITIONS

In the tables of geographic 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 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. The tables may be conveniently consulted by using as finders the sketches and the index at the end of this publication.

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 usually followed in 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 derived from a measured distance and azimuth) 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.

If the station is described but not marked, the letter "d." is given in the first column of the table; if marked and not described, the letters "m. n. d." are given; and if described and marked, the letters "d. m." are given. Other letters used in this column are "n. d.," not described; "r.," recovered; "l.," lost; "p. l.," probably lost; and "d. n. m.," described and not marked.

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 18, the azimuth from Jarilla to Corduna is 306°16′21″.87, while the back azimuth, or azimuth from Corduna to Jarilla, is 126°35′27″.27.

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 determined and may be used as the starting azimuth for traverse lines and other local surveys. Care should be used to distinguish between the geodetic azimuths and the plane-coordinate azimuths (see p. 94).

GEOGRAPHIC POSITIONS

TEXAS-CALIFORNIA ARC

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points	° ′ ″	° ′ ″	° ′ ″				
Quitman (Tex.), 1909, l. 1934 (d. m.)	31 08 58.537 105 29 46.011						
Black (Tex.), 1909, r. 1934 (d. m.)	31 34 21.594 105 08 51.285	35 20 58.52 230 16 40	215 10 05.52	Quitman Azimuth mark.	4.7592502	57,444.73	188,466.6
Corduna, 1909, r. 1937 (d. m.)	32 01 31.147 105 30 55.922	325 07 54.06 358 54 26.46 77 21 49	145 19 32.07 178 55 03.08	Black Quitman Azimuth mark.	4.7860428 4.9872831	61,100.23 97,114.29	200,459.7 318,615.8
North Franklin (Tex.), 1909, r. 1936 (d. m.)	31 54 10.122 106 29 35.111	261 22 44.74 285 39 50.35 311 08 57.76	81 53 47.79 106 22 18.45 131 40 14.54	Corduna Black Quitman	4.9703593 5.1227205 5.1012485	93,402.67 132,654.04 126,254.97	306,438.6 435,215.8 414,221.5
Jarilla, 1909, r. 1936 (d. m.)	32 23 59.582 106 06 44.618	306 16 21.87 33 11 21.24 308 21 14	126 35 27.27 212 59 11.91	Corduna North Franklin Azimuth mark.	4.8447153 4.8181361	69,938.34 65,786.39	229,456.0 215,834.2
Kent, 1909, r. 1936 (d. m.)	32 30 27.079 106 28 58.694	288 48 34.98 300 08 13.62 0 49 03.35	109 00 30.87 120 39 12.97 180 48 43.94	Jarilla Corduna North Franklin	4.5662236 5.0239830 4.8264711	36,831.86 105,677.62 67,061.17	120,839.2 346,710.7 220,016.5
Cerro Alto (Tex.), 1909, r. 1936	31 56 42.827 105 58 12.954	84 42 15.87 142 21 24.62 165 08 50.80 258 12 16.78 332 50 12 75 263 17 24	264 25 40.59 322 05 00.33 345 04 18.35 78 26 43.92 153 05 05.86	North Franklin Kent Jarilla Corduna Quitman Azimuth mark.	4.6960761 4.8970094 4.7173931 4.6423125 4.9958162	49,667.93 78,887.73 52,166.67 43,884.64 99,041.27	162,952.2 258,817.5 171,150.1 143,978.2 324,937.9
Cooks, 1910, r. 1936 (d. m.)	32 32 09.225 107 43 51.263	271 12 05.85 300 42 01.19 249 07 54	91 52 21.20 121 21 37.14	Kent North Franklin Azimuth mark.	5.0692715 5.1341010	117,292.84 136,176.14	384,818.3 446,771.2
Hermanas, 1909, r. 1936 (d. m.)	31 48 11.261 107 56 51.173	194 03 30.75 265 01 33.00	14 10 26.00 85 47 36.39	Cooks North Franklin	4.9231597 5.1401949	83,783.73 138,100.38	274,880.5 453,084.3
Florida, 1910, r. 1936 (d. m.)	32 07 01.517 107 37 34.887	41 10 49.84 168 03 36.06 247 47 27.51 282 12 36.18	221 00 37.78 348 00 14.79 68 24 07.81 102 48 38.78	Hermanas Cooks Kent North Franklin	4.6645862 4.6764471 5.0646596 5.0401306	46,194.06 47,473.04 116,053.87 109,680.81	151,555.0 155,751.1 380,753.4 359,844.5
Red, 1910, r. 1936 (d. m.)	32 13 00.487 107 53 30.508	203 07 28.05 293 45 20.13 6 33 52.75 189 05 50	23 12 38.22 113 53 48.89 186 32 06.38	Cooks Florida Hermanas Azimuth mark.	4.5853253 4.4372890 4.6643683	38,488.00 27,370.89 46,170.89	126,272.7 89,799.3 151,479.0
Deming north base, 1910, r. 1939 (d. m.)	32 10 19.171 107 45 20.112	183 17 17.95 296 30 00.54 111 11 03.42 243 48 18	3 18 05.49 116 34 08.07 291 06 42.14	Cooks Florida Red Azimuth mark.	4.6065957 4.1344259 4.1390151	40,419.94 13,627.81 13,772.57	132,611.1 44,710.6 45,185.5
Deming south base 1910, r. 1939 (d. m.)	32 03 00.129 107 50 13.249	249 26 45.07 20 55 37.42 164 23 37.79 190 28 52.26 209 35 16.40 137 14 57	69 33 27.89 200 52 06.99 344 21 52.88 10 32 16.34 29 37 52.23	Florida Hermanas Red Cooks Deming north base Azimuth mark.	4.3269963 4.4669465 4.2833277 4.7387445 4.1918512	21,232.26 29,305.32 19,201.17 54,795.45 15,554.326	69,659.5 96,145.9 62,995.8 179,774.7 51,031.15
Burro, 1910, r. 1938 (d. m.)	32 35 26.309 108 25 55.623	275 04 42.19 332 15 01.58	95 27 20.89 152 30 31.10	Cooks Hermanas	4.8204111 4.9936819	66,131.91 98,555.73	216,967.8 323,344.9
Chiricahua (Chiricaqua) (Ariz.), 1910, r. 1936 (d. m.)	31 52 23.241 109 17 00.158	225 00 54.12 242 55 37.74 273 09 34.74	45 28 08.63 63 45 16.48 93 51 51.67	Burro Cooks Hermanas	5.0530634 5.2142762 5.1027347	112,996.09 163,785.77 126,687.78	370,721.3 537,353.8 415,641.5
Graham (U. S. G. S.) (Ariz.), 1910, r. 1934 (d. m.)	32 42 05.712 109 52 14.711	274 49 10.67 328 46 57.43	95 35 44.63 149 05 46.90	Burro Chiricahua	5.1320696 5.0303652	135,540.66 107,242.07	444,686.3 351,843.4
Line (U. S. G. S.), 1910, r. 1936 (d. m.)	32 51 06.270 108 59 46.855	14 03 23.53 78 44 50.73 298 32 36.74 3 01 51	193 54 10.41 258 16 26.56 118 50 54.73	Chiricahua Graham Burro Azimuth mark.	5.0485611 4.9221951 4.7803309	111,830.72 83,597.85 60,301.89	366,898.0 274,270.6 197,840.5
Supplementary points							
Quitman (U. S. G. S.), cairn (Tex.), 1909, r. 1934 (d. m.).[1]	31 08 58.59 105 29 45.97	30 58	210 58	Quitman	0.301030	2.0	7
Corduna (U. S. G. S.), cairn, 1909, r. 1937 (d. m.)[1]	32 01 31.40 105 30 55.97	350 48	170 48	Corduna	0.892095	7.8	26
Cerro Alto (U. S. G. S.) (Tex.), 1910, r. 1936 (d. m.).[1]	31 56 43.04 105 58 13.05	338 50	158 50	Cerro Alto	0.84510	7.0	23
Mesa (Tex.), 1909, r. 1931 (d. m.)	31 45 34.993 106 20 18.573	137 21 06.5 239 21 13.2	317 16 13.0 59 32 52.8	North Franklin Cerro Alto	4.334153 4.607118	21,585.0 40,468.6	70,817 132,771

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

TEXAS-CALIFORNIA ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
North Franklin (U. S. G. S.), cairn (Tex.), 1909 (d. m.).[1]	31 54 10.22 106 29 35.12	354 05	174 05	North Franklin	0.462398	2.9	10
Orogrande, smelter, 1910 (n. d.)[1]	32 23 09.63 106 05 17.71	110 03 31 124 07 15	289 50 48 304 06 29	Kent Jarilla	4.596455 3.438289	39,487.1 2,743.4	129,551 9,001
Jarilla astronomical station, 1911, r. 1936 (d. m.)[1]	32 23 59.57 106 06 44.52	98 39	278 39	Jarilla	0.403120	2.53	8.3
Noonday Peak, 1910 (n. d.)[1]	32 47 31.50 107 47 23.40	348 58 24 3 05 59	169 00 18 183 04 28	Cooks Deming south base	4.461536 4.915956	28,942.5 82,405.5	94,956 270,359
Black Mountain, cairn, 1910 (n. d.)[2]	32 19 58.69 107 53 00.24	325 57 23 352 03 02	146 01 28 172 04 31	Deming north base Deming south base	4.333121 4.500742	21,533.8 31,676.9	70,649 103,927
Deming, city waterworks, 1909, r. 1914 (d.)	32 16 10.287 107 46 00.234	354 26 54.3 63 39 14.0	174 27 15.7 243 35 13.8	Deming north base Red	4.036070 4.119188	10,866.0 13,157.9	35,650 43,169
Deming, municipal water tank, 1936 (n. d.)	32 16 08.770 107 45 59.956	354 27 46.8 63 51 02.3	174 28 08.0 243 47 01.9	Deming north base Red	4.034178 4.118720	10,818.8 13,143.8	35,495 43,123
Deming, Luna County Courthouse, spire, 1936 (n. d.).	32 15 43.680 107 45 20.790	359 53 53.7 68 37 39.7	179 53 54.1 248 33 18.5	Deming north base Red	3.999807 4.138969	9,995.6 13,771.1	32,794 45,181
Deming, magnetic station, 1936 (d. m.)	32 15 13.431 107 46 03.917	183 28 52.4 186 18 46.7 230 27 43.9 318 36 46.3	3 28 54.5 6 19 57.8 50 28 06.9 138 41 17.5	Deming, municipal water tank Cooks Deming, Luna County Courthouse, spire. Florida	3.232386 4.498046 3.165460 4.305002	1,707.6 31,480.8 1,463.7 20,183.8	5,602 103,283 4,802 66,220
Near, 1910, r. 1936 (d. m.)	31 47 23.436 108 11 02.689	235 19 06.7 266 10 31.8	55 36 49.3 86 18 00.5	Florida Hermanas	4.806229 4.351189	64,007.2 22,448.6	209,997 73,650
United States and Mexico boundary monument No. 39, 1909, r. 1936 (d. m.).	31 47 00.943 108 11 10.312	196 08 46.6 264 27 48.9	16 08 50.6 84 35 21.6	Near Hermanas	2.858075 4.356122	721.2 22,705.0	2,366 74,491
United States and Mexico boundary monument No. 32, 1909, r. 1910 (d. m.).	31 47 00.884 107 57 16.868	90 03 56.8 197 19 04.5	269 56 37.7 17 19 18.0	United States and Mexico boundary monument No. 39. Hermanas	4.340997 3.356126	21,927.9 2,270.5	71,942 7,449
United States and Mexico boundary monument No. 40, 1910, r. 1936 (d. m.).	31 47 00.948 108 12 28.406	252 55 14.2 269 59 54.7	72 55 59.3 90 00 35.8	Near United States and Mexico boundary monument No. 39.	3.372757 3.312746	2,359.2 2,054.7	7,740 6,741
United States and Mexico boundary monument No. 31, 1909 (d. m.).[1]	31 47 00.88 107 55 44.22	140 54 39 217 38 47	320 54 04 37 48 23	Hermanas Florida	3.446112 4.669827	2,793.3 46,754.9	9,164 153,395
Cone Summit, 1910 (n. d.)[1]	32 12 02.39 108 06 31.64	275 21 30 303 00 08	95 32 47 123 08 48	Deming, north base Deming, south base	4.524522 4.485803	33,459.7 30,605.7	109,776 100,412
Bear Mountain, highest point, 1910 (n. d.)	32 50 08.539 108 21 28.442	299 18 52.6 322 16 33.0	119 39 11.5 142 35 58.2	Cooks Deming, north base	4.829631 4.967773	67,550.9 92,848.1	221,623 304,619

THIRTY-FIFTH PARALLEL ARC

Principal points							
Harwell (Tex.), 1921, r. 1934 (d. m.)	35 10 47.882 102 51 51.796	244 57 32		Azimuth mark.			
Bippus (Tex.), 1921 (d. m.)	34 59 44.389 103 01 35.891	215 50 39.66	35 56 15.42	Harwell	4.4020620	25,238.41	82,803.0
Warmuth, 1921, r. 1935 (d. m.)	35 14 38.017 103 15 30.312	281 04 04.40 322 26 11.05	101 17 42.32 142 34 11.08	Harwell Bippus	4.5631550 4.5404565	36,572.53 34,710.15	119,988.4 113,878.2
Martin, 1921, r. 1935 (d. m.)	34 59 35.417 103 23 06.632	202 31 20.46 246 16 36.82 269 24 47.71 320 30 07	22 35 42.97 66 34 34.51 89 37 07.95	Warmuth Harwell Bippus Azimuth mark.	4.4788496 4.7144715 4.5150058	30,119.63 51,816.90 32,734.51	98,817.5 170,002.6 107,396.5
Canadian, 1921 (d. m.)	35 15 38.499 103 15 32.394	283 53 00.94 324 10 01.41 21 13 05.68	104 06 40.23 144 18 02.74 201 08 44.31	Harwell Bippus Martin	4.5685150 4.5591430 4.5028287	37,026.70 36,236.23 31,829.42	121,478.4 118,885.0 104,427.0
Glenrio (Tex.-N. Mex.), 1921 (d. m.)	35 10 04.675 103 02 31.152	58 19 05.70 117 33 57.18	238 07 15.63 297 26 26.69	Martin Canadian	4.5660752 4.3478550	36,819.27 22,276.91	120,797.9 73,086.8
Clark Monument No. 9 (Tex.-N. Mex.), 1921 (d. m.).	34 57 39.544 103 02 31.878	96 36 08.52 149 19 55.56 180 02 44.98	276 24 20.70 329 12 26.64 0 02 45.40	Martin Canadian Glenrio	4.4986277 4.5874995 4.3610139	31,523.01 38,681.16 22,962.22	103,421.7 126,906.4 75,335.2

[1] No check on this position.
[2] Checked by vertical angles only.

GEOGRAPHIC POSITIONS—Continued

THIRTY-FIFTH PARALLEL ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Dripping, 1921, r. 1935 (d. m.)	35 19 46.443	286 45 30.80	106 57 27.84	Warmuth	4.5155428	32,775.01	107,529.3
	103 36 11.586	331 54 36.16	152 02 08.20	Martin	4.6261152	42,278.08	138,707.3
		41 17 46		Azimuth mark.			
Redondo, 1921, r. 1935 (d. m.)	35 00 07.595	191 54 55.84	11 57 50.67	Dripping	4.5697446	37,131.68	121,822.9
	103 41 15.134	235 26 10.71	55 40 59.50	Warmuth	4.6760443	47,429.03	155,606.7
		271 58 14.30	92 08 38.60	Martin	4.4412436	27,621.27	90,620.8
		68 15 58		Azimuth mark.			
Pablo, 1921 (d. m.)	35 14 44.840	254 53 33.14	75 06 46.29	Dripping	4.5553103	35,917.85	117,840.5
	103 59 04.571	314 52 02.29	135 02 17.59	Redondo	4.5827783	38,262.94	125,534.3
Moletor, 1921 (d. m.)	34 58 51.506	195 35 55.59	15 39 02.22	Pablo	4.4843819	30,505.76	100,084.3
	104 04 29.025	227 52 20.79	48 08 38.18	Dripping	4.7619643	57,804.85	189,648.1
		266 05 39.14	86 18 58.48	Redondo	4.5493484	35,428.15	116,233.9
Phillips, 1921 (d. m.)	34 59 03.363	204 59 24.04	25 04 31.82	Pablo	4.5054339	32,020.93	105,055.3
	104 07 59.629	273 53 46.73	93 55 47.47	Moletor	3.7286952	5,354.21	17,566.3
Corazon, 1921 (d. m.)	35 27 07.939	293 16 23.40	113 36 33.56	Pablo	4.7601702	57,566.55	188,866.3
	104 33 56.253	319 19 46.75	139 36 45.86	Moletor	4.8374665	68,780.68	225,657.9
		322 42 01.90	142 56 59.60	Phillips	4.8139331	65,152.80	213,755.5
Pintada, 1921, r. 1934 (d. m.)	34 57 31.666	209 46 58.55	29 58 55.45	Corazon	4.8002556	63,132.88	207,128.5
	104 54 39.754	267 29 56.47	87 56 41.43	Phillips	4.8517920	71,087.30	233,225.6
		199 06 36		Azimuth mark.			
Louisiana, 1921, r. 1922 (d. m.)	34 57 28.774	90 17 09.29	269 52 01.34	Pintada	4.8245820	66,770.09	219,061.5
	104 10 48.027	147 28 23.97	327 15 03.64	Corazon	4.8136435	65,109.37	213,613.0
Hill, 1921, r. 1922 (d. m.)	35 07 42.355	63 18 46.41	243 04 42.53	Pintada	4.6204742	41,732.48	136,917.3
	104 30 10.095	170 58 42.77	350 56 32.11	Corazon	4.5607683	36,372.09	119,330.8
		302 36 25.84	122 47 33.10	Louisiana	4.5440649	34,999.75	114,828.3
Haile, 1922 (d. m.)	34 58 24.248	159 09 50.85	339 07 22.35	Hill	4.2649297	18,404.74	60,382.9
	104 25 51.535	274 11 36.13	94 20 13.92	Louisiana	4.3614397	22,984.75	75,409.1
Rica, 1922 (d. m.)	35 13 58.255	352 36 33.05	172 38 02.68	Louisiana	4.4878019	30,746.94	100,875.6
	104 13 23.918	65 36 52.03	245 27 12.31	Hill	4.4466989	27,970.41	91,766.3
Huerf, 1921, r. 1922 (d. m.)	35 29 02.283	309 10 28.18	129 23 28.84	Rica	4.6434750	44,002.26	144,364.1
	104 35 52.932	326 45 56.66	147 00 24.60	Louisiana	4.8430268	69,666.95	228,565.6
		344 55 22.85	165 01 09.77	Haile	4.7682608	58,649.03	192,417.7
		347 35 16.23	167 38 34.37	Hill	4.6062091	40,383.98	132,493.1
Aguilar, 1921, r. 1934 (d. m.)	35 22 42.637	257 59 41.42	78 14 34.03	Corazon	4.5989236	39,712.17	130,289.0
	104 59 36.563	298 55 13.53	119 24 57.91	Phillips	4.9529820	89,739.16	294,419.2
		301 42 36.97	121 59 36.57	Hill	4.7207622	52,572.93	172,483.0
		301 57 19.96	122 25 26.77	Louisiana	4.9423626	87,571.46	287,307.4
		350 48 46.04	170 51 37.00	Pintada	4.6736226	47,165.30	154,741.5
		290 52 36		Azimuth mark.			
Pedernal, 1921, r. 1934 (d. m.)	34 50 42.383	224 51 41.35	45 14 07.67	Aguilar	4.9230202	83,756.83	274,792.2
	105 38 37.240	259 07 26.08	79 32 35.20	Pintada	4.8333981	68,139.37	223,553.9
Tompson, 1921 (d. m.)	35 40 20.164	293 37 00.44	114 05 20.38	Aguilar	4.9062969	80,592.93	264,412.0
	105 48 22.087	313 56 23.94	134 27 26.77	Pintada	5.0551423	113,538.28	372,500.2
		350 48 04.14	170 53 41.76	Pedernal	4.9682513	92,950.40	304,954.8
Sandia, 1920, r. 1921 (d. m.)	35 12 36.149	228 30 50.02	48 53 12.09	Tompson	4.8904173	77,699.34	254,918.6
	106 26 56.492	298 36 59.86	119 04 43.97	Pedernal	4.9238049	83,908.29	275,289.1
Manzano, 1920, r. 1935 (d. m.)	34 35 27.548	179 47 22.28	359 47 16.57	Sandia	4.8368041	68,675.86	225,314.0
	106 26 46.518	205 45 10.81	26 07 16.98	Tompson	5.1251298	133,392.00	437,636.9
		248 47 33.43	69 14 59.00	Pedernal	4.8961792	78,737.05	258,323.1
Ladrones, 1920, r. 1934 (d. m.)	34 26 05.106	213 52 37.31	34 14 23.73	Sandia	5.0162495	103,812.46	340,591.4
	107 05 04.238	253 20 47.45	73 42 29.33	Manzano	4.7861707	61,118.23	200,518.7
Los Lunas, 1920, r. 1921 (d. m.)	34 48 26.538	210 13 35.08	30 23 25.91	Sandia	4.7138547	51,743.37	169,761.4
	106 44 06.339	312 07 36.92	132 17 28.86	Manzano	4.5530204	35,728.96	117,220.8
Belen south base, 1920, r. 1935 (d. m.)	34 19 19.944	107 29 52.35	287 15 10.57	Ladrones	4.6212223	41,804.43	137,153.4
	106 39 02.634	190 33 42.34	10 40 36.41	Sandia	5.0008955	100,206.41	328,760.5
		212 09 40.43	32 16 36.91	Manzano	4.5470550	35,241.55	115,621.7
Belen north base, 1920, r. 1935 (d. m.)	34 28 58.210	195 32 48.72	15 41 15.89	Sandia	4.9230607	83,764.63	274,817.8
	106 41 44.096	242 16 06.33	62 24 35.20	Manzano	4.4123282	25,842.13	84,783.7
		346 57 20.76	166 58 51.99	Belen south base	4.2621911	18,289.046	60,003.31
		81 37 16.62	261 24 04.40	Ladrones	4.5579085	36,133.38	118,547.6
Taylor, 1920, r. 1921 (d. m.)	35 14 19.160	271 23 20.96	92 03 27.33	Sandia	5.0234685	105,552.50	346,300.2
	107 36 28.476	303 45 27.15	124 25 20.82	Manzano	5.1078376	128,185.12	420,554.0
		314 52 55.44	135 24 12.80	Belen north base	5.0729111	118,279.95	388,056.8
		318 58 17.62	139 31 03.34	Belen south base	5.1277746	134,206.82	440,310.2
		331 37 16.78	151 55 13.16	Ladrones	5.0052604	101,218.62	332,081.4
Alegros, 1920 (d. m.)	34 09 26.467	203 45 33.24	24 05 23.53	Taylor	5.1180156	131,224.71	430,526.4
	108 11 19.350	252 50 56.83	73 28 16.73	Ladrones	5.0261747	106,212.27	348,464.8

GEOGRAPHIC POSITIONS—Continued

THIRTY-FIFTH PARALLEL ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Sawyer, 1920, r. 1934 (d. m.)	35 13 06.876	257 43 04.30	88 06 17.60	Taylor	4.7861822	61,119.85	200,524.0
	108 16 43.855	355 57 38.57	176 00 43.26	Alegros	5.0719297	118,012.96	387,180.8
Pinon, 1920, r. 1936 (d. m.)	34 11 49.540	188 28 54.43	8 35 14.92	Sawyer	5.0591238	114,583.96	375,930.9
	108 27 52.070	213 56 11.25	34 25 27.56	Taylor	5.1450846	139,664.05	458,214.5
		279 45 34.87	99 54 52.54	Alegros	4.4116624	25,802.54	84,653.8
		282 56 11		Azimuth mark.			
Crafton (Ariz.), 1920, r. 1936 (d. m.)	35 11 38.164	267 42 03.75	88 10 57.65	Sawyer	4.8815102	76,122.00	249,743.6
	109 06 51.338	331 30 56.44	151 33 08.05	Pinon	5.0989557	125,590.17	412,040.4
		79 50 43		Azimuth mark.			
Ords (Ariz.), 1920, r. 1934 (d. m.)	33 56 15.437	197 44 44.36	18 01 25.30	Crafton	5.1656524	146,437.53	480,437.1
	109 36 15.463	220 11 07.72	40 56 15.99	Sawyer	5.2719132	187,030.82	613,616.9
		254 23 01.11	75 01 19.75	Pinon	5.0377716	109,086.66	357,895.1
Green (Ariz.), 1920, r. 1936 (d. m.)	34 06 42.716	8 17 56.82	188 16 55.40	Ords	4.2907285	19,531.18	64,078.5
	109 34 25.689						
Supplementary points							
Tucumcari, 1921 (d.)	35 08 04.111	115 24 57.3	295 15 03.2	Pablo	4.460313	28,861.1	94,688
	103 41 53.503	201 44 50.8	21 48 08.1	Dripping	4.367484	23,306.9	76,466
Tucumcari, city water tank, 1921 r. 1935 (d.)	35 10 43.299	302 57 41.2	123 09 38.7	Martin	4.576659	37,727.6	123,778
	103 43 54.826	348 19 13.6	168 20 45.4	Redondo	4.301104	20,003.4	65,628
Small butte northwest of station Hill, 1921 (d.)	35 15 24.711	196 09 25.5	16 11 49.6	Corazon	4.353446	22,565.6	74,034
	104 38 05.268	319 48 29.8	139 53 03.7	Hill	4.270488	18,641.8	61,161
Lone butte southeast of station Tompson, 1921 (d.)	35 22 36.454	320 37 25.6	140 51 48.1	Pintada	4.777340	59,888.0	196,483
	105 19 37.256	26 10 11.2	205 59 15.5	Pedernal	4.817372	65,670.8	215,455
Moriarity, 1921 (d. m.)	34 57 29.178	127 38 09.0	307 24 23.1	Sandia	4.661718	45,890.0	150,557
	106 02 59.732	288 32 19.2	108 46 16.0	Pedernal	4.593172	39,189.7	128,575
Sandia Range, sharp peak, 1921 (d.)	35 07 12.837	19 02 36.8	198 53 31.1	Belen north base	4.873719	74,768.6	245,303
	106 25 48.044	38 25 12.4	218 02 48.4	Ladrones	4.985908	96,807.3	317,609
Bosque Peak, 1921 (d.)[1]	34 46 15.49	21 40 48	201 33 29	Belen south base	4.728742	53,547.8	175,681
	106 26 08.88	36 46 18	216 37 27	Belen north base	4.600583	39,864.2	130,788
Ohas Peak, cairn, 1921 (d.)	34 38 13.519	252 10 35.0	72 37 44.9	Pedernal	4.882679	76,327.1	250,416
	106 26 17.353	8 16 08.7	188 15 52.1	Manzano	3.713319	5,168.0	16,955
Becker, coal elevator, 1921 (n. d.)	34 29 46.003	78 56 11.7	258 53 24.9	Belen north base	3.884139	7,658.4	25,126
	106 36 49.543	235 33 46.0	55 39 28.0	Manzano	4.270282	18,633.0	61,132
Hill between Belen base stations, 1921 (d.)	34 24 35.038	94 25 58.5	274 12 25.2	Ladrones	4.566360	36,843.4	120,877
	106 41 05.496	173 04 29.2	353 04 07.4	Belen north base	3.912158	8,168.8	26,800
Belen, Atchison, Topeka & Santa Fe Railway coal elevator, 1921 (d.).	34 39 10.621	283 03 24.6	103 14 20.9	Manzano	4.480276	30,218.7	99,143
	106 46 01.655	340 47 45.4	160 50 11.5	Belen north base	4.300600	19,980.2	65,552
Magdalena Mountain Lookout, 1920 (d.)	33 59 26.396	219 33 59.2	39 50 35.8	Belen north base	4.851015	70,960.2	232,809
	107 11 15.445	233 14 43.7	53 32 48.8	Belen south base	4.790103	61,674.1	202,342
Madre Mountain, 1920 (n. d.)	34 17 52.795	78 13 53.9	257 54 28.9	Pinon	4.733549	54,143.8	177,637
	107 53 21.817	193 47 30.0	13 57 07.0	Taylor	5.031346	107,484.5	352,639
Highest hill between stations Taylor and Sawyer, west shoulder, 1920 (n. d.).[1]	35 01 27.50	12 40 11	192 32 12	Alegros	4.993638	98,545.8	323,312
	107 57 15.59	27 09 44	206 52 20	Pinon	5.012850	103,003.0	337,936
Rock cairn on north end of Alegros Mountain, 1920 (d.).[1]	34 09 37.00	41 21 14	221 21 08	Alegros	2.636013	432.5	1,419
	108 11 08.19	99 06 14	278 56 51	Pinon	4.415489	26,030.9	85,403
Putnam's Ranch, windmill, 1920 (n. d.) [1]	34 17 46.49	328 05 29	148 09 00	Alegros	4.258720	18,143.5	59,526
	108 17 33.73	55 14 41	235 08 53	Pinon	4.284871	19,269.5	63,220
Higher one of two sharp buttes, 1920 (n. d.) [1]	34 34 19.32	346 22 52	166 26 57	Alegros	4.675072	47,323.0	155,259
	108 18 34.35	18 57 15	198 52 00	Pinon	4.643093	43,963.6	144,237
Escudilla Mountain (Ariz.), 1920 (n. d.)	33 57 18.720	87 36 53.3	267 20 49.6	Ords	4.646998	44,360.7	145,540
	109 07 29.630	246 03 33.1	66 25 45.3	Pinon	4.823501	66,604.1	218,517
Mount Baldy Lookout (Ariz.), 1920 (n. d.) [1]	33 54 21.46	131 54 04	311 52 39	Ords	3.720925	5,259.3	17,255
	109 33 43.04	177 15 36	357 15 12	Green	4.359167	22,864.8	75,016
Mount Baldy, south peak (Ariz.), 1920 (n. d.) [1]	33 54 01.03	135 36 31	315 35 03	Ords	3.763150	5,796.3	19,017
	109 33 37.58	176 59 32	356 59 05	Green	4.371078	23,500.5	77,101

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC

Principal points							
Seven L (Colo.), 1922 (d. m.)	37 06 11.530						
	103 30 04.196						
Potato (Colo.), 1922 (d. m.)	37 10 24.656	77 32 57.77	257 18 41.70	Seven L	4.5545601	35,855.86	117,637.1
	103 06 26.254						

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Clayton east base, 1922 (d. m.)	36 47 44.160	141 38 10.10	321 27 11.48	Seven L	4.6393974	43,591.06	143,015.0
	103 11 48.530	190 44 00.41	10 47 14.29	Potato	4.6303231	42,689.70	140,057.8
New Mexico-Colorado boundary milepost No. 328 eccentric, 1922 (d. m.).	36 59 57.333	15 30 01.34	195 27 29.57	Clayton east base	4.3701675	23,451.33	76,939.9
	103 07 35.739	109 12 31.09	288 58 58.60	Seven L	4.5472811	35,259.90	115,681.9
		185 03 55.73	5 04 37.63	Potato	4.2881240	19,414.40	63,695.4
Grande, 1922 (d. m.)	36 42 19.805	217 01 41.19	37 15 11.98	Seven L	4.7432305	55,364.38	181,641.3
	103 52 34.423	260 26 21.98	80 50 45.45	Clayton east base	4.7888215	61,492.41	201,746.3
Dora, 1922, r. 1935 (d. m.)	36 32 35.571	115 49 52.68	295 34 54.52	Grande	4.6182288	41,517.27	136,211.2
	103 27 28.890	176 28 07.30	356 26 34.21	Seven L	4.7942230	62,261.99	204,271.2
		219 44 34.11	39 53 55.69	Clayton east base	4.5618748	36,464.88	119,635.2
Des Moines, 1922 (d. m.)	36 45 22.455	305 23 19.44	125 36 35.88	Dora	4.6096779	40,707.82	133,555.6
	103 49 43.127	37 03 51.46	217 02 09.01	Grande	3.8484582	7,054.37	23,144.2
		217 03 19.57	37 15 07.91	Seven L	4.6840373	48,310.03	158,497.2
Clayton west base, 1922 (d. m.)	36 46 02.869	254 07 43.46	74 12 09.29	Clayton east base	4.0585424	11,443.067	37,542.80
	103 19 12.496	26 23 50.10	206 18 53.75	Dora	4.4435975	27,771.38	91,113.3
		181 48 28		Reference mark.			
Seneca, 1922, r. 1935 (d. m.)	36 38 46.512	67 03 27.28	246 52 42.24	Dora	4.4657466	29,224.47	95,880.6
	103 09 26.891	132 49 46.32	312 43 56.29	Clayton west base	4.2967475	19,803.75	64,972.8
		168 02 14.93	348 00 50.24	Clayton east base	4.2289548	16,941.61	55,582.6
Rabbit, 1922, r. 1935 (d. m.)	36 31 56.083	93 42 16.78	273 34 38.98	Dora	4.2825420	19,166.46	62,882.0
	103 14 39.932	165 28 54.63	345 26 11.93	Clayton west base	4.4308090	26,965.53	88,469.4
		188 16 22.88	8 18 05.23	Clayton east base	4.4703004	29,532.51	96,891.2
		211 34 10.92	31 37 17.52	Seneca	4.1718093	14,852.83	48,729.7
		99 57 17		Azimuth mark.			
Carriso, 1922 (d. m.)	36 09 11.041	188 17 54.56	8 21 28.48	Grande	4.7920680	61,953.80	203,260.1
	103 58 34.667	226 54 27.96	47 12 53.80	Dora	4.8031179	63,550.34	208,498.1
Laughlin, 1922 (d. m.)	36 37 31.532	252 04 31.73	72 15 35.93	Grande	4.4626514	29,016.93	95,199.7
	104 11 06.725	277 45 46.38	98 11 46.64	Dora	4.8176680	65,715.53	215,601.7
		340 15 40.51	160 23 06.69	Carriso	4.7455818	55,664.95	182,627.4
Wagon, 1922 (d. m.)	35 58 52.103	205 59 30.84	26 13 22.21	Laughlin	4.9009882	79,613.78	261,199.5
	104 34 30.914	250 21 13.02	70 42 22.48	Carriso	4.7576422	57,232.43	187,770.1
		338 53 05.42	159 05 23.10	Rica	4.9490767	88,935.82	291,783.6
		2 08 47.52	182 07 59.61	Huerf	4.7419416	55,200.32	181,103.0
Montoya, 1922 (d. m.)	35 43 19.311	5 53 59.93	185 51 51.20	Rica	4.7368762	54,560.23	179,003.0
	104 09 42.126	56 22 59.80	236 07 45.33	Huerf	4.6771444	47,549.33	156,001.4
		127 42 04.32	307 27 32.36	Wagon	4.6733836	47,139.35	154,656.3
		178 47 55.14	358 47 05.20	Laughlin	5.0011385	100,262.49	328,944.5
		199 13 35.57	19 20 07.31	Carriso	4.7047292	50,667.47	166,231.5
Solana, 1922, r. 1928 (d. m.)	35 51 06.564	30 22 44.79	210 19 28.43	Montoya	4.2224053	16,688.04	54,750.7
	104 04 06.343	107 33 44.83	287 15 54.53	Wagon	4.6807320	47,943.75	157,295.5
		193 55 46.68	13 59 01.65	Carriso	4.5370838	34,441.63	112,997.2
Anil, 1922 (d. m.)	34 46 52.856	135 37 53.63	315 30 03.30	Haile	4.4747558	29,837.04	97,890.4
	104 12 09.032	185 59 13.82	6 00 00.13	Louisiana	4.2945480	19,703.71	64,644.6
Nelson, 1922 (d. m.)	34 44 39.125	186 07 02.58	6 08 03.98	Haile	4.4077717	25,572.41	83,898.8
	104 27 38.965	227 11 52.86	47 21 30.56	Louisiana	4.5435466	34,958.00	114,691.4
		260 02 30.67	80 11 20.90	Anil	4.3803166	24,005.82	78,759.1
Fort Sumner, 1922 (d. m.)	34 26 57.200	159 10 44.11	339 06 06.28	Nelson	4.5442818	35,017.23	114,885.7
	104 19 29.646	196 54 36.65	16 58 46.95	Anil	4.5856308	38,515.08	126,361.6
Charlotte, 1922 (d. m.)	34 35 10.200	57 21 07.66	237 12 22.38	Fort Sumner	4.4487544	28,103.11	92,201.6
	104 04 02.677	116 02 19.43	295 48 53.87	Nelson	4.6031014	40,096.04	131,548.4
		150 16 39.73	330 12 02.97	Anil	4.3969233	24,941.54	81,829.0
Tolar, 1922 (d. m.)	34 15 00.561	118 36 05.93	298 21 07.19	Fort Sumner	4.6656882	46,311.43	151,940.1
	103 52 56.830	155 31 48.47	335 25 32.11	Charlotte	4.6124431	40,967.84	134,408.7
		62 43 25		Reference mark No. 1.			
Urton, 1922 (d. m.)	34 08 42.318	166 27 03.31	346 24 03.83	Fort Sumner	4.5403961	34,705.33	113,862.4
	104 14 11.136	197 34 52.30	17 40 35.76	Charlotte	4.7104378	51,337.87	168,431.0
		250 14 37.14	70 26 33.37	Tolar	4.5396482	34,645.61	113,666.5
La Lande, 1922 (d. m.)	34 26 46.222	313 18 16.29	133 26 44.33	Tolar	4.5005120	31,660.08	103,871.4
	104 07 57.253	16 00 19.74	195 56 49.07	Urton	4.5408224	34,739.41	113,974.2
		91 09 03.04	271 02 31.38	Fort Sumner	4.2474428	17,678.39	57,999.9
Kenna, 1922 (d. m.)	33 57 38.515	122 09 58.61	301 58 05.85	Urton	4.5857210	38,523.08	126,387.8
	103 52 58.266	180 03 56.01	0 03 56.81	Tolar	4.5065987	32,106.93	105,337.5
Haystack, 1922 (d. m.)	33 46 44.278	175 05 01.55	355 03 45.38	Urton	4.6102377	40,760.33	133,727.8
	104 11 54.790	209 06 09.30	29 16 45.89	Tolar	4.7771885	59,867.14	196,414.1
		235 18 15.64	55 28 49.04	Kenna	4.5501153	35,490.76	116,439.3
		78 25 32		Reference mark No. 1.			

GEOGRAPHIC POSITIONS—Continued

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Sardine, 1922, r. 1935 (d. m.)	33 29 20.138	164 49 14.10	344 46 06.19	Haystack	4.5229128	33,335.95	109,369.7
	104 06 15.537	201 21 26.40	21 28 49.06	Kenna	4.7497979	56,207.97	184,409.0
		157 12 21		Azimuth mark.			
Mescalera, 1922, r. 1935 (d. m.)	33 21 14.350	121 08 12.01	300 59 22.32	Sardine	4.4624747	29,005.12	95,161.0
	103 50 13.852	176 24 37.70	356 23 06.58	Kenna	4.8288238	67,425.44	221,211.6
		223 23 09		Azimuth mark.			
Sears, 1922, r. 1935 (d. m.)	33 37 31.417	17 57 20.05	197 53 51.91	Mescalera	4.5002052	31,637.72	103,798.1
	103 43 56.634	66 26 17.12	246 13 57.02	Sardine	4.5764387	37,708.45	123,715.1
		111 38 26.31	291 22 55.14	Haystack	4.6670027	46,451.82	152,400.7
		159 30 11.41	339 25 10.16	Kenna	4.5989535	39,714.90	130,298.0
		334 22 08		Azimuth mark.			
Wade, 1922, r. 1935 (d. m.)	33 17 21.732	200 52 01.92	20 55 01.81	Sardine	4.3745661	23,690.05	77,723.1
	104 11 42.410	257 46 00.22	77 57 48.08	Mescalera	4.5326338	34,090.54	111,845.4
		48 02 24		Azimuth mark.			
Cedar, 1922 (d. m.)	33 01 02.146	135 34 14.17	315 23 47.99	Wade	4.6265649	42,321.87	138,851.0
	103 52 37.412	158 01 18.97	337 53 50.36	Sardine	4.7515438	56,434.39	185,151.8
		185 40 34.44	5 41 53.02	Mescalera	4.5743647	37,528.80	123,125.7
Artesia north base, 1922 (d. m.)	33 01 14.514	216 43 15.97	36 51 06.17	Wade	4.5706036	37,205.20	122,064.1
	104 26 02.155	270 16 04.14	90 34 16.56	Cedar	4.7162782	52,032.92	170,711.3
Baylor, 1922 (d. m.)	32 48 08.924	137 48 19.54	317 40 39.77	Artesia north base	4.5145205	32,697.95	107,276.5
	104 11 55.974	231 33 45.71	51 44 15.18	Cedar	4.5842146	38,389.69	125,950.2
Artesia south base, 1922 (d. m.)	32 50 23.212	188 13 52.38	8 14 53.17	Artesia north base	4.3069173	20,272.967	66,512.23
	104 27 53.986	279 21 11.14	99 29 50.40	Baylor	4.4024483	25,260.87	82,876.7
Walker, 1922 (d. m.)	32 56 13.636	62 48 43.23	242 41 25.35	Artesia south base	4.3724913	23,577.15	77,352.7
	104 14 27.570	117 15 06.36	297 08 48.28	Artesia north base	4.3070222	20,277.86	66,528.3
		186 14 34.10	6 16 04.33	Wade	4.5943862	39,299.42	128,934.8
		255 15 35.17	75 27 28.30	Cedar	4.5460730	35,161.95	115,360.5
		345 12 10.00	165 13 32.28	Baylor	4.1887328	15,443.04	50,666.0
Millman, 1922 (d. m.)	32 39 37.584	127 15 31.80	307 06 26.97	Artesia south base	4.5172972	32,907.67	107,964.6
	104 11 06.877	175 21 49.53	355 21 22.98	Baylor	4.1987493	15,803.36	51,848.2
Deadman, 1922, r. 1928 (d. m.)	32 29 58.322	186 22 11.24	6 23 38.66	Artesia south base	4.5794063	37,967.00	124,563.4
	104 30 35.953	220 54 04.62	41 04 08.87	Baylor	4.6483959	44,503.68	146,009.2
		239 34 37.64	59 45 07.16	Millman	4.5481325	35,329.10	115,908.9
Carlsbad, 1922 (d. m.)	32 28 44.134	94 16 45.89	274 06 04.17	Deadman	4.4951988	31,275.11	102,608.4
	104 10 41.257	178 06 01.26	358 05 47.47	Millman	4.3040545	20,139.77	66,075.2
Jurnegan, 1922 (d. m.)	32 12 18.047	160 03 55.38	339 59 52.53	Deadman	4.5409330	34,748.26	114,003.2
	104 23 02.127	200 15 03.33	20 21 26.93	Millman	4.7311743	53,848.59	176,668.2
		212 28 37.63	32 35 13.98	Carlsbad	4.5566278	36,026.98	118,198.5
Loving, 1922 (d. m.)	32 15 52.954	75 34 04.81	255 25 23.51	Jurnegan	4.4221003	26,430.19	86,713.0
	104 06 44.804	165 25 53.32	345 23 46.72	Carlsbad	4.3899724	24,545.53	80,529.8
		171 09 16.93	351 06 56.26	Millman	4.6475165	44,413.65	145,713.8
Screwbean (Tex.), 1922, r. 1931 (d. m.)	31 51 02.389	153 50 46.27	333 44 15.38	Jurnegan	4.6414116	43,793.70	143,679.8
	104 10 45.078	187 47 57.53	7 50 05.06	Loving	4.6659726	46,341.77	152,039.6
Pope, 1922 (d. m.)	32 02 01.528	52 21 14.76	232 12 26.02	Screwbean	4.5209296	33,184.07	108,871.4
	103 54 05.685	112 46 21.43	292 30 58.18	Jurnegan	4.6930427	49,322.23	161,818.0
		142 12 56.55	322 06 12.60	Loving	4.5109223	32,428.16	106,391.4
Devine (Tex.), 1922, r. 1931 (d. m.)	31 42 55.770	110 33 10.03	290 19 45.01	Screwbean	4.6326089	42,914.98	140,796.9
	103 45 16.674	158 32 00.54	338 27 21.19	Pope	4.5789852	37,930.21	124,442.7
Welch, 1922 (d. m.)	32 02 59.593	133 49 00.67	313 42 56.32	Jurnegan	4.3956299	24,867.37	81,585.7
	104 11 37.012	197 47 52.55	17 50 28.08	Loving	4.3983078	25,021.18	82,090.3
		273 37 56.52	93 47 14.29	Pope	4.4415588	27,641.32	90,686.6
		356 27 46.72	176 28 14.21	Screwbean	4.3450287	22,132.41	72,612.7
New Mexico-Texas boundary mile corner 53 eccentric (Tex.), 1922, r. 1931 (d. m.).	31 59 46.036	236 55 41.91	56 57 51.45	Pope	3.8837439	7,651.45	25,103.1
	103 58 10.048	50 56 22.80	230 49 43.55	Screwbean	4.4076415	25,564.75	83,873.7
		105 46 58.31	285 39 50.40	Welch	4.3424160	21,999.66	72,177.2
Roes (Tex.), 1922, r. 1931 (d. m.)	31 43 32.390	124 11 17.14	304 04 27.74	Screwbean	4.3927266	24,701.69	81,042.1
	103 57 47.892	189 41 06.27	9 43 03.63	Pope	4.5397953	34,657.34	113,705.0
		273 12 32.93	93 19 07.91	Devine	4.2968881	19,810.16	64,993.8
Supplementary points							
Colorado-New Mexico boundary milepost No. 313 (Colo.-N. Mex.), 1922 (d. m.)	36 59 57.457	6 10 39.3	186 08 27.4	Dora	4.706763	50,905.3	167,012
	103 23 48.658	52 48 57.0	232 31 42.0	Grande	4.730509	53,766.2	176,398
De Maya, 1922 (d. m.)	36 58 12.414	128 26 36.9	308 24 57.7	New Mexico-Colorado boundary milepost No. 328 eccentric.	3.716297	5,203.5	17,072
	103 04 50.914	174 03 05.4	354 02 07.9	Potato	4.355934	22,695.2	74,459
Collins (Colo.), 1922 (d. m.)	37 01 01.412	39 44 22.7	219 42 37.4	De Maya	3.830811	6,773.5	22,223
	103 01 55.853	158 59 11.7	338 56 28.6	Potato	4.269580	18,602.9	61,033

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GEOGRAPHIC POSITIONS—Continued

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	′ ″				
Boundary monument (1900) (Colo.-N. Mex.-Okla.), 1922 (d. m.).	37 00 00.473 103 00 06.631	64 40 20.1 124 50 05.8	244 37 29.1 304 49 00.1	De Maya Collins	3.890965 3.517128	7,779.7 3,289.5	25,524 10,792
New Mexico-Colorado boundary (old) (M. C. 1881), 1922 (n. d.).[1]	37 00 09.66 103 00 06.64	359 56 06	179 56 06	Boundary monument (1900)	2.452155	283.24	929.3
New Mexico-Colorado old boundary milepost No. 328, 1922 (d. m.).[1]	37 00 00.63 103 07 35.74	0 02 41	180 02 41	New Mexico-Colorado boundary milepost No. 328 eccentric.	2.006594	101.53	333.1
T. 30 N., R. 35 E., sec. 33, southeast corner, 1922 (n. d.).[1]	36 47 09.76 103 12 26.97	221 56 26	41 56 49	Clayton east base	3.154053	1,425.78	4,677.8
T. 29 N., R. 34 E., sec. 3, southwest corner, 1922 (n. d.).[1]	36 46 15.45 103 18 22.26	72 42 58	252 42 28	Clayton west base	3.115551	1,304.8	4,281
T. 29 N., R. 29 E., sec. 10, southeast corner, Des Moines townsite, 1922 (n. d).[1]	36 45 23.65 103 49 37.71	74 42 40	254 42 37	Des Moines	2.143666	139.2	457
T. 26 N., R. 34 E., sec. 1, northeast corner, 1922 (n. d.).[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, 1922 (n. d.).[1]	36 38 29.76 103 09 46.17	222 51 14	42 51 26	Seneca	2.847714	704.23	2,310.5
T. 28 N., R. 26 E., sec. 28, southwest corner, 1922 (n. d.).[1]	36 37 31.28 104 11 06.11	116 51	296 51	Laughlin	1.234264	17.15	56.3
Laughlin (U. S. G. S.), cairn, 1922 (n. d.) [1]	36 37 31.59 104 11 06.62	57 06	237 06	Laughlin	0.505150	3.2	10
T. 27 N., R. 33 E., sec. 17, southwest corner, 1922 (n. d.).[1]	36 34 08.51 103 27 01.00	13 36 38	193 36 21	Dora	3.469441	2,947.411	9,669.96
T. 22 N., R. 28 E., sec. 4, southwest corner, 1922 (n. d.).[1]	36 09 35.15 103 58 22.20	22 45 28	202 45 21	Carriso	2.906197	805.744	2,643.51
T. 20 N., R. 22 E., sec. 2, southwest corner, 1922 (n. d.).[1]	35 59 14.92 104 34 45.88	331 55 38	151 55 47	Wagon	2.901364	796.8	2,614
T. 19 N., R. 27 E., sec. 28, northeast 1/16 corner, 1922 (n. d.).[1]	35 51 01.40 104 04 12.84	225 38 46	45 38 50	Solana	2.357586	227.8	747
Solana townsite, northeast corner, 1922 (n. d.) [1]	35 51 01.41 104 03 59.92	134 35 48	314 35 44	Solana	2.354595	226.3	742
T. 12 N., R. 26 E., sections 30 and 31, 1/4 sec. corner, 1922 (n. d.).[1]	35 13 49.83 104 13 20.34	160 47 02	340 47 00	Rica	2.439107	274.9	902
T. 9 N., R. 24 E., sec. 29, southwest corner, 1922 (n. d.).[1]	34 58 08.69 104 25 32.64	134 59 53	314 59 43	Haile	2.831190	677.9	2,224
Station A, 1922 (n. d.) [1]	34 57 20.83 104 10 52.94	206 58 01	26 58 04	Louisiana	2.438685	274.59	900.9
Station B, 1922 (n. d.) [1]	34 57 17.04 104 10 45.10	120 27 28	300 27 24	Station A	2.363066	230.71	756.9
Section corner near station Louisiana, 1922 (n. d.) [1]	34 57 15.96 104 10 42.89	120 35 06	300 35 04	Station B	1.813781	65.13	213.7
T. 7 N., R. 26 E., sec. 28, southwest corner, 1922 (n. d.).[1]	34 47 34.70 104 11 57.29	13 02 06	193 01 59	Anil	3.121764	1,323.6	4,343
Elkins, 1922 (d. m.)	33 41 19.377 104 03 15.193	126 51 00.1 207 41 30.4	306 46 11.5 27 47 13.8	Haystack Kenna	4.222891 4.532556	16,706.7 34,084.4	54,812 111,825
Sierra Capitan, 1922 (n. d.)	33 35 26.585 105 15 55.578	239 50 56.1 275 39 18.3	60 37 14.6 96 17 47.9	Tolar Sardine	5.168278 5.035174	147,325.5 108,436.1	483,350 355,761
Bench mark Z 9, 1922 (d. m.)	32 59 52.313 104 21 59.129	299 50 29.1 27 46 06.3	119 54 34.8 207 42 53.5	Walker Artesia south base	4.131101 4.296846	13,523.9 19,808.2	44,370 64,987
Deadman (U. S. G. S.), 1922 (n. d.) [1]	32 29 58.33 104 30 35.94	46 18	226 18	Deadman	9.525045	0.335	1.10
Carl, 1922 (d. m.)	32 25 07.394 104 12 51.668	330 38 50.2 34 01 13.1	150 42 06.4 213 55 46.8	Loving Jurneg-n	4.291999 4.456005	19,588.4 28,576.2	64,266 93,754
New Mexico-Texas boundary mile corner 61 eccentric (Tex.), 1922 (d. m.)	31 59 49.861 104 06 31.461	22 19 01.1 126 06 29.4	202 16 47.0 306 03 47.4	Screwbean Welch	4.244512 3.996595	17,559.5 9,921.9	57,610 32,552
New Mexico-Texas boundary mile corner 61 (N. Mex.-Tex.), 1922 (d. m.) [1]	31 59 59.40 104 06 13.18	58 32 00	238 31 51	New Mexico-Texas boundary mile corner 61 eccentric.	2.750184	562.58	1,845.7
New Mexico-Texas boundary mile corner 53 (N. Mex.-Tex.), 1922, r. 1931 (d. m.) [1]	31 59 59.93 103 58 02.53	24 46 00	204 45 56	New Mexico-Texas boundary mile corner 53 eccentric.	2.673181	471.174	1,545.84

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

OKLAHOMA-TEXAS BOUNDARY (PARALLEL OF 36°30′) ARC

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points	° ′ ″	° ′ ″	° ′ ″				
Eklund, 1931 (d. m.)	36 31 24.371	98 23 36.85	278 20 57.92	Rabbit	3.8269843	6,714.05	22,027.7
	103 10 12.930	184 47 47.60	4 48 15.04	Seneca	4.1359792	13,676.63	44,870.7
Hoover, 1922, r. 1931 (d. m.)	36 35 40.959	50 04 00.30	230 00 14.25	Eklund	4.0903783	12,313.41	40,398.2
	103 03 53.428	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
Clay, 1922, p. l. 1937 (d. m.)	36 27 25.997	139 02 53.05	319 00 00.26	Rabbit	4.0424495	11,026.80	36,177.1
	103 09 49.410	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
School (Okla.), 1931 (d. m.)	36 36 22.829	49 18 58.14	229 11 18.57	Clay	4.4039928	25,350.87	83,172.0
	102 56 57.383	82 55 12.84	262 51 04.78	Hoover	4.0179077	10,420.96	34,189.4
		337 44 28		Reference mark No. 1.			
Worsham (Tex.), 1931 (d. m.)	36 26 59.251	93 22 28.80	273 16 50.50	Clay	4.1523615	14,202.39	46,595.7
	103 00 20.038	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		Reference mark No. 1.			
New Mexico-Texas boundary milepost No. 4 eccentric (N. Mex.-Tex.), 1922 (d. m.).	36 26 38.574	97 36 35.18	277 32 12.88	Clay	4.0449689	11,091.0	36,388
	103 02 27.925	118 18 08.64	298 10 53.34	Rabbit	4.3155996	20,682.3	67,855
		172 45 18.90	352 44 28.02	Hoover	4.2266824	16,853.2	55,293
Supplementary points							
Texhomex (Tex.-Okla.-N. Mex. boundary), 1931 (d. m.).	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	15,295.98	50,183.6
		151 42 19.16	331 40 04.23	Hoover	4.0749076	11,882.49	38,984.5
		179 15 34		Reference mark No. 2.			
Kidder astronomical station, 1931 (d. m.)	36 30 03.679	288 49 17.5	108 49 22.0	Texhomex	2.3017871	200.349	657.31
	103 00 14.455						
Northwest corner of Texas—Clarks monument (N. Mex.-Tex.), 1922 (d. m.).	36 30 01.598	66 26 35.3	246 22 13.0	Clay	4.0785754	11,983.3	39,315
	103 02 28.272	101 01 50.3	280 54 34.9	Rabbit	4.2682006	18,543.9	60,839
New Mexico-Texas boundary milepost No. 1 (N. Mex.-Tex.), 1922 (d. m.).	36 30 01.606	69 45 52.5	249 40 42.5	Clay	4.1411113	13,839.2	45,404
	103 01 07.937	99 58 26.2	279 50 23.0	Rabbit	4.3119598	20,509.7	67,289
New Mexico-Texas boundary mile corner 306, 1922 (n. d.).[1]	36 26 21.60	180 07 44	0 07 44	New Mexico-Texas boundary milepost No. 4 eccentric.	2.718672	523.205	1,716.55
	103 02 27.98						
New Mexico-Texas boundary milepost No. 4, 1922 (d. m.).[1]	36 26 32.78	180 04 57	0 04 57	New Mexico-Texas boundary milepost No. 4 eccentric.	2.251480	178.435	585.42
	103 02 27.94						
Booster Station, black water tank, finial, 1931 (n. d.).	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, 1931 (n. d.).[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
Clayton, municipal water tank (silver), finial 1931 (n. d.).	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	64,180
		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, finial (Tex.), 1931 (n. d.).	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	21,098.1	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
Rabbit Ear Butte, northernmost peak, tip, 1931 (n. d.).[1]	36 31 44.38						
	103 10 09.42						

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC

Principal points							
Wilcox (Tex.), 1934 (d. m.)	31 54 53.039	17 23 33		Azimuth mark.			
	105 09 02.455						
Powell (Tex.), 1934 (d. m.)	31 53 20.967	261 24 53.46	81 31 13.62	Wilcox	4.2813462	19,113.76	62,709.1
	105 21 01.812	300 05 18		Azimuth mark.			
Orange, 1934 (d. m.)	32 03 54.758	349 56 21.98	169 57 21.67	Wilcox	4.2290550	16,945.52	55,595.4
	105 10 55.126	39 15 28.23	219 10 06.94	Powell	4.4013186	25,195.24	82,661.4
		33 07 56		Azimuth mark.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Jones, 1934 (d. m.)	32 04 45.689	273 52 06.31	93 59 48.30	Orange	4.3593339	22,873.57	75,044.4
	105 25 25.176	341 49 45.89	161 52 05.39	Powell	4.3462441	22,194.44	72,816.3
		311 17 33		Azimuth mark.			
Henry, 1934 (d. m.)	32 00 01.173	40 46 31.27	220 42 57.34	Powell	4.2113951	16,270.28	53,380.1
	105 14 17.476	116 37 29.37	296 31 35.15	Jones	4.2919960	19,588.27	64,265.8
		216 24 42.18	36 26 29.51	Orange	3.9514199	8,941.70	29,336.2
		318 53 58.42	138 56 45.16	Wilcox	4.1000301	12,590.13	41,306.1
New Mexico-Texas, Clark boundary monument No. 135, 1934 (d. m).	32 00 01.592	147 16 18.35	327 14 24.56	Jones	4.0171880	10,403.71	34,132.8
	105 21 50.702	247 17 28.24	67 23 15.96	Orange	4.2704658	18,640.85	61,157.5
		270 01 43.13	90 05 43.30	Henry	4.0754205	11,896.53	39,030.5
		295 10 01.23	115 16 47.85	Wilcox	4.3483257	22,301.07	73,166.1
		80 59 41		Azimuth mark.			
New Mexico-Texas, Clark boundary monument No. 15, 1934 (d. m.).	32 00 00.423	2 38 09.17	182 38 00.39	Wilcox	3.9767013	9,477.66	31,094.6
	105 08 45.865	90 10 35.18	270 07 39.45	Henry	3.9397357	8,704.34	28,557.5
		270 22 39		Azimuth mark.			
Scott, 1934 (d. m.)	32 12 13.879	356 47 49.38	176 48 06.83	Orange	4.1874567	15,397.73	50,517.4
	105 11 27.924	57 53 11.65	237 45 46.22	Jones	4.4137063	25,924.26	85,053.2
		192 37 15		Azimuth mark.			
Brownfield, 1934 (d. m.)	32 11 46.418	263 30 47.88	83 33 19.73	Scott	3.8757373	7,511.68	24,644.6
	105 16 12.899	330 08 58.35	150 11 47.36	Orange	4.2239160	16,746.19	54,941.5
		48 12 11.32	228 07 17.53	Jones	4.2884347	19,428.30	63,741.0
		169 41 12		Azimuth mark.			
Waldie (U. S. G. S.), 1934 (d. m.)	32 23 11.662	313 23 48.74	133 31 05.38	Scott	4.4691927	29,457.28	96,644.4
	105 25 05.170	326 32 33.26	146 37 17.62	Brownfield	4.4029107	25,287.78	82,965.0
		0 52 56.57	180 52 45.90	Jones	4.5323753	34,070.25	111,778.8
		250 22 53		Azimuth mark.			
Dry (U. S. G. S.), 1934 (d. m.)	32 30 31.184	349 28 50.84	169 30 59.08	Scott	4.5362511	34,375.67	112,780.8
	105 15 27.545	48 08 26.06	228 03 16.15	Waldie (U. S. G. S.)	4.3068867	20,271.54	66,507.5
Well, 1934 (d. m.)	32 18 11.232	143 44 45.67	323 42 26.73	Waldie (U. S. G. S.)	4.0598843	11,478.48	37,659.0
	105 20 45.472	200 00 13.33	20 03 03.71	Dry (U. S. G. S.)	4.3848845	24,259.65	79,591.9
		306 58 56.97	127 03 54.51	Scott	4.2619756	18,279.97	59,973.5
		257 50 48		Azimuth mark.			
Thorn, 1934 (d. m.)	32 31 23.879	274 37 27.80	94 44 16.05	Dry (U. S. G. S.)	4.2986277	19,889.68	65,254.7
	105 28 07.042	342 35 26.60	162 37 04.20	Waldie (U. S. G. S.)	4.2010840	15,888.54	52,127.7
		157 32 58		Azimuth mark.			
One Tree, 1934 (d. m.)	32 43 09.062	343 49 01.16	163 51 21.04	Dry (U. S. G. S.)	4.3857210	24,306.42	79,745.3
	105 19 47.071	31 00 10.38	210 55 40.86	Thorn	4.4036852	25,332.92	83,113.1
		13 06 06		Azimuth mark.			
Mescal (U. S. G. S.), 1934 (d. m.)	32 34 45.951	7 05 37.86	187 04 43.18	Waldie (U. S. G. S.)	4.3334677	21,551.01	70,705.3
	105 23 23.347	49 57 31.23	229 54 58.59	Thorn	3.9854766	9,671.12	31,729.3
		199 58 12.50	20 00 09.18	One Tree	4.2172484	16,491.05	54,104.4
		302 15 44.84	122 20 00.80	Dry (U. S. G. S.)	4.1669409	14,687.26	48,186.5
		253 32 16		Azimuth mark.			
Tidwell, 1934 (d. m.)	32 33 23.121	355 30 47.29	175 30 55.85	Dry (U. S. G. S.)	3.7253028	5,312.55	17,429.6
	105 15 43.467	160 38 12.22	340 36 00.83	One Tree	4.2817976	19,133.64	62,774.3
		161 18 17		Azimuth mark.			
Lewis (U. S. G. S.), 1934 (d. m.)	32 38 23.350	39 31 29.72	219 27 22.33	Dry (U. S. G. S.)	4.2752325	18,846.58	61,832.5
	105 07 48.045	53 18 49.35	233 14 33.23	Tidwell	4.1894053	15,466.97	50,744.6
		115 13 08.49	295 06 40.26	One Tree	4.3159168	20,697.45	67,904.9
		258 23 25		Azimuth mark.			
Cuevo, 1934 (d. m.)	32 48 52.711	357 46 49.65	177 47 05.24	Lewis (U. S. G. S.)	4.2878394	19,401.68	63,653.7
	105 08 16.873	59 32 31.20	239 26 17.65	One Tree	4.3191358	20,851.43	68,410.1
		180 23 48		Azimuth mark			
Stone, 1934 (d. m.)	32 50 34.399	281 00 12.72	101 05 47.06	Cuevo	4.2133483	16,343.62	53,620.7
	105 18 33.587	323 13 00.38	143 18 49.53	Lewis (U. S. G. S.)	4.4487049	28,099.91	92,191.1
		7 56 28.87	187 55 49.09	One Tree	4.1414862	13,851.16	45,443.3
		305 03 46		B. M. 6924 (U. S. G. S.).			
Bluewater eccentric (N. Mex. Geodetic Survey), 1934 (d. m.).	32 44 29.051	232 17 33.78	52 22 37.24	Stone	4.2652518	18,418.40	60,427.7
	105 27 53.911	280 57 47.61	101 02 10.84	One Tree	4.1110549	12,913.82	42,368.1
Mayhill eccentric (U. S. G. S.), 1934 (d. m.)	32 55 18.345	295 13 27.47	115 19 54.34	Stone	4.3114208	20,484.28	67,205.5
	105 30 26.163	323 27 03.31	143 32 49.71	One Tree	4.4463432	27,947.52	91,691.2
		348 47 23.67	168 48 46.22	Bluewater eccentric (N. Mex. Geodetic Survey).	4.3094116	20,389.74	66,895.3
Hendricks, 1934 (d. m.)	32 57 55.123	15 04 38.25	195 03 04.30	Cuevo	4.2381418	17,303.81	56,770.9
	105 05 23.847	56 34 28.03	236 27 19.02	Stone	4.3910733	24,607.83	80,734.2
		125 03 10		Azimuth mark.			
Elk (U. S. G. S.), 1934 (d. m.)	32 58 22.410	272 36 37.36	92 42 56.09	Hendricks	4.2575049	18,092.76	59,359.3
	105 16 59.805	322 12 16.16	142 17 00.16	Cuevo	4.3463009	22,197.34	72,825.8
		9 36 05.86	189 35 14.91	Stone	4.1650010	14,621.80	47,971.7
		358 37 46		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Manning, 1934, r. 1936 (d. m.)	33 02 49.198	299 51 31.55	119 57 02.10	Hendricks	4.2593760	18,170.88	59,615.6
	105 15 30.656	15 43 54.60	195 43 06.04	Elk (U. S. G. S.)	3.9313664	8,538.20	28,012.4
		156 39 53		Azimuth mark.			
Burnt, 1934 (d. m.)	33 05 23.598	3 51 43.88	183 51 24.30	Hendricks	4.1413602	13,847.14	45,430.2
	105 04 47.933	55 42 56.62	235 36 17.68	Elk (U. S. G. S.)	4.3617566	23,001.52	75,464.2
		74 07 31.64	254 01 40.94	Manning	4.2389815	17,337.30	56,880.8
		133 22 06		Azimuth mark.			
McKnight, 1934, r. 1936 (d. m.)	33 12 34.539	314 52 46.31	134 57 27.23	Burnt	4.2741943	18,801.58	61,684.9
	105 13 21.657	10 30 55.62	190 29 45.12	Manning	4.2633930	18,339.73	60,169.6
		186 41 26		Azimuth mark.			
Treat, 1934 (d. m.)	33 10 57.478	349 45 58.32	169 46 37.46	Burnt	4.0191911	10,451.80	34,290.6
	105 05 59.536	44 35 30.45	224 30 18.43	Manning	4.3244297	21,107.16	69,249.1
		104 40 01.10	284 35 59.03	McKnight	4.0731991	11,835.84	38,831.4
		29 12 04		Azimuth mark.			
Goodrum, 1934 (d. m.)	33 11 31.134	21 10 54.91	201 09 22.42	Burnt	4.0842858	12,141.88	39,835.5
	105 01 58.760	80 34 48.78	260 32 36.98	Treat	3.8009124	6,322.84	20,744.2
		96 21 13.40	276 14 59.46	McKnight	4.2503011	17,795.13	58,382.9
		6 39 17		Azimuth mark.			
Joseph, 1934 (d. m.)	33 15 26.020	308 19 48.61	128 23 02.09	Goodrum	4.0667220	11,660.63	38,256.6
	105 07 51.886	58 16 43.47	238 13 42.73	McKnight	4.0017489	10,040.35	32,940.7
		43 08 22		Azimuth mark.			
Slaughter, 1934 (d. m.)	33 17 37.995	314 03 58.67	134 08 05.62	Goodrum	4.2105925	16,240.24	53,281.5
	105 09 29.248	328 12 20.58	148 13 14.00	Joseph	3.6797199	4,783.22	15,692.9
		32 46 48.28	212 44 40.84	McKnight	4.0459921	11,117.12	36,473.4
		19 03 44		Azimuth mark.			
Border, 1934 (d. m.)	33 20 27.663	20 25 09.43	200 22 59.14	Goodrum	4.2463788	17,635.13	57,857.9
	104 58 01.236	58 44 25.13	238 39 00.86	Joseph	4.2524880	17,884.96	58,677.6
		73 41 03.35	253 34 45.44	Slaughter	4.2683007	18,548.15	60,853.4
		26 56 55		Azimuth mark.			
Picacho, 1934 (d. m.)	33 23 29.307	287 26 58.85	107 33 16.39	Border	4.2696880	18,607.50	61,048.1
	105 09 27.685	0 12 50.65	180 12 49.79	Slaughter	4.0343544	10,823.17	35,509.0
		51 28 30		Azimuth mark.			
Menecke, 1934, r. 1935 (d. m.)	33 23 55.650	36 19 16.05	216 17 35.87	Border	3.9004399	7,951.33	26,087.0
	104 54 59.111	62 43 23.04	242 35 24.72	Slaughter	4.4036357	25,330.03	83,103.6
		87 59 44.82	267 51 46.74	Picacho	4.3514410	22,461.62	73,692.8
		213 11 40		Azimuth mark.			
Doolin, 1934, r. 1935 (d. m.)	33 31 44.644	343 39 57.45	163 41 27.80	Menecke	4.1776982	15,055.60	49,394.9
	104 57 42.958	50 04 23.18	229 57 54.62	Picacho	4.3756717	23,750.44	77,921.2
		307 42 15		Azimuth mark.			
Bela, 1934 (d. m.)	33 35 15.634	286 27 36.49	106 35 26.00	Doolin	4.3589448	22,853.08	74,977.1
	105 11 52.311	308 36 56.00	128 46 15.13	Menecke	4.5251819	33,510.58	109,942.6
		350 15 11.44	170 16 31.24	Picacho	4.3439741	22,078.73	72,436.6
Juniper, 1934 (d. m.)	33 37 15.406	354 01 38.59	174 02 33.66	Menecke	4.3939847	24,773.35	81,277.2
	104 56 38.860	9 13 09.45	189 12 34.00	Doolin	4.0138299	10,323.57	33,869.9
		81 09 54.15	261 01 28.59	Bela	4.3772586	23,837.38	78,206.5
Lowrey (U. S. G. S.), 1934 (d. m.)	33 44 05.229	330 37 14.00	150 39 46.90	Juniper	4.1609743	14,486.86	47,529.0
	105 01 14.581	45 14 57.35	225 09 03.87	Bela	4.3646606	23,155.84	75,970.5
		29 50 50		Azimuth mark.			
Sink, 1934 (d. m.)	33 44 09.564	270 22 06.85	90 28 37.33	Lowrey (U. S. G. S.)	4.2576796	18,100.04	59,383.2
	105 12 57.686	296 46 01.22	116 55 04.02	Juniper	4.4511523	28,258.71	92,712.1
		354 08 55.36	174 09 31.60	Bela	4.2184288	16,535.94	54,251.7
		351 14 16		Azimuth mark.			
Arabella east base, 1934 (d. m.)	33 46 47.068	325 29 40.95	145 30 54.93	Lowrey (U. S. G. S.)	3.7817490	6,049.91	19,848.7
	105 03 27.714	71 44 19.97	251 39 03.24	Sink	4.1889400	15,450.41	50,690.2
		60 28 09		Azimuth mark.			
Arabella west base, 1934 (d. m.)	33 46 45.881	269 45 15.99	89 48 45.04	Arabella east base	3.9856050	9,673.976	31,738.70
	105 09 43.704	290 39 18.22	110 44 01.13	Lowrey (U. S. G. S.)	4.1463272	14,006.42	45,952.7
		46 02 38.48	226 00 50.68	Sink	3.8411492	6,936.64	22,758.0
		265 59 30		Azimuth mark.			
Huff, 1934 (d. m.)	33 51 01.485	304 17 14.93	124 24 00.73	Lowrey (U. S. G. S.)	4.3566487	22,732.58	74,581.8
	105 13 24.197	356 55 19.04	176 55 33.78	Sink	4.1041294	12,709.53	41,697.8
		172 49 00		Azimuth mark.			
McGinis, 1934 (d. m.)	33 50 20.175	18 18 12.42	198 16 49.87	Lowrey (U. S. G. S.)	4.0851775	12,166.83	39,917.3
	104 58 46.150	62 32 11.22	242 24 17.66	Sink	4.3927749	24,704.43	81,051.1
		93 17 41.49	273 09 32.47	Huff	4.3543028	22,610.11	74,180.0
		31 09 09		Azimuth mark.			
Galla, 1934 (d. m.)	33 56 01.125	313 17 08.53	133 21 10.23	McGinis	4.1850224	15,311.66	50,235.0
	105 05 59.656	51 05 19.09	231 01 11.20	Huff	4.1669329	14,686.99	48,185.6
		356 13 55		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Foster, 1934 (d. m.)	33 56 28.837	273 06 25.14	93 12 02.00	Galla	4.1908791	15,519.55	50,917.1
	105 16 03.042	293 00 31.23	113 10 09.40	McGinis	4.4618601	28,964.11	95,026.4
		337 57 21.98	157 58 50.56	Huff	4.0366434	10,880.36	35,696.6
		0 57 21		Azimuth mark.			
Omer, 1934 (d. m.)	34 01 42.880	306 51 48.29	126 56 53.59	Galla	4.2439033	17,534.90	57,529.1
	105 15 05.898	8 37 26.95	188 36 55.01	Foster	3.9906255	9,786.46	32,107.7
		91 36 39		Azimuth mark.			
Cowboy, 1934 (d. m.)	34 02 05.687	18 14 43.82	198 13 23.23	Galla	4.0728498	11,826.32	38,800.2
	105 03 35.486	61 38 54.44	241 31 56.54	Foster	4.3387417	21,814.32	71,569.1
		87 46 53.67	267 40 27.28	Omer	4.2485955	17,725.38	58,154.0
		349 07 36		Azimuth mark.			
Spanish, 1934 (d. m.)	34 09 48.058	304 44 56.78	124 52 24.90	Cowboy	4.3971591	24,955.09	81,873.5
	105 16 54.803	349 24 48.51	169 25 49.56	Omer	4.1820563	15,207.45	49,893.1
		318 27 08		Azimuth mark.			
Moseley, 1934 (d. m.)	34 09 00.371	352 36 22.99	172 36 59.22	Cowboy	4.1100492	12,883.96	42,270.1
	105 04 40.118	50 00 36.74	229 54 46.00	Omer	4.3212647	20,953.89	68,746.2
		94 31 17.44	274 24 24.95	Spanish	4.2759286	18,876.81	61,931.7
		56 44 16		Azimuth mark.			
Gypsum, 1934 (d. m.)	34 12 29.992	4 16 05.93	184 15 55.36	Moseley	3.8113578	6,476.76	21,249.2
	105 04 21.301	75 33 36.81	255 26 33.44	Spanish	4.2994987	19,929.61	65,385.7
		206 49 31		Azimuth mark.			
Cedar, 1934 (d. m.)	34 14 45.225	284 36 28.68	104 42 18.81	Gypsum	4.2166378	16,467.88	54,028.4
	105 14 43.778	304 27 39.09	124 33 18.38	Moseley	4.2731371	18,755.87	61,534.9
		20 07 49.82	200 06 36.17	Spanish	3.9890668	9,751.40	31,992.7
		96 55 49		Thompson Ranch windmill.			
Morgan, 1934 (d. m.)	34 17 21.733	13 26 47.84	193 25 26.76	Moseley	4.2009222	15,882.62	52,108.2
	105 02 15.947	19 38 50.68	199 37 40.13	Gypsum	3.9797428	9,544.27	31,313.2
		75 54 38.94	255 47 37.86	Cedar	4.2951189	19,729.63	64,729.6
		110 01 39		Azimuth mark.			
Burgette, 1934 (d. m.)	34 19 17.574	281 39 22.62	101 45 42.21	Morgan	4.2452186	17,588.09	57,703.6
	105 13 29.453	12 46 12.05	192 45 30.18	Cedar	3.9347177	8,604.34	28,229.4
		321 14 31		Azimuth mark.			
Derrick, 1934 (d. m.)	34 23 27.190	4 37 05.30	184 36 45.24	Morgan	4.0529752	11,297.31	37,064.6
	105 01 40.382	51 17 50.44	231 10 28.77	Cedar	4.4097141	25,687.04	84,274.9
		67 03 24.11	246 56 43.96	Burgette	4.2941430	19,685.34	64,584.3
		307 32 17		Azimuth mark.			
Duran, 1934, r. 1935 (d. m.)	34 29 10.895	150 15 30.65	330 07 01.25	Pedernal	4.6614923	45,866.15	150,479.2
	105 23 41.648	287 19 34.97	107 32 02.17	Derrick	4.5484612	35,355.85	115,996.7
		319 24 45.22	139 30 31.13	Burgette	4.3812323	24,056.49	78,925.3
		126 12 38		Azimuth mark.			
Tank, 1934 (d. m.)	34 25 26.802	313 50 27.54	133 51 52.41	Derrick	3.7258974	5,319.83	17,453.5
	105 04 10.588	51 29 52.01	231 24 36.49	Burgette	4.2614375	18,257.34	59,899.3
		103 05 57.26	282 54 54.72	Duran	4.4868388	30,678.83	100,652.1
		259 07 19		Azimuth mark.			
Joffre, 1934 (d. m.)	34 29 02.127	346 52 24.52	166 53 17.79	Derrick	4.0251844	10,597.04	34,767.1
	105 03 14.593	12 09 41.91	192 09 10.23	Tank	3.8316810	6,787.05	22,267.2
		41 07 59.43	221 02 12.03	Burgette	4.3783369	23,896.64	78,400.9
		90 35 27.26	270 23 52.51	Duran	4.4956963	31,310.96	102,726.0
		176 43 18		Azimuth mark.			
Leon, 1934, r. 1935 (d. m.)	34 43 24.253	334 11 01.27	154 15 47.20	Joffre	4.4698360	29,500.95	96,787.7
	105 11 38.080	35 05 32.53	214 58 41.61	Duran	4.5067010	32,114.49	105,362.3
		108 17 07 65	288 01 43.95	Pedernal	4.6367295	43,324.10	142,139.2
		40 38 23		Azimuth mark.			
Argonne, 1934 (d. m.)	34 48 53.120	0 14 38.31	180 14 34.83	Joffre	4.5646639	36,699.82	120,406.0
	105 03 08.469	40 51 37.60	220 39 56.45	Duran	4.6821147	48,096.63	157,797.0
		52 00 54.56	231 56 03.94	Leon	4.2161928	16,451.02	53,973.1
		93 43 49.86	273 23 34.03	Pedernal	4.7339858	54,198.31	177,815.6
		184 53 17.05	4 55 18.89	Aguilar	4.7977693	62,772.48	205,946.0
		218 54 44.75	38 59 35.72	Pintada	4.3127634	20,547.71	67,413.6
		238 02 14		Azimuth mark.			
Supplementary Points							
Cerro Diablo Peak (Tex.), 1934 (n. d.)	31 53 40.261	175 49 06.8	355 48 36.6	Jones	4.312824	20,550.6	67,423
	105 24 28.041	276 14 31.5	96 16 20.5	Powell	3.736560	5,452.1	17,887
		317 49 49.6	137 54 46.5	Quail	4.343911	22,075.5	72,426
New Mexico-Texas Clark boundary monument No. 14, 1934 (d. m.).[1]	32 00 00.24 105 14 06.96	95 57 57.8	275 57 52.2	Henry	2.443246	277.489	910.40
T. 26 S., R. 15 E., sec. 4, northwest corner, 1934 (d. m.).[1]	32 04 45.73 105 25 26.27	272 16	92 16	Jones	1.459679	28.819	94.55

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
T. 24 S., R. 16 E., sec. 23, southeast corner, 1934 (d. m.).[1]	32 11 47.40 105 16 09.63	70 27 23	250 27 21	Brownfield	1.958659	90.92	298.3
Beargrass, 1934 (d. m.)	32 17 48.019 105 24 27.764	174 23 54.8 262 58 27.4 110 46 26	354 23 34.8 83 00 26.2	Waldie (U. S. G. S.) Well Azimuth mark.	4.000734 3.767866	10,016.9 5,859.6	32,864 19,224
Pinon, 1934 (d. m.)	32 40 12.547 105 24 39.462	234 27 17.3 348 50 12.8 144 16 22	54 29 55.3 168 50 53.8	One Tree Mescal (U. S. G. S.) Azimuth mark.	3.971192 4.010904	9,358.2 10,254.3	30,703 33,643
Gage, 1934 (d. m.)	32 36 51.492 105 21 34.168	36 22 10.2 142 04 00.8 208 15 00	216 21 11.4 322 02 20.9	Mescal (U. S. G. S.) Pinon Azimuth mark.	3.681436 3.895076	4,802.2 7,853.7	15,755 25,767
Old Carrisa (N. Mex. Geodetic Survey), 1934 (d. m.).[1]	32 39 06.92 105 38 00.15	237 48 37 312 38 07	57 54 05 132 43 26	Bluewater eccentric (N. Mex. Geodetic Survey.) Thorn	4.270688 4.323061	18,650.4 21,040.7	61.189 69.031
New Carrisa (N. Mex. Geodetic Survey), 1934 (d. m.).[1]	32 40 34.38 105 37 08.09	243 21 15 271 55 06	63 26 15 92 01 50	Bluewater eccentric (N. Mex. Geodetic Survey). Pinon	4.207970 4.290414	16,142.5 19,517.0	52,961 64,032
Bluewater (N. Mex. Geodetic Survey), 1934 (d. m.).	32 44 28.082 105 27 53.991	183 59 48 280 49 52.8	3 59 48 100 54 16.1	Bluewater eccentric (N. Mex. Geodetic Survey). One Tree	1.476165 4.110934	29.934 12,910.2	98.21 42,356
Potato (N. Mex. Geodetic Survey), 1934, (d.)	32 45 04.800 105 40 50.948	220 38 22.5 253 37 58.5 273 03 27.3	40 44 01.3 73 50 02.8 93 10 27.6	Mayhill eccentric (U. S. G. S.) Stone Bluewater eccentric (N. Mex. Geodetic Survey).	4.396635 4.559282 4.306622	24,925.0 36,247.8 20,259.2	81,775 118,923 66,467
Weed (N. Mex. Geodetic Survey), 1934 (d. m.).[1]	32 48 22.69 105 33 34.52	200 54 59 309 02 52	20 56 41 129 05 57	Mayhill eccentric (U. S. G. S.) Bluewater eccentric (N. Mex. Geodetic Survey).	4.136998 4.057612	13,708.8 11,418.6	44,976 37,463
Curtis (N. Mex. Geodetic Survey), 1934 (d. m.).[1]	32 53 17.66 105 34 45.51	241 05 54 326 38 32	61 08 15 146 42 15	Mayhill eccentric (U. S. G. S.) Bluewater eccentric (M. Nex. Geodetic Survey).	3.886332 4.289780	7,697.2 19,488.6	25,253 63,939
Mayhill (N. Mex. Geodetic Survey), 1934 (d. m.).[1]	32 55 18.54 105 30 25.89	48 53	228 53	Mayhill eccentric (U. S. G. S.)	0.968436	9.299	30.51
Walker (N. Mex. Geodetic Survey), 1934 (d. m.)	32 58 29.154 105 29 04.432	270 34 40.0 311 41 21.6 332 52 27.6 19 51 51.9	90 41 14.4 131 47 04.3 152 57 30.0 199 51 07.5	Elk (U. S. G. S.) Stone One Tree Mayhill eccentric (U. S. G. S.)	4.274571 4.341809 4.502896 3.795852	18,817.9 21,968.9 31,834.4 6,249.6	61,738 72,076 104,443 20,504
Williams, 1934 (d. m.)	32 50 43.564 105 11 46.966	301 59 11.2 344 43 23.8 88 30 04.3 340 53 14	122 01 05.1 164 45 33.0 268 26 23.7	Cuevo Lewis (U. S. G. S.) Stone Azimuth mark.	3.809133 4.373559 4.024407	6,443.7 23,635.2 10,578.1	21,141 77,543 34,705
Corral, 1934 (d. m.)	32 53 09.178 105 05 40.536	27 14 26.4 118 43 11.6 182 49 00.5 64 56 03	207 13 01.6 298 37 02.4 2 49 09.6	Cuevo Elk (U. S. G. S.) Hendricks Azimuth mark.	3.948661 4.303487 3.945437	8,885.1 20,113.5 8,819.4	29,151 65,989 28,935
Posey, 1934 (d. m.)	33 01 03.759 105 12 28.815	54 46 43.8 124 33 18.0 294 21 44	234 44 16.2 304 31 38.9	Elk (U. S. G. S.) Manning Azimuth mark.	3.935202 3.758056	8,613.9 5,728.7	28,261 18,795
Clements, 1934 (d. m.)	33 07 56.672 105 15 59.465	205 31 09.6 250 14 33.0 355 29 16.8 299 50 30	25 32 35.9 70 20 01.1 175 29 32.5	McKnight Treat Manning Azimuth mark.	3.977107 4.217852 3.977795	9,486.5 16,514.0 9,501.6	31,124 54,180 31,173
T. 13 S., R. 17 E., section corner, 1934 (d. m.).[1]	33 07 55.71 105 15 53.43	100 41 53	280 41 50	Clements	2.202232	159.306	522.66
Highway, 1934 (d. m.)	33 21 07.850 105 01 15.146	63 12 12.9 108 55 56.9 283 51 18.9	243 07 41.5 288 51 26.0 103 53 05.4	Slaughter Picacho Border	4.156006 4.128964 3.713042	14,322.1 13,457.5 5,164.7	46,988 44,152 16,945
Fears, 1934 (d. m.)	33 27 48.068 105 11 00.618	174 28 42.0 250 26 46.1 343 13 57.6 14 05 07	354 28 13.4 70 34 06.3 163 14 48.8	Bela Doolin Picacho Azimuth mark.	4.141550 4.339299 3.920415	13,853.2 21,842.3 8,325.6	45,450 71,661 27,315
Purcella, 1934 (d. m.)	33 40 13.600 105 07 41.608	35 09 36.9 131 47 38.7 234 22 00.9 150 45 54	215 07 18.0 311 44 43.3 54 25 35.6	Bela Sink Lowrey (U. S. G. S.) Azimuth mark.	4.050229 4.037965 4.088427	11,226.1 10,913.5 12,258.2	36,831 35,805 40,217
Plainview (U. S. G. S.), 1934 (d. m.)	33 42 56.368 105 06 00.368	305 56 35.5 32 36 01.2 101 53 11.0 104 16 56	126 01 46.8 212 32 46.2 281 49 19.3	Juniper Bela Sink Azimuth mark.	4.252309 4.226454 4.040525	17,877.6 16,844.3 10,978.0	58,653 55,263 36,017

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
El Capitan Mountain, east peak, 1934 (n. d.)	33 35 11.443	182 18 56.3	2 19 21.8	Huff	4.466783	29,294.3	96,110
	105 14 10.238	186 25 38.1	6 26 18.3	Sink	4.222303	16,684.1	54,738
		227 04 00.1	47 07 35.3	Purcella	4.135912	13,674.5	44,864
El Capitan Mountain, 1934 (n. d.)	33 35 29.480	179 37 58.1	359 37 52.7	Foster	4.588845	38,801.2	127,300
	105 15 53.360	187 36 22.8	7 37 45.6	Huff	4.461952	28,970.2	95,046
		223 51 55.4	44 01 25.6	McGinis	4.581072	38,112.9	125,042
Salley, 1934 (d. m.)	34 07 11.870	4 06 03.9	184 05 48.0	Omer	4.007005	10,162.6	33,342
	105 14 37.568	143 51 29.5	323 50 12.5	Spanish	3.775247	5,960.0	19,554
		257 38 02.9	77 43 38.2	Moseley	4.195037	15,668.8	51,407
		255 09 48		Azimuth mark.			
Ramon, 1934 (d. m.)	34 13 56.720	55 08 21.4	235 03 34.2	Moseley	4.203007	15,959.0	52,359
	104 56 08.945	78 04 00.6	257 59 23.7	Gypsum	4.110010	12,882.8	42,266
		123 57 35.7	303 54 09.1	Morgan	4.053716	11,316.6	37,128
		325 48 00		Azimuth mark.			
Iden, 1934 (d. m.)	34 33 07.342	163 10 38.7	343 08 30.3	Leon	4.298008	19,861.3	65,162
	105 07 52.165	193 53 42.0	13 56 23.4	Argonne	4.477483	30,025.0	98,507
		316 50 28.9	136 53 06.2	Joffre	4.015130	10,354.5	33,971
		134 00 15		Azimuth mark.			
Bench mark S 4, 1934 (d. m.) [1]	34 33 01.85	162 38 32	342 38 30	Iden	2.248584	177.249	581.52
	105 07 50.09						
Vaughn, 1934 (d. m.)	34 36 21.854	0 50 07.2	180 49 57.0	Burgette	4.499202	31,564.7	103,559
	105 13 11.454	50 28 42.2	230 22 44.8	Duran	4.319013	20,845.5	68,391
		190 20 38.2	10 21 31.3	Leon	4.121602	13,231.3	43,410
		79 41 08		Azimuth mark.			
T 5 N., R. 16 E., sections 34 and 35, corner, 1934 (d. m.).[1]	34 36 21.96	87 00 22	267 00 20	Vaughn	1.811910	64.85	212.8
	105 13 08.91						
Vaughn, high school, chimney, 1934 (n. d.)	34 35 49.544	54 55 43.4	234 49 15.1	Duran	4.329389	21,349.6	70,044
	105 12 16.847	125 35 19.6	305 34 48.6	Vaughn	3.233235	1,710.9	5,613
		184 01 36.4	4 01 58.4	Leon	4.147560	14,046.2	46,083
Vaughn, water tank, 1934 (n. d.)	34 35 43.623	56 18 01.0	236 11 18.4	Duran	4.338031	21,778.7	71,452
	105 11 51.545	181 22 57.5	1 23 05.2	Leon	4.152230	14,198.1	46,582
		313 08 33.2	133 13 26.4	Joffre	4.257155	18,078.2	59,312
Vaughn, Catholic Church, cross, 1934 (n. d.) [1]	34 36 05.53	113 51 28	293 51 03	Vaughn	3.094682	1,243.6	4,080
	105 12 26.82	185 14 27	5 14 55	Leon	4.132762	13,575.7	44,540
Torlupe, 1934 (d. m.)	34 36 24.829	345 45 30.8	165 48 28.6	Burgette	4.513924	32,653.1	107,129
	105 18 43.657	29 37 50.0	209 35 01.0	Duran	4.186930	15,379.1	50,456
		270 40 06		Azimuth mark.			
U. S. G. S. target, 1934 (n. d.) [1]	34 29 06.13	225 46 38	45 51 47	Torlupe	4.287728	19,396.7	63,637
	105 27 49.22	280 27 37	100 41 00	Tank	4.566278	36,836.5	120,854
Winkle, 1934 (d. m.)	34 43 32.077	2 38 51.7	182 38 24.1	Joffre	4.428704	26,835.1	88,041
	105 02 26.012	89 03 37.3	268 58 22.8	Leon	4.147627	14,048.4	46,090
		173 46 30.5	353 46 06.2	Argonne	3.997894	9,951.6	32,650
		226 44 47		Azimuth mark.			
Encino, 1934, r. 1935 (d. m.)	34 43 20.872	121 49 09.4	301 40 56.2	Pedernal	4.412530	25,854.1	84,823
	105 24 12.541	269 37 45.6	89 44 55.4	Leon	4.283221	19,196.5	62,981
		358 16 34.1	178 16 51.7	Duran	4.418350	26,202.9	85,967
		192 40 42		Azimuth mark.			
Los Angeles—Amarillo Airway, beacon No. 75, 1934 (d.).	35 05 59.245	283 17 16.5	103 41 52.5	Pintada	4.826314	67,036.9	219,937
	105 37 31.284	300 58 30.3	121 18 12.3	Argonne	4.786378	61,147.4	200,614
		3 23 39.0	183 23 01.2	Pedernal	4.451838	28,303.4	92,859
Los Angeles—Amarillo Airway, beacon No. 78B, 1934 (d.).	35 06 53.979	192 33 23.8	12 35 52.6	Aguilar	4.476452	29,953.8	98,273
	105 03 54.557	320 53 42.3	140 59 00.8	Pintada	4.348627	22,316.5	73,217
		357 59 09.0	177 59 35.4	Argonne	4.522810	33,328.1	109,344
Los Angeles—Amarillo Airway, beacon No. 81A, 1934 (d.).	35 07 42.152	55 25 19.4	235 06 25.6	Argonne	4.785764	61,061.0	200,331
	104 30 10.345	63 18 59.9	243 04 56.2	Pintada	4.620386	41,724.0	136,889
		122 00 10.4	301 43 10.9	Aguilar	4.720745	52,570.9	172,476
Los Angeles—Amarillo Airway, beacon No. 81B, 1934 (d.).[1]	35 06 42.37	69 29 00	249 12 00	Pintada	4.682170	48,102.8	157,817
	104 25 04.05	119 37 20	299 17 24	Aguilar	4.779434	60,177.5	197,432
Los Angeles—Amarillo Airway, beacon No. 82, 1934 (n. d.).[1]	35 08 00.74	73 54 09	253 29 07	Pintada	4.839129	69,044.5	226,523
	104 11 05.06	110 30 01	290 02 00	Aguilar	4.894635	78,457.6	257,406

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

PICACHO, N. MEX., TO SLATON, TEX., ARC

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points	° ′ ″	° ′ ″	° ′ ″				
Hondo, 1935 (d. m)	33 22 32.349	102 43 04.62	282 39 01.85	Menecke	4.0677197	11,687.45	38,344.6
	104 47 37.948	137 29 04.37	317 23 30.86	Doolin	4.3636345	23,101.20	75,791.2
		76 12 23		Azimuth mark.			
Corn, 1935 (d. m.)	33 29 15.809	29 00 52.99	208 58 26.08	Hondo	4.1526207	14,210.87	46,623.5
	104 43 11.296	61 42 24.85	241 35 54.77	Menecke	4.3175061	20,773.33	68,153.8
		101 35 12.76	281 27 11.55	Doolin	4.3609725	22,960.03	75,328.0
		126 15 11		Azimuth mark.			
Sunken, 1935 (d. m.)	33 21 47.274	95 27 00.64	275 21 48.47	Hondo	4.1684190	14,737.34	48,350.8
	104 38 10.399	150 39 47.53	330 37 01.78	Corn	4.2001629	15,854.88	52,017.2
		90 06 57		Azimuth mark.			
Klyng, 1935 (d. m.)	33 29 22.004	354 42 47.93	174 43 15.55	Sunken	4.1482651	14,069.06	46,158.2
	104 39 00.541	88 19 49.78	268 17 31.42	Corn	3.8113243	6,476.26	21,247.5
		321 13 20		Azimuth mark.			
Roswell, 1935 (d. m.)	33 24 42.974	62 24 57.54	242 21 17.22	Sunken	4.0673615	11,677.81	38,312.9
	104 31 30.041	126 29 33.74	306 25 25.41	Klyng	4.1603558	14,466.24	47,461.3
		184 35 33		Azimuth mark.			
Buck, 1935 (d. m.)	33 31 46.367	357 55 01.26	177 55 11.39	Roswell	4.1156968	13,052.59	42,823.4
	104 31 48.402	28 09 23.25	208 05 52.71	Sunken	4.3207379	20,928.49	68,662.9
		68 17 33.05	248 13 34.48	Klyng	4.0794489	12,007.40	39,394.3
		288 14 48		Azimuth mark.			
Melena, 1935 (d. m.)	33 32 27.636	30 58 22.85	210 55 19.47	Roswell	4.2224992	16,691.65	54,762.5
	104 25 57.588	82 01 52.71	261 58 38.90	Buck	3.9609716	9,140.53	29,988.6
		228 25 42		Azimuth mark.			
Gopher, 1935 (d. m.)	33 25 33.332	84 40 59.34	264 35 07.24	Roswell	4.2198574	16,590.42	54,430.4
	104 20 50.722	124 08 26.26	304 02 23.48	Buck	4.3118421	20,504.17	67,270.8
		148 11 45.98	328 08 56.69	Melena	4.1767508	15,022.80	49,287.3
		316 51 00.78	136 56 02.28	Wade	4.3169065	20,744.67	68,059.8
		335 37 46		Azimuth mark.			
Campbell, 1935 (d. m.)	33 35 16.012	309 40 42.65	129 45 26.26	Sardine	4.2344593	17,157.71	56,291.6
	104 14 47.055	27 37 54.91	207 34 34.15	Gopher	4.3065817	20,257.31	66,460.9
		73 21 20.34	253 15 09.62	Melena	4.2566324	18,056.45	59,240.2
		144 04 48		Azimuth mark.			
Rice, 1935 (d. m.)	33 27 43.919	70 08 38.57	250 04 41.29	Gopher	4.0728322	11,825.85	38,798.6
	104 13 40.180	172 56 31.91	352 55 54.98	Campbell	4.1472067	14,034.82	46,045.9
		255 29 16.65	75 33 21.91	Sardine	4.0739769	11,857.06	38,901.0
		350 58 00.32	170 59 05.11	Wade	4.2879895	19,408.39	63,675.7
		0 23 38		Azimuth mark.			
Lera, 1935 (d. m.)	33 22 48.135	66 28 54.52	246 26 33.41	Mescalera	3.8594337	7,234.92	23,736.6
	103 45 57.276	186 31 07.72	6 32 14.31	Sears	4.4375929	27,390.06	89,862.2
		154 13 11		Bench mark J 147.			
Roberts, 1935 (d. m.)	33 33 14.829	29 23 43.46	209 19 51.48	Lera	4.3454396	22,153.36	72,681.5
	103 38 56.600	38 17 22.90	218 11 09.56	Mescalera	4.4511683	28,259.75	92,715.5
		135 38 25.91	315 35 39.92	Sears	4.0437955	11,061.03	36,289.4
		209 11 30		Azimuth mark.			
Caprock, 1935 (d. m.)	33 25 02.223	69 32 08.34	249 25 29.02	Mescalera	4.3016246	20,027.40	65,706.6
	103 38 08.151	71 13 10.85	251 08 52.62	Lera	4.1074748	12,807.81	42,020.3
		175 17 31.82	355 17 05.09	Roberts	4.1826376	15,227.81	49,959.9
		63 15 03		Azimuth mark.			
Tankersley, 1935 (d. m.)	33 29 35.071	59 13 10.97	239 08 10.23	Caprock	4.2149997	16,405.89	53,825.0
	103 29 02.618	113 52 36.41	293 47 08.37	Roberts	4.2241864	16,756.62	54,975.7
		196 06 51		Azimuth mark.			
Lane, 1935, r. 1936 (d. m.)	33 24 19.939	95 32 03.46	275 27 14.85	Caprock	4.1337146	13,605.50	44,637.4
	103 29 24.014	138 08 55.33	318 03 39.47	Roberts	4.3451435	22,138.26	72,631.9
		183 15 21.69	3 15 33.48	Tankersley	3.9878593	9,724.32	31,903.9
		9 18 05		Azimuth mark.			
Royal, 1935 (d. m.)	33 26 11.118	76 56 48.69	256 51 34.83	Lane	4.1794325	15,115.85	49,592.6
	103 19 54.159	113 58 00.48	293 52 58.05	Tankersley	4.1901650	15,494.05	50,833.4
		346 26 38		Azimuth mark.			
Blank, 1935 (d. m.)	33 33 13.075	357 04 02.27	177 04 16.50	Royal	4.1145049	13,016.82	42,706.0
	103 20 19.941	40 34 47.01	220 29 46.89	Lane	4.3347056	21,612.53	70,907.1
		63 34 07.95	243 29 19.29	Tankersley	4.1780453	15,067.64	49,434.4
		0 17 02		Bench mark Q 95.			
Sawyer, 1935 (d. m.)	33 31 00.305	56 44 36.16	236 39 46.37	Royal	4.2102912	16,228.98	53,244.6
	103 11 08.786	106 05 22.13	286 00 17.65	Blank	4.1701873	14,797.46	48,548.0
		335 39 27		Azimuth mark.			
Warren, 1935 (d. m.)	33 25 41.360	94 25 27.65	274 21 12.90	Royal	4.0784465	11,979.72	39,303.5
	103 12 11.773	137 52 30.20	317 48 00.83	Blank	4.2735697	18,774.56	61,596.2
		189 23 35.43	9 24 10.17	Sawyer	3.9982506	9,959.80	32,676.4
		245 32 32		Azimuth mark.			

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GEOGRAPHIC POSITIONS—Continued

PICACHO, N. MEX., TO SLATON, TEX., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Cam, 1934, r. 1935 (d. m.)	33 25 16.689	93 47 57.34	273 43 51.07	Warren	4.0635210	11,575.00	37,975.6
	103 04 44.699	136 53 48.03	316 50 16.21	Sawyer	4.1615527	14,506.17	47,592.3
		253 57 20		Azimuth mark.			
Texmex, 1934, r. 1935 (d. m.)	33 31 39.173	9 15 16.75	189 14 35.76	Cam	4.0769635	11,938.88	39,169.5
	103 03 30.382	50 43 35.70	230 38 48.09	Warren	4.2405340	17,399.39	57,084.5
		84 15 17.81	264 11 04.65	Sawyer	4.0751802	11,889.95	39,008.9
		235 08 13		Azimuth mark.			
Field (Tex.), 1934, r. 1935 (d. m.)	33 25 29.885	88 45 40.08	268 39 15.82	Cam	4.2559442	18,027.86	59,146.4
	102 53 07.074	125 18 20.58	305 12 36.77	Texmex	4.2946608	19,708.83	64,661.4
		342 20 46		Azimuth mark.			
Yoakum (Tex.), 1934, r. 1938 (d. m.)	33 17 52.659	143 14 06.16	323 10 28.55	Cam	4.2325556	17,082.67	56,045.4
	102 58 08.947	208 57 57.06	29 00 43.07	Field	4.2069234	16,103.61	52,833.3
		265 25 10		Azimuth mark.			
Beall (Tex.), 1934, r. 1938 (d. m.)	33 22 07.563	134 51 32.16	314 49 27.39	Cam	3.9171308	8,262.87	27,109.1
	103 00 57.994	242 50 37.50	62 54 56.71	Field	4.1358742	13,673.33	44,859.9
		330 52 54.34	150 54 27.23	Yoakum	3.9536563	8,987.86	29,487.7
		4 02 23		Azimuth mark.			
Supplementary points							
Fairbanks, 1935 (d. m.)	33 21 15.483	94 03 28.3	273 58 31.6	Sunken	4.145574	13,982.2	45,873
	104 29 10.920	150 39 05.9	330 37 49.3	Roswell	3.865359	7,334.3	24,063
		151 25 13		Azimuth mark.			
Roswell, red brick church, spire, 1935 (n. d.)	33 23 07.624	76 55 31.6	256 51 45.3	Sunken	4.038090	10,916.7	35,816
	104 31 19.085	174 29 44.8	354 29 38.7	Roswell	3.469992	2,951.2	9,682
		316 11 19.1	136 12 29.6	Fairbanks	3.680040	4,786.7	15,704
Roswell, courthouse dome, 1935 (n. d.)	33 23 49.065	70 41 03.9	250 37 16.4	Sunken	4.054066	11,325.7	37,158
	104 31 16.976	130 37 14.4	310 32 58.9	Klyng	4.197729	15,766.3	51,727
		176 50 36.8	356 50 19.5	Buck	4.168119	14,727.2	48,317
Roswell, Military Institute, flagpole, 1935 (n. d.)	33 24 35.012	330 24 06.7	150 25 20.9	Fairbanks	3.849347	7,068.8	23,192
	104 31 25.954	63 43 30.8	243 39 48.2	Sunken	4.066731	11,660.9	38,257
		177 30 15.4	357 30 03.0	Buck	4.123914	13,301.9	43,641
Roswell, Federal Building, flagpole, 1935 (n. d.) [1]	33 23 46.25	70 45 00	250 41 17	Sunken	4.045343	11,100.5	36,419
	104 31 25.03	175 45 59	355 45 56	Roswell	3.243611	1,752.3	5,749
Walker, 1935 (d. m.)	33 30 13.700	39 40 45.5	219 37 45.2	Roswell	4.121693	13,234.1	43,419
	104 26 03.017	107 47 11.3	287 44 00.5	Buck	3.971256	9,359.6	30,707
		181 56 38.7	1 56 41.7	Melena	3.615818	4,128.7	13,546
		213 37 38		Azimuth mark.			
Comanche, 1935 (d. m.)	33 24 12.212	104 34 29.7	284 31 04.4	Gopher	3.997835	9,950.3	32,645
	104 14 37.960	192 53 08.4	12 53 40.2	Rice	3.825484	6,690.9	21,952
		85 15 02		Azimuth mark.			
Acme, 1935 (d. m.)	33 38 02.291	325 07 05.6	145 11 05.6	Sardine	4.292304	19,602.2	64,312
	104 13 29.776	0 48 28.7	180 48 22.9	Rice	4.279965	19,053.1	62,510
		21 15 22.8	201 14 40.0	Campbell	3.740096	5,496.6	18,033
		59 53 58		Azimuth mark.			
Coffee, 1935 (d. m.)	33 25 02.705	108 12 33.1	288 07 10.1	Rice	4.202267	15,931.9	52,270
	104 03 54.125	155 17 06.9	335 15 48.9	Sardine	3.941090	8,731.5	28,647
		288 17 40.8	108 25 12.2	Mescalera	4.349039	22,337.7	73,286
		85 28 59		Azimuth mark.			
N. M. C H 29 (N. Mex. Geodetic Survey), 1935 (d. m.).[1]	33 25 00.96	185 14 11	5 14 11	Coffee	1.732748	54.044	177.31
	104 03 54.32						
Ed, 1935 (d. m.)	33 25 08.324	113 29 35.9	293 23 14.0	Sardine	4.290088	19,502.4	63,984
	103 54 42.711	216 00 53.9	36 06 50.7	Sears	4.452111	28,321.2	92,917
		316 01 43.6	136 04 11.5	Mescalera	4.000534	10,012.3	32,849
		276 29 34		Bench mark N 94.			

VEGA, TEX., TO ODESSA, TEX., ARC (NORTHERN SECTION)

Principal points							
Fuqua (Tex.), 1934 (d. m.)	34 02 21.676	359 42 14		Azimuth mark.			
	102 56 18.996						
Bass (Tex.), 1934 (d. m.)	34 00 49.780	99 12 48.48	279 06 25.49	Fuqua	4.2500692	17,785.63	58,351.7
	102 44 54.576	278 08 32		Azimuth mark.			
Bailey (Tex.), 1934, r. 1938 (d. m.)	33 58 27.974	204 30 43.53	24 31 55.13	Fuqua	3.8984211	7,914.46	25,966.0
	102 58 27.006	258 06 07.76	78 13 42.00	Bass	4.3284544	21,303.67	69,893.8
		271 14 05		Azimuth mark.			
Childress (Tex.), 1934, r. 1938 (d. m.)	33 51 39.517	127 21 57.84	307 15 59.20	Bailey	4.3172176	20,759.54	68,108.6
	102 47 44.283	146 17 47.62	326 13 00.17	Fuqua	4.3764628	23,793.74	78,063.3
		194 24 13.77	14 25 48.52	Bass	4.2431659	17,505.15	57,431.5
		209 03 41		Azimuth mark.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

VEGA, TEX., TO ODESSA, TEX., ARC (NORTHERN SECTION)—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Hansford (Tex.), 1934, r. 1938 (d. m.)	33 48 49.374	170 46 35.68	350 45 32.79	Bailey	4.2567373	18,060.81	59,254.5
	102 56 34.237	248 54 59.88	68 59 54.98	Childress	4.1643422	14,599.64	47,899.0
		242 50 14		Azimuth mark.			
Morton (Tex.), 1934, r. 1938 (d. m.)	33 43 22.159	136 15 17.44	316 11 48.80	Hansford	4.1449394	13,961.74	45,806.1
	102 50 18.876	194 32 13.95	14 33 39.93	Childress	4.1995133	15,831.18	51,939.5
		358 41 04		Azimuth mark.			
Campbell (Tex.), 1934, r. 1938 (d. m.)	33 43 27.068	185 34 58.18	5 35 57.06	Bailey	4.4454434	27,889.67	91,501.4
	103 00 12.700	209 29 52.05	29 31 53.49	Hansford	4.0573210	11,410.93	37,437.4
		231 42 09.79	51 49 06.06	Childress	4.3893944	24,512.88	80,422.7
		270 31 15.78	90 36 45.47	Morton	4.1843862	15,289.25	50,161.5
		150 31 52		Azimuth mark.			
Armstrong (Tex.), 1934, r. 1938 (d. m.)	33 37 41.025	51 55 14.46	231 50 09.79	Texmex	4.2566845	18,058.62	59,247.3
	102 54 19.504	139 32 59.70	319 29 43.85	Campbell	4.1456186	14,015.82	45,983.6
		210 30 45.75	30 32 59.18	Morton	4.0864247	12,201.82	40,032.1
		55 53 28		Azimuth mark.			
Bledsoe (Tex.), 1934, r. 1938 (d. m.)	33 38 08.571	202 47 15.73	22 48 44.53	Campbell	4.0271206	10,644.38	34,922.4
	103 02 52.834	243 29 35.44	63 36 33.55	Morton	4.3362924	21,691.64	71,166.7
		273 37 50.83	93 42 35.14	Armstrong	4.1224562	13,257.33	43,495.1
		4 37 02.62	184 36 41.85	Texmex	4.0804773	12,035.86	39,487.7
		88 52 48		Azimuth mark.			
Callis (Tex.), 1934, r. 1938 (d. m.)	33 31 49.625	343 01 17.60	163 02 33.86	Field	4.0874822	12,231.57	40,129.7
	102 55 25.329	50 04 24.93	229 59 16.39	Cam	4.2751990	18,845.13	61,827.7
		88 33 48.45	268 29 20.53	Texmex	4.0976165	12,520.35	41,077.2
		135 22 00.60	315 17 53.07	Bledsoe	4.2152603	16,415.73	53,857.3
		188 54 22.95	8 54 59.36	Armstrong	4.0397494	10,958.46	35,952.9
		49 23 38		Azimuth mark.			
Supplementary points							
Bledsoe High School, stack (Tex.), 1934 (n. d.)	33 37 00.180	19 05 34.5	199 04 21.1	Texmex	4.019734	10,464.9	34.334
	103 01 17.726	130 41 15.6	310 40 22.9	Bledsoe	3.509536	3,232.5	10,605
		187 59 41.9	8 00 17.9	Campbell	4.080513	12,036.9	39,491
Texas-New Mexico, Clark boundary monument No. 99 eccentric, 1934 (d. m.).	33 26 12.574	44 10 43.3	224 10 07.7	Cam	3.380295	2,400.5	7,876
	103 03 39.949	181 24 19.4	1 24 24.7	Texmex	4.002814	10,065.0	33,022
Texas-New Mexico, Clark boundary monument No. 99 (Tex. & N. Mex.), 1934 (d. m.).[1]	33 26 12.15	91 20 22	271 20 10	Texas-New Mexico, Clark boundary monument No. 99 eccentric.	2.745169	556.121	1,824.54
	103 03 18.43						

VEGA, TEX., TO ODESSA, TEX., ARC (SOUTHERN SECTION)

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points							
Roach (Tex.), 1935, r. 1938 (d. m.)	32 37 36.989	2 09 16		Azimuth mark.			
	102 57 41.531						
Rachel (Tex.), 1935, r. 1938 (d. m.)	32 45 32.741	37 31 42.18	217 27 49.04	Roach	4.2665024	18,471.51	60,601.9
	102 50 29.899	347 19 47		Azimuth mark.			
Bettie (Tex.), 1935, r. 1938 (d. m.)	32 44 07.981	260 52 24.79	80 58 04.28	Rachel	4.2186970	16,546.15	54,285.2
	103 00 57.507	337 00 45.31	157 02 31.13	Roach	4.1166648	13,081.72	42,918.9
		15 33 02		Azimuth mark.			
Belcher (Tex.), 1935 (d. m.)	32 50 18.343	349 00 21.87	169 00 57.44	Rachel	3.9524166	8,962.24	29,403.6
	102 51 35.559	52 04 50.86	231 59 46.56	Bettie	4.2682761	18,547.10	60,849.9
		149 56 55		Azimuth mark.			
Texpac (Tex.), 1935, r. 1938 (d. m.)	32 52 38.639	285 56 52.28	106 02 06.96	Belcher	4.1955541	15,687.51	51,468.1
	103 01 15.547	307 56 49.20	128 02 39.13	Rachel	4.3286260	21,312.09	69,921.4
		358 17 22.90	178 17 32.68	Bettie	4.1969430	15,737.76	51,633.0
		202 29 46		Azimuth mark.			
Gilly (Tex.), 1935, r. 1938 (d. m.)	32 53 41.428	2 53 07.99	182 52 52.19	Rachel	4.1782019	15,073.08	49,452.3
	102 50 00.749	21 30 43.69	201 29 52.24	Belcher	3.8276396	6,724.18	22,060.9
		83 45 28.86	263 39 22.46	Texpac	4.2466566	17,646.42	57,895.0
		350 39 33		Azimuth mark.			
Pensive (Tex.), 1935, r. 1938 (d. m.)	32 59 04.483	335 29 04.70	155 30 39.64	Gilly	4.0388897	10,936.79	35,881.8
	102 52 55.354	47 35 22.75	227 30 50.83	Texpac	4.2457860	17,611.08	57,779.0
		40 10 24		Azimuth mark.			
Jones (Tex.), 1935, r. 1938 (d. m.)	32 57 33.888	258 28 11.73	78 32 59.47	Pensive	4.1464486	14,010.34	45,965.6
	103 01 44.065	355 20 25.05	175 20 40.55	Texpac	3.9602522	9,125.41	29,938.9
		236 09 29		Azimuth mark.			
Hudson (Tex.), 1935, r. 1938 (d. m.)	32 55 28.577	59 14 29.66	239 11 26.00	Texpac	4.0098149	10,228.57	33,558.2
	102 55 37.424	112 05 27.97	292 02 08.60	Jones	4.0118542	10,276.71	33,716.2
		212 19 02.31	32 20 30.48	Pensive	3.8960447	7,871.27	25,824.3
		290 38 41.84	110 41 44.77	Gilly	3.9708511	9,350.85	30,678.6
		26 22 08		Azimuth mark.			
Fillingim (Tex.), 1934, r. 1938 (d. m.)	33 01 21.439	286 21 09.48	106 26 10.38	Pensive	4.1745823	14,947.97	49,041.8
	103 02 07.777	354 58 45.10	174 58 58.01	Jones	3.8473792	7,036.86	23,086.8

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

VEGA, TEX., TO ODESSA, TEX., ARC (SOUTHERN SECTION)—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Gibson (Tex.), 1934, r. 1938 (d. m.)	33 03 50.016	344 23 18.76	164 24 10.35	Pensive	3.9606009	9,132.74	29,963.0
	102 54 30.012	44 13 45.51	224 09 49.04	Jones	4.2084786	16,161.39	53,022.8
		68 57 37.53	248 53 27.93	Fillingim	4.1047965	12,729.06	41,761.9
		261 14 06		Azimuth mark.			
Plains (Tex.), 1934, r. 1938 (d. m.)	33 09 16.807	348 57 50.55	168 58 31.89	Gibson	4.0110082	10,256.71	33,650.6
	102 55 45.698	34 06 44.45	214 03 15.86	Fillingim	4.2475218	17,681.61	58,010.4
		166 52 23.38	346 51 04.88	Yoakum	4.2126928	16,318.97	53,539.8
		3 26 06		Azimuth mark.			
Creak, 1934, r. 1938 (d. m.)	33 07 50.989	260 33 28.45	80 39 05.50	Plains	4.2093820	16,195.04	53,133.2
	103 06 02.175	292 25 02.02	112 31 19.99	Gibson	4.2883217	19,423.24	63,724.4
		333 06 53.22	153 09 01.15	Fillingim	4.1288102	13,452.72	44,136.1
		173 53 25		Azimuth mark.			
Read (Tex.), 1934, r. 1938 (d. m.)	33 10 15.035	190 21 15.08	10 22 09.65	Yoakum	4.1562991	14,331.75	47,020.1
	102 59 48.509	285 53 41.76	105 55 54.59	Plains	3.8157395	6,542.44	21,464.7
		65 24 31.52	245 21 07.18	Creak	4.0274357	10,652.11	34,947.8
		122 12 23		Azimuth mark.			
Bronco, 1934, r. 1938 (d. m.)	33 12 55.768	235 04 26.46	55 09 04.36	Yoakum	4.2038780	15,991.09	52,464.1
	103 06 35.706	291 46 52.66	111 52 48.44	Plains	4.2586278	18,139.60	59,513.0
		295 07 01.30	115 10 44.22	Read	4.0664055	11,652.13	38,228.7
		354 42 40.10	174 42 58.44	Creak	3.9744822	9,429.36	30,936.2
		178 48 21		Azimuth mark.			
School, 1934, r. 1938 (d. m.)	33 16 07.344	256 45 54.09	76 50 47.58	Yoakum	4.1527270	14,214.35	46,634.9
	103 07 03.761	352 58 55.70	172 59 11.08	Bronco	3.7742550	5,946.41	19,509.2
		349 17 30		Azimuth mark.			
Echol, 1934 (d. m.)	33 21 05.150	210 45 33.08	30 47 11.33	Cam	3.9551682	9,019.20	29,590.5
	103 07 43.239	259 34 11.37	79 37 54.21	Beall	4.0274355	10,652.11	34,947.8
		291 43 12.04	111 48 27.54	Yoakum	4.2039484	15,993.68	52,472.6
		353 22 59.73	173 23 36.79	Bronco	4.1811990	15,177.46	49,794.7
		353 38 43.87	173 39 05.55	School	3.9652625	9,231.29	30,286.3
		356 18 52		Azimuth mark.			
Supplementary point							
Bench mark R 182 (Tex.), 1935, r. 1938 (d. m.)	32 43 31.181	228 52 18.9	48 53 48.0	Rachel	3.755456	5,694.5	18,683
	102 53 14.683	32 31 34.9	212 29 10.8	Roach	4.111851	12,937.5	42,446
		267 14 17		Azimuth mark.			

LAS CRUCES TO BELEN ARC

Principal points							
Aden, 1934 (d. m.)	32 04 07.898	233 20 47.91	53 43 11.54	Kent	4.9129623	81,839.38	268,501.4
	107 10 53.973	285 36 54.24	105 58 47.33	North Franklin	4.8301466	67,631.12	221,886.4
Flat Top, 1934, r. 1936 (d. m.)	32 29 29.080	268 13 21.32	88 35 22.77	Kent	4.8077347	64,229.52	210,726.3
	107 09 58.142	315 37 21.49	135 58 52.59	North Franklin	4.9592140	91,036.17	298,674.5
		1 47 24.46	181 46 54.64	Aden	4.6709750	46,878.64	153,801.0
		47 00 06		Azimuth mark.			
Table, 1934, r. 1936 (d. m.)	32 15 33.408	154 43 21.16	334 39 11.79	Flat Top	4.4544604	28,474.78	93,421.0
	107 02 12.426	307 27 09.60	127 44 29.17	North Franklin	4.8114841	64,786.43	212,553.5
		262 47 27		Reference mark No. 3.			
Tortugas (N. Mex. Geodetic Survey), 1934, r. 1936 (d. m.).	32 17 34.120	61 35 48.52	241 20 19.92	Aden	4.7159159	51,989.53	170,569.0
	106 41 50.439	83 27 31.13	263 16 38.59	Table	4.5077812	32,194.47	105,624.7
		116 39 24.55	296 24 20.43	Flat Top	4.6928675	49,302.34	161,752.8
		335 54 57.27	156 01 28.00	North Franklin	4.6753063	47,348.51	155,342.6
		94 33 25		Azimuth mark.			
Rincon, 1934, r. 1936 (d. m.)	32 48 35.642	299 22 33.80	119 42 58.82	Kent	4.8325008	67,998.73	223,092.5
	107 06 48.754	7 58 10.87	187 56 28.70	Flat Top	4.5522062	35,662.04	117,001.2
		216 43 53		Azimuth mark.			
Gardner, 1934 (d. m.)	32 49 26.291	348 06 28.28	168 09 01.08	Kent	4.5546028	35,859.38	117,648.6
	106 33 41.785	57 07 45.64	236 48 11.23	Flat Top	4.8302723	67,650.70	221,950.7
		88 25 14.17	268 07 17.31	Rincon	4.7135833	51,711.05	169,655.3
Mesa, 1934 (d. m.)	32 36 15.148	58 42 49.05	238 35 45.60	Flat Top	4.3810361	24,045.63	78,889.7
	106 56 51.058	145 43 58.71	325 38 35.74	Rincon	4.4411632	27,616.15	90,604.0
		235 55 57.48	56 08 28.31	Gardner	4.6397189	43,623.34	143,120.9
		154 49 04		Reference mark No. 3.			
Engle, 1934 (d. m.)	33 18 36.430	317 30 12.73	137 47 26.55	Gardner	4.8630568	72,955.29	239,354.1
	107 05 16.513	2 28 36.96	182 27 46.64	Rincon	4.7445034	55,526.90	182,174.5
Gyp, 1934 (d. m.)	33 10 46.112	339 08 25.60	159 13 40.10	Gardner	4.6250972	42,179.09	138,382.6
	106 43 19.189	41 51 59.79	221 39 12.19	Rincon	4.7399310	54,945.35	180,266.5
		113 07 09.40	292 55 07.22	Engle	4.5688239	37,053.04	121,564.8

GEOGRAPHIC POSITIONS—Continued

LAS CRUCES TO BELEN ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Jawibi, 1934 (d. m.)	33 01 34.270	21 13 53.17	201 10 38.54	Rincon	4.4104026	25,727.80	84,408.6
	107 00 50.621	167 40 45.31	347 38 19.84	Engle	4.5083172	32,234.22	105,755.1
		237 58 27.58	58 08 01.81	Gyp	4.5069015	32,129.32	105,410.9
		297 47 47.08	118 02 32.43	Gardner	4.6802857	47,894.51	157,133.9
		168 40 10		Reference mark No. 3.			
Little Burro, 1934 (d. m.)	33 31 32.360	31 35 25.55	211 27 04.86	Gyp	4.6535930	45,039.44	147,766.9
	106 28 08.492	67 37 08.74	247 16 41.67	Engle	4.7947024	62,330.76	204,496.8
Jornada, 1934 (d. m.)	33 31 12.224	269 07 23.08	89 24 41.15	Little Burro	4.6858232	48,509.10	159,150.3
	106 59 28.130	326 22 15.90	146 31 08.58	Gyp	4.6563563	45,326.93	148,710.1
		21 09 44.29	201 06 32.44	Engle	4.3973100	24,963.76	81,901.9
Exter, 1934 (d. m.)	33 29 59.463	264 20 32.28	84 28 42.23	Jornada	4.3619933	23,014.06	75,505.3
	107 14 15.584	326 27 18.36	146 32 15.16	Engle	4.4020149	25,235.67	82,794.0
		198 19 07		Reference mark No. 3.			
Bursum, 1934 (d. m.)	33 48 53.732	359 52 26.54	179 52 28.06	Little Burro	4.5062874	32,083.92	105,262.0
	106 28 11.225	45 53 01.30	225 32 31.05	Engle	4.9040810	80,182.76	263,066.3
Chupedera (U. S. G. S.), 1934 (d. m.)	33 50 49.002	274 26 29.01	94 42 29.99	Bursum	4.6486113	44,525.76	146,081.6
	106 56 57.303	308 32 09.48	128 48 08.36	Little Burro	4.7561210	57,032.32	187,113.5
		6 07 39.97	186 06 16.32	Jornada	4.5618550	36,463.22	119,629.7
		12 14 21.86	192 09 45.76	Engle	4.7847317	60,916.04	199,855.4
Slash, 1934 (d. m.)	33 37 51.313	153 10 50.50	333 06 28.73	Chupedera (U. S. G. S.)	4.4290546	26,856.82	88,112.7
	106 49 05.981	237 37 14.03	57 48 50.64	Bursum	4.5821956	38,211.63	125,366.0
		289 42 10.29	109 53 45.78	Little Burro	4.5374050	34,467.12	113,080.9
		141 28 04		Reference mark No. 3.			
Holcomb, 1934 (d. m.)	34 04 48.129	344 21 22.32	164 24 21.10	Bursum	4.4847697	30,533.01	100,173.7
	106 33 31.359	54 29 48.83	234 16 43.39	Chupedera (U. S. G. S.)	4.6473833	44,400.03	145,669.1
		129 14 22.28	308 56 36.75	Ladrones	4.7951749	62,398.61	204,719.4
		190 18 56.47	10 22 44.82	Manzano	4.7605295	57,614.20	189,022.6
Socorro (U. S. G. S.), 1934 (d. m.)	34 04 17.940	357 12 20.04	177 12 46.49	Chupedera (U. S. G. S.)	4.3971315	24,953.50	81,868.3
	106 57 44.623	164 25 50.10	344 21 42.66	Ladrones	4.6213612	41,817.80	137,197.2
		219 21 40.05	39 39 08.00	Manzano	4.8731104	74,663.85	244,959.6
		268 27 25.00	88 40 59.25	Holcomb	4.5714008	37,273.56	122,288.3
		301 52 43.57	122 09 13.80	Bursum	4.7300590	53,710.48	176,215.1
		274 12 28		Apex of the most northerly college building.			
Storm, 1934 (d. m.)	33 53 39.673	80 11 59.21	260 01 05.29	Chupedera (U. S. G. S.)	4.4858935	30,612.13	100,433.3
	106 37 23.959	122 12 32.10	302 01 09.80	Socorro (U. S. G. S.)	4.5681120	36,992.36	121,365.8
		196 08 50.32	16 11 00.34	Holcomb	4.3312954	21,443.49	70,352.5
		301 45 25.77	121 50 33.69	Bursum	4.2231967	16,718.48	54,850.5
		82 29 39		Azimuth Mark.			
Puerco, 1934 (d. m.)	34 25 05.477	94 44 07.69	274 35 49.30	Ladrones	4.3538227	22,585.14	74,098.1
	106 50 22.660	241 56 19.75	62 09 41.97	Manzano	4.6116848	40,896.37	134,174.2
		16 25 45.46	196 21 36.76	Socorro (U. S. G. S.)	4.6028026	40,068.45	131,457.9
		52 42 23		Reference mark No. 3.			
Supplementary points							
Bishop's Cap Mountain, 1934 (n. d.)[1]	32 11 22.08	341 56 56	162 00 25	North Franklin	4.524075	33,425.3	109,663
	106 36 09.28	142 05 36	322 02 34	Tortugas (N. Mex. Geodetic Survey)	4.162237	14,529.0	47,667
Organ Mountain, 1934 (n. d.)[1]	32 24 08.34	42 27 15	222 23 28	Tortugas (N. Mex. Geodetic Survey)	4.216159	16,449.7	53,969
	106 34 46.07	217 50 46	37 53 52	Kent	4.169646	14,779.0	48,487
San Andreas Peak, 1934 (n. d.)	32 40 32.629	105 31 54	285 13 10	Rincon	4.749091	56,116.6	184,109
	106 32 10.456	171 46 38	351 45 49	Gardner	4.220378	16,610.3	54,496
		344 58 40	165 00 23	Kent	4.285825	19,311.9	63,359
Salinas Peak, 1934 (n. d.)	33 17 53.063	53 36 21.8	233 30 04.7	Gyp	4.345191	22,140.7	72,640
	106 31 51.259	120 01 43.5	299 46 31.2	Jornada	4.693612	49,387.0	162,031
		192 49 44.8	12 51 47.4	Little Burro	4.413112	25,888.8	84,937

LORDSBURG, N. MEX., TO GRAND JUNCTION, COLO., ARC

Principal points							
Secho, 1934 (d. m.)	32 27 06.250	105 27 55.20	284 52 46.09	Graham (U. S. G. S.)	5.0247270	105,858.80	347,305.1
	108 46 57.637	155 44 17.11	335 37 22.10	Line	4.6873330	48,678.03	159,704.5
Burro (U. S. G. S.), 1934 (d. m.)	32 35 26.279	65 02 02.39	244 50 43.84	Secho	4.5606671	36,363.62	119,303.0
	108 25 55.507	95 35 45.64	274 49 11.61	Graham (U. S. G. S.)	5.1320795	135,543.75	444,696.5
		118 50 52.56	298 32 34.50	Line	4.7803531	60,304.97	197,850.6
		137 40 51		Azimuth mark.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

LORDSBURG, N. MEX., TO GRAND JUNCTION, COLO., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Lordsburg, 1934 (d. m.)	32 21 00.445	149 20 57.16	329 18 40.13	Secho	4.1172812	13,100.30	42,979.9
	108 42 41.941	154 24 52.65	334 15 40.43	Line	4.7903796	61,713.41	202,471.4
		224 30 16.05	44 39 16.37	Burro (U. S. G. S.)	4.5733807	37,443.87	122,847.1
		189 11 59		Reference mark No. 1.			
Guthrie (U. S. G. S.) (Ariz.), 1934 (d. m.)	32 53 13.836	277 26 58.75	97 37 18.88	Line	4.4766052	29,964.37	98,308.1
	109 18 49.468	313 57 53.31	134 15 05.31	Secho	4.8412193	69,377.60	227,616.3
		68 37 25.29	248 19 19.19	Graham (U. S. G. S.)	4.7488745	56,088.58	184,017.3
Sunset (U. S. G. S.) (Ariz.), 1934 (d. m.)	33 07 20.818	324 17 29.62	144 25 01.09	Line	4.5675389	36,943.57	121,205.7
	109 13 36.080	17 20 24.94	197 17 34.23	Guthrie (U. S. G. S.)	4.4366521	27,330.79	89,667.8
		52 24 43.48	232 03 43.63	Graham (U. S. G. S.)	4.8820330	76,213.68	250,044.4
Bryce (U. S. G. S.) (Ariz.), 1934 (d. m.)	33 01 11.519	254 34 19.24	74 48 53.69	Sunset (U. S. G. S.)	4.6344376	43,096.06	141,391.0
	109 40 18.589	286 15 35.09	106 37 37.22	Line	4.8186669	65,866.85	216,098.2
		293 37 38.86	113 49 20.09	Guthrie (U. S. G. S.)	4.5631696	36,573.76	119,992.4
		27 51 58.64	207 45 30.07	Graham (U. S. G. S.)	4.6010461	39,906.72	130,927.3
Arimex (Ariz.-N. Mex.), 1934 (d. m.)	32 46 02.278	84 49 47.57	264 23 04.36	Graham (U. S. G. S.)	4.8895097	77,537.12	254,386.4
	109 02 49.957	118 06 55.68	297 58 15.52	Guthrie (U. S. G. S.)	4.4514342	28,277.06	92,772.3
		206 56 51.22	26 58 30.43	Line	4.0214514	10,506.34	34,469.6
		72 39 35		Reference mark No. 3.			
Telephone 1934 (d. m.)	32 57 06.782	349 55 11.32	169 57 39.12	Burro (U. S. G. S.)	4.6094569	40,687.11	133,487.6
	108 30 28.572	76 28 20.89	256 12 25.78	Line	4.6723315	47,025.29	154,282.1
Mogollon, 1934 (d. m.)	33 16 16.929	347 13 54.69	167 16 43.54	Telephone	4.5602278	36,326.86	119,182.4
	108 35 37.667	39 02 32.26	218 49 21.66	Line	4.7768852	59,825.34	196,277.0
		74 32 19.62	254 11 32.14	Sunset (U. S. G. S.)	4.7873381	61,282.73	201,058.4
Tularosa, 1934 (d. m.)	33 40 36.262	2 04 19.52	182 03 44.85	Mogollon	4.6531037	44,988.73	147,600.5
	108 34 34.814	44 43 22.34	224 21 53.51	Sunset (U. S. G. S.)	4.9357802	86,254.20	282,985.7
		107 11 41.43	286 37 22.34	Ords	4.9977549	99,484.39	326,391.7
		190 07 43.63	10 11 28.47	Pinon	4.7681658	58,636.20	192,375.6
Cliff, 1934 (d. m.)	32 57 57.649	181 23 23.12	1 23 40.47	Mogollon	4.5298779	33,874.89	111,137.9
	108 36 09.413	280 00 44.68	100 03 50.11	Telephone	3.9537545	8,989.89	29,494.3
		338 57 26.99	159 02 59.35	Burro (U. S. G. S.)	4.6492290	44,589.13	146,289.5
		49 57 05		Reference mark No. 3.			
Whiterocks (U.S. G. S.), 1934 (d. m.)	33 30 11.395	214 39 52.04	34 59 12.22	Pinon	4.9720194	93,760.39	307,612.2
	109 02 34.865	245 54 40.65	66 10 10.13	Tularosa	4.6758339	47,406.07	155,531.4
		301 28 12.75	121 43 02.68	Mogollon	4.6908235	49,070.84	160,993.2
		22 06 09.04	202 00 05.89	Sunset (U. S. G. S.)	4.6585519	45,556.66	149,463.8
Rose (Ariz.), 1934 (d. m.)	33 26 18,356	31 16 48.97	211 06 54.04	Bryce (U. S. G. S.)	4.7345524	54,269.08	178,047.8
	109 22 12.911	158 39 43.20	338 31 55.84	Ords	4.7742818	59,467.79	195,103.9
		256 37 46.59	76 48 36.29	Whiterocks (U. S. G. S.)	4.4949078	31,254.16	102,539.7
		339 04 18.89	159 09 02.49	Sunset (U. S. G. S.)	4.5741439	37,509.72	123,063.1
Escadilla (U. S. G. S.) (Ariz.), 1934 (d. m.)	33 56 50.225	6 09 02.09	186 05 32.02	Sunset (U. S. G. S.)	4.9638237	92,007.60	301,861.6
	109 07 15.830	88 45 38.10	268 29 26.75	Ords	4.6501823	44,687.11	146,611.0
		245 14 52.33	65 36 56.60	Pinon	4.8237559	66,643.22	218,645.3
		300 35 57.73	120 54 08.98	Tularosa	4.7685476	58,687.77	192,544.8
		351 37 27.44	171 40 03.44	Whiterocks (U. S. G. S.)	4.6971193	49,787.38	163,344.1
Blue (U. S. G. S.) (Ariz.), 1934 (d. m.)	33 33 45.257	26 33 43.85	206 31 16.81	Rose	4.1872462	15,390.27	50,492.9
	109 17 46.480	145 37 45.99	325 27 29.86	Ords	4.7028548	50,449.26	165,515.6
		200 46 36.96	20 52 27.38	Escadilla (U. S. G. S.)	4.6594688	45,652.95	149,779.7
		285 34 41.24	105 43 04.84	Whiterocks (U. S. G. S.)	4.3878783	24,427.46	80,142.4
Chusca, 1934 (d. m.)	35 53 05.925	18 13 53.42	198 04 13.44	Crafton	4.9067900	80,684.48	264,712.3
	108 50 13.563	325 26 26.60	145 45 55.14	Sawyer	4.9523217	89,602.82	293,971.9
Tohatchi, 1934 (d. m.)	35 54 29.482	21 27 05.40	201 15 10.26	Crafton	4.9298528	85,084.96	279,149.6
	108 46 21.381	66 09 37.08	246 07 20.95	Chusca	3.8039278	6,366.90	20,888.7
		329 31 32.28	149 48 46.11	Sawyer	4.9476482	88,643.78	290,825.5
		351 47 48		Tohatchi, standpipe.			
Hosta, 1934 (d. m.)	35 35 13.285	10 40 46.00	190 37 49.44	Sawyer	4.6190357	41,594.48	136,464.6
	108 11 39.080	119 48 04.02	299 25 32.24	Chusca	4.8254239	66,899.66	219,486.6
		124 25 36.96	304 05 20.44	Tohatchi	4.8014113	63,301.10	207,680.4
Ebon, 1934, r. 1936 (d. m.)	35 36 16.918	155 31 02.29	335 25 32.37	Chusca	4.5337997	34,182.17	112,146.0
	108 40 48.796	272 24 28.37	92 41 26.82	Hosta	4.6443360	44,089.59	144,650.6
Knoll. 1934, r. 1936 (d. m.)	35 29 39.018	179 40 37.34	359 40 31.66	Chusca	4.6370985	43,360.92	142,260.0
	108 50 03.817	228 41 54.57	48 47 17.26	Ebon	4.2694184	18,595.95	61,010.2
		259 45 07.98	80 07 27.68	Hosta	4.7705890	58,964.28	193,452.0
		200 01 30		Azimuth mark.			
Gallup, 1934 (d. m.)	35 31 33.360	68 33 05.70	248 29 39.26	Knoll	3.9833829	9,624.60	31,576.7
	108 44 08.409	209 53 32.01	29 55 28.11	Ebon	4.0035284	10,081.58	33,076.0
		154 27 08		Reference mark No. 3.			
G. L. O. Station 7, 1934 (d. m.)	36 00 09.852	44 55 12.53	224 51 07.70	Tohatchi	4.1704500	14,806.42	48,577.4
	108 39 24.428	317 40 04.07	137 56 18.10	Hosta	4.7942023	62,259.03	204,261.5

GEOGRAPHIC POSITIONS—Continued

LORDSBURG, N. MEX., TO GRAND JUNCTION, COLO., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Stony Butte, 1934 (d. m.)	36 07 05.057	63 01 56.73	242 44 08.95	Tohatchi	4.7083583	51,092.64	167,626.4
	108 16 05.350	70 02 16.67	249 48 33.13	G. L. O. Station 7	4.5714752	37,279.94	122,309.3
		353 30 32.09	173 33 08.04	Hosta	4.7730487	59,299.18	194,550.7
Bennett, 1934 (d. m.)	36 22 35.868	3 24 56.85	183 23 43.88	Tohatchi	4.7165842	52,069.60	170,831.7
	108 44 17.659	304 02 14.93	124 18 55.55	Stony Butte	4.7081876	51,072.55	167,560.5
Simpson (U. S. G. S.), 1934 (d. m.)	36 28 36.771	2 57 16.82	182 56 28.17	Stony Butte	4.6006122	39,866.87	130,796.6
	108 14 43.180	37 05 02.69	216 46 21.78	Tohatchi	4.8972818	78,937.22	258,979.9
		76 01 14.00	255 43 40.32	Bennett	4.6587863	45,581.26	149,544.5
		186 10 44		Bench mark E 17.			
Dike, 1934 (d. m.)	36 39 35.298	290 57 54.79	111 18 52.61	Simpson (U. S. G. S.)	4.7503783	56,283.14	184,655.6
	108 49 54.389	345 02 33.70	165 05 54.08	Bennett	4.5121580	32,520.56	106,694.5
Dune (U. S. G. S.), 1934 (d. m.)	36 40 10.056	1 37 04.91	181 36 50.46	Simpson (U. S. G. S.)	4.3299760	21,378.44	70,139.1
	108 14 18.932	54 09 55.71	233 52 05.20	Bennett	4.7427591	55,304.33	181,444.3
		89 01 11.06	268 39 55.92	Dike	4.7246295	53,043.17	174,025.8
Ute (Colo.), 1934, r. 1936 (d. m.)	37 17 02.714	324 41 07.30	145 00 35.35	Dune (U. S. G. S.)	4.9212782	83,421.54	273,692.2
	108 46 40.828	3 58 10.17	183 56 13.76	Dike	4.8416387	69,444.63	227,836.3
		4 27 29		Shiprock, highest point.			
Madden (Colo.), 1934, r. 1936 (d. m.)	37 22 56.641	8 34 20.23	188 29 31.05	Dune (U. S. G. S.)	4.9031133	80,004.30	262,480.8
	108 06 18.722	39 05 54.48	218 39 39.53	Dike	5.0128757	103,009.12	337,955.8
		79 50 04.19	259 25 35.29	Ute	4.7825925	60,616.73	198,873.4
Huerfanita (U. S. G. S.), 1934 (d. m.)	36 32 11.294	110 01 51.72	289 45 33.43	Dune (U. S. G. S.)	4.6371489	43,365.95	142,276.5
	107 46 58.242	163 05 31.25	342 53 53.49	Madden	4.9919703	98,168.09	322,073.1
Piedra (U. S. G. S.) (Colo.), 1934, r. 1936 (d. m.)	37 05 20.891	25 33 40.17	205 21 54.16	Huerfanita (U. S. G. S.)	4.8320510	67,928.34	222,861.6
	107 27 20.009	56 31 37.87	236 03 26.12	Dune (U. S. G. S.)	4.9238629	83,919.50	275,325.9
		119 38 38.23	299 15 03.06	Madden	4.8208629	66,200.75	217,193.6
Supplementary points							
Lordsburg, water tank, 1934 (n. d.)[1]	32 20 56.49	122 52 25	302 52 21	Lordsburg	2.350823	224.3	736
	108 42 34.74	148 55 10	328 52 49	Secho	4.123899	13,301.5	43,640
Mulligan Peak (Ariz.), 1934 (n. d.)[1]	33 09 50.74	32 44 21	212 43 19	Sunset (U. S. G. S.)	3.739593	5,490.3	18,013
	109 11 41.54	151 49 08	331 43 21	Rose	4.538237	34,533.2	113,298
Mogollon-Baldy Lookout, 1934 (n. d.)[1]	33 16 17.25	28 54	208 54	Mogollon	1.051075	11.248	36.90
	108 35 37.46						
Rose Peak Lookout (Ariz.), 1934 (d. n. m.)	33 26 23.535	206 50 14.7	26 52 42.0	Blue (U. S. G. S.)	4.183390	15,254.2	50,046
	109 22 13.470	256 55 13.4	77 06 03.4	Whiterocks (U. S. G. S.)	4.494596	31,231.7	102,466
		339 08 16.8	159 13 00.7	Sunset (U. S. G. S.)	4.575926	37,664.0	123,569
Bear Mountain Lookout (Ariz.), 1934 (n. d.)[1]	33 31 59.72	63 31 42	243 24 12	Rose	4.371840	23,541.8	77,237
	109 08 37.07	102 57 43	282 52 39	Blue (U. S. G. S.)	4.162620	14,541.9	47,710
Tularosa Lookout, 1934 (n. d.)[1]	33 40 36.52	339 57	159 57	Tularosa	0.921686	8.350	27.39
	108 34 34.92						
G. L. O. Station 9 eccentric, 1934 (d. m.)	35 19 17.281	150 51 50.6	330 37 47.0	Tohatchi	4.872804	74,611.2	244,787
	108 22 12.674	208 25 12.8	28 31 20.3	Hosta	4.525252	33,516.0	109,960
G. L. O. Station 8 eccentric, 1934 (d. m.)	35 39 13.830	167 25 08.1	347 22 54.7	Chusca	4.119592	26,278.0	86,214
	108 46 25.359	180 12 09.2	0 12 11.5	Tohatchi	4.450566	28,220.6	92,587
		221 24 04.9	41 41 51.7	Stony Butte	4.837749	68,825.4	225,805
G. L. O. Station 8, 1934 (d. m.)[1]	35 39 13.22	157 04	337 04	G. L. O. Station 8 eccentric	1.307582	20.304	66.61
	108 46 25.04						
G. L. O. Station 6 eccentric, 1934 (d. m.)	36 00 08.389	82 03 04.2	261 34 42.8	Tohatchi	4.865492	73,365.5	240,700
	107 58 03.623	115 27 59.9	295 17 23.2	Stony Butte	4.476599	29,963.9	98,307
		273 46 48		Reference mark No. 1.			
G. L. O. Station 6, 1934 (d. m.)[1]	36 00 07.45	103 56 06	283 56 04	G. L. O. Station 6 eccentric	2.079127	119.985	393.65
	107 57 58.97						
Carson, 1934 (d. m.)	36 21 10.474	118 11 47.2	298 01 33.6	Simpson (U. S. G. S.)	4.465311	29,195.2	95,785
	107 57 29.587	144 31 04.2	324 21 03.6	Dune (U. S. G. S.)	4.635300	43,181.7	141,672
		217 36 50.3	37 43 05.2	Huerfanita (U. S. G. S.)	4.410466	25,731.6	84,421
G. L. O. Station 5, 1934 (d. m.)	36 21 01.452	104 19 43.1	284 19 17.2	Carson	3.050753	1,124.0	3,688
	107 56 45.912	215 17 00.0	35 22 49.0	Huerfanita (U. S. G. S.)	4.403261	25,308.2	83,032
G. L. O. Station 4, 1934 (d. m.)	36 40 34.138	64 02 57.2	244 01 27.7	Dike	3.617297	4,142.8	13,592
	108 47 24.399	180 54 41.3	0 55 07.5	Ute	4.829138	67,474.2	221,372
G. L. O. Station 3 1934 (d. m.)	36 40 33.169	52 48 32.2	232 31 10.7	Bennett	4.738402	54,752.3	179,633
	108 15 07.830	88 12 04.9	267 51 18.9	Dike	4.714720	51,846.6	170,100
		358 24 29.7	178 24 44.4	Simpson (U. S. G. S.)	4.344213	22,090.9	72,477
		91 36 18		Shiprock, highest point.			
Shiprock, highest point, 1934 (d.)	36 41 15.464	293 41 47.9	114 02 54.7	Simpson	4.761816	57,785.1	189,583
	108 50 08.685	320 58 31.0	141 18 43.7	Stony Butte	4.909332	81,158.1	266,266
		334 30 10.1	154 52 52.2	Hosta	5.130609	135,085.6	443,193

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

LORDSBURG, N. MEX., TO GRAND JUNCTION, COLO., ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
New Mexico-Colorado boundary milepost No. 247 (G. L. O. Station 2) (N. Mex.-Colo.), 1934 (d.m.)	37 00 00.129 107 31 46.163	129 52 15.0 213 36 28.7	309 31 22.2 33 39 09.0	Madden Piedra (U. S. G. S.)	4.822399 4.074657	66,435.3 11,875.6	217,963 38,962
Four Corners (G. L. O. Station 1) eccentric (Utah), 1934 (d. m.).	37 00 05.244 109 02 42.158	217 01 25.4 242 50 55.6	37 11 05.8 63 25 00.9	Ute Madden	4.594703 4.971024	39,328.1 93,545.7	129,029 306,908
Four Corners (G. L. O. Station 1) (Utah-Colo.-Ariz.-N. Mex.), 1934 (d. m.) [1]	36 59 56.30 109 02 40.24	170 15 51	350 15 50	Four corners (G. L. O. Station 1) eccentric.	2.446845	279.798	917.97
G. L. O. Station 15 eccentric (Colo.), 1934 (d. m.)	37 03 15.728 108 08 58.095	114 44 05.3 186 08 49.4 307 35 02	294 21 18.2 6 10 25.8	Ute Madden Reference mark No. 2.	4.787955 4.563672	61,369.8 36,616.1	201,344 120,131
G. L. O. Station 15 (Colo.), 1934 (d. m.) [1]	37 03 14.30 108 08 44.95	97 43 15	277 43 07	G. L. O. Station 15 eccentric	2.515586	327.783	1,075.40

LOWER RIO GRANDE AREA

Principal points							
Reeves (Tex.), 1934, r. 1936 (d. m.)	31 59 28.593 106 23 13.493	277 16 23.20 45 38 42.46	97 29 37.66 225 35 20.53	Cerro Alto North Franklin	4.5991198 4.1468723	39,730.11 14,024.01	130,347.9 46,010.4
Bishop, 1936 (d. m.)	32 11 25.633 106 36 12.599	294 17 08.29 341 51 54.67 100 41 58.95 142 05 52.18 24 51 00	114 37 18.62 161 55 25.58 280 28 07.18 322 02 51.95	Cerro Alto North Franklin Table Tortugas Azimuth mark.	4.8174713 4.5257752 4.6185712 4.1580390	65,685.77 33,556.39 41,550.02 14,389.28	215,504.1 110,092.9 136,318.7 47,208.8
New, 1936 (d. m.)	32 00 18.326 106 15 30.337	62 59 10.98 82 51 09.97 122 20 38.27 283 37 09.54 75 51 37	242 51 43.89 262 47 04.55 302 09 38.17 103 46 18.89	North Franklin Reeves Bishop Cerro Alto Azimuth mark.	4.3964765 4.0882637 4.5856389 4.4476902	24,915.90 12,253.60 38,515.80 28,034.33	81,744.9 40,202.0 126,363.9 91,976.0
United States and Mexico boundary monument No. 2 eccentric (Mexico), 1909, r. 1936 (d. m.).	31 47 01.351 106 32 11.977	197 19 58.55 244 06 16	17 21 21.31	North Franklin Azimuth mark.	4.1409883	13,835.29	45,391.3
Mastodon, 1936 (d. m.)	31 49 02.759 106 44 35.500	197 39 45.54 248 08 05.62 262 38 24	17 44 12.07 68 16 00.89	Bishop North Franklin Azimuth mark.	4.6376589 4.4064167	43,416.91 25,492.75	142,443.6 83,637.5
North Anthonys Nose (N. Mex. Geodetic Survey), 1936 (d. m.).	32 02 20.885 106 31 58.861	224 38 09.15 345 58 09.48 39 00 45.76 158 23 35.31 74 38 33	44 51 36.50 165 59 25.59 218 54 05.60 338 21 20.42	Jarilla North Franklin Mastodon Bishop Azimuth mark.	4.7506976 4.1925663 4.4998631 4.2564653	56,324.53 15,579.96 31,612.81 18,049.51	184,791.4 51,115.3 103,716.4 59,217.4
Crater (U. S. G. S.), 1936 (d. m.)	32 01 00.305 106 56 34.851	217 03 49.99 238 54 09.06 286 25 25.24	37 11 40.69 59 04 58.63 106 39 42.61	Tortugas Bishop North Franklin	4.5842701 4.5727459 4.6471007	38,394.59 37,389.18 44,371.15	125,966.3 122,667.7 145,574.3
Afton, 1936 (d. m.)	31 59 54.076 106 58 12.192	231 23 14.72 263 38 03.39 283 05 39.10	51 24 06.31 83 51 57.57 103 20 47.76	Crater (U. S. G. S.) North Anthonys Nose (N. Mex. Geodetic Survey). North Franklin	3.5144602 4.6184273 4.6657954	3,269.34 41,536.25 46,322.86	10,726.2 136,273.5 151,977.6
Lava, 1936 (d. m.)	32 02 14.567 106 46 16.590	82 01 13.50 222 57 59.62 269 26 29.12 299 29 54.13	261 55 45.62 43 03 20.70 89 34 04.13 119 38 44.38	Crater (U. S. G. S.) Bishop North Anthonys Nose (N. Mex. Geodetic Survey). North Franklin	4.2144250 4.3657256 4.3522927 4.4805023	16,384.19 23,212.70 22,505.71 30,234.47	53,753.8 76,157.0 73,837.5 99,194.3
Strauss, 1936 (d. m.)	31 53 45.752 106 44 07.485	124 20 50.04 200 51 16.47 268 03 37.98 317 11 25	304 14 14.48 20 55 28.43 88 11 18.97	Crater (U. S. G. S.) Bishop North Franklin Azimuth mark.	4.3757738 4.5433509 4.3605157	23,756.03 34,942.25 22,935.89	77,939.6 114,639.7 75,248.8
Target, 1936 (d. m.)	32 13 14.749 106 29 41.637	241 01 33.95 359 43 16.74 10 08 09.58 338 01 14	61 13 49.98 179 43 20.20 190 06 56.60	Jarilla North Franklin North Anthonys Nose (N. Mex. Geodetic Survey). Azimuth mark.	4.6142185 4.5472366 4.3108779	41,135.66 35,256.29 20,458.69	134,959.2 115,670.0 67,121.6
Cox, 1936 (d. m.)	32 22 34.237 106 29 41.468	184 23 01.09 265 43 10.44 112 31 54	4 23 24.03 85 55 27.95	Kent Jarilla Azimuth mark.	4.1645835 4.5573065	14,607.76 36,083.32	47,925.6 118,383.4
Kent Azimuth, 1936 (d. m.)	32 30 24.538 106 29 18.209	261 15 48.47 2 24 11.90	81 15 58.96 182 23 59.43	Kent Cox	2.7121310 4.1613508	515.38 14,499.43	1,690.9 47,570.2
Pipe, 1936 (d. m.)	32 08 37.974 106 58 59.417	238 25 12.70 261 41 35.86 344 56 08.96 284 41 25	58 34 21.30 81 53 43.54 164 57 25.74	Tortugas Bishop Crater (U. S. G. S.) Azimuth mark.	4.4997304 4.5584960 4.1642854	31,603.15 36,182.28 14,597.73	103,684.7 118,708.0 47,892.7

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

LOWER RIO GRANDE AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
San Miguel Lava Cone (N. Mex. Geodetic Survey), 1936 (d. m.).	32 10 15.098	210 02 01.77	30 04 41.17	Tortugas	4.1937797	15,623.55	51,258.3
	106 46 49.303	262 31 54.15	82 37 33.25	Bishop	4.2258435	16,820.68	55,185.8
		292 59 47		Azimuth mark.			
Las Cruces Magnetic, 1936 (d. m.)	32 16 55.891	256 15 16.16	76 16 54.53	Tortugas	3.6955324	4,960.58	16,274.8
	106 44 54.598	306 37 23.95	126 42 02.39	Bishop	4.2313905	17,036.90	55,895.2
		13 40 55.73	193 39 54.56	San Miguel Lava Cone (N. Mex Geodetic Survey).	4.1039855	12,705.32	41,684.0
		179 59 32		Las Cruces Magnetic—North.			
N. M. D. A. 97 (N. Mex. Geodetic Survey) 1936 (d. m.).	32 18 56.511	295 01 58.73	115 03 49.66	Tortugas	3.7777306	5,994.19	19,665.9
	106 45 18.012	350 38 09.16	170 38 21.67	Las Cruces Magnetic	3.5758268	3,765.54	12,354.1
Dona Ana (N. Mex. Geodetic Survey) 1936 (d. m.)	32 27 14.671	334 25 47.72	154 28 42.78	Tortugas	4.2971067	19,820.14	65,026.6
	106 47 17.391	47 21 31.46	227 13 32.45	Table	4.5030721	31,847.26	104,485.6
		96 44 50.68	276 32 40.10	Flat Top	4.5535649	35,773.79	117,367.8
		142 21 16.00	322 10 44.35	Rincon	4.6980415	49,893.22	163,691.3
		190 01 02		Azimuth mark.			
Jornada, 1936 (d. m.)	32 28 41.686	349 59 21.61	170 00 35.91	Tortugas	4.3197335	20,880.14	68,504.3
	106 44 09.160	61 24 42.04	241 23 01.00	Dona Ana (N. Mex. Geodetic Survey)	3.7481037	5,598.91	18,369.1
		355 07 06		Azimuth mark.			
Tonuco (N. Mex. Geodetic Survey) 1936 (d. m.)	32 36 09.152	311 21 19.54	131 27 44.20	Dona Ana (N. Mex. Geodetic Survey)	4.3960502	24,891.45	81,664.7
	106 59 12.752	53 51 00.23	233 45 13.02	Flat Top	4.3194611	20,867.05	68,461.3
		152 43 05.79	332 38 59.39	Rincon	4.4129839	25,881.17	84,911.8
		69 53 43		Azimuth mark.			
Fort, 1936 (d. m.)	32 30 01.833	186 15 45.21	6 16 10.83	Tonuco (N. Mex. Geodetic Survey)	4.0562486	11,382.79	37,345.0
	107 00 00.371	284 26 03.61	104 32 53.30	Dona Ana (N. Mex. Geodetic Survey)	4.3133907	20,577.41	67,511.1
		74 36 57		Azimuth mark.			
Hawk, 1936 (d. m.)	32 23 18.380	184 20 41.12	4 21 18.28	Tonuco (N. Mex. Geodetic Survey)	4.3767766	23,810.95	78,119.8
	107 00 21.930	250 23 34.77	70 30 35.39	Dona Ana (N. Mex. Geodetic Survey)	4.3375038	21,752.23	71,365.4
		289 57 37.09	110 07 31.68	Tortugas	4.4905292	30,940.64	101,511.1
		306 41 21		Azimuth mark.			
Tab, 1936 (d. m.)	32 15 45.026	82 48 08.99	262 47 11.27	Table	3.4553502	2,853.32	9,361.3
	107 00 24.273	180 15 04.92	0 15 06.18	Hawk	4.1450272	13,964.56	45,815.4
		224 01 30.17	44 08 31.33	Dona Ana (N. Mex. Geodetic Survey)	4.4708908	29,572.69	97,023.1
		263 20 28.17	83 30 22.99	Tortugas	4.4674788	29,341.26	96,263.8
		281 45 47.58	101 58 41.72	Bishop	4.5892923	38,841.17	127,431.4
		347 32 24.39	167 34 26.44	Crater (U. S. G. S.)	4.4457023	27,906.30	91,555.9
Range, 1936 (d. m.)	32 37 12.848	10 03 40.82	190 02 33.50	Dona Ana (N. Mex. Geodetic Survey)	4.2721486	18,713.22	61,395.0
	106 45 12.221	84 56 48.81	264 49 15.82	Tonuco (N. Mex. Geodetic Survey)	4.3424780	22,002.80	72,187.5
		261 52 09		Azimuth mark.			
Blow, 1936 (d. m.)	32 50 15.059	0 24 22.83	180 24 16.59	Dona Ana (N. Mex. Geodetic Survey)	4.6286206	42,522.68	139,509.8
	106 47 05.845	43 04 37.61	222 52 16.95	Flat Top	4.7198091	52,457.69	172,104.9
		84 24 17.87	264 13 36.66	Rincon	4.4902537	30,921.01	101,446.7
		354 00 48		Azimuth mark.			
Upham, 1936 (d. m.)	32 50 08.807	269 05 35.12	89 09 59.47	Blow	4.1031265	12,680.21	41,601.7
	106 55 13.349	326 44 10.25	146 49 35.25	Range	4.4559427	28,572.14	93,740.4
		13 34 11.81	193 32 02.41	Tonuco (N. Mex. Geodetic Survey)	4.4249776	26,605.88	87,289.5
		81 02 12.78	260 55 55.84	Rincon	4.2628028	18,314.83	60,087.9
		351 43 25		Azimuth mark.			
Dry, 1936 (d. m.)	32 43 00.162	60 59 48.77	240 51 57.11	Tonuco (N. Mex. Geodetic Survey)	4.4159521	26,058.66	85,494.1
	106 44 38.726	128 41 21.46	308 35 37.90	Upham	4.3252201	21,145.60	69,375.2
		54 07 14		Azimuth mark.			
Aleman, 1936 (d. m.)	32 59 58.290	336 56 14.15	156 58 55.67	Upham	4.2952016	19,733.39	64,742.0
	107 00 10.580	26 13 47.89	206 10 11.58	Rincon	4.3699050	23,437.16	76,893.4
		335 13 25		Azimuth mark.			
Anders, 1936 (d. m.)	32 58 38.234	39 28 15.40	219 23 45.60	Upham	4.3078868	20,318.27	66,660.9
	106 46 56.726	96 52 59.56	276 45 47.34	Aleman	4.3171853	20,757.99	68,103.5
Cutter, 1936 (d. m.)	32 59 10.848	264 13 08.59	84 18 13.63	Aleman	4.1648412	14,616.43	47,954.1
	107 09 30.755	306 47 04.27	126 54 50.13	Upham	4.4447152	27,842.95	91,348.1
		347 50 41.06	167 52 09.05	Rincon	4.3013676	20,015.55	65,667.7
		245 42 50		Azimuth mark.			
Trujillo (U. S. G. S.), 1936 (d. m.)	32 52 54.606	281 49 19.27	102 02 26.67	Rincon	4.5864330	38,586.29	126,595.2
	107 31 00.510	322 41 10.43	142 52 32.17	Flat Top	4.7353560	54,369.59	178,377.6
		27 40 45.44	207 33 48.95	Cooks	4.6364661	43,297.83	142,053.0
		95 32 11		Azimuth mark.			
Nutt, 1936 (d. m.)	32 37 16.252	70 29 21.84	250 20 13.13	Cooks	4.4504313	28,211.83	92,558.3
	107 26 52.214	167 24 49.86	347 22 35.53	Trujillo (U. S. G. S.)	4.4715777	29,619.50	97,176.6
		298 28 04.00	118 37 09.70	Flat Top	4.4788065	30,116.64	98,807.7
		21 57 19		Azimuth mark.			
Paint, 1936 (d. m.)	32 49 24.730	40 59 42.39	220 52 58.32	Nutt	4.4728482	29,706.27	97,461.3
	107 14 24.726	104 05 40.06	283 56 39.86	Trujillo (U. S. G. S.)	4.4263185	26,688.15	87,559.4
		277 13 50.68	97 17 57.78	Rincon	4.0776355	11,957.37	39,230.1
		349 17 53.91	169 20 17.76	Flat Top	4.5738043	37,480.41	122,967.0
		43 39 24		Azimuth mark.			

161260°—40——5

GEOGRAPHIC POSITIONS—Continued

LOWER RIO GRANDE AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Sibley (U. S. G. S.), 1936 (d. m.)	32 47 58.097	34 41 15.52	214 34 17.36	Cooks	4.5504997	35,522.19	116,542.4
	107 30 56.562	179 21 22.80	359 21 20.65	Trujillo (U. S. G. S.)	3.9606885	9,134.58	29,969.0
		342 08 23.64	162 10 35.68	Nutt	4.3174481	20,770.56	68,144.7
		121 49 49		Azimuth mark.			
Benson, 1936 (d. m.)	32 59 35.630	22 05 01.67	201 59 13.88	Nutt	4.6484651	44,510.77	146,032.4
	107 16 10.321	61 57 20.99	241 49 16.97	Trujillo (U. S. G. S.)	4.4186042	26,218.28	86,017.8
		36 31 57		Azimuth mark.			
Sign, 1936 (d. m.)	32 58 30.453	261 20 20.82	81 24 58.46	Benson	4.1268620	13,392.51	43,938.6
	107 24 40.294	316 22 23.11	136 27 57.47	Paint	4.3656152	23,206.80	76,137.6
		43 42 14.84	223 38 48.16	Trujillo (U. S. G. S.)	4.1554728	14,304.50	46,930.7
		78 44 53		Azimuth mark.			
Alka, 1936 (d. m.)	32 30 21.181	95 52 00.56	275 40 42.44	Cooks	4.5196777	33,088.55	108,558.0
	107 22 49.892	153 42 34.84	333 40 24.42	Nutt	4.1542125	14,263.05	46,794.7
		274 29 48.66	94 36 43.31	Flat Top	4.3055840	20,210.82	66,308.3
		167 05 57		Azimuth mark.			
Prairie, 1936 (d. m.)	32 30 00.170	102 39 26.54	282 33 20.44	Cooks	4.2604085	18,214.13	59,757.5
	107 32 30.228	213 15 27.11	33 18 29.02	Nutt	4.2059787	16,068.62	52,718.5
		315 52 48		Azimuth mark.			
Black (U. S. G. S.), 1936 (d. m.)	32 54 34.101	315 36 50.68	135 50 49.02	Cooks	4.7623412	57,855.04	189,812.7
	108 09 42.095	35 42 06.23	215 33 19.63	Burro (U. S. G. S.)	4.6385000	43,501.08	142,719.8
Caballo, 1936 (d. m.)	32 42 15.711	313 45 06.73	133 51 49.45	Cooks	4.4311693	26,987.91	88,542.8
	107 56 18.325	74 54 03.99	254 38 05.25	Burro (U. S. G. S.)	4.6812796	48,004.24	157,493.9
		137 28 02.06	317 20 46.57	Black (U. S. G. S.)	4.4899222	30,897.42	101,369.3
		47 34 30		Azimuth mark.			
Sawyer, 1936 (d. m.)	32 52 31.768	288 50 39.52	108 59 12.47	Sibley (U. S. G. S.)	4.4150718	26,005.89	85,321.0
	107 46 42.509	312 12 59.04	132 23 42.93	Nutt	4.6222081	41,899.43	137,465.0
		353 13 58.03	173 15 30.56	Cooks	4.5789014	37,922.89	124,418.7
		38 20 08.21	218 14 56.37	Caballo	4.3834470	24,179.48	79,328.8
		62 54 03.20	242 32 50.86	Burro (U. S. G. S.)	4.8384144	68,930.97	226,151.0
		96 06 13.08	275 53 43.88	Black (U. S. G. S.)	4.5569607	36,054.60	118,289.1
Hillsboro, 1936 (d. m.)	32 58 48.867	345 33 26.02	165 35 13.77	Sibley (U. S. G. S.)	4.3159701	20,699.99	67,913.2
	107 34 14.992	16 58 28.12	196 53 16.30	Cooks	4.7118831	51,509.00	168,992.4
		59 10 15.06	239 03 28.72	Sawyer	4.3546895	22,630.26	74,246.1
		66 25 56		Azimuth mark.			
Granite (U. S. G. S.), 1936 (d. m.)	33 00 05.940	277 36 40.23	97 42 50.35	Hillsboro	4.2505782	17,806.48	58,420.1
	107 45 34.723	314 25 33.32	134 33 30.32	Sibley (U. S. G. S.)	4.5050618	31,993.50	104,965.3
Hendricks, 1936 (d. m.)	32 53 41.852	279 44 34.79	99 48 56.44	Sawyer	4.1041668	12,710.62	41,701.4
	107 54 44.399	6 36 08.39	186 35 17.51	Caballo	4.3279160	21,277.27	69,807.2
		94 00 51.64	273 52 44.01	Black (U. S. G. S.)	4.3689398	23,385.13	76,722.7
		21 50 53		Azimuth mark.			
Powder, 1936 (d. m.)	32 59 38.879	306 55 22.49	127 01 28.25	Sawyer	4.3399697	21,876.09	71,771.8
	107 57 55.251	335 43 18.99	155 45 02.78	Hendricks	4.0814947	12,064.09	39,580.3
		62 58 07.22	242 51 42.75	Black (U. S. G. S.)	4.3143080	20,620.92	67,653.8
		29 13 58		Azimuth mark.			
North Star, 1936 (d. m.)	33 00 21.744	316 40 28.55	136 44 31.57	Hendricks	4.2285166	16,924.53	55,526.6
	108 02 11.201	47 35 28.76	227 31 23.47	Black (U. S. G. S.)	4.2005547	15,869.19	52,064.2
Signal, 1936 (d. m.)	32 55 28.203	235 51 58.09	55 56 37.98	North Star	4.2076720	16,131.40	52,924.4
	108 10 45.586	315 17 13.89	135 17 48.40	Black (U. S. G. S.)	3.3701572	2,345.08	7,693.8
Meadow, 1936 (d. m.)	33 00 47.221	272 31 38.24	92 37 44.07	North Star	4.2417524	17,448.27	57,244.9
	108 13 22.720	337 26 20.21	157 27 45.72	Signal	4.0269854	10,641.07	34,911.6
Meadow Azimuth, 1936 (d. m.)	33 00 08.692	216 36 26.17	36 36 44.67	Meadow	3.1698620	1,478.64	4,851.2
	108 13 56.691	330 06 46.73	150 08 30.71	Signal	3.9984593	9,964.59	32,692.2
Lone, 1936 (d. m.)	32 42 55.449	57 58 36.83	237 50 59.93	Burro (U. S. G. S.)	4.4157611	26,047.20	85,456.5
	108 11 48.707	188 41 29.93	8 42 38.54	Black (U. S. G. S.)	4.3379079	21,772.48	71,431.9
		272 49 19.71	92 57 42.47	Caballo	4.3849294	24,262.16	79,600.1
		157 40 53		Azimuth mark.			
Pinos, 1936 (d. m.)	32 51 42.786	234 34 32.88	54 37 07.98	Black (U. S. G. S.)	3.9595011	9,109.64	29,887.2
	108 14 27.757	345 41 40.27	165 43 06.40	Lone	4.2243632	16,763.44	54,998.1
		283 30 07		Azimuth mark.			
Hodges, 1936 (d. m.)	32 44 08.391	180 57 46.16	0 57 51.06	Pinos	4.1461140	13,999.55	45,930.2
	108 14 36.805	201 39 58.06	21 42 37.80	Black (U. S. G. S.)	4.3168804	20,743.42	68,055.7
		297 09 35.59	117 11 06.46	Lone	3.6919879	4,920.26	16,142.6
		93 51 52		Azimuth mark.			
Station 10 (N. Mex. Geodetic Survey), 1936 (d. m.).	32 45 51.265	198 05 30.63	18 06 44.37	Pinos	4.0566166	11,392.44	37,376.7
	108 16 43.826	214 13 23.25	34 17 11.93	Black (U. S. G. S.)	4.2897213	19,485.94	63,930.1
		305 09 23.86	125 12 03.47	Lone	3.9731540	9,400.57	30,841.7
		7 31 06		Bench mark J126.			
Spence, 1936 (d. m.)	32 31 23.483	98 23 07.30	278 05 21.66	Burro (U. S. G. S.)	4.7176707	52,200.02	171,259.6
	107 52 55.286	165 15 15.07	345 13 25.63	Caballo	4.3175802	20,776.88	68,165.5
		264 17 29.84	84 22 22.38	Cooks	4.1543311	14,266.95	46,807.5
		16 27 39		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

LOWER RIO GRANDE AREA Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Hiway, 1936, r. 1939 (d. m.)	32 30 47.745	101 57 32.18	281 43 28.26	Burro (U. S. G. S.)	4.6212803	41,810.01	137,171.7
	107 59 47.093	194 23 23.68	14 25 16.18	Caballo	4.3400463	21,879.95	71,784.5
		264 10 59.61	84 19 33.52	Cooks	4.3991770	25,071.31	82,254.8
		139 51 54		Azimuth mark.			
Dog, 1936, r. 1939 (d. m.)	32 29 46.047	188 43 04.15	8 44 21.31	Lone	4.3909628	24,601.57	80,713.7
	108 14 11.887	230 24 02.20	50 33 40.61	Caballo	4.5597850	36,289.83	119,060.9
		265 07 23.29	85 15 08.01	Hiway	4.3551511	22,654.32	74,325.0
		106 21 34		Azimuth mark.			
White, 1936 (d. m.)	32 33 20.848	101 21 11.15	281 14 31.96	Burro (U. S. G. S.)	4.2949605	19,722.43	64,706.0
	108 13 34.048	188 48 36.48	8 49 33.29	Lone	4.2531381	17,911.75	58,765.5
		8 29 29.19	188 29 08.84	Dog	3.8254184	6,689.88	21,948.4
		258 46 27		Azimuth mark.			
Supplementary points							
United States and Mexico boundary monument No. 2, 1909, r. 1936 (d. m.).[1]	31 47 01.63	329 58	149 58	United States and Mexico boundary monument No. 2 eccentric.	0.989005	9.75	32.0
	106 32 12.16						
United States and Mexico boundary monument No. 3, 1909 (d. m.).	31 47 01.629	212 25 10.8	32 27 59.1	North Franklin	4.194192	15,638.4	51,307
	106 34 54.182	270 06 11.1	90 07 36.5	United States and Mexico boundary monument No. 2 eccentric.	3.630186	4,267.6	14,001
El Paso, cross on mountain, 1936 (n. d.)[1]	31 47 13.66	294 36 58	114 37 15	United States and Mexico boundary monument No. 2 eccentric.	2.958950	909.8	2,985
	106 32 43.42	100 13 22	280 07 06	Mastodon	4.279446	19,030.3	62,435
Phoenix-El Paso Airway, beacon No. 39, 1936 (n. d.)	31 49 17.302	144 08 37.2	324 03 21.8	Crater (U. S. G. S.)	4.427008	26,730.6	87,699
	106 46 38.235	181 21 32.1	1 21 43.6	Lava	4.379250	23,946.9	78,566
		223 40 48.9	43 48 34.0	North Anthonys Nose (N. Mex. Geodetic Survey).	4.523849	33,407.9	109,606
		277 53 27.1	97 54 31.8	Mastodon	3.513062	3,258.8	10,692
Dona Ana, target range, water tank, 1936 (n. d.)[1]	32 09 00.81	358 17 51	178 18 08	North Franklin (U. S. G. S.)	4.438482	27,446.2	90,046
	106 30 06.14	13 30 04	193 29 04	North Anthonys Nose (N. Mex. Geodetic Survey).	4.102705	12,667.9	41,561
United States Detention Farm, northwest water tank (Tex.), 1936 (n. d.).	31 58 55.791	176 41 11.1	356 40 44.0	Bishop	4.364267	23,134.9	75,902
	106 35 21.549	220 05 09.7	40 06 57.2	North Anthonys Nose (N. Mex. Geodetic Survey).	3.916906	8,258.6	27,095
		314 00 46.3	134 03 49.6	North Franklin (U. S. G. S.)	4.102350	12,657.6	41,527
United States Detention Farm, southwest water tank (Tex.), 1936 (n. d.).	31 58 45.929	136 23 00.5	316 04 32.3	Flat Top	4.895528	78,619.1	257,936
	106 35 20.847	218 40 10.5	38 41 57.6	North Anthonys Nose (N. Mex. Geodetic Survey).	3.928484	8,481.7	27,827
		313 03 55.0	133 06 57.9	North Franklin (U. S. G. S.)	4.094644	12,434.9	40,797
United States Detention Farm, dome (Tex.), 1936 (n. d.)	31 58 54.887	139 33 22.8	319 27 20.5	San Miguel Lava Cone (N. Mex. Geodetic Survey).	4.440128	27,550.4	90,388
	106 35 27.166	220 44 03.9	40 45 54.3	North Anthonys Nose (N. Mex. Geodetic Survey).	3.923005	8,375.4	27,478
		313 27 40.8	133 30 47.0	North Franklin (U. S. G. S.)	4.105335	12,744.9	41,814
Newman, water tank, 1936 (n. d.)	32 00 14.812	268 56 30.1	88 58 30.3	New	3.774778	5,953.6	19,533
	106 19 17.125	77 05 41.4	257 03 36.2	Reeves	3.803847	6,365.7	20,885
		101 02 57.3	280 56 13.4	North Anthonys Nose (N. Mex. Geodetic Survey).	4.308853	20,363.5	66,809
Texas-New Mexico boundary monument No. 195, 1934 (d. m.).[1]	32 00 04.67	3 28 39	183 28 38	Reeves	3.0466387	1,113.368	3,652.77
	106 23 10.92						
Lava, azimuth mark, 1936 (d. m.)[1]	32 02 31.37	270 45 10	90 52 48	North Anthonys Nose (N. Mex. Geodetic Survey).	4.355367	22,665.6	74,362
	106 46 22.65	342 55 27	162 55 30	Lava	2.733532	541.4	1,776
N. M. D. A. 55 (N. Mex. Geodetic Survey), 1936 (d. m.).[1]	32 15 45.40	81 37 49	261 37 47	Tab	1.904044	80.176	263.04
	107 00 21.24						
Hendricks Peak, cairn (U. S. F. S.), 1936 (d.)[1]	32 53 41.74	232 27	52 27	Hendricks	0.763428	5.8	19
	107 54 44.58						
Hurley, tall black stack, 1936 (n. d.)[1]	32 41 44.54	295 37 43	115 50 23	Cooks	4.610824	40,815.4	133,909
	108 07 21.50	329 36 39	149 40 44	Hiway	4.370070	23,446.1	76,923
Signal Peak Lookout, 1936 (n. d.)	32 55 28.168	278 08 06.6	98 21 10.4	Sawyer	4.578607	37,897.2	124,334
	108 10 45.641	27 41 15.4	207 38 01.1	Station 10 (N. Mex. Geodetic Survey)	4.302432	20,064.7	65,829
		39 45 35.7	219 43 35.1	Pinos	3.955666	9,029.5	29,624
Fort Bayard, Veterans Hospital, water tank, 1936 (n. d.).	32 48 00.549	25 03 58.4	205 02 27.1	Lone	4.015972	10,374.6	34,037
	108 08 59.932	71 46 38.4	251 42 27.3	Station 10 (N. Mex. Geodetic Survey)	4.104215	12,712.0	41,706
		128 47 10.5	308 44 12.8	Pinos	4.038808	10,934.7	35,875
"T" on hill, 1936 (n. d.)	32 49 38.564	338 46 46.4	158 48 26.6	Lone	4.124498	13,319.8	43,700
	108 14 53.833	22 14 24.3	202 13 24.7	Station 10 (N. Mex. Geodetic Survey)	3.878763	7,564.2	24,817
		33 19 49.5	213 13 51.9	Burro (U. S. G. S.)	4.496995	31,404.7	103,034

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

LOWER RIO GRANDE AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Silver City, Presbyterian Church, spire, 1936 (n. d.).[1]	32 46 22.75 108 16 37.38	198 52 20 310 19 55	18 53 31 130 22 31	Pinos Lone	4.017846 3.993968	10,419.5 9,862.1	34,185 32,356
Silver City, Catholic Church, east spire, 1936 (n. d.).[1]	32 46 17.21 108 16 42.41	309 05 01 2 38 48	129 07 40 182 38 47	Lone Station 10 (N. Mex. Geodetic Survey)	3.993601 2.903183	9,853.7 800.2	32,328 2,625
Silver City, Catholic Church, west spire, 1936 (n. d.).[1]	32 46 17.25 108 16 42.88	309 02 36 1 45 06	129 05 15 181 45 06	Lone Station 10 (N. Mex. Geodetic Survey)	3.994062 2.903592	9,864.2 800.9	32,363 2,628
Silver City, public school, chimney, 1936 (n. d.) [1]	32 46 19.53 108 16 39.56	198 59 22 7 15 47	19 00 34 187 15 45	Pinos Station 10 (N. Mex. Geodetic Survey)	4.022501 2.943290	10,531.8 877.6	34,553 2,879
Phoenix-El Paso Airway, beacon No. 33, 1936 (n. d.).[1]	31 50 00.82 107 47 41.20	158 55 52 184 24 20	338 42 59 4 26 23	Lone Cooks	5.020637 4.892718	104,866.5 78,112.0	344,050 256,272

LITTLE COLORADO RIVER AREA

Principal points							
Green eccentric (Ariz.) 1936 (d. m.)	34 06 42.496 109 34 25.606	162 34 17.68 5 20 41	342 34 17.63	Green Azimuth mark.	0.8520528	7.113	23.34
Reese (Ariz.) 1936 (d. m.)	34 59 35.900 109 24 44.594	8 39 36.28 230 36 20.40 112 09 34	188 34 06.74 50 46 37.43	Green eccentric Crafton Azimuth mark.	4.9951958 4.5457324	98,899.89 35,134.39	324,474.1 115,270.1
Los Angeles-Albuquerque Airway, beacon No. 54B eccentric (Ariz.) 1936 (d. m.).	35 02 08.884 109 15 35.789	71 19 36.22 130 17 54	251 14 21.33	Reese Azimuth mark.	4.1670603	14,691.30	48,199.7
St. Johns (Ariz.) 1936 (d. m.)	34 27 35.177 109 11 35.858	42 20 09.51 161 19 58.23 322 55 06	222 07 17.90 341 12 28.92	Green eccentric Reese Azimuth mark.	4.7170575 4.7958500	52,126.37 62,495.68	171,017.9 205,037.9
Hinkson, (Ariz.) 1936 (d. m.)	34 41 35.917 109 03 14.256	26 18 22.55 135 31 58.97 195 17 03	206 13 37.89 315 19 41.76	St. Johns Reese Azimuth mark.	4.4607385 4.6694552	28,889.40 46,714.87	94,781.3 153,263.7
Witch (Ariz.) 1936 (d. m.)	34 45 49.240 109 18 08.579	288 51 53.80 343 26 18.62 183 10 56	109 00 23.28 163 30 01.69	Hinkson St. Johns Azimuth mark.	4.3812062 4.5461217	24,055.04 35,165.90	78,920.6 115,373.5
Loco (Ariz.) 1936 (d. m.)	34 00 27.904 109 06 06.213	104 57 55.18 170 28 28.82 350 49 43	284 42 03.42 350 25 23.37	Green eccentric St. Johns Azimuth mark.	4.6540161 4.7062434	45,083.34 50,844.43	147,910.9 166,812.1
State (Ariz.) 1931, r. 1936 (d. m.)	34 10 16.553 109 14 10.257	267 28 37.29 325 34 59.49 52 46 37.32 78 08 07.54	87 54 38.24 145 39 30.79 232 34 15.23 257 56 45.44	Pinon Loco Ords Green eccentric	4.8524797 4.3419448 4.6308381 4.5028166	71,199.95 21,975.81 42,740.35 31,828.53	233,595.2 72,099.0 140,224.0 104,424.1
Wahl (Ariz.) 1936 (d. m.)	33 59 29.716 109 22 48.877	126 47 06.72 213 40 11.12 265 56 11.58 302 12 58	306 40 36.60 33 45 01.74 86 05 32.26	Green eccentric State Loco Azimuth mark.	4.3482306 4.3794563 4.4115166	22,296.19 23,958.31 25,793.88	73,150.1 78,603.2 84,625.4
Pole (Ariz.) 1936 (d. m.)	34 02 33.493 109 30 43.135	143 23 13.29 240 38 44.27 294 55 01.67 11 42 30	323 21 08.64 60 48 01.02 114 59 26.99	Green eccentric State Wahl Azimuth mark.	3.9804681 4.4650098 4.1277970	9,560.22 29,174.93 13,421.37	31,365.5 95,718.1 44,033.3
Saffell (Ariz.) 1936 (d. m.)	34 02 23.464 109 16 40.425	60 30 26.94 194 46 47.46 282 17 37.68 108 22 48	240 27 00.82 14 48 11.66 102 23 32.55	Wahl State Loco Azimuth mark.	4.0360034 4.1782902 4.2215775	10,864.34 15,076.14 16,656.26	35,644.1 49,462.3 54,646.4
Bench mark Z 66 (Ariz.) 1936 (d. m.)	34 09 25.725 109 12 45.220	328 16 49.83 24 52 53.56 125 43 23.68	148 20 33.43 204 50 41.70 305 42 35.93	Loco Saffell State	4.2894606 4.1565345 3.4285698	19,474.24 14,339.51 2,682.69	63,891.7 47,045.5 8,801.5
Springerville (U. S. G. S.) (Ariz.) 1936 (d. m.)	34 07 34.964 109 16 48.740	219 11 01.56 358 43 36.56 220 41 10	39 12 30.52 178 43 41.22	State Saffell Azimuth mark.	3.8078312 3.9822753	6,424.38 9,600.09	21,077.3 31,496.3
Bare (Ariz.) 1936 (d. m.)	34 13 24.416 109 30 03.288	283 16 14.49 297 49 22.99 28 30 06.01 281 17 47	103 25 10.14 117 56 49.31 208 27 38.69	State Springerville Green eccentric Azimuth mark.	4.3992948 4.3621373 4.1488802	25,078.11 23,021.70 14,089.00	82,277.1 75,530.4 46,223.7
Bench mark K 47 (Ariz.) 1936 (d. m.)	34 14 53.994 109 23 28.963	48 02 44.97 74 44 02.58 323 19 51	227 56 36.07 254 40 19.73	Green eccentric Bare Azimuth mark.	4.3546817 4.0196196	22,629.85 10,462.12	74,244.8 34,324.5
Red Cone, 1936 (d. m.)	34 17 40.635 108 53 28.137	285 16 04.96 31 27 18.19 123 28 42.13 351 58 47	105 30 29.37 211 20 12.62 303 18 27.96	Pinon Loco St. Johns Azimuth mark.	4.6103157 4.5714536 4.5222497	40,767.65 37,278.09 33,285.08	133,751.9 122,303.2 109,202.8

[1]No check on this position.

GEOGRAPHIC POSITIONS—Continued

LITTLE COLORADO RIVER AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Fox, 1936 (d. m.)	34 04 40.230	78 09 09.54	257 55 48.43	Loco	4.5742674	37,520.40	123,098.2
	108 42 15.182	144 25 31.15	324 19 13.03	Red Cone	4.4710402	29,582.86	97,056.4
		239 02 49.05	59 10 53.41	Pinon	4.4110887	25,768.47	84,542.1
		297 36 04		Azimuth mark.			
Holder, 1936 (d. m.)	34 27 28.405	350 48 54.36	170 50 37.37	Pinon	4.4669178	29,303.39	96,139.5
	108 30 54.757	22 29 21.82	202 22 58.69	Fox	4.6590491	45,608.84	149,635.0
		62 27 43.53	242 14 59.37	Red Cone	4.5914403	39,033.75	128,063.2
		338 29 30		Azimuth mark.			
Quemado, 1936 (d. m.)	34 18 18.310	36 33 00.96	216 26 11.71	Fox	4.4962973	31,354.31	102,868.3
	108 30 06.920	175 52 47.40	355 52 20.40	Holder	4.2302954	16,993.99	55,754.4
		343 55 14.45	163 56 30.35	Pinon	4.0957231	12,465.89	40,898.5
		315 19 20		Azimuth mark.			
G. L. O. Station 10, 1934, r. 1936 (d. m.)	34 15 34.397	288 06 45.07	108 14 28.82	Pinon	4.3465386	22,209.49	72,865.6
	108 41 36.524	2 48 55.07	182 48 33.36	Fox	4.3049281	20,180.32	66,208.3
		67 14 14.36	246 43 36.10	Ords	4.9605694	91,320.73	299,608.1
		250 08 57		Azimuth mark.			
Sanchez, 1936 (d. m.)	34 12 44.393	220 21 32.54	40 23 10.45	G. L. O. Station 10	3.8373127	6,875.63	22,557.8
	108 44 30.553	273 42 17.24	93 51 38.54	Pinon	4.4085496	25,618.26	84,049.2
		346 54 06.29	166 55 22.28	Fox	4.1851358	15,315.66	50,248.1
		76 30 55		Azimuth mark.			
Hardcastle, 1936 (d. m.)	34 02 27.126	154 42 18.55	334 37 26.35	Red Cone	4.4933474	31,142.06	102,171.9
	108 44 47.835	181 19 57.16	1 20 06.85	Sanchez	4.2793035	19,024.07	62,414.8
		223 39 25.07	43 40 50.57	Fox	3.7535545	5,669.63	18,601.1
		121 30 36		Azimuth mark.			
Bench mark F 64, 1936 (d. m.)	34 13 27.035	275 45 58.74	95 50 42.62	Sanchez	4.1135640	12,988.65	42,613.6
	108 52 55.375	314 39 15.52	134 45 14.91	Fox	4.3631325	23,074.51	75,703.6
		253 16 55		Azimuth mark.			
Beard, 1936 (d. m.)	34 02 21.243	77 09 18.09	257 03 45.32	Loco	4.1945858	15,652.58	51,353.5
	108 56 11.494	188 23 20.56	8 24 52.30	Red Cone	4.4569028	28,635.37	93,947.9
		258 38 36.29	78 46 24.65	Fox	4.3398665	21,870.89	71,754.7
		16 34 43		Azimuth mark.			
Martin, 1936 (d. m.)	34 36 54.488	307 18 57.01	127 27 24.48	Holder	4.4582998	28,727.63	94,250.6
	108 45 49.867	18 14 51.70	198 10 32.43	Red Cone	4.5732052	37,428.74	122,797.5
		66 30 31.00	246 15 54.51	St. Johns	4.6337275	43,025.65	141,160.0
		125 26 29.52	305 04 16.92	Reese	4.8613917	72,676.12	238,438.2
		173 22 01		Azimuth mark.			
Tingle, 1936 (d. m.)	34 37 12.588	8 03 48.83	188 02 52.18	Holder	4.2595980	18,180.17	59,646.1
	108 29 14.847	88 49 05.13	268 39 39.86	Martin	4.4040647	25,355.06	83,185.7
		222 49 02		Azimuth mark.			
Terreo, 1936 (d. m.)	34 47 20.716	352 55 25.39	172 56 17.38	Tingle	4.2760641	18,882.70	61,951.0
	108 30 46.158	50 04 27.21	229 55 52.72	Martin	4.4774441	30,022.31	98,498.2
		54 28 37		Azimuth mark.			
Crockett, 1936 (d. m.)	34 53 31.960	314 29 31.95	134 33 53.45	Terreo	4.2125414	16,313.28	53,521.2
	108 38 23.888	20 17 28.96	200 13 14.73	Martin	4.5153843	32,763.05	107,490.1
		319 03 51		Azimuth mark.			
Colorado, 1936 (d. m.)	34 54 53.330	280 54 58.21	100 59 50.11	Crockett	4.1203242	13,192.41	43,282.1
	108 46 54.045	357 11 03.47	177 11 40.06	Martin	4.5222395	33,284.31	109,200.3
		98 46 32.49	278 24 51.65	Reese	4.7653996	58,263.91	191,154.2
		1 03 51		Azimuth mark.			
Porter (Ariz.), 1936 (d. m.)	35 04 24.106	74 16 46.57	254 04 56.67	Reese	4.5129555	32,580.33	106,890.6
	109 04 07.956	162 49 47.17	342 48 13.14	Crafton	4.1461636	14,001.15	45,935.4
		317 51 53		Azimuth mark.			
Zuni, 1920, r. 1936 (d. m.)	35 07 24.762	68 54 01.39	248 48 34.63	Porter	4.1884525	15,433.07	50,633.3
	108 54 39.654	112 55 23.23	292 48 21.89	Crafton	4.3031444	20,097.61	65,936.9
		201 23 05.87	21 31 06.75	Ebon	4.7585671	57,354.45	188,170.4
		210 01 50		Azimuth mark.			
Los Angeles–Albuquerque Airway, beacon No. 56, eccentric (Ariz.), 1936 (d. m.).	35 01 54.761	161 14 40.64	341 14 05.22	Porter	3.6866814	4,860.51	15,946.5
	109 03 06.274	231 34 07.86	51 38 59.01	Zuni	4.2141910	16,375.37	53,724.9
		338 51 02		Azimuth mark.			
Scrub (Ariz.), 1936 (d. m.)	34 56 43.468	100 59 53.43	280 49 30.70	Reese	4.4482507	28,070.54	92,094.8
	109 06 38.061	194 59 49.73	15 01 15.85	Porter	4.1672117	14,696.43	48,216.5
		222 36 07.08	42 42 59.50	Zuni	4.4293135	26,872.83	88,165.3
		154 19 06		Azimuth mark.			
Ojo, 1936 (d. m.)	34 53 00.952	117 37 40.46	297 32 44.56	Scrub	4.1704628	14,806.85	48,578.8
	108 58 01.079	156 10 54.23	336 07 23.91	Porter	4.3620500	23,017.07	75,515.2
		190 50 44.42	10 52 39.96	Zuni	4.4330453	27,104.74	88,926.1
		33 46 20		Azimuth mark.			
Cousins, 1936 (d. m.)	35 14 41.844	20 32 44.78	200 30 49.91	Zuni	4.1578493	14,382.99	47,188.2
	108 51 20.296	76 33 26.69	256 24 29.74	Crafton	4.3841270	24,217.37	79,453.2
		201 42 30.27	21 48 36.31	Ebon	4.6332024	42,973.66	140,989.4
		311 13 32		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

LITTLE COLORADO RIVER AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Lupton, 1936 (d. m.)	35 19 57.805	226 26 46.10	46 38 59.12	Ebon	4.6422126	43,874.55	143,945.1
	109 01 52.063	301 19 47.48	121 25 52.45	Cousins	4.2718256	18,699.31	61,349.3
		334 44 09.83	154 48 19.26	Zuni	4.4091510	25,653.76	84,165.7
		26 11 18.95	206 08 26.16	Crafton	4.2344037	17,155.51	56,284.4
		207 31 28		Azimuth mark.			
Whitewater, 1936 (d. m.)	35 14 40.383	47 03 25.20	227 01 07.70	Crafton	3.9159117	8,239.71	27,033.1
	109 02 52.915	188 55 42.48	8 56 17.64	Lupton	3.9957338	9,902.25	32,487.6
		180 25 18		Azimuth mark.			
Pond, 1936 (d. m.)	35 21 42.117	188 39 13.28	8 40 04.72	Knoll	4.1722162	14,866.76	48,775.4
	108 51 32.565	210 59 37.30	31 05 50.98	Ebon	4.4978622	31,467.50	103,239.6
		358 37 40.98	178 37 48.07	Cousins	4.1124540	12,955.50	42,504.8
		10 09 54.67	190 08 06.71	Zuni	4.4288052	26,841.40	88,062.2
		78 26 12.95	258 20 14.55	Lupton	4.2032981	15,969.75	52,394.1
		231 09 27		Azimuth mark.			
Supplementary points							
G. L. O. Station 2 eccentric (Ariz.), 1934, r. 1936 (d. m.).	34 28 47.821	287 36 37.9	108 12 20.6	Pinon	5.008749	102,035.0	334,760
	109 31 10.534	322 37 18.1	142 46 53.4	State	4.633910	43,043.7	141,219
		114 45 33		Reference mark No. 1.			
G. L. O. Station 2 (Ariz.), 1934, r. 1936 (d. m.) [1]	34 28 48.53	273 11 46	93 11 55	G. L. O. Station 2 eccentric	2.592108	390.938	1,282.60
	109 31 25.83						
Arizona-New Mexico boundary mile post No. 197 eccentric (Ariz.), 1934 (d. m.).	34 08 57.762	65 34 50.6	245 16 09.6	Ords	4.751871	56,476.9	185,291
	109 02 53.072	98 01 11.8	277 54 51.5	State	4.243409	17,515.0	57,464
		264 13 06.3	84 32 46.4	Pinon	4.732940	54,068.0	177,388
		327 24 17		Arizona-New Mexico boundary mile-post No. 197.			
Green Peak Lookout (Ariz.), 1934 (n. d.) [1]	34 06 42.72	257 57 31	78 08 54	State	4.502821	31,828.9	104,425
	109 34 25.68	8 18 00	188 16 59	Ords	4.290732	19,531.3	64,079
Mount Baldy, cabin (Ariz.), 1934 (n. d.) [1]	33 54 21.42	131 54 00	311 52 35	Ords	3.721120	5,261.6	17,262
	109 33 42.97	225 32 15	45 43 11	State	4.624104	42,082.7	138,066
Springerville, grammar school, cupola (Ariz.), 1936 (d.). [1]	34 07 56.48	353 23 26	173 23 28	Springerville	2.824402	667.4	2,190
	109 16 51.74	116 33 21	296 25 57	Bare	4.355064	22,649.8	74,310
Fox Mountain Lookout, 1936 (n. d.)	34 04 39.926	250 30 49.2	70 30 49.8	Fox	1.447778	28.04	92.0
	108 42 16.213	43 33 07.5	223 31 42.6	Hardcastle	3.751635	5,644.6	18,519
Zuni (U. S. G. S.), 1919, r. 1936 (d. m.) [1]	35 07 25.02	343 26	163 26	Zuni	0.926754	8.448	27.72
	108 54 39.75						
Boundary (N. Mex.-Ariz.), 1920 (d. m.) [1]	35 00 34.63	224 05 54	44 10 32	Zuni	4.245777	17,610.7	57,778
	109 02 43.66						
Line (N. Mex.-Ariz.), 1920 (n. d.) [1]	35 00 50.35	225 13 04	45 17 42	Zuni	4.237202	17,266.4	56,648
	109 02 43.68	359 57 19	179 57 19	Boundary	2.685208	484.404	1,589.25
Arizona-New Mexico boundary milepost No. 137 (Ariz.-N. Mex.), 1920 (n. d.). [1]	35 01 00.96	0 03 43	180 03 43	Line	2.514521	326.98	1,072.8
	109 02 43.66						
Los Angeles-Albuquerque Airway, beacon No. 54A (Ariz.), 1936 (n. d.).	35 02 23.264	62 25 25.5	242 21 42.3	Reese	4.046476	11,129.5	36,514
	109 18 15.596	276 13 50.7	96 15 22.5	Los Angeles-Albuquerque Airway, beacon No. 54 B eccentric.	3.610103	4,074.8	13,369
Los Angeles-Albuquerque Airway, beacon No. 54B (Ariz.), 1936 (d).	35 02 05.214	71 44 06.7	251 38 52.0	Reese	4.165764	14,647.5	48,056
	109 15 36.121	184 15 14.5	4 15 14.7	Los Angeles-Albuquerque Airway, beacon No. 54 B eccentric.	2.054594	113.395	372.03
Los Angeles-Albuquerque Airway, beacon No. 56 (Ariz.), 1936 (d.).	35 01 54.257	161 22 25.0	341 21 49.7	Porter	3.687812	4,873.2	15,988
	109 03 06.523	202 09 50.3	22 09 50.4	Los Angeles-Albuquerque Airway, beacon No. 56 eccentric.	1.224144	16.755	54.97
Los Angeles-Albuquerque Airway, beacon No. 57, 1936 (n. d.).	35 03 28.257	86 50 33.2	266 34 29.4	Los Angeles-Albuquerque Airway, beacon No. 54 B eccentric.	4.629447	42,603.7	139,776
	108 47 37.544						
		124 18 48.8	304 14 46.1	Zuni	4.111932	12,939.9	42,454
		164 49 18.4	344 47 10.1	Cousins	4.332638	21,509.9	70,570

MESCALERO INDIAN RESERVATION AREA

Principal points							
Pajarita (U. S. G. S.), 1936 (d. m.)	33 14 12.716	278 50 11.9	98 57 00.9	McKnight	4.291455	19,563.9	64,186
	105 25 48.104	322 43 06.1	142 48 43.7	Manning	4.422391	26,447.9	86,771
		96 50 52		Azimuth mark.			
Wofford (N. Mex. Geodetic Survey), 1934, r. 1936 (d. m.)	32 59 47.593	224 24 15.2	44 33 26.7	Pajarita (U. S. G. S.)	4.572334	37,353.7	122,551
	105 42 37.634	262 19 46.8	82 34 33.4	Manning	4.629354	42,594.5	139,745
		35 35 04		Azimuth mark.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

MESCALERO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Sierra Blanca, 1936 (d. m.)	33 22 27.256	293 17 24.1	113 29 51.6	Pajarita (U. S. G. S.)	4.584010	38,371.6	125,891
	105 48 29.427	347 41 55.2	167 45 07.8	Wofford (N. Mex. Geodetic Survey)	4.632121	42,866.8	140,639
		273 40 41		Azimuth mark.			
Nogal (U. S. G. S.), 1936 (d. m.)	33 29 50.398	309 40 07.1	129 52 25.5	Pajarita (U. S. G. S.)	4.654721	45,156.6	148,151
	105 48 10.665	2 02 04.5	182 01 54.2	Sierra Blanca	4.135481	13,661.0	44,819
		322 23 40		Azimuth mark.			
Analla, 1936 (d. m.)	33 26 27.808	352 23 26.7	172 24 39.4	McKnight	4.413272	25,898.3	84,968
	105 15 34.073	35 05 01.6	214 59 24.1	Pajarita (U. S. G. S.)	4.441830	27,658.6	90,743
		97 11 32.6	276 53 33.5	Nogal (U. S. G. S.)	4.706771	50,906.2	167,015
		195 50 16		Azimuth mark.			
Monjeau, 1936 (d. m.)	33 25 50.631	48 54 15.7	228 51 42.8	Sierra Blanca	3.978999	9,527.9	31,259
	105 43 51.652	137 51 36.2	317 49 13.4	Nogal (U. S. G. S.)	3.998476	9,965.0	32,694
		307 24 56.3	127 34 51.7	Pajarita (U. S. G. S.)	4.548028	35,320.6	115,881
		6 12 22		Azimuth mark.			
Westbox, 1936 (d. m.)	33 25 47.071	72 15 30.6	252 08 42.1	Sierra Blanca	4.304043	20,139.2	66,073
	105 36 07.388	90 33 33.8	270 29 18.0	Monjeau	4.078959	11,993.9	39,350
		111 55 27.4	291 48 48.6	Nogal (U. S. G. S.)	4.303748	20,125.6	66,029
		232 02 58		Azimuth mark.			
West Spur, 1936 (d. m.)	33 29 33.848	61 36 22.1	241 31 50.9	Monjeau	4.159688	14,444.0	47,388
	105 35 39.784	91 33 51.8	271 26 57.4	Nogal (U. S. G. S.)	4.287574	19,389.8	63,615
West Spur Azimuth, 1936 (d. m.)	33 29 43.040	290 10 43.6	110 11 00.1	West Spur	2.914234	820.8	2,693
	105 36 09.628	59 03 59.1	238 59 44.4	Monjeau	4.143470	13,914.6	45,651
		90 45 11.3	270 38 33.4	Nogal (U. S. G. S.)	4.269836	18,613.8	61,069
Lincoln, 1936 (d. m.)	33 29 24.237	4 56 09.5	184 55 18.0	Pajarita (U. S. G. S.)	4.450034	28,186.0	92,474
	105 24 14.432	91 21 19.6	271 08 07.0	Nogal (U. S. G. S.)	4.569187	37,084.0	121,666
Lincoln Azimuth, 1936 (d. m.)	33 29 37.400	33 44 42.4	213 44 36.6	Lincoln	2.688145	487.7	1,600
	105 24 03.938	90 43 30.9	270 30 12.5	Nogal (U. S. G. S.)	4.572262	37,347.5	122,531

Coe, 1936 (d. m.)	33 21 35.097	359 31 12.4	179 31 14.8	Pajarita (U. S. G. S.)	4.134466	13,629.1	44,715
	105 25 52.513	105 50 45.0	285 40 51.0	Monjeau	4.462076	28,978.5	95,074
		55 45 36		Azimuth mark.			
Rain, 1936 (d. m.)	33 17 03.534	73 01 22.0	252 55 17.9	Pajarita (U. S. G. S.)	4.254560	17,970.5	58,958
	105 14 44.248	175 45 57.6	355 45 30.2	Analla	4.241338	17,431.6	57,190
		264 18 04		Azimuth mark.			
Turkey, 1936 (d. m.)	33 06 03.793	144 05 39.3	323 56 16.6	Monjeau	4.654996	45,185.2	148,245
	105 26 45.871	185 40 14.3	5 40 45.9	Pajarita (U. S. G. S.)	4.180020	15,136.3	49,660
		163 10 54		Azimuth mark.			
Tuton, 1936 (d. m.)	33 00 28.087	172 56 31.4	352 55 25.0	Pajarita (U. S. G. S.)	4.408213	25,598.4	83,984
	105 23 46.617	251 18 02.1	71 22 32.4	Manning	4.133070	13,585.3	44,571
Tuton Azimuth, 1936 (d. m.)	33 00 12.823	214 05 10.1	34 05 16.8	Tuton	2.754159	567.8	1,863
	105 23 58.875	249 53 51.1	69 58 28.1	Manning	4.147419	14,041.7	46,068
Silver, 1936 (d. m.)	33 00 17.314	85 09 09.9	265 05 24.9	Wofford (N. Mex. Geodetic Survey)	4.032061	10,766.2	35,322
	105 35 44.409	210 56 48.9	31 02 14.7	Pajarita (U. S. G. S.)	4.477436	30,021.8	98,497
		272 27 24		Azimuth mark.			
Harley, 1936 (d. m.)	33 09 38.560	161 31 13.2	341 27 40.5	Monjeau	4.499419	31,580.5	103,610
	105 37 24.163	244 50 44.7	64 57 05.8	Pajarita (U. S. G. S.)	4.299053	19,909.2	65,319
		170 32 54		Azimuth mark.			
Whitetail, 1936 (d. m.)	33 15 28.329	284 35 24.7	104 38 33.9	Pajarita (U. S. G. S.)	3.965248	9,231.0	30,285
	105 31 33.150	40 10 46.6	220 07 34.4	Harley	4.149151	14,097.8	46,253
		12 05 34		Azimuth mark.			
Carrizo, 1936 (d. m.)	33 16 29.881	137 56 32.4	317 53 01.2	Sierra Blanca	4.171301	14,835.5	48,673
	105 42 04.975	170 56 12.1	350 55 13.4	Monjeau	4.242893	17,494.2	57,396
		131 45 28		Azimuth mark.			
Mescalero, 1936 (d. m.)	33 08 06.588	189 57 28.3	9 59 30.6	Monjeau	4.522227	33,283.3	109,197
	105 47 34.448	259 47 50.7	79 53 24.4	Harley	4.205966	16,068.2	52,717
		217 33 12		Azimuth mark.			
Cloud, 1936 (d. m.)	32 57 57.619	174 53 00.8	354 51 35.0	Sierra Blanca	4.657597	45,456.6	149,136
	105 45 52.605	236 11 41.4	56 13 27.6	Wofford (N. Mex. Geodetic Survey)	3.784722	6,091.5	19,985
		285 49 39		Azimuth mark.			
Domingo (U. S. G. S.), 1936 (d. m.)	33 03 16.298	188 57 05.9	8 59 04.3	Sierra Blanca	4.555050	35,896.3	117,770
	105 52 05.502	315 22 37.9	135 26 01.1	Cloud	4.139450	13,786.4	45,231
		227 06 14		Azimuth mark.			
Coy, 1936 (d. m.)	33 10 28.059	214 46 56.8	34 52 23.6	Sierra Blanca	4.431225	26,991.4	88,554
	105 58 25.084	323 28 27.7	143 31 55.0	Domingo (U. S. G. S.)	4.218688	16,545.8	54,284
Black Ledge, 1936 (d. m.)	33 10 46.903	282 48 43.2	102 49 37.1	Coy	3.417692	2,616.3	8,584
	106 00 03.553	318 12 17.0	138 16 38.1	Domingo (U. S. G. S.)	4.269726	18,609.1	61,053
		113 05 08		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

MESCALERO INDIAN RESERVATION AREA—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Reservoir, 1936 (d. m.)	33 04 44.056 105 59 15.898	187 04 53.3 283 34 46.2 103 13 10	7 05 21.1 103 38 41.0	Coy Domingo (U. S. G. S.) Azimuth mark.	4.028534 4.060215	10,679.1 11,487.2	35,036 37,688
Laborcita, 1936 (d. m.)	33 00 34.937 105 52 47.736	127 20 10.5 154 26 27.8 192 25 49.9 303 28 48	307 16 38.9 334 23 23.7 12 26 12.9	Reservoir Coy Domingo (U. S. G. S.) Azimuth mark.	4.102510 4.306602 3.706741	12,662.2 20,258.3 5,090.3	41,543 66,464 16,700
Rinconado, 1936 (d. m.)	33 13 31.491 105 50 45.178	64 39 20.8 192 00 07.5 85 42 49	244 35 09.0 12 01 22.1	Coy Sierra Blanca Azimuth mark.	4.120063 4.227244	13,184.5 16,875.0	43,256 55,364
Rose, 1936 (d. m.)	33 25 45.629 105 59 17.711	246 18 22.2 289 59 33.7 357 14 18.4 285 02 16	66 24 30.0 110 05 30.6 177 14 47.3	Nogal (U. S. G. S.) Sierra Blanca Coy Azimuth mark.	4.274242 4.251214 4.451797	18,803.6 17,832.6 28,300.7	61,691 58,506 92,850
McCray, 1936 (d. m.)	33 18 19.912 105 52 47.937	143 45 29.6 221 14 25.9 340 18 53.0 204 50 28	323 41 55.2 41 16 48.0 160 20 00.3	Rose Sierra Blanca Rinconado Azimuth mark.	4.231264 4.005901 3.974807	17,031.9 10,136.8 9,436.4	55,879 33,257 30,959
Fall, 1936 (d. m.)	33 19 58.107 106 00 00.149	185 50 47.8 285 06 30.5 178 03 06	5 51 11.1 105 10 27.9	Rose McCray Azimuth mark.	4.031910 4.063770	10,762.4 11,581.6	35,310 37,997
Supplementary points							
Capitan, large brick building, principal gable, 1936 (n. d.).[1]	33 32 28.50 105 34 20.51	20 49 28 28 55 35	200 48 45 208 54 35	West Spur West Spur Azimuth	3.760155 3.765191	5,756.5 5,823.6	18,886 19,106
Wooden windmill north of station West Spur, 1936 (n. d.).[1]	33 30 20.86 105 35 19.60	19 47 03 47 56 34	199 46 52 227 56 06	West Spur West Spur Azimuth	3.187287 3.240364	1,539.2 1,739.3	5,050 5,706
Monjeau Lookout, 1936 (d.) [1]	33 25 50.80 105 43 51.60	14 31	194 31	Monjeau	0.740363	5.50	18.0
U. S. G. S. bench mark near station Sierra Blanca, 1936 (d. m.).[1]	33 22 27.21 105 48 29.44	191 57	11 57	Sierra Blanca	0.152288	1.420	4.66
Lead pipe near station Sierra Blanca, 1936 (d. m.) [1]	33 22 27.33 105 48 29.38	30 36	210 36	Sierra Blanca	0.422097	2.643	8.67
Rose (U. S. G. S.), cairn, 1936 (d. m.) [1]	33 25 45.67 105 59 17.74	324 59	144 59	Rose	0.146128	1.4	5
Harley Lookout, 1936 (d.)	33 09 36.914 105 37 24.174	80 04 05.1 180 19 34.7 219 59 40.7 244 42 50.9	259 58 31.4 0 19 34.7 40 02 52.9 64 49 12.0	Mescalero Harley Whitetail Pajarita (U. S. G. S.)	4.205720 1.705169 4.150351 4.299529	16,059.1 50.7 14,136.8 19,931.0	52,687 166 46,380 65,390
Cloudcroft (U. S. G. S.), 1936 (d. m.) [1]	32 57 57.58 105 45 52.73	249 07	69 07	Cloud	0.548389	3.535	11.60

CLAYTON TO TUCUMCARI ARC

Principal points							
Grimes, 1935 (d. m.)	36 24 33.128 103 15 46.829	130 27 01.8 186 56 57.1 198 08 08	310 20 04.5 6 57 36.9	Dora Rabbit Azimuth mark.	4.360741 4.138451	22,947.8 13,754.7	75,288 45,127
Comyford, 1935 (d. m.)	36 23 41.262 103 27 54.946	182 15 12.5 232 19 10.7 264 54 16.0 136 56 36	2 15 28.0 52 27 03.2 85 01 28.1	Dora Rabbit Grimes Azimuth mark.	4.217013 4.397753 4.260400	16,482.1 24,989.2 18,213.8	54,075 81,985 59,756
Cook, 1935 (d. m.)	36 16 54.796 103 24 31.018	157 55 22.8 222 44 01.9 250 45 35	337 53 22.0 42 49 12.6	Comyford Grimes Azimuth mark.	4.131020 4.284357	13,521.3 19,246.7	44,361 63,145
Rardin, 1935 (d. m.)	36 19 02.071 103 13 13.070	76 59 55.7 111 26 48.3 159 25 24.1 1 48 46	256 53 14.3 291 18 05.5 339 23 52.9	Cook Comyford Grimes Azimuth mark.	4.239660 4.373130 4.037444	17,364.4 23,611.8 10,900.4	56,970 77,466 35,762
Hopson, 1935 (d. m.)	36 10 47.059 103 12 19.408	121 52 28.2 174 59 09.7 241 07 24	301 45 15.8 354 58 38.0	Cook Rardin Azimuth mark.	4.332452 4.185151	21,500.7 15,316.2	70,540 50,250
Thomas, 1935 (d. m.)	36 14 43.595 103 18 06.588	112 52 56.9 222 34 23.6 310 01 30.2 268 47 29	292 49 09.5 42 37 17.3 130 04 55.3	Cook Rardin Hopson Azimuth mark.	4.017600 4.034336 4.054211	10,413.6 10,822.7 11,329.5	34,165 35,507 37,170

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

CLAYTON TO TUCUMCARI ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Howard, 1935 (d. m.)	36 08 44.277	186 12 08.1	6 12 47.0	Cook	4.182075	15,208.1	49,895
	103 25 36.855	225 24 39.7	45 29 05.6	Thomas	4.198279	15,786.3	51,792
		259 11 02.5	79 18 53.1	Hopson	4.307236	20,287.9	66,561
		210 57 58		Azimuth mark.			
Clapham, 1935 (d. m.)	36 07 42.948	107 37 48.4	287 35 27.9	Howard	3.795732	6,247.9	20,498
	103 21 38.677	247 51 41.7	67 57 11.6	Hopson	4.178631	15,088.0	49,501
		155 03 20		Azimuth mark.			
Zurick, 1935 (d. m.)	36 02 39.098	127 24 13.9	307 18 26.6	Howard	4.268345	18,550.0	60,859
	103 15 47.427	136 51 01.1	316 47 34.2	Clapham	4.108653	12,842.6	42,134
		199 03 53.3	19 05 55.9	Hopson	4.201787	15,914.3	52,212
		30 26 12		Azimuth mark.			
Swoyer, 1935 (d. m.)	35 59 53.482	176 38 53.0	356 38 30.4	Howard	4.214527	16,388.0	53,766
	103 24 58.527	199 03 04.8	19 05 02.5	Clapham	4.184966	15,309.7	50,229
		249 39 17.6	69 44 41.7	Zurick	4.167703	14,713.1	48,271
		98 25 56		Azimuth mark.			
Bell, 1935 (d. m.)	35 53 58.037	163 27 51.6	343 26 35.4	Swoyer	4.057984	11,428.4	37,495
	103 22 48.663	213 16 39.9	33 20 47.4	Zurick	4.283690	19,217.2	63,048
		327 48 15		Azimuth mark.			
Amistad, 1935 (d. m.)	35 57 18.953	69 40 46.8	249 34 16.5	Bell	4.250084	17,786.2	58,354
	103 11 43.561	103 30 49.1	283 23 02.1	Swoyer	4.311291	20,478.2	67,186
		148 15 43.4	328 13 20.1	Zurick	4.064634	11,604.7	38,073
		177 59 19		Azimuth mark.			
Whaley, 1935, l. 1936 (d. m.)	35 50 50.164	106 20 40.9	286 12 57.8	Bell	4.315022	20,654.8	67,765
	103 09 38.318	165 19 23.0	345 18 09.6	Amistad	4.092984	12,387.5	40,641
		179 39 25		Bench mark S 107.			
Mitchil, 1935 (d. m.)	35 50 27.105	153 40 40.3	333 39 25.2	Bell	3.860560	7,253.7	23,798
	103 20 40.405	267 29 49.0	87 36 16.7	Whaley	4.220904	16,630.5	54,562
		92 12 17		Bench mark Y 107.			
Centerville, 1935 (d. m.)	35 43 48.895	130 35 06.3	310 29 32.1	Mitchil	4.276058	18,882.4	61,950
	103 11 09.003	136 57 46.2	316 50 56.8	Bell	4.410092	25,709.4	84,348
		189 56 28.5	9 57 21.5	Whaley	4.119973	13,181.7	43,247
		309 22 58		Azimuth mark.			
Reed, 1935 (d. m.)	35 43 46.096	179 01 09.2	359 01 01.7	Bell	4.275608	18,862.9	61,886
	103 22 35.788	193 11 08.9	13 12 16.4	Mitchil	4.103607	12,694.2	41,648
		269 39 28.6	89 46 09.7	Centerville	4.237039	17,259.9	56,627
		182 46 43		Azimuth mark.			
Kerlin, 1935 (d. m.)	35 40 08.414	110 11 00.3	290 03 55.3	Reed	4.290016	19,499.2	63,974
	103 10 27.543	171 16 56.8	351 16 32.6	Centerville	3.837248	6,874.6	22,554
		57 25 40		Azimuth mark.			
Shed, 1935 (d. m.)	35 38 02.864	152 20 46.2	332 18 37.5	Reed	4.077165	11,944.4	39,188
	103 18 55.197	253 06 08.6	73 11 04.5	Kerlin	4.125278	13,343.8	43,779
		190 38 07		Azimuth mark.			
McCarty, 1935 (d. m.)	35 35 45.296	201 48 33.5	21 50 51.1	Reed	4.203100	15,962.5	52,370
	103 26 31.762	249 42 36.6	69 47 02.5	Shed	4.088055	12,247.7	40,183
		219 27 26		Azimuth mark.			
Clampit, 1935 (d. m.)	35 33 31.967	103 10 56.9	283 04 09.7	McCarty	4.257542	18,094.3	59,364
	103 14 51.911	143 45 28.3	323 43 06.7	Shed	4.015115	10,354.2	33,970
		208 32 58.3	28 35 32.3	Kerlin	4.143400	13,912.3	45,644
		298 44 56		Azimuth mark.			
Sand Springs, 1935 (d. m.)	35 26 18.800	344 01 46.6	164 04 08.0	Warmuth	4.351436	22,461.4	73,692
	103 19 34.746	148 59 27.7	328 55 25.5	McCarty	4.309139	20,376.9	66,853
		208 04 43.3	28 07 27.6	Clampit	4.179943	15,133.6	49,651
		45 04 18		Azimuth mark.			
McCullough, 1935 (d. m.)	35 27 45.181	194 49 41.7	14 51 12.1	McCarty	4.184895	15,307.2	50,220
	103 29 07.382	280 23 55.0	100 29 27.1	Sand Springs	4.166856	14,684.4	48,177
		319 33 20.2	139 41 13.0	Warmuth	4.503037	31,844.7	104,477
		35 59 52.9	215 55 47.3	Dripping	4.260747	18,228.3	59,804
		179 51 48		Azimuth mark.			
Brown, 1935 (d. m.)	35 31 51.240	32 49 40.9	212 47 48.3	McCullough	3.955340	9,022.8	29,602
	103 25 53.392	172 22 24.1	352 22 01.8	McCarty	3.862000	7,277.8	23,877
		259 23 34.5	79 29 59.1	Clampit	4.229141	16,948.9	55,607
		316 59 46.8	137 03 26.6	Sand Springs	4.146207	14,002.5	45,940
		250 49 28		Azimuth mark.			
Woods, 1935 (d. m.)	35 21 21.465	83 04 12.0	262 55 06.2	Dripping	4.380374	24,009.0	78,770
	103 20 27.916	132 05 57.7	312 00 56.7	McCullough	4.246820	17,653.1	57,917
		188 19 34.1	8 20 04.9	Sand Springs	3.966658	9,261.0	30,384
		328 48 44.3	148 51 36.3	Warmuth	4.162268	14,530.1	47,671
		123 03 28		Azimuth mark.			

161260°—40——6

GEOGRAPHIC POSITIONS—Continued

CLAYTON TO TUCUMCARI ARC—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Supplementary points	° ′ ″	° ′ ″	° ′ ″				
Pits, 1935 (d. m.)	36 30 26.268	162 27 14.8	342 26 44.7	Dora	3.621198	4,180.2	13,715
	103 26 38.225	261 08 06.2	81 15 13.7	Rabbit	4.257313	18,084.8	59,333
		283 14 50		Azimuth mark.			
Ears, 1935 (d. m.)	36 28 40.711	112 36 13.7	292 29 16.8	Dora	4.276017	18,880.7	61,944
	103 15 48.121	195 43 52.3	15 44 32.9	Rabbit	3.796340	6,256.6	20,527
		287 36 46		Azimuth mark.			
Highway marker No. 590+00, 1935 (m.) [1]	36 28 39.45	190 30	10 30	Ears	1.597958	39.624	130.00
	103 15 48.41						
Court magnetic station, 1935 (d. m.)	36 26 46.124	58 03 13.2	238 00 36.6	Grimes	3.888899	7,742.8	25,403
	103 11 23.138	114 13 04.9	294 03 30.6	Dora	4.420606	26,339.4	86,415
		152 52 20.7	332 50 23.7	Rabbit	4.030865	10,736.6	35,225
		110 01 28		Azimuth mark.			
Bench mark N 106, 1935 (d. m.)	36 13 53.089	17 40 38.0	197 39 54.8	Hopson	3.779439	6,017.8	19,743
	103 11 06.283	98 28 17.2	278 24 08.7	Thomas	4.025716	10,610.0	34,810
		161 37 47.8	341 36 32.8	Rardin	4.001543	10,035.6	32,925
		179 37 39		Azimuth mark.			
Whaley 2, 1936 (d. m.) [1]	35 50 50.33	303 47	123 47	Whaley	0.954001	8.995	29.51
	103 09 38.62						
Obar, 1935 (d. m.)	35 32 12.743	119 02 46.7	299 01 05.2	Clampit	3.701660	5,031.1	16,506
	103 11 57.271	188 45 03.9	8 45 56.2	Kerlin	4.171221	14,832.7	48,664
		46 39 22		Azimuth mark.			
Mater, 1935 (d. m.)	35 18 31.361	216 41 52.1	36 45 58.6	Sand Springs	4.254656	17,974.5	58,971
	103 26 40.615	240 51 19.4	60 54 54.9	Woods	4.032378	10,774.0	35,348
		292 56 49.0	113 03 16.1	Warmuth	4.264902	18,403.6	60,379
		332 51 05		Azimuth mark.			
Tucum, 1935 (d. m.)	35 10 11.512	301 53 11.8	122 05 03.9	Martin	4.568268	37,005.6	121,409
	103 43 45.618	348 24 43.5	168 26 10.0	Redondo	4.278684	18,997.0	62,326
Tucumcari magnetic station, 1935 (d. m.) [1]	35 10 22.23	0 25 20	180 25 20	Tucum	2.518973	330.349	1,083.82
	103 43 45.52						
Los Angeles-Amarillo Airway, beacon No. 85, 1935 (d.).	35 08 03.377	201 46 14.8	21 49 32.5	Dripping	4.368008	23,335.0	76,558
	103 41 54.264	252 59 28.9	73 14 41.7	Warmuth	4.621992	41,878.6	137,397
		298 37 33.3	118 48 21.1	Martin	4.512946	32,579.6	106,888
Los Angeles-Amarillo Airway, beacon No. 86, 1935 (d.).	35 10 26.155	314 11 27.0	134 19 14.0	Martin	4.458418	28,735.5	94,276
	103 36 39.073	20 10 04.7	200 07 26.0	Redondo	4.307582	20,304.0	66,614
		87 38 24.5	267 34 18.8	Tucum	4.033555	10,803.3	35,444
Los Angeles-Amarillo Airway, beacon No. 87, 1935 (d.).	35 11 10.356	354 04 47.0	174 05 37.3	Martin	4.333046	21,530.1	70,637
	103 24 34.197	51 13 32.8	231 03 57.3	Redondo	4.512635	32,556.3	106,812
		86 31 50.2	266 20 46.8	Tucum	4.465252	29,191.2	95,771
Los Angeles-Amarillo Airway, beacon No. 88, 1935 (d.).	35 11 58.229	39 26 08.2	219 19 01.8	Martin	4.471485	29,613.2	97,156
	103 10 44.905	64 51 32.3	244 33 59.9	Redondo	4.709839	51,267.1	168,199
		124 19 32.4	304 16 47.8	Warmuth	3.941393	8,737.6	28,667
Los Angeles-Amarillo Airway, beacon No. 89 (Tex.), 1935 (d.).	35 11 43.946	58 26 58.5	238 13 12.3	Martin	4.631106	42,766.7	140,310
	102 59 09.556	102 16 55.4	282 07 29.8	Warmuth	4.404444	25,377.2	83,258
		278 49 52.9	98 54 05.2	Harwell	4.049582	11,209.4	36,776

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (NORTHERN SECTION)

Principal points							
Lobo, 1935 (d. m.)	34 58 05.496	128 30 21.2	308 28 34.3	Redondo	3.781424	6,045.4	19,834
	103 38 08.573	263 01 18.7	83 09 55.8	Martin	4.362565	23,044.4	75,605
		286 25 30		Azimuth mark.			
Gregory, 1935 (d. m.)	34 56 42.725	97 07 26.9	276 59 41.8	Lobo	4.317094	20,753.6	68,089
	103 24 36.792	104 04 39.4	283 55 07.2	Redondo	4.416633	26,099.5	85,628
		203 15 01.1	23 15 52.8	Martin	3.762854	5,792.3	19,004
		303 45 24		Azimuth mark.			
Frio, 1935 (d. m.)	34 51 26.964	186 47 09.6	6 47 42.6	Lobo	4.092290	12,367.7	40,576
	103 39 06.180	246 08 29.6	66 16 47.1	Gregory	4.382418	24,122.3	79,141
		5 37 35		Azimuth mark.			
Watts, 1935 (d. m.)	34 45 23.937	121 24 45.5	301 17 53.2	Frio	4.332409	21,498.5	70,533
	103 27 03.898	144 19 13.7	324 12 53.8	Lobo	4.461044	28,909.7	94,848
		190 07 05.4	10 08 29.5	Gregory	4.327323	21,248.2	69,712
		226 09 01		Azimuth mark.			
Forest, 1935 (d. m.)	34 47 45.648	168 04 02.8	348 03 30.4	Frio	3.843271	6,970.6	22,869
	103 38 09.443	231 12 39.4	51 20 24.1	Gregory	4.422523	26,455.9	86,797
		284 24 58.3	104 31 17.9	Watts	4.242474	17,477.3	57,340
		0 15 20		Bench mark G 110.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (NORTHERN SECTION)—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Phone, 1935 (d. m.)	34 41 48.444	179 24 33.3	359 24 30.8	Forest	4.041696	11,007.7	36,114
	103 38 04.979	248 24 13.0	68 30 29.6	Watts	4.257267	18,082.9	59,327
		359 14 53		Bench mark K 110.			
Hammond, 1935 (d. m.)	34 39 44.431	102 42 23.0	282 36 02.5	Phone	4.241665	17,444.8	57,233
	103 26 56.354	130 56 35.7	310 50 12.2	Forest	4.355115	22,652.4	74,319
		178 56 57.5	358 56 53.2	Watts	4.019676	10,463.5	34,329
		271 06 38		Azimuth mark.			
Lummis, 1935 (d. m.)	34 36 34.455	176 03 39.3	356 03 24.4	Phone	3.986694	9,698.3	31,819
	103 37 38.802	250 15 52.7	70 21 57.9	Hammond	4.240022	17,378.9	57,017
		58 58 39		Azimuth mark.			
Melrose, 1935 (d. m.)	34 29 35.110	155 45 19.1	335 43 09.5	Lummis	4.151476	14,173.5	46,501
	103 33 50.368	209 18 16.7	29 22 11.7	Hammond	4.333199	21,537.7	70,662
		270 06 21		Azimuth mark.			
Gordon, 1935 (d. m.)	34 30 24.847	85 06 42.6	265 00 09.1	Melrose	4.250107	17,787.2	58,357
	103 22 15.744	115 53 53.9	295 45 10.2	Lummis	4.417363	26,143.5	85,772
		157 29 44.3	337 27 05.0	Hammond	4.271079	18,667.2	61,244
		178 52 13		Azimuth mark.			
Raybourn, 1935 (d. m.)	34 21 44.850	153 17 03.4	333 14 21.7	Melrose	4.210186	16,225.0	53,232
	103 29 04.476	213 02 38.6	33 06 29.7	Gordon	4.281520	19,121.4	62,734
		213 45 08		Azimuth mark.			
Portair, 1935 (d. m.)	34 24 14.918	74 01 26.9	253 55 31.0	Raybourn	4.224013	16,749.9	54,954
	103 18 34.308	112 56 49.8	292 48 11.5	Melrose	4.404503	25,380.7	83,270
		153 38 31.9	333 36 26.6	Gordon	4.104593	12,723.1	41,742
		94 23 53		Azimuth mark.			
Hardwick, 1935 (d. m.)	34 18 50.451	107 48 49.5	287 42 39.3	Raybourn	4.245872	17,614.6	57,791
	103 18 08.203	176 11 04.8	356 10 50.1	Portair	4.000864	10,019.9	32,874
		59 54 22		Azimuth mark.			
Floyd, 1935 (d. m.)	34 11 51.436	180 19 38.5	0 19 40.8	Raybourn	4.262089	18,284.7	59,989
	103 29 08.564	232 33 49.1	52 40 00.8	Hardwick	4.327645	21,264.0	69,764
		341 42 39		Azimuth mark.			
Portales, 1935 (d. m.)	34 13 18.365	81 48 15.4	261 41 29.8	Floyd	4.270945	18,661.4	61,225
	103 17 07.144	130 26 33.9	310 19 49.7	Raybourn	4.381755	24,085.5	79,021
		171 19 30.7	351 18 56.3	Hardwick	4.014977	10,350.9	33,960
		73 18 00		Azimuth mark.			
Boyd, 1935 (d. m.)	34 04 10.608	130 17 09.8	310 11 02.3	Floyd	4.342070	21,982.1	72,120
	103 18 13.631	185 45 28.4	5 46 05.7	Portales	4.229503	16,963.0	55,653
		265 21 31		Azimuth mark.			
Delphos, 1935 (d. m.)	34 04 39.640	182 23 52.3	2 24 04.5	Floyd	4.124374	13,316.0	43,688
	103 29 30.324	229 55 44.6	50 02 41.8	Portales	4.395466	24,858.0	81,555
		272 53 54.7	93 00 13.8	Boyd	4.239900	17,374.0	57,001
		263 33 14		Azimuth mark.			
Red Lake, 1935 (d. m.)	33 55 17.766	191 54 20.8	11 55 40.4	Delphos	4.247804	17,693.1	58,048
	103 31 52.687	231 56 46.1	52 04 24.0	Boyd	4.426054	26,671.9	87,506
		192 05 57		Azimuth mark.			
Burkett, 1935 (d. m.)	33 54 33.743	94 16 14.4	274 09 34.7	Red Lake	4.266083	18,453.7	60,544
	103 19 56.263	141 45 48.5	321 40 27.6	Delphos	4.376243	23,781.7	78,024
		188 25 20.1	8 26 17.5	Boyd	4.254496	17,967.8	58,949
		19 45 30		Azimuth mark.			
Tanneyhill, 1935 (d. m.)	33 49 14.932	177 14 14.6	357 14 02.9	Red Lake	4.048909	11,192.0	36,719
	103 31 31.686	241 09 23.0	61 15 50.5	Burkett	4.309543	20,395.9	66,916
		0 01 45		Azimuth mark.			
Dean, 1935 (d. m.)	33 45 02.891	114 18 10.2	294 11 57.6	Tanneyhill	4.276597	18,905.9	62,027
	103 20 21.675	136 53 22.7	316 46 57.9	Red Lake	4.414513	25,972.5	85,211
		182 07 32.8	2 07 46.9	Burkett	4.245515	17,600.1	57,743
		0 11 35		Azimuth mark.			
Twin, 1935 (d. m.)	33 39 27.053	168 49 27.9	348 48 10.6	Tanneyhill	4.266304	18,463.1	60,574
	103 29 12.538	232 50 16.2	52 55 10.8	Dean	4.234133	17,144.8	56,249
		309 57 34.9	130 02 29.6	Blank	4.253449	17,924.6	58,808
		359 11 44.0	179 11 49.4	Tankersley	4.261025	18,240.0	59,842
		271 27 08		G. L. O. mark.			
Milne-Sand, 1935 (d. m.)	33 39 00.059	5 24 59.3	185 24 37.5	Blank	4.030926	10,738.1	35,230
	103 19 40.648	39 49 34.2	219 44 23.4	Tankersley	4.355083	22,650.8	74,313
		93 16 27.5	273 11 10.6	Twin	4.169061	14,759.1	48,422
		136 02 22.3	315 55 47.4	Tanneyhill	4.420649	26,342.0	86,424
		174 36 13.8	354 35 51.1	Dean	4.050320	11,228.5	36,839
		334 09 46		Azimuth mark.			
Supplementary points							
Cari, 1935 (d. m.)	35 10 20.642	314 13 19.1	134 21 01.6	Martin	4.454486	28,476.5	93,427
	103 36 31.326	6 12 53.6	186 11 57.7	Lobo	4.357708	22,788.1	74,764
		20 51 24.8	200 48 41.7	Redondo	4.305644	20,213.6	66,317
		47 15 19		Bench mark B 112.			

GEOGRAPHIC POSITIONS—Continued

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (NORTHERN SECTION)—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Los Angeles-Amarillo Airway, beacon No. 83, 1935 (d).	35 09 30.651	267 48 20.0	88 04 35.2	Cari	4.632237	42,878.2	140,676
	104 04 44.539	285 57 52.6	106 21 48.1	Martin	4.818813	65,889.0	216,171
		295 48 19.0	116 01 49.1	Redondo	4.598769	39,698.0	130,243
Los Angeles-Amarillo Airway, beacon No. 84, 1935 (d).	35 09 58.590	268 11 27.7	88 19 57.4	Cari	4.350332	22,404.3	73,505
	103 51 16.253	294 01 41.0	114 17 52.0	Martin	4.671311	46,914.9	153,920
		320 03 07.8	140 08 53.3	Redondo	4.375476	23,739.7	77,886
San Jon, 1935 (d. m.)	35 06 16.203	21 28 38.4	201 26 48.4	Martin	4.122901	13,270.9	43,540
	103 19 55.038	61 28 20.5	241 17 52.7	Lobo	4.499338	31,574.6	103,591
		70 48 15.0	250 35 59.8	Redondo	4.536197	34,371.4	112,767
		344 08 00		Azimuth mark.			
Vrain, 1935 (d. m.)	34 24 42.291	41 28 52.2	221 27 05.4	Raybourn	3.863104	7,296.3	23,938
	103 25 55.348	126 41 26.3	306 36 57.5	Melrose	4.179381	15,114.1	49,587
		274 14 51.5	94 19 00.8	Portair	4.052908	11,295.6	37,059
		94 22 52		Azimuth mark.			
Clovis Roof, 1935 (d. m.)	34 23 58.975	43 23 53.8	223 20 35.4	Hardwick	4.116528	13,077.6	42,905
	103 12 16.784	92 56 46.0	272 53 12.7	Portair	3.984754	9,655.0	31,676
		127 55 06.7	307 49 27.8	Gordon	4.287087	19,368.1	63,544
		87 15 16		Azimuth mark.			
Clovis Ground, 1935 (d. m.) [1]	34 23 58.92	181 45	1 45	Clovis Roof	0.203033	1.596	5.24
	103 12 16.79						
Clovis, water tank, 1935 (n. d.)	34 23 52.157	21 46 42.1	201 43 50.3	Portales	4.322760	21,026.2	68,983
	103 12 02.369	45 11 26.4	225 07 59.9	Hardwick	4.120059	13,184.4	43,256
		94 02 17.7	273 58 36.2	Portair	4.001533	10,035.4	32,924
Portales, water tank, 1935 (n. d.)	34 11 18.872	49 27 37.0	229 22 22.6	Delphos	4.276655	18,908.4	62,035
	103 20 09.881	94 12 09.7	274 07 07.0	Floyd	4.140801	13,829.3	45,372
		192 36 11.0	12 37 19.5	Hardwick	4.154065	14,258.2	46,779
		231 46 58.5	51 48 41.3	Portales	3.774759	5,953.3	19,532
Bench mark H 50 (U. S. G. S.), 1935 (d. m.) [1]	33 54 34.06	271 46 52	91 46 59	Burkett	2.500105	316.304	1,037.74
	103 20 08.57						

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (SOUTHERN SECTION)

Principal points												
Gulf (Tex.), 1935, r. 1938 (d. m.)	31 52 55.725	354 33 52			Azimuth mark.			
	103 10 09.249							
Scarborough (Tex.), 1935 (d. m.)	31 52 42.523	268 04 13.7	88 08 20.6	Gulf	4.089728	12,295.0	40,338
	103 17 56.790	224 00 10			Azimuth mark.			
New Mexico-Texas boundary (Clark), mile corner No. 8 (N. Mex.-Tex.), 1935, r. 1938 (d. m.).	32 00 00.761	347 15 36.9	167 16 36.4	Gulf	4.127796	13,421.3	44,033
	103 12 01.862	34 39 26.7	214 36 18.9	Scarborough	4.214961	16,404.4	53,820
Clarence (Tex.), 1935 (d. m.)	31 58 48.931	262 10 26.7	82 15 53.5	New Mexico-Texas boundary (Clark), mile corner No. 8.	4.213318	16,342.5	53,617
	103 22 18.667						
		299 32 00.0	119 38 25.7	Gulf	4.343084	22,033.5	72,288
		328 36 57.9	148 39 16.4	Scarborough	4.121130	13,216.9	43,362
		270 52 48		Azimuth mark.			
Winters, 1935 (d. m.)	32 07 57.280	355 11 50.3	175 12 15.3	New Mexico-Texas boundary (Clark), mile corner No. 8.	4.168174	14,729.0	48,323
	103 12 48.843						
		41 33 06.4	221 28 04.0	Clarence	4.353234	22,554.5	73,998
		96 38 09		Azimuth mark.			
Beard, 1935 (d. m.)	32 07 49.910	269 11 03.7	89 16 47.4	Winters	4.228872	16,938.4	55,572
	103 23 35.014	308 25 34.1	128 31 42.2	New Mexico-Texas boundary (Clark), mile corner No. 8.	4.365945	23,224.4	76,195
		353 08 26.0	173 09 06.6	Clarence	4.224862	16,782.7	55,061
		71 03 02		Azimuth mark.			
Hooper, 1935 (d. m.)	32 15 21.281	337 32 31.2	157 34 26.1	Winters	4.170164	14,796.7	48,546
	103 16 24.495	39 04 38.7	219 00 49.3	Beard	4.252887	17,901.4	58,732
		298 44 33		Azimuth mark.			
Page, 1935 (d. m.)	32 14 25.709	264 59 02.1	85 05 44.1	Hooper	4.296598	19,796.9	64,950
	103 28 57.915	295 09 47.7	115 18 23.9	Winters	4.448140	28,063.4	92,071
		325 13 20.5	145 16 12.5	Beard	4.171385	14,838.3	48,682
		178 42 02		Azimuth mark.			
Merchant, 1935 (d. m.)	32 22 12.238	333 15 04.6	153 17 14.9	Hooper	4.151467	14,173.2	46,500
	103 20 28.197	42 53 51.7	222 49 19.3	Page	4.292348	19,604.1	64,318
		212 55 34		Azimuth mark.			
Brinninstool, 1935 (d. m.)	32 17 24.537	245 30 35.6	65 37 14.4	Merchant	4.330888	21,423.4	70,287
	103 32 53.950	278 16 03.6	98 24 51.9	Hooper	4.417828	26,171.5	85,864
		311 42 14.6	131 44 20.6	Page	3.917862	8,276.8	27,155
		315 55 04		Azimuth mark.			
Berry, 1935 (d. m.)	32 29 40.965	307 46 40.6	127 52 46.0	Merchant	4.352900	22,537.2	73,941
	103 31 49.581	4 14 46.8	184 14 12.3	Brinninstool	4.356912	22,746.4	74,627
		292 48 30		Azimuth mark.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (SOUTHERN SECTION)—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Conoco, 1935, r. 1936 (d. m.)	32 28 23.773	21 48 39.6	201 47 05.7	Merchant	4.090811	12,325.7	40,439
	103 17 33.022	49 55 09.3	229 46 56.1	Brinninstool	4.498218	31,493.3	103,324
		96 07 57.4	276 00 17.4	Berry	4.352002	22,490.6	73,788
		3 52 45		Azimuth mark.			
King, 1935 (d. m.)	32 21 05.166	16 12 29.6	196 11 26.8	Hooper	4.042593	11,030.4	36,189
	103 14 26.869	102 21 45.9	282 18 32.5	Merchant	3.985442	9,670.3	31,727
		160 12 46.7	340 11 06.9	Conoco	4.157135	14,359.4	47,111
		148 35 01		Azimuth mark.			
Weir, 1935 (d. m.)	32 38 08.601	346 29 56.5	166 31 25.6	Conoco	4.267777	18,525.8	60,780
	103 20 18.651	49 06 27.1	229 00 15.2	Berry	4.377700	23,861.6	78,286
		110 05 51		Azimuth mark.			
Scharb, 1935 (d. m.)	32 40 03.348	280 30 49.6	100 37 21.8	Weir	4.284933	19,272.3	63,229
	103 32 25.605	312 43 08.4	132 51 08.9	Conoco	4.501401	31,725.0	104,084
		357 11 29.7	177 11 49.1	Berry	4.283182	19,194.7	62,975
		69 51 44		Azimuth mark.			
Alzugary, 1935 (d. m.)	32 45 14.336	340 43 42.7	160 45 17.7	Weir	4.142760	13,891.8	45,577
	103 23 14.548	56 19 05.9	236 14 08.1	Scharb	4.236924	17,255.4	56,612
		128 38 43		Azimuth mark.			
Lee, 1935 (d. m.)	32 44 20.081	265 07 38.6	85 14 30.8	Alzugary	4.299058	19,909.4	65,319
	103 35 56.600	295 01 27.4	115 09 53.9	Weir	4.431063	26,981.3	88,521
		325 11 18.7	145 13 12.7	Scharb	3.983650	9,630.5	31,596
		260 40 04		Bench mark H 38 (U. S. G. S.).			
Eidson, 1935 (d. m.)	32 52 59.348	350 47 00.7	170 47 49.1	Alzugary	4.161720	14,511.8	47,611
	103 24 43.834	47 37 29.5	227 31 25.0	Lee	4.374942	23,710.6	77,791
		221 50 38		Azimuth mark.			
Williams, 1935 (d. m.)	32 54 26.124	277 24 28.9	97 31 35.0	Eidson	4.313216	20,569.1	67,484
	103 37 48.535	306 43 18.0	126 51 11.8	Alzugary	4.453076	28,384.2	93,124
		351 07 38.1	171 08 38.8	Lee	4.276342	18,894.8	61,991
		73 36 52		Bench mark U 34.			
Rycade, 1935 (d. m.)	32 50 01.923	39 52 33.5	219 49 30.6	Lee	4.137242	13,716.5	45,002
	103 30 18.827	124 52 39.3	304 48 35.2	Williams	4.153663	14,245.0	46,735
		237 52 03.0	57 55 04.7	Eidson	4.012130	10,283.2	33,737
		308 42 48.6	128 46 38.4	Alzugary	4.150911	14,155.0	46,440
		141 23 36		Azimuth mark.			
Graham, 1935 (d. m.)	32 47 43.720	192 14 10.0	12 15 06.1	Williams	4.103277	12,684.6	41,616
	103 39 31.986	253 28 36.7	73 33 36.5	Rycade	4.176270	15,006.2	49,233
		318 11 51.3	138 13 47.9	Lee	3.924951	8,413.0	27,602
		294 38 34		Azimuth mark.			
Pello, 1935 (d. m.)	33 01 14.322	315 37 05.3	135 42 17.3	Eidson	4.328771	21,319.2	69,945
	103 34 17.483	23 34 02.2	203 32 07.4	Williams	4.137274	13,717.5	45,005
		252 57 19		G. L. O. pipe, secs. 12, 13, 7, 18, T. 15 S., R's. 33 & 34 E.			
Lea, 1935 (d. m.)	33 00 14.861	5 42 29.9	185 42 01.9	Eidson	4.129787	13,483.0	44,235
	103 23 52.242	63 44 46.6	243 37 11.8	Williams	4.384396	24,232.4	79,502
		96 29 13.2	276 23 32.6	Pello	4.213037	16,331.9	53,582
		202 26 20		Azimuth mark.			
Baum, 1935 (d. m.)	33 08 11.253	313 32 51.3	133 38 15.5	Lea	4.328051	21,283.9	69,829
	103 33 46.520	3 34 48.7	183 34 31.8	Pello	4.109550	12,869.2	42,222
		73 24 46		Azimuth mark.			
Austin, 1935 (d. m.)	33 06 29.239	15 28 10.0	195 27 02.9	Lea	4.077953	11,966.1	39,259
	103 21 49.290	63 29 55.7	243 23 07.5	Pello	4.336427	21,698.4	71,189
		99 38 52.6	279 32 20.7	Baum	4.275476	18,857.1	61,867
		266 22 44		Azimuth mark.			
Jones, 1935 (d. m.)	33 14 07.059	196 17 07.9	16 19 05.2	Lane	4.293852	19,672.2	64,541
	103 32 57.500	309 07 01.5	129 13 07.1	Austin	4.348901	22,330.6	73,263
		6 36 43.4	186 36 16.6	Baum	4.042755	11,034.6	36,203
		232 21 20		Azimuth mark.			
Callaghan, 1935 (d. m.)	33 12 47.175	4 54 28.6	184 54 07.5	Austin	4.067656	11,685.7	38,339
	103 21 10.730	66 35 30.6	246 28 37.0	Baum	4.329332	21,346.8	70,035
		97 42 45.2	277 36 17.9	Jones	4.266368	18,465.8	60,583
		149 09 43.5	329 05 12.6	Lane	4.395609	24,866.2	81,582
		187 14 38		Azimuth mark.			
Tatum, 1935 (d. m.)	33 18 21.134	355 45 13.3	175 45 29.5	Callaghan	4.013537	10,316.6	33,847
	103 21 40.227	65 59 16.5	245 53 04.9	Jones	4.283218	19,196.3	62,980
		132 42 22.2	312 38 07.2	Lane	4.212424	16,308.9	53,507
		190 42 54.0	10 43 52.4	Royal	4.168392	14,736.4	48,348
		280 44 11		Azimuth mark.			
Ranger, 1935 (d. m.)	33 16 05.259	75 35 45.2	255 30 45.7	Jones	4.164262	14,596.9	47,890
	103 23 51.431	219 02 00.2	39 03 12.2	Tatum	3.731558	5,389.6	17,682
		325 42 10.4	145 43 38.5	Callaghan	3.868390	7,385.7	24,231
		299 22 13		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (SOUTHERN SECTION)—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points	° ′ ″	° ′ ″	° ′ ″				
New Mexico-Texas boundary (Clark) mile corner No. 12 (N. Mex.-Tex.), 1935, r. 1938 (d. m.).	32 00 00.675 103 16 07.270	269 57 30.2	89 59 40.2	New Mexico-Texas boundary (Clark) mile corner No. 8.	3.808995	6,441.6	21,134
		324 16 42.2	144 19 51.5	Gulf	4.207270	16,116.5	52,876
		77 15 25.1	257 12 08.3	Clarence	3.999870	9,997.0	32,798
Bench mark H 105 (U. S. G. S.), 1935, r. 1938, (d. m.).[1]	32 00 00.73 105 16 02.55	89 14 44	269 14 42	New Mexico-Texas boundary (Clark) mile corner No. 12.	2.092777	123.816	406.22
T. 24 S., R. 34 E., sec. 4, southwest corner, 1935 (d. m.).[1]	32 14 21.18 103 28 58.74	188 46	8 46	Page	2.149736	141.168	463.15
Sims, 1935 (d. m.)	32 20 28.561 103 09 48.227	47 38 07.6	227 34 35.9	Hooper	4.147314	14,038.3	46,057
		98 49 02.5	278 46 33.4	King	3.867648	7,373.1	24,190
		218 19 13		Azimuth mark.			
Bench mark A 96, 1935 (d. m.) [1]	32 20 27.23 103 09 48.28	182 02 54	2 02 54	Sims	1.614127	41.127	134.93
T. 19 S., R. 34 E., sec. 10, southeast corner, 1935 (d. m.).[1]	32 40 02.81 103 32 20.62	97 13 04	277 13 01	Scharb	2.117361	131.027	429.88
Bench mark H 36 (U. S. G. S.), 1935 (d. m.) [1]	32 40 09.14 103 32 27.04	348 08 00	168 08 01	Scharb	2.260582	182.214	597.81
Hobbs, municipal water tank, 1935 (n. d.)	32 42 27.378 103 08 12.255	29 24 41.4	209 19 39.4	Conoco	4.474488	29,818.7	97,830
		67 12 53.4	247 06 21.3	Weir	4.312533	20,536.8	67,378
		102 24 55.4	282 16 47.6	Alzugary	4.381125	24,050.6	78,906
APACHE NATIONAL FOREST AREA							
Principal points							
Red Hill (U. S. F. S.) (Ariz.), 1935 (d. m.)	33 40 31.737 109 08 52.381	332 58 45.2	153 02 14.1	Whiterocks (U. S. G. S.)	4.331393	21,448.3	70,368
		47 45 02.4	227 40 06.7	Blue (U. S. G. S.)	4.269773	18,611.1	61,060
Saddle Mountain (U. S. F. S.), 1935 (d. m.)	33 36 55.875 109 00 01.314	17 38 39.8	197 37 14.9	Whiterocks (U. S. G. S.)	4.116468	13,075.8	42,900
		78 00 46.4	257 50 57.1	Blue (U. S. G. S.)	4.448507	28,087.1	92,149
		115 57 32.5	295 52 38.2	Red Hill (U. S. F. S.)	4.182287	15,215.5	49,920
Tularosa (U. S. G. S.), 1913, r. 1934 (d. m.)	33 40 36.39 108 34 34.90	330 06 16	150 06 16	Tularosa	0.659441	4.565	14.98
		66 09 50	245 54 21	Whiterocks (U. S. G. S.)	4.675830	47,405.6	155,530
		120 54 01	300 35 50	Escadilla (U. S. G. S.)	4.768518	58,683.8	192,532
Box (U. S. G. S.), 1913, r. 1915 (d. m.)	33 47 38.28 108 48 56.18	300 18 54	120 26 52	Tularosa (U. S. G. S.)	4.409941	25,700.5	84,319
		33 15 02	213 07 29	Whiterocks (U. S. G. S.)	4.585912	38,540.0	126,443
		121 07 12	300 56 59	Escadilla (U. S. G. S.)	4.518313	32,984.7	108,217
Fox (U. S. G. S.), 1913, r. 1915 (d. m.)	34 04 40.01 108 42 16.15	345 02 28	165 06 45	Tularosa (U. S. G. S.)	4.663048	46,030.7	151,019
		26 17 18	206 06 00	Whiterocks (U. S. G. S.)	4.851428	71,027.7	233,030
		69 30 10	249 16 11	Escadilla (U. S. G. S.)	4.613978	41,112.9	134,885
Apache (U. S. G. S.), 1913, r. 1915 (d. m.)	33 56 55.29 108 37 14.29	352 14 51	172 16 20	Tularosa (U. S. G. S.)	4.483405	30,437.2	99,859
		38 30 15	218 16 11	Whiterocks (U. S. G. S.)	4.799634	63,042.6	206,832
		46 28 59	226 22 28	Box (U. S. G. S.)	4.396182	24,899.0	81,689
		89 56 47	269 40 01	Escadilla (U. S. G. S.)	4.665219	46,261.4	151,776
		151 36 44	331 33 55	Fox (U. S. G. S.)	4.211629	16,279.0	53,409
Apache Mountain, south end (U. S. F. S.), 1935 (d. m.).	33 54 50.88 108 36 17.04	354 17 35	174 18 32	Tularosa (U. S. G. S.)	4.422549	26,457.5	86,803
		55 43 34	235 36 31	Box (U. S. G. S.)	4.373509	23,632.5	77,534
John Kerr (U. S. F. S.), 1935 (d. m.)	33 48 09.71 108 28 24.94	34 19 03	214 15 37	Tularosa (U. S. G. S.)	4.227999	16,904.4	55,461
		88 20 38	268 09 13	Box (U. S. G. S.)	4.500877	31,686.7	103,959
		135 33 43	315 29 20	Apache Mountain, south end (U. S. F. S.)	4.238595	17,321.9	56,830
T. 5 S., R. 17 W., southeast corner (U. S. F. S.), 1935 (n. d.).	33 49 23.83 108 33 20.43	6 43 58	186 43 17	Tularosa (U. S. G. S.)	4.213859	16,362.9	53,684
		82 22 37	262 13 57	Box (U. S. G. S.)	4.385366	24,286.6	79,680
		155 45 48	335 44 10	Apache Mountain, south end (U. S. F. S.)	4.043431	11,051.7	36,259
T. 5 S., R. 17 W., section 32, southeast corner (U. S. F. S.), 1935 (n. d.).	33 49 23.17 108 37 28.02	344 38 05	164 39 41	Tularosa (U. S. G. S.)	4.226093	16,830.3	55,217
		79 42 21	259 35 58	Box (U. S. G. S.)	4.255086	17,992.3	59,030
		190 14 15	10 14 54	Apache Mountain, south end (U. S. F. S.)	4.011166	10,260.4	33,663
Mangus (U. S. F. S.), 1935 (d. m.)	34 03 06.909 108 18 23.378	137 53 58.6	317 48 39.6	Pinon	4.336824	21,718.2	71,254
		222 52 11.9	42 56 09.6	Alegros	4.203176	15,965.3	52,379
El Caso (U. S. F. S.), 1935 (d. m.)	34 06 11.173 108 29 41.188	195 00 03.0	15 01 04.3	Pinon	4.033179	10,793.9	35,413
		257 52 58.0	78 03 16.2	Alegros	4.460407	28,867.4	94,709
		288 02 18.7	108 08 38.5	Mangus	4.262040	18,282.7	59,982

[1] No check on this position.

DESCRIPTIONS, ELEVATIONS, AND PLANE COORDINATES OF TRIANGULATION STATIONS

In all but recent triangulation publications of this Bureau the elevations and plane coordinates of the triangulation stations have been listed in separate tables apart from the descriptions. In recent publications, for the convenience of the engineer and others who use the information, the elevation and plane coordinates of a station are given with its description, in order to make the data readily available. Thus there appears in the description of each station all the information concerning the station except its geographic position, and this may be found in the list of geographic positions.

DESCRIPTIONS

The following descriptions of stations may be conveniently consulted by reference to the illustrations at the end of this publication or to the index. Azimuths given in the descriptions are geodetic azimuths, unless noted otherwise, and are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. These azimuths should not be confused with plane-coordinate or "grid" azimuths. (See p. 94.) Where magnetic azimuths are given they are indicated as such. Wherever the name of a point is printed in *italics* in the body of the descriptions, its position may be found in the tables.

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 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, U. S. Coast and Geodetic Survey, Washington, D. C.

MARKING OF STATIONS

The standard station and reference marks referred to in the following descriptions and notes consist of a disk and shank of bronze cast in one piece. The disk of the station mark (see fig. 3) 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 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. In recent years the slits in the stems of both station and

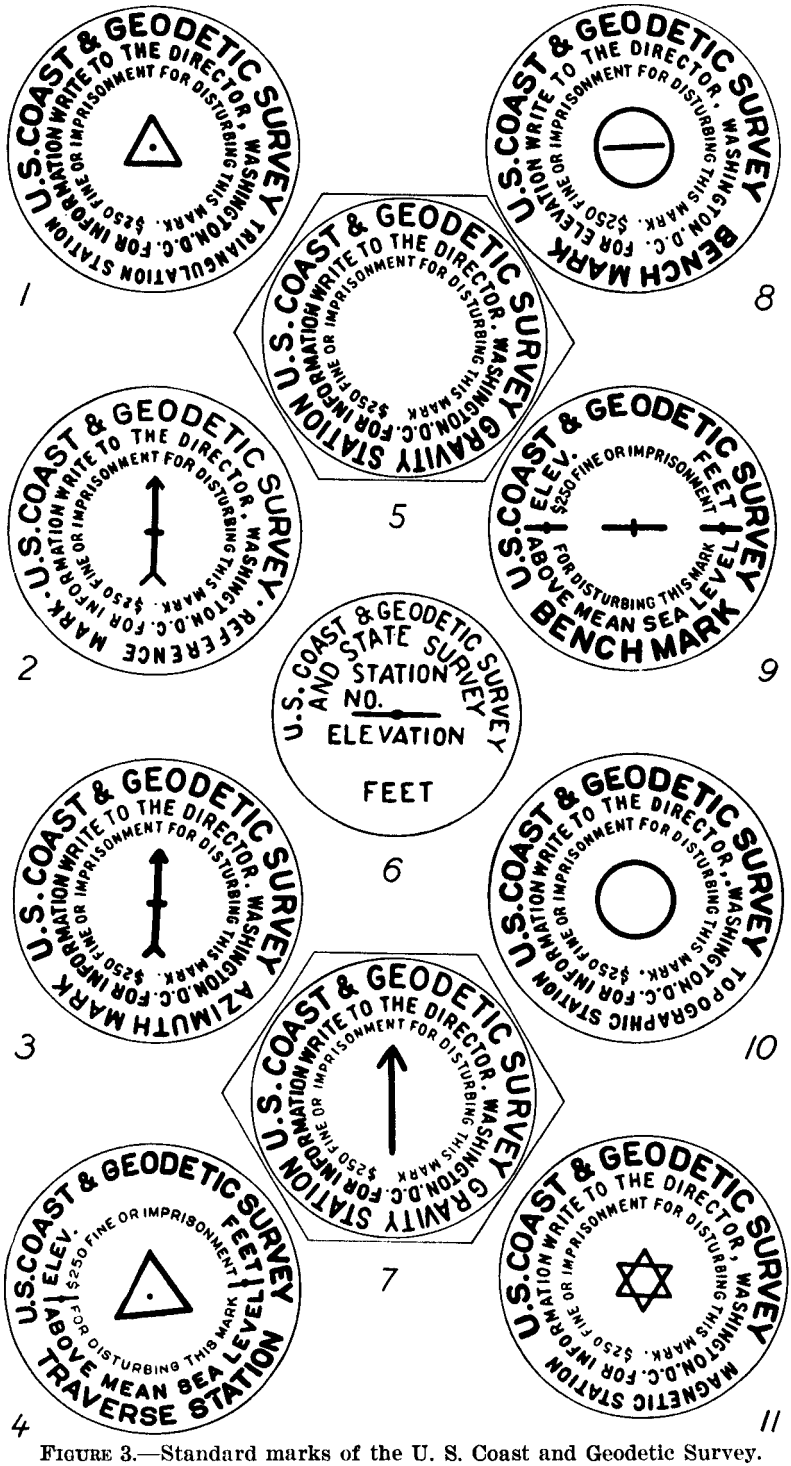

FIGURE 3.—Standard marks of the U. S. Coast and Geodetic Survey.

1. Triangulation station mark.
2. Reference mark.
3. Azimuth mark.
4. Traverse station mark.
5. Gravity station mark.
6. Local control survey mark.
7. Gravity station reference mark.
8. Tidal bench mark.
9. Geodetic bench mark.
10. Topographic station mark.
11. Magnetic station mark.

reference disks have been enlarged so that the two prongs may be spread far apart and set in concrete without the use of a wedge. The marks used between 1915 and 1920 have grooves cut around the shank instead of the slit.

The old type of station mark used in marking stations 20 or more years ago 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 disk azimuth mark is the same as the reference mark described above except that the words "azimuth mark" take the place of the words "reference mark" in the inscribed legend. (See Fig. 3.)

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 were made as general as possible in order that it might not be necessary in the field to describe small and unimportant variations.

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 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, (*c*) 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, (*b*) a standard disk triangulation station mark set in concrete in a depression, (*c*) a copper bolt set in concrete in a drill hole or depression, (*d*) an iron spike set point up in concrete 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 disk triangulation station mark set in concrete in a depression, (*c*) a copper bolt set in concrete in a drill hole or depression, (*d*) an iron spike set in concrete 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 and azimuth marks

Note 11.—A standard disk reference or azimuth 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 or azimuth 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 or azimuth 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.

ELEVATIONS

The elevations of some of the triangulation stations and bench marks included in this publication have been determined either by means of spirit levels or by means of vertical angle observations. Where the elevation of a station has been determined it is given at the end of the description of the station. The elevations are based on mean sea-level datum and are of varying accuracy.

Elevations determined by first- or second-order leveling are given to two decimal places in meters and one decimal place in feet, not because the absolute elevations are certain to this degree of refinement but because differences between adjacent marks are uncertain only in the last decimal place given.

In the cases where the elevations were determined by trigonometrical leveling, the elevations are given to one decimal place in meters and to the nearest whole foot since relatively inaccurate methods were used in the determination.

Absolute elevations, determined by spirit levels, in New Mexico are probably correct to within 1 foot, while the elevations determined by trigonometrical methods may be in error by 2 meters or possibly more.

Unless otherwise specified, the point to which the elevation refers is the top of the surface mark.

EXPLANATION OF PLANE-COORDINATE SYSTEM

In order to meet the various demands imposed upon it by engineering and surveying operations (see p. 10), a plane-coordinate system must satisfy conditions which naturally accompany requirements for accurate computations and exact results. The preservation of angles is one important factor to be considered; another factor of utmost importance is the elimination of variations of scale. Since variations of scale are inevitable, it becomes necessary to select a projection which will give definite scale values in certain directions, so that scale values may be tabulated, and through their use, when utmost accuracy is desired, one can eliminate the distortions of scale which result from the projection of spheroidal coordinates onto a plane.

These various requirements pointed very definitely to the adoption of one of the conformal projections. After due consideration it was decided to employ the Lambert conformal projection with two standard parallels in States with greatest extent in an east-west direction and the transverse Mercator projection where the greatest extent was in a north-south direction. Such a rule, however, could be applied only in those States which were of such limited extent in one of these directions that the entire State could be included in a single zone. It therefore became necessary to divide the larger States into a number of zones, using the projection in each which would satisfy the requirements of accuracy indicated by the limiting scale error, and at the same time keep to a minimum the number of zones required.

For these reasons the transverse Mercator projection with three zones was adopted for New Mexico (see fig. 4). It will be noticed that the junction lines between zones follow the county boundary lines; so that all stations in any county will be included in the same zone. Since, however, some surveys will extend across these artificial boundaries, the coordinates of stations which lie within what may be termed the borderland of two contiguous zones are given on both zones. With these data the engineer will not have to go from one zone of coordinates to the other in extending a survey a short distance beyond a boundary. Care must always be taken, however, to use in direct combination only coordinates which are given on the same zone. Where it is necessary to go from one zone or system to another, suitable directions for so doing will be found in Special Publication No. 193.

The geodetic positions in this publication have been reduced to plane coordinates which are given at the end of the description of each station. These coordinates are based upon the transverse Mercator projection of New Mexico with three zones. The zone upon which a station has been computed is denoted in the description by the capital letter directly preceding the plane coordinates in the second paragraph of each description. The letter (E) indicates the east zone, (W) the west zone, and (C) the central zone. Coordinate tables for the State have been prepared by this Bureau as a basis for computing the coordinates. The purpose in view in supplying these coordinates has been to provide for computations of surveys by the usual methods of plane surveying in which the convergence of the meridians is not considered. A State-wide application can now be made of principles ordinarily confined in common practice to very restricted areas.

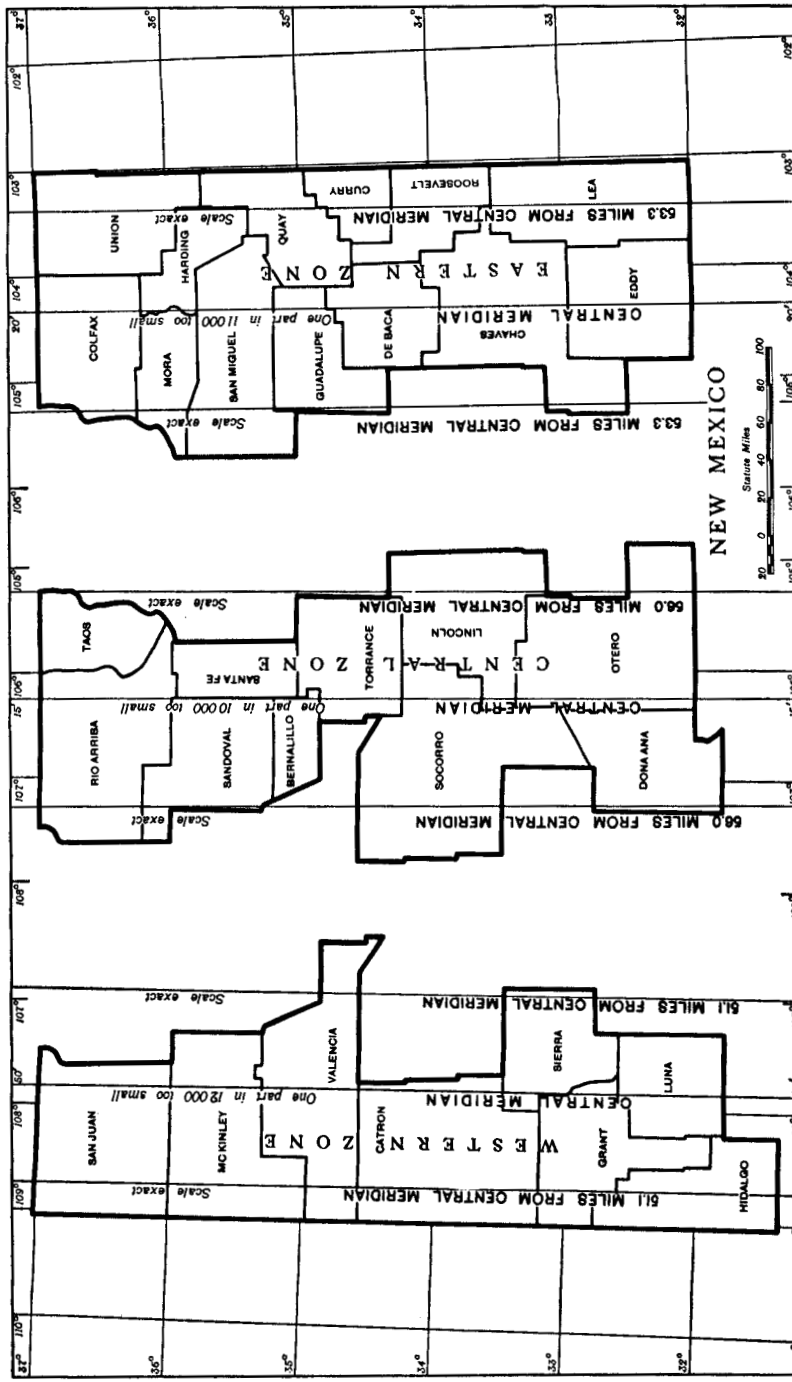

FIGURE 4.—Map of New Mexico with grid system outline.

The x and y coordinates are given in feet to two decimal places. This is one place farther than geodetic positions justify, but it was thought desirable to accept the positions as if they were correct to three decimal places, and carry two decimal places in the coordinates for use in adjusting traverses between fixed points.

The plane coordinates are in all essential features merely the plane representation of the spheroidal coordinates given in the tables of geodetic positions. For definite instructions regarding the use of plane coordinates, reference should be made to the following manuals of this Bureau: Special Publication No. 193, Manual of plane-coordinate computation, cost 35 cents; Special Publication No. 194, Manual of traverse computation on the Lambert grid, cost 20 cents; and Special Publication No. 195, Manual of traverse computation on the transverse Mercator grid, cost 25 cents. These manuals may be procured from the Superintendent of Documents, Washington, D. C. The State coordinate tables for this State are contained in this publication. (See p. 98.)

A few stations, for which geodetic positions are given in this publication, lie so far outside the State that plane coordinates were not computed for them on the grid of this State. If it becomes necessary to use any of these as control for local surveys, their coordinates should be obtained from the Coast and Geodetic Survey on the grid of the State in which they lie. Computation of traverses tied to them would then have to be made by passing from one grid to the other. The method of accomplishing this is given in Special Publication No. 193. It is not thought that this necessity will arise very often, but when it does occur the method of handling it is not complicated and the necessary computations can easily be made.

Explanation of plane lengths

The length of line between any two stations can be computed from the differences of coordinates just as is done in ordinary plane surveying. The resulting length is affected by the distortion due to the reduction of the actual curved surface of the earth to a plane. It must be corrected for the scale of the grid at that point to reduce it to the sea-level length listed in the geographic-position tables. Should it be desired to obtain the actual ground-level length, a further correction must be applied, as described on page 17 for lines of triangulation.

Explanation of plane or grid azimuths

The plane or grid azimuths given in the descriptions of stations are based upon the central meridian of the proper zone, and they therefore differ from the geodetic azimuths which appear in the lists of geographic positions and in the descriptions. The back azimuth differs from the forward azimuth by exactly 180°, hence it is necessary to list the azimuth of each line in only one direction.

Many of the azimuths listed are to special azimuth marks located at comparatively short distances from the stations. These marks have been placed at such positions as to be visible from the ground at the stations, and thus are readily available as starting azimuths for local surveys such as traverses. Since 1927 it has been the custom to establish these azimuth marks at most of the first-order stations determined by this Bureau.

The plane azimuth from a triangulation station to an azimuth mark or other triangulation station may be computed in two ways: first, by means of the formula:[4]

$$\text{Geodetic azimuth} - \text{grid azimuth} = \Delta\alpha + \frac{(y_2 - y_1)(2x_1' + x_2')}{(6\rho_0^2 \sin 1'')_g}$$

In this formula, the sub-one coordinates are the coordinates of the origin of the line, and the sub-two coordinates are those of the azimuth mark or other triangulation station. The x''s are the x coordinates minus 500,000. The value of $\Delta\alpha$ is the convergence of the meridian through the origin of the line with reference to the central meridian (Y axis) of the projection; it is constant for a given triangulation station, and is computed at the same time as the coordinates for a station, and on the same form.[5] The value of log $\frac{1}{(6\rho_0^2 \sin 1'')_g}$ is given among the constants of the projection, page 114, for the zone in which the station is located. The second method of computing a plane azimuth is by means of the usual plane-surveying formula:

$$\text{Tangent grid azimuth} = \frac{\Delta x}{\Delta y}$$

in which Δx and Δy are the respective differences of the x and y coordinates of two stations.

Since the second term of the first formula is negligible for distances up to approximately one mile, the grid azimuth may be derived by applying the $\Delta\alpha$ term directly to the geodetic azimuth. For azimuths over short distances, more consistent results will be obtained in this way than can be had through using the second (or tangent) formula. This is due to the fact that there are not enough significant figures in the differences of the x and y coordinates to make the second formula sufficiently exact.

Inconsistencies between the plane azimuths as computed from the two formulas may also arise when the coordinates of the azimuth mark are derived from a "no check" (see p. 16) geodetic position. This results from discarding the third decimal place of the seconds of latitude and longitude, and thus using only hundredths of seconds for computing the plane-coordinate position.

Since these inconsistencies diminish as the distance between the station and azimuth mark increases, the second formula has been used to compute the plane azimuths of such lines as are of sufficient length to make the difference negligible. In other words, when the distance between the station and the azimuth mark is such that both formulas give practically the same result, and when the coordinates of both station and azimuth mark are known, the second (or tangent) formula is used.

The first formula (neglecting the second term) has been used in computing the plane azimuths to all azimuth marks whose coordinates were not known; this includes practically all special azimuth marks, the distances to such marks being nearly always less than one mile, and very rarely known with sufficient accuracy to permit the computation of the position of the mark. The first formula was also used for computing the plane azimuths to stations whose

[4] See Special Publication No. 193, Manual of plane-coordinate computation, page 13.
[5] Idem, page 28.

plane coordinates were derived from "no check" geodetic positions, and to other azimuth marks whose coordinates were known, but for which consistent results were not obtained through the use of the second formula. In the descriptions of stations, the plane azimuths computed by means of the first formula are marked by footnotes. The plane azimuths computed by the second formula are carried out to tenths of seconds, distinguishing them from the ones computed by the first formula which are carried to even seconds only.

A table of values of $\Delta\alpha$ may be found on page 115. The latitude of a station and its distance from the central meridian ($\Delta\lambda$) are the arguments for obtaining $\Delta\alpha$ from this table. Straight-line interpolation in the table will give $\Delta\alpha$ within a tenth of a second of the value computed by means of the rigid formula.[6]

All of the $\Delta\alpha$'s for plane azimuths listed in the following descriptions were computed by formula instead of by use of the table. For most practical purposes the value derived by interpolation in the table will be sufficiently exact, that is, within a tenth of a second and will furnish an excellent check on the value computed by formula. For ease in interpolation horizontally, the tabular differences for each latitude listed are given in the two right-hand columns of the table. The tabular differences in the vertical direction are small enough so that no special aids are necessary for interpolating in that direction.

The following computation should serve as an example in the use of the table for computing $\Delta\alpha$. The position of station Lordsburg (p. 54) is: latitude (ϕ), 32°21′00′.445; longitude (λ), 108°42′41″.941. The geodetic azimuth to reference mark No. 1 is 189°11′59″. The grid azimuth is to be computed on the western zone of the plane-coordinate system. In this zone the central meridian is 107°50′00″.000 (see p. 114). This value minus λ equals −52′41″.941, the value of $\Delta\lambda$ with which to enter the table as one argument. The other argument is the latitude (ϕ). In the column headed 0°50′ opposite latitude 32°20′ is the value 26′44″.6. To this value add 2×32″.09 (minutes of $\Delta\lambda$ and value of $\Delta\alpha$ for 1′ of $\Delta\lambda$) and 41.941×0″.535 (seconds of $\Delta\lambda$ and value of $\Delta\alpha$ for 1″ of $\Delta\lambda$). The 32″.09 and 0″.535 appear in the last two columns of the table opposite latitude 32°20′. The result of these multiplications and addition is 28′11″.22, the value of $\Delta\alpha$ for latitude 32°20′ and $\Delta\lambda$, 52′41″.941. In the column headed 0°50′ opposite latitude 32°30′ is the value 26′52″.0. To this quantity add 2×32″.24 and 41.941×0″.537 giving 28′19″.00, the value of $\Delta\alpha$ for latitude 32°30′ and $\Delta\lambda$, 52′41″.941. Latitude 32°21′00″.445 is 1′00″.445 or 1′.0074 from 32°20′, the lower limit. The 1′.0074 is 0.10074 of the whole tabular difference for 10′. The difference between 28′19″.00 and 28′11″.22 is 7″.78. This multiplied by 0.10074 gives 0″.78 which added to 28′11″.22 gives 28′12″.00 as the final interpolated value of $\Delta\alpha$. As the value of $\Delta\lambda$ is negative, this value of $\Delta\alpha$ is also negative. The grid azimuth equals the geodetic azimuth minus $\Delta\alpha$; so, in this case the grid azimuth to reference mark No. 1 is equal to −28′12″.00 subtracted from 189°11′59″ which gives 189°40′11″.

[6] See Special Publication No. 195, p. 10.

EXPLANATION OF PLANE-COORDINATE PROJECTION TABLES

The State tables of plane coordinates (see p. 98) are intended primarily for use in the reduction of geodetic positions to grid coordinates, and they were computed with this end in view. However, they serve another purpose, as they are needed for use in the computation of surveys on the grid coordinate system. The zone projection constants are frequently needed in the solution of special problems, while the scale factors are necessary if computations are to produce exact results through the elimination of variations in scale.

There are several ways in which the table of scale variations can be used on the transverse Mercator grid. The scale varies with the distance from the central meridian and the factors are tabulated for every 5,000 feet from this meridian. The factor is the same at a given distance out from the central meridian, whether in an east or a west direction. This distance is given by the x' value, which is the x coordinate minus the added constant (500,000 in this State).

The first method would be to make a preliminary computation of these x' values for the various stations of the survey and then obtain the mean value of the x' for each line. An interpolation in the table of scale factors using the x' of each line as an argument would give a scale factor for each of the lines of the survey. This is probably the most accurate method of computing the scale factors.

A second method would be to make an approximate plotting of the traverse on a Geological Survey quadrangle map by means of angles and distances and from this map scale off approximate distances of the traverse stations from the central meridian. If the traverse runs from one control station to another, the x''s of these two stations being known, two lines could be drawn through them with known x' values. By scaling out from one or the other of these lines approximate x' values for all of the traverse stations could be determined. These could then be used just as the computed x' values were used in the first method.

A third method that is probably accurate enough for most traverses consists in computing a mean scale factor for the whole traverse. If a general mean x' for an entire traverse is determined, the scale factor corresponding to this value can be adopted and applied to all the lines of the traverse. The x''s of the control points will be known and from these an acceptable mean x' for the whole traverse can be determined and from it the mean scale factor.

The scale factors are given in two forms in the table on page 101: First, as a correction to the logarithm of the length; and second, as a factor for multiplying the length. The signs of the logarithmic corrections are adopted for algebraic addition to the logarithms of the measured lengths reduced to sea level. They are expressed in units of the seventh place of logarithms with tenths for the eighth place. The ratio form is used as a factor for multiplying the measured lengths to obtain the grid lengths. If the grid length is given, the process must be reversed to get the geodetic or sea-level length; that is, the logarithmic correction must be subtracted algebraically and the length must be divided by the factor. This gives the geodetic or sea-level length. To get the ground-level length a correction for elevation must also be applied. (See p. 17.) Before applying the grid correction to the measured lengths, they should be reduced to

sea level by applying a correction for elevation. Reference should be made to Special Publication No. 193, Manual of plane-coordinate computation and to Special Publication No. 195, Manual of traverse computation on the transverse Mercator grid. These publications give a full account of the use of the State tables and of the use of the coordinates in computations.

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO

Table I, east zone

Latitude	y	Tabular difference for 1 second of latitude	Latitude	y	Tabular difference for 1 second of latitude
° ′	*Feet*	*Feet*	° ′	*Feet*	*Feet*
31 00	0	101.02750	31 51	309,164.59	101.04117
01	6,061.65	783	52	315,227.06	133
02	12,123.32	800	53	321,289.54	167
03	18,185.00	833	54	327,352.04	200
04	24,246.70	867	55	333,414.56	217
05	30,308.42	883	31 56	339,477.09	101.04233
31 06	36,370.15	101.02917	57	345,539.63	283
07	42,431.90	950	58	351,602.20	300
08	48,493.67	967	31 59	357,664.78	317
09	54,555.45	2983	32 00	363,727.37	350
10	60,617.24	3017	32 01	369,789.98	101.04383
31 11	66,679.05	101.03050	02	375,852.61	417
12	72,740.88	067	03	381,915.26	433
13	78,802.72	100	04	387,977.92	450
14	84,864.58	117	05	394,040.59	500
15	90,926.45	167	32 06	400,103.29	101.04517
31 16	96,988.35	101.03183	07	406,166.00	533
17	103,050.26	200	08	412,228.72	567
18	109,112.18	233	09	418,291.46	600
19	115,174.12	250	10	424,354.22	617
20	121,236.07	283	32 11	430,416.99	101.04650
31 21	127,298.04	101.03317	12	436,479.78	683
22	133,360.03	333	13	442,542.59	700
23	139,422.03	367	14	448,605.41	733
24	145,484.05	383	15	454,668.25	750
25	151,546.08	417	32 16	460,731.10	101.04783
31 26	157,608.13	101.03450	17	466,793.97	817
27	163,670.20	467	18	472,856.86	833
28	169,732.28	500	19	478,919.76	867
29	175,794.38	533	20	484,982.68	883
30	181,856.50	550	32 21	491,045.61	101.04917
31 31	187,918.63	101.03567	22	497,108.56	950
32	193,980.77	600	23	503,171.53	4983
33	200,042.93	633	24	509,234.52	5000
34	206,105.11	667	25	515,297.52	033
35	212,167.31	683	32 26	521,360.54	101.05050
31 36	218,229.52	101.03700	27	527,423.57	083
37	224,291.74	733	28	533,486.62	100
38	230,353.98	767	29	539,549.68	133
39	236,416.24	800	30	545,612.76	167
40	242,478.52	817	32 31	551,675.86	101.05183
31 41	248,540.81	101.03833	32	557,738.97	217
42	254,603.11	883	33	563,802.10	250
43	260,665.44	900	34	569,865.25	267
44	266,727.78	917	35	575,928.41	300
45	272,790.13	950	32 36	581,991.59	101.05333
31 46	278,852.50	101.03983	37	588,054.79	350
47	284,914.89	4000	38	594,118.00	383
48	290,977.29	033	39	600,181.23	400
49	297,039.71	050	40	606,244.47	433
50	303,102.14	083			

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, east zone—Continued

Latitude	y	Tabular difference for 1 second of latitude	Latitude	y	Tabular difference for 1 second of latitude
° ′	*Feet*	*Feet*	° ′	*Feet*	*Feet*
32 41	612, 307. 73	101. 05467	33 41	976, 133. 37	101. 07100
42	618, 371. 01	483	42	982, 197. 63	133
43	624, 434. 30	517	43	988, 261. 91	150
44	630, 497. 61	550	44	994, 326. 20	200
45	636, 560. 94	567	45	1, 000, 390. 52	217
32 46	642, 624. 28	101. 05600	33 46	1, 006, 454. 85	101. 07233
47	648, 687. 64	617	47	1, 012, 519. 19	283
48	654, 751. 01	650	48	1, 018, 583. 56	300
49	660, 814. 40	683	49	1, 024, 647. 94	317
50	666, 877. 81	717	50	1, 030, 712. 33	367
32 51	672, 941. 24	101. 05733	33 51	1, 036, 776. 75	101. 07383
52	679, 004. 68	750	52	1, 042, 841. 18	400
53	685, 068. 13	783	53	1, 048, 905. 62	433
54	691, 131. 60	817	54	1, 054, 970. 08	467
55	697, 195. 09	850	55	1, 061, 034. 56	500
32 56	703, 258. 60	101. 05867	33 56	1, 067, 099. 06	101. 07517
57	709, 322. 12	900	57	1, 073, 163. 57	550
58	715, 385. 66	917	58	1, 079, 228. 10	583
32 59	721, 449. 21	950	33 59	1, 085, 292. 65	600
33 00	727, 512. 78	5983	34 00	1, 091, 357. 21	633
33 01	733, 576. 37	101. 06017	34 01	1, 097, 421. 79	101. 07650
02	739, 639. 98	033	02	1, 103, 486. 38	683
03	745, 703. 60	050	03	1, 109, 550. 99	717
04	751, 767. 23	100	04	1, 115, 615. 62	750
05	757, 830. 89	117	05	1, 121, 680. 27	767
33 06	763, 894. 56	101. 06133	34 06	1, 127, 744. 93	101. 07800
07	769, 958. 24	183	07	1, 133, 809. 61	833
08	776, 021. 95	200	08	1, 139, 874. 31	850
09	782, 085. 67	217	09	1, 145, 939. 02	883
10	788, 149. 40	250	10	1, 152, 003. 75	900
33 11	794, 213. 15	101. 06283	34 11	1, 158, 068. 49	101. 07933
12	800, 276. 92	300	12	1, 164, 133. 25	7967
13	806, 340. 70	350	13	1, 170, 198. 03	8000
14	812, 404. 51	367	14	1, 176, 262. 83	017
15	818, 468. 33	383	15	1, 182, 327. 64	050
33 16	824, 532. 16	101. 06417	34 16	1, 188, 392. 47	101. 08083
17	830, 596. 01	433	17	1, 194, 457. 32	100
18	836, 659. 87	483	18	1, 200, 522. 18	133
19	842, 723. 76	500	19	1, 206, 587. 06	150
20	848, 787. 66	533	20	1, 212, 651. 95	183
33 21	854, 851. 58	101. 06550	34 21	1, 218, 716. 86	101. 08217
22	860, 915. 51	583	22	1, 224, 781. 79	250
23	866, 979. 46	600	23	1, 230, 846. 74	283
24	873, 043. 42	633	24	1, 236, 911. 71	300
25	879, 107. 40	667	25	1, 242, 976. 69	317
33 26	885, 171. 40	101. 06700	34 26	1, 249, 041. 68	101. 08350
27	891, 235. 42	717	27	1, 255, 106. 69	383
28	897, 299. 45	750	28	1, 261, 171. 72	417
29	903, 363. 50	767	29	1, 267, 236. 77	433
30	909, 427. 56	800	30	1, 273, 301. 83	467
33 31	915, 491. 64	101. 06833	34 31	1, 279, 366. 91	101. 08500
32	921, 555. 74	867	32	1, 285, 432. 01	517
33	927, 619. 86	883	33	1, 291, 497. 12	550
34	933, 683. 99	917	34	1, 297, 562. 25	583
35	939, 748. 14	933	35	1, 303, 627. 40	600
33 36	945, 812. 30	101. 06966	34 36	1, 309, 692. 56	101. 08633
37	951, 876. 48	7000	37	1, 315, 757. 74	667
38	957, 940. 68	017	38	1, 321, 822. 94	683
39	964, 004. 89	050	39	1, 327, 888. 15	717
40	970, 069. 12	083	40	1, 333, 953. 38	750

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, east zone—Continued

Latitude		y	Tabular difference for 1 second of latitude	Latitude		y	Tabular difference for 1 second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
34	41	1, 340, 018. 63	101. 08783	35	41	1, 703, 964. 37	101. 10467
	42	1, 346, 083. 90	800		42	1, 710, 030. 65	500
	43	1, 352, 149. 18	817		43	1, 716, 096. 95	517
	44	1, 358, 214. 47	850		44	1, 722, 163. 26	550
	45	1, 364, 279. 78	900		45	1, 728, 229. 59	583
34	46	1, 370, 345. 12	101. 08917	35	46	1, 734, 295. 94	101. 10600
	47	1, 376, 410. 47	950		47	1, 740, 362. 30	633
	48	1, 382, 475. 84	8967		48	1, 746, 428. 68	667
	49	1, 388, 541. 22	9000		49	1, 752, 495. 08	683
	50	1, 394, 606. 62	017		50	1, 758, 561. 49	717
34	51	1, 400, 672. 03	101. 09067	35	51	1, 764, 627. 92	101. 10767
	52	1, 406, 737. 47	083		52	1, 770, 694. 38	783
	53	1, 412, 802. 92	100		53	1, 776, 760. 85	800
	54	1, 418, 868. 38	133		54	1, 782, 827. 33	833
	55	1, 424, 933. 86	167		55	1, 788, 893. 83	867
34	56	1, 430, 999. 36	101. 09200	35	56	1, 794, 960. 35	101. 10883
	57	1, 437, 064. 88	233		57	1, 801, 026. 88	917
	58	1, 443, 130. 42	250		58	1, 807, 093. 43	950
34	59	1, 449, 195. 97	267	35	59	1, 813, 160. 00	0983
35	00	1, 455, 261. 53	317	36	00	1, 819, 226. 59	1017
35	01	1, 461, 327. 12	101. 09333	36	01	1, 825, 293. 20	101. 11033
	02	1, 467, 392. 72	367		02	1, 831, 359. 82	050
	03	1, 473, 458. 34	383		03	1, 837, 426. 45	100
	04	1, 479, 523. 97	417		04	1, 843, 493. 11	117
	05	1, 485, 589. 62	450		05	1, 849, 559. 78	150
35	06	1, 491, 655. 29	101. 09483	36	06	1, 855, 626. 47	101. 11167
	07	1, 497, 720. 98	500		07	1, 861, 693. 17	217
	08	1, 503, 786. 68	533		08	1, 867, 759. 90	233
	09	1, 509, 852. 40	567		09	1, 873, 826. 64	250
	10	1, 515, 918. 14	583		10	1, 879, 893. 39	300
35	11	1, 521, 983. 89	101. 09617	36	11	1, 885, 960. 17	101. 11317
	12	1, 528, 049. 66	650		12	1, 892, 026. 96	350
	13	1, 534, 115. 45	667		13	1, 898, 093. 77	367
	14	1, 540, 181. 25	700		14	1, 904, 160. 59	400
	15	1, 546, 247. 07	733		15	1, 910, 227. 43	433
35	16	1, 552, 312. 91	101. 09767	36	16	1, 916, 294. 29	101. 11467
	17	1, 558, 378. 77	783		17	1, 922, 361. 17	500
	18	1, 564, 444. 64	817		18	1, 928, 428. 07	517
	19	1, 570, 510. 53	833		19	1, 934, 494. 98	533
	20	1, 576, 576. 43	883		20	1, 940, 561. 90	583
35	21	1, 582, 642. 36	101. 09900	36	21	1, 946, 628. 85	101. 11600
	22	1, 588, 708. 30	917		22	1, 952, 695. 81	633
	23	1, 594, 774. 25	967		23	1, 958, 762. 79	667
	24	1, 600, 840. 23	9983		24	1, 964, 829. 79	683
	25	1, 606, 906. 22	10000		25	1, 970, 896. 80	717
35	26	1, 612, 972. 22	101. 10050	36	26	1, 976, 963. 83	101. 11750
	27	1, 619, 038. 25	067		27	1, 983, 030. 88	767
	28	1, 625, 104. 29	100		28	1, 989, 097. 94	817
	29	1, 631, 170. 35	117		29	1, 995, 165. 03	833
	30	1, 637, 236. 42	150		30	2, 001, 232. 13	867
35	31	1, 643, 302. 51	101. 10183	36	31	2, 007, 299. 25	101. 11883
	32	1, 649, 368. 62	217		32	2, 013, 366. 38	917
	33	1, 655, 434. 75	233		33	2, 019, 433. 53	950
	34	1, 661, 500. 89	267		34	2, 025, 500. 70	1983
	35	1, 667, 567. 05	300		35	2, 031, 567. 89	2000
35	36	1, 673, 633. 23	101. 10333	36	36	2, 037, 635. 09	101. 12033
	37	1, 679, 699. 43	350		37	2, 043, 702. 31	067
	38	1, 685, 765. 64	383		38	2, 049, 769. 55	083
	39	1, 691, 831. 87	400		39	2, 055, 836. 80	117
	40	1, 697, 898. 11	433		40	2, 061, 904. 07	150

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, east zone—Continued

Latitude		y	Tabular difference for 1 second of latitude	Latitude		y	Tabular difference for 1 second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
36	41	2, 067, 971. 36	101. 12183	37	01	2, 189, 320. 76	101. 12750
	42	2, 074, 038. 67	200		02	2, 195, 388. 41	783
	43	2, 080, 105. 99	233		03	2, 201, 456. 08	817
	44	2, 086, 173. 33	267		04	2, 207, 523. 77	833
	45	2, 092, 240. 69	300		05	2, 213, 591. 47	867
36	46	2, 098, 308. 07	101. 12317	37	06	2, 219, 659. 19	101. 12900
	47	2, 104, 375. 46	350		07	2, 225, 726. 93	917
	48	2, 110, 442. 87	383		08	2, 231, 794. 68	950
	49	2, 116, 510. 30	400		09	2, 237, 862. 45	2983
	50	2, 122, 577. 74	433		10	2, 243, 930. 24	3017
36	51	2, 128, 645. 20	101. 12467	37	11	2, 249, 998. 05	101. 13050
	52	2, 134, 712. 68	500		12	2, 256, 065. 88	067
	53	2, 140. 780. 18	517		13	2, 262, 133. 72	083
	54	2, 146, 847. 69	550		14	2, 268, 201. 57	133
	55	2, 152, 915. 22	583		15	2, 274, 269. 45	150
36	56	2, 158, 982. 77	101. 12600	37	16	2, 280, 337. 34	101. 13183
	57	2, 165, 050. 33	633		17	2, 286, 405. 25	217
	58	2, 171, 117. 91	667		18	2, 292, 473. 18	250
36	59	2, 177, 185. 51	700		19	2, 298, 541. 13	267
37	00	2, 183, 253. 13	717		20	2, 304, 609. 09	

Table II, east zone

x′	Scale in units of seventh place of logarithms	Scale expressed as a ratio	x′	Scale in units of seventh place of logarithms	Scale expressed as a ratio
Feet			*Feet*		
0	−394. 8	0. 9999091	150, 000	−283. 0	0. 9999348
5, 000	−394. 7	091	155, 000	−275. 4	366
10, 000	−394. 3	092	160, 000	−267. 5	384
15, 000	−393. 7	093	165, 000	−259. 5	402
20, 000	−392. 8	096	170, 000	−251. 1	422
25, 000	−391. 7	0. 9999098	175, 000	−242. 6	0. 9999441
30, 000	−390. 3	101	180, 000	−233. 7	462
35, 000	−388. 7	105	185, 000	−224. 7	483
40, 000	−386. 8	109	190, 000	−215. 3	504
45, 000	−384. 7	114	195, 000	−205. 8	526
50, 000	−382. 4	0. 9999119	200, 000	−196. 0	0. 9999549
55, 000	−379. 8	126	205, 000	−185. 9	572
60, 000	−376. 9	132	210, 000	−175. 6	596
65, 000	−373. 8	140	215, 000	−165. 0	620
70, 000	−370. 4	147	220, 000	−154. 2	645
75, 000	−366. 8	0. 9999156	225, 000	−143. 1	0. 9999671
80, 000	−363. 0	164	230, 000	−131. 8	697
85, 000	−358. 9	174	235, 000	−120. 3	723
90, 000	−354. 5	184	240, 000	−108. 5	750
95, 000	−349. 9	194	245, 000	−96. 4	778
100, 000	−345. 1	0. 9999205	250, 000	−84. 1	0. 9999806
105, 000	−340. 0	217	255, 000	−71. 6	835
110, 000	−334. 6	230	260, 000	−58. 8	865
115, 000	−329. 1	242	265, 000	−45. 7	895
120, 000	−323. 2	256	270, 000	−32. 4	925
125, 000	−317. 1	0. 9999270	275, 000	−18. 9	0. 9999956
130, 000	−310. 8	284	280, 000	−5. 1	0. 9999988
135, 000	−304. 2	300	285, 000	+9. 0	1. 0000021
140, 000	−297. 4	315	290, 000	+23. 3	054
145, 000	−290. 3	332	295, 000	+37. 8	087

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table II, east zone—Continued

x'	Scale in units of seventh place of logarithms	Scale expressed as a ratio	x'	Scale in units of seventh place of logarithms	Scale expressed as a ratio
Feet			*Feet*		
300,000	+52.6	1.0000121	425,000	+503.1	1.0001158
305,000	+67.6	156	430,000	+524.4	207
310,000	+82.9	191	435,000	+545.9	257
315,000	+98.5	227	440,000	+567.6	307
320,000	+114.2	263	445,000	+589.6	358
325,000	+130.3	1.0000300	450,000	+611.8	1.0001409
330,000	+146.6	338	455,000	+634.3	461
335,000	+163.1	376	460,000	+657.1	513
340,000	+179.9	414	465,000	+680.1	566
345,000	+196.9	453	470,000	+703.3	619
350,000	+214.2	1.0000493	475,000	+726.8	1.0001674
355,000	+231.7	534	480,000	+750.5	728
360,000	+249.5	574	485,000	+774.5	783
365,000	+267.5	616	490,000	+798.8	839
370,000	+285.7	658	495,000	+823.2	895
375,000	+304.3	1.0000701	500,000	+848.0	1.0001953
380,000	+323.0	744	505,000	+872.9	2010
385,000	+342.0	787	510,000	+898.2	068
390,000	+361.3	832	515,000	+923.7	127
395,000	+380.8	877	520,000	+949.4	186
400,000	+400.6	1.0000922	525,000	+975.4	1.0002246
405,000	+420.6	0968	530,000	+1001.6	306
410,000	+440.8	1015			
415,000	+461.3	062			
420,000	+482.1	110			

Table I, central zone

Latitude	y	Tabular difference for one second of latitude	Latitude	y	Tabular difference for one second of latitude
° ′	*Feet*	*Feet*	° ′	*Feet*	*Feet*
31 00	0	101.02667	31 26	157,606.70	101.03350
01	6,061.60	683	27	163,668.71	383
02	12,123.21	717	28	169,730.74	400
03	18,184.84	733	29	175,792.78	433
04	24,246.48	783	30	181,854.84	467
05	30,308.15	783			
			31 31	187,916.92	101.03483
31 06	36,369.82	101.02833	32	193,979.01	517
07	42,431.52	850	33	200,041.12	533
08	48,493.23	867	34	206,103.24	567
09	54,554.95	900	35	212,165.38	583
10	60,616.69	933			
			31 36	218,227.53	101.03617
31 11	66,678.45	101.02950	37	224,289.70	650
12	72,740.22	2983	38	230,351.89	667
13	78,802.01	3000	39	236,414.09	700
14	84,863.81	033	40	242,476.31	733
15	90,925.63	067			
			31 41	248,538.55	101.03750
31 16	96,987.47	101.03083	42	254,600.80	783
17	103,049.32	117	43	260,663.07	800
18	109,111.19	133	44	266,725.35	833
19	115,173.07	167	45	272,787.65	850
20	121,234.97	200			
			31 46	278,849.96	101.03900
31 21	127,296.89	101.03217	47	284,912.30	900
22	133,358.82	233	48	290,974.64	950
23	139,420.76	283	49	297,037.01	967
24	145,482.73	300	50	303,099.39	3983
25	151,544.71	317			

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, central zone—Continued

Latitude		y	Tabular difference for one second of latitude	Latitude		y	Tabular difference for one second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
31	51	309, 161. 78	101. 04017	32	51	672, 935. 12	101. 05633
	52	315, 224. 19	050		52	678, 998. 50	667
	53	321, 286. 62	067		53	685, 061. 90	700
	54	327, 349. 06	100		54	691, 125. 32	733
	55	333, 411. 52	133		55	697, 188. 76	750
31	56	339, 474. 00	101. 04150	32	56	703, 252. 21	101. 05767
	57	345, 536. 49	183		57	709, 315. 67	817
	58	351, 599. 00	217		58	715, 379. 16	833
31	59	357, 661. 53	233	32	59	721, 442. 66	850
32	00	363, 724. 07	250	33	00	727, 506. 17	883
32	01	369, 786. 62	101. 04300	33	01	733, 569. 70	101. 05933
	02	375, 849. 20	300		02	739, 633. 26	933
	03	381, 911. 78	350		03	745, 696. 82	5967
	04	387, 974. 39	367		04	751, 760. 40	6000
	05	394, 037. 01	400		05	757, 824. 00	017
32	06	400, 099. 65	101. 04417	33	06	763, 887. 61	101. 06050
	07	406, 162. 30	450		07	769, 951. 24	083
	08	412, 224. 97	483		08	776, 014. 89	117
	09	418, 287. 66	500		09	782, 078. 56	133
	10	424, 350. 36	533		10	788, 142. 24	150
32	11	430, 413. 08	101. 04550	33	11	794, 205. 93	101. 06200
	12	436, 475. 81	583		12	800, 269. 65	217
	13	442, 538. 56	617		13	806, 333. 38	233
	14	448, 601. 33	633		14	812, 397. 12	267
	15	454, 664. 11	667		15	818, 460. 88	300
32	16	460, 726. 91	101. 04700	33	16	824, 524. 66	101. 06333
	17	466, 789. 73	717		17	830, 588. 46	350
	18	472, 852. 56	750		18	836, 652. 27	383
	19	478, 915. 41	767		19	842, 716. 10	400
	20	484, 978. 27	800		20	848, 779. 94	433
32	21	491, 041. 15	101. 04833	33	21	854, 843. 80	101. 06467
	22	497, 104. 05	850		22	860, 907. 68	500
	23	503, 166. 96	883		23	866, 971. 58	517
	24	509, 229. 89	900		24	873, 035. 49	533
	25	515, 292. 83	950		25	879, 099. 41	583
32	26	521, 355. 80	101, 04950	33	26	885, 163. 36	101. 06600
	27	527, 418. 77	5000		27	891, 227. 32	617
	28	533, 481. 77	017		28	897, 291. 29	667
	29	539, 544. 78	033		29	903, 355. 29	683
	30	545, 607. 80	067		30	909, 419. 30	700
32	31	551, 670. 84	101. 05100	33	31	915, 483. 32	101. 06733
	32	557, 733. 90	133		32	921, 547. 36	767
	33	563, 796. 98	150		33	927, 611. 42	800
	34	569, 860. 07	183		34	933, 675. 50	817
	35	575, 923. 18	200		35	939, 739. 59	850
32	36	581, 986. 30	101. 05233	33	36	945, 803. 70	101. 06883
	37	588, 049. 44	267		37	951, 867. 83	900
	38	594, 112. 60	283		38	957, 931. 97	933
	39	600, 175. 77	317		39	963, 996. 13	950
	40	606, 238. 96	350		40	970, 060. 30	6983
32	41	612, 302. 17	101. 05367	33	41	976, 124. 49	101. 07017
	42	618, 365. 39	400		42	982, 188. 70	050
	43	624, 428. 63	417		43	988, 252. 93	067
	44	630, 491. 88	450		44	994, 317. 17	083
	45	636, 555. 15	483		45	1, 000, 381. 42	133
32	46	642, 618. 44	101. 05500	33	46	1, 006, 445. 70	101. 07150
	47	648, 681. 74	533		47	1, 012, 509. 99	183
	48	654, 745. 06	567		48	1, 018, 574. 30	200
	49	660, 808. 40	583		49	1, 024, 638. 62	233
	50	666, 871. 75	617		50	1, 030, 702. 96	267

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, central zone—Continued

Latitude		y	Tabular difference for one second of latitude	Latitude		y	Tabular difference for one second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
33	51	1,036,767.32	101.07300	34	51	1,400,659.30	101.08967
	52	1,042,831.70	317		52	1,406,724.68	8983
	53	1,048,896.09	333		53	1,412,790.07	9017
	54	1,054,960.49	383		54	1,418,855.48	050
	55	1,061,024.92	400		55	1,424,920.91	083
33	56	1,067,089.36	101.07433	34	56	1,430,986.36	101.09100
	57	1,073,153.82	450		57	1,437,051.82	133
	58	1,079,218.29	483		58	1,443,117.30	150
33	59	1,085,282.78	517	34	59	1,449,182.79	183
34	00	1,091,347.29	533	35	00	1,455,248.30	233
34	01	1,097,411.81	101.07567	35	01	1,461,313.84	101.09233
	02	1,103,476.35	600		02	1,467,379.38	267
	03	1,109,540.91	617		03	1,473,444.94	300
	04	1,115,605.48	650		04	1,479,510.52	333
	05	1,121,670.07	683		05	1,485,576.12	350
34	06	1,127,734.68	101.07700	35	06	1,491,641.73	101.09383
	07	1,133,799.30	733		07	1,497,707.36	417
	08	1,139,863.94	767		08	1,503,773.01	450
	09	1,145,928.60	783		09	1,509,838.68	467
	10	1,151,993.27	817		10	1,515,904.36	500
34	11	1,158,057.96	101.07850	35	11	1,521,970.06	101.09517
	12	1,164,122.67	883		12	1,528,035.77	550
	13	1,170,187.40	900		13	1,534,101.50	583
	14	1,176,252.14	917		14	1,540,167.25	617
	15	1,182,316.89	967		15	1,546,233.02	633
34	16	1,188,381.67	101.07983	35	16	1,552,298.80	101.09667
	17	1,194,446.46	8000		17	1,558,364.60	683
	18	1,200,511.26	050		18	1,564,430.41	733
	19	1,206,576.09	067		19	1,570,496.25	750
	20	1,212,640.93	083		20	1,576,562.10	783
34	21	1,218,705.78	101.08133	35	21	1,582,627.97	101.09800
	22	1,224,770.66	150		22	1,588,693.85	833
	23	1,230,835.55	183		23	1,594,759.75	867
	24	1,236,900.46	200		24	1,600,825.67	900
	25	1,242,965.38	233		25	1,606,891.61	917
34	26	1,249,030.32	101.08267	35	26	1,612,957.56	101.09950
	27	1,255,095.28	300		27	1,619,023.53	9983
	28	1,261,160.26	317		28	1,625,089.52	10000
	29	1,267,225.25	333		29	1,631,155.52	033
	30	1,273,290.25	383		30	1,637,221.54	067
34	31	1,279,355.28	101.08400	35	31	1,643,287.58	101.10083
	32	1,285,420.32	433		32	1,649,353.63	117
	33	1,291,485.38	450		33	1,655,419.70	150
	34	1,297,550.45	483		34	1,661,485.79	167
	35	1,303,615.54	517		35	1,667,551.89	217
34	36	1,309,680.65	101.08550	35	36	1,673,618.02	101.10233
	37	1,315,745.78	567		37	1,679,684.16	250
	38	1,321,810.92	600		38	1,685,750.31	283
	39	1,327,876.08	633		39	1,691,816.48	317
	40	1,333,941.26	650		40	1,697,882.67	350
34	41	1,340,006.45	101.08683	35	41	1,703,948.88	101.10367
	42	1,346,071.66	700		42	1,710,015.10	417
	43	1,352,136.88	750		43	1,716,081.35	433
	44	1,358,202.13	767		44	1,722,147.61	450
	45	1,364,267.39	783		45	1,728,213.88	483
34	46	1,370,332.66	101.08833	35	46	1,734,280.17	101.10517
	47	1,376,397.96	850		47	1,740,346.48	550
	48	1,382,463.27	883		48	1,746,412.81	567
	49	1,388,528.60	900		49	1,752,479.15	600
	50	1,394,593.94	933		50	1,758,545.51	633

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, central zone—Continued

Latitude		y	Tabular difference for one second of latitude	Latitude		y	Tabular difference for one second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
35	51	1,764,611.89	101.10650	36	36	2,037,616.57	101.11933
	52	1,770,678.28	683		37	2,043,683.73	1967
	53	1,776,744.69	717		38	2,049,750.91	2000
	54	1,782,811.12	750		39	2,055,818.11	033
	55	1,788,877.57	767		40	2,061,885.33	050
35	56	1,794,944.03	101.10800	36	41	2,067,952.56	101.12083
	57	1,801,010.51	833		42	2,074,019.81	117
	58	1,807,077.01	850		43	2,080,087.08	150
35	59	1,813,143.52	883		44	2,086,154.37	167
36	00	1,819,210.05	917		45	2,092,221.67	200
36	01	1,825,276.60	101.10933	36	46	2,098,288.99	101.12233
	02	1,831,343.16	0983		47	2,104,356.33	250
	03	1,837,409.75	1000		48	2,110,423.68	283
	04	1,843,476.35	017		49	2,116,491.05	317
	05	1,849,542.96	067		50	2,122,558.44	350
36	06	1,855,609.60	101.11083	36	51	2,128,625.85	101.12367
	07	1,861,676.25	100		52	2,134,693.27	400
	08	1,867,742.91	150		53	2,140,760.71	433
	09	1,873,809.60	167		54	2,146,828.17	450
	10	1,879,876.30	200		55	2,152,895.64	500
36	11	1,885,943.02	101.11233	36	56	2,158,963.14	101.12517
	12	1,892,009.76	250		57	2,165,030.65	533
	13	1,898,076.51	283		58	2,171,098.17	583
	14	1,904,143.28	317	36	59	2,177,165.72	600
	15	1,910,210.07	333	37	00	2,183,233.28	633
36	16	1,916,276.87	101.11367	37	01	2,189,300.86	101.12667
	17	1,922,343.69	400		02	2,195,368.46	683
	18	1,928,410.53	433		03	2,201,436.07	717
	19	1,934,477.39	450		04	2,207,503.70	750
	20	1,940,544.26	483		05	2,213,571.35	767
36	21	1,946,611.15	101.11517	37	06	2,219,639.01	101.12800
	22	1,952,678.06	533		07	2,225,706.69	833
	23	1,958,744.98	583		08	2,231,774.39	867
	24	1,964,811.93	583		09	2,237,842.11	900
	25	1,970,878.88	633		10	2,243,909.85	917
36	26	1,976,945.86	101.11650	37	11	2,249,977.60	101.12933
	27	1,983,012.85	683		12	2,256,045.36	2983
	28	1,989,079.86	717		13	2,262,113.15	3017
	29	1,995,146.89	750		14	2,268,180.96	033
	30	2,001,213.94	767		15	2,274,248.78	067
36	31	2,007,281.00	101.11800	37	16	2,280,316.62	101.13083
	32	2,013,348.08	817		17	2,286,384.47	117
	33	2,019,415.17	867		18	2,292,452.34	150
	34	2,025,482.29	883		19	2,298,520.23	183
	35	2,031,549.42	917		20	2,304,588.14	

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table II, central zone

x'	Scale in units of seventh place of logarithms	Scale expressed as a ratio	x'	Scale in units of seventh place of logarithms	Scale expressed as a ratio
Feet			*Feet*		
0	−434.3	0.9999000	275,000	−58.4	0.9999866
5,000	−434.2	000	280,000	−44.6	897
10,000	−433.8	001	285,000	−30.5	930
15,000	−433.2	003	290,000	−16.2	963
20,000	−432.3	005	295,000	−01.7	0.9999996
25,000	−431.2	0.9999007	300,000	+13.1	1.0000030
30,000	−429.8	010	305,000	+28.1	065
35,000	−428.2	014	310,000	+43.4	100
40,000	−426.4	018	315,000	+59.0	136
45,000	−424.3	023	320,000	+74.8	172
50,000	−421.9	0.9999029	325,000	+90.8	1.0000209
55,000	−419.3	035	330,000	+107.1	247
60,000	−416.4	041	335,000	+123.6	285
65,000	−413.3	048	340,000	+140.4	323
70,000	−410.0	056	345,000	+157.4	362
75,000	−406.4	0.9999064	350,000	+174.7	1.0000402
80,000	−402.5	073	355,000	+192.2	443
85,000	−398.4	083	360,000	+210.0	484
90,000	−394.0	093	365,000	+228.0	525
95,000	−389.4	103	370,000	+246.3	567
100,000	−384.6	0.9999114	375,000	+264.8	1.0000610
105,000	−379.5	126	380,000	+283.6	653
110,000	−374.1	139	385,000	+302.6	697
115,000	−368.5	151	390,000	+321.8	741
120,000	−362.7	165	395,000	+341.3	786
125,000	−356.6	0.9999179	400,000	+361.1	1.0000831
130,000	−350.3	193	405,000	+381.1	878
135,000	−343.7	209	410,000	+401.4	924
140,000	−336.8	224	415,000	+421.9	0971
145,000	−329.7	241	420,000	+442.6	1019
150,000	−322.4	0.9999258	425,000	+463.6	1.0001067
155,000	−314.8	275	430,000	+484.9	117
160,000	−307.0	293	435,000	+506.4	166
165,000	−298.9	312	440,000	+528.2	216
170,000	−290.6	331	445,000	+550.2	267
175,000	−282.0	0.9999351	450,000	+572.4	1.0001318
180,000	−273.2	371	455,000	+594.9	370
185,000	−264.1	392	460,000	+617.6	422
190,000	−254.8	413	465,000	+640.6	475
195,000	−245.2	435	470,000	+663.9	529
200,000	−235.4	0.9999458	475,000	+687.4	1.0001583
205,000	−225.3	481	480,000	+711.1	637
210,000	−215.0	505	485,000	+735.1	693
215,000	−204.5	529	490,000	+759.4	749
220,000	−193.7	554	495,000	+783.9	805
225,000	−182.6	0.9999580	500,000	+808.6	1.0001862
230,000	−171.3	606	505,000	+833.6	919
235,000	−159.7	632	510,000	+858.8	1977
240,000	−147.9	659	515,000	+884.3	2036
245,000	−135.9	687	520,000	+910.0	095
			525,000	+936.0	155
250,000	−123.6	0.9999715			
255,000	−111.0	744			
260,000	−98.2	774			
265,000	−85.2	804			
270,000	−71.9	834			

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, west zone

Latitude	y	Tabular difference for one second of latitude	Latitude	y	Tabular difference for one second of latitude
° ′	*Feet*	*Feet*	° ′	*Feet*	*Feet*
31 00	0	101.02833	32 01	369,792.79	101.04450
01	6,061.70	850	02	375,855.46	483
02	12,123.41	883	03	381,918.15	517
03	18,185.14	917	04	387,980.86	533
04	24,246.89	933	05	394,043.58	567
05	30,308.65	967			
31 06	36,370.43	101.02983	32 06	400,106.32	101.04583
07	42,432.22	3017	07	406,169.07	617
08	48,494.03	050	08	412,231.84	650
09	54,555.86	067	09	418,294.63	667
10	60,617.70	100	10	424,357.43	700
31 11	66,679.56	101.03117	32 11	430,420.25	101.04733
12	72,741.43	150	12	436,483.09	750
13	78,803.32	183	13	442,545.94	783
14	84,865.23	200	14	448,608.81	800
15	90,927.15	217	15	454,671.69	833
31 16	96,989.08	101.03250	32 16	460,734.59	101.04867
17	103,051.03	283	17	466,797.51	883
18	109,113.00	317	18	472,860.44	917
19	115,174.99	333	19	478,923.39	933
20	121,236.99	367	20	484,986.35	4967
31 21	127,299.01	101.03383	32 21	491,049.33	101.05000
22	133,361.04	417	22	497,112.33	033
23	139,423.09	433	23	503,175.35	050
24	145,485.15	467	24	509,238.38	067
25	151,547.23	500	25	515,301.42	100
31 26	157,609.33	101.03517	32 26	521,364.48	101.05133
27	163,671.44	550	27	527,427.56	167
28	169,733.57	567	28	533,490.66	183
29	175,795.71	600	29	539,553.77	217
30	181,857.87	633	30	545,616.90	233
31 31	187,920.05	101.03650	32 31	551,680.04	101.05267
32	193,982.24	683	32	557,743.20	300
33	200,044.45	700	33	563,806.38	317
34	206,106.67	733	34	569,869.57	350
35	212,168.91	767	35	575,932.78	367
31 36	218,231.17	101.03783	32 36	581,996.00	101.05400
37	224,293.44	817	37	588,059.24	433
38	230,355.73	850	38	594,122.50	467
39	236,418.04	867	39	600,185.78	483
40	242,480.36	883	40	606,249.07	500
31 41	248,542.69	101.03917	32 41	612,312.37	101.05533
42	254,605.04	950	42	618,375.69	567
43	260,667.41	3983	43	624,439.03	600
44	266,729.80	4000	44	630,502.39	617
45	272,792.20	017	45	636,565.76	650
31 46	278,854.61	101.04050	32 46	642,629.15	101.05667
47	284,917.04	083	47	648,692.55	700
48	290,979.49	117	48	654,755.97	733
49	297,041.96	133	49	660,819.41	750
50	303,104.44	167	50	666,882.86	783
31 51	309,166.94	101.04183	32 51	672,946.33	101.05817
52	315,229.45	217	52	679,009.82	833
53	321,291.98	233	53	685,073.32	867
54	327,354.52	267	54	691,136.84	900
55	333,417.08	300	55	697,200.38	917
31 56	339,479.66	101.04317	32 56	703,263.93	101.05950
57	345,542.25	350	57	709,327.50	5967
58	351,604.86	383	58	715,391.08	6000
31 59	357,667.49	400	32 59	721,454.68	033
32 00	363,730.13	433	33 00	727,518.30	050

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, west zone—Continued

Latitude		y	Tabular difference for one second of latitude	Latitude		y	Tabular difference for one second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
33	01	733, 581. 93	101. 06083	34	01	1, 097, 430. 10	101. 07733
	02	739, 645. 58	117		02	1, 103, 494. 74	767
	03	745, 709. 25	133		03	1, 109, 559. 40	800
	04	751, 772. 93	167		04	1, 115, 624. 08	817
	05	757, 836. 63	200		05	1, 121, 688. 77	850
33	06	763, 900. 35	101. 06217	34	06	1, 127, 753. 48	101. 07867
	07	769, 964. 08	250		07	1, 133, 818. 20	900
	08	776, 027. 83	267		08	1, 139, 882. 94	933
	09	782, 091. 59	300		09	1, 145, 947. 70	950
	10	788, 155. 37	333		10	1, 152, 012. 47	7983
33	11	794, 219. 17	101. 06350	34	11	1, 158, 077. 26	101. 08017
	12	800, 282. 98	383		12	1, 164, 142. 07	050
	13	806, 346. 81	417		13	1, 170, 206. 90	067
	14	812, 410. 66	450		14	1, 176, 271. 74	100
	15	818, 474. 53	467		15	1, 182, 336. 60	117
33	16	824, 538. 41	101. 06483	34	16	1, 188, 401. 47	101. 08150
	17	830, 602. 30	517		17	1, 194, 466. 36	183
	18	836, 666. 21	550		18	1, 200, 531. 27	217
	19	842, 730. 14	583		19	1, 206, 596. 20	233
	20	848, 794. 09	600		20	1, 212, 661. 14	267
33	21	854, 858. 05	101. 06633	34	21	1, 218, 726. 10	101. 08283
	22	860, 922. 03	667		22	1, 224, 791. 07	317
	23	866, 986. 03	683		23	1, 230, 856. 06	350
	24	873, 050. 04	717		24	1, 236, 921. 07	383
	25	879, 114. 07	733		25	1, 242, 986. 10	400
33	26	885, 178. 11	101. 06767	34	26	1, 249, 051. 14	101. 08433
	27	891, 242. 17	800		27	1, 255, 116. 20	467
	28	897, 306. 25	817		28	1, 261, 181. 28	483
	29	903, 370. 34	850		29	1, 267, 246. 37	517
	30	909, 434. 45	883		30	1, 273, 311. 48	533
33	31	915, 498. 58	101. 06917	34	31	1, 279, 376. 60	101. 08567
	32	921, 562. 73	933		32	1, 285, 441. 74	600
	33	927, 626. 89	6950		33	1, 291, 506. 90	633
	34	933, 691. 06	7000		34	1, 297, 572. 08	650
	35	939, 755. 26	017		35	1, 303, 637. 27	683
33	36	945, 819. 47	101. 07033	34	36	1, 309, 702. 48	101. 08717
	37	951, 883. 69	067		37	1, 315, 767. 71	733
	38	957, 947. 93	100		38	1, 321, 832. 95	767
	39	964, 012. 19	133		39	1, 327, 898. 21	800
	40	970, 076. 47	150		40	1, 333, 963. 49	817
33	41	976, 140. 76	101. 07183	34	41	1, 340, 028. 78	101. 08850
	42	982, 205. 07	217		42	1, 346, 094. 09	883
	43	988, 269. 40	233		43	1, 352, 159. 42	917
	44	994, 333. 74	267		44	1, 358, 224. 77	933
	45	1, 000, 398. 10	300		45	1, 364, 290. 13	8950
33	46	1, 006, 462. 48	101. 07317	34	46	1, 370, 355. 50	101. 09000
	47	1, 012, 526. 87	350		47	1, 376, 420. 90	017
	48	1, 018, 591. 28	367		48	1. 382, 486. 31	050
	49	1, 024, 655. 70	400		49	1, 388. 551. 74	067
	50	1, 030, 720. 14	433		50	1, 394, 617. 18	100
33	51	1, 036, 784. 60	101. 07467	34	51	1, 400, 682. 64	101. 09133
	52	1, 042, 849. 08	483		52	1, 406, 748. 12	167
	53	1, 048, 913. 57	517		53	1, 412, 813. 62	183
	54	1, 054, 978. 08	533		54	1, 418, 879. 13	217
	55	1, 061, 042. 60	567		55	1, 424, 944. 66	250
33	56	1, 067, 107. 14	101. 07600	34	56	1, 431, 010. 21	101. 09267
	57	1, 073, 171. 70	633		57	1, 437, 075. 77	300
	58	1, 079, 236. 28	650		58	1, 443, 141. 35	333
33	59	1, 085, 300. 87	683	34	59	1, 449, 206. 95	350
34	00	1, 091, 365. 48	700	35	00	1, 455, 272. 56	383

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, west zone—Continued

Latitude		y	Tabular difference for one second of latitude	Latitude		y	Tabular difference for one second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
35	01	1,461,338.19	101.09417	36	01	1,825,307.02	101.11117
	02	1,467,403.84	433		02	1,831,373.69	133
	03	1,473,469.50	467		03	1,837,440.37	167
	04	1,479,535.18	500		04	1,843,507.07	200
	05	1,485,600.88	533		05	1,849,573.79	233
35	06	1,491,666.60	101.09550	36	06	1,855,640.53	101.11250
	07	1,497,732.33	583		07	1,861,707.28	283
	08	1,503,798.08	600		08	1,867,774.05	300
	09	1,509,863.84	633		09	1,873,840.83	333
	10	1,515,929.62	667		10	1,879,907.63	367
35	11	1,521,995.42	101.09700	36	11	1,885,974.45	101.11400
	12	1,528,061.24	717		12	1,892,041.29	433
	13	1,534,127.07	750		13	1,898,108.15	450
	14	1,540,192.92	783		14	1,904,175.02	483
	15	1,546,258.79	800		15	1,910,241.91	500
35	16	1,552,324.67	101.09833	36	16	1,916,308.81	101.11533
	17	1,558,390.57	867		17	1,922,375.73	567
	18	1,564,456.49	900		18	1,928,442.67	600
	19	1,570,522.43	917		19	1,934,509.63	633
	20	1,576,588.38	950		20	1,940,576.61	650
35	21	1,582,654.35	101.09967	36	21	1,946,643.60	101.11683
	22	1,588,720.33	10000		22	1,952,710.61	700
	23	1,594,786.33	033		23	1,958,777.63	733
	24	1,600,852.35	067		24	1,964,844.67	767
	25	1,606,918.39	083		25	1,970,911.73	800
35	26	1,612,984.44	101.10117	36	26	1,976,978.81	101.11817
	27	1,619,050.51	150		27	1,983,045.90	867
	28	1,625,116.60	183		28	1,989,113.02	883
	29	1,631,182.71	200		29	1,995,180.15	900
	30	1,637,248.83	233		30	2,001,247.29	933
35	31	1,643,314.97	101.10250	36	31	2,007,314.45	101.11967
	32	1,649,381.12	283		32	2,013,381.63	2000
	33	1,655,447.29	317		33	2,019,448.83	033
	34	1,661,513.48	350		34	2,025,516.05	050
	35	1,667,579.69	367		35	2,031,583.28	083
35	36	1,673,645.91	101.10400	36	36	2,037,650.53	101.12100
	37	1,679,712.15	433		37	2,043,717.79	150
	38	1,685,778.41	450		38	2,049,785.08	167
	39	1,691,844.68	483		39	2,055,852.38	200
	40	1,697,910.97	517		40	2,061,919.70	217
35	41	1,703,977.28	101.10550	36	41	2,067,987.03	101.12250
	42	1,710,043.61	567		42	2,074,054.38	283
	43	1,716,109.95	600		43	2,080,121.75	317
	44	1,722,176.31	633		44	2,086,189.14	333
	45	1,728,242.69	650		45	2,092,256.54	367
35	46	1,734,309.08	101.10683	36	46	2,098,323.96	101.12400
	47	1,740,375.49	717		47	2,104,391.40	433
	48	1,746,441.92	733		48	2,110,458.86	450
	49	1,752,508.36	767		49	2,116,526.33	483
	50	1,758,574.82	800		50	2,122,593.82	517
35	51	1,764,641.30	101.10817	36	51	2,128,661.33	101.12533
	52	1,770,707.79	867		52	2,134,728.85	567
	53	1,776,774.31	883		53	2,140,796.39	600
	54	1,782,840.84	917		54	2,146,863.95	633
	55	1,788,907.39	933		55	2,152,931.53	650
35	56	1,794,973.95	101.10967	36	56	2,158,999.12	101.12683
	57	1,801,040.53	1000		57	2,165,066.73	717
	58	1,807,107.13	017		58	2,171,134.36	750
35	59	1,813,173.74	050	36	59	2,177,202.01	767
36	00	1,819,240.37	083	37	00	2,183,269.67	800

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table I, west zone—Continued

Latitude		y	Tabular difference for one second of latitude	Latitude		y	Tabular difference for one second of latitude
°	′	*Feet*	*Feet*	°	′	*Feet*	*Feet*
37	01	2,189,337.35	101.12833	37	11	2,250,015.10	101.13117
	02	2,195,405.05	850		12	2,256,082.97	150
	03	2,201,472.76	883		13	2,262,150.86	167
	04	2,207,540.49	917		14	2,268,218.76	200
	05	2,213,608.24	950		15	2,274,286.68	233
37	06	2,219,676.01	101.12967	37	16	2,280,354.62	101.13267
	07	2,225,743.79	3000		17	2,286,422.58	283
	08	2,231,811.59	033		18	2,292,490.55	317
	09	2,237,879.41	067		19	2,298,558.54	350
	10	2,243,947.25	083		20	2,304,626.55	

Table II, west zone

x′	Scale in units of seventh place of logarithms	Scale expressed as a ratio	x′	Scale in units of seventh place of logarithms	Scale expressed as a ratio
Feet			*Feet*		
0	−361.9	0.9999167	200,000	−163.0	0.9999625
5,000	−361.8	167	205,000	−153.0	648
10,000	−361.4	168	210,000	−142.7	671
15,000	−360.8	169	215,000	−132.1	696
20,000	−359.9	171	220,000	−121.3	721
25,000	−358.8	0.9999174	225,000	−110.2	0.9999746
30,000	−357.4	177	230,000	−98.9	772
35,000	−355.8	181	235,000	−87.4	799
40,000	−353.9	185	240,000	−75.6	826
45,000	−351.8	190	245,000	−63.5	854
50,000	−349.5	0.9999195	250,000	−51.2	0.9999882
55,000	−346.9	201	255,000	−38.6	911
60,000	−344.0	208	260,000	−25.8	941
65,000	−340.9	215	265,000	−12.8	0.9999971
70,000	−337.5	223	270,000	+0.5	1.0000001
75,000	−333.9	0.9999231	275,000	+14.1	1.0000032
80,000	−330.1	240	280,000	+27.9	064
85,000	−326.0	249	285,000	+41.9	096
90,000	−321.6	259	290,000	+56.2	129
95,000	−317.0	270	295,000	+70.7	163
100,000	−312.2	0.9999281	300,000	+85.5	1.0000197
105,000	−307.1	293	305,000	+100.6	232
110,000	−301.7	305	310,000	+115.8	267
115,000	−296.2	318	315,000	+131.4	303
120,000	−290.3	332	320,000	+147.2	339
125,000	−284.2	0.9999346	325,000	+163.2	1.0000376
130,000	−277.9	360	330,000	+179.5	413
135,000	−271.3	375	335,000	+196.0	451
140,000	−264.5	391	340,000	+212.8	490
145,000	−257.4	407	345,000	+229.8	529
150,000	−250.0	0.9999424	350,000	+247.1	1.0000569
155,000	−242.5	442	355,000	+264.6	609
160,000	−234.6	460	360,000	+282.4	650
165,000	−226.6	478	365,000	+300.4	692
170,000	−218.2	498	370,000	+318.7	734
175,000	−209.7	0.9999517	375,000	+337.2	1.0000776
180,000	−200.8	538	380,000	+356.0	820
185,000	−191.8	558	385,000	+375.0	863
190,000	−182.4	580	390,000	+394.2	908
195,000	−172.9	602	395,000	+413.8	953

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table II, west zone—Continued

x'	Scale in units of seventh place of logarithms	Scale expressed as a ratio	x'	Scale in units of seventh place of logarithms	Scale expressed as a ratio
Feet			*Feet*		
400,000	+433.5	1.0000998	475,000	+759.8	1.0001750
405,000	+453.5	1044	480,000	+783.5	804
410,000	+473.8	090	485,000	+807.5	859
415,000	+494.3	138	490,000	+831.7	915
420,000	+515.0	186	495,000	+856.2	1971
425,000	+536.0	1.0001234	500,000	+880.9	1.0002028
430,000	+557.3	283	505,000	+905.9	086
435,000	+578.8	333	510,000	+931.1	144
440,000	+600.6	383	515,000	+956.6	203
445,000	+622.6	434	520,000	+982.4	262
			525,000	+1008.3	322
450,000	+644.8	1.0001485			
455,000	+667.3	537			
460,000	+690.0	589			
465,000	+713.0	642			
470,000	+736.3	695			

Table III, common to all three zones

Latitude	Colog A	Log C	Latitude	Colog A	Log C
° ′			° ′		
31 00	1.49066367	1.184158	31 36	1.49067736	1.194349
01	6405	4443	37	7775	4631
02	6443	4727	38	7813	4912
03	6481	5012	39	7851	5194
04	6519	5296	40	7889	5475
05	6556	5580			
			31 41	1.49067927	1.195756
31 06	1.49066594	1.185864	42	7966	6037
07	6632	6148	43	8004	6318
08	6670	6432	44	8042	6599
09	6708	6716	45	8081	6880
10	6746	7000			
			31 46	1.49068119	1.197161
31 11	1.49066784	1.187284	47	8157	7442
12	6822	7567	48	8196	7722
13	6860	7851	49	8234	8003
14	6898	8134	50	8272	8283
15	6936	8418			
			31 51	1.49068311	1.198563
31 16	1.49066974	1.188701	52	8349	8844
17	7012	8984	53	8388	9124
18	7050	9267	54	8426	9404
19	7088	9550	55	8465	9684
20	7126	89833			
			31 56	1.49068503	1.199964
31 21	1.49067164	1.190116	57	8541	200244
22	7202	0399	58	8580	0524
23	7240	0681	31 59	8618	0803
24	7278	0964	32 00	8657	1083
25	7317	1247			
			32 01	1.49068695	1.201362
31 26	1.49067355	1.191529	02	8734	1642
27	7393	1811	03	8772	1920
28	7431	2094	04	8811	2200
29	7469	2376	05	8850	2479
30	7507	2658			
			32 06	1.49068888	1.202758
31 31	1.49067545	1.192940	07	8927	3037
32	7583	3222	08	8965	3316
33	7622	3504	09	9004	3594
34	7660	3786	10	9042	3873
35	7698	4068			

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table III, common to all three zones—Continued

Latitude	Colog A	Log C	Latitude	Colog A	Log C
° ′			° ′		
32 11	1.49069081	1.204152	33 16	1.49071614	1.222109
12	9120	4430	17	1653	2383
13	9158	4709	18	1692	2657
14	9197	4988	19	1732	2930
15	9236	5266	20	1771	3204
32 16	1.49069274	1.205545	33 21	1.49071810	1.223478
17	9313	5823	22	1850	3751
18	9352	6101	23	1889	4024
19	9390	6380	24	1929	4298
20	9429	6658	25	1968	4571
32 21	1.49069468	1.206936	33 26	1.49072007	1.224844
22	9507	7214	27	2047	5117
23	9545	7492	28	2086	5390
24	9584	7769	29	2125	5663
25	9623	8047	30	2165	5936
32 26	1.49069662	1.208324	33 31	1.49072204	1.226209
27	9700	8602	32	2244	6481
28	9739	8879	33	2283	6754
29	9778	9156	34	2323	7026
30	9817	9433	35	2362	7298
32 31	1.49069856	1.209710	33 36	1.49072402	1.227571
32	9894	09987	37	2441	7843
33	9933	10264	38	2481	8116
34	69972	0541	39	2520	8388
35	70011	0818	40	2560	8660
32 36	1.49070050	1.211095	33 41	1.49072599	1.228932
37	0089	1372	42	2639	9205
38	0128	1649	43	2678	9477
39	0167	1925	44	2718	29749
40	0206	2202	45	2758	30021
32 41	1.49070244	1.212478	33 46	1.49072797	1.230293
42	0283	2755	47	2837	0565
43	0322	3031	48	2876	0837
44	0361	3307	49	2916	1108
45	0400	3584	50	2956	1380
32 46	1.49070439	1.213860	33 51	1.49072995	1.231651
47	0478	4136	52	3035	1923
48	0517	4411	53	3075	2194
49	0556	4687	54	3114	2466
50	0595	4963	55	3154	2737
32 51	1.49070634	1.215239	33 56	1.49073194	1.233008
52	0673	5514	57	3233	3279
53	0713	5790	58	3273	3550
54	0752	6065	33 59	3313	3821
55	0791	6341	34 00	3352	4092
32 56	1.49070830	1.216616	34 01	1.49073392	1.234363
57	0869	6892	02	3432	4634
58	0908	7167	03	3472	4904
32 59	0947	7442	04	3511	5175
33 00	0986	7717	05	3551	5446
33 01	1.49071025	1.217992	34 06	1.49073591	1.235716
02	1065	8267	07	3631	5987
03	1104	8542	08	3670	6257
04	1143	8817	09	3710	6528
05	1182	9091	10	3750	6798
33 06	1.49071221	1.219366	34 11	1.49073790	1.237068
07	1261	9641	12	3830	7339
08	1300	19915	13	3870	7609
09	1339	20190	14	3909	7879
10	1378	0464	15	3949	8149
33 11	1.49071417	1.220738	34 16	1.49073989	1.238419
12	1457	1013	17	4029	8689
13	1496	1287	18	4069	8959
14	1535	1561	19	4109	9228
15	1575	1835	20	4149	9498

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table III, common to all three zones—Continued

Latitude	Colog A	Log C	Latitude	Colog A	Log C
° ′			° ′		
34 21	1.49074189	1.239767	35 26	1.49076802	1.257165
22	4229	40037	27	6843	7431
23	4269	0306	28	6883	7697
24	4308	0576	29	6924	7962
25	4348	0844	30	6964	8228
34 26	1.49074388	1.241114	35 31	1.49077005	1.258494
27	4428	1384	32	7045	8759
28	4468	1653	33	7086	9025
29	4508	1922	34	7126	9290
30	4548	2191	35	7167	9556
34 31	1.49074588	1.242460	35 36	1.49077207	1.259822
32	4628	2729	37	7248	60086
33	4668	2999	38	7289	0352
34	4708	3268	39	7329	0617
35	4748	3536	40	7370	0882
34 36	1.49074789	1.243805	35 41	1.49077410	1.261147
37	4829	4074	42	7451	1412
38	4869	4343	43	7492	1677
39	4909	4611	44	7532	1942
40	4949	4880	45	7573	2207
34 41	1.49074989	1.245148	35 46	1.49077613	1.262471
42	5029	5417	47	7654	2736
43	5069	5685	48	7695	3001
44	5109	5953	49	7735	3265
45	5149	6221	50	7776	3530
34 46	1.49075190	1.246489	35 51	1.49077817	1.263794
47	5230	6757	52	7857	4059
48	5270	7025	53	7898	4323
49	5310	7293	54	7939	4588
50	5350	7561	55	7980	4852
34 51	1.49075390	1.247829	35 56	1.49078020	1.265116
52	5431	8097	57	8061	5380
53	5471	8364	58	8102	5645
54	5511	8632	35 59	8142	5909
55	5551	8900	36 00	8183	6173
34 56	1.49075591	1.249167	36 01	1.49078224	1.266437
57	5632	9435	02	8265	6701
58	5672	9702	03	8306	6965
34 59	5712	49970	04	8346	7229
35 00	5752	50237	05	8387	7493
35 01	1.49075793	1.250504	36 06	1.49078428	1.267756
02	5833	0771	07	8469	8020
03	5873	1038	08	8510	8284
04	5914	1305	09	8550	8547
05	5954	1572	10	8591	8811
35 06	1.49075994	1.251839	36 11	1.49078632	1.269074
07	6034	2106	12	8673	9338
08	6075	2373	13	8714	9601
09	6115	2639	14	8755	69865
10	6155	2906	15	8796	70128
35 11	1.49076196	1.253173	36 16	1.49078836	1.270391
12	6236	3439	17	8877	0655
13	6277	3706	18	8918	0918
14	6317	3972	19	8959	1181
15	6357	4238	20	9000	1444
35 16	1.49076398	1.254505	36 21	1.49079041	1.271707
17	6438	4771	22	9082	1970
18	6479	5037	23	9123	2233
19	6519	5304	24	9164	2496
20	6559	5570	25	9205	2759
35 21	1.49076600	1.255836	36 26	1.49079246	1.273021
22	6640	6102	27	9287	3284
23	6681	6368	28	9327	3547
24	6721	6634	29	9368	3809
25	6762	6900	30	9409	4072

PLANE-COORDINATE PROJECTION TABLES FOR NEW MEXICO—Continued

Table III, common to all three zones—Continued

Latitude	Colog A	Log C	Latitude	Colog A	Log C
° ′			° ′		
36 31	1.49079450	1.274334	36 56	1.49080478	1.280882
32	9491	4597	57	0519	1143
33	9532	4859	58	0560	1405
34	9573	5122	36 59	0601	1666
35	9614	5384	37 00	0642	1927
36 36	1.49079656	1.275646	37 01	1.49080683	1.282188
37	9697	5909	02	0725	2450
38	9738	6171	03	0766	2711
39	9779	6433	04	0807	2972
40	9820	6695	05	0848	3233
36 41	1.49079861	1.276957	37 06	1.49080890	1.283494
42	9902	7219	07	0931	3755
43	9943	7481	08	0972	4016
44	79984	7743	09	1013	4277
45	80025	8005	10	1054	4538
36 46	1.49080066	1.278267	37 11	1.49081096	1.284798
47	0107	8529	12	1137	5059
48	0148	8791	13	1178	5320
49	0189	9052	14	1220	5580
50	0231	9314	15	1261	5841
36 51	1.49080272	1.279575	37 16	1.49081302	1.286101
52	0313	79837	17	1344	6361
53	0354	80098	18	1385	6623
54	0395	0359	19	1426	6883
55	0436	0621	20	1467	7144

Table of constants

Constant	Zone		
	East	Central	West
λ, central meridian	104°20′00″.000	106°15′00″.000	107°50′00″.000
log R	−0.00003948	−0.00004343	−0.00003619
log $(1/6\rho_0^2)_g$	4.5816237−20	4.5816316−20	4.5816411−20
$\log\left(\frac{1}{6\rho_0^2 \sin 1''}\right)_g$	9.8960488−20	9.8960567−20	9.8960662−20

$$\text{Geodetic azimuth} - \text{grid azimuth} = \Delta\alpha + \frac{(y_2 - y_1)\,(2x_1' + x_2')}{(6\rho_0^2 \sin 1'')_g}$$

Table for computing $\Delta\alpha$

[$\Delta\alpha$ *has same sign as* $\Delta\lambda$]

Latitude		$\Delta\lambda$ = (Central meridian − λ)								Tabular differences	
		0°05′	0°10′	0°15′	0°20′	0°25′	0°30′	0°35′	0°40′	$\Delta\lambda$=1′	$\Delta\lambda$=1″
°	′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″		
31	00	2 34.5	5 09.0	7 43.5	10 18.0	12 52.6	15 27.1	18 01.6	20 36.1	+30.91	+0.515
	10	35.3	10.5	45.8	21.0	12 56.3	31.6	06.8	42.1	+31.06	+0.518
	20	36.0	12.0	48.0	24.0	13 00.0	36.0	12.1	48.1	+31.21	+0.520
	30	36.8	13.5	50.2	27.0	03.8	40.5	17.3	20 54.0	+31.35	+0.523
	40	37.5	15.0	52.5	30.0	07.5	45.0	22.5	21 00.0	+31.50	+0.525
	50	38.2	16.5	54.7	32.9	11.2	49.4	27.7	05.9	+31.65	+0.528
32	00	2 39.0	5 18.0	7 56.9	10 35.9	13 14.9	15 53.9	18 32.9	21 11.9	+31.80	+0.530
	10	39.7	19.4	7 59.2	38.9	18.6	15 58.3	38.0	17.8	+31.95	+0.532
	20	40.4	20.9	8 01.4	41.8	22.3	16 02.7	43.2	23.7	+32.09	+0.535
	30	41.2	22.4	03.6	44.8	26.0	07.2	48.4	29.6	+32.24	+0.537
	40	41.9	23.8	05.8	47.7	29.6	11.6	53.5	35.4	+32.39	+0.540
	50	42.7	25.3	08.0	50.6	33.3	16.0	18 58.6	41.3	+32.54	+0.542
33	00	2 43.4	5 26.8	8 10.2	10 53.6	13 37.0	16 20.4	19 03.8	21 47.2	+32.68	+0.545
	10	44.1	28.2	12.4	56.5	40.6	24.8	08.9	53.0	+32.83	+0.547
	20	44.8	29.7	14.6	10 59.4	44.3	29.1	14.0	21 58.9	+32.98	+0.550
	30	45.6	31.2	16.8	11 02.3	47.9	33.5	19.1	22 04.7	+33.12	+0.552
	40	46.3	32.6	18.9	05.2	51.6	37.9	24.2	10.5	+33.27	+0.554
	50	47.0	34.1	21.1	08.1	55.2	42.2	29.3	16.3	+33.41	+0.557
34	00	2 47.8	5 35.5	8 23.3	11 11.0	13 58.8	16 46.6	19 34.3	22 22.1	+33.56	+0.559
	10	48.5	37.0	25.4	13.9	14 02.4	50.9	39.4	27.9	+33.70	+0.562
	20	49.2	38.4	27.6	16.8	06.0	55.2	44.4	33.7	+33.85	+0.564
	30	49.9	39.8	29.8	19.7	09.6	16 59.5	49.5	39.4	+33.99	+0.567
	40	50.6	41.3	31.9	22.6	13.2	17 03.9	54.5	45.2	+34.13	+0.569
	50	51.4	42.7	34.1	25.4	16.8	08.2	19 59.5	50.9	+34.28	+0.571
35	00	2 52.1	5 44.2	8 36.2	11 28.3	14 20.4	17 12.5	20 04.5	22 56.6	+34.42	+0.574
	10	52.8	45.6	38.4	31.2	23.9	16.7	09.5	23 02.3	+34.56	+0.576
	20	53.5	47.0	40.5	34.0	27.5	21.0	14.5	08.0	+34.71	+0.578
	30	54.2	48.4	42.6	36.8	31.1	25.3	19.5	13.7	+34.85	+0.581
	40	54.9	49.8	44.8	39.7	34.6	29.5	24.5	19.4	+34.99	+0.583
	50	55.6	51.3	46.9	42.5	38.2	33.8	29.4	25.1	+35.13	+0.586
36	00	2 56.3	5 52.7	8 49.0	11 45.4	14 41.7	17 38.0	20 34.4	23 30.7	+35.27	+0.588
	10	57.0	54.1	51.1	48.2	45.2	42.3	39.3	36.4	+35.42	+0.590
	20	57.7	55.5	53.2	51.0	48.7	46.5	44.2	42.0	+35.56	+0.593
	30	58.4	56.9	55.3	53.8	52.2	50.7	49.2	47.6	+35.70	+0.595
	40	59.1	58.3	57.4	56.6	55.7	54.9	54.1	53.2	+35.84	+0.597
	50	2 59.8	5 59.7	8 59.5	11 59.4	14 59.2	17 59.1	20 59.0	23 58.8	+35.98	+0.600
37	00	3 00.5	6 01.1	9 01.6	12 02.2	15 02.7	18 03.3	21 03.8	24 04.4	+36.12	+0.602
	10	01.2	02.5	03.7	05.0	06.2	07.5	08.7	10.0	+36.25	+0.604
	20	01.9	03.9	05.8	07.8	09.7	11.6	13.6	15.5	+36.39	+0.607
	30	02.6	05.3	07.9	10.5	13.2	15.8	18.4	21.1	+36.53	+0.609

Table for computing Δ *α*—Continued

[*Δα has same sign as* Δλ]

Latitude		Δλ=(Central meridian−λ)								Tabular differences	
		0°45′	0°50′	0°55′	1°00′	1°05′	1°10′	1°15′	1°20′	Δλ=1′	Δλ=1″
°	′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″		
31	00	23 10.7	25 45.2	28 19.7	30 54.3	33 28.8	36 03.4	38 38.0	41 12.5	+30.91	+0.515
	10	17.4	25 52.7	28.0	31 03.2	38.5	13.8	38 49.2	24.5	+31.06	+0.518
	20	24.1	26 00.1	36.2	12.2	48.2	24.3	39 00.4	36.4	+31.21	+0.520
	30	30.8	07.6	44.4	21.1	33 57.9	34.7	11.5	41 48.3	+31.35	+0.523
	40	37.5	15.0	28 52.5	30.0	34 07.6	45.1	22.7	42 00.2	+31.50	+0.525
	50	44.2	22.4	29 00.7	38.9	17.2	36 55.5	33.8	12.1	+31.65	+0.528
32	00	23 50.8	26 29.8	29 08.8	31 47.8	34 26.9	37 05.9	39 44.9	42 23.9	+31.80	+0.530
	10	23 57.5	37.2	17.0	31 56.7	36.5	16.2	39 56.0	35.8	+31.95	+0.532
	20	24 04.1	44.6	25.1	32 05.6	46.1	26.6	40 07.1	47.6	+32.09	+0.535
	30	10.8	52.0	33.2	14.4	34 55.6	36.9	18.1	42 59.4	+32.24	+0.537
	40	17.4	26 59.3	41.3	23.2	35 05.2	47.2	29.2	43 11.1	+32.39	+0.540
	50	24.0	27 06.7	49.4	32.0	14.7	37 57.5	40.2	22.9	+32.54	+0.542
33	00	24 30.6	27 14.0	29 57.4	32 40.8	35 24.3	38 07.7	40 51.2	43 34.6	+32.68	+0.545
	10	37.2	21.3	30 05.5	49.6	33.8	18.0	41 02.1	46.3	+32.83	+0.547
	20	43.7	28.6	13.5	32 58.4	43.3	28.2	13.1	43 58.0	+32.98	+0.550
	30	50.3	35.9	21.5	33 07.1	35 52.7	38.4	24.0	44 09.6	+33.12	+0.552
	40	24 56.8	43.2	29.5	15.8	36 02.2	48.5	34.9	21.3	+33.27	+0.554
	50	25 03.4	50.4	37.5	24.5	11.6	38 58.7	45.8	32.9	+33.41	+0.557
34	00	25 09.9	27 57.7	30 45.5	33 33.2	36 21.0	39 08.8	41 56.6	44 44.5	+33.56	+0.559
	10	16.4	28 04.9	30 53.4	41.9	30.4	19.0	42 07.5	44 56.0	+33.70	+0.562
	20	22.9	12.1	31 01.3	50.6	39.8	29.1	18.3	45 07.6	+33.85	+0.564
	30	29.4	19.3	09.2	33 59.2	49.2	39.1	29.1	19.1	+33.99	+0.567
	40	35.8	26.5	17.1	34 07.8	36 58.5	49.2	39.9	30.6	+34.13	+0.569
	50	42.3	33.6	25.0	16.4	37 07.8	39 59.2	42 50.6	42.1	+34.28	+0.571
35	00	25 48.7	28 40.8	31 32.9	34 25.0	37 17.1	40 09.2	43 01.4	45 53.5	+34.42	+0.574
	10	25 55.1	48.0	40.8	33.6	26.4	19.2	12.1	46 04.9	+34.56	+0.576
	20	26 01.5	28 55.1	48.6	42.1	35.7	29.2	22.8	16.3	+34.71	+0.578
	30	07.9	29 02.2	31 56.4	50.7	44.9	39.2	33.4	27.7	+34.85	+0.581
	40	14.3	09.3	32 04.2	34 59.2	37 54.1	49.1	44.1	39.1	+34.99	+0.583
	50	20.7	16.4	12.0	35 07.7	38 03.3	40 59.0	43 54.7	46 50.4	+35.13	+0.586
36	00	26 27.1	29 23.4	32 19.8	35 16.2	38 12.5	41 08.9	44 05.3	47 01.7	+35.27	+0.588
	10	33.4	30.5	27.6	24.6	21.7	18.8	15.9	13.0	+35.42	+0.590
	20	39.8	37.5	35.3	33.1	30.9	28.7	26.5	24.2	+35.56	+0.593
	30	46.1	44.6	43.0	41.5	40.0	38.5	37.0	35.5	+35.70	+0.595
	40	52.4	51.6	50.7	49.9	49.1	48.3	47.5	46.7	+35.84	+0.597
	50	26 58.7	29 58.6	32 58.4	35 58.3	38 58.2	41 58.1	44 58.0	47 57.9	+35.98	+0.600
37	00	27 05.0	30 05.5	33 06.1	36 06.7	39 07.3	42 07.9	45 08.4	48 09.0	+36.12	+0.602
	10	11.2	12.5	13.8	15.0	16.3	17.6	18.9	20.2	+36.25	+0.604
	20	17.5	19.4	21.4	23.4	25.3	27.3	29.3	31.3	+36.39	+0.607
	30	23.7	26.4	29.0	31.7	34.3	37.0	39.7	42.4	+36.53	+0.609

Table for computing Δ α—Continued

[Δα *has same sign as* Δλ]

Latitude	Δλ=(Central meridian −λ)						Tabular differences	
	1° 25′	1° 30′	1° 35′	1° 40′	1° 45′	1° 50′	Δλ=1′	Δλ=1″
° ′	′ ″	′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″		
31 00	43 47.1	46 21.7	0 48 56.3	0 51 30.9	0 54 05.5	0 56 40.1	+30.91	+0.515
10	43 59.8	35.1	49 10.5	51 45.8	21.2	56 56.6	+31.06	+0.518
20	44 12.5	46 48.6	24.7	52 00.7	36.9	57 13.0	+31.21	+0.520
30	25.1	47 02.0	38.8	15.6	54 52.5	29.3	+31.35	+0.523
40	37.8	15.4	49 52.9	30.5	55 08.1	57 45.7	+31.50	+0.525
50	44 50.4	28.7	50 07.0	52 45.4	23.7	58 02.0	+31.65	+0.528
32 00	45 03.0	47 42.0	0 50 21.1	0 53 00.2	0 55 39.2	0 58 18.3	+31.80	+0.530
10	15.6	47 55.3	35.1	15.0	55 54.8	34.6	+31.95	+0.532
20	28.1	48 08.6	50 49.2	29.7	56 10.3	58 50.8	+32.09	+0.535
30	40.6	21.9	51 03.2	44.4	25.7	59 07.0	+32.24	+0.537
40	45 53.1	35.1	17.1	53 59.1	41.2	23.2	+32.39	+0.540
50	46 05.6	48 48.3	31.1	54 13.8	56 56.6	39.4	+32.54	+0.542
33 00	46 18.1	49 01.5	0 51 45.0	0 54 28.5	0 57 12.0	0 59 55.5	+32.68	+0.545
10	30.5	14.7	51 58.9	43.1	27.3	1 00 11.6	+32.83	+0.547
20	42.9	27.8	52 12.8	54 57.7	42.7	27.6	+32.98	+0.550
30	46 55.3	40.9	26.6	55 12.3	57 58.0	43.6	+33.12	+0.552
40	47 07.6	49 54.0	40.4	26.8	58 13.2	00 59.6	+33.27	+0.554
50	20.0	50 07.1	52 54.2	41.3	28.5	01 15.6	+33.41	+0.557
34 00	47 32.3	50 20.1	0 53 08.0	0 55 55.8	0 58 43.7	1 01 31.5	+33.56	+0.559
10	44.6	33.1	21.7	56 10.3	58 58.9	01 47.4	+33.70	+0.562
20	47 56.8	46.1	35.4	24.7	59 14.0	02 03.3	+33.85	+0.564
30	48 09.1	50 59.1	53 49.1	39.1	29.1	19.2	+33.99	+0.567
40	21.3	51 12.0	54 02.7	56 53.5	44.2	35.0	+34.13	+0.569
50	33.5	24.9	16.3	57 07.8	0 59 59.3	02 50.7	+34.28	+0.571
35 00	48 45.6	51 37.8	0 54 29.9	0 57 22.1	1 00 14.3	1 03 06.5	+34.42	+0.574
10	48 57.8	51 50.6	43.5	36.4	29.3	22.2	+34.56	+0.576
20	49 09.9	52 03.5	54 57.1	57 50.7	44.3	37.9	+34.71	+0.578
30	22.0	16.3	55 10.6	58 04.9	00 59.2	03 53.5	+34.85	+0.581
40	34.1	29.1	24.1	19.1	01 14.1	04 09.1	+34.99	+0.583
50	46.1	41.8	37.5	33.2	29.0	24.7	+35.13	+0.586
36 00	49 58.1	52 54.5	0 55 50.9	0 58 47.4	1 01 43.8	1 04 40.3	+35.27	+0.588
10	50 10.1	53 07.2	56 04.3	59 01.5	01 58.6	04 55.8	+35.42	+0.590
20	22.1	19.9	17.7	15.5	02 13.4	05 11.3	+35.56	+0.593
30	34.0	32.5	31.1	29.6	28.1	26.7	+35.70	+0.595
40	45.9	45.1	44.4	43.6	42.8	42.1	+35.84	+0.597
50	50 57.8	53 57.7	56 57.7	0 59 57.6	02 57.5	05 57.5	+35.98	+0.600
37 00	51 09.7	54 10.3	0 57 10.9	1 00 11.5	1 03 12.2	1 06 12.9	+36.12	+0.602
10	21.5	22.8	24.1	25.5	26.8	28.2	+36.25	+0.604
20	33.3	35.3	37.3	39.4	41.4	43.5	+36.39	+0.607
30	45.1	47.8	50.5	53.2	56.0	58.7	+36.53	+0.609

DESCRIPTIONS, ELEVATIONS, AND PLANE COORDINATES

TEXAS-CALIFORNIA ARC

Principal points

Quitman (Hudspeth County, Tex., J. S. Hill, 1909).—The station is near the U. S. Geological Survey station of the same name. It is 8½ miles air line, or 10 miles by road, S. 80° W. from the town of Sierra Blanca, on the highest peak of the Quitman Mountains near the northern end of the Quitman Range, and in the pasture of the Love brothers. The station was marked with a standard disk station mark set in bedrock according to note 2. The reference mark, a cross cut in the top of a large rock, is 3.83 meters (12.6 feet) from the station in azimuth 357°31′. Station *Quitman* (*U. S. G. S.*), marked with a cairn, is 2.0 meters (7 feet) from the station in azimuth 210°58′. In 1934 the station was reported destroyed and a new station, Quitman 2, was established in the same locality. Elevation: 2,038.3 meters (6,687 feet).

Black (Hudspeth County, Tex., J. S. Hill, 1909; 1934).—The station is 30 miles air line and 35 miles by road N. 23° E. from the town of Sierra Blanca, about 13 miles south-southwest of Salt Flat, and on the highest and most southern point of the southeast end of a small range of isolated mountains known locally as the Black Mountains, but given as the Sierra Prieta Mountains on the U. S. Geological Survey map of this region. The station is about 400 meters (1.312 feet) south of station Salt (U. S. G. S.), which is marked by a large rock on a very rough peak of about the same height as the one described above. The station is marked with a standard disk station mark set in bedrock according to note 2. A reference mark, a galvanized nail driven into a crevice in a rock 6 inches below its top and on the opposite side of the rock from the station, is 3.39 meters (11.1 feet) from station in azimuth 83°.0 from the station. The station and reference mark were recovered in 1931. In 1934 they were recovered and an azimuth mark and two new reference marks, consisting of standard disks set in drill doles in rock according to note 12*c*, were established. Reference mark no. 1 is 32.6 feet from the station in azimuth 216°32′, and no. 2 is 45.8 feet from the station in azimuth 57°42′. The azimuth mark is 0.25 mile from the station in azimuth 230°16′40″. Elevation: 1,695.0 meters (5,561 feet).

Corduna (Otero County, J. S. Hill, 1909; 1937).—The station is near the U. S. Geological Survey station of the same name. It is 60 miles air line north of the town of Sierra Blanca, Texas, about 15 miles north of U. S. Highway 62, about 1½ miles north of the Texas-New Mexico boundary, and about 3 miles northeast of San Antonio Peak, on the highest and most northern peak, known locally as Wind Mountain, of the Las Cornudas Mountains. The station was marked with a standard disk station mark set in bedrock according to note 2. The reference mark, a cross cut in the top of a rock, is 4.634 meters (15.20 feet) from the station in azimuth 157°43′. Station *Corduna* (*U. S. G. S.*), marked with a cairn, is 7.8 meters (26 feet) from the station in azimuth 170°48′. In 1914 the station was recovered; the cairn marking *Corduna* (*U. S. G. S.*) was torn down and rebuilt in the same location. In 1937 the stations and reference mark were recovered and a new reference mark and an azimuth mark were established. The new reference mark, a standard disk reference mark, was cemented in a drill hole in rock according to note 12*c* and is 3.273 meters (10.74 feet) from the station in azimuth 263°09′. The azimuth mark, a standard disk azimuth mark set in a drill hole in a large, flat rock about 4 by 6 feet across the top and flush with the ground, is about 1.5 miles from the station in azimuth 77°21′49″. It is at the southeast base of the steep part of a hill which is about 500 feet high and about 0.4 mile southwest of a wire enclosure and dirt tank. Elevation: 2,218.4 meters (7,278 feet).

For notes in regard to marking of stations see p. 90.

Plane coordinates: (C), x=727,618.68 feet; y=373,707.49 feet; grid azimuth to azimuth mark=76°58′27″.*

North Franklin (El Paso County, Tex., J. S. Hill, 1909; 1936).—The station is near the U. S. Geological Survey station of the same name. It is 10 miles air line north of El Paso, about 6 miles east of Canutillo, Tex., and on the highest peak of the Franklin Mountains. The peak is smooth in appearance, rather pointed, reddish brown in color, the darkest in the Franklin Range, and, as viewed from El Paso, it is the second peak north of the one which rises in El Paso. To reach from El Paso follow the highway from El Paso to Alamogordo, N. Mex. (State Highway 33), to a point 1.8 miles beyond Restlawn Cemetery, turn left on dirt road, known as the Dona Ana Road, at this point and go northwest 0.9 mile to a fork, take the left fork and continue 2.1 miles to a gate at the entrance to a park, continue up the canyon 0.7 mile to the end of the road. From this point it is a 2½-hour pack up to the canyon to the west, keeping well below and to the north of a high and prominent peak. After passing the peak bear to the southwest and follow the ridge to the highest point and the station. No attempt should be made to reach this peak by the way of Fusselman Canyon, which is to the left of the peak, without first interviewing the authorities at Fort Bliss. The station is marked with a U. S. Geological Survey bench-mark disk cemented into a drill hole in the solid rock. The disk is inscribed with the elevation 7,141 feet. The old reference mark is the highest point of the upper one of two outcropping rocks on the north side of the ridge, 0.48 meter (1.6 feet) from the south point and 0.47 meter (1.5 feet) from the west point of the rock, and 14.61 meters (47.9 feet) from the station in azimuth 303°38′. Station *North Franklin* (*U. S. G. S.*), *cairn* is 2.9 meters (10 feet) from the station in azimuth 174°05′. The station and reference mark were recovered in 1931. In 1934 two new reference marks, standard reference disks set in outcropping bedrock according to note 12*a*, were established. Reference mark No. 1 is 4.37 meters (14.3 feet) from the station in azimuth 290°.4, and No. 2 is 18.10 meters (59.4 feet) (slope distance), or 17.67 meters (58.0 feet) (horizontal distance), from the station in azimuth 25°01′. In 1936 the station and reference marks were recovered. Elevation: 2,187.3 meters (7,176 feet).

Plane coordinates: (C), x=424,565.72 feet; y=328,456.36 feet.

Jarilla (Otero County, J. S. Hill, 1909; 1936).—The station is on the extreme southern peak of the Jarilla Mountains, but not on the highest peak of the range, about 2½ miles air line N. 26° W. from the railroad station at Orogrande. From Orogrande take the road leading through the town to the Jarilla Mountains. The position of the station is well known to the residents of Orogrande and can be pointed out from the town. The station is marked with a standard disk station mark set in bedrock according to note 2. The reference mark, the center of an iron pipe embedded in cement, is 7.14 meters (23.4 feet) from the station in azimuth 269°42′. A conical pile of rocks with a stone at the top bearing the inscription "I. P. Jarilla U. S. M. M." is 9.72 meters (31.9 feet) from the station in azimuth 275°42′. *Jarilla latitude and longitude station* (see geographic position and description thereof) is 2.5 meters (8 feet) due east and 0.38 meter (1.2 feet) due south of the station. The station was recovered in 1931, 1934, and 1936. In 1936 a new reference mark, R. M. No. 1, a standard disk reference mark set in bedrock according to note 12*a*, was established 7.418 meters (24.34 feet) from the station in azimuth 84°28′, and an azimuth mark, a standard disk mark set in concrete according to note 13*a*, was established about ¾ mile from the station in azimuth 308°21′14″. The azimuth mark is 100 feet northwest of a Y-intersection of a track road, 66 feet west of the center line of one and 33 feet north of the center line of another track road. The azimuth from the station to the center of a wooden water tank on the Southern Pacific Railway at Orogrande, 3 miles distant, is 316°06′57″. Elevation: 1,478.1 meters (4,849 feet).

Plane coordinates: (C), x=542,470.63 feet; y=509,214.97 feet; grid azimuth to azimuth mark=308°16′49″.*

Kent (Dona Ana County, J. S. Hill, 1909; 1936).—The station is about 22 miles air line northeast of Las Cruces, 9 miles northeast of the town of Organ, and on the most northern and highest one of three peaks close together on Black Mountain. Black Mountain is a spur running eastward from the San

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Andres Range just north of the San Augustin Pass and has a mine on its west side about 100 meters (328 feet) from the top. To reach from Organ, go eastward 8.4 miles on State Highway 3, turn left and follow unimproved road past ranch buildings and a windmill toward the peak. Trucks can be taken with ease to the old, abandoned mines, and with caution to the large, white rock at the mouth of the canyon to the left of the peak, from which point it is a three-hour pack with very steep and rough going. The station was marked with a standard station disk set in outcropping rock according to note 2. The reference mark, a crosscut in the top of a flat rock which is two feet lower than the station, is 6.86 meters (22.5 feet) from the station in azimuth 160°15′. The station was recovered in 1931, 1934 and 1936. In 1934 two new reference marks, standard reference mark disks set in outcropping bedrock according to note 12*a*, were established. Reference mark No. 1 is 6.817 meters (22.37 feet) from the station in azimuth 160°52′, and No. 2 is 8.743 meters (28.68 feet) from the station in azimuth 286°07′. Station *Kent azimuth* (see description and geographic position thereof) may be used as an azimuth mark. Elevation: 2,132.7 meters (6,997 feet).

Plane coordinates: (C), x=428,181.56 feet; y=548,422.62 feet; grid azimuth to *Kent Azimuth*=81°23′30″.**

Cerro Alto (Hudspeth County, Tex., J. S. Hill, 1909; 1936).—The station is on the highest peak, known as Cerro Alto Peak, of the Hueco Mountains, about 40 miles east of north of El Paso. To reach the station from the Pow Wow camp, which consists of two small gray houses owned by the Texas Highway Department and is 35 miles east of El Paso on the Carlsbad road (U. S. Highway 62), follow the gravel road northward 7.0 miles, and take the left fork 0.4 mile to a ranch with rock buildings. The station is on the highest point of the detached rocky mountain just behind the ranch houses. A reference mark, a crosscut in the top of a large rock, is 4.17 meters (13.7 feet) from the station in azimuth 339°39′. Station *Cerro Alto* (*U. S. G. S.*) (see geographic position and description thereof) is 7.0 meters (23 feet) from the station in azimuth 158°49′58″. In 1934 the station was recovered and two new reference marks and an azimuth mark, standard disks set in rock according to note 12*b*, were established. Reference mark No. 1 is 9.750 meters (31.99 feet) from the station in azimuth 243°03′, and No. 2 is 4.218 meters (13.84 feet) from the station in azimuth 339°47′. The azimuth mark is about 2 miles from the station in azimuth 263°17′24″. It is 22 feet east of the center line of the north-south graded road. Elevation: 2,068.7 meters (6,787 feet).

Plane coordinates: (C), x=586,767.23 feet; y=343,913.38 feet; grid azimuth to azimuth mark=263°08′31″.*

Cooks (Luna County, J. S. Hill, 1910; 1936).—The station is on Cooks Peak, a sharp, prominent peak, the top of which is almost entirely composed of light colored rock, 20 miles air line north of Deming, 26 miles air line east-southeast of Hurley, and about 3 miles a little west of south from Cooks post office. It is best reached from Grover Bros. Ranch which is on the east side of the peak. The station mark is a standard disk set in solid rock according to note 2. The reference mark, a crosscut in the rock, is 11.62 meters (38.1 feet) from the station in azimuth 202°13′. In 1936 the station was recovered and two new reference marks, and an azimuth mark, standard disks set in solid rock according to note 12*a*, were established. Reference mark No. 1 is 11.630 meters (38.16 feet) from the station in azimuth 202°14′, and No. 2 is 10.689 meters (35.07 feet) from the station in azimuth 329°08′. The azimuth mark is about 35 yards northeast of a track road at the site of an old cemetery and building ruins, and is approximately 2½ miles from the station in azimuth 249°07′54″. Elevation: 2,562.9 meters (8,408 feet).

Plane coordinates: (W), x=531,566.00 feet; y=558,690.59 feet; grid azimuth to azimuth mark=249°04′36″.*

Hermanas (Luna County, J. S. Hill, 1909; 1936).—The station is on the highest one of four hills 3 miles S. 5° E. from Hermanas. This range of hills which is visible from Hermanas is of malpais and the upper slopes are covered with scattering juniper. The station mark is a standard disk station mark stamped "HERMANES" and set in a small boulder according to note 4. The reference mark, a cross cut in the top of a large, high boulder is 11.785 meters (38.66 feet) from the station in azimuth 349°12′. In 1936 the station and reference

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

For notes in regard to marking of stations see p. 90.

marks were recovered and a new reference mark, a standard disk reference mark set in a large boulder according to note 12*c*, stamped "HERMANAS 1909–1936," was established 12.167 meters (39.92 feet) from the station in azimuth 228°43′. *United States and Mexico boundary monuments Nos. 31 and 32* (see geographic positions and descriptions thereof) can be used as azimuth marks. The azimuth from the station to the United States and Mexico boundary monument No. 33 is 40°01′11″. Elevation: 1,611.0 meters (5,285 feet).

Plane coordinates: (W), x=464,518.32 feet; y=292,135.96 feet; grid azimuth to *United States and Mexico boundary monument No. 32*=17°22′55.6″.

Florida (Luna County, J. S. Hill, 1910; 1936).—The station is 13.5 miles air line southeast of Deming, on the Big Florida Mountains, in sec. 24, T. 25 S., R. 8 W., on a flat-top, inconspicuous knob near the center of the saddle between the high, rock peak on the north end of the mountain and the round-top peak to the south. It is about 500 meters (1,640 feet) south of the high, rock peak and 400 meters (1,312 feet) north of the round-top peak. To reach the station, turn south of U. S. Highway 80 at a point 12.3 miles eastward from the main intersection in Deming, and follow the graded dirt road 6.2 miles to the Birchfield Ranch, and go about 7 miles farther to Mr. English's camp near the south end of the mountain. From here it is about a 2-hour pack up the mountain northwestward to the station. The station was marked with a standard disk station mark set in a drill hole in outcropping rock according to note 2. In 1933 the disk was found broken off and the stem remaining in the hole. The reference mark, a cross cut in the rock, is 4.59 meters (15.1 feet) from the station in azimuth 346°41′. In 1936 the station was recovered as found in 1933 and a new reference mark, a standard reference disk set in outcropping rock according to note 12*a*, was established 4.417 meters (14.49 feet) from the station in azimuth 262°07′. Elevation: 2,145.0 meters (7,037 feet).

Plane coordinates: (C), x=73,865.55 feet; y=409,037.24 feet. (W), x=564,080.29 feet; y=406,383.89 feet.

Red (Luna County, J. S. Hill, 1910; 1936).—The station is 8½ miles air line S. 65° W. from Deming and about 20 paces a little north of east of the highest point of Red Mountain, a very conspicuous, low, lone mountain. To reach the station, turn south off U. S. Highway 80 at a point 8¼ miles west of Deming and follow the dirt road 0.9 mile to the foot of the peak from which point it is a ½-hour pack southerly, up an old trail along the rocky ridge to the summit. The station was marked with a standard disk station mark set in rock according to note 2. The reference mark, a cross cut in the east side of a small rock, is 5.28 meters (17.3 feet) from the station in azimuth 70°55′. In 1936 the top part of the seamy bedrock containing the station mark was found to have been removed, and there was found attached to the remaining rock a small piece of concrete which showed the imprint of the tablet stem. A new station disk was set in a drill hole in the firm rock below according to note 2. Two new reference marks were established in 1936, one reference mark, a standard disk set according to note 12*a*, being 2.614 meters (8.58 feet) from the station in azimuth 159°31′, and the other reference mark, a drill hole in rock, being 6.695 meters (21.97 feet) from the station in azimuth 238°30′. An azimuth mark, a standard disk set in concrete according to note 11*a*, was established at a point 25 paces south of the center line of U. S. Highway 80 and 14 paces west of the center line of the dirt road leading to the mountain, and about 1¼ miles from the station in azimuth 189°05′50″. Azimuth from station to the cupola of a hospital northeast of Deming, about 8 miles distant, is 231°00′01″. Elevation: 1,651.4 meters (5,418 feet).

Plane coordinates: (W), x=481,915.88 feet; y=442,600.07 feet; grid azimuth to azimuth mark=189°07′42″.*

Deming north base (Luna County, J. S. Hill, 1910; 1939).—The station is 7 miles air line south of Deming, ¼ mile west of the Deming-Columbus Highway (State Highway 11), 2 miles due south of J. M. Kennedy's house in 1910, and on a broad, flat, sandy ridge which is 5 or 6 feet above the general level. To reach from the main corner in Deming, go south 6.8 miles on States Highway 11 to a fence corner on the west side of the road. There is an old engine foundation 100 yards southeast of this fence corner, and the azimuth mark is 5 yards west of the fence corner. The station is 0.3 mile west-southwest of this fence corner and may be reached by driving directly to it, or by going west along south side of fence 0.25 mile, then south 0.15 mile to station site. The station is a cap

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

station mark on a 3-inch iron pipe set in a cylinder of concrete 20 inches in diameter by 24 inches long. The underground mark is an old-type station mark set in a cylinder of concrete 12 inches in diameter by 6 inches long. The reference mark, a 20-penny nail cemented into the top of a 3-inch iron pipe which is embedded in a concrete cylinder 18 inches in diameter by 30 inches long, is 19.895 meters (65.27 feet) from the station in azimuth 32°15′. In 1936 the station and reference marks were recovered and a new reference mark and an azimuth mark were established. The new reference mark, a standard reference mark disk set in concrete and projecting about 6 inches above the ground, is 22.518 meters (73.88 feet) from the station in azimuth 122°41′. The azimuth mark, a standard disk set in concrete and projecting about 6 inches above the ground, is 0.3 mile from the station in azimuth 243°48′18″. The following distances and azimuths are from station: Windmill, on east side of State Highway 11, ½ mile, 333°54′48″; windmill, ¾ mile, 34°47′58″; windmill, 1½ miles, 145°19′18″; and another windmill, 1½ miles, 196°41′44″. Elevation: 1,301.0 meters (4,268 feet).

Plane coordinates: (W), x=524,056.14 feet; y=426,303.29 feet; grid azimuth to azimuth mark=243°45′49″.*

Deming south base (Luna County, J. S. Hill, 1910; 1939).—The station is on a brush-covered flat, about 15 miles air line S. 15° W. from Deming, 1¾ miles N. 75° E. from the ranch house and windmills of R. W. Yeargins in 1910, and 300 meters (984 feet) E. 10° N. from an old, abandoned ranch house known as the Schweiyers' house in 1910. To reach the station from Deming Post Office go west on U. S. Highway 80 for 4.15 miles, turn left (south) on graded dirt road and go 12.0 miles, turn left (east) and go 0.2 mile, turn right (south) and go 1.0 mile, turn left (east) and go 0.15 mile to the azimuth mark which is 30 feet north of an east-west track road, continue east 0.1 mile, turn right (south) off track road and go across country 0.25 mile to the station. The station and reference mark set in 1910 are exactly similar to those set in 1910 at *Deming north base* (see description thereof). The reference mark is 16.561 meters (54.33 feet) from the station in azimuth 10°52′. In 1936 the marks were recovered and a new reference mark and an azimuth mark were established. The new reference mark, set in concrete according to note 11a, is 23.716 meters (77.81 feet) from the station in azimuth 283°12′. The azimuth mark, a standard disk set in concrete according to note 11a, is 0.15 mile east of the crossroads, 30 feet north of the center line of the road, and 0.25 mile from the station in azimuth 137°14′57″. The following distances and azimuths are from station: Cairn on round hill, about 2 miles, 3°44′56″; windmill at ranch, about ¾ mile, 66°43′21″; windmill at ranch, about 1 mile, 188°16′20″; windmill, about ¾ mile, 199°20′37″; and the south peak of the Florida Mountains, 268°12′32″. Elevation: 1,280.4 meters (4,201 feet).

Plane coordinates: (W), x=498,859.74 feet; y=381,931.21 feet; grid azimuth to azimuth mark=137°15′04″.*

Burro (Grant County, J. S. Hill, 1910; 1938).—This station is near station *Burro* (*U. S. G. S.*), on the northeast and highest point of Big Burro Mountains, 15 miles air line southwest by west from Silver City, 24 miles air line northeast from Lordsburg, and 5½ miles air line southwest from Tyrone. The station was marked with a standard disk station mark cemented into a drill hole in outcropping rock according to note 2. Station *Burro* (*U. S. G. S.*), marked with the stem of a U. S. Geological Survey brass station mark cemented in a drill hole in the rock, the top, or disk part, having been broken off, is 3.150 meters (10.33 feet) from the station in azimuth 286°51′. In 1934 an old station mark was found with the disk broken off and a new disk was placed in the drill hole and stamped "BURRO 1910-1934." It was decided later that this new disk does not mark the 1910 station; it marks station *Burro* (*U. S. G. S.*). In 1936 and in 1938 the drill hole which held the mark for *Burro* and the station *Burro* (U. S. G. S.) which is stamped "Burro 1910-1934" were recovered. Elevation: 2,463.0 meters (8,081 feet).

Plane coordinates: (W), x=315,576.99 feet; y=579,110.48 feet.

Chiricahua (Chiricaqua) (Cochise County, Ariz., J. S. Hill, 1910; 1936).—The station is on what is locally known as Fly Peak, the most northern one of several high peaks on the crest of the Chiricahua Mountains in the Coronado National Forest, 48 miles air line southwest of Lordsburg, N. Mex., 15 miles air line west by north of Rodeo, N. Mex., 5½ miles air line southwest of Paradise, and 9 miles air line west-southwest of Portal, Ariz. The peak on which the

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

station is located is not the highest peak of the ridge. There is a 60-foot-high, steel fire-lookout tower, the center of which is triangulation station *Fly Peak lookout house* (see geographic position and description thereof), on the same peak, 48.159 meters (158.00 feet) from the station in azimuth 291°34′. The station was marked with a standard disk station mark set in outcropping rock according to note 2. The reference mark, a ½-inch drill hole 2 inches deep in the top of a rock on the highest point of the west end of the peak, is 9.496 meters (31.15 feet) from the station in azimuth 329°09′. Two blazed trees, the first one having 3 nails in the blaze and the second one 4 nails, were at the following distances and azimuths from the station: 12.18 meters (40.0 feet), 304°21′, and 13.61 meters (44.7 feet), 202°10′. In 1934 the station and all marks were recovered and two new reference marks, probably standard reference mark disks set in rock according to note 12*a*, were established. Reference mark No. 1 is 9.360 meters (30.71 feet) from the station in azimuth 178°44′, and No. 2 is 9.550 meters (31.33 feet) from the station in azimuth 329°04′. The station was recovered in 1935 and 1936. Elevation: 2,955.4 meters (9,696 feet).

Plane coordinates: (W.), x=49,851.50 feet; y=320,586.22 feet.

Graham (U. S. G. S.) (Graham County, Ariz., J. S. Hill, 1910; 1934).—The station is 13 miles air line southwest of Safford, Ariz., on what is locally known as High Peak which is the highest point of Graham Mountain, about 10 meters (33 feet) northeast of the southwest point of the mountain, and in section 32 or 33, T. 8 S. R. 24 E. The station was marked with a U. S. Geological Survey triangulation station mark cemented into the rock. The reference mark, a ½-inch drill hole ½ inch deep in the top of a large rock, is 13.43 meters (44.1 feet) from the station in azimuth 248°21′. Two blazed pine trees, 9 inches in diameter, with a 40-penny nail in the center of the blaze on each tree, were at the following distances and azimuths from the station: 13.10 meters (43.0 feet), 9°45′, and 11.95 meters (39.2 feet), 125°25′. In 1934 the station was recovered and two new reference marks, standard reference mark disks set in rock according to note 12*a*, were established. Reference mark No. 1 is 17.590 meters (57.71 feet) from the station in azimuth 249°16′, and No. 2 is 13.345 meters (43.78 feet) from the station in azimuth 47°19′. Elevation: 3,267.6 meters (10,720 feet).

Line (U. S. G. S.) (Grant County, J. S. Hill, 1910; 1936).—The station is on the highest point of a prominent, large peak, known as Laura Mountain and also as Line Mountain and as Vanderbilt Mountain, 11 miles northeast by east from Duncan, Ariz., and in T. 17 S., R. 21 W. The station was originally marked with a U. S. Geological Survey triangulation mark cemented into the solid rock. The reference mark, a cross cut in the highest point of a rock ledge, is 5.020 meters (16.47 feet) from the station in azimuth 234°.0. In 1934 the station was recovered, and remarked with a standard disk station mark set in rock and two new reference marks, standard disk reference marks set in drill holes in boulders according to note 12*c*, were established. Reference mark No. 1 is 7.242 meters (23.76 feet) from the station in azimuth 241°30′, and No. 2 is 11.712 meters (38.43 feet) from the station in azimuth 333°22′. In 1936 all marks were recovered and an azimuth mark, a standard tablet set in rock, was established on a low hill at an estimated distance of 1½ miles from the station in azimuth 3°01′51″. Elevation: 2,076.7 meters (6,813 feet).

Plane coordinates: (W), x=142,831.01 feet; y=675,546.66 feet; grid azimuth to azimuth mark=3°39′42″.*

Supplementary points

Quitman (U. S. G. S.), cairn (Hudspeth County, Tex., J. S. Hill, 1909; 1934.—See the description of station *Quitman*.

Corduna (U. S. G. S.), cairn (Otero County, J. S. Hill, 1909; 1937).—See the description of station *Corduna*.

Plane coordinates:[1] (C), x=727,614 feet; y=373,733 feet.

Cerro Alto (U. S. G. S.) (Hudspeth County, Tex., J. S. Hill, 1910; 1936).—See the description of station *Cerro Alto*.

Plane coordinates:[1] (C), x=586,759 feet; y=343,935 feet.

Mesa (El Paso County, Tex., J. S. Hill, 1909; 1931).—The station is about 10 miles air line S. 89° E. from the post office in El Paso, about 4 miles N. 20° E.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

from the town of Ysleta, and on a long, narrow point extending south on the south side of the mesa. This point is the most southern point of the mesa in the vicinity and quite prominent on account of its steep, high bluffs on the east, south, and west sides. The station is marked with a standard station disk set in rock according to note 2. The reference mark, a cross cut in a rock near the edge of the bluff, is 15.53 meters (51.0 feet) from the station in azimuth 327°32′. In 1931 the station site was visited and a drill hole in rock was found, but the disk was gone. The station was searched for, but not found, in 1934. Elevation: 1,213.5 meters (3,981 feet).

Plane coordinates: (C), x=472,496.75 feet; y=276,334.50 feet.

North Franklin (U. S. G. S.), cairn (El Paso County, Tex., J. S. Hill, 1909).—See the description of station *North Franklin.*

Plane coordinates:[1] (C), x=424,565 feet; y=328,466 feet.

Orogrande, smelter (Otero County, J. S. Hill, 1910).—Plane coordinates:[1] (C), x=549,929 feet; y=504,178 feet.

Jarilla astronomical station (Otero County, Edwin Smith, 1911; 1936).—The station is marked with a standard station disk, on which is stamped the words "Astronomical Station," set in the top of a concrete pier, 14 by 26 inches and 35 inches high above the solid rock on which it stands. See description of station *Jarilla.*

Plane coordinates:[1] (C), x=542,479 feet; y=509,214 feet.

Noonday Peak (Grant County, J. S. Hill, 1910).—Plane coordinates:[1] (W), x=513,368 feet; y=651,879 feet.

Black Mountain, cairn (Luna County, J. S. Hill, 1910).—Elevation of the top of the peak: 1,638.7 meters (5,376 feet).

Plane coordinates:[2] (W), x=484,536 feet; y=484,858 feet.

Deming, city waterworks (Luna County, J. S. Hill, 1909; 1914).—This station is the high, red water tank which supplies Deming with water and is known as the Deming city waterworks. A United States Geological Survey bench mark is near the base of the tower, and it is used to control the vertical angle elevations of the triangulation in this vicinity. Elevation of the bench mark: 1,324.91 meters (4,346.8 feet).

Plane coordinates: (W), x=520,585.70 feet; y=461,780.56 feet.

Deming, municipal water tank (Luna County, Wm. Mussetter, 1936).—Plane coordinates: (W), x=520,609.66 feet; y=461,627.19 feet.

Deming, Luna County Courthouse, spire (Luna County, Wm. Mussetter, 1936).—Plane coordinates: (W), x=523,974.20 feet; y=459,094.14 feet.

Deming magnetic station (Luna County, Wm. Mussetter, 1936).—The magnetic station was first established in 1905 and was connected with triangulation in 1936. To reach from the post office in Deming, go west on U. S. Highway 80 (West Spruce St.) 0.65 mile, turn left opposite the municipal swimming pool, and go 0.8 mile to the intersection of an east-west road. The station is in the southeast corner of this intersection, about 98 feet southeast of a telephone pole in the corner, 65 feet from a line of poles on the east side of a well-traveled road, 129.5 feet from a line of poles on the north side of the east-west road, and nearly in line with two windmills on opposite sides of the north-south road. It is marked with a stone 6 by 6 by 30 inches, projecting about 4 inches above the ground and lettered "U. S. C. & G. S., 1905."

Plane coordinates: (W), x=520,273.00 feet; y=456,035.06 feet.

Near (Luna County, J. S. Hill, 1910; 1936).—The station is about 5 miles S. 33° W. from the town of Victorio, about one mile west-northwest of the old International Mine and tank, and on a high, rocky peak which is the higher and more eastern one of two peaks in the vicinity. The station is marked with a standard disk station mark set in rock according to note 2. The reference mark, a cross cut in the rock, is 4.11 meters (13.5 feet) from the station in azimuth 116°30′. In 1936 the station and reference marks were recovered and a new reference mark, a standard disk set in rock according to note 12*a*, was established on a ridge about one foot higher than the general level and 10.265 meters (33.68 feet) from the station in azimuth 288°13′. An air beacon northwest of Hermanas, which can be used as an azimuth mark, is about 10 miles (estimated) from the station in azimuth 249°08′41″. Elevation: 1,649.4 meters (5,411 feet).

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[1] No check on this position.
[2] Checked by vertical angles only.
For notes in regard to marking of stations see p. 90.

Plane coordinates: (W), x=391,021.92 feet; y=287,460.75 feet; grid azimuth to air beacon northwest of Hermanas=249°19′46″.*

United States and Mexico boundary monument No. 39 (United States and Mexico Boundary Commissions) (New Mexico-Mexico, J. S. Hill, 1909; 1936).—The station is an iron monument on a sharp ridge sloping south of the Sierra Rica Mountains. It is best reached from Victorio by way of the old International Mines. The reference mark, a small cross cut in the top of the rock, is 2.80 meters (9.2 feet) from the station in azimuth 221°29′. Elevation of the top of the monument: 1,534.2 meters (5,033 feet).

Plane coordinates: (W), x=390,356.64 feet; y=285,190.15 feet.

United States and Mexico boundary monument No. 32 (United States and Mexico Boundary Commissions) (New Mexico-Mexico, J. S. Hill, 1909; 1910).—The station is a stone monument 4 miles south of the town of Hermanas and on the highest point of the boundary line where it crosses the Sierra Carrizalillo. Elevation of the top of the monument, 1,494.99 meters (4,904.8 feet).

Plane coordinates: (W), x=462,293.07 feet; y=285,027.40 feet.

United States and Mexico boundary monument No. 40 (United States and Mexico Boundary Commissions) (New Mexico-Mexico, J. S. Hill, 1910; 1936).—The station is 2½ miles air line west of the International Mines. It is known as the "upper corner," or "jog," since the boundary line makes a right-angled turn at this point. The monument was occupied eccentrically and the eccentric point was marked with a standard disk station mark set in rock flush with the surface according to note 2. Elevation of the top of the monument: 1,501.39 meters (4,925.8 feet).

Plane coordinates: (W), x=383,616.13 feet; y=285,213.20 feet.

United States and Mexico boundary monument No. 31 (United States and Mexico Boundary Commissions) (New Mexico-Mexico, J. S. Hill, 1909.)—The station is an iron monument about 4 miles southeast of the town of Hermanas and on the first ridge of the Sierra Carrizalillo in a commanding position overlooking the valley to the east. Elevation of the top of the masonry base: 1,437.6 meters (4,717 feet).

Plane coordinates:[1] (W), x=470,290 feet; y=285,019 feet.

Cone Summit (Luna County, J. S. Hill, 1910).—Plane coordinates:[1] (W), x=414,796 feet; y=436,834 feet.

Bear Mountain, highest point (Grant County, J. S. Hill, 1910).—This station has not been described. Elevation of the mountain top: 2,449.5 meters (8,036 feet).

Plane coordinates: (W), x=338,876.92 feet; y=668,145.74 feet.

THIRTY-FIFTH PARALLEL ARC

Principal points

Harwell (Deaf Smith County, Tex., E. O. Heaton, 1921; 1934).—The station is about 12 miles southwest of Adrian, a town on the Chicago, Rock Island and Gulf Railway, in sec. 26, T. 7 N., R. 2 E., on pasture land owned by the Landergin estate, about ¼ mile west of the west fence line of land owned by J. A. Cheatem and 1¾ miles southwest of his ranch house, and about ¼ mile east of the west edge of the cap rock on the highest point of ground in this vicinity. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 18.18 meters (59.6 feet) from the station in azimuth 127°01′, and No. 2 is 38.25 meters (125.5 feet) from the station in azimuth 216°05′. In 1934 the station was recovered and an azimuth mark, a standard disk set in concrete according to note 11a, was established 2 feet west of a north-south fence and 10 feet north of a north gate post in the same fence, and about 0.8 mile from the station in azimuth 244°57′32″. Elevation: 1,333.1 meters (4,374 feet).

Plane coordinates: (E), x=938,972.19 feet; y=1,524,001.58 feet; grid azimuth to azimuth mark=244°06′44″.*

Bippus (Deaf Smith County, Tex., E. O. Heaton, 1921).—The station is about 13 miles south of Glenrio, N. Mex., about 35 miles northwest of Hereford, Texas, about 1¼ miles east of the Texas-New Mexico boundary, 6 miles west 23° south from George Bippus' house, on the highest point of land in this vicinity, about 200 meters (656 feet) east from the west edge of the cap rock

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

and about 1 mile north of a wagon road leading down into the valley. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 38.56 meters (126.5 feet) from the station in azimuth 321°08′, and No. 2 is 45.98 meters (150.9 feet) from the station in azimuth 17°05′. Elevation: 1,366.3 meters (4,483 feet).

Plane coordinates: (E), x=891,363.20 feet; y=1,456,243.26 feet.

Warmuth (Quay County, E. O. Heaton, 1921; 1935).—The station is about 10 miles north-northeast of the town of San Jon, 12 miles southeast of Logan, 4 miles east of State Highway 39, in the NW ¼ sec. 20, T. 12 N., R. 35 E., about one mile south of the high breaks on the south side of the Canadian River Valley, 122 feet south of an east-west fence, 208 feet southeast of a T-fence-corner (stem of the T north) 150 meters (492 feet) south of A. Warmuth's house and on a high ridge in pasture land owned by B. F. Beck. The station and reference marks are standard disks set in concrete according to notes 1a and 11a. The underground mark is a nail set in concrete according to note 7c. Reference mark No. 1 is 18.90 meters (62.0 feet) from the station in azimuth 17°48′, and No. 2 is 19.88 meters (65.2 feet) from the station in azimuth 279°50′. Elevation: 1,276.0 meters (4,186 feet).

Plane coordinates: (E), x=820,964.37 feet; y=1,545,762.24 feet.

Martin (Quay County, E. O. Heaton, 1921; 1935).—The station is about 9 miles south and 4 miles west of the town of San Jon, 13½ miles air line northwest of Grady, about 1½ miles northwest of the point where the road which leads up onto the rim rock from San Jon turns southward (in 1921 Mr. C. L. Height lived at the turn in the road), ½ mile northwest of ranch buildings known as the "Old Martin Ranch," but occupied in 1935 by Chester Bunch, and on the highest point of pasture land at the north edge of high breaks which overlook the Tucumcari Valley to the north. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 19.96 meters (65.5 feet) from the station in azimuth 170°59′, and an unnumbered reference mark is 18.75 meters (61.5 feet) from the station in azimuth 81°03′. In 1935 the station and reference marks were recovered and an azimuth mark, a standard disk set in concrete according to note 11a, was established 2 feet southeast of a fence T-intersection, 6 inches east of a fence, 0.1 mile west of Chester Bunch's residence, and 0.5 mile from the station in azimuth 320°30′07″. Elevation: 1,511.0 meters (4,957 feet).

Plane coordinates: (E), x=783,983.27 feet; y=1,454,124.02 feet; grid azimuth to azimuth mark=319°57′29″.*

Canadian (Quay County, E. O. Heaton, 1921).—The station is about 11 miles north and 3 miles east of San Jon, in the SW ¼ sec. 17, T. 12 N., R. 35 E., at the edge of a high bluff forming the south side of Rana Creek Valley, about one mile due north of Mr. A. Warmuth's house on land owned by Mrs. Ellison, and only a few meters south of a rim rock. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 24.02 meters (78.8 feet) from the station in azimuth 17°22′, and No. 2 is 18.11 meters (59.4 feet) from the station in azimuth 101°12′. Elevation: 1,268.8 meters (4,163 feet).

Plane coordinates: (E), x=820,725.48 feet; y=1,551,875.29 feet.

Glenrio (Quay County, N. Mex., Deaf Smith County, Tex., E. O. Heaton, 1921).—The station is about ¾ mile south of Glenrio, on the Texas-New Mexico boundary, on the second small knoll south of the town and in the boundary-line fence near milepost No. 218 of the boundary survey. The station, under ground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 17.14 meters (56.2 feet) from the station in azimuth 179°48′, and No. 2 is 21.78 meters (71.5 feet) from the station in azimuth 0°15′. Elevation: 1,208.8 meters (3,966 feet.)

Plane coordinates: (E), x=885,952.90 feet; y=1,518,896.29 feet.

Clark Monument No. 9 (Texas-New Mexico boundary, E. O. Heaton, 1921).—The station is on the Texas-New Mexico boundary, about 15 miles south of Glenrio, on the north edge of the cap rock of the plains, about 10 meters (33 feet) south of the bluff, and 135 meters (443 feet) north of milepost No. 204. The station is marked with a concrete monument 2½ feet high with a plate in the center stamped "Texas-New Mexico. Clark Monument No. 9, 1859. Rees-

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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tablished 1911, General Land Office, Boundary Commission." A standard disk reference mark is set in a hole in outcropping bedrock according to note 12a, and is 11.08 meters (36.4 feet) from the station in azimuth 330°53′. Boundary post 204 of the Texas-New Mexico boundary is 135 meters (443 feet) from the station in azimuth 0°04′.

Plane coordinates: (E), x=886,868.11 feet; y=1,443,560.67 feet.

Dripping (Quay County, E. O. Heaton, 1921; 1935).—The station is about 10 miles north and 7 miles east of Tucumcari, 1½ miles southeast of Dripping Springs, in the NW ¼ sec. 25, T. 13 N., R. 31 E., about ¾ mile northeast of Hubert Osbourne's house, on top of the bluffs on the south side of the Canadian River, about 15 feet south of the break in the slope, and about 120 feet south of the cliffs which drop about 300 feet to the river valley. The station and underground marks are standard disks set in concrete according to notes 1a and 7a. The reference marks are standard reference mark disks set in rock according to note 12a. In 1921 the reference marks were reported as follows: No. 1 is 15.35 meters (50.4 feet) from the station in azimuth 207°19′, and No. 2 is 56.65 meters (185.9 feet) from the station in azimuth 264°08′. In 1935 the marks were recovered and the reference marks were reported as follows: No. 1 is 50.26 feet from the station in azimuth 207°17′, and No. 2 is 184.76 feet from the station in azimuth 263°49′. In 1935 an azimuth mark, a standard disk set in concrete according to note 11a, was established 9½ feet east of the center of a trail, 5½ feet east of the east edge of a cattle guard, 186 feet east of a fence east of the ranch house, belonging to H. Osbourne, and 0.5 mile from the station in azimuth 41°17′46″. Station *Warmuth* may also be used as an azimuth mark. Elevation: 1,254.7 meters (4,116 feet).

Plane coordinates: (E), x=717,777.25 feet; y=1,576,008.28 feet; grid azimuth to azimuth mark=40°52′26″.*

Redondo (Quay County, E. O. Heaton, 1921; 1935).—The station is about 12 miles air line south-southeast of Tucumcari, 3 miles east of State Highway 18, 1 mile northeast of the Thorpe ranch house, and on the most northern high point of the Mesa Redondo on a spur which makes out northward from the main part of the mesa which runs from east to west. This spur falls off sharply about 800 feet in all directions except to the south-southeast where the slope gradually rises. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 22.00 meters (72.2 feet) from the station in azimuth 155°20′, and No. 2 is 35.15 meters (115.3 feet) from the station in azimuth 328°29′. In 1935 the marks were recovered and an azimuth mark, a standard disk set in concrete according to note 11a, was established 50 feet north of the northwest corner of the ranch yard of the Thorpe Ranch, at the base of the mesa, under a large juniper tree, and 1.0 mile from the station in azimuth 68°15′58″. Elevation: 1,544.7 meters (5,068 feet).

Plane coordinates: (E), x=693,400.09 feet; y=1,456,654.55 feet; grid azimuth to azimuth mark=67°53′44″.*

Pablo (San Miguel County, E. O. Heaton, 1921).—The station is about 11 miles northeast of Montoya, 15 miles northwest of Tucumcari, 8 miles northwest of Palomas railway station, 1½ miles northwest from the head of a large, deep canyon which makes in from the Canadian River, 1½ miles northwest from the southwestern line fence of the Bell Ranch, 1 mile north of an east-west wagon road through the Bell pasture and on the highest point in this vicinity. At the head of the large canyon there is a place in the mesa which is only about 100 meters (328 feet) wide and is called the narrows. The station and reference marks are standard disks set flush in the tops of stone posts. Reference mark No. 1 is 11.86 meters (38.9 feet) from the station in azimuth 323°28′, and No. 2 is 17.02 meters (55.8 feet) from the station in azimuth 67°35′. Elevation: 1,545.6 meters (5,071 feet).

Plane coordinates: (E), x=604,125.06 feet; y=1,544,897.30 feet.

Moletor (Quay County, E. O. Heaton, 1921).—The station is about 7½ miles west of south of Montoya, ½ mile east of the Montoya-Haile wagon road, on the highest point of Louisiana Mesa, 210 meters (689 feet) east of the first north-south wire fence east of the Montoya-Haile wagon road, 160 meters (525 feet) north of an east-west fence line, ¾ mile northeast of a sod house and ¾ mile south of a Mexican dwelling. The station is marked with a standard disk set in the top of a stone post. The underground mark is a standard disk set in concrete according to note 7a. The reference marks are probably similar to

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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the station mark. Reference mark No. 1 is 213.87 meters (701.7 feet) from the station in azimuth 103°54′22″, and No. 2 is 161.72 meters (530.6 feet) from the station in azimuth 11°42′05″. Elevation: 1,684.5 meters (5,527 feet).

Plane coordinates: (E), x=577,465.04 feet; y=1,448,437.51 feet; grid azimuth to reference mark No. 1=103°45′28″.*

Phillips (Guadalupe County, E. O. Heaton, 1921).—The station is about 7½ miles south and 4½ miles west by road from Montoya, about 1 mile west of the Quay-Guadalupe county line, on the west end of Louisiana Mesa, about 250 meters (820 feet) northeast of Zach Grey Phillip's stone house which is built in the side of a hill, 105 meters (344 feet) north of section-line fence, and about 95 meters (312 feet) west of a north-south fence line. The station mark and reference mark No. 1 are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 109.35 meters (358.8 feet) from the station in azimuth 3°56′52″. Reference mark No. 2, a brass bolt probably set in rock, is 105.25 meters (345.3 feet) from the station in azimuth 127°06′27″. Elevation: 1,703.3 meters (5,588 feet).

Plane coordinates: (E), x=559,938.57 feet; y=1,449,595.95 feet; grid azimuth to reference mark No. 1=3°49′59″.*

Corazon (San Miguel County, E. O. Heaton, 1921).—The station is about 30 miles north-northwest of Cuervo, about 40 miles east-southeast of Las Vegas, 8 miles south of west of Trementina, 3 miles northeast of Corazon, and on the highest point of Corazon Hill, an isolated, symmetrical hill. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 9.93 meters (32.6 feet) from the station in azimuth 102°51′, and No. 2 is 6.12 meters (20.1 feet) from the station in azimuth 174°56′. Elevation: 1,907.3 meters (6,258 feet).

Plane coordinates: (E), x=430,817.63 feet; y=1,619,922.23 feet.

Pintada (Guadalupe County, E. O. Heaton, 1921; 1934).—The station is about 13 miles a little west of north of Santa Rosa, 7 miles west of the Santa Rosa-Las Vegas wagon road, ½ mile south of the north road from Santa Rosa to Pintada Canyon, and on the southeastern end of the first prominent wooded ridge crossed after leaving the Santa Rosa-Las Vegas road. There are few trees near the station. Most of the timber on the ridge is about ½ mile southwest of the station. Pintada Canyon is visible about 3 miles south of the station. The ridge is the highest one crossed by the Santa Rosa-Palma county road. To reach the station go west from the south end of the bridge over the Pecos River south of Santa Rosa for 6.7 miles on U. S. Highway 66 to where the Palma road turns left, follow Palma road 7.1 miles to the first high part of the first high wooded ridge, turn left, cross wire fence and go 0.3 mile due south to the station. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 42.88 meters (140.7 feet) from the station in azimuth 325°44′, and No. 2 is 50.97 meters (167.2 feet) from the station in azimuth 29°33′. The marks were recovered in 1934 and an azimuth, a standard disk set in rock according to note 12a, was established 102 feet south of the Santa Rosa-Palma county road and about 0.35 mile from the station in azimuth 199°06′36″. Elevation: 1,699.5 meters (5,576 feet).

Plane coordinates: (E), x=326,899.32 feet; y=1,440,766.12 feet; grid azimuth to azimuth mark=199°26′28″.*

Louisiana (Guadalupe County, E. O. Heaton, 1921; 1922).—The station is about 17 miles by road southwest of Montoya, about ½ mile east of Bull Canyon Pass, 1 mile southwest of the extreme head of this canyon, on the extreme southwestern high point of the mesa, and about 10 meters (33 feet) from the end of a cedar covered spur making out from the main mesa. The station, underground, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 5.03 meters (16.5 feet) from the station in azimuth 224°03′, and No. 2 is 7.13 meters (23.4 feet) from the station in azimuth 4°13′. Elevation: 1,697.5 meters (5,569) feet).

Plane coordinates: (E), x=545,941.64 feet; y=1,440,008.93 feet.

Hill (Guadalupe County, E. O. Heaton, 1921; 1922).—The station is about 10 miles northwest of the town of Cuervo, on the highest point of Cuervo Peak and about 30 meters (98 feet) from the southwest end of the peak. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark 1 is 8.09 meters (26.5 feet) from the station

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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in azimuth 187°26′, and No. 2 is 17.58 meters (57.7 feet) from the station in azimuth 40°53′. Elevation: 1,635.6 meters (5,366 feet).

Plane coordinates: (E), x=449,326.11 feet; y=1,502,045.99 feet.

Haile (Guadalupe County, C. M. Durgin, 1922).—The station is 5 miles south of the town of Cuervo, 9 miles west of the site of Haile Post Office, near the southeast end of sec. 29, T. 9 N., R 24 E., ¼ mile northwest of an old adobe ruin, on the northwest point of the mesa, and about 10 meters (33 feet) from the edge. The station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 18.12 meters (59.4 feet) from the station in azimuth 204°, and No. 2 is 29.56 meters (97.0 feet) from the station in azimuth 119°. Elevation: 1,593.9 meters (5,229 feet).

Plane coordinates: (E), x=470,746.63 feet; y=1,445,596.00 feet.

Rica (San Miguel County, C. M. Durgin, 1922).—The station is 28 miles west by north from Tucumcari, about 15 miles northwest from Montoya, about 19 miles northeast from Cuervo, 2½ miles northeast from the site of Isidore Post Office, on the highest grassy ground at the end of Mesa Rica, ½ mile northeast of the southwesternmost point, on land owned by Mr. Starks, and about 50 meters (164 feet) southwest of Mr. Starks' house. The station, underground, and reference mark are standard disks set in concrete according to notes 1a, 7a, and 11a. The reference mark is 37.03 meters (121.9 feet) from the station in azimuth 149°21′. Elevation: 1,651.7 meters (5,419 feet).

Plane coordinates: (E), x=532,856.13 feet; y=1,540,023.03 feet.

Huerf (San Miguel County, E. O. Heaton, 1921; 1922).—The station is about 35 *miles north-northwest from the town of* Cuervo, 35 *miles east by south from* Las Vegas, 2 miles northeast from the Mexican town of Corazon, and on the highest point (wooded) of Mesa Huerfano. The station is on line with Corazon Hill (an isolated, symmetrical hill 3 miles distant), a peach orchard at the foot of the mesa 1 mile distant, and a stone post 90 meters (295 feet), distant is 126½° from magnetic north from the station. A tree, blazed on the east side is 60° from magnetic north and 60 meters (197 feet), from the station. The station, underground, and reference marks are standard disks set in concrete according to notes 1*a*, 7*a*, and 11*a*. Reference mark No. 1 is 11.15 meters (36.6 feet) from the station in azimuth 190°22′, and No. 2 is 18.455 meters (60.55 feet) from the station in azimuth 318°31′. Elevation: 1,995.7 meters (6,548 feet).

Plane coordinates: (E), x=421,195.86 feet; y=1,631,506.83 feet.

Aguilar (San Miguel County, E. O. Heaton, 1921; 1934).—The station is about 25 miles southeast of Las Vegas, 3 miles northwest of Chaperito, 2 miles southwest of the small Mexican village of Los Torres, about 1 mile southwest of a large bend in the Gallinas River, and on a flat mesa butte at the southeast end of the Mesa Quatros. It is located on the highest point of the mesa about 150 meters (492 feet) southeast of a small Catholic mission and 50 meters (164 feet) west of the west edge of the rim rock. There is a large wooden cross 100 feet east of the station. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 10.26 meters (33.7 feet) from the station in azimuth 148°13′, and No. 2 is 10.53 meters (34.5 feet) from the station in azimuth 346°54′. In 1934 the station and reference marks were recovered and an azimuth mark was established 20.7 feet south of the south edge and the east end of an unused steel bridge crossing the Gallinas River at Chaperito. It is marked with a standard disk, set in ledge rock according to note 12a, on the east bank of the river and is about 3 miles from the station in azimuth 290°52′36″. Elevation: 2,072.5 meters (6,800 feet).

Plane coordinates: (E), x=303,208.97 feet; y=1,593,675.27 feet; grid azimuth to azimuth mark=291°15′32″.*

Pedernal (Torrance County, E. O. Heaton, 1921; 1934).—The station is about 24 miles east of McIntosh, about 22 miles northwest of Encino, and on the highest point of Pedernal Mountain. The Santa Fe-Encino highway passes about 4 miles east of the peak. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 14.35 meters (47.1 feet) from the station in azimuth 261°.2, and No. 2 is 13.10 meters (43.0 feet) from the station in azimuth 99°.8. In 1934 the station and reference marks were recovered. The reference marks were found loose and were recemented. Elevation: 2,309.3 meters (7,576 feet).

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Plane coordinates: (E), x=106,826.79 feet; y=1,401,460.35 feet. (C), x=681,922.99 feet; y=1,399,428.41 feet.

Tompson (Santa Fe County, E. O. Heaton, 1921).—The station is about 8 miles east of the city of Santa Fe, 2 miles south of the Monument Rock Road. and on the highest peak of the southern group of the Santa Fe Mountains, known as Tompson Peak. The top of the peak is bald, but the mountain is well timbered on all sides nearly to the top. The station mark and reference mark are standard disks set in rock according to notes 2 and 12a. The reference mark is 22.90 meters (75.1 feet) from the station in azimuth 54°14′. Elevation: 3,223.8 meters (10,577 feet).

Plane coordinates: (E), x=62,545.94 feet; y=1,703,216.19 feet. (C), x=631,831.98 feet; y=1,700,219.11 feet.

Sandia (Bernalillo County, C. L. Garner, 1920; 1921).—The station is about 18 miles air line northeast of Albuquerque, 25 miles northwest of Moriarty, 13 miles west of San Pedro, and on the highest peak of the Sandia Range. This peak is near the north end of the range and is free from trees to a distance of about 100 yards down its sides on the north, east, and south, and is covered with small timber on the west. To reach the station, take the Moriarty-Albuquerque road to Tijeras, 18 miles east of Albuquerque, then go north 7 miles to the Mexican village San Antonito. From San Antonito several trails lead to the top and ranchers can be found to do animal packing. The vicinity of the station is locally known as "Valle Grande." The station mark and the reference mark are standard disks set in rock according to notes 2 and 12a. The station mark is stamped "1919," but it was not occupied until 1920. The reference mark is 12.71 meters (41.7 feet) from the station in azimuth 185°15′. Elevation: 3,259.0 meters (10,692 feet).

Plane coordinates: (C), x=440,548.84 feet; y=1,531,749.81 feet. (W), x=913,528.43 feet; y=1,534,596.68 feet.

Manzano (Torrance County, C. L. Garner, 1920; 1935).—The station is 20 miles E. 8° S. from Belen, 13 miles west-northwest of Mountainair, in the NW¼ sec. 8, T. 4 N., R. 5 E., on the highest and most conspicuous peak at the southern end of the Manzano Mountain range. The peak is bald on the southeast side of the top and has small timber on the other sides. The station and reference marks are standard disks set in rock according to notes 2 and 12a. The station mark is stamped "1919," but it was not occupied until 1920. Reference mark No. 1 is 10.01 meters (32.8 feet) from the station in azimuth 70°03′ and No. 2 is 16.20 meters (53.1 feet) from the station in azimuth 169°21′. Elevation: 3,079.0 meters (10,103 feet).

Plane coordinates: (C), x=440,934.90 feet; y=1,306,457.66 feet. (W), x=917,477.66 feet; y=1,309,291.46 feet.

Ladrones (Socorro County, C. L. Garner, 1920; 1934).—The station is about 24 miles air line southwest of Belen, on the western and highest peak of the Sierra del Ladrones, in section 31 or 32, T. 3 N., R. 2 W., and at the northeastern extremity of the peak. The station mark is stamped "1919," but it was not occupied until 1920. The station mark and reference mark No. 2 are standard disks set in boulders according to notes 4 and 12d. Reference mark No. 1 is a U.S. Geological Survey triangulation station mark which is 50.193 meters (164.67 feet) from the station in azimuth 24°51′, and No. 2 is 23.710 meters (77.79 feet) from the station in azimuth 126°24′. In 1934 the station was recovered and the reference marks were reported to be as follows: Reference mark No. 1 is 23.637 meters (77.55 feet) from the station in azimuth 126°27′, and No. 2 is 12.321 meters (40.42 feet) from the station in azimuth 9°27′. Elevation: 2,797.1 meters (9,177 feet).

Plane coordinates: (C), x=248,372.70 feet; y=1,250,582.72 feet. (W), x=725,793.34 feet; y=1,250,401.67 feet.

Los Lunas (Valencia County, C. L. Garner, 1920; 1921).—The station is in the town of Los Lunas, west of the Atchison, Topeka and Santa Fe Railway tracks, 150 meters (492 feet) north of the railway station, and one meter (3 feet) south of the south side of the sidewalk along the Los Lunas-Gallup road, the northeast corner of the stone fence of the residence which formerly belonged to Soloman Lunas is 2.745 meters (9.01 feet) from the station in azimuth 130°13′. The station mark is stamped "1919," but it was not occupied until 1920. The station and underground marks are standard disks set in concrete according to notes 1a and 7a. The reference mark, a U.S. Geological Survey bench mark, is 2.568 meters (8.43 feet) from the station in azimuth

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102°24′. A tank is 100 meters (328 feet) from the station in azimuth 247°44′, the courthouse flagstaff is 267°57′ in azimuth, and the Catholic Church steeple is 346°18′ in azimuth from the station. Elevation: 1,479.0 meters (4,852 feet).

Plane coordinates: (C), x=354,384.62 feet; y=1,385,497.84 feet. (W), x=829,680.20 feet; y=1,386,972.85 feet.

Belen south base (Socorro County, C. L. Garner, 1920; 1935).—The station is 27.5 miles by road south of Belen, 4 miles east of the old and now unused Ocean-to-Ocean Highway, 1.2 miles south-southwest of an old adobe, abandoned house and dirt tank, about 1½ miles west of the foot of the Los Pinos Mountains, and about 50 meters (164 feet) from the dim road leading southwest from the adobe house. The base line is on the west side of the Ocean-to-Ocean Highway and nearly parallel to it along the northern end. The station is nearly on line with the projection of the road. To reach the station, go southward on the old Ocean-to-Ocean Highway from its intersection with U. S. Highway 60, a distance of 3.3 miles, to a large, concrete signboard, bear left off the highway and go south-southeastward across country 3.2 miles to a large surface tank, thence go southward along an old stock trail 1.1 miles to the top of the first low divide and the station. The station mark is stamped "1919," but it was not occupied until 1920. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11c. Reference mark No. 1 is 24.33 meters (79.8 feet) from the station in azimuth 90°46′, and No. 2 is 23.045 meters (75.61 feet) from the station in azimuth 269°21′. Elevation: 1,672.9 meters (5,489 feet).

Plane coordinates: (C), x=379,008.11 feet; y=1,208,830.61 feet. (W), x=857,074.08 feet: y=1,210,690.28 feet.

Belen north base (Socorro County, C. L. Garner, 1920; 1935).—The station is 12.5 miles air line south-southeast of Belen, in the NW¼ sec. 13, T. 3 N., R. 2 E., 20 meters (66 feet) west of the old Ocean-to-Ocean Highway, 1.2 miles by road south of a small bridge over a dry stream, and on the crest of the first ridge south of the bridge. To reach the station, go east on U. S. Highway 60 from its intersection with U. S. Highway 85 for a distance of 9.3 miles to a cross road, thence north on the graveled road 4.2 miles to the station. The station mark is stamped "1919," but it was not occupied until 1920. The station was recovered in 1921, 1934, and 1935. In 1934 the station was reported to be 4 meters (13 feet) west of the west edge of the gravel road which used to be the Ocean-to-Ocean Highway. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11c. Reference mark No. 1 is 23.318 meters (76.50 feet) from the station in azimuth 166°36′, and No. 2 is 22.924 meters (75.21 feet) from the station in azimuth 248°19′. Elevation: 1,533.8 meters (5,032 feet).

Plane coordinates: (C), x=365,723.24 feet; y=1,267,339.92 feet. (W), x=842,875.29 feet; y=1,268,993.06 feet.

Taylor (Valencia County, C. L. Garner, 1920; 1921).—The station is about 15 miles air line east-northeast of the town of Grants, on the highest point of Mount Taylor of the San Mateo Mountains. The peak can be approached best from the southwest. At Grants inquire the way to "Canyon Lobo station of the U. S. Forest Service." A wagon can be driven over rough roads to within a 1-hour climb to the top. The station mark is stamped "1919," but was not occupied until 1920. The station and the reference mark are standard disks set in concrete in boulders according to notes 5 and 12d. The reference mark is 21.68 meters (71.1 feet) from the station in azimuth 116°40′. A cross in a boulder is 8.92 meters (29.3 feet) from the station in azimuth 228°51′ and a large rock cairn used by the U. S. Forest Service as an alidade stand is 8.5 meters (28 feet) from the station in azimuth 211°. Elevation: 3,452.2 meters (11,326 feet).

Plane coordinates: (C), x=94,506.93 feet; y=1,544,877.22 feet. (W), x=567,313.98 feet; y=1,542,206.35 feet.

Alegros (Catron County, C. L. Garner, 1920).—The station is on top of Allegros Mountain, between the towns of Datil and Mangas, and 10 miles east of Mangas. The top of the mountain is a lava ridge extending north and south and broadening at the south end to a mesa about 200 yards wide. The station is midway along the top of the ridge in the middle of a small, flat, grassy area. *Rock cairn on north end of Allegros Mountain* is 432.5 meters (1,419 feet) northeast of station. The station mark is stamped "1919," but was not occupied until 1920. The station mark and the reference mark are standard disks cemented into solid rock according to notes 2 and 12a. The reference mark is 22.755 meters (74.66 feet) from the station in azimuth 39°30′. Elevation: 3,122.3 meters (10,244 feet).

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Plane coordinates: (W), x=392,491.45 feet; y=1,148,810.17 feet; grid azimuth to *rock cairn on north end of Allegros Mountain*=221°33′06″.**

Sawyer (Valencia County, C. L. Garner, 1920; 1934).—The station is 3 miles air line northwest of the site of the small sawmill town of Sawyer, 13 miles air line west of south of the town of Thoreau, on the western mesa of the heavily wooded, flat-top mountain locally known as Lookout Mountain, 400 meters (1,312 feet) from the cliff on the west side of the mesa, and 100 meters (328 feet) from the cliff on the north side. In 1934 the station was recovered and a new reference mark (No. 1) was established. The station may be reached from the town of McGaffey via the Closson Ranch which is southwest of McGaffey. Follow the road past the post office at Closson Ranch 0.5 mile to forks, take right fork and follow the road 6.3 miles to an old railroad cut. From the cut it is about ½-hour pack northeastward up the mountain to the station. The station mark is stamped "1919," but was not occupied until 1920. The station and reference marks are standard disks set in boulders according to notes 4 and 12c. Reference mark No. 1 (1934) is 7.890 meters (25.89 feet) from the station in azimuth 92°28′, and No. 2 (1919) is 13.80 meters (45.3 feet) from the station in azimuth 178°09′. Elevation: 2,782.3 meters (9,128 feet).

Plane coordinates: (W), x=366,930.94 feet; y=1,535,120.57 feet.

Pinon (Catron County, C. L. Garner, 1920; 1936).—The station is about 10 miles air line south-southeast of the town of Quemado, in sec. 25, T. 1 S., R. 16 W., on the highest point of Pinion Mountain which is locally known as Escondido Mountain, on the north rim of a small crater which is about 5 meters (16 feet) in diameter, and 8 meters (26 feet) southwest of a dead tree. The station mark is stamped "1919," but was not occupied until 1920. The station, reference, and azimuth marks are standard disks set in boulders according to notes 4 and 12c. Reference mark No. 1, established in 1934, is 29.37 feet from the station in azimuth 176°05′, and No. 2, established in 1919, is 57.67 feet from the station in azimuth 91°46′. In 1936 the azimuth mark was established on top of a knoll 0.35 mile from the station in azimuth 282°56′11″. Elevation: 3,008.0 meters (9,869 feet).

Plane coordinates: (W), x=309,158.01 feet; y=1,163,675.54 feet; grid azimuth to azimuth mark=283°17′28″.*

Crafton (Apache County, Ariz., C. L. Garner, 1920; 1936).—The station is about 12 miles air line east by south of Sanders, 10 miles air line southeast of Houck, 4 miles east of E. H. Bargman's ranch house, 1 mile southwest of a wagon road which leads from Houck to Zuni and over which trucks cannot be driven on account of long stretches of deep sand, in sec. 26, T. 21 N., R. 30 E., and on a flat, sandy, wooded ridge which is the highest in the vicinity. The station mark is stamped "1919," but was not occupied until 1920. The station mark is a standard disk set in concrete according to note 1a. The underground mark is a bottle set in concrete according to note 7d. In 1919 a U. S. Geological Survey triangulation station, marked with a copper nail in the stump of a dead cedar tree, was reported to be 10.265 meters (33.68 feet) from the station in azimuth 189°04′. The reference marks are standard disks set in concrete; No. 1 is 36.44 feet from the station in azimuth 319°57′, and No. 2 is 59.33 feet from the station in azimuth 41°25′. In 1936 an azimuth mark, a standard disk set in concrete according to note 11a, was established 8 feet north of a truck trail where it makes a sharp turn around a ceder tree, 2.2 miles by trail from the station in azimuth 79°50′43″. Elevation: 2,117.3 meters (6,947 feet).

Plane coordinates: (W), x=117,280.24 feet; y=1,528,319.74 feet; grid azimuth to azimuth mark=80°35′01″.*

Ords (Apache County, Ariz., C. L. Garner, 1920; 1934).—The station is about 25 miles southwest of Springerville, on Ord Peak which is in the White Mountains. Baldy Peak, which is higher, is about three miles southeast of Ord Peak. The station mark is stamped "1919," but was not occupied until 1920. The station mark and reference mark No. 1 are standard disks cemented into solid rock according to notes 2 and 12a. Reference mark No. 1 is 18.800 meters (61.68 feet) from the station in azimuth 70°37′, and No. 2 is 29.500 meters (96.78 feet) from the station in azimuth 167°17′. On the highest point and 3 feet higher than the station a rock cairn, which is about 10 feet high and 16

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

For notes in regard to marking of stations see p. 90.

feet in diameter and which was built by the U. S. Geological Survey, is 16.2 meters (53 feet) from the station in azimuth 38°. Elevation: 3,460.5 meters (11,353 feet).

Green (Apache County, Ariz., C. L. Garner, 1920; 1936).—The station is about 17 miles air line west of Springerville, in the Apache National Forest, on top of Greens Peak, and on the highest ground in the vicinity. Greens Peak is the highest of several grassy peaks in the vicinity. In 1920 the station was reported to be 8 meters (26 feet) northwest of a lookout tower. In 1936 the station was reported to be under the center of Green Peak lookout tower. A new station *Green, eccentric* was established 7.113 meters (23.34 feet) from the station in azimuth 342°34′18″. The station mark is stamped "1919", but it was not occupied until 1920. The station and the reference mark are standard disks set in rock according to notes 2 and 12a. The reference mark is 27.005 meters (88.60 feet) from the station in azimuth 342°59′. Elevation: 3,088.5 meters (10,133 feet).

Supplementary points

Tucumcari (Quay County, E. O. Heaton, 1921).—The station is on Tucumcari Mountain, which is about 4 miles southeast of the town of Tucumcari. No report has been made on how the station was marked. Elevation: 1,516.1 meters (4,974 feet).

Plane coordinates: (E), x=689,901.40 feet; y=1,504,808.05 feet.

Tucumcari, city water tank (Quay County, E. O. Heaton, 1921; 1935).—This is the large municipal water tank for the town of Tucumcari. Elevation: 1,284.2 meters (4,213 feet).

Plane coordinates: (E), x=679,727.68 feet; y=1,520,838.97 feet.

Small butte northwest of station Hill (San Miguel County, E. O. Heaton, 1921).—This is a small, isolated butte lying about 15 miles northwest of triangulation station *Hill*.

Plane coordinates: (E), x=410,000.35 feet; y=1,548,881.96 feet.

Lone butte southeast of station Tompson (San Miguel County, E. O. Heaton, 1921).—As seen from triangulation stations *Tompson* and *Aguilar*, this is a small, lone butte lying about 5 miles northward of a large mesa, about 30 miles from station *Tompson*, and about 10 degrees south of the line from *Tompson* to *Aguilar*.

Plane coordinates: (E), x=203,776.69 feet; y=1,593,881.06 feet.

Moriarity (Torrance County, E. O. Heaton, 1921).—The station is about 2 miles south of the town of Moriarity, on the right-of-way at a deep cut, east of the railroad and west of the highway. No report has been made on the marking of the station.

Plane coordinates: (C), x=559,948.51 feet; y=1,440,061.44 feet.

Sandia Range, sharp peak (Bernalillo County, E. O. Heaton, 1921).—This is a sharp point in the southern part of the Sandia Mountains about 6 miles south of triangulation station *Sandia*.

Plane coordinates: (C), x=446,169.20 feet; y=1,499,053.75 feet.

Bosque Peak (Torrance County, E. O. Heaton, 1921).—This is a well-defined peak which terminates a long, flat mountain on its northern end. It is the first point south of Tetillas Peak, which is a sharp, prominent peak, bare at the top, from the south appears to be composed of alternate layers of red and white rock, and which is the most northern high point of the Manzano Mountains.

Plane coordinates:[1] (C), x=444,202 feet; y=1,371,950 feet. (W), x=919,715 feet; y=1,374,841 feet.

Osha Peak, cairn (Torrance County, E. O. Heaton, 1921).—This is a cairn erected as a triangulation station by the U. S. Army Engineers in 1876. The peak is located in about the central part of the Cerro de Manzano Range and is about 5 miles north and one mile east of triangulation station *Manzano*. The peak has a bald, rounded top, and is timbered on all sides below the top.

Plane coordinates: (C), x=443,404.41 feet; y=1,323,230.32 feet. (W), x=919,684.00 feet; y=1,326,104.38 feet.

Becker, coal elevator (Socorro County, E. O. Heaton, 1921).—Plane coordinates: (C), x=390,397.39 feet; y=1,272,072.44 feet. (W), x=867,475.92 feet; y=1,274,111.88 feet.

Hill between Belen base stations (Socorro County, E. O. Heaton, 1921).—This is a small, isolated, rounded hill about midway between triangulation sta-

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

tions *Belen north base* and *Belen south base*, and about one mile westward of the line between them.

Plane coordinates: (C), x=368,840.21 feet; y=1,240,723.45 feet. (W), x=846,408.42 feet; y=1,242,425.03 feet.

Belen, Atchison, Topeka and Santa Fe Railway, coal elevator (Valencia County, E. O. Heaton, 1921).—This is a large wooden coal elevator situated in the Santa Fe yards in the southeastern part of the town of Belen.

Plane coordinates: (C), x=344,480.15 feet; y=1,329,348.79 feet. (W), x=820,659.94 feet; y=1,330,668.52 feet.

Magdalena Mountain Lookout (Socorro County, C. L. Garner, 1920).—This is a U. S. Forest Service lookout tower about 9 miles air line south by east from the town of Magdalena, about 18 miles east-southeast from Socorro, on the Magdalena Mountains in Cibola National Forest.

Plane coordinates: (C), x=215,793.29 feet; y=1,089,250.94 feet.

Madre Mountain (Catron County, C. L. Garner, 1920).—Plane coordinates: (C), x=4,856.66 feet; y=1,203,775.72 feet. (W), x=483,068.77 feet; y=1,199,807.65 feet.

Highest hill between stations Taylor and Sawyer, west shoulder (Valencia County, C. L. Garner, 1920).—This point is about 25 miles southwest of triangulation station *Taylor* and about 22 miles southeast of triangulation station *Sawyer*.

Plane coordinates:[1] (W), x=463,774 feet; y=1,464,140 feet.

Rock cairn on the north end of Alegros Mountain (Catron County, C. L. Garner, 1920).—This point is 432.5 meters (1,419 feet) from triangulation station *Alegros* (see geographic position and description thereof) in azimuth 221°21′08″.

Plane coordinates:[1] (W), x=393,433 feet; y=1,149,872 feet.

Putnam's ranch, windmill (Catron County, C. L. Garner, 1920).—Plane coordinates:[1] (W), x=361,259 feet; y=1,199,479 feet.

Higher one of two sharp buttes (Catron County, C. L. Garner, 1920).—Plane coordinates:[1] (W), x=356,644 feet; y=1,299,863 feet.

Escudilla Mountain (Apache County, Ariz., C. L. Garner, 1920).—Plane coordinates: (W), x=108,334.06 feet; y=1,077,529.94 feet.

Mt. Baldy, Lookout (Apache County, Ariz., C. L. Garner, 1920).—A. U. S. Forest Service lookout tower on Baldy Peak 3¼ miles southeast of triangulation station *Ords* (see geographic position and description thereof).

Mt. Baldy, south peak (Apache County, Ariz., C. L. Garner, 1920).—This point is about 3½ miles southeast of triangulation station *Ords* (see geographic position and description thereof).

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC

Principal points

Seven L (Las Animas County, Colo., C. M. Durgin, 1922).—On Mesa de Maya, about 6 miles north of the State line, 7 miles southwest of the old Seven L Ranch, 2 miles south of the Montoya place, on the higher of the two rocky hills known as Seven L or Black Buttes, midway between two piles of rocks. The station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 6.62 meters (21.7 feet) from the station in azimuth 177°10′, and No. 2 is 7.66 meters (25.1 feet) from the station in azimuth 284°36′. Elevation: 2,011.4 meters (6,599 feet).

Plane coordinates: (E), x=742,677.38 feet; y=2,221,888.41 feet.

Potato (Las Animas County, Colo., C. M. Durgin, 1922).—About 15 miles southeast of Kim, Colo., 25 miles northwest of Kenton, Okla., on the highest point of Potato Butte (a lone knob on the top of a lone mesa, Mesa Baquite), and about 1½ miles southeast of McArthur's sheep ranch. The best approach is by the road from the southeast side of the mesa. The station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 10.20 meters (33.5 feet) from the station in azimuth 198°07′, and No. 2 is 2.88 meters (9.4 feet) from the station in azimuth 275°39′. Elevation: 1,669.8 meters (5,478 feet).

Plane coordinates: (E), x=857,212.10 feet; y=2,248,733.36 feet.

Clayton east base (Union County, C. M. Durgin, 1922).—About 24 miles north of Clayton, 6 miles east and 2 miles north of Cuates Post Office, near the west-

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

ern end of a level-topped knoll at the western side of sec. 27, T. 30 N., R. 35 E., on land owned by Orville Moulder, ¼ mile north-northeast of a stone house, 50 meters (164 feet) back from the brow of the hill, and on line with Mount Dora and the stone house. The station mark is a standard disk set in concrete according to note 1a. The underground mark is a standard disk set in bedrock according to note 8a. The reference mark, a standard disk set in concrete according to note 11a, is on the north and south fence line on the west of the section, directly on line with *Clayton west base* and 150.425 meters (493.52 feet) from the station. Elevation: 1,600.9 meters (5,252 feet).

Plane coordinates: (E), x=832,770.89 feet; y=2,110,818.15 feet; the grid azimuth to the reference mark=73°31′18″.*

New Mexico-Colorado boundary milepost no. 328 eccentric (Union County, N. Mex.; Las Animas County, Colo., C. M. Durgin, 1922).—On Mesa de Maya, about 3 miles east of Sheep Pen Canyon, 1 mile north of Cimarron Valley, 3 miles east of the Steele Ranch and the stone schoolhouse in Cimarron Valley, on grassy prairie, and ¼ mile southeast from a small lake. To reach from Kenton, go up Blacksmith Canyon, or from Dalerose go up Owl Roost Canyon and proceed southeast 15 miles across country to the station site. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. The reference mark is 16.20 meters (53.1 feet) from the station in azimuth 287°20′. The *New Mexico-Colorado old boundary milepost No. 328* may be used as an azimuth mark. Elevation: 1,589.6 meters (5,215 feet).

Plane coordinates: (E), x=852,394.22 feet; y=2,185,217.03 feet; the grid azimuth to *New Mexico-Colorado old boundary milepost No. 328*=179°19′06″.**

Grande (Union County, C. M. Durgin, 1922).—On the highest point of Sierra Grande, a prominent grassy and rock-covered mountain 5 miles southwest of Des Moines, and 3 meters (10 feet) south of two piles of stones on the western peak. The station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 33.48 meters (109.8 feet) from the station in azimuth 84°41′, and No. 2 is 14.64 meters (48.0 feet) from the station in azimuth 324°12′. Elevation: 2,658.0 meters (8,720 feet).

Plane coordinates: (E), x=633,993.92 feet; y=2,076,360.87 feet.

Dora (Union County, C. M. Durgin, 1922; 1935).—About 2½ miles northeast of the town of Mount Dora, on the highest point of Mount Dora, a grassy hill covered with lava and rock, and near the western end of the rocky ridge. The station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 14.825 meters (48.64 feet) (slope distance) from the station in azimuth 163°46′, and No. 2 is 8.644 meters (28.36 feet) (slope distance) from station in azimuth 274°28′. Station *Pits* may be used as an azimuth mark. Elevation: 1,917.2 meters (6,290 feet).

Plane coordinates: (E), x=757,125.12 feet; y=2,018,132.82 feet; the grid azimuth to *Pits*=341°55′29″.1.

Des Moines (Union County, C. M. Durgin, 1922).—On high ground, about 300 meters (984 feet) south of Colorado & Southern Depot at Des Moines, 200 meters (656 feet) west of the track, and about 300 meters (984 feet) southeast of the brick high school. The station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 41.29 meters (135.5 feet) from the station in azimuth 249°16′, and No. 2 is 7.89 meters (25.9 feet) from the station in azimuth 345°24′. *T. 29 N., R. 29 E., sec. 10, southeast corner, Des Moines townsite* may be used as an azimuth mark. Elevation: 2,025.4 meters (6,645 feet).

Plane coordinates: (E), x=647,844.80 feet; y=2,094,901.06 feet; the grid azimuth to *T. 29 N., R. 29 E., sec. 10, southeast corner, Des Moines townsite*= 254°24′30″.**

Clayton west base (Union County, C. M. Durgin, 1922).—About 23 miles north-northwest of Clayton, ¼ mile south of Cuates Post Office, on the highest point and western end of a ridge at the western half of sec. 9, T. 29 N., R. 34 E., and on land belonging to the First National Bank of Clayton. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. The reference mark is in an east-and-west fence line, on the south side of the roadway along the section line north of the station, and 1,308.8 feet from the station in azimuth 181°48′28″. *T. 29 N., R. 34 E.,*

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

For notes in regard to marking of stations see p. 90.

sec. 3, southwest corner may be used as an azimuth mark. Elevation: 1,658.3 meters (5,441 feet).

Plane coordinates: (E), x=796,769.21 feet; y=2,100,168.98 feet; the grid azimuth to the reference mark=181°12′05″.*

Seneca (Union County, C. M. Durgin, 1922; 1935).—About 18 miles north of Clayton, 2½ miles northwest of Seneca Post Office, on the highest point of a ridge, about 900 meters (2,953 feet) west of a road, and 704.23 meters (2,310.5 feet) northeast of *T. 28 N., R. 35 E., sec. 23, southeast corner*. The station, underground, and reference marks are standard disks set in concrete, according to notes 1a, 7a, and 11a. Reference mark No. 1 is 8.21 meters (26.9 feet) from the station in azimuth 295°31′, and No. 2 is 11.82 meters (38.8 feet) from the station in azimuth 60°46′. The following distances and azimuths are from station: House, chimney, ½ mile, 70°55′59″; stone house, chimney, ¾ mile, 207°24′25″; large square frame house, chimney, 1 mile, 292°34′24″. The station was recovered and described in 1931, and both reference marks and the station re-marked, presumably as described in the original marking. The distance of reference mark No. 2 was reported to be 38.62 feet in 1931. Elevation: 1,554.9 meters (5,101 feet).

Plane coordinates: (E), x=844,958.55 feet; y=2,056,585.94 feet; the grid azimuth to house, chimney, ½ mile=70°13′52″.*

Rabbit (Union County, C. M. Durgin, 1922; 1935).—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. To reach from Clayton, go north from Main Street 0.3 mile, leave highway, take right fork and go 8.2 miles to a point where road turns west. The azimuth mark is located at this point. Pass through gate northeast of road and drive across country easterly about 1¼ miles to the west base of butte, and from here pack up west slope of butte to station site. The station and reference marks are standard disks set in rock, according to notes 2 and 12. Reference mark No. 1 is 11.289 meters (37.04 feet) from the station in azimuth 315°03′, and No. 2 is 8.193 meters (26.88 feet) (slope distance) from station in azimuth 79°46′. The azimuth mark, a standard disk set in concrete, according to note 11a, is 3 feet south of a northeast fence corner which is northeast of road at point where road turns from the north to west, and 1½ miles from station in azimuth 99°57′17″. Elevation: 1,847.6 meters (6,062 feet).

Plane coordinates: (E), x=819,917.93 feet; y=2,014,780.16 feet; the grid azimuth to the azimuth mark =99°18′23″.*

Carriso (Harding County, C. M. Durgin, 1922).—About 20 miles northeast of Roy, 1½ miles south of the Harding-Union Counties line, in the Mitchell pasture, on the highest point of the southeastern rounded butte covered with lava rock and having a cairn on the top. The hill is sometimes called Sierra La Cruce. Station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 19.95 meters (65.5 feet) from station in azimuth 188°06′, and No. 2 is 34.90 meters (114.5 feet) from station in azimuth 257°55′. Elevation: 1,888.6 meters (6,196 feet).

Plane coordinates: (E), x=605,404.49 feet; y=1,875,136.76 feet.

Laughlin (Colfax County, C. M. Durgin, 1922).—About 20 miles north-northeast of Maxwell, 18 miles southwest from Dedman, 6 miles northwest of Chico Post Office, on top of a grassy, isolated hill, which is the northwesternmost of the hills north of Chico. The best approach is from road leading south from the Clayton-Raton Highway that goes past the foot of the hill. The station is marked with a standard disk set in rock according to note 2. Reference mark No. 1, a standard disk set in rock according to note 12, is 22.25 meters (73.0 feet) from the station in azimuth 322°52′. *Laughlin (U. S. G. S.), cairn*, is 3.2 meters (10 feet) from the station in azimuth 237°06′. *T. 28 N., R. 26 E., sec. 28, southwest corner*, is 17.15 meters (56.3 feet) from the station in azimuth 296°51′. Elevation: 2,688.5 meters (8,821 feet).

Plane coordinates: (E), x=543,467.72 feet; y=2,046,924.37 feet.

Wagon (Mora County, C. M. Durgin, 1922).—About 5 miles east by south from Wagon Mound, on the southeastern of two rounded knobs near the eastern end of Canjelon Mesa. To reach station approach from north of the mesa. Station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 70.38 meters (230.9 feet) from station in azimuth 301°21′, and No. 2 is 19.745 meters (64.78 feet) from station in azimuth 1°21′. Elevation: 2,215.2 meters (7,268 feet).

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Plane coordinates: (E), x=428,424.70 feet; y=1,812,450.31 feet.

Montoya (San Miguel County, C. M. Durgin, 1922).—About 18 miles south of Roy, 12 miles west by south of Mosquero, on the highest ground on the Montoya Mesa, 400 meters (1,312 feet) from its easternmost point, and 10 meters (33 feet) north of the south edge. To reach station approach from Roy over the mesa. Station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 11.15 meters (36.6 feet) from station in azimuth 14°49′, and No. 2 is 38.86 meters (127.5 feet) from station in azimuth 27°25′. Elevation: 1,768.5 meters (5,802 feet).

Plane coordinates: (E), x=550,944.88 feet; y=1,718,093.94 feet.

Solana (Harding County, C. M. Durgin, 1922; 1928).—About 700 feet southeast of the Southern Pacific Railroad station in the town of Solana (Solano), 130 feet north of the south end of a switch and 50 feet west of the track. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. *T. 19 N., R. 27 E., sec. 28, northeast* $\frac{1}{16}$ *corner* (reference mark No. 1), the northwest corner of Solana Townsite, is 747 feet from station in azimuth 45°38′50″, and *Solana Townsite, northeast corner* (reference mark No. 2), is 742 feet from station in azimuth 314°35′44″. In 1928 this station was recovered and used as a first order bench mark. Elevation: 1,716.856 meters (5,632.72 feet).

Plane coordinates: (E), x=578,503.14 feet; y=1,765,397.89 feet; the grid azimuth to *Solana Townsite, northeast corner* 314°26′25″.**

Anil (Guadalupe County, C. M. Durgin, 1922).—About 24 miles north of Fort Sumner at the northern end of Gayhart Valley, 1½ miles northwest of Anil Post Office, on the south end and highest point of an isolated mesa about 2 miles south from a prominent, sharp, conical knob located near the northern end of the same mesa. One road passes the south side of the mesa, and another goes through the gap at the east. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. Reference marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is 51.03 meters (167.4 feet) from station in azimuth 202°08′, and No. 2 is 41.69 meters (136.8 feet) from station in azimuth 283°07′. Elevation: 1,564.0 meters (5,131 feet).

Plane coordinates: (E), x=539,283.37 feet; y=1,375,713.87 feet.

Nelson (Guadalupe County, C. M. Durgin, 1922).—About 23 miles north-northwest from Fort Sumner, 23 miles southeast from Santa Rosa, 22 miles south from Cuervo, 6 miles north from the Alamagorda Creek crossing, ½ mile east of the Fort Sumner-Santa Rosa road, and on the highest ground in a pasture ⅜ mile northwest from the house of R. A. Nelson. Station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 21.30 meters (69.9 feet) from station in azimuth 50°00′, and No. 2 is 20.90 meters (68.6 feet) from station in azimuth 157°31′. Elevation: 1,422.2 meters (4,666 feet).

Plane coordinates: (E), x=461,700.65 feet; y=1,362,193.84 feet.

Fort Sumner (De Baca County, C. M. Durgin, 1922).—About 5 miles west-southwest from Fort Sumner, on the eastern spur of sand hills 1½ miles from J. E. Brown's ranch. An old road runs along the side of the spur ⅜ mile below the top. There is higher ground ½ mile to the west. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. Reference mark No. 1, a standard disk set in bedrock according to note 12a, is 49.09 meters (161.1 feet) from station in azimuth 234°41′. Reference mark No. 2, a standard disk set in concrete according to note 11a, is 14.94 meters (49.0 feet) from station in azimuth 139°57′. The following azimuths are from the station: Fort Sumner water tank, north tangent, 247°50′46″; and Fort Sumner water tank, south tangent, 247°53′38″. Elevation: 1,356.3 meters (4,450) feet).

Plane coordinates: (E), x=502,541.93 feet; y=1,254,823.76 feet; the grid azimuth to Fort Sumner water tank, north tangent=247°50′29″.*

Charlotte (De Baca County, C. M. Durgin, 1922).—On a mesa, 12 miles north-northwest of Taiban, 3¾ miles west of the Charlotte post office, 1 mile northwest from the ranch house of J. L. Woodward, 140 meters (459 feet) east from the western extremity of the point, and 30 meters (98 feet) south of the north face of the bluff. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. Reference marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is 26.55 meters

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

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(87.1 feet) from station in azimuth 333°52′, and No. 2 is 38.71 meters (127.0 feet) from station in azimuth 76°08′. Elevation: 1,489.9 meters (4,888 feet).

Plane coordinates: (E), x=580,037.85 feet; y=1,304,763.91 feet.

Tolar (Roosevelt County, C. M. Durgin, 1922).—About 20 miles southwest from Melrose, 14 miles south by east from Tolar, 5 miles northeast from the Bush Ranch, 2 miles south from the Hallifield Ranch, ½ mile south of the Willis place under the hill, and 200 meters (656 feet) east from a pile of stone on the northwestern point of the mesa. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. Reference marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is 190.11 meters (623.7 feet) from station in azimuth 62°43′25″, and No. 2 is 138.09 meters (453.1 feet) from station in azimuth 113°11′57″. Elevation: 1,433.9 meters (4,704 feet).

Plane coordinates: (E), x=636,250.80 feet; y=1,182,686.07 feet; the grid azimuth to reference mark no. 1=62°28′11″.*

Urton (De Baca County, C. M. Durgin, 1922).—About 22 miles S. 16° W. from La Lande, 2 miles northwest of Urton Lake, 4 miles west of Hall's ranch, 5 miles northwest of Bill Elliott's ranch, 10 miles north of Spy Mountain, and on the highest point of a prominent, round-topped hill. A section-line road passes ½ mile south of the station. Station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 13.78 meters (45.2 feet) from station in azimuth 193°57′ and No. 2 is 14.65 meters (48.1 feet) from station in azimuth 297°39′. Elevation: 1,268.4 meters (4,161 feet).

Plane coordinates: (E), x=529,320.29 feet; y=1,144,165.67 feet.

La Lande (De Baca County, C. M. Durgin, 1922).—In the town of La Lande, in range with the west end of the Atchison, Topeka & Santa Fe Railway depot, 50 meters (164 feet) south of the southwest corner and 47 meters (154 feet) from the center of the main line track. Station is marked with a disk in top of an iron pipe. Elevation: 1,257.7 meters (4,126 feet).

Plane coordinates: (E), x=560,527.03 feet; y=1,253,773.94 feet.

Kenna (Chaves County, C. M. Durgin, 1922).—About 10 miles northwest of Kenna, 5 miles northwest of Bill Littlefield's ranch, 2½ miles northeast from the ranch of Jeff White who lives in the "breaks," near the steep, western end of a large mesa 3 miles north of the south end, on the highest point in the vicinity, and 50 meters (164 feet) south of a fence line. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 47.73 meters (156.6 feet) from station in azimuth 357°20′, and No. 2 is 30.43 meters (99.8 feet) from station in azimuth 100°59′. Elevation: 1,449.0 meters (4,754 feet).

Plane coordinates: (E), x=636,594.62 feet; y=1,077,356.46 feet.

Haystack (Chaves County, C. M. Durgin, 1922).—About 10 miles N. 54° W. of Elkins, 2½ miles northwest of Mr. Rudolph's place, 2 miles southwest from the Stratton, Fahrlander, and Schlegel houses, on the highest point of the hill known locally as Haystack Butte which has a prominent tip a short distance off the north end. The station is on the flat top 100 meters (328 feet) east of the "breaks," and 80 meters (262 feet) north of a road leading west over the high part of the hill. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. Reference marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is 157.24 meters (515.9 feet) from station in azimuth 78°26′32″, and No. 2 is 95.35 meters (312.8 feet) from station in azimuth 136°14′. Elevation: 1,276.6 meters (4,188 feet).

Plane coordinates: (E), x=540,954.58 feet; y=1,010,956.91 feet; the grid azimuth to reference mark No. 1=78°22′03″.*

Sardine (Chaves County, C. M. Durgin, 1922; 1935).—About 26 miles east-northeast of Roswell, 15 miles south of Elkins, 5½ miles north of U. S. Highway 380, on the southeast end and highest part of a prominent, flat, rocky ridge, or mesa, locally known as Sardine Mountain. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 96.32 feet (slope distance) from station in azimuth 289°28′, and No. 2 is 94.44 feet from station in azimuth 53°28′. The azimuth mark, a standard disk set in concrete according to note 11a, is on the northeast point of mesa, about 35 feet from the edge, and 0.6 mile from station in azimuth 157°12′21″. In

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

1935 it was reported that the station mark was found loose and was reset with concrete in the original drill hole. Elevation: 1,211.0 meters (3,973 feet).

Plane coordinates: (E), x=569,823.21 feet; y=905,475.79 feet; the grid azimuth to the azimuth mark=157°04′46″.*

Mescalera (Chaves County, C. M. Durgin, 1922; 1935).—Located 40 miles air line east of Roswell, 6 miles south of Clark's gap, 1 mile south of the ranch house of Woody Tullos (at the foot of the caprock), 1½ miles north and ½ mile west of Mescalera Spring, 2 miles west of D. H. Lucas' two windmills, 2 miles northwest of the home formerly owned by D. W. Stiele, and now owned by E. E. James, 78 feet east of a cliff on the western end of Mescalera Point which is the most prominent point of the caprocks in the vicinity. A circular pile of stones is 5 meters (16 feet) east of the rim of the caprock and the station is 15 meters (49 feet) east of the pile of stones. To reach the station from Caprock post office go westward 2.4 miles on U. S. Highway 380, turn left (south) off highway and go 1.3 miles on graded road, cross wooden cattle guard and go south-southwest 2.8 miles on main road, cross wooden cattle guard and go straight ahead (southerly) on main road (right fork) 1.6 miles, take right fork and go southwest 0.9 mile to E. E. James' ranch buildings, go north on main road 1.2 miles, go west on main road 100 yards around south side of four trees, go north and northwest 0.6 mile, drive west along south side of fence 0.3 mile to T-fence, cross fence and continue west 0.6 mile, go southwest across country along edge of breaks 0.3 mile to station site. The original station mark was a standard disk in rock according to note 2. In 1935 it was reported that the station mark was set in concrete according to note 1c. The original reference marks (1922) were standard disks set in bedrock according to note 12a. Reference mark No. 1 was 25.40 meters (83.3 feet) from station in azimuth 239°46′, and No. 2 was 43.17 meters (141.6 feet) from station in azimuth 178°34′. The 1922 reference marks were not recovered in 1935. In 1935 two new reference marks and an azimuth mark, standard disks in concrete according to note 11a, were set. Reference mark No. 1 is 121.85 feet from station in azimuth 238°22′, and No. 2 is 110 feet east of the breaks, and 92.78 feet from station in azimuth 327°41′. The azimuth mark is 2.3 feet south of an east-west fence, 100 feet southeast of the breaks, and 0.3 mile from station in azimuth 223°23′09″. Elevation: 1,375.0 meters (4,511 feet).

Plane coordinates: (E), x=651,502.43 feet; y=856,662.53 feet; the grid azimuth to the azimuth mark=223°06′47″.*

Sears (Chaves County, C. M. Durgin, 1922; 1935).—About 16 miles south of Kenna, 4½ miles south from the house and windmill of D. T. Gouty (1922), 4½ miles west-northwest of Sears' and McComb's home ranch (1935 note states: 4 miles southwest of the old Sears-McComb Ranch), on the west end of the most prominent projection of sand hills, on the highest point for several miles, 70 meters (230 feet) east of a pile of stones on the western slope, and 100 yards west of a north-south fence line which runs across the spur. The hill breaks off sharply a few yards west and north of the station but is nearly level to the east. To reach the station from McComb's service station which is 49 miles north-northeast of Roswell and at the edge of the breaks on U. S. Highway 70, go north 4.9 miles on U. S. Highway 70, turn right off highway, pass through board gate, go toward ranch buildings, then southerly and southeasterly, keeping on the main-traveled road, 7.8 miles to old Sears-McComb Ranch, take right fork southwesterly and go 0.9 mile, cross fence, take right fork and go 1.6 miles on main road, pass through gate and go 0.6 mile, turn left (south) off main road and go 1.0 mile on dim road, pass through gate, leave road and go 0.5 mile west-southwest across country along top of ridge to highest point and station site. Station and reference marks are standard disks set in bedrock according to notes 2a and 12a. Reference mark No. 1 is 129.65 feet (slope distance) from station in azimuth 33°29′, and No. 2 is 112.15 feet (slope distance) from station in azimuth 85°54′. The azimuth mark, a standard disk set in concrete according to note 11a, is 2 feet north of an east-west fence, and 0.2 mile from station in azimuth 334°22′08″. Elevation: 1,370.4 meters (4,496 feet).

Plane coordinates: (E), x=682,927.25 feet; y=955,583.03 feet; the grid azimuth to the azimuth mark=334°02′10″.*

Wade (Chaves County, C. M. Durgin, 1922; 1935).—About 21 miles east-southeast of Roswell, 12 miles northeast of Dexter, on the western part and

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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highest point of a high, flat mesa having prominent and steep dropoffs on the south and west sides, the highest ground for several miles in any direction, and in sec. 12, T. 12 S., R. 27 E., on state land which was leased in 1935 by Tom Crawford, whose ranch is 3 miles northwest. The station is 75 yards northeast of the head of a deep canyon which runs southwest and has a small, isolated, round-topped hill near its mouth. Station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is in the rimrock of the mesa at the head of the above-mentioned canyon, and 75.967 meters (249.24 feet) from station in azimuth 17°21′, and No. 2 is in the rimrock of the mesa, and 102.847 meters (337.42 feet) from station in azimuth 112°33′. The azimuth mark is on the rimrock on the southeast side of the above-mentioned canyon, and 0.5 mile from station in azimuth 48°02′24″. The azimuth from station to the windmill at Tom Crawford's Ranch is 142°12′. Elevation: 1,167.9 meters (3,832 feet).

Plane coordinates: (E), x=542,236.92 feet; y=832,820.30 feet; the grid azimuth to the azimuth mark=47°57′51″.*

Cedar (Chaves County, C. M. Durgin, 1922).—About 35 miles east-northeast of Artesia, 30 miles east of Lake Arthur, 10 miles south of Mescalera Sands, on Cedar Point on the western side of the caprock, and ¾ mile southwest of Maxwell's Gap where the Artesia-Lovington road reaches the top of the caprock. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 19.40 meters (63.6 feet) from station in azimuth 69°14′, and No. 2 is 23.368 meters (76.67 feet) from station in azimuth 152°07′. Elevation: 1,363.9 meters (4,475 feet).

Plane coordinates: (E), x=639,859.47 feet; y=734,096.69 feet.

Artesia north base (Chaves County, C. M. Durgin, 1922).—About 4 miles west by north of Lake Arthur, 1¼ miles west of the ranch of D. G. Ditto, ½ mile north of old well and corral on the south side of the road, 30 meters (98 feet) southeast of the road leading from the upper cottonwood settlements to Hagerman, on the northern of two knolls of the same elevation. Station mark is a standard disk set in concrete according to note 1a. Underground mark is a standard disk set in bedrock. Reference marks are standard disks set in concrete according to note 11a. Reference mark No. 1 is 30.63 meters (100.5 feet) from station in azimuth 209°58′, and No. 2 is 40.055 meters (131.41 feet) from station in azimuth 270°06′. Elevation: 1,075.1 meters (3,527 feet).

Plane coordinates: (E), x=469,165.34 feet; y=735,057.91 feet.

Baylor (Eddy County, C. M. Durgin, 1922).—About 11 miles east by south from Artesia, 3½ miles north from J. A. Simpson's ranch house, 1 mile southeast from a red windmill known as Taylor's first mill, alongside the Hart Canyon road, on the highest land at the northern end of the mesa, 160 meters (525 feet) south from a prospect hole dug in the red earth on the slope of the mesa. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 17.08 meters (56.0 feet) from station in azimuth 183°39′, and No. 2 is 20.55 meters (67.4 feet) from station in azimuth 250°25′. Elevation: 1,135.9 meters (3,727 feet).

Plane coordinates: (E), x=541,312.24 feet; y=655,679.09 feet.

Artesia south base (Eddy County, C. M. Durgin, 1922).—About 3 miles west of Artesia, 600 meters (1,968 feet) south of the Artesia-Hope wagon road, 1 mile north of Mr. Larsh's house, on the highest point of a rounded hill in pasture belonging to Mrs. Louise Lucas, and 20 meters (66 feet) east of a prospect hole. Station mark is a standard disk set in concrete according to note 1a. Underground mark is a standard disk set in bedrock. Reference marks are standard disks set in concrete according to note 11a. Reference mark No. 1 is 31.18 meters (102.3 feet) from station in azimuth 290°00′, and No. 2 is 36.14 meters (118.6 feet) from station in azimuth 16°08′. Elevation: 1,080.0 meters (3,543 feet).

Plane coordinates: (E), x=459,561.59 ffeet; y=669,248.74 feet.

Walker (Eddy County, C. M. Durgin, 1922).—About 12 miles northeast of Artesia, 10 miles southeast of Lake Arthur, 6 miles southeast of Pecos River bridge near Lake Arthur, 4 miles south of the Walker Ranch, on the highest point of the highest hill in the locality, prominent from all directions. There is a cairn 5 meters (16 feet) southwest of the highest point. Station mark is a standard disk set in rock according to note 2. Reference mark No. 1, a

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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standard disk set in bedrock according to note 12a, is 27.112 meters (88.95 feet) from station in azimuth 353°19′. Reference mark No. 2, a drill hole in rock, is 12.205 meters (40.04 feet) from station in azimuth 84°03′. Elevation: 1,147.8 meters (3,766 feet).

Plane coordinates: (E), x=528,330.48 feet; y=704,649.05 feet.

Millman (Eddy County, C. M. Durgin, 1922).—About 12 miles by road east of Lakewood, 7 miles east of a dam at Lake McMillan Reservoir, 6 miles and 355° magnetic from Louis Angel's house, 1½ miles and 338° magnetic from the house of S. D. Millman, on the western side of a ravine fence, on approximately the highest ground of the flat mesa and 15 paces east of a point where the Millman ranch house windmill just clears the left tangent of a hill 1 mile distant. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. Reference mark No. 1, a standard disk set in concrete according to note 11a, is 38.12 meters (125.1 feet) from station in magnetic azimuth 70°00′. Reference mark No. 2, a standard disk set in bedrock according to note 12a, is 68.45 meters (224.6 feet) from station in magnetic azimuth 138°38′. Elevation: 1,081.2 meters (3,547 feet).

Plane coordinates: (E), x=545,574.96 feet; y=604,011.03 feet.

Deadman (Eddy County, C. M. Durgin, 1922; 1928).—About 16 miles west-northwest from Carlsbad, 12 miles southwest from Lakewood, on the highest ground south of the western entrance of the road leading through Deadmans Gulch. Station is about 10 paces east of the ledge at the west side of the bluff at a point where the town of Lakewood shows over and to left of left tangent of hills 3 miles north, about 9 miles south of the Seven Rivers School. The north side of bluff has a prominent V-shaped gully one-third of the distance from the top and is visible from the road. To reach from Carlsbad, take the Carlsbad-Roswell Highway and go 11.1 miles toward Roswell, turn onto the Rocky Arroyo Road and continue 13 miles, from here take a trail to the right and go ¼ mile. keep to the right and follow the west edge of the plain about 4 miles to a point just past the second gap in the hills to the right. The station is on a prominent hill northwest of the second gap and about ¾ mile east of the road. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 21.10 meters (69.2 feet) from station in azimuth 69°56′, and No. 2 is 12.13 meters (39.8 feet) from station in azimuth 44°06′. Station *Deadman* (*U. S. G. S.*) is 0.335 meters (1.10 feet) from the station in azimuth 226°18′. Elevation: 1,271.1 meters (4,170 feet).

Plane coordinates: (E), x=445,537.25 feet; y=545,488.30 feet.

Carlsbad (Eddy County, C. M. Durgin, 1922).—About 5 miles northeast from Carlsbad, and 1½ miles northeast and up draw from the house of John Sachowiak on the highest point of a grassy hill. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 19.10 meters (62.7 feet) from station in azimuth 265°57′, and No. 2 is 54.47 meters (178.7 feet) from station in azimuth 5°37′. Elevation: 1,022.2 meters (3,354 feet).

Plane coordinates: (E), x=547,861.42 feet; y=537,981.22 feet.

Jurnegan (Eddy County, C. M. Durgin, 1922).—About 18 miles southwest from Carlsbad, 16 miles west from Malaga, 6 miles west from the schoolhouse at the Johnson Ranch on Black River, 2½ miles southwest from Ed. Judkin's goat ranch at the Jurnegan Springs. To reach, follow up the canyon from the goat ranch by Jurnegan Springs and at this point climb ridge to the south and follow along to the highest point and station site. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 28.70 meters (94.2 feet) from station in azimuth 250°13′, and No. 2 is 13.655 meters (44.80 feet) from station in azimuth 3°13′. Elevation: 1,295.2 meters (4,249 feet).

Plane coordinates: (E), x=484,352.10 feet; y=438,307.05 feet.

Loving (Eddy County, C. M. Durgin, 1922).—About 3½ miles northwest from the depot at Malaga, 1¾ miles southwest from the depot at Loving, in the big bend of the main canal, in the northwest quarter section of T. 23 S., R. 28 E., around the eastern end of which the canal leads, on the highest point of the eastern and highest of two prominent knolls. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 13.91 meters (45.6 feet) from the station in azimuth 18°50′, and No. 2 is 37.81 meters (124.0 feet) from station in azimuth 108°30′. Elevation: 964.0 meters (3,163 feet).

Plane coordinates: (E), x=568,276.66 feet; y=460,089.38 feet.

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Screwbean (Culberson County, Tex., C. M. Durgin, 1922; 1931).—About 11 miles south of the New Mexico-Texas State line 4½ miles south from the Reynolds ford on the Delaware Creek which is 14 miles due west from Angeles, 5 miles west from the Alexander Ranch at Screwbean Springs, ¾ mile north of the road leading from Screwbean Springs through the gap to the Delaware Creek, on the highest point of the Screwbean Hills, and ½ mile northeast from a cairn on a prominent hill just north of the road in the gap. Station and reference marks are standard disks set in rocks according to notes 2 and 12a. Reference mark No. 1 is 28.630 meters (93.93 feet) from the station in azimuth 288°51′, and No. 2 is 9.195 meters (30.17 feet) from station in azimuth 54°32′. Elevation: 1,116.5 meters (3,663 feet).

Plane coordinates: (E), x=547,861.44 feet; y=309,439.95 feet.

Pope (Eddy County, C. M. Durgin, 1922).—About 12 miles northeast of Angeles, Tex., 7 miles east of Corral, 6 miles east of the Pecos River, 3 miles north of the New Mexico-Texas State line, on the highest point of a large mesa, 40 meters (131 feet) from the south side, which is sheer. To reach, cross the river at Popes Crossing 2 miles north of the State line opposite Corral and follow main wagon road for 6 miles; station is 1 mile to the south on the highest point. Station mark is a standard disk set in rock according to note 2. The reference mark, a standard disk set in bedrock according to note 12a, is 32.55 meters (106.8 feet) from station in azimuth 14°57′. Elevation: 948.6 meters (3,112 feet).

Plane coordinates: (E), x=633,793.01 feet; y=376,274.40 feet.

Devine (Reeves County, Tex., C. M. Durgin, 1922; 1931).—About 10 miles southeast of Orla, 7 miles northwest of Arno, 3 miles southeast of the Fishtail Ranch, 1 mile south and west of the Pecos River Branch of the Atchison, Topeka & Santa Fe Railway, on the northwest hump of a two-humped hill. To reach, go to Arno and follow the railway north until opposite the station, then turn to the west and go across country. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. The reference mark, a standard disk set in concrete according to note 11a, is 32.86 meters (107.8 feet) from station in azimuth 153°39′. Elevation: 868.8 meters (2,850 feet).

Welch (Eddy County, C. M. Durgin, 1922).—About 4 miles north of the New Mexico-Texas State line, 1½ miles northwest from the ranch house of J. H. Welch, 1 mile southeast from Crowders' house, 4 miles west from the Coad brothers ranch, on the highest point of the western ridge running east and west, at the western end of a range of hills. To the west the hill drops off abruptly. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 23.76 meters (78.0 feet) from station in azimuth 271°00′, and No. 2 is 47.15 meters (154.7 feet) from station in azimuth 5°10′. Elevation: 1,040.0 meters (3,412 feet).

Plane coordinates: (E), x=543,288.67 feet; y=381,902.14 feet.

New Mexico-Texas boundary mile corner 53 eccentric (Loving County, Tex., C. M. Durgin, 1922; 1931).—About 7 miles northeast of Angeles, Tex., 1 mile east of the Pecos River, 1½ miles northwest from the Cascade Ranch house owned by the Crowder brothers, on the highest point of the prominent hill on the south side of the saddle in which *New Mexico-Texas boundary mile corner 53* is located. Station and reference marks are standard disks set in rock according to notes 2 and 12a. The reference mark is 25.36 meters (83.2) feet from station in azimuth 300°46′. *New Mexico-Texas boundary mile corner 53* is 471.174 meters (1,545.84 feet) from the station in azimuth 204°45′56″. Elevation: 892.0 meters (2,927 feet).

Plane coordinates: (E), x=612,804.56 feet; y=362,506.20 feet; the grid azimuth to *New Mexico-Texas boundary mile corner 53*=204°34′22″.**

Ross (Reeves County, Tex., C. M. Durgin, 1922; 1931).—About 9 miles southeast of Orla, 12 miles southeast of the Screwbean Springs, 3 miles east of the Incline well and cottonwoods which are 1 mile north of the Incline Ranch, 1 mile southeast of the old Charlie Ross place, on the highest point on the eastern spur of the hill. Station and underground marks are standard disks set in concrete according to notes 1a and 7a. The reference mark, a standard disk set in concrete according to note 11a, is 18,985 meters (62.29 feet) from station in azimuth 331°44′. The azimuth from station to Toyah Valley Sulphur Co. Mine is 81°52′07″. Elevation: 972.8 meters (3,192 feet).

**This azimuth has been computed by the first formula (p. 95), using both terms.
For notes in regard to marking of stations see p. 90.

Supplementary points

Colorado-New Mexico boundary milepost No. 313 (Union County, N. Mex., and Las Animas County, Colo.; C. M. Durgin, 1922).—On top of Mesa de Maya, ¾ mile west of the old William McCash place in Cimarron Valley, 2 miles northeast of A. J. Jones's ranch, 1 mile east of Baker's lower ranch, 125 meters (410 feet) west of a pile of white stones on the State line, and 48 meters (157 feet) east of the bluff. Station is at the southeast edge of a clump of bushes and is marked by a pipe, 3 feet high, surrounded by a pile of stones.

Plane coordinates: (E), x=773,471.41 feet; x=2,184,341.06 feet.

De Maya (Union County, C. M. Durgin, 1922).—About 15 miles northwest of Kenton, Okla., on prominent point of Mesa de Maya, and opposite cone-shaped butte which is 2½ 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. Reference mark No. 1 is 29.80 meters (97.8 feet) from the station in azimuth 264°43′, and No. 2 is 65.30 meters (214.2 feet) from the station in azimuth 316°48′. Elevation: 1,545.8 meters (5,072 feet).

Plane coordinates: (E), x=865,904.51 feet; y=2,174,778.93 feet.

Collins (Baca County, Colo., C. M. Durgin, 1922).—About 16 miles northeast of Kenton, Okla., 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. Reference mark No. 1 is 33.34 meters (109.4 feet) from station in azimuth 187°01′, and No. 2 is 29.37 meters (96.4 feet) from station in azimuth 283°39′. Elevation: 1,495.8 meters (4,907 feet).

Plane coordinates: (E), x=879,877.50 feet; y=2,192,060.87 feet.

Boundary monument (1900) (Union County, N. Mex., Baca County, Colo., Cimarron County, Okla., C. M. Durgin, 1922).—About 13 miles northwest of Kenton, Okla., 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)* may be used as an azimuth mark. Elevation: 1,354.7 meters (4,445 feet).

Plane coordinates: (E), x=888,821.89 feet; y=2,186,020.38 feet; the grid azimuth to *New Mexico-Colorado boundary (old) (M. C. 1881)*=179°08′01″.**

New Mexico-Colorado boundary (old) (M. C. 1881) (Union County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=888,808 feet; y=2,186,950 feet.

New Mexico-Colorado old boundary milepost No. 328 (Union County, N. Mex., H. B. Carpenter, 1902; C. M. Durgin, 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 ¼ 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) it was held that the true boundary line between New Mexico and Colorado was the line originally surveyed by E. N. Darling in 1868. The court directed the resurvey of this line and the boundary marks of Carpenter's survey in 1902 and 1903 were ordered destroyed. However, this mark was replaced by a concrete survey monument 8 x 8 x 36 inches, set 24 inches in the ground and with a triangle templet seated in the top. This is not to be considered as a boundary mark but as a triangulation station. A mound of stone was built around the monument. *New Mexico-Colorado boundary milepost no. 328 eccentric* may be used as an azimuth mark.

Plane coordinates:[1] (E), x=852,390 feet; y=2,185,550 feet.

T. 30 N., R. 35 E., sec. 33, southeast corner (Union County, C. M. Durgin, 1922).—Elevation: 1,573 meters (5,161 feet).

Plane coordinates:[1] (E), x=829,685 feet; y=2,107,302 feet.

T. 29 N., R. 34 E., sec. 3, southwest corner (Union County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=800,843 feet; y=2,101,485 feet.

T. 29 N., R. 29 E., sec. 10, southeast corner, Des Moines townsite (Union County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=648,285 feet; y=2,095,024 feet.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

T. 26 N., R. 34 E., sec. 1, northeast corner (Union County, C. M. Durgin, 1922).—Elevation: 1,672 meters (5,486 feet).

Plane coordinates:[1] (E), x=817,569 feet; y=2,012,106 feet.

T. 28 N., R. 35 E., sec. 23, southeast corner (Union County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=843,408 feet; y=2,054,873 feet.

T. 28 N., R. 26 E., sec. 28, southwest corner (Colfax County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=543,518 feet; y=2,046,899 feet.

Laughlin (U. S. G. S.), cairn (Colfax County, C. M. Durgin, 1922).—Marked by a rock cairn. See description of *Laughlin*.

Plane coordinates:[1] (E), x=543,476 feet; y=2,046,930 feet.

T. 27 N., R. 33 E., sec. 17, southwest corner (Union County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=759,315 feet; y=2,027,552 feet.

T. 22 N., R. 28 E., sec. 4, southwest corner (Harding County, C. M. Durgin, 1922).—Elevation: 1,786 meters (5,860 feet).

Plane coordinates:[1] (E), x=606,418 feet; y=1,877,578 feet.

T. 20 N., R. 22 E., sec. 2, southwest corner (Mora County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=427,201 feet; y=1,814,760 feet.

T. 19 N., R. 27 E., sec. 28, northeast 1/16 corner (Harding County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=577,970 feet; y=1,764,874 feet.

Solana townsite, northeast corner (Harding County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=579,033 feet; y=1,764,878 feet.

T. 12, N., R. 26 E., sections 30 and 31, quarter section corner (San Miguel County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=533,154 feet; y=1,539,172 feet.

T. 9 N., R. 24 E., sec. 29, southwest corner (Guadalupe County, C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=472,318 feet; y=1,444,022 feet.

Station A (Guadalupe County, C. M. Durgin, 1922).—Elevation: 1,645 meters (5,397 feet).

Plane coordinates:[1] (E), x=545,534 feet; y=1,439,205 feet.

Station B (Guadalupe County, C. M. Durgin, 1922).—Elevation: 1,649 meters (5,410 feet).

Plane coordinates:[1] (E), x=546,187 feet; y=1,438,823 feet.

Section corner near station Louisiana (Guadalupe County, C. M. Durgin, 1922).—Elevation: 1,646 meters (5,400 feet).

Plane coordinates:[1] (E), x=546,371 feet; y=1,438,714 feet.

T. 7 N., R. 26 E., sec. 28, southwest corner (Guadalupe County, C. M. Durgin, 1922).—Elevation: 1,526 meters (5,007 feet).

Plane coordinates:[1] (E), x=540,257 feet; y=1,379,945 feet.

Elkins (Chaves County, C. M. Durgin, 1922).—About 200 meters (656 feet) southeast of Elkins Post Office, about 200 meters (656 feet) south of the Atchison, Topeka & Santa Fe Railway tracks, on the top of the first ridge of sand hills about 20 feet higher than the tracks. The station and underground marks are standard disks set in concrete according to notes 1a and 7a. There are no reference marks. Elevation: 1,239.2 meters (4,066 feet).

Plane coordinates: (E), x=584,900.56 feet; y=978,206.53 feet.

Sierra Capitan (Lincoln County, C. M. Durgin, 1922).—Plane coordinates: (C), x=799,825.78 feet; y=943,851.86 feet.

Bench mark Z 9 (Chaves County, C. M. Durgin, 1922).—In the city of Lake Arthur, at the southeast corner of Broadway and Kansas Streets, in the large cement buttress at the north entrance to a building. Station mark is a standard bench-mark disk, stamped "3377.818 Z 9 1916." Elevation: 1,029.561 meters (3,377.82 feet).

Plane coordinates: (E), x=489,854.49 feet; y=726,737.53 feet.

Deadman (U. S. G. S.) (Eddy County, C. M. Durgin, 1922).—Station is marked by a U. S. Geological Survey bronze bench mark cemented in solid rock. See description of *Deadman*.

Plane coordinates:[1] (E), x=445,664 feet; y=545,489 feet.

Carl (Eddy County, C. M. Durgin, 1922).—One-half mile east of Carlsbad, ¼ mile east of the river, on Hagerman Heights, on the estate owned (1922) by Mrs. H. C. Kerr. The station is on top of the south stone wall of the reservoir at the southeast point of the curve. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 33.547 meters (110.06 feet) from station in azimuth 325°35′, and No. 2 is 27.22 meters (89.3 feet) from station in azimuth 36°33′. The following azimuths are from station: City standpipe, south tangent, 96°23′44″; city standpipe, north

[1] No check on this position

For notes in regard to marking of stations see p. 90.

tangent, 96°29′20″; courthouse, spire, 99°53′06″; and church spire, 105°19′04″. Elevation: 977.5 meters (3,207 feet).

Plane coordinates: (E), x=536,714.93 feet; y=516,065.14 feet; the grid azimuth to courthouse, spire=99°49′16″.*

New Mexico-Texas boundary mile corner 61 eccentric (Culberson County, Tex., C. M. Durgin, 1922).—About 7 miles northwest of Angeles, Tex., about 1,000 meters (3,281 feet) west of Delaware Creek, 1¼ miles southwest of the old Coad Dam, on the eastern spur of the cluster of hills ½ mile southwest of the mile corner. Station is marked with a 1-inch hole drilled in rock. *New Mexico-Texas boundary mile corner 61* is 562.58 meters (1,845.7 feet) from the station in azimuth 238°31′51″. Elevation: 950.5 meters (3,118 feet).

Plane coordinates: (E), x=569,625.20 feet; y=362,775.20 feet; grid azimuth to *New Mexico-Texas boundary mile corner 61*=238°24′43″.**

New Mexico-Texas boundary mile corner 61 (Eddy County, N. Mex., Culberson County, Tex., C. M. Durgin, 1922).—See description of *New Mexico-Texas boundary mile corner 61 eccentric.*

Plane coordinates:[1] (E), x=571,197 feet; y=363,742 feet.

New Mexico-Texas boundary mile corner 53 (Eddy County, N. Mex.; Loving County, Tex., C. M. Durgin, 1922; 1931).—See description of *New Mexico-Texas boundary mile corner 53 eccentric.*

Plane coordinates: (E), x=613,447 feet; y=363,912 feet.

OKLAHOMA-TEXAS BOUNDARY (PARALLEL OF 36°30′) ARC

Principal points

Eklund (Union County, C. I. Alaskson, 1931).—About 6 miles north of Clayton, on the 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. The station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 38.24 meters (125.5 feet) (slope distance) from the station in azimuth 197°11′, and No. 2 is 62.27 meters (204.3 feet) (slope distance) from the station in azimuth 76°29′. Elevation: 1,619.8 meters (5,314 feet).

Plane coordinates: (E), x=841,747.67 feet; y=2,011,828.26 feet.

Hoover (Union County, C. M. Durgin, 1922; 1931).—About 16 miles northeast of Clayton, 3½ miles east and 2 miles south from Seneca post office, on the highest point of a hill in the western half of sec. 11, T. 27 N., R. 36 E., 120 meters (394 feet) west of a fence, and on pasture land owned in 1931 by O. T. Campbell. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. In 1931 the surface mark was found to have been destroyed, and a new mark was set in concrete according to note 1a. Reference mark No. 1 is 9.396 meters (30.83 feet) from the station in azimuth 159°11′, and No. 2 is 10.965 meters (35.97 feet) from the station in azimuth 256°44′. Elevation: 1,500.1 meters (4,922 feet).

Plane coordinates: (E), x=872,381.72 feet; y=2,038,167.47 feet.

Clay (Union County, C. M. Durgin, 1922; 1937).—The station is ½ 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. In 1931 a new railroad cut was reported between the highway and station, the dairy buildings were reported as having been removed, there no longer being any buildings near the station, and a north-south telephone line is about 250 yards east of the station. The station and reference marks are standard disks set in rock according to notes 2 and 12. Reference mark No. 1 is 22.958 meters (75.32 feet) from the station in azimuth 238°31′, and No. 2 is 27.682 meters (90.82 feet) from the station in azimuth 356°19′. In 1937 it was reported that the marks were covered by drifted sand and soil. Elevation: 1,539.7 meters (5,051 feet).

Plane coordinates: (E), x=843,960.13 feet; y=1,987,746.06 feet.

School (Cimarron County, Okla., 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 State lines, about ¼ mile north and 0.1 mile west of the southeast corner of sec. 28, T. 2 N., R. 1 E., on public-school land, on a small knoll in pasture land, on the highest ground

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

in the vicinity. The station and reference marks are standard disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is approximately ¼ mile from the station in azimuth 337°44′28″, and No. 2 is 150.98 feet from the station in azimuth 62°59′. Elevation: 1,449.5 meters (4,756 feet).

Plane coordinates: (E), x=906,249.01 feet; y=2,042,870.09 feet; the grid azimuth to reference mark No. 1=336°54′56″.*

Worsham (Dallam County, Tex., C. I. Aslakson, 1931).—About 5 miles air line north of Texline, about 2 miles east of the western boundary of Texas, about 3½ miles south of the northern boundary of Texas, on land belonging to Carl Worsham, of Henrietta, Tex., and occupied by Joe Cluck, in an east-west fence line, 287.4 feet southeast of the southeast corner of a brick foundation of a white house, and 11.4 meters (37 feet) west of a north-south fence. To reach from Texline, go westward two blocks from the flagpole and street light, turn right (north) and go northeast and north 4.75 miles, pass through a gate, turn right and go eastward to a two-story white farm house and station. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in a north-south fence line at the north end of a gate, 9 feet north of an east-west fence, and 0.25 mile (speedometer) from the station in azimuth 358°23′18″, and No. 2 is in an east-west fence line, 25.405 meters (83.35 feet) from the station in azimuth 90°33′. Elevation: 1,444.6 meters (4,739 feet).

Plane coordinates: (E), x=890,511.28 feet; y=1,985,643.89 feet; the grid azimuth to reference mark No. 1=357°35′58″.*

New Mexico-Texas boundary milepost No. 4 eccentric (Union County, N. Mex.-Dallam County, Tex., C. M. Durgin, 1922).—On the boundary between New Mexico and Texas, 4 miles south of the *Northwest corner of Texas*, at the summit of the first rise south of that corner, and on the east side of a section-line road. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. The reference mark is 21.45 meters (70.4 feet) from the station in azimuth 96°12′. The *New Mexico-Texas boundary, milepost No. 4*, and *New Mexico-Texas boundary, mile corner 306*, may be used as azimuth marks.

Plane coordinates: (E), x=880,090.72 feet; y=1,983,410.95 feet; grid azimuth to *New Mexico-Texas boundary, milepost No. 4*=359°18′53″.**

Supplementary points

Texhomex (Texas-Oklahoma-New Mexico boundary, C. I. Aslakson, 1931).—The station is a standard disk set in a red sandstone post projecting about 6 inches above the ground at a point common to the three States—Texas, Oklahoma, and New Mexico. It is 10.6 meters (35 feet) south of the center line of a road, 13.66 meters (44.8 feet) west of a fence corner, and 0.3 meter (1 foot) north of the fence. The reference marks are standard disks set in concrete according to note 11a. Reference mark No. 1 is 8.2 meters (27 feet) south of the center line of the road, 0.35 meter (1.1 feet) north of the fence line, and 25.53 meters (83.8 feet) from the station in azimuth 89°59′, and No. 2 is 15.4 meters (51 feet) west of the center line of the road, 0.23 meter (0.8 foot) east of the fence line, and approximately 0.5 mile from the station in azimuth 179°15′34″. *Kidder astronomical station* may be used as an azimuth mark. Elevation: 4,712 feet.

Plane coordinates: (E), x=891,335.23 feet; y=2,004,097.22 feet; the grid azimuth to reference mark No. 2=178°28′03″.*

Kidder astronomical station (Union County, General Land Office, 1903; C. I. Aslakson, 1931).—About 200 yards west by north from the corner common to the States of Texas, Oklahoma, and New Mexico. The mark is a truncated cone of concrete molded in a zinc form, and resting on a concrete base. The cone is about 15 inches in diameter and 30 inches high, and on its side is stamped: 36°30′ N. Lat., 103° W. Long., 1903. Station *Texhomex* may be used as an azimuth mark.

Plane coordinates:[1] (E), x=890,710 feet; y=2,004,301 feet.

Northwest corner of Texas-Clark's Monument (Union County, N. Mex.-Dallam County, Tex., C. M. Durgin, 1922).—At the northwest corner of Texas, about 8 miles north of Texline and about 9 miles air line east-northeast of Clayton. The mark is a concrete monument known as Clark's Monument.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=879,787.08 feet; y=2,003,941.50 feet.

New Mexico-Texas boundary milepost No. 1 (Union County, N. Mex.-Dallam County, Tex., C. M. Durgin, 1922).—On the Texas-New Mexico boundary, about 10 miles east-northeast of Clayton and 1 mile east of the *Northwest corner of Texas*. The mark is a stone monument.

Plane coordinates: (E), x=886,346.29 feet; y=2,004,031.09 feet.

New Mexico-Texas boundary mile corner 306 (Union County, N. Mex.-Dallam County, Tex., C. M. Durgin, 1922).—Plane coordinates:[1] (E), x=880,109 feet; y=1,981,694 feet.

New Mexico-Texas boundary milepost No. 4 (Union County, N. Mex.-Dallam County, Tex., C. M. Durgin, 1922).—On the boundary between New Mexico and Texas, 4 miles south of the *Northwest corner of Texas*, and at the summit of the first rise south of that corner. The mark is a stone monument.

Plane coordinates:[1] (E), x=880,097 feet; y=1,982,825 feet.

Booster Station, black water tank, finial (Union County, C. I. Aslakson, 1931).—Plane coordinates: (E), x=870,759.06 feet; y=2,007,929.32 feet.

Booster Station, galvanized tank on red platform, center (Union County, C. I. Aslakson, 1931).—Plane coordinates:[1] (E), x=871,713 feet; y=2,008,318 feet.

Clayton, municipal water tank (silver), finial (Union County, C. I. Aslakson, 1931).—Plane coordinates: (E), x=838,086.57 feet; y=1,983,914.79 feet.

Texline, West Texas Utilities Co., water tank, finial (Dallam County, Tex., C. I. Aslakson, 1931).—Plane coordinates: (E), x=885,819.57 feet; y=1,958,446.80 feet.

Rabbit Ear Butte, northernmost peak, tip (Union County, C. I. Aslakson, 1931).—Plane coordinates:[1] (E), x=842,010 feet; y=2,013,855 feet.

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC

Principal points

Wilcox (Hudspeth County, Tex., W. R. Porter, 1934).—About 15 miles northwest of the post office at Ables, Tex., about 10 miles north-northwest of Salt Flat service station, on northeastern one of a group of hills known as Wilcox, or White Hills, and about ¼ mile northeast of another hill of same height. To reach from Salt Flat service station, go east 0.95 mile on U. S. Highway 62 to crossroads, turn left (north) and follow dirt road 0.15 mile, pass through a wire gate and continue northwesterly 1.45 miles to a point where a road joins from southeast, continue 3.60 miles to two windmills and a steel water tank on the east side of road, continue 4.25 miles, follow right fork 0.8 mile, pass through a wire gate and go 2.1 miles, pass through a wire gate and go 0.5 mile, leave the road at this point and go east 0.2 mile along the north side of hills to base of hill, pack about 100 yards up slope southward to the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 3 and 12b. Reference mark No. 1 is 9.698 meters (31.82 feet) from station in azimuth 359°37′, and No. 2 is 10.595 meters (34.76 feet) from station in azimuth 100°28′. The azimuth mark is on the slope of the hill, in a small rim about 25 yards northeast of the top of the hill, and 300 yards from station in azimuth 17°23′33″.

Plane coordinates: (C), x=841,103.90 feet; y=334,438.32 feet; the grid azimuth to the azimuth mark=16°48′41″.*

Powell (Hudspeth County, Tex., W. R. Porter, 1934).—About 18 miles northwest of Salt Flat, 10 miles north of U. S. Highway 62, on highest point near west end of brush-covered ridge which extends farther east and is most northerly of series of low ridges in the vicinity. To reach from landing field at Salt Flat, go west 16.75 miles on U. S. Highway 62, turn right (north) onto dirt road on east side of north-and-south fence and go north 1.75 miles to crossroads, turn left (west) and go 0.35 mile along north side of a wire fence to T-intersection (Chastin ranch about 100 yards south), turn right (north) and follow main-traveled road northeast 2.25 miles, pass through a gate and go northeast 1.45 miles to the northwest fence corner on right side of road, continue northeast 1.65 miles to Porter's ranch (unoccupied, wooden house, tank, corrals, and windmill), turn east and go through wooden gate, go north-

[1] No check on this position.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

east on main-traveled road 0.7 mile, pass through a gate and continue north 1.7 miles on main-traveled road to top of rocky ridge. Diablo Peak, a sharp, rocky mountain, bears 264° magnetic from this point. Continue north 0.4 mile, turn left and go southwest to top of ridge, and then go west about 0.7 mile along top of ridge to highest part and the station, which is 160 feet north of south edge and 120 feet south of north edge of ridge. The station and azimuth marks are standard disks set in bedrock according to notes 2 and 12a. The reference marks are standard disks set in concrete, according to note 11a. Reference mark No. 1 is 52.34 feet from station in azimuth 210°31′, and No. 2 is 53.63 feet from station in azimuth 126°13′. The azimuth mark is 100 feet west of a north-and-south dirt road, 0.5 mile south of the point where it is necessary to leave the road to reach station, and 0.75 mile (1.2 miles by road) from station in azimuth 300°05′18″.

Plane coordinates: (C), x=779,176.64 feet; y=324,562.91 feet; the grid azimuth to the azimuth mark=299°36′47″.*

Orange (Otero County, W. R. Porter, 1934).—About 24 miles northwest of the post office at Ables, Tex., about 4 miles air line northwest of the deserted town of Orange, N. Mex., near southwest corner of a high, flat, bushy mesa. To reach from Orange, go west 0.2 mile on the Pinon road to a rocky ridge, follow the right fork on top of the ridge due west 1.35 miles, pass through a wire gate and continue west up hills 1.4 miles to point where dim road joins from the east, go straight ahead (northwest) 2.5 miles on main-traveled road, leave road and go east 0.4 mile to a small cap rock, turn north and go up ridge to the highest point and station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 21.57 meters (70.8 feet) (slope) from station in azimuth 321°10′, and No. 2 is 30.54 meters (100.2 feet) (slope) from station in azimuth 121°16′. The azimuth mark is near the edge of mesa, 832 feet from station in azimuth 33°07′56″. Azimuth to "Four Mile Well," in a broad valley, is 35°25′49″.

Plane coordinates: (C), x=830,851.56 feet; y=389,081.95 feet; the grid azimuth to the azimuth mark=32°33′55″.*

Jones (Otero County, W. R. Porter, 1934).—About 30 miles northwest of Salt Flat, Tex., and 33 miles south of Pinon, N. Mex., about 100 yards from the south and west sides of a flat, bushy mesa, and 28.819 meters (94.55 feet) from *T. 26 S., R. 15 E., sec. 4, northwest corner*, in azimuth 272°15′48″. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 58.81 feet from station in azimuth 261°11′, and No. 2 is 60.72 feet from station in azimuth 8°13′. The azimuth mark, a standard disk set in bedrock according to note 12a, is 20 feet north of a wire fence, 100 feet west of a fence corner, and 0.25 mile from station in azimuth 311°17′33″.

Plane coordinates: (C), x=755,941.70 feet; y=393,571.23 feet; the grid azimuth to the azimuth mark=311°14′55″.*

Henry (Otero County, W. R. Porter, 1934).—About 22 miles air line northwest of post office at Ables, Tex., on highest point of a prominent, round-topped hill known locally as Henry Hill, about 50 feet north of Texas-New Mexico boundary line. The station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 29.74 meters (97.6 feet) (slope) from station in azimuth 340°09′, and No. 2 is 16.21 meters (53.2 feet) (slope) from station in azimuth 71°25′. The azimuth from station to "Four Mile Well," located in a wide valley about 2 miles distant, is 217°53′37″. The azimuth from station to the El Paso-Midland Airway, beacon No. 8 A, is 332°11′02″, and to the El Paso-Midland Airway, beacon No. 8 B, is 309°48′24″. *New Mexico-Texas Clark boundary monument No. 14* may be used as an azimuth mark.

Plane coordinates: (C), x=813,659.62 feet; y=365,319.38 feet; the grid azimuth to *New Mexico-Texas Clark boundary monument No. 14*=275°25′42″.**

New Mexico-Texas Clark boundary monument no. 135 (Otero County, N. Mex., Hudspeth County, Tex., W. R. Porter, 1934).—About 29 miles air line northwest of post office at Ables, Tex., 321 feet north of New Mexico-Texas boundary fence, about 1 mile west of the Chastin Ranch-Bennett Ranch road, and on a large, flat-topped mesa. It is marked by bronze cap on 3-inch iron pipe which projects 10 inches above the ground. The cap is stamped "Clark Boundary 1859, Mile

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

For notes in regard to marking of stations see p. 90.

Corner No. 135, New Mexico-Texas, General Land Office Reestablishment 1911, United States Boundary Commission," and the center is punched for the station mark. The reference and azimuth marks are standard disks set in concrete according to note 11a, projecting 4 inches above the ground and stamped "Boundary Monument No. 135." Reference mark No. 1 is 25.25 meters (82.8 feet) from station in azimuth 75°06′, and No. 2 is 20.93 meters (68.7 feet) from station in azimuth 173°33′. The azimuth mark is 10 feet north of the boundary fence and 0.4 mile from station in azimuth 80°59′41″. The azimuth from station to a lone conical peak to the southwest is 56°40′, and to a rock cairn on a high, rounded mountain to the west by north is 100°58′.

Plane coordinates: (C), x=774,630.29 feet; y=365,010.15 feet; the grid azimuth to the azimuth mark=80°31′31″.*

New Mexico-Texas Clark boundary monument no. 15 (Otero County, N. Mex.; Hudspeth County, Tex., W. R. Porter, 1934).—About 18 miles air line north-northwest of Ables, Tex., 25 feet north of Texas-New Mexico boundary fence, 0.75 mile west of twin windmills just south of boundary fence, and 0.35 mile west of a north-and-south fence on a low ridge. It is marked by a 6-inch bronze tablet set in cylindrical concrete post that projects 16 inches above the ground. The tablet is stamped "Clark Boundary 1859, Clark Monument No. 15, New Mexico-Texas, General Land Office Reestablishment 1911, United States Boundary Commission," and the center is punched for the station mark. Reference and azimuth marks are standard reference disks in concrete according to note 11a, projecting 4 inches above ground. No. 1 is 16.95 meters (55.6 feet) from station in azimuth 186°28′, and No. 2 is on a low hill 18.28 meters (60.0 feet) from station in azimuth 91°20′. Azimuth mark is 28 feet north of boundary fence, and 0.5 mile from station in azimuth 270°22′39″. New Mexico-Texas Clark boundary mile corner No. 122, marked by an iron pipe projecting 16 inches above ground with a 4-inch brass cap stamped "Clark Boundary 1859, Mile Corner No. 122, New Mexico-Texas, General Land Office Reestablishment 1911, United States Boundary Commission," is approximately 0.3 mile from station in azimuth 269°47′05″. The following azimuths are from station: Windmill tower at a ranch to north, 200°28′17″; lone prominent cone, 74°08′; Signal Peak in the Guadalupe Mountains, 293°58′; Hurt ranch, east windmill tower, 1°38′29″; and southern of two windmill towers, distant approximately ¾ mile, 271°47′43″.

Plane coordinates: (C), x=842,217.09 feet; y=365,514.05 feet; the grid azimuth to the azimuth mark=269°47′33″.*

Scott (Otero County, W. R. Porter, 1934).—About 7 miles east of the Brownfield Ranch, on a high mesa about midway between the north and south extremities and about ⅓ mile southeast of the rim of a canyon. To reach from the Brownfield Ranch, go east and south 0.7 mile on the road to Orange, to the Boardman (Boardwell?) Canyon Road which forks to left (east), follow this road 2.6 miles, pass through a gate and continue down the canyon 3.3 miles to a dim fork which leads left to the north side of canyon, follow left fork north 1.2 miles up a wide canyon to an old shack, turn west just before reaching shack and pass to south of some dirt tanks, then bear to the north on a dim trail along the west side of the canyon 1.1 miles to a very dim trail which turns to right (east) across the canyon floor, follow track 0.6 mile across flat to the northeast, turn right and go toward the base of canyon wall to end of truck travel, go ¾ mile up the ridge to the east and across a flat to station. The station and reference marks are standard disks set in boulders according to notes 5 and 12c. Reference mark No. 1 is 292.42 feet from station in azimuth 276°04′, and No. 2 is 191.33 feet from station in azimuth 180°54′. The azimuth mark, a standard disk set in bedrock according to note 12b, is on the north slope of the head of the canyon in ledge rock, about 1 foot south of a 3-foot rock cairn and ½ mile from station in azimuth 192°37′15″.

Plane coordinates: (C), x=827,533.26 feet; y=439,491.40 feet; the grid azimuth to the azimuth mark=192°03′23″.*

Brownfield (Otero County, W. R. Porter, 1934).—The station is 34 miles northwest of the post office at Ables, Tex., 0.35 mile north of an east-and-west fence and near the south end of a long, flat-topped, brush-covered ridge. To reach from the Brownfield Ranch, which is very well known in this locality, go southeast 0.7 mile on the main road toward Orange, turn left onto a less-traveled road known as Boardwell (Boardman?) Canyon Road and go northeast 1.8 miles, turn left and go 0.2 mile across country to a sandy wash, cross the

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

wash and continue northwest 2.8 miles up a ridge (cross fence at 2.45 miles) and continue to the station. There is slightly higher ground on the northern end of ridge about 0.5 mile north of the station. The station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 100.68 feet from station in azimuth 333°24′, and No. 2 is 26.47 meters (86.8 feet) from station in azimuth 53°53′. The azimuth mark is on slightly higher ground, about 0.3 mile from station in azimuth 169°41′12″. *T. 24 S., R. 16 E., sec. 23, southeast corner* is 298.3 feet east-by-north of the station.

Plane coordinates: (C), x=803,072.44 feet; y=436,484.20 feet; the grid azimuth to the azimuth mark=169°09′53″.*

Waldie (U. S. G. S.) (Otero County, W. R. Porter, 1934).—About 16 miles south of Pinon, on highest part of mountain known locally as Waldie Peak. To reach from post office at Pinon, go east 1.65 miles, follow right fork 1.35 miles, cross a cattle guard, turn right (south) at fence corner and go 1.5 mile, follow left fork (main road) 1.8 miles to top of divide, go down steep grade into Cornucopia Wash and continue south 1.7 miles, to a cattle guard, continue south 1.7 miles, follow right fork south 2.2 miles, pass through a gate and go south 1.7 miles to Sam Lewis' ranch on west side of Wash, go in general direction of Wind Mountain, which is clearly visible 30 miles to the south, 1.60 miles on plain road on west side of Cornucopia Wash, follow left fork 0.5 mile, pass through a gate and continue south 1.45 miles, follow right fork (straight ahead) 0.55 mile to east side of dirt tank, go south 0.8 mile, leave the road and go west 2.6 miles up a ridge sloping to the west, continue south and west 0.5 mile on ridge, go south and west 0.3 mile on ridge (deep canyon to south), go west 1.9 miles to top of a high hill east of deep canyon. Here the station is visible 200 yards across the canyon to the west on the summit of a steep hill. The station mark is a U. S. Geological Survey bench-mark disk, on which no elevation has been stamped, set in bedrock. The reference and azimuth marks are standard reference disks set in bedrock, according to note 12a. Reference mark No. 1 is on the east slope of the peak, 47.58 feet from station in azimuth 207°38′, and No. 2 is on the west slope of the peak, 64.70 feet from station in azimuth 95°15′. The azimuth mark is on the west edge of the second hill east of the station, approximately 0.5 mile from station in azimuth 250°22′53″.

Plane coordinates: (E), x=165,137.14 feet; y=506,048.09 feet; the grid azimuth to the azimuth mark=250°57′45″.* (C), x=756,797.44 feet; y=505,343.97 feet; the grid azimuth to the azimuth mark=249°56′09″.*

Dry (U. S. G. S.) (Otero County, W. R. Porter, 1934).—On the highest point of a range of high hills about 11 miles southeast of Pinon, about 4 miles south of the Tidwell Ranch. The slopes of the hill are steep and rocky. There is a large, grassy flat about 1 mile northwest of the station. To reach the station from Pinon, go east on the Artesia road 3.0 miles, take the right fork and go 0.8 mile, take the left fork and go 3.0 miles, take the right fork and go 2.1 miles, take the left fork straight ahead and go 0.2 mile, take the left fork straight ahead and go 1.9 miles to the Tidwell Ranch, pass between the house and corral and go 0.8 mile, take the right fork and go 0.6 mile, take the left fork and go 0.7 mile, take the right fork west and go up Little Collins Canyon 1.6 miles, leave the canyon road and bear southwest on an old trail 0.4 mile to the end of truck travel. From here go to the saddle toward the southeast, go down the slope to the east of the ravine and southeastward across the grassy flat to the dry wash below the hill on which the station is located. The station mark is an unstamped U. S. Geological Survey disk set in bedrock according to note 3. The reference marks are standard disks set in bedrock according to note 12b. Reference mark No. 1 is 8.272 meters (27.14 feet) from station in azimuth 186°23′, and No. 2 is 8.314 meters (27.28 feet) from station in azimuth 317°04′. Station *Tidwell* may be used as an azimuth mark.

Plane coordinates: (E), x=215,054.14 feet; y=549,999.29 feet; the grid azimuth to *Tidwell*=176°00′45.3″. (C), x=805,916.18 feet; y=550,182.84 feet; the grid azimuth to *Tidwell*=174°58′54.3″.

Well (Otero County, W. R. Porter, 1934).—About 20 miles south of post office at Pinon, on prominent, round-topped hill in the first range east of Coffelt's well. To reach from Brownfield ranch, go northwest 3.55 miles on main road towards Pinon, pass through a gate, and continue 1.05 miles, go northwest 1.8 miles on main road, follow left fork 0.85 mile to Coffelt's ranch buildings, go past house,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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through two wooden corral gates, and continue northwest on plain road 0.25 mile, follow left fork northwest 2.4 miles, follow right fork 2.55 miles to Coffelt's well and corral, turn east onto dim road at east side of corral leading towards most prominent round hill on first range. Do not take road leading east 0.1 mile south of corral, but one directly opposite (east of) corral. Follow old road into canyon at south side of hill 1.4 miles, climb hill across canyon to northwest. The station is at the top of the hill. The station, azimuth and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 9.47 meters (31.1 feet) (slope) from station in azimuth 233°40′, and No. 2 is 12.04 meters (39.5 feet) (slope) from station in azimuth 139°12′. The azimuth mark is on the first round-topped hill to the east, and ¼ mile from station in azimuth 257°50′48″.

Plane coordinates: (E), x=187,119.78 feet; y=475,469.53 feet; the grid azimuth to the azimuth mark=258°23′17″.* (C), x=779,322.82 feet; y=475,165.23 feet; the grid azimuth to the azimuth mark=257°21′49″.*

Thorn (Otero County, W. R. Porter, 1934).—About 8 miles southwest of Pinon, ½ mile south of the Chatfield Canyon road, on top of a rounded, grassy hill which is the second hill south of the road where it crosses the divide at the head of Chatfield Canyon. To reach from post office at Pinon, go south 3.1 miles on the Chatfield Canyon road, follow left fork (main road) straight ahead 0.3 mile, follow left fork (main road) 1.7 miles to a white schoolhouse, follow left fork (main road) 3.0 miles past a small bridge, follow right fork (main road) 2.9 miles to a point where the road drops into the canyon after crossing the divide at the head of the canyon, turn left at the top of the divide. The azimuth mark is about 20 feet south of the road at this point. Go to the top of the second grassy hill to the southeast along the only ridge suitable for truck travel to the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 39.88 feet from station in azimuth 224°42′, and No. 2 is 38.18 feet from station in azimuth 326°29′. The azimuth mark is at the foot of the ridge which leads up to the hill on which station is located about 20 feet south of the Chatfield Canyon road, and 0.5 mile from the station in azimuth 157°32′58″.

Plane coordinates: (E), x=150,069.99 feet; y=555,953.03 feet; the grid azimuth to the azimuth mark=158°09′36″.* (C), x=740,838.01 feet; y=554,966.82 feet; the grid azimuth to the azimuth mark=157°07′46″.*

One Tree (Chaves County, W. R. Porter, 1934).—About 8 miles north-northeast of Pinon, on highest point of a bare, grassy hill which is the highest in the vicinity and the most northerly one of a range of rounded hills. To reach from the post office at Pinon, go north 4.7 miles on main road toward Weed, follow right fork (rut road) north and west 0.7 mile, follow right fork east 1.4 miles, follow left fork 0.2 mile, pass through a gate and go 0.95 mile, follow left fork 0.4 mile, pass through a gate and continue 0.1 mile, follow left fork to forks about 200 yards south of Chimney Lake Ranch, follow right fork 0.15 mile, pass through a gate at southeast corner of dirt tank east of house and go north 0.15 mile up valley, turn right onto cattle trail and go 0.2 mile, follow a wagon track 0.8 mile to large piñon tree with bark stripped from west side, turn left here and go north about 0.5 mile toward east-and-west spur ridge, go to top of ridge and then east and north, keeping on west side of high point, continue north across saddle, and climb to top of high hill and the station at north end of range of hills. The station and azimuth marks are standard disks set in boulders, according to notes 4 and 12c. Reference marks are standard reference disks in bedrock, according to note 12a. Reference mark No. 1 is on the east slope of the hill, 94.40 feet from station in azimuth 265°50′, and No. 2 is on south slope of the hill, 47.04 feet from station in azimuth 2°49′. The azimuth mark is on the north slope of the first hill south of station, about 100 yards from top of the hill, and 0.5 mile from station in azimuth 13°06′06″.

Plane coordinates: (E), x=193,547.35 feet; y=626,790.52 feet; the grid azimuth to the azimuth mark=13°38′26″.* (C), x=783,028.55 feet; y=626,573.06 feet; the grid azimuth to the azimuth mark=12°36′16″.*

Mescal (U. S. G. S.) (Otero County, W. R. Porter, 1934).—About 2 miles due south of Pinon, on the highest part of the eastern of two prominent hills visible to the south from Pinon. The station is marked by a standard U. S. Geological Survey disk in bedrock, stamped "Elevation, 6,597 feet," but with no name. The

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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reference and azimuth marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is 16.68 meters (54.7 feet) (slope) from station in azimuth 272°45′, and No. 2 is 17.83 meters (58.5 feet) (slope) from station in azimuth 42°49′. The azimuth mark is on the first hill east-northeast of the one on which the station is located, and ½ mile from station in azimuth 253°32′16″.

Plane coordinates: (E), x=174,563.63 feet; y=576,124.50 feet; the grid azimuth to the azimuth mark=254°06′24″.* (C), x=764,962.99 feet; y=575,574.56 feet; the grid azimuth to the azimuth mark=253°04′29″.*

Tidwell (Chaves County, W. R. Porter, 1934).—About 10 miles air line southeast of Pinon, on the highest part of the highest hill in the immediate vicinity which overlooks little Collins Canyon to south and Pinon Creek to north, and about 1 mile west of W. A. Gage's goat camp. To reach from the post office at Pinon, go east 3.0 miles on the main Pinon-Artesia, graded, county road to a point where a plain, dirt road turns to right, go 1.8 miles to a wire gate in a north-and-south fence, continue 1.3 miles to another wire gate in an east-and-west fence, continue 0.7 mile, and turn onto right fork after crossing a dry arroyo, continue 1.6 miles on right fork, follow left fork straight ahead 0.5 mile, follow right fork 0.8 mile and leave main road, go in a southerly direction across country, swing to the right up a wide draw, then go left over a ridge above a dry wash on the south side, cross this wash at 0.5 mile and continue 0.1 mile up hill to an east-and-west fence, cross fence and bear left over ridge into wide, flat, level wash to the end of truck travel, go south up north side of hill above head of the wash to the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 18.29 meters (60.0 feet) (slope) from station in azimuth 258°36′, and No. 2 is 13.17 meters (43.2 feet) (slope) from station in azimuth 171°37′. The azimuth mark is on the north end of a ridge running northwest from the hill, and approximately ¼ mile from station in azimuth 161°18′17″.

Plane coordinates: (E), x=213,842.13 feet; y=567.386.69 feet; the grid azimuth to the azimuth mark=161°48′17″.* (C), x=804,391.55 feet; y=567,545.71 feet; the grid azimuth to the azimuth mark=160°46′23″.*

Lewis (U. S. G. S.) (Chaves County, W. R. Porter, 1934).—About 13 miles east of Pinon, 1 mile northeast of the Lewis ranch house, on the top of a small, round, grassy hill which is the highest point in the vicinity. To reach from Pinon, go east 5.6 miles on the Artesia road, follow right fork 2.8 miles to a point where the road crosses a dry wash and starts up canyon, turn sharply to the right after crossing wash and go 0.5 mile, follow left fork 0.1 mile, follow right fork 0.6 mile, follow left fork 4.0 miles, follow left fork 1.6 miles, follow right fork 3.6 miles, pass through a gate and continue 0.4 mile to two dirt tanks on west side of road, leave road at this point and follow high ground to northeast about ⅜ mile, pass through a gate and continue northeast about 0.5 mile up slope to saddle on ridge and end of truck travel, go up ridge to the northeast to the station. The station is probably marked by a U. S. Geological Survey disk in boulder. Reference mark No. 1, a standard disk set in a boulder according to note 12d, is 12.200 meters (40.03 feet) from station in azimuth 279°13′. Reference mark No. 2, a standard disk set in bedrock according to note 12b, is 20.150 meters (66.11 feet) from station in azimuth 160°48′. The azimuth mark, a standard disk set in bedrock according to note 12b, is on the southwest slope of the hill, about 1 foot southwest of a 2-foot rock cairn, and ⅜ mile from station in azimuth 258°23′25″.

Plane coordinates: (E), x=254,760.65 feet; y=597,397.26 feet; the grid azimuth to the azimuth mark=258°49′12″.* (C), x=844,763.81 feet; y=598,289.82 feet; the grid azimuth to the azimuth mark=257°47′11″.*

Cuevo (Chaves County, W. R. Porter, 1934).—About 4 miles air line east of Dunken's store, on the highest hill between Big Cuevo and Little Cuevo Creeks, about 1 mile west of a sheep camp which is at a windmill and not visible from the station and 91 feet east of a north-and-south sheep fence. To reach from Dunken store which is 22.6 miles northeast of Pinon on the Artesia road, go east 2.0 miles on a ranch road, pass through a gate and go 0.6 mile, follow left fork east 0.9 mile, follow the dim road to the right (southeast) 0.3 mile to top of hill and the station. The station, azimuth,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 146 feet east of a north-south sheep fence and 23.70 meters (77.8 feet) from station in azimuth 228°32′, and No. 2 is 123 feet east of the fence and 16.88 meters (55.4 feet) from station in azimuth 329°30′. The azimuth mark is 5 feet east of the north-south fence and 0.4 mile from station in azimuth 180°23′48″. Azimuth from station to a lone, conical peak in the second range is 130°48′12″.

Plane coordinates: (E), x=252,778.54 feet; y=661,018.66 feet; the grid azimuth to the azimuth mark=180°49′58″.* (C), x=841,631.18 feet; y=661,868.57 feet; the grid azimuth to the azimuth mark=179°47′38″.*

Stone (Chaves County, W. R. Porter, 1934).—About 15 miles north by east of Pinon, on a high, wooded peak. Bearing to peak from Dunken's store is 273° (magnetic), and from Stone's ranch house 12° (magnetic). To reach from Dunken's store which is 22.6 miles northeast of Pinon on the Artesia road, go west 6.3 miles to cross cattle guard on opposite side of Cuevo Creek from Watt's ranch house (guard and creek on main road) and continue 0.55 mile, follow right fork 1.5 miles to Lincoln National Forest boundary gate, continue west and northwest 1.3 miles to top of steep grade, turn right (northeast) and go 0.3 mile along top of ridge, pass through a gate and go 0.1 mile, follow right fork 0.7 mile to Stone's ranch house, follow road north 0.3 mile, turn right and follow road northeast 0.7 mile, turn sharp left at a small log cabin and go 0.15 mile, turn right passing sheep corral and barn on left and go 0.4 mile down hill, follow right fork 0.5 mile to dirt tank, pass through tank and go 0.45 mile, turn east and go 0.7 mile to top of ridge, turn left and go 0.3 mile up hill to end of truck travel, proceed about 200 yards to top and the station. The station mark is a standard disk in a boulder, according to note 4. The underground mark and reference marks are standard disks in bedrock, according to notes 8a and 12a. Reference mark No. 1 is 14.24 meters (46.7 feet) (slope) from station in azimuth 278°39′, and No. 2 is 23.10 meters (75.8 feet) (slope) from station in azimuth 6°35′. "B. M. 6924 (U. S. G. S.)" is on slightly lower, bare peak, and approximately 300 yards from the station in azimuth 305°03′46″. Azimuth to White Mountain, a prominent peak in Mescalero Apache Indian Reservation, is 141°49′26″.

Plane coordinates: (E), x=200,240.67 feet; y=671,738.84 feet; the grid azimuth to "B. M. 6924 (U. S. G. S.)"=305°35′32″.* (C), x=788,906.53 feet; y=671,634.30 feet; the grid azimuth to "B. M. 6924 (U. S. G. S.)"=304°33′10″.*

Bluewater eccentric (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 10 miles north-northwest of Pinon, on the same mountain as Bluewater lookout tower, and 19.2 feet north of the northeast corner of a ranger's cabin. The station mark is a standard U. S. C. & G. S. and State Survey disk set in the top of a concrete post six inches square. Station *Bluewater* (N. Mex. Geodetic Survey) is 98.21 feet south of the station. Stations *Old Carissa* (N. Mex. Geodetic Survey) and *Weed* (N. Mex. Geodetic Survey) may be used as azimuth marks.

Plane coordinates: (E), x=152,039.56 feet; y=635,292.11 feet; the grid azimuth to *Weed*=129°42′41″.* (C), x=741,376.01 feet; y=634,322.00 feet; the grid azimuth to *Weed*=128°40′27″.**

Mayhill eccentric (U. S. G. S.) (Otero County, W. R. Porter, 1934).—The station is on the summit of a high, rounded, wooded peak which is the highest in the vicinity of Mayhill, and on the same peak as a 50-foot fire lookout tower. Marked by a U. S. Geological Survey disk set in a drill hole in outcropping bedrock, and stamped "Mayhill Ecc–B. M. 7768 Feet-Datum V. A." Station *Mayhill* is 9.30 meters (30.5 feet) to the northeast.

Plane coordinates: (E), x=139,763.75 feet; y=701,055.01 feet. (C), x=727,910.66 feet; y=699,845.56 feet.

Hendricks (Chaves County, W. R. Porter, 1934).—About 4 miles southeast of Flying H ranch, a well-known ranch located about 13 miles east-southeast of Elk post office, and on west slope about 400 feet from highest part of highest hill in the vicinity. To reach from Dunken's store, which is 22.6 miles northeast of Pinon on the Artesia road, go northeast 5.6 miles on main road to State Highway 83, go eastward 1.4 miles on highway towards Artesia, turn left onto dirt road and go 0.7 mile, pass through a gate and go straight ahead 1.5 miles,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

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follow right fork and go 0.8 mile, pass through a gate and go 3.3 miles, pass through a gate and go 3.6 miles on right-hand road to crossroad at west side of Felix River Valley, take right-hand road that leads east down Felix River and go 3.7 miles to Flying H ranch, go east 0.3 mile on main road to gate on top of hill east of ranch house, pass through gate and continue east 0.1 mile on main road, turn right and pass through gate, turn sharp right and go east 0.05 mile along south side of fence to gate in north-and-south fence, pass through gate and go southwest 0.1 mile to dry creek bed, enter creek bottom and go west 0.05 mile, turn left and go out of creek over south bank, go south 0.5 mile along east side of north-and-south fence to dry creek at west end of ridge, cross creek and go southeast 0.3 mile to very rocky and rough road that winds up south side of canyon wall, go 0.7 mile on road to top of rim. The station is 1.9 miles from this point on a high cactus-covered hill in magnetic bearing 140°. The station, azimuth and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 67.82 feet from station in azimuth 264°50′, and No. 2 is 91.32 feet from station in azimuth 157°57′. The azimuth mark is 10 feet east of a 12-inch cedar tree which is on a north-and-south spur ridge that extends south from an east-and-west ridge and directly in line with the station and White Mountain which is a prominent peak far to the west, and approximately 0.5 mile from station in azimuth 125°03′10″. Azimuth from station to rock cairn, distant 431 feet, is 291°20′.

Plane coordinates: (E), x=267,938.20 feet; y=715,726.58 feet; the grid azimuth to the azimuth mark=125°27′53″.* (C), x=855,795.47 feet; y=716,846.42 feet; the grid azimuth to the azimuth mark=124°25′18″.*

Elk (U. S. G. S.) (Chaves County, W. R. Porter, 1934).—About 2 miles northeast of Elk post office, on the north end of a high north-and-south ridge, on the highest peak in the vicinity which is known as Wind Mountain or High Point. The station, azimuth and reference marks are standard disks set in bedrock according to notes 3 and 12b. Reference mark No. 1 is 9.095 meters (29.84 feet) from station in azimuth 224°02′, and No. 2 is 13.540 meters (44.42 feet) from station in azimuth 111°28′. The azimuth mark is in a saddle between station peak and a lower peak to the southeast, about 1 foot north of a 2-foot rock cairn, and approximately ¼ mile from station in azimuth 358°37′46″.

Plane coordinates: (E), x=208,668.00 feet; y=718,964.90 feet; the grid azimuth to the azimuth mark=359°08′47″.* (C), x=796,474.10 feet; y=719,005.21 feet; the grid azimuth to the azimuth mark=358°06′12″.*

Manning (Chaves County, W. R. Porter, 1934; 1936).—The station is 32 miles east-southeast of Mescalero, 7 miles air line north-northeast of Elk post office, on the highest peak in the vicinity which overlooks the Rio Felix Valley to the west. The peak is nearly bare and is conspicuous due to a large dead double tree which is 100 feet northwest of the station. To reach the station from Elk post office, go east 1.1 miles on State Highway 83, turn left and go 1.1 miles to a Y, bear left and go 4.2 miles to a Y, bear left and follow the main-traveled road 5.9 miles, go through gate on the left and go around south and east sides of field 0.6 mile to Manning's ranch house, go north on the main-traveled road 0.8 mile to the Posey homestead, continue 2.8 miles to a concrete house on the left. From here the station is visible at 214° magnetic. Pass through a gate on the west of the yard of the concrete house and follow tracks westward along the foot of the hills for about 1.5 miles to a north-south fence, turn southeasterly up a draw and go 0.4 mile to a saddle and the end of truck travel, go southeasterly up hill and follow ridge to the station. The station, underground, azimuth, and reference marks are standard disks set in rock according to notes 4, 8a and 12a. Reference mark No. 1 is 17.790 meters (58.37 feet) from station in azimuth 248°52′, and No. 2 is 14.355 meters (47.10 feet) from station in azimuth 321°34′. The azimuth mark is on the first peak to the northwest which is slightly lower than the one on which the station is situated and is formed by a shoulder extending westward from the main mountain. It is ¼ mile from station in azimuth 156°39′53″. Station *Tuton Azimuth* may also be used as an azimuth mark.

Plane coordinates: (E), x=216,500.07 feet; y=745,860.24 feet; the grid azimuth to the azimuth mark=157°10′10″.* (C), x=803,814.69 feet; y=746,038.82 feet; the grid azimuth to the azimuth mark=156°07′26″.*

Burnt (Chaves County, W. R. Porter, 1934).—About 6 miles air line north of the Flying H Ranch, about 250 yards northwest of the southeast edge of a

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

flat-topped mesa, about 200 yards southwest of the head of a small draw that runs southeast, and about 250 yards northeast of the edge of a draw to the southwest, about 0.2 mile south of an east-and-west sheep fence. To reach from Flying H Ranch which is owned by A. C. Hendricks, go west 1.4 miles on the main road, pass through a gate on the right near a square rock dugout and continue north and west 0.7 mile, cross the dry wash of Felix River and follow right fork northwest 4.8 miles to Salt House Well and corrals, go through gate at southeast corner of feed lot and go north about 50 yards, go east 0.5 mile on a track leading eastward, cross a dry wash and turn sharply to the north, follow track north and east about 2.5 miles up main canyon, go southeast 0.2 mile, pass through a gate in a north-and-south fence and go southeast across country to a track following east along an east-and-west fence, go 1.4 miles on track along fence, turn south and go about 0.1 mile to the highest point of mesa and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 157.86 feet from station in azimuth 230°39′, and No. 2 is 104.47 feet from station in azimuth 327°51′. The azimuth mark is 15 feet south of the east-and-west sheep fence, and ¼ mile from station in azimuth 133°22′06″.

Plane coordinates: (E), x=271,319.96 feet; y=761,029.25 feet; the grid azimuth to the azimuth mark=133°46′34″.* (C), x=858,350.82 feet; y=762,206.67 feet; the grid azimuth to the azimuth mark=132°43′47″.*

McKnight (Lincoln County, W. R. Porter, 1934; 1936).—About 10 miles south of Tinnie post office, 1½ miles north of the McKnight Ranch, and on top of a high, grassy, treeless hill which is most northern and highest one of a group of three hills and the highest ground in vicinity. To reach from Tinnie post office, go east 4.4 miles on U. S. Highway 70, turn onto graded road and go south 8.5 miles, follow right fork 1.0 mile, pass through a gate and continue south and west 2.8 miles, pass through a gate and continue 2.0 miles, follow left fork 1.1 miles, pass through a gate and go 2.6 miles. The McKnight Ranch is 0.5 mile on the left fork from this point. Go north 0.4 mile on main county road, to dim road to right, follow dim road to right 0.9 mile up small valley, pass through gate and go straight ahead 0.5 mile across country to top of high, grassy hill and the station. The station, reference, and azimuth marks are standard disks set in bedrock, according to notes 2 and 12a. Reference mark No. 1 is 6.638 meters (21.78 feet) from station in azimuth 41°21′, and No. 2 is 6.830 meters (22.41 feet) from station in azimuth 167°44′. The azimuth mark is on the ridge which extends north from the hill on which the station is located, and 0.3 mile from station in azimuth 186°41′26″.

Plane coordinates: (E), x=227,982.50 feet; y=804,923.90 feet; the grid azimuth to the azimuth mark=187°10′40″.* (C), x=814,215.52 feet; y=805,303.25 feet; the grid azimuth to the azimuth mark=186°07′41″.*

Treat (Lincoln County, W. R. Porter, 1934).—About 14 miles south-southeast of Tinnie, on highest point of a long, flat ridge known locally as Border Ridge, one of several summits of the range. There is another hill about ½ mile northeast, near a break in the range, and about the same elevation. To reach from Tinnie, go east 4.4 miles on U. S. Highway 70, to graded road to south, turn south, cross Rio Hondo, on white bridge a few yards, go south 8.5 miles on graded county road, follow left fork 0.1 mile, go through a gate and continue 0.6 mile, pass through a gate and continue southeastward 1.8 miles, leave graded road and follow right fork through a gate, follow the only well-traveled road southeast 2.1 miles, pass through a gate and continue 3.7 miles on main road, cross cattle guard and follow left fork 0.2 mile to a road junction, go northeast 0.2 mile down canyon to a point opposite canyon mouth on the left, turn left across deep, dry wash and go 1.2 miles up canyon to end of truck travel, go southeast to top of hill and the station, which is 52 feet east of corner post at 30° angle in northeast-and-southwest fence. The station, underground, and reference marks are standard disks set in rock according to notes 4, 8a, and 12a. Reference mark No. 1 is 24 feet east of the fence, and 13.93 meters (45.7 feet) (slope) from station in azimuth 58°10′, and No. 2 is 20 feet southeast of the fence, and 8.53 meters (28.0 feet) (slope) from station in azimuth 136°51′. The azimuth mark is on the same Border Ridge, 42 feet southeast of the fence, and approximately 0.2 mile from station in azimuth 29°12′04″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=265,474.87 feet; y=794,816.94 feet; the grid azimuth to the azimuth mark=29°37′14″.* (C), x=851,888.38 feet; y=795,884.31 feet; the grid azimuth to the azimuth mark=28°34′17″.*

Goodrum (Lincoln County, W. R. Porter, 1934).—About 16 miles southeast of Tinnie, 3 miles northwest of the Goodrum Ranch, on the highest point of a rocky mesa, and about 0.2 mile east of a small, dry, natural lake bed. To reach from Goodrum Ranch, go west 0.4 mile on the road to Rock House, follow right fork on a road leading into a large canyon 0.5 mile to a dry creek bed, continue 1.4 miles to a steel tank on the left side of road, go up ridge 0.2 mile to the top, leave road and go west and north 1 mile along a dim trace of an old road running along top of the ridge to top of a high mesa and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 3 and 12a. Reference mark No. 1 is 12.769 meters (41.89 feet) from station in azimuth 71°28′, and No. 2 is 17.975 meters (58.97 feet) from station in azimuth 169°45′. The azimuth mark is 2 feet north of a 2-foot rock cairn, and approximately 0.2 mile from station in azimuth 6°39′17″. Azimuth from station to a cairn on Capitan Mountain is 157°02′25″.

Plane coordinates: (E), x=285,960.90 feet; y=798,075.10 feet; the grid azimuth to the azimuth mark=7°02′16″.* (C), x=872,313.02 feet; y=799,517.38 feet; the grid azimuth to the azimuth mark=5°59′18″.*

Joseph (Lincoln County, W. R. Porter, 1934).—About 9 miles air line south-southeast of Tinnie, on top of a smooth treeless, grassy ridge, which is the highest in the immediate vicinity. To reach from Tinnie, go east 4.4 miles on U. S. Highway 70, cross Hondo River and go south 8.5 miles on a graded county road keeping to main-traveled tracks, follow left fork (graded road) 0.1 mile, pass through a gate and go 0.7 mile, leave the main road 100 yards before reaching a gate and go northeast 0.5 mile on a plain road to a fence and then northeast to a fence corner, cross a small stream bed and continue 0.5 mile on main road, cross another stream bed, follow dim road straight ahead (east) 0.4 mile up a small canyon, pass through a gate and go east 1.25 miles on only plain road, pass through a gate and go 0.05 mile to top of the ridge and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 20.94 meters (68.7 feet) from station in azimuth 267°56′, and No. 2 is 18.51 meters (60.7 feet) from station in azimuth 166°24′. The azimuth mark is 50 feet east of the dirt road leading to the station, and 0.3 mile from station in azimuth 43°08′22″.

Plane coordinates: (E), x=256,133.36 feet; y=822,029.09 feet; the grid azimuth to the azimuth mark=43°34′38″.* (C), x=842,049.10 feet; y=822,922.38 feet; the grid azimuth to the azimuth mark=42°31′33″.*

Slaughter (Lincoln County, W. R. Porter, 1934).—About 5 miles south-southwest of Picacho on a hill covered with piñon trees and Spanish daggers, which is the highest one in the immediate vicinity. To reach from post office at Tinnie, go east 3.9 miles on U. S. Highway 70, turn right (south) and go 6.9 miles on graded road to the top of hill and a road leading east to a windmill and tank, go east 0.2 mile to a gate, pass through a gate south of tank, and go east across country up rocky slope and 0.9 mile along top of ridge to its highest point, turn left (north) and go down over low divide, go north and west 1.5 miles, crossing over several divides and always keeping to the highest part of ridge, cross an east-west fence and go north about 100 yards along east side of the north-south fence to the highest point of the ridge and the station which is 100 yards north of fence corner and 16 feet east of north-south fence. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 65 feet east of a north-south fence, and 49.56 feet from station in azimuth 234°26′, and No. 2 is 4 feet east of a north-south fence, and 51.07 feet from station in azimuth 141°44′. The azimuth mark is on the highest point of the second east-and-west ridge south of station, and approximately 0.5 mile from station in azimuth 19°03′44″.

Plane coordinates: (E), x=247,970.97 feet; y=835,431.80 feet; the grid azimuth to the azimuth mark=19°30′54″.* (C), x=833,641.67 feet; y=836,173.67 feet; the grid azimuth to the azimuth mark=18°27′46″.*

Border (Lincoln County, W. R. Porter, 1934).—About 12 miles (not air line) east of Picacho, on the highest point of Border Range for several miles in either

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

direction. There are lower peaks to the north and south. To reach from Border Hill service station, which is 18.6 miles east of Tinnie on U. S. Highway 70, go southwest about ½ mile on old highway, turn off the road and go south across country along the west side of a range of hills to a point below the highest hill in the vicinity, go up ridge to the north of the peak and follow top of ridge to the station. The station mark is a standard disk set in a boulder according to note 5. The underground mark is a standard disk set in concrete according to note 7a. The reference and azimuth marks are standard disks set in bedrock according to note 12b. Reference mark No. 1 is 6.635 meters (21.77 feet) from station in azimuth 108°24′, and No. 2 is 12.349 meters (40.52 feet) from station in azimuth 213°10′. The azimuth mark is 2 feet northwest of a 2-foot rock cairn, on peak and approximately ½ mile from station in azimuth 26°56′55″.

Plane coordinates: (E), x=306,474.54 feet; y=852,171.64 feet; the grid azimuth to the azimuth mark=27°17′49″.* (C), x=891,832.67 feet; y=853,987.29 feet; the grid azimuth to the azimuth mark=26°14′36″.*

Picacho (Lincoln County, W. R. Porter, 1934).—The station is 3 miles air line north-northwest of Picacho on the highest point of the highest hill in vicinity. To reach from Tinnie post office, go east 3.2 miles on U. S. Highway 70, turn north (left) through a gate onto a ranch road and go 0.3 mile, pass through a gate south of a lone adobe hut and continue northeast 0.9 mile on main track to the end at a well and tank, go west on a stock trail that leads into a wash and out onto the west bank, continue up wash 0.3 mile to a point west of the wash fork and south of the ridge that divides the forks, follow old woods road up south end of ridge to north, at the top bear east along divide to highest point and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 17.99 meters (59.0 feet) from station in azimuth 249°07′, and No. 2 is 14.74 meters (48.4 feet) from station in azimuth 159°08′. The azimuth mark is in a saddle south of a round-topped hill, on the first ridge west of station which is connected to main peak by a saddle running east and west, and ¾ mile from station in azimuth 51°28′30″.

Plane coordinates: (E), x=248,384.47 feet; y=870,937.66 feet; the grid azimuth to the azimuth mark=51°55′44″.* (C), x=833,402.23 feet; y=871,682.77 feet; the grid azimuth to the azimuth mark=50°52′26″.*

Menecke (Lincoln County, W. R. Porter, 1934; 1935).—About 17 miles air line east of Tinnie post office, on one of the highest points of Border Range, on a hill about ¼ mile north-northwest of an east-west fence. To reach from Tinnie, go east 23.9 miles on U. S. Highway 70, turn north through a gate onto a plain road leading northwest and passing west of a large, rock borrow pit (Skousen's Pit), go northwest on this road 1.0 mile to a fork, go straight ahead 1.0 mile to a gate in an east-west fence. The station may be seen from gate on the first high hill of Border Range. Go west along the fence line 0.8 mile, turn left and go across country toward the first high hill of Border Range, proceed to the top and the station. The station, azimuth, and reference marks are standard disks set in rock according to notes 4 and 12a. Reference mark No. 1 is 9.11 meters (29.9 feet) (slope) from the station in azimuth 303°14′, and No. 2 is 11.44 meters (37.5 feet) (slope) from the station in azimuth 41°20′. The azimuth mark is on the south slope of the second rise north of station, in the same Border Range, and approximately ¼ mile from station in azimuth 213°11′40″. Azimuth from station to windmill (Menecke's well), about 2 miles away, is 310°41′; and to rock cairn, 26 feet (slope distance), 238°.

Plane coordinates: (E), x=322,042.74 feet; y=873,102.25 feet; the grid azimuth to the azimuth mark=213°30′55″.* (C), x=907,015.14 feet; y=875,203.71 feet; the grid azimuth to the azimuth mark=212°27′37″.*

Doolin (Lincoln County, W. R. Porter, 1934; 1935).—About 13 miles east-southeast of Arabela, about 2 miles north of Blackwater River, about ¼ mile south of east-west fence, and about ¼ mile north of south edge of a long, flat-topped ridge. To reach from the courthouse in Roswell, go north 3.3 miles on U. S. Highway 70, go north on a graded road 0.4 mile to cross roads, turn left (west) and go 14.4 miles to a stone filling station, continue 0.5 mile, leave main road and go southwesterly 3.3 miles to a gate leading into the Porter Ranch, turn left and go south 1.9 miles, turn south onto right fork and go 1.8 miles,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

pass through gate in an east-west fence and go south and west 1.0 mile to point where the road turns left into Blackwater Canyon, turn right and go 1.3 miles across country to highest point of ridge and the station. The station and reference marks are standard disks set in boulders according to notes 4 and 12c, and the underground and azimuth marks are standard disks set in bedrock according to notes 8a and 12a. Reference mark No. 1 is 160.8 feet (slope) from station in azimuth 307°13′, and No. 2 is 10.70 meters (35.1 feet) (slope) from station in azimuth 23°47′. The azimuth mark is on the western slope of the second small ridge, and 0.4 mile from station in azimuth 307°42′15″.

Plane coordinates: (E), x=308,438.78 feet; y=920,584.19 feet; the grid azimuth to the azimuth mark=308°03′05″.* (C), x=892,535.65 feet; y=922,432.95 feet; the grid azimuth to the azimuth mark=306°59′34″.*

Bela (Lincoln County, W. R. Porter, 1934).—About 2 miles west of Arabela post office which is on the main county road, 19 miles north of Tinnie, on top of a brush-covered ridge which is in the eastern foothills of the Capitan Mountains. The station bears 259° magnetic from Arabela store and is in range with the highest point of Capitan Mountains. To reach from Arabela post office and store, go west 0.3 mile on a dirt road, pass through a gate and go west 0.4 mile on the main road, follow right fork 0.5 mile to an old log and adobe shack. The station bears 265° magnetic from shack. Go west up canyon to its head, then go up canyon wall to the right and on up ridge to the highest point and the station. The station and reference marks are standard disks set in rock according to notes 2 and 12c. Reference mark No. 1 is on the top of a boulder which juts out on the east side of ridge, and 25.85 feet (slope) from station in azimuth 256°56′, and No. 2 is 20.53 feet from station in azimuth 150°05′.

Plane coordinates: (E), x=236,716.40 feet; y=942,427.19 feet. (C), x=820,416.05 feet; y=942,947.38 feet.

Juniper (Lincoln County, W. R. Porter, 1934).—About 4 miles west of Jones Ranch, on the highest point of a juniper-, scrub-, and cedar-covered ridge, about 20 yards east of an old road which runs southeast and northwest along the side of ridge. To reach from Jones Ranch, go west 5 miles on the only main road, at a 2-foot rock cairn of white stones, turn onto a road and go south 1.5 miles, turn southeast onto a dim road and go 0.5 mile to a fence corner, turn left onto a dim track which leads eastward and go 1.2 miles to the station. The station mark is a standard disk set in a boulder according to note 5. The underground mark is a standard disk set in concrete according to note 7a. The reference marks are standard disks set in boulders according to note 12d. Reference mark No. 1 is 20.770 meters (68.14 feet) from station in azimuth 218°26′, and No. 2 is 17.551 meters (57.58 feet) from station in azimuth 127°59′. Station *Doolin* may be used as an azimuth mark.

Plane coordinates: (E), x=314,061.90 feet; y=953,982.34 feet; the grid azimuth to *Doolin*=9°33′25.3″. (C), x=897,540.58 feet; y=955,933.74 feet; the grid azimuth to *Doolin*=8°29′49.2″.

Lowrey (U. S. G. S.) (Lincoln County, W. R. Porter, 1934).—About 13 miles northeast of Arabela, 4 miles north of the Roswell highway, 2 miles south of the Lowrey Ranch, on a low hill which is about 0.2 mile northwest of the road from the Lowrey Ranch to the Roswell highway, and in sec. 36, T. 6 S., R. 19 E. To reach from the Worswick and Yriart Ranch, go south 6.9 miles on the main road, pass through a gate at the top of grade, turn east (left) onto dim road along the south side of a fence and go 0.8 mile, turn north through a gate and go 0.6 mile to top of grade, turn north and go 0.2 mile to top of the hill and the station. The station is marked by a U. S. Geological Survey disk set in a boulder according to note 5. The underground mark is probably a standard disk set in concrete according to note 7a. A U. S. Geological Survey reference disk, set in concrete in outcropping bedrock, is 11.358 meters (37.26 feet) from station in azimuth 13°30′. Reference mark No. 1, a standard disk set in bedrock according to note 12b, is 25.272 meters (82.91 feet) from station in azimuth 266°25′. The azimuth mark, a standard disk set in bedrock according to note 12b, is on the northeast side of a low hill, 50 feet south of the road, 2 feet northeast of a 4-foot cairn, and approximately 0.4 mile from station in azimuth 29°50′50″.

Plane coordinates: (E), x=291,021.78 feet; y=995,550.90 feet; the grid azimuth to the azimuth mark 30°13′44.* (C), x=873,730.56 feet; y=997,072.50 feet; the grid azimuth to the azimuth mark=29°09′52″.*

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Sink (Lincoln County, W. R. Porter, 1934).—About 9 miles north-by-west of Arabela post office, in sec. 1, T. 7 S., R. 17 E., on the north end of the highest bare ridge in the immediate vicinity, and about ½ mile north of a 5-foot rock cairn. To reach from the Garciana Ranch (a well-known ranch about 14 miles north-northeast of Arabela post office), go south 1.5 miles on the main road to the top of a grade and an old gravel pit on the west side of the road, turn sharp right (west) and follow main-traveled road west 1.1 miles, pass through a gate and go west 1.2 miles, pass through a gate and continue west 2.3 miles, pass through a gate and continue west 1.7 miles to a crossroad, make acute-angle turn to the left (south) and go 2.0 miles to a gate, pass through gate and continue southeast 1.0 mile to a crossroad. There is a small rock with "B. M. 5277" painted on it at this crossroad. Turn right (west) and go 1.1 miles, pass through a gate and continue 0.4 mile to a point where road crosses a small wash in which there is a small tree with "USBM 5354.9" painted on it, cross wash and follow the right fork west 1.2 miles, follow left fork straight ahead 0.1 mile to a rock on right side of the road with "BM 5479.5" painted on it, continue 0.3 mile, turn right and go north 0.9 mile up a low ridge to a 5-foot rock cairn. The azimuth mark is near this cairn, continue north 0.3 mile to the north end of a low ridge and the station. The station and underground marks are standard disks set in a rock according to notes 4 and 8a. Reference mark No. 1, a standard disk set in bedrock according to note 12a, is 106.90 feet from station in azimuth 310°50′. Reference mark No. 2, a standard disk set in concrete according to note 11a, is 71.35 feet from station in azimuth 50°29′. The azimuth mark, a standard disk set in bedrock according to note 12a, is 260 feet northeast of a 5-foot rock cairn, and 0.3 mile from station in azimuth 351°14′16″. A rock cairn is 0.5 mile from station in azimuth 351°51′.

Plane coordinates: (E), x=231,646.77 feet; y=996,440.94 feet; the grid azimuth to the azimuth mark=351°43′41″.* (C), x=814,345.60 feet; y=996,859.20 feet; the grid azimuth to the azimuth mark=350°39′48″.*

Arabella east base (Lincoln County, W. R. Porter, 1934).—About 3 miles south of the Worswick and Yriart Ranch and on the southernmost tip of a low, rolling, north-and-south ridge which slopes to the south and southwest. There is higher ground to the north and east. To reach from the Worswick and Yriart Ranch, go south 3 miles on the main road to crossroad, turn east (left) and follow the road up a gentle slope 0.5 mile, turn north (left) and go 0.2 mile to the top of ridge and the station. The station and reference marks are standard disks set in boulders according to notes 4 and 12c. Reference mark No. 1 is 67.94 feet (slope) from station in azimuth 310°57′, and No. 2 is 120.45 feet (slope) from station in azimuth 44°40′. The azimuth mark, a standard disk set in bedrock according to note 12a, is near the crossroads, 47 feet south of the east-west road, 182 feet west of the north-south road, and 0.5 mile from station in azimuth 60°28′09″.

Plane coordinates: (E), x=279,893.42 feet; y=1,011,985.75 feet; the grid azimuth to the azimuth mark=60°52′19″.* (C), x=862,297.52 feet; y=1,013,299.15 feet; the grid azimuth to the azimuth mark=59°48′23″.*

Arabella west base (Lincoln County, W. R. Porter, 1934).—The station is twelve miles air line north of Arabela post office, on top of a broad, grassy ridge in an unsurveyed township, on the Lowrey Ranch at a point two miles east and three miles north of township corner, Tps. 6 and 7 S., Rs. 17 and 18 E. To reach from Worswick and Yriart Ranch (known locally as Garciana's ranch), go south 1.5 miles on the main road to Roswell to the top of the grade, turn right at crossroads and go northwest 1.2 miles on a good dirt road bearing west to a gate, pass through gate and follow main-traveled road west and west-southwest 1.3 miles, pass through a gate and turn west onto main road and go 2.4 miles, pass through a gate, leave road, turn due north, and go 0.4 mile to the top of hill, go due west 0.2 mile to the station, which is 0.2 mile west of a north-and-south sheep-proof fence. The station and reference marks are standard disks set in concrete according to notes 1a and 11a. The underground and azimuth marks are standard disks set in bedrock according to notes 8a and 12a. Reference mark No. 1 is 22.36 meters (73.4 feet) from station in azimuth 240°55′, and No. 2 is 20.24 meters (66.4 feet) from station in azimuth 135°01′. The azimuth mark is 132.18 feet west-southwest of a fence line, and 0.15 mile from station in azimuth 265°59′30″.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Plane coordinates: (E), x=248,155.86 feet; y=1,012,104.97 feet; the grid azimuth to the azimuth mark=266°27′09″.* (C), x=830,561.21 feet; y=1,012,827.95 feet; the grid azimuth to the azimuth mark=265°23′12″.*

Huff (Lincoln County, W. R. Porter, 1934).—About 16 miles north of Arabela post office, in sec. 25, T. 5 S., R. 16 E., on top of the hill on which the Huff Ranch is located, 115 feet east of northeast corner of the ranch house, 100 feet east of southeast corner of the house, and 9 feet north of an east-and-west fence. To reach from house at Garciana's ranch, go north 1.8 miles up canyon on only road to top of grade, pass through gate and go 0.1 mile, follow left fork 0.8 mile to crossroads, go straight ahead 1.5 miles, follow right fork 0.5 mile, follow right fork 1.1 miles, pass through a gate and continue north 1.9 miles on well-traveled road, follow left fork west 0.6 mile to crossroads, turn right (north) and 0.4 mile on main road to crossroads, turn left (west), and go up grade 1.7 miles to the Huff Ranch. The station, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 9 feet north of an east-and-west fence, and 61.57 feet from station in azimuth 260°51′, and No. 2 is 5 feet west of a north-and-south fence, 5 feet north of an east-and-west fence, and 82.70 feet from station in azimuth 350°11′. The azimuth mark is 105 feet west of southwest corner of Aspers Canyon Schoolhouse (District 34), and 107 feet west of the northwest corner of the schoolhouse (an adobe brick structure in the valley north of station), and 1.5 miles from station in azimuth 172°49′00″.

Plane coordinates: (E), x=229,767.62 feet; y=1,038,096.10 feet; the grid azimuth to the azimuth mark=173°18′45″.* (C), x=811,691.70 feet; y=1,038,473.02 feet; the grid azimuth to the azimuth mark=172°14′41″.*

McGinis (Lincoln County, W. R. Porter, 1934).—About 18 miles air line northeast of Arabela post office, 1 mile east of Dan McFarland's ranch (not visible from station), on the highest point of a prominent, flat-topped ridge which slopes to the south and east and has bluffs on west and north sides, on southwest edge of mesa, about 250 feet from the west rimrock. To reach from McFarland's ranch, turn south onto a track road that passes to the east of a shack on hill-side and go 0.2 mile, follow left fork 0.7 mile to the top of grade, turn left and go 0.3 mile across country up ridge to a fence, cross fence, and continue 0.5 mile up ridge to the top and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 8.646 meters (28.37 feet) (slope) from station in azimuth 300°02′, and No. 2 is 6.946 meters (22.79 feet) (slope) from station in azimuth 50°25′. The azimuth mark is on the same mesa as station about 100 feet southeast of the southeast edge of a 60-foot-wide crater and ½ mile from station in azimuth 31°09′09″.

Plane coordinates: (E), x=303,794.67 feet; y=1,033,367.60 feet; the grid azimuth to the azimuth mark=31°30′44″.* (C), x=885,799.02 feet; y=1,035,124.44 feet; the grid azimuth to the azimuth mark=30°26′42″.*

Galla (Lincoln County, W. R. Porter, 1934).—About 16 miles south of Moseley, about 9 miles north of Garciana's ranch, on the highest point of a prominent hill with gently sloping sides to the west and bluffs to the east which overlook Galla Valley. To reach from Garciana's ranch, go north 1.8 miles on the main road, pass through a gate and go 0.1 mile, follow right fork 1.3 miles, pass through a gate and go 1.4 miles, follow right fork straight ahead 2.2 miles, pass through a gate and go 0.3 mile to a crossroads, follow right fork 1.1 miles, turn right onto a dim road leading northeast down the wash and go about 0.2 mile, cross the wash and continue 1.9 miles on a trail up side canyon northward, pass through a gate and go east 0.8 mile across country to the highest point and the station. The station, azimuth and reference marks are standard disks set in bedrock according to notes 3 and 12b. Reference mark No. 1 is near edge of the bluffs, and 25.524 meters (83.74 feet) from station in azimuth 250°51′, and No. 2 is 12.483 meters (40.95 feet) from station in azimuth 173°32′. The azimuth mark is near the east end of a long ridge which slopes gently westward and breaks sharply eastward, about 6 inches north of a 3-foot cairn which is about 20 paces northwest of a 7-foot cairn near the end of the ridge, and approximately ½ mile from station in azimuth 356°13′55″.

Plane coordinates: (E), x=267,485.77 feet; y=1,068,081.11 feet; the grid azimuth to the azimuth mark=356°39′36″.* (C), x=848,845.56 feet; y=1,069,157.80 feet; the grid azimuth to the azimuth mark=355°35′23″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Foster (Lincoln County, W. R. Porter, 1934).—The station is 24 miles air line north-northwest of Arabela post office, about 5.5 miles from an adobe schoolhouse in magnetic bearing 315°, 0.2 mile north of a small shack with lean-to in line with Capitan peak and the station, and on top of a long, broad, grassy, ridge which runs east-southeast and west-northwest. The ridge is about 1½ miles north of Little Aspers Creek and ends in a higher top about 4 miles east-southeast of station. To reach from the Huff ranch house, go north 1.5 miles to the adobe schoolhouse which is visible from the ranch, continue due north 0.1 mile, pass through a gate and go north 1.2 miles to the J. W. Foster ranch buildings which are two small shacks at the west side of the road, continue north 0.3 mile to a crossroad at the west edge of a dirt tank, turn northwest and follow main road 0.25 mile up the south side of Little Aspers Creek, pass through a gate and go 2.0 miles, follow right fork 0.1 mile and then the left fork 0.15 mile to the Golden Drana Windmill and square concrete tank 50 yards southwest of the main road, continue northwest 0.4 mile on main road, turn right and go 0.1 mile through a low, rocky cut to a crossroad, go north 0.7 mile, pass through a gate and continue 0.5 mile to an old shack on the side of hill, go due north 0.2 mile to the top of hill and the station. The station and reference marks are standard disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is 29.28 meters (96.1 feet) from station in azimuth 83°06′, and No. 2 is 26.46 meters (86.8 feet) from station in azimuth 170°52′. The azimuth mark, a standard disk set in bedrock according to note 12a, is 0.2 mile from station in azimuth 0°57′21″.

Plane coordinates: (E), x=216,671.56 feet; y=1,071,303.51 feet; the grid azimuth to the azimuth mark=1°28′39″.* (C), x=797,978.27 feet; y=1,071,430.63 feet; the grid azimuth to the azimuth mark=0°24′26″.*

Omer (Lincoln County, W. R. Porter, 1934).—About 12 miles southwest of Moseley post office, 6 miles south of Corona county road, on east end of the highest grassy ridge in the vicinity, 22 feet north of 5-foot rock cairn and 100 yards west of a north-and-south fence which passes over the ridge at a point considerably lower than the station. To reach from Moseley post office, which is 21 miles west of the junction of U. S. Highway 285 and the Corona county road, go west on the county road 8.0 miles to crossroads, turn left (south) and go 2.0 miles, pass through a gate and go south 3.3 miles to Hegler's ranch, continue south 0.8 mile on road on west side of Gallo Creek to where the road crosses the creek bed, go south 0.4 mile, follow left fork 0.1 mile, follow right fork 0.7 mile, pass through a gate and go 0.9 mile to top of ridge, turn right (east) and go 0.35 mile along ridge to 5-foot cairn and station. The station and reference marks are standard disks set in boulders, according to notes 4 and 12c, and the underground and azimuth marks are standard disks set in bedrock, according to notes 8a and 12a. Reference mark No. 1 is 60.19 feet from station in azimuth 286°55′, and No. 2 is 71.82 feet from station in azimuth 146°52′. The azimuth mark is on top of same ridge as station, 200 yards east of a north-and-south road that passes over the ridge at a point 0.35 mile west of station, and 0.3 mile from station in azimuth 91°36′39″.

Plane coordinates: (E), x=221,770.38 feet; y=1,103,003.78 feet; the grid azimuth to the azimuth mark=92°07′29″.* (C), x=802,483.46 feet; y=1,103,220.83 feet; the grid azimuth to the azimuth mark=91°03′07″.*

Cowboy (Lincoln County, W. R. Porter, 1934).—About 9 miles air line southeast of Moseley, on the highest point of a prominent, flat-topped mesa which is the highest ground in vicinity, which is visible for a great distance in all directions, and which is known locally as Cowboy Mesa. To reach from Billing's ranch, which is about 8 miles south of Moseley, go north 0.8 mile on a plain dirt road, follow right fork northeast 2.4 miles to a point north of Cowboy Mesa, turn right and go southeast across country up slope to the east side of mesa, turn right and go up a small canyon on the east slope of mesa to top. Station is to right of the head of this canyon near the northeast edge of mesa, at point about 1.3 miles from road. There are high bluffs on all sides except the east where a small canyon slopes down to the valley floor. The station mark is a standard disk set in a boulder according to note 4. The underground mark is a standard disk set in bedrock according to note 8a. The reference marks are standard disks set in boulders according to note 12c. Reference mark No. 1 is 23.552 meters (77.27 feet) (slope) from station in azimuth 31°59′, and No. 2 is 12.370 meters (40.58 feet) (slope) from station in azimuth 115°25′.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

The azimuth mark, a standard disk set in bedrock according to note 12a, is at the south edge of a small hill on the south end of mesa, 5 paces from the west rim rock, 25 paces from the south rim rock, and approximately ½ mile from station in azimuth 349°07′36″. An old rock cairn is on the northeast rim rock, 481 feet (slope) from station in azimuth 227°13′, and another rock cairn, marking an old spring (now dry) is on the west rim rock, near the center of mesa, 687 feet (slope) from station in azimuth 12°25′.

Plane coordinates: (E), x=279,894.24 feet; y=1,104,842.30 feet; the grid azimuth to the azimuth mark=349°32′00″.* (C), x=860,565.35 feet; y=1,106,147.42 feet; the grid azimuth to the azimuth mark=348°27′37″.*

Spanish (Lincoln County, W. R. Porter, 1934).—About 10 miles west of Moseley post office, bearing 304° magnetic from Sallie Davis' ranch house, and on broad ridge covered with grass and many Spanish-daggers and is about ½ mile south of lightly timbered ridge and deep canyon. To reach from Moseley post office, which is 21 miles west of the junction of U. S. Highway 285 and Corona County road, go west 8.0 miles on county road toward Corona, turn right (north) at crossroads onto dirt road and go 0.85 mile to Sallie Davis' ranch, follow road leading north-northwest 0.4 mile, follow left fork northwest 0.65 mile, follow left fork (straight ahead) northwest 1.45 miles, leave road just before reaching top of ridge and go northeast 0.1 mile across country to the station. The station, reference, and azimuth marks are standard disks set in bedrock, according to notes 2 and 12a. Reference mark No. 1 is 22.23 meters (72.9 feet) from station in azimuth 221°28′, and No. 2 is 16.08 meters (52.8 feet) from station in azimuth 127°38′. The azimuth mark (not visible from ground at station) is 0.2 mile east-northeast of a gate, 50 feet north of fence line, and 0.4 mile from station in azimuth 318°27′08″.

Plane coordinates: (E), x=213,059.66 feet; y=1,152,130.58 feet; the grid azimuth to the azimuth mark=318°59′06″.* (C), x=792,852.99 feet; y=1,152,175.68 feet; the grid azimuth to the azimuth mark=317°54′31″.*

Moseley (Lincoln County, W. R. Porter, 1934).—About 3 miles east of Moseley store and post office which is 21 miles west of the junction of Corona County road with U. S. Highway 285, on the highest point of a wide, grassy ridge which is the highest ridge in the vicinity east of Moseley. To reach from Moseley store, go east 2.4 miles on the graded road to the top of the grade, turn right (south) at a small rock cairn on the south side of road and go across country 0.4 mile to the top of the ridge and the station. The station, reference, and azimuth marks are standard disks set in boulders according to notes 5 and 12d. The underground mark is a standard disk set in bedrock according to note 8b. Reference mark No. 1 is 21.190 meters (69.52 feet) from station in azimuth 13°53′. The azimuth mark is 6 feet northeast of a wooden cross, and 0.35 mile from station in azimuth 56°44′16″.

Plane coordinates: (E), x=274,760.34 feet; y=1,146,798.03 feet; the grid azimuth to the azimuth mark=57°09′21″.* (C), x=854,645.15 feet; y=1,148,002.87 feet; the grid azimuth to the azimuth mark=56°04′47″.*

Gypsum (Lincoln County, W. R. Porter, 1934).—About 7 miles air line west of Ramon, about 5 miles air line northeast of Moseley, about 4 miles air line south of L. O. Morgan's ranch, on a low, flat-topped mesa running east and west, ¼ mile southeast of head of small ravine that runs northeast and southwest, and 120 feet southeast of southeast edge of a sink on north edge of mesa. To reach from Ramon post office, go north 0.5 mile on State Route 2 (U. S. Highway 285) to schoolhouse, turn left through schoolyard and pass through gate in northwest corner of yard, continue 0.5 mile to main road, follow left fork south and then west on section line road 4.8 miles to L. O. Morgan's ranch, pass between house and barn and go west 1.2 miles on main road to crossroad, go west 0.4 mile, follow left fork 1.4 miles, follow left fork southwest 1.8 miles, to dim fork leading off to left, follow a dim, left fork south 0.7 mile, turn left and go up rough slope to fence corner, proceed east 0.3 mile to station. The station, reference, and azimuth marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 21.576 meters (70.79 feet) (slope) from station in azimuth 221°01′, and No. 2 is 105.4 feet (slope) from station in azimuth 137°56′. The azimuth mark is on a rocky point at north edge of ravine running northeast and southwest, and ½ mile from station in azimuth 206°49′31″.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=276,495.36 feet; y=1,167,975.50 feet; the grid azimuth to the azimuth mark=207°14′27″.* (C), x=855,981.99 feet; y=1,169,210.87 feet; the grid azimuth to the azimuth mark=206°09′48″.*

Cedar (Lincoln County, W. R. Porter, 1934).—About 24 miles south of Vaughn, 10 miles northwest of Moseley post office, 1.5 miles east of the Thompson Ranch, near center of a rectangle with triangle-blazed pine trees at its corners, 18.5 feet east-southeast of 8-inch pine, 12 feet west of 5-inch pine, 23 feet north-northwest of another 8-inch pine, and 19.5 feet northeast of leaning 8-inch pine tree. Distances between trees in order mentioned are: 8-inch pine to 5-inch pine, 26 feet; 5-inch pine to 8-inch pine, 24 feet; 8-inch pine to leaning 8-inch pine, 25 feet; and leaning 8-inch pine to 8-inch pine, 29 feet. Length of diagonal lines of rectangle are: east-west (5-inch pine to leaning 8-inch pine), 31 feet; and north-south (8-inch pine to 8-inch pine), 41.5 feet. To reach from post office in Vaughn, go west 0.9 mile on U. S. Highway 60, turn left onto graded road and go south 12.8 miles, turn right and follow graded road southwest and south 15.2 miles to the Thompson Ranch, go south between house and barn, turn left (east) and circle corral 0.1 mile to northeast corner of pole corral and 75 yards east of red windmill, follow right fork northeast, bearing easterly on main white-dirt road running along north side of timbered ridge 1.25 miles, follow right fork 0.15 mile, follow right fork 0.45 mile to road junction, continue south 0.05 mile, follow left fork south 0.2 mile, follow right fork 0.1 mile to 8-inch pine tree on south side of road (this tree is marked with two square and one triangular blazes), go southeast 50 feet from blazed tree, then go southwest 100 feet to 8-inch pine marked with rectangular blaze, go south 70 feet to 6-inch pine marked with rectangular blaze, continue south 90 feet to 8-inch pine marked with three square blazes (reference mark No. 1 is north-northeast of this tree), so west-southwest 140 feet to small clearing and the station. The station and reference marks are standard disks set in boulders, according to notes 4 and 12c. The underground mark is a standard disk set in concrete, according to note 7a. Reference mark No. 1 is 18 feet northeast of 8-inch pine tree marked with three square blazes, and 137 feet from station in azimuth 263°06′, and No. 2 is 20 feet southeast of 8-inch pine tree marked with one square blaze, and 111.87 feet from station in azimuth 21°41′. The azimuth from station to Thompson Ranch windmill is 96°55′49″.

Plane coordinates: (E), x=224,338.68 feet; y=1,182,069.11 feet; the grid azimuth to Thompson Ranch windmill=97°26′37″.* (C), x=803,567.04 feet; y=1,182,321.08 feet; the grid azimuth to Thompson Ranch windmill=96°21′53″.*

Morgan (Lincoln County, W. R. Porter, 1934).—About 8 miles northwest of Ramon, in highest point of a large, flat ridge which lies north of Gyp Well and overlooks valleys to the east and south. To reach from Ramon, go north 0.5 mile on highway to schoolhouse on west side of road, turn left, pass through gate and across schoolyard to gate in northwest corner of yard, pass through gate and go 0.5 mile, follow left fork 4.8 miles to Morgan Ranch, continue west 0.6 mile, follow right fork 0.6 mile, follow right fork north 0.3 mile to fence corner, turn left and go 0.2 mile to an old road which bears to northwest over hill, follow this road 0.9 mile to point opposite Gyp Well on east side of road, continue straight ahead 0.4 mile to point where road curves to west, follow right fork (dim trail) 1.7 miles to top of ridge, turn right and go 0.7 mile up gentle slope to east to highest point and the station. The station, reference, and azimuth marks are standard disks set in concrete, according to notes 1a and 11a. The underground mark is a standard disk set in bedrock according to note 8b. Reference mark No. 1 is 23.788 meters (78.04 feet) from station in azimuth 229°11′, and No. 2 is 23.966 meters (78.63 feet) from station in azimuth 322°22′. The azimuth mark is about 0.1 mile east of road at point 0.1 mile north of top of ridge, 6 feet east of a wooden cross, and 0.45 mile from station in azimuth 110°01′39″.

Plane coordinates: (E), x=287,227.26 feet; y=1,197,391.02 feet; the grid azimuth to the azimuth mark=110°25′28″.* (C), x=866,159.04 feet; y=1,198,825.77 feet; the grid azimuth to the azimuth mark=109°20′40″.*

Burgette (Guadalupe County, W. R. Porter, 1934).—About 19 miles air line south of Vaughn, 3 miles air line south of Burgette's ranch, on the highest point of the highest hill in the vicinity. To reach from Lewis' filling station and cabin camp in Vaughn, go west 0.8 mile to a graded road leading south on a section line, turn left (south) and go 12.0 miles, follow left fork south 5.1 miles

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

to Burgette's ranch, follow the main road southwest 1.4 miles, pass through a gate and go south 1.4 miles on the main-traveled road, continue south 0.5 mile on the right or main fork to the top of a low grade, turn right (west) and go 0.3 mile to the highest point of hill and the station. The station, azimuth, and reference marks are standard disks set in rock, according to notes 2 and 12a. Reference mark No. 1 is 14.11 meters (46.3 feet) (slope) from station in azimuth 85°01′, and No. 2 is 104.5 feet (slope) from station in azimuth 157°18′. The azimuth mark is on the first spur ridge to the southeast, 0.2 mile from station in azimuth 321°14′31″.

Plane coordinates: (E), x=230,819.49 feet; y=1,209,544.34 feet; the grid azimuth to the azimuth mark=321°44′41″.* (C), x=809,529.06 feet; y=1,209,913.96 feet; the grid azimuth to the azimuth mark=320°39′50″.*

Derrick (Guadalupe County, W. R. Porter, 1934).—About 16 miles air line southeast of Vaughn, about 1 mile east of an old well derrick which is a landmark, and the highest point of a divide which is 0.7 mile west of State Highway 2 (U. S. Highway 285). To reach from the Atchison, Topeka & Santa Fe Railway depot at East Vaughn go east 10.8 miles on U. S. Highway 60, follow State Highway 2 (U. S. Highway 285) south 7.9 miles to a dugout at the east side of a road (homestead of C. A. Star), turn right (west) and go 0.7 mile across country to top of divide and the station. The station, azimuth, and reference marks are disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is 23.32 meters (76.5 feet) from station in azimuth 52°34′, and No. 2 is 19.81 meters (65.0 feet) from station in azimuth 143°12′. The azimuth mark is 28.0 feet east of the center line of State Highway 2, and 2.1 miles from station in azimuth 307°32′17″.

Plane coordinates: (E), x=290,463.93 feet; y=1,234,312.57 feet; the grid azimuth to the azimuth mark=307°55′49″.* (C), x=868,698.66 feet; y=1,235,805.32 feet; the grid azimuth to the azimuth mark=306°50′52″.*

Duran (Torrance County, W. R. Porter, 1934; 1935).—About 1½ miles north of Duran on northwest and highest side of a very prominent wooded sandstone mesa which is steep on the south side and has a ridge sloping from its top on the east side. To reach from Vaughn, go west 2 miles on U. S. Highway 60, go southwest 13 miles on U. S. Highway 54 to Duran, from point 50 yards north of the Southern Pacific Railroad depot in front of the Hindi General Store go east to a large cylindrical water tank, go north one block, then east to a wire gate (total of 0.5 mile), pass through gate and go north 0.3 mile, pass through a gate and continue north 0.5 mile, leave road and pack to the top of butte to the west and the station, which is 34.5 feet north of a 6-inch pine tree marked with two square and one triangular blazes. The station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 20.5 feet south of the blazed tree and 55.29 feet from station in azimuth 11°26′, and No. 2 is 54.70 feet from station in azimuth 119°16′. The azimuth mark, a standard disk set in a boulder according to note 12c, is on a point which projects about 200 yards on northwest side of mesa, and 0.25 mile from station in azimuth 126°12′38″.

Plane coordinates: (E), x=180,100.00 feet; y=1,270,016.25 feet; the grid azimuth to the azimuth mark=126°48′42″.* (C), x=757,676.46 feet; y=1,269,415.34 feet; the grid azimuth to the azimuth mark=125°43′35″.*

Tank (Guadalupe County, W. R. Porter, 1934).—About 14 miles air line southeast of Vaughn, about 2 miles west of State Highway 2 (U. S. Highway 285), on the highest point of a low, flat-topped ridge which is the highest in the vicinity. To reach from the Atchison, Topeka & Santa Fe Railway station in East Vaughn, go east 10.8 miles on U. S. Highway 60, turn south onto State Highway 2 (U. S. Highway 285) and go 3.7 miles, follow a dim road that turns sharply to the west 0.6 mile to a fork, take left fork and go 1.0 mile to a crossroad, turn right and go 0.6 mile to a point south of a large sink, turn left and go 0.6 mile across country to a cylindrical concrete tank which is 8 feet in diameter, 20 feet deep, and projects about 3 feet above ground, turn right and go 0.3 mile to the top of a hill and the station. There is a deep sink hole marked by a 6-foot pole on the hill about ½ mile to the southeast. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 19.73 meters (64.7 feet) from station in azimuth 358°09′, and No. 2 is 23.64 meters (77.6 feet) from station in azimuth 81°21′.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

The azimuth mark is in a valley 6 feet north of a dim east-and-west road and 0.85 mile from station in azimuth 259°07′19″.

Plane coordinates: (E), x=277,964.00 feet; y=1,246,492.45 feet; the grid azimuth to the azimuth mark=259°32′18″.* (C), x=855,969.59 feet; y=1,247,747.76 feet; the grid azimuth to the azimuth mark=258°27′17″.*

Joffre (Guadalupe County, W. R. Porter, 1934).—About 12 miles southeast of Vaughn, about 1 mile southwest of the railway station in Joffre, about 0.4 mile east of State Highway 2 (U. S. Highway 285), and on highest point of a ridge which is the first on the south side of the railway. To reach from Vaughn, go east 10.8 miles on U. S. Highway 60, turn south onto State Highway 2 (U. S. Highway 285) and go 0.9 mile to top of ridge, turn east and follow an old road 0.4 mile along the top of ridge to the station. The station, reference, and azimuth marks are standard disks set in concrete according to notes 1a and 11a. The underground mark is a standard disk set in bedrock according to note 8b. Reference mark No. 1 is 21.190 meters (69.52 feet) from station in azimuth 327°03′, and No. 2 is 19.383 meters (63.59 feet) from station in azimuth 61°32′. The azimuth mark is 39 feet west of the center of State Highway 2 at a point 56 yards south of the railroad underpass, and approximately ¾ mile from station in azimuth 176°43′18″.

Plane coordinates: (E), x=282,809.62 feet; y=1,268,225.21 feet; the grid azimuth to the azimuth mark=177°07′47″.* (C), x=860,403.40 feet; y=1,269,570.15 feet; the grid azimuth to the azimuth mark=176°02′40″.*

Leon (Guadalupe County, W. R. Porter, 1934; 1935).—About 8 miles north of Vaughn, at the northeast and highest part of Leon Mesa which is covered with small cedar and pine trees and is plainly visible from Vaughn, north of an east-and-west fence, ¼ mile west of a north-and-south fence, 22.5 feet south of a 6-inch pine tree marked with two square and one triangular blazes, and 30.0 feet west of a 10-inch pine tree marked in same manner. Distance between trees is 27 feet. To reach from Vaughn post office, go north and then west 0.4 mile on U. S. Highway 60, turn right and go 0.15 mile, cross Atchison, Topeka & Santa Fe Railway tracks and go east 0.45 mile, cross Southern Pacific Railroad tracks, turn left and go 0.4 mile, turn right and follow road on fill on the west side of hills 0.4 mile, follow right fork north 7.95 miles, follow left fork 0.4 mile, follow right fork northeast 0.7 mile, pass through a gate and follow left fork 0.25 mile, follow left fork 0.15 mile, follow left fork 0.15 mile, follow right fork 0.35 mile to an east-west fence, leave road and go northeast 0.25 mile to high ground and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 42.90 feet from station in azimuth 338°26′, and No. 2 is 49.16 feet from station in azimuth 75°54′. The azimuth mark is 25 feet northeast of a 6-inch pine marked with a square blaze, and 0.25 mile from station in azimuth 40°38′23″.

Plane coordinates: (E), x=241,405.69 feet; y=1,355,707.16 feet; the grid azimuth to the azimuth mark=41°07′48″.* (C), x=817,342.52 feet; y=1,356,254.68 feet; the grid azimuth to the azimuth mark=40°02′18″.*

Argonne (Guadalupe County, W. R. Porter, 1934).—About 17 miles air line northeast of Vaughn on Argonne Mesa which is the first mesa south of Pintada Canyon, about 100 yards north of south edge of the mesa, about ¾ mile northwest of a heavily wooded point, and in the vicinity of a few scattered cedar trees. To reach from Vaughn, go east 1.0 mile on U. S. Highway 60, follow U. S. Highway 54 northeast 15.0 miles to side road to left (west), turn left (west) on side road and go across railroad tracks and through two gates, follow left fork (main road) 4.7 miles to Tapia ranch, continue northwest 0.15 mile, turn west at fence corner and go 1.6 miles along fence, turn and go north 0.1 mile up slope of mesa to top, continue 0.5 mile, turn and go east 0.65 mile, follow right fork 1.2 miles, go south 0.15 mile across country, to the station. The station, reference, and azimuth marks are standard disks set in concrete according to notes 1a and 11a. The underground mark is a standard disk set in bedrock according to note 8b. Reference mark No. 1 is 21.211 meters (69.59 feet) from station in azimuth 325°14′, and No. 2 is 21.069 meters (69.12 feet) from station in azimuth 60°18′. The azimuth mark is 35 feet north of road, and approximately ¼ mile from station in azimuth 238°02′14″. Azimuth from the station to an airway beacon is 137°39′35″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=284,181.32 feet; y=1,388,618.90 feet; the grid azimuth to the azimuth mark=238°26′52″.* (C), x=859,484.94 feet; y=1,389,978.46 feet; the grid azimuth to the azimuth mark=237°21′12″.*

Supplementary points

Cerro Diablo Peak (Hudspeth County, Tex., W. R. Porter, 1934).—Plane coordinates: (C), x=761,381.12 feet; y=326,369.69 feet.

New Mexico-Texas Clark boundary monument No. 14 (Otero County, N. Mex., Hudspeth County, Tex., W. R. Porter, 1934).—About 22 miles northwest of Ables, Tex., about 250 yards west of the highest point of a prominent hill known as Henry Hill. The mark, reestablished in 1911, consists of a brass disk set in top of a concrete post which projects about 18 inches above the ground. Station *Henry* may be used as an azimuth mark.

Plane coordinates:[1] (C), x=814,566 feet; y=365,225 feet.

T. 26 S., R. 15 E., sec. 4, northwest corner (Otero County, N. Mex., W. R. Porter, 1934).—This is a brass disk stamped with section, township, and range numbers, and set in top of 2-inch iron pipe which projects 1.9 feet above ground, 28.819 meters (94.55 feet) from station *Jones* in azimuth 92°15′48″, and near south and west side of a flat, bushy mesa, at the corner of sections 4, 5, 32, and 33, Tps. 25 and 26 S., R. 15 E.

Plane coordinates:[1] (C), x=755,848 feet; y=393,575 feet.

T. 24 S., R. 16 E., sec. 23, southeast corner (Otero County, W. R. Porter, 1934).—This is a G. L. O. brass cap on iron pipe projecting 30 inches above ground and marked with township, range, and section numbers, 90.92 meters (298.3 feet) in azimuth 250°27′21″ from station *Brownfield*, and on southern end of long, flat-topped, brush-covered ridge, and at the corner of secs. 23, 24, 25, and 26, T. 24 S., R. 16 E. The pipe is surrounded by a rock cairn, but has been tipped to southwest and is now very unstable.

Plane coordinates:[1] (C), x=803,352 feet; y=436,586 feet.

Beargrass (Otero County, W. R. Porter, 1934).—About 20 miles south of Pinon, on a broad, flat saddle which is covered with a little brush, 39 feet north of center line of Artesia-Alamogordo road. To reach from Pinon, go east 1.65 miles on the Artesia road, follow right fork (main road) 2.85 miles, follow left fork (main road) 1.8 miles to top of divide, follow road south 15.6 miles down Cornucopia Wash, follow right fork (straight ahead) 5.0 miles up canyon to south and southwest to the road forks about 0.3 mile north of Coffelt's well, follow right fork west 3.1 miles to top of slight grade and station. The station, underground, azimuth and reference marks are standard disks in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 37 feet north of the road, and 79.50 feet from station in azimuth 300°37′, and No. 2 is 49 feet south of the road, and 88.70 feet from station in azimuth 39°11′. The azimuth mark is 10 feet south of the road, and approximately 0.2 mile from station in azimuth 110°46′26″.

Plane coordinates: (C), x=760,262.22 feet; y=472,664.11 feet; the grid azimuth to the azimuth mark=110°19′26″.*

Pinon (Otero County, W. R. Porter, 1934).—About 4 miles air line north of Pinon, on a ridge running northwest and southeast, about 0.3 mile from a road, 100 feet from the northeast edge of a ridge, and 50 feet west of a lone piñon tree. To reach from post office at Pinon, go north 3.9 miles on main-traveled road toward Weed to top of the first, low, rocky saddle. At top of ridge turn right (southeast) and go up ridge to highest point and the station. The station mark is a standard disk set in a boulder according to note 4. The reference and azimuth marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is 18 feet northwest of the lone piñon tree, and 13.92 meters (45.7 feet) from station in azimuth 257°05′, and No. 2 is 20 feet southwest of a small piñon tree which is southwest of the lone tree and 24.91 meters (81.7 feet) from station in azimuth 349°29′. The azimuth mark is on a small rim rock on the southeast slope of the first ridge northwest and 0.4 mile from station in azimuth 144°16′22″.

Plane coordinates: (E), x=168,385.19 feet; y=609,195.97 feet; the grid azimuth to the azimuth mark=144°51′16″.* (C), x=758,189.47 feet; y=608,527.42 feet; the grid azimuth to the azimuth mark=143°49′12″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Gage (Otero County, W. R. Porter, 1934).—About 2 miles east of Pinon, just south of the ranch road leading to the S. W. Lewis Ranch, and on the summit of a small, rounded hill which is covered with cedar trees. To reach from Pinon, follow the Artesia-Salt Flat road 1.6 miles, follow the left fork toward Artesia 0.5 mile to a road leading to the Lewis Ranch, follow this road 0.2 mile, turn left and go to the summit of the hill and station, which is 26 feet west of a blazed cedar tree. The station, underground, reference and azimuth marks are standard disks set in boulders according to notes 4, 9b, and 12c. All marks are flush with surface of ground. Reference mark No. 1 is 68.43 feet from station in azimuth 283°15′, and No. 2 is 53 feet southwest of the blazed tree, and 67.45 feet from station in azimuth 14°41′. The azimuth mark is 45 feet north of the center line of the Artesia road at a point 75 feet south of the center of a curve eastward, 100 feet west of a dim road leading north into a deep ravine, and approximately 0.2 mile from station in azimuth 208°15′00″.

Plane coordinates: (E), x=184,028.47 feet; y=588,720.23 feet; the grid azimuth to the azimuth mark=208°48′11″.* (C), x=774,198.90 feet; y=588,338.26 feet; the grid azimuth to the azimuth mark=207°46′12″.*

Old Carrisa (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 12 miles air line southwest of Weed, at the U. S. Forest Service lookout tower "Old Carrisa." To reach from Weed post office, go south 6.0 miles on the main road, follow road leading uphill to the left 1.2 miles to C. J. Buck's farm, take right-hand road at a junction south of the farmhouse and go 2.3 miles, pass through a gate and drive to head of canyon, turn left through gate and go 1.0 mile to the station. The station is marked by a U. S. C. & G. S. and State survey disk set in a concrete post at the center of the base of the tower. Station *Bluewater eccentric* (*N. Mex. Geodetic Survey*) may be used as an azimuth mark.

Plane coordinates:[1] (C), x=689,786 feet; y=601,426 feet.

New Carrisa (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 9 miles south and 7 miles west of Weed, at the U. S. Forest Service lookout tower "New Carrisa." To reach from Weed post office go south 8.0 miles on the main road, turn left across a bridge and follow the road to the tower. The station is marked by a U. S. C. & G. S. and State survey disk set in a concrete post at the center of the base of the tower.

Plane coordinates:[1] (C), x=694,184 feet; y=610,291 feet.

Bluewater (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 10 miles northwest of Pinon, beneath the center of Bluewater lookout tower. The station is marked with a U. S. C. & G. S. and State survey disk set in the top of a concrete post six inches square. Station *Bluewater eccentric* (*N. Mex. Geodetic Survey*) is 98.21 feet north of station.

Plane coordinates: (E), x=152,031.70 feet; y=635,194.25 feet. (C), x=741,369.89 feet; y=634,224.02 feet.

Potato (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 4 miles south and 9 miles west of Weed, in Potato Canyon. To reach from the Weed post office, go north 0.2 mile on the main road to a T-intersection just after crossing a bridge, follow the left fork 7.4 miles to a point where road keys west in Potato Canyon, cross a cattle guard, leave the main road and continue 1.85 miles up Potato Canyon, turn onto a dim road on the left, crossing a stream, and follow it 1.75 miles to the upper end of a field and the end of truck travel; take right fork of canyon and follow old forest trail to top of ridge on south side of the canyon and the station. The station is a 35-foot growing pine tree with platform built on its top, used in the summer by the U. S. Forest Service as a lookout tower. The reference marks are U. S. C. & G. S. and State survey disks set in rock. Reference mark No. 1 is 50.4 feet from station in magnetic bearing N. 4° E., and No. 2 is 35.8 feet from station in magnetic bearing N. 83° E.

Plane coordinates: (C), x=674,988.85 feet; y=637,510.44 feet.

Weed (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 2½ miles air line west of Weed, at the U. S. Forest Service lookout tower Weed. To reach from Weed post office, go north 0.2 mile on the main road, follow left fork 2.0 miles up hill, turn left and follow the main-traveled road to its end at the station. The station is marked by a U. S. C. & G. S. and State survey disk set in a concrete post at the center of the base of the tower. Station *Bluewater eccentric* (*N. Mex. Geodetic Survey*) may be used as an azimuth mark.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Plane coordinates:[1] (C), x=712,130 feet; y=657,731 feet.

Curtis (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 5 miles south and 10 miles east of Cloudcroft, on top of a high ridge at the head of Curtis Canyon. This ridge is used as a lookout by U. S. Forest Service. The lookout is a platform built on top of a 35-foot spruce tree. To reach from Cloudcroft, go east 10 miles on the main road to a road leading to the Harvey and Calentine Silver Fox Farm, turn right and follow the road to the fox farm and end of truck travel, go southeast along an old fire patrol trail to top of ridge at the head of the canyon. The station is marked by a U. S. C. & G. S. and State survey disk set in a concrete post. Reference marks are U. S. Forest Service disks. Reference mark No. 1 is 22.05 feet from station in magnetic bearing N. 86° W., and No. 2 is 25.00 feet from station in magnetic bearing N. 22° E. A stump with several nails in it is 40.95 feet distant in magnetic bearing S. 30° W.

Plane coordinates:[1] (C), x=705,882 feet; y=687,501 feet.

Mayhill (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—On the summit of a high, rounded, wooded peak which is highest in the vicinity of Mayhill, beneath the center of the 50-foot Mayhill fire lookout tower. The station is marked by a U. S. C. & G. S. and State survey station disk set in a precast concrete post 6 inches square and stamped "Mayhill 1934." Station *Mayhill eccentric* (*U. S. G. S.*) is 9.30 meters (30.5 feet) southwest.

Plane coordinates:[1] (E), x=139,787 feet; y=701,074 feet. (C), x=727,934 feet; y=699,865 feet.

Walker (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934).—About 3 miles north and 2 miles east of Mayhill, on the highest hill about 1 mile southeast of Clarence Walker's ranch, on a prominent hill used as a lookout by the U. S. Forest Service. To reach from Mayhill ranger station, go 3.75 miles on the road behind the ranger house, turn left and follow road to Sixteen Springs Canyon, turn right on north side of canyon and follow road to its end at Clarence Walker's ranch, go southeast about 1 mile to the highest hill and the station. The station is marked by a U. S. C. & G. S. and State survey disk, set in a concrete post or boulder (?), flush with surface of ground. Directions and distances to other Coast and Geodetic Survey and State survey disks are: S. 44° W. (magnetic) 28.50 feet; and N. 75° E. (magnetic) 35.90 feet.

Plane coordinates: (E), x=146,941.62 feet; y=720,262.68 feet. (C), x=734,737.24 feet; y=719,178.86 feet.

Williams (Chaves County, W. R. Porter, 1934).—About 2.7 miles northwest of Dunken's store, which is 22.6 miles northeast of Pinon on the Artesia road, 4 miles south of State Highway 83, 150 feet south of the north edge and 40 feet west of the east edge of a round-topped hill, which is about 0.2 mile west of the Pinon-Artesia road. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 68.57 feet from station in azimuth 227°02′, and No. 2 is 48.95 feet (slope) from station in azimuth 316°44′. The azimuth mark, a standard disk set in bedrock according to note 12a, is 150 paces east of the Pinon-Artesia road, 65 paces north of a point where the road crosses the creek, 60 feet east of the east bank of creek, and 0.5 mile from station in azimuth 340°53′14″. Station *Cueve* may be used as an azimuth mark.

Plane coordinates: (E), x=234,940.00 feet; y=672,363.08 feet; the grid azimuth to the azimuth mark=341°21′20″.* (C), x=823,589.05 feet; y=672,888.04 feet; the grid azimuth to the azimuth mark=340°18′57″.*

Corral (Chaves County, W. R. Porter, 1934.—About 7 miles northeast of Dunken's store, which is 22.6 miles northeast of Pinon on the Artesia road, and 0.1 mile north of State Highway 83. To reach from Dunken's store go north 5.6 miles on the main road to the junction with State Highway 83, turn east onto highway and go 5.3 miles, cross a cattle guard, turn left and follow fence 0.1 mile, go east about 25 yards to the highest point of a low, rocky hill and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 3 and 12b. Reference mark No. 1 is 23.515 meters (77.15 feet) from station in azimuth 284°06′, and No. 2 is 29.005 meters (95.16 feet) from station in azimuth 18°00′. The azimuth mark is 0.5 mile southwest of cattle guard on the highway, 70 feet southeast of center line of road, 2 feet east of a 4-foot rock cairn, and 0.6 mile from station in azimuth 64°56′03″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=266,307.62 feet; y=686,838.62 feet; the grid azimuth to the azimuth mark=65°20′51″.*

Posey (Chaves County, W. R. Porter, 1934).—About 7.4 miles by road northwest of the Hendrick Ranch, 8 miles air line northeast of Elk post office, on the highest point of the southeast shoulder of a smooth, grassy ridge running southeast and northwest, ¾ mile northwest of a ranch on Rio Felix. To reach from the corral gates at Hendrick's ranch, go west 3.4 miles, pass through a gate and continue west and northwest 0.5 mile to a crossroads, continue straight ahead (northwest) 0.5 mile, pass through a gate and continue 0.9 mile, follow right fork 0.9 mile to the azimuth mark on south side of road, continue 0.5 mile to river crossing, continue west 0.7 mile to toe of slope of ridge to the northwest, turn northwest and go about 0.1 mile up slope to the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is on the south slope of the shoulder, and 52.16 feet from station in azimuth 7°59′, and No. 2 is on top of same ridge as station at a distance of 53.24 feet in azimuth 113°47′. The azimuth mark is on the south side of Rio Felix, 50 feet south of road, and ¾ mile from station in azimuth 294°21′44″.

Plane coordinates: (E), x=231,889.89 feet; y=735,071.45 feet; the grid azimuth to the azimuth mark=300°21′06″.* (C), x=801,071.20 feet; y=777,091.02 feet; the grid azimuth to the azimuth mark=293°47′40″.*

Clements (Lincoln County, W. R. Porter, 1934).—About 2 miles northeast of Clement's ranch, on the north end of a long ridge or mesa that extends north, west, and then north and the north end overlooks a valley to the west and north, 0.8 mile north of a point where the road leading northeast from ranch crosses ridge, 100 paces south of a point where ridge breaks northward, and 79 feet northeast of a blazed cedar tree. The station, underground, azimuth, and reference marks are standard disks set in boulders according to notes 4, 9a and 12c. Reference mark No. 1 is 6.21 meters (20.4 feet) from station in azimuth 73°42′, and No. 2 is 28.32 meters (92.9 feet) from station in azimuth 175°45′. The azimuth mark is on the highest point of the ridge to the east, and is marked by a small rock cairn, and is approximately 0.4 mile from station in azimuth 299°50′30″. *T. 13 S., R. 17 E., section corner* may also be used as an azimuth mark.

Plane coordinates: (E), x=214,324.14 feet; y=776,957.29 feet; the grid azimuth to the azimuth mark=300°21′06″.* (C), x=801,071.20 feet; y=777,091.02 feet; the grid azimuth to the azimuth mark=299°18′14″.*

T. 13 S., R. 17 E., section corner (Lincoln County, W. R. Porter, 1934).—About 2 miles northeast of Clement's ranch, on the north end of a long ridge or mesa that extends north, west and then north and overlooks a valley to the west and north and 159.306 meters (522.66 feet) in azimuth 280°41′50″ from station *Clements*. The station is marked by an iron pipe surrounded by a rock cairn projecting 3 feet above the ground and capped with a bronze disk stamped with the township, and range numbers and the date "1929."

Plane coordinates:[1] (E), x=214,836 feet; y=776,856 feet. (C), x=801,585 feet; y=776,999 feet.

Highway (Lincoln County, W. R. Porter, 1934).—About 8 miles air line east of Picacho, 2 miles east of Riverside Camp, in a flat area between old U. S. Highway 70 and its new location to the north, 141 feet south of the center line of the new highway, 91 feet south of the south right-of-way fence of the new highway, approximately 400 feet north of the old highway, just south of a telephone line, 112 feet east of pole No. 5931, and 39 feet west of pole No. 5930. To reach from Picacho, go east 9.6 miles on U. S. Highway 70 to the highest point at the top of a grade and station site. The station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 16 feet southeast of pole No. 5930, and 48.77 feet from station in azimuth 283°14′, and No. 2 is 73.72 feet from station in azimuth 10°03′. Station *Border* may be used as an azimuth mark.

Plane coordinates: (E), x=290,050.94 feet; y=856,337.53 feet; the grid azimouth to *Border*=284°13′59″.0. (C), x=875,333.39 feet; y=857,850.85 feet; the grid azimuth to *Border*=283°10′45″.2.

Fears (Lincoln County, W. R. Porter, 1934).—About 8 miles air line north of Tinnie post office, which is on U. S. Highway 70, and on the highest point of the

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

highest hill lying east of Beatrice Flat and north of Stovepipe Canyon, approximately 1 mile northeast of Fear's ranch. To reach from Tinnie post office, go west 0.3 mile on U. S. Highway 70 to a road leading up a canyon to the north, turn north and follow road 4.6 miles to a point where main road turns left, follow road to the right, pass through a board gate and follow ranch road 0.4 mile, follow left fork (main track) northeast 1.2 miles to a well and shacks, pass through lane between stone house and shed barn following a rut road east and northeast 0.7 mile to the top of a ridge, turn north and go to top of hill and the station site. Capitan Mountain is very prominent to the northwest. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12 a. Reference mark No. 1 is 50.20 feet from station in azimuth 282°51′, and No. 2 is 31.3 feet from station in azimuth 55°04′. The azimuth mark is on the first hump south of station, approximately 700 feet south of a point where the road crosses the ridge, and 0.6 mile from station in azimuth 14°05′07″.

Plane coordinates: (C), x=825,254.30 feet; y=897,754.72 feet; the grid azimuth to the azimuth mark=13°29′50″.*

Purcella (Lincoln County, W. R. Porter, 1934).—About 5 miles air line north-northeast of Arabela post office, on top of a low, rocky ridge, about 300 yards south of the center line of the county road, inside Purcella's pasture, and about ½ mile from the ranch house in magnetic bearing 102°. To reach from Arabela post office which is at the east end of the Capitan Mountains, go north 1.1 miles on the main road, follow right fork 4.1 miles down a wash, follow right fork 1.9 miles, go through a wire gate about 50 yards south of Purcella's ranch house, then go southeast ½ mile up slope to top of the first ridge and the station. A small, white schoolhouse is about 200 yards north of the county road. The station, azimuth and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 25.80 meters (84.6 feet) from station in azimuth 305°28′, and No. 2 is 17.62 meters (57.8 feet) from station in azimuth 27°49′. The azimuth mark is 50 feet south of an east-and-west right-of-way fence, 70.5 feet south of the center line of the highway and 0.5 mile from station in azimuth 150°45′54″.

Plane coordinates: (C), x=841,298.48 feet; y=973,287.42 feet; the grid azimuth to the azimuth mark=150°08′34″.*

Plainview (U. S. G. S.) (Lincoln County, W. R. Porter, 1934).—About 9 miles air line north-northeast of Arabela, on highest point of a ridge north of Roswell-Capitan road, and 3.0 miles north-northeast of Purcella's ranch house. To reach from Arabela post office, go north 7.0 miles to the Roswell-Captain road at Purcella's ranch, turn left (north) onto a dirt road and follow the main road to the right of a schoolhouse 1.3 miles, pass through a gate and follow right fork 0.4 mile, follow another right fork 0.4 mile, pass through a gate and go 0.2 mile, follow right fork 1.0 mile to a road junction, make sharp left turn and follow road up over ridge 1.4 miles, follow right fork 0.2 mile at the top, follow right fork 0.6 mile, cross fence and follow dim road up hill eastward 1.1 miles to the station at top of the second hill. The station is marked by U. S. Geological Survey bronze disk in outcropping bedrock, flush with surface of ground. Reference mark No. 1 is an unstamped U. S. Geological Survey disk set in outcropping bedrock, flush with surface of ground, 29.10 feet from station in azimuth 21°54′, and No. 2 is a standard disk set in bedrock according to note 12a, flush with surface of ground, 26.45 feet from station in azimuth 127°44′. The azimuth mark, a standard disk set in bedrock according to note 12a, is flush with surface of ground, on first hump to the north, 50 feet north of road, and about ¾ mile from station in azimuth 104°16′56″.

Plane coordinates: (C), x=849,671.87 feet; y=989,833.77 feet; the grid azimuth to the azimuth mark=108°38′38″.*

El Capitan Mountain, east peak (Lincoln County, W. R. Porter, 1934).—Plane coordinates: (C), x=808,751.92 feet; y=942,407.38 feet.

El Capitan Mountain (Lincoln County, W. R. Porter, 1934).—Plane coordinates: (C), x=800,010.63 feet; y=944,146.26 feet.

Salley (Lincoln County, W. R. Porter, 1934).—About 7.6 miles west of Moseley post office which is 21 miles west of the junction of Corona county road with U. S. Highway 285, on a high, level ridge, about ½ mile south of a well, 285 feet south of the center line of county road, 137 feet east of a north-and-south fence. To reach from Moseley post office, go west 7.6 miles on county road to a cattle guard

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

at top of a low hill, turn south and go about 90 yards to the station. The station, azimuth and reference marks are standard disks set in boulders according to notes 4 and 12c. Reference mark No. 1 is 73.82 feet from station in azimuth 258°12′, and No. 2 is 71.68 feet from station in azimuth 352°15′. The azimuth mark is 200 feet north of the center line of the county road, and about ¾ mile from station in azimuth 255°09′48″.

Plane coordinates: (C), x=804,540.60 feet; y=1,136,499.25 feet; the grid azimuth to the azimuth mark=254°35′56″.*

Ramon (Lincoln County, W. R. Porter, 1934).—About 0.6 mile air line northwest of Ramon post office and store which is on State Highway 2 (U. S. Highway 285), on a wide plain sloping gently to the east and west, approximately 0.5 mile west of a schoolhouse on the highway, 51.5 feet south of a fence corner, and south of the center line at a point where the road turns north. To reach from Ramon post office, go north 0.5 mile on State Highway 2 to a schoolhouse, turn west through the schoolyard and pass through a gate at the northwest corner, follow road west 0.5 mile to a fence corner where the road turns north, turn south and go 50 feet to station site, south of a point where a General Land Office ¼ section post is supposed to have been located, but was found lying on ground. The station, underground, azimuth and reference marks are standard disks set in concerete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 21 feet north of a fence corner, 2 feet west of the fence, and 72.40 feet from station in azimuth 180°35′, and No. 2 is 25 feet south of center line of road, and 74.90 feet from station in azimuth 269°34′. The azimuth mark is 12 feet west of fence, approximately 600 feet south of fence corner, and 0.4 mile from station in azimuth 325°48′00″.

Plane coordinates: (E), x=317,897.47 feet; y=1,176,469.91 feet; the grid azimuth to the azimuth mark=326°08′20″.* (C), x=897,221.33 feet; y=1,178,483.73 feet; the grid azimuth to the azimuth mark=325°03′38″.*

Iden (Guadalupe County, W. R. Porter, 1934).—The station is 5 miles air line southeast of Vaughn, about 100 yards northwest of Iden maintenance station, 53 feet southeast of the center line of U. S. Highway 60, and 31 feet northeast of the northeast right-of-way fence of the Atchison, Topeka & Santa Fe Railway. To reach from the Atchison, Topeka & Santa Fe Railway station in East Vaughn, go east 5.6 miles on U. S. Highway 60 to the Iden maintenance station on the Santa Fe Railway. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 51 feet northeast of the center line of U. S. Highway 60, and 103.75 feet (slope) from station in azimuth 233°17′, and No. 2 is 50 feet southwest of the center line of U. S. Highway 60 and 23.750 meters (77.92 feet) (slope) from station in azimuth 143°43′. The azimuth mark is on the second rise from station, 44 feet northeast of the center line of U. S. Highway 60, and about 0.5 mile (speedometer) from station in azimuth 134°00′15″. *Bench mark S 4* may also be used as an azimuth mark.

Plane coordinates: (E), x=259,769.47 feet; y=1,293,187.95 feet; the grid azimuth to the azimuth mark=134°27′24″.* (C), x=836,892.53 feet; y=1,294,093.34 feet; the grid azimuth to the azimuth mark=133°22′10″.*

Bench mark S 4 (Guadalupe County, W. R. Porter, 1934).—Five miles air line southeast of Vaughn, 97 feet southwest of the center line of the main track, 3 feet southwest of the right-of-way fence of the Atchison, Topeka & Santa Fe Railway, on a line from triangulation station *Iden* to the west edge of the Iden maintenance station. The mark is a brass-capped iron pipe 3 inches in diameter. Station *Iden* may be used as an azimuth mark. Elevation: 1,772.027 meters (5,813.73 feet).

Plane coordinates:[1] (E), x=259,939 feet; y=1,292,631 feet. (C), x=837,072 feet; y=1,293,540 feet.

Vaughn (Guadalupe County, W. R. Porter, 1934).—The station is 37 yards west of the Vaughn city limit sign and 39.0 feet south of the center line of U. S. Highway 60. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 40 feet south of the center line of the highway, and 22.71 meters (74.5 feet) from station in azimuth 89°56′, and No. 2 is 30 feet north of the center line of the highway, and 24.10 meters (79.1 feet) from station in azimuth 180°36′. The azimuth mark is 35 feet north-northwest of the highway, 178.4 feet southeast of

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

the south right-of-way fence of the Atchison, Topeka & Santa Fe Railway, and 0.4 mile from station in azimuth 79°41′08″. *T. 5 N., R. 16 E., sections 34 and 35* is east of station.

Plane coordinates: (E), x=233,235.80 feet; y=1,313,073.87 feet; the grid azimuth to the azimuth mark=80°11′20″.* (C), x=809,985.11 feet; y=1,313,472.59 feet; the grid azimuth to the azimuth mark=79°06′01″.*

T. 5 N., R. 16 E., sections 34 and 35, corner (Guadalupe County, W. R. Porter, 1934).—The station is just west of the city limit of Vaughn, 24.0 feet south of the center line of U. S. Highway 60, at the corner of secs. 34 and 35, T. 5 N., R. 16 E. The mark is a pipe set in concrete, capped with a bronze disk, and projects 1.5 feet above ground. Station *Vaughn* is west of station.

Plane coordinates:[1] (E), x=233,449 feet; y=1,313,083 feet. (C), x=810,198 feet; y=1,313,485 feet.

Vaughn, high school, chimney (Guadalupe County, W. R. Porter, 1934).—Plane coordinates: (E), x=237,772.16 feet; y=1,309,767.86 feet. (C), x=814,583.57 feet; y=1,310,253.29 feet.

Vaughn, water tank (Guadalupe County, W. R. Porter, 1934).—Plane coordinates: (E), x=239,832.23 feet; y=1,309,151.11 feet. (C), x=816,705.02 feet; y=1,309,676.71 feet.

Vaughn, Catholic Church, cross (Guadalupe County, W. R. Porter, 1934).—Plane coordinates:[1] (E), x=236,952 feet; y=1,311,391 feet. (C), x=813,733 feet; y=1,311,861 feet.

Torlupe (Torrance-Guadalupe Counties, W. R. Porter, 1934).—About 5 miles west of Vaughn, on a slight rise, on the same section line at a corner of the Torrance-Guadalupe county line, 20 feet north of an east-west section-line road. The station is marked by a General Land Office brass-capped iron pipe marker, projecting 9 inches above ground, and stamped "T. 5 N., R. 15 E., S. 35; S. 1, R. 15 E.: S. 6, R. 16 E.: C. C." the cap was center punched for the station mark. The reference marks are standard disks set in concrete according to note 11a. Reference mark No. 1 is 2 feet east of a north-south fence line, 49 feet south of the east-west section-line road, and 19.720 meters (64.70 feet) from station in azimuth 359°49′, and No. 2 is 16 feet north of the section-line road, 3 feet south of an east-west fence line, and 16.203 meters (53.16 feet) from station in azimuth 87°35′. A General Land Office capped iron pipe stamped "T. 5 N., R. 15 E., S. 35, S. 36," at the center of the section-line road, flush with ground, is ¼ mile from station in azimuth 270°40′06″.

Plane coordinates: (E), x=205,469.93 feet; y=1,313,631.37 feet; the grid azimuth to the azimuth mark=271°13′27″.* (C), x=782,213.64 feet; y=1,313,502.43 feet; the grid azimuth to the azimuth mark=270°08′08″.*

U. S. G. S. target (Torrance County, W. R. Porter, 1934).—Plane coordinates:[1] (E), x=159,370 feet; y=1,269,759 feet. (C), x=736,956 feet; y=1,268,766 feet.

Winkle (Guadalupe County, W. R. Porter, 1934).—About 13 miles northeast of Vaughn, 125 feet northwest of the center line of U. S. Highway 54 at a point where it passes over a high, gently sloping ridge. To reach from Vaughn, go east 1.0 mile on U. S. Highway 60, go northeast 12.2 miles on U. S. Highway 54, pass through a gate and follow the fence north 0.2 mile to top of ridge and the station. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 3 feet west of the right-of-way fence line, and 20.559 meters (67.45 feet) from station in azimuth 263°11′, and No. 2 is 3 feet west of the right-of-way fence line, and 14.735 meters (48.34 feet) from station in azimuth 338°01′. The azimuth mark is 42 feet east of the center line of the highway, and approximately ½ mile from station in azimuth 226°44′47″.

Plane coordinates: (E), x=287,492.85 feet; y=1,356,138.93 feet; the grid azimuth to the azimuth mark=227°08′58″.*

Encino (Torrance County, W. R. Porter, 1934; 1935).—The station is 6 miles air line northeast of Encino, on the highest point of a timbered mesa, 18 feet west of the center line of the road leading to the top of the mesa from Encino. To reach from the Bond Brothers Mercantile Company in Encino, go north 6.5 miles on the main road, which passes to the east of the school building, to top of grade and the station. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 94.0 feet west of the center line of the road, and 88.74 feet (slope)

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

from station in azimuth 68°26′, and No. 2 is 123 feet west of the center line of the road, and 128.73 feet from station in azimuth 134°31′. The azimuth mark is 14 feet east of the center line of the road, and 0.35 mile from station in azimuth 192°40′42″. Azimuth from station to an airway beacon is 154°13′02″.

Plane coordinates: (E), x=178,425.45 feet; y=1,355,969.87 feet; the grid azimuth to the azimuth mark=193°17′16″.* (C), x=754,369.47 feet; y=1,355,317.19 feet; the grid azimuth to the azimuth mark=192°11′46″.*

Los Angeles-Amarillo Airway, beacon No. 75 (San Miguel County, W. R. Porter, 1934).—On a 65-foot tower, 25 miles air line and 32 miles by road east-northeast of Moriarty, in sec. 12, T. 10 N., R. 12 E.

Plane coordinates: (C), x=686,840.97 feet; y=1,492,151.05 feet.

Los Angeles-Amarillo Airway, beacon No. 78 B (Guadalupe County, W. R. Porter, 1934).—On a 51-foot tower, 4 miles air line and 9 miles by road southeast of Dilia, in sec. 6, T. 10 N., R. 18 E.

Plane coordinates: (E), x=281,138.44 feet; y=1,497,916.33 feet.

Los Angeles-Amarillo Airway, beacon No. 81 A (Guadalupe County, W. R. Porter, 1934).—On a 51-foot tower, 8 miles air line and 12 miles by road northwest of Cuervo, in sec. 4, T. 10 N., R. 23 E.

Plane coordinates: (E), x=449,305.31 feet; y=1,502,025.49 feet.

Los Angeles-Amarillo Airway, beacon No. 81 B (Guadalupe County, W. R. Porter, 1934).—On a 20-foot tower, 5 miles air line and 8 miles by road north-northeast of Cuervo, in sec. 9, T. 10 N., R. 24 E.

Plane coordinates:[1] (E), x=474,741 feet; y=1,495,949 feet.

Los Angeles-Amarillo Airway, beacon No. 82 (Guadalupe County, W. R. Porter, 1934).—Plane coordinates:[1] (E), x=544,429 feet; y=1,503,895 feet.

PICACHO, N. MEX., TO SLATON, TEX., ARC

Principal points

Hondo (Chaves County, W. R. Porter, 1935).—About 16 miles west of Roswell, in pasture land on a high ridge, the highest ridge that is crossed by U. S. Highway 70, 35.6 feet north of the right-of-way fence on the north side of the highway, 53.95 feet northeast of right-of-way marker "755+00" in the above fence, and 99.52 feet northeast of right-of-way marker "754+47.6" in the above fence. To reach the station from the intersection of Main and Second Streets in Roswell, go west on Second Street (U. S. Highway 70) 12.0 miles to a concrete bridge on the highway. Continue west on the highway 1.5 miles to a large bridge on the highway, pass over bridge and continue on the highway 1.8 miles to the top of grade where the highway passes through a cut about 6 feet deep. The station is 12 yards north of the right-of-way fence on the north side of the road at this point. The station is marked with a standard disk set in a boulder according to note 5. The reference marks are standard disks set in boulders according to note 12c, No. 1 is 42.3 feet north of the above-mentioned right-of-way fence, and is 39.39 feet from station in azimuth 235°46′, and No. 2 is 48.0 feet north of right-of-way marker "755+00", and is 48.04 feet from the station in azimuth 135°11′. The azimuth mark, a standard disk set in concrete according to note 11a, is 3 feet north of the right-of-way fence on the north side of U. S. Highway 70, and is at a point 2 feet north of right-of-way marker "656+50", and it is 1.8 miles from the station in azimuth 76°12′23″.

Plane coordinates: (E), x=359,406.53 feet; y=864,495.74 feet; grid azimuth to azimuth mark=76°27′35″.* (C), x=944,537.39 feet; y=867,285.24 feet; grid azimuth to azimuth mark=75°24′18″.*

Corn (Chaves County, W. R. Porter, 1935).—About 14 miles west-northwest of Roswell, on the top of a stony hill about 200 yards north of the Roswell-Pine Lodge Road, about 1.4 miles west of the ranch buildings of Mrs. George Corn. To reach from Chaves County Courthouse in Roswell go north 3.3 miles on U. S. Highway 70, to a point where the highway turns northeast, continue straight ahead 0.4 mile, turn left (west) on the Pine Lodge Road and follow the road westerly 10.5 miles to the George Corn Ranch on the north side of the road, continue westerly on the main road up the canyon 1.5 miles to the top of the divide, turn off the road to the right and drive up the slope north-

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

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northeast about 200 yards to the top of the hill and the station site. The surface and underground marks are standard disks set in concrete according to notes 1a and 7a. The reference marks are standard disks set in bedrock according to note 12b. No. 1 is 81.00 feet from the station in azimuth 318°18′, and No. 2 is 123.23 feet from the station in azimuth 30°17′. The azimuth mark, a standard disk set in concrete according to note 11a, is 31 feet west of the center of the road, about 50 yards southeast of the top of the hill, and approximately 0.4 mile from the station in azimuth 126°15′11″.

Plane coordinates: (E), x=382,170.23 feet; y=905,180.55 feet; grid azimuth to azimuth mark=126°27′59″.* (C), x=966,551.92 feet; y=908,391.36 feet; grid azimuth to azimuth mark=125°24′31″.*

Sunken (Chaves County, W. R. Porter, 1935).—About 6 miles west-southwest of Roswell and 2 miles south of U. S. Highway 70, on the highest point of a stony east-and-west ridge which is the second one south of the highway. To reach from the intersection of Main Street and East Second Street in Roswell, go west on East Second Street (U. S. Highway 70) 5.4 miles to a pipe gate in the right-of-way fence on the south side of the road (highway marker 90+00 is at this point), turn left from the highway and pass through the gate, go southwest on graded road (old highway) 0.2 mile to a fork, take the left fork and go southwest on plain track road 0.4 mile to a fork, take the left fork, straight ahead, and go 1.0 mile to a fork at east side of windmill and tank, take the left fork and follow dim road south across draw 0.2 mile to a fork, take the right fork and go west up draw 0.1 mile to a fork, take the right fork (a less-traveled road), and go 0.1 mile to a fork, take the right fork and follow dim road 0.6 mile to top of grade, turn left and follow main road east 0.1 mile, leave road, turn right and go south across country 0.1 mile to top of hill and the station. The surface mark is a standard disk set in concrete according to note 1a. The underground mark is a standard disk in rock according to note 8a. The reference and azimuth marks are standard disks set in rock according to note 12a. Reference mark No. 1 is 55.21 feet from the station in azimuth 233°05′, and No. 2 is 106.31 feet from the station in azimuth 310°58′. The azimuth mark is 18 yards west of the center line of a dim track road, 10 yards north of the north edge of a small sink, 30 yards southeast of the southeast edge of another sink, on a saddle connecting the station ridge with a broad and high ridge to the south, and is 500 yards from the station in azimuth 90°06′57″.

Plane coordinates: (E), x=407,521.49 feet; y=859,763.78 feet; grid azimuth to azimuth mark=90°16′57″.*

Klyng (Chaves County, W. R. Porter, 1935).—About 9 miles northwest of Roswell in the W½ sec. 32, T. 9 S., R. 23 E., on the top of a short, rocky ridge about 2 miles west of the Klyng Ranch. There is a concrete cistern about 0.3 mile southeast of the station. To reach from the Chaves County Courthouse in Roswell go north 3.3 miles on U. S. Highway 70, at the point where the highway turns to the northeast, continue straight ahead 0.4 mile, turn left (west) on the Pine Lodge Road and go 5.7 miles, cross a cattle guard and continue 0.5 mile, turn off the road to the right and go northerly on a trail 1.3 miles to the ranch buildings of Mrs. C. P. Klyng, pass to the west along the south side of the buildings and corrals and pick up a trail leading westerly up the valley, go 0.7 mile, take the right fork and go 0.7 mile, pass to the north of a concrete cistern, turn off the trail to the right and drive northwest up the slope to the top of the most prominent hill and the station. The surface and underground marks are standard disks set in concrete according to notes 1a and 7a. The reference marks are standard disks set in bedrock according to note 12b, No. 1 is 48.59 feet (slope distance) from the station in azimuth 264°39′, and No. 2 is 41.88 feet (slope distance) from the station in azimuth 98°10′. The azimuth mark, a standard disk set in concrete according to note 11a, is 63 feet northwest of the northwest corner of the concrete cistern and is approximately 0.3 mile from the station in azimuth 321°13′20″.

Plane coordinates: (E) x=403,408.84 feet; y=905,734.75 feet; grid azimuth to azimuth mark=321°23′50″.*

Roswell (Chaves County, W. R. Porter, 1935).—About 1.1 miles north of Chaves County Courthouse, in the concrete coping on the Cahoon Armory of the New Mexico Military Institution, 1.34 feet east of the southwest turret, and 2.65 feet west of a projection in the coping. To reach from Roswell, go north on

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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the street west of the courthouse for 1.1 miles, then west to the Cahoon Armory of the Military Institution, which is the second building and is the northwestern-most of the Institution buildings. The superintendent of the grounds will direct a party to the roof of the building and the station. The station, reference and azimuth marks are standard disks set in concrete according to notes 1c, 11c, and 11a. Reference mark No. 1 is in the east coping of the Armory and is 19.41 feet from the station in azimuth 259°02′, and No. 2 is in the north coping of the Armory, and is 22.57 feet from the station in azimuth 179°18′. The azimuth mark is 1 foot west of a corral fence, 21.8 feet south of a northwest corral fence corner, 54 feet south of the center line of a graded road, and is 0.25 mile from station in azimuth 184°35′33″.

Plane coordinates: (E), x=441,509.26 feet; y=877,440.52 feet; grid azimuth to azimuth mark=184°41′53″.*

Buck (Chaves County, W. R. Porter, 1935).—About 8 miles air line north of Roswell, located on the highest point of smooth hill, which is part of a long ridge extending north and south, ¾ mile west of State Highway No. 2, ¼ mile east of a lone windmill. To reach from courthouse in Roswell drive north 3.3 miles on U. S. Highway 70 to point where paved highway turns northeast, continue north on graded road 5.7 miles to a large metal sign on the left side of the road advertising "Buck's Place" (the azimuth mark is at this point), leave graded road here and drive west across country 0.7 mile to the top of the first high, smooth hill and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 28.735 meters from the station in azimuth 359°29′, and No. 2 is 24.426 meters from the station in azimuth 85°40′. The azimuth mark is 40 feet west of the center line of State Highway 2, 5 feet north of a large metal sign advertising Buck's Place, and is 0.7 mile from the station in azimuth 288°14′48″.

Plane coordinates: (E), x=440,033.95 feet; y=920,234.76 feet; grid azimuth to azimuth mark=288°21′20″.*

Melena (Chaves County, W. R. Porter, 1935).—About 10 miles north-northeast of Roswell, about 2 miles west-southwest of Melena Siding, on the southern part of a nearly barren table land. The mesa drops off to the south about 100 yards south of the station and a long point of the mesa runs out about ¼ mile east-southeast of the station, which is about 0.2 mile south of a well defined trail crossing the mesa and is about 80 yards southwest of a dim trail. To reach from Melena Siding which is about 13.5 miles northeast of Roswell on U. S. Highway 70, go south on the highway about 200 yards, turn off the highway to the west, cross a cattle guard, take the left fork westerly 1.0 mile to a crossroads, continue straight ahead (westerly) 0.5 mile (at this point a trail comes in from the northeast), continue west-southwesterly on the trail 0.2 mile (the azimuth mark is at this point), take a dim left fork southwesterly 0.35 mile up the slope to the top, at the point where the trail turns to the southeast leave the trail and go about 80 yards southwest to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 125.27 feet from the station in azimuth 135°17′, and No. 2 is 112.36 feet from the station in azimuth 57°29′. The azimuth mark is 9.5 feet north of the center of the well-defined trail, 77 feet west of a dim trail forks and is approximately 0.4 mile from the station in azimuth 228°25′42″.

Plane coordinates: (E), x=469,734.28 feet; y=924,363.37 feet; grid azimuth to azimuth mark=228°28′59″.*

Gopher (Chaves County, W. R. Porter, 1935).—About 10 miles east of Roswell, in pasture land on the highest point of the second ridge east of the river. To reach from the intersection of Main and East Second Streets go east on East Second Street (U. S. Highway 380) 8.9 miles to the bridge across the Pecos River, cross bridge and continue on highway in a general easterly direction 2.3 miles to a track road on the left, turn left off the highway and go north up grade on track road 0.2 mile to a fork, take the right fork and follow main road northeast 0.5 mile to a fork, take the left fork and follow the main road north 0.6 mile to a fork, continue north on right fork 0.6 mile to a gate in an east-and-west fence, pass through gate and continue north 0.3 mile to a fork, take the left fork straight ahead and continue north 1.9 miles to a lone, southeast fence corner on the west side of the road. The azimuth mark is in the east-west

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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fence. Pass through wire gate in the east-west fence and go northwest on track road 0.1 mile and then north across country 0.1 mile to high point of pasture and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 95.52 feet from the station in azimuth 246°17′, and No. 2 is 79.94 feet from the station in azimuth 358°01′. The azimuth mark is at a point 90 feet west of a southeast fence corner, and 0.2 mile from the station in azimuth 335°37′46″.

Plane coordinates: (E), x=495,701.29 feet; y=882,476.45 feet; grid azimuth to azimuth mark=335°38′14″.*

Campbell (Chaves County, W. R. Porter, 1935).—About 3 miles west-southwest of the Campbell railroad siding and ranch buildings 2½ miles south of the new Acme Post Office and High Lonesome Service Station which are on U. S. Highway 70 and are visible from the station, ¼ mile south of the Santa Fe Railroad tracks, located on the highest point of a broad pasture ridge of the Campbell Ranch. The ground slopes down to the north, east, and west, but runs out nearly level for about 1 mile to the southeast. The Campbell ranch buildings bear 53° magnetic; and the new Acme Post Office and High Lonesome Service Station (combined) bear 355° magnetic from the station. To reach from the courthouse in Roswell, drive north and northeasterly 24.7 miles on U. S. Highway to the new Acme Post Office and High Lonesome Service Station (combined), leave U. S. Highway 70 and drive south 2.1 miles on a plain road along the west side of a fence and a telephone line, keep the left fork at 1.7 miles straight ahead along the fence and the telephone line (do not take the road starting out on the east side of the fence which goes southeasterly to the Campbell railroad siding), at a T-fence intersection on the north side of the railroad tracks turn right and keep close to the tracks westerly for 1.0 mile on the main track road; turn left (south) off the main road, cross the railroad tracks 50 yards west of railroad trestle No. 85A, pass through two pipe gates, drive southeasterly up hill on the only road 0.2 mile to the head of a draw, leave the track road and drive east across county 0.3 mile to the highest point of the ridge and the station. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 115.52 feet from the station in azimuth 37°44′, and No. 2 is 122.06 feet from the station in azimuth 133°42′. The azimuth mark, a standard disk set in rock according to note 12a, is about 0.2 mile northwest of the railroad tracks on the south edge of a rock ledge, and is approximately ½ mile from the station in azimuth 144°04′48″.

Plane coordinates: (E), x=526,472.93 feet; y=941,377.57 feet; grid azimuth to azimuth mark=144°01′55″.*

Rice (Chaves County, W. R. Porter, 1935).—The station is 18 miles air line east-northeast of Roswell, located on the highest point of the ridge or plateau of pasture land which is owned by Ray Rice, of Roswell, and which extends approximately east and west, 4.5 miles north of U. S. Highway 380 and 8 miles northeast of the old Comanche Store. The south and southwest sides of the plateau drop off abruptly while the north and east slopes are gradual. Rice's windmill at the foot of the breaks lies about one mile west-southwest of the station. To reach from Roswell, drive east 15.7 miles on U. S. Highway 380 to the Comanche Store and filling station, continue on the highway 3 miles to a ranch crossroads at a corrugated-iron culvert and an upright piece of iron, leave the highway and drive north on a plain track road 1.4 miles to forks, take right fork and drive toward windmill visible at foot of breaks approximately two miles, drive from windmill north into canyon and pick way up canyon, keeping on right side of it, to the top, turn east at top of mesa and drive 0.3 mile to the highest point and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 99.52 feet from the station in azimuth 347°48′, and No. 2 is 102.46 feet from the station in azimuth 79°41′. The azimuth mark is 10 yards north of the edge of the breaks and 0.4 mile from the station in azimuth 0°23′38″.

Plane coordinates: (E), x=532,176.55 feet; y=895,690.52 feet; grid azimuth to azimuth mark=0°20′08″.*

Lera (Chaves County, W. R. Porter, 1935).—About 3½ miles west of Caprock Post Office, 2.0 miles south of U. S. Highway 380, 0.6 mile south of two

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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windmills, 0.4 mile east of a graded road, 15 feet west and 10 feet east of ranch roads, and 6 inches west of a fence line. To reach from Caprock Post Office go west on the highway for 2.4 miles to a point which is on the down grade through the Mescalero breaks, leave the highway 30 yards east of a windmill on the north side of the road, take a graded road up grade, south, for 1.3 miles passing on the east side of a stone quarry at 0.5 mile, cross a wooden cattle guard and go south-southwest on the same graded road for 0.7 mile (there is a G. L. O. pipe a few yards east of this cattle guard, marking T. 10 and 11 S., Rs. 31 and 32 E.), leave the graded road, turn left, go east on a track road 0.25 mile to a wire gate with iron pipes 200 yards south-southwest of twin windmills, turn right and go south on a dim track road 0.5 mile along the west side of a fence line to the station. The surface, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is one foot west of a fence line and 131.14 feet from the station in azimuth 0°08′, and No. 2 is 1 foot west of a fence line and 88.62 feet from the station in azimuth 179°53′. Bench mark J 147 (azimuth mark) set in concrete, is 58 feet east of the center line of a bladed road and 0.5 mile from the station in azimuth 154°13′11″.

Plane coordinates: (E), x=673,214.03 feet; y=866,252.23 feet; grid azimuth to Bench mark J 147=153°54′27″.*

Roberts (Lea County, W. R. Porter, 1935).—The station is 29 miles air line northwest of Tatum, probably sec. 10, T. 9 S., R. 32 E., located in a pasture on the highest ground in the vicinity, one mile west-northwest of twin windmills and earth tank, approximately four miles west of the Hood Ranch house, and on land owned by Mrs. Roberts. To reach from Tatum, drive north on State Highway 18 for 18.1 miles to the Crossroads Post Office, leave highway here, and go west on main-traveled road about 14½ miles to Hood Ranch house and windmills, continue west on main road for 3.2 miles to twin windmills, leave road and drive across country for 1.0 mile to highest point in pasture and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 91.40 feet from the station in azimuth 319°32′, and No. 2 is 84.20 feet from the station in azimuth 57°47′. The azimuth mark is 2 feet west of a 3-foot rock cairn, and is 0.5 mile from the station in azimuth 209°11′30″.

Plane coordinates: (E), x=708,468.96 feet; y=929,806.71 feet; grid azimuth to azimuth mark=208°48′48″.*

Caprock (Lea County, W. R. Porter, 1935).—About 4 miles east-northeast of Caprock, on pasture land on the highest ground in the vicinity, about 0.2 mile northwest of a windmill, tank, and some trees, about 1½ miles north of U. S. Highway 380. To reach from the Caprock Post Office go east on U. S. Highway 380 for 0.7 mile, leave the highway and go to the left (easterly) on a trail 1.3 miles, cross a cattle guard and continue on the trail 1.9 miles, cross a cattle guard, go easterly on the trail 1.4 miles to a windmill, tank, and trees, leave the trail northwest of the windmill, go across country 0.2 mile northwest to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 156.86 feet from the station in azimuth 215°49′, and No. 2 is 115.69 feet from the station in azimuth 301°02′. The azimuth mark is 14 feet south of the trail and 1.1 miles from the station in azimuth 63°15′03″.

Plane coordinates: (E), x=712,903.64 feet; y=880,046.05 feet; grid azimuth to azimuth mark=62°51′59″.*

Tankersley (Lea County, W. R. Porter, 1935).—About 9 miles west of the Crossroads Post Office, in sec. 32, T. 9 S., R. 34 E., on top of a small, prominent sand dune on school land about 1 mile south-southwest of the Tankersley Ranch, on the highest ground in the vicinity. To reach from the Crossroads Post Office, which is 18 miles north of Tatum, go west 7.7 miles, pass through a wire gate, follow the trail southwest 0.1 mile to the Tankersley Ranch, from the buildings go southwesterly along the north side of the fence on a trail to the fence corner, thence south along the west side of the fence 0.7 mile to the southwest fence corner (the azimuth mark is at this point), from the fence corner follow a dim trail southerly and southwesterly 0.7 mile to the station on the top of the most westerly of the prominent dunes as seen from the fence corner. The station and reference marks are standard disks set in

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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iron pipes. Reference mark No. 1 is 86.86 feet (slope distance) from the station in azimuth 275°45′, and No. 2 is 90.74 feet (slope distance) from the station in azimuth 47°44′. The azimuth mark, a standard disk set in concrete according to note 11a, is 4½ feet east of a southwest fence corner, 1½ feet south of the fence and is approximately 0.6 mile from the station in azimuth 196°06′51″.

Plane coordinates: (E), x=758,918.73 feet; y=907,967.05 feet; grid azimuth to azimuth mark=195°38′44″.*

Lane (Lea County, W. R. Porter, 1935; 1936).—About 12 miles northwest of Tatum, 6 miles north of U. S. Highway 380, 3 miles north-northeast of the Robert Alley Ranch, on a prominent ridge that extends in a general east-and-west direction, approximately in sec. 16, T. 11 S., R. 34 E., on land owned by the J. J. Lane Ranch. To reach from the intersection of U. S. Highway 380 and State Highway 18, in Tatum, go west and north 11.2 miles on U. S. Highway 380 to a gate in the right-of-way fence on the right side of the road (at this point there is a gate with tall posts and sign "A. D. Jones Ranch" on the left side of the road), leave highway, turn right, pass through gate, go north on graded road 3.6 miles to a gate about 100 yards southwest of the Robert Alley ranch house, pass through gate and go north 150 yards across yard through another gate, take right fork, go in a general northerly direction 0.4 mile to a fork, take the left fork and continue in a general northerly direction 1.9 miles on main road to the azimuth mark on the right side of the road, continue on road 0.3 mile, then leave road, turn left, go northwest across country up steep slope 0.3 mile to the top of the spur ridge and the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 156.40 feet from the station in azimuth 218°50′, and No. 2 is 158.06 feet from the station in azimuth 312°40′. The azimuth mark is 9 feet east of the center line of a north-and-south track road and 0.5 mile from the station in azimuth 9°18′05″.

Plane coordinates: (E), x=757,365.15 feet; y=876,101.45 feet; grid azimuth to azimuth mark=8°50′13″.*

Royal (Lea County, W. R. Porter, 1935).—About 12 miles north of Tatum, at the east base of sand dune about 10 feet high, 150 yards west of State Highway 18, approximately in sec. 23, T. 10 S., R. 35 E. To reach from the junction of U. S. Highways 380 and 62 and State Highway 18, go north on State Highway 18 for 12.6 miles to the top of the grade. The station is about 150 yards west of this point at the east base of the highest sand dune. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 6a, 7a, 13a, and 11a. Reference mark No. 1 is 108.68 feet from the station in azimuth 254°14′, and No. 2 is on a low sand ridge running north and south and 67.64 feet (slope distance) from the station in azimuth 128°55′. The azimuth mark is 37 feet east of the center line of State Highway 18, 35 feet west of the east right-of-way fence line, and 0.3 mile from the station in azimuth 346°26′38″.

Plane coordinates: (E), x=805,566.19 feet; y=887,766.90 feet; grid azimuth to azimuth mark=345°53′30″.*

Blank (Lea County, W. R. Porter, 1935).—About 3 miles north of Crossroads Post Office, at the top of a grade 0.9 mile north of a cattle guard and 85 feet east of the center line of State Highway 18, approximately in sec. 14, T. 10 S., R. 35 E. To reach from Crossroads Post Office, which is 18.2 miles by road north of Tatum, go north on State Highway 18 for 2.9 miles, to the top of the grade and the station. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 151.86 feet from the station in azimuth 283°22′, and No. 2 is 40 feet east of the center line of the highway and 202.48 feet (slope distance) from the station in azimuth 166°56′. Bench mark Q 95 (azimuth mark), a standard bench mark disk set in concrete, is 58 feet east of the center line of the highway and 0.9 mile from the station in azimuth 0°17′02″.

Plane coordinates: (E), x=802,972.75 feet; y=930,394.72 feet; grid azimuth to bench mark Q 95=359°44′03″.*

Sawyer (Lea County, W. R. Porter, 1935).—About 20 miles north-northeast of Tatum in sec. 24, T. 9 S., R. 36 E., in sandy pasture land on high ground about 2 miles northeast of the Sawyer ranch and 0.1 mile west of a fence line. To

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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reach from the Crossroads Post Office, which is about 18 miles north of Tatum, go east on the main road 7.3 miles to the Sawyer ranch, continue easterly on a trail 1.1 mile, leave the trail just before it crosses a cattle guard, go north along the west side of the fence 1.8 miles to a T-fence corner (the azimuth mark is at this point), continue northerly along the west side of the fence 0.25 mile, leave the fence line and go west 0.1 mile to the top of the sand ridge and the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 93.96 feet from the station in azimuth 344°49′, and No. 2 is 65.15 feet from the station in azimuth 82°07′. The azimuth mark is 35 feet north of a T-fence corner, 2 feet west of the fence and approximately 0.3 mile from the station in azimuth 335°39′27″.

Plane coordinates: (E), x=849,766.60 feet; y=917,456.83 feet; grid azimuth to azimuth mark=335°01′25″.*

Warren (Lea County, W. R. Porter, 1935).—The station is about 14 miles air line northeast of Tatum, in sec. 30, T. 10 S., R. 37 E., or sec. 25, T. 10 S., R. 36 E., located in open pasture land on a low rise, 0.4 mile east-southeast of windmill, trees, and tanks, 2.5 miles east-northeast of a small, deserted ranch, and 0.2 mile south of a track road. To reach from Tatum, drive north 18.1 miles on State Highway 18 to Crossroads Post Office, leave highway here, go east through gate on a well-worn track road 9.9 miles to road forks just west of twin windmills, leave road and drive easterly across country 0.3 mile, pass just north of the mills to the north-south track road, turn south on track road, go south-southeasterly 3.9 miles to forks, take right fork westerly and southwesterly 3.2 miles to a point 0.4 mile eastward of mill and trees, leave track road and drive southerly across country 0.2 mile to top of rise and the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 111.00 feet from the station in azimuth 306°06′, and No. 2 is 7 feet south of the center line of a track road and 142.17 feet from the station in azimuth 71°11′. The azimuth mark is 7 feet south of a track road and is approximately 0.7 mile from station in azimuth 245°32′32″.

Plane coordinates: (E), x=844,784.31 feet; y=885,160.86 feet; grid azimuth to azimuth mark=244°55′10″.*

Cam (Lea County, W. R. Porter, 1934; 1935).—About 13 miles south-southwest of Bledsoe, Texas, 11 miles north of Bronco, Texas, 1½ miles west of the north-and-south graded road along the Texas-New Mexico State line, on the highest point of a hill in sandy pasture land, at a point one mile west-southwest of the ranch house occupied by Al Grice, in sec. 29, T. 10 S., R. 38 E. To reach from the post office in Bledsoe, go west on the main road 1.8 miles, pass over cattle guard, turn left (south) on graded road along the Texas-New Mexico State line 13.8 miles to a track cross road, turn right from main road, through a gate, go west on track road 0.5 mile to Al Grice's ranch house and windmill in a small grove of trees (the azimuth mark is north-northwest of this house a distance of 163.3 feet), go southwest from the house on dim track road 0.5 mile, pass through a gate, turn right, and go north along the west side of north-and-south fence 100 yards, turn left leaving the fence, and go west across country 0.5 mile to high point of ridge and the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, 11a, and 13a. Reference mark No. 1 is 154.4 feet from the station in azimuth 267°17′, and No. 2 is 153.6 feet from the station in azimuth 153°01′. The azimuth mark, a standard, bronze, pipe-cap disk of the General Land Office, stamped "T. 10 S., secs. 20, 21, 29, 28, 1911," is 11 feet west of a north-and-south fence, at a point 40 yards northwest of the northwest corner of Al Grice's ranch house, and 1.1 miles from the station in azimuth 253°57′20″.

Plane coordinates: (E), x=882,706.40 feet; y=883,101.67 feet; grid azimuth to azimuth mark =253°15′52″.*

Texmex (Lea County, W. R. Porter, 1934; 1935).—About 6½ miles south-southwest of Bledsoe, Texas, 0.3 mile west of the Texas-New Mexico Boundary Line, on the highest ground in the immediate vicinity, in sec. 16, T. 9 S., R. 38 E. To reach from the post office in Bledsoe, go west on the main, graded road 1.8 miles to the intersection of road with the Texas-New Mexico State Line, pass over the cattle guard and go left (south) on the State-line road for 6.2 miles, leave this graded road and drive west across country 0.3 mile to the highest part of the ridge and the station. The surface, underground, reference and azimuth

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1 foot north of an east-and-west fence line, and is 279.86 feet from the station in azimuth 324°33′, and No. 2 is 1 foot north of an east-and-west fence line and 273.95 feet from the station in azimuth 33°38′. The azimuth mark is 32 feet west of the center line of the boundary-line road, 0.6 mile north of a ranch house and windmill, 0.2 mile north of a lone, northeast fence corner and 0.35 mile from the station in azimuth 235°08′13″. A General Land Office mark, bronze cap on an iron pipe, is 32½ feet east of a lone, northeast fence corner, 40 feet west of the center line of the Texas-New Mexico State-line road. It is stamped T. 9 S., R. 38 E., and is 0.3 mile from the station in azimuth 278°02′32″.

Plane coordinates: (E), x=888,531.18 feet; y=921,838.72 feet; grid azimuth to azimuth mark=234°25′57″.*

Field (Cochran County, Tex., W. R. Porter, 1934; 1935).—About 14 miles south-southeast of Bledsoe, Texas, at the southern end of a prominent sand ridge running north and south, which is the highest point in the vicinity, in sec. 37, Harrison and Brown survey, 0.2 mile west-northwest of a lone windmill and 0.6 mile north of an east-and-west fence. To reach from Bledsoe, Texas, go west from the post office 1.8 miles, turn south on the Texas-New Mexico State-line road and go 13.5 miles (this point is about 10 miles north of Bronco and ½ mile east of Mr. Al Grice's ranch house with windmill and small grove of trees), leave the State-line road, turn left opposite a wire gate, drive easterly on a plain track road for 0.6 mile, follow along the right fork easterly and southerly 1.6 miles, pass through a board gate, go easterly (taking care to avoid blown sand) 0.4 mile to deserted ranch buildings and a windmill, pass to the south of the house and through a wire gate between house and windmill, then east through a wooden gate at the northeast corner of a barn, continue east on a track road for 1.7 miles, pass through a wire gate, continue east 0.5 mile, leave the main tracks, continue straight ahead for 50 yards to a crossroad, continue on a dim track road leading northeast for 0.65 mile, through a wire gate 0.2 mile east of a northwest fence corner, turn right (east) along the north side of a fence, go for 4.55 miles, to a T-fence intersection (the stem south), leave the track road and the fence, turn left (north) and drive across country 0.5 mile to a lone windmill, then northwest 0.2 mile to the top of the ridge, turn left, go 0.1 mile to the end of the ridge and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 6a, 7a, 13a, and 11a. Reference mark No. 1 has been destroyed, and No. 2 is 82.03 feet from the station in azimuth 355°41′. The azimuth mark is 0.05 mile west of a wire gate in an east-and-west fence, 1½ feet north of the fence and is 0.7 mile from the station in azimuth 342°20′46″.

Plane coordinates: (E), x=941,821.52 feet; y=885,203.82 feet; grid azimuth to azimuth mark=341°32′54″.*

Yoakum (Yoakum County, Tex., W. R. Porter, 1934; 1938).—About 6 miles northeast of Bronco, 4 miles north of U. S. Highway 62, in a group of sand hills which are slightly lower than a similar group about 0.3 mile west of the station, on a high and sandy ridge that extends in a general east-and-west direction, in sec. 222, Block D of John H. Gibson Survey. To reach from the store and post office in Bronco, go south 1.0 mile on U. S. Highway 62 to a point where the highway turns left (east), continue on highway easterly 6.0 miles to a point where there are gates between tall posts in the right-of-way fences on both sides of the highway, turn left off highway, pass through gate, go north on track road 4.0 miles to a southeast fence corner on the west side of the road (the azimuth mark is at this corner), leave road, turn left, go west across country along the south side of east-and-west fence 0.8 mile, leave fence, turn left, go south across country 150 yards to the station on the west side of a large blowout hole. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 6a, 7a, and 13a. Reference mark No. 1 is 107.45 feet from the station in azimuth 8°38′, and No. 2 is 123.64 feet from the station in azimuth 96°04′. The azimuth mark is in an east-and-west fence at a point 8 feet west of a southeast fence corner, 50 feet west of the center line of a north-and-south track road and 0.8 mile from the station in azimuth 265°25′10″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=916,839.53 feet; y=838,642.77 feet; grid azimuth to azimuth mark =264°40′14″.*

Beall (Yoakum County, Tex., W. R. Porter, 1934; 1938).—The station is located on the top of the highest part of a sand hill, 9 miles air line north-northeast of Bronco Post Office, 2.5 miles east of the Texas-New Mexico State line, 2 miles north of a ranch known as the "Old Beall Place." To reach from Bronco post office, drive north on the State-line road for 6.5 miles to an intersection of a well-worn track road leading easterly, follow the track road leading easterly 0.5 mile to forks, take left fork, follow trail easterly 1.7 miles to ranch buildings known as the "Old Beall Place," turn north at the wire gate of the ranch, follow the trail 2.0 miles to top of highest ground on sand hill and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 97.96 feet from the station in azimuth 295°38′, and No. 2 is 102.35 feet from the station in azimuth 54°26′. The azimuth mark is 0.1 mile northwest of a windmill, 0.2 mile southeast of ranch buildings, on the top of a small knoll and 1.8 miles from the station in azimuth 4°02′23″.

Plane coordinates: (E), x=902,164.64 feet; y=864,223.01 feet; grid azimuth to azimuth mark=3°18′55″.*

Supplementary points

Fairbanks (Chaves County, W. R. Porter, 1935).—The station is 3 miles air line southeast of Roswell, 100 yards west-northwest of Fairbanks Service Station, 60 feet southwest of center of State Highway 2, 42 feet northeast of northeast rail of Santa Fe track, 5½ feet west of corner post in a fence corner on the A. T. & S. F. R. R. right-of-way. To reach from Roswell, go 3.2 miles south and southeast on State Highway 2 from its junction with U. S. Highway 380 to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 56 feet southwest of State Highway 2, 48 feet northeast of northeast rail of Santa Fe track and 85.93 feet from the station in azimuth 324°28′, and No. 2 is 32 feet northeast of center of State Highway 2 and 121.65 feet from the station in azimuth 195°24′. The azimuth mark is 38 feet northeast of center of State Highway 2, 22 feet northwest of corner post and 0.3 mile from the station in azimuth 151°25′13″.

Plane coordinates: (E), x=453,270.93 feet; y=856,450.69 feet; grid azimuth to azimuth mark=151°30′16″.*

Roswell, red brick church, spire (Chaves County, W. R. Porter, 1935).—Plane coordinates: (E), x=442,420.47 feet; y=867,802.15 feet.

Roswell, courthouse, dome (Chaves County, W. R. Porter, 1935).—Plane coordinates: (E), x=442,606.86 feet; y=871,990.11 feet.

Roswell, Military Institute, flagpole (Chaves County, W. R. Porter, 1935).—Plane coordinates: (E), x=441,854.21 feet, y=876,635.20 feet.

Roswell, Federal Building, flagpole (Chaves County, W. R. Porter, 1935).—Plane coordinates:[1] (E), x=441,924 feet; y=871,707 feet.

Walker (Chaves County, W. R. Porter, 1935).—The station is 7 miles air line north-northeast of Roswell, 1.4 miles south of yellow plaster house of W. C. Walker, 0.4 mile west of the A. T. & S. F. R. R. tracks, on a low rise 66 feet west of the center of U. S. Highway 70, on the north side of a wide draw and 4 feet east of fence. To reach from Roswell, drive north and east from the courthouse 10.6 miles on U. S. Highway 70. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 36½ feet east of the center of the highway and 102.54 feet from the station in azimuth 301°34′, and No. 2 is 59 feet west of the center of the highway, 77 feet north of fence corner, 1 foot east of fence, and 135.72 feet from the station in azimuth 34°52′. The azimuth mark is 74 feet west of the center of the highway, 2 feet east of fence and 0.5 mile from the station in azimuth 213°37′38″.

Plane coordinates: (E), x=469,261.62 feet; y=910,827.12 feet; grid azimuth to azimuth mark=213°40′58″.*

Comanche (Chaves County, W. R. Porter, 1935).—The station is 18 miles air line east of Roswell, 3½ miles east of Comanche store and the concrete bridge

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

over Comanche Draw, at the top of the first rise in the highway going east from Comanche store. To reach from Comanche store, drive 3.7 miles east on U. S. Highway 380. The station is 41 feet south of the center of highway and about 50 yards southwest of a State highway marker. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 174 feet south of the center of highway and 132.78 feet from the station in azimuth 347°54′, and No. 2 is 38 feet south of center of the highway and 129.56 feet from the station in azimuth 83°54′. The azimuth mark is 36 feet north of the center of the highway, 43½ feet west of U. S. G. S. & N. M. State Survey bench mark N. M. CH 19, and is 0.5 mile from the station in azimuth 85°15′02″.

Plane coordinates: (E), x=527,300.11 feet; y=874,289.38 feet; grid azimuth to azimuth mark=85°12′04″.*

Acme (Chaves County, W. R. Porter, 1935).—The station is 22 miles air line northeast of Roswell, 1.2 miles northeast via U. S. Highway 70 of the new Acme Post Office, 54 feet north-northwest of the center of highway, 34 feet west of intersection of a rough trail from the north with the main highway, on a flat-topped hill which slopes rather sharply to the east. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 36 feet northwest of center of U. S. Highway 70 and 116.61 feet from the station in azimuth 241°09′, and No. 2 is 56½ feet south-southeast of center of highway and 110.50 feet from the station in azimuth 332°37′. The azimuth mark is 30 feet northwest of the center of highway, 16 feet north of the north side of cattle guard, 3 feet north of fence corner post, about 150 yards east of Acme Post Office and 1.1 miles from the station in azimuth 59°53′58″.

Plane coordinates: (E), x=532,992.58 feet; y=958,189.51 feet; grid azimuth to azimuth mark=59°50′22″.*

Coffee (Chaves County, W. R. Porter, 1935).—The station is on pasture ground 27 miles air line east of Roswell, 22 miles air line west-northwest of Caprock Post Office, 5.2 miles west of Ed's Coffee Shop, 15 miles east of Comanche store, on a small hill 202 feet north of center of U. S. Highway 380. To reach from Comanche store, drive easterly 15.2 miles on U. S. Highway 380. At this point the station is visible on a small hill north of the road. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. The reference mark is 109.87 feet from the station in azimuth 276°01′. *N. M. CH 29* (*N. Mex. Geodetic Survey*), a bronze disk set in a concrete post, is south of the station, 25 feet north of the center of the highway and 177.31 feet from the station in azimuth 5°14′. The azimuth mark is 29 feet south of the center of the highway and 0.65 mile from the station in azimuth 85°28′.

Plane coordinates: (E), x=581,866.49 feet; y=879,486.35 feet; grid azimuth to azimuth mark=85°20′07″.*

N. M. CH 29 (N. Mex. Geodetic Survey) (Chaves County, W. R. Porter, 1935.—See description of station *Coffee*. The mark is a standard U. S. C. & G. S. and State Survey bench mark disk set in a concrete post.

Plane coordinates:[1] (E), x=581,850 feet; y=879,310 feet.

Ed (Chaves County, W. R. Porter, 1935).—About 35 miles east of Roswell, about 12 miles west of Caprock Post Office, 39 feet north of the center line of U. S. Highway 380, on sandy ground 11 feet south of the north right-of-way fence. To reach from Caprock Post Office, go west on the highway 6.2 miles to the Wayside Service Station and store, continue westerly on highway for 5.7 miles to the station. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 48 feet south of the center line of the highway, 6 inches north of the south right-of-way fence and 86.90 feet from the station in azimuth 358°04′, and No. 2 is 47 feet north of the center line of the highway, 6 inches south of the north right-of-way fence, and 85.12 feet from the station in azimuth 97°44′. Bench mark N 94, a standard disk set in a concrete block, 48 feet south of the center line of the highway, 1½ feet north of the south right-of-way fence and 0.15 mile from the station in azimuth 276°29′34″.

Plane coordinates: (E), x=628,601.71 feet; y=880,209.19 feet; grid azimuth to Bench mark N 94=276°15′38″.*

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

VEGA, TEX., TO ODESSA, TEX., ARC (NORTHERN SECTION)

Principal points

Fuqua (Bailey County, Tex., W. R. Porter, 1934).—About 17 miles southwest of Muleshoe, Tex., in section 143, block A of the Melvin, Blum, and Blum Survey, in pasture land about ½ mile north of a graded road and about 1.0 mile northeast of a graded road running south to the Evans Store. To reach from Muleshoe, go southwest from the Bailey County Courthouse 0.6 mile to a point where the road turns south, go south on the main road 10.5 miles, turn west on a graded road and go 8.0 miles, turn south and go 2.3 miles, turn west and go 2.2 miles, pass through a wire gate on the north side of the road, and go west along the north side of the fence 1.4 miles. The azimuth mark is on the north side of the road at this point. Turn due north and go 0.45 mile to the station. The surface, underground, reference, and azimuth marks are standards disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 119.07 feet from station in azimuth 181°08′, and No. 2 is 106.13 feet from station in azimuth 82°45′. The azimuth mark is 1 foot north of the fence line on the north side of the road and approximately 0.45 mile from station in azimuth 359°42′14″.

Plane coordinates: (E), x=922,531.12 feet; y=1,108,556.58 feet; grid azimuth to azimuth mark=358°55′23″.*

Bass (Bailey County, Tex., W. R. Porter, 1934).—About 13½ miles south of Muleshoe, Tex., on land owned by Henry Bass, in league 185, Labor 12, 22.8 feet south of the southwest corner of a chicken house, in the west corral fence 60.4 feet north of the southwest corner. To reach from Muleshoe go south-southwest from the Bailey County Courthouse 0.6 mile, continue south on graded road 7.6 miles, take right fork (south) and continue on graded road 4.6 miles to a crossroads, cotton gin and Needmore store, continue south on graded road 1.1 miles, turn right and go west on poor graded road 0.6 mile, turn left off road, pass through wire gate and go 0.1 mile to Henry Bass' farm. The station is about 50 yards southwest of the house. The station, underground, azimuth and reference marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 42 feet north-northeast of the well, ½ foot west of the west garden fence, and 165.51 feet from station in azimuth 238°41′, and No. 2 is 6½ feet north of a southeast corral fence corner, 1 foot west of a north-south fence, and 99.83 feet from station in azimuth 300°38′. The azimuth mark is 0.3 mile south of the road leading into the station, 4½ feet west of the new right-of-way line, 14½ feet west of the present line, 54 feet west of the center line of State Highway 214, and 0.6 mile from station in azimuth 278°08′32″.

Plane coordinates: (E), x=980,275.90 feet; y=1,100,105.42 feet; grid azimuth to azimuth mark=277°15′20″.*

Bailey (Bailey County, Tex., W. R. Porter, 1934; 1938).—About 7 miles north of Goodland, Tex., in the southeast corner of section 47, block B, Blum and Blum survey, northwest of an intersection of two ungraded roads, 46 feet north of the center of the east-west road, and 21 feet west of the north-south road. To reach from Evans Store, which is about 7½ miles north of Goodland, go 1.0 mile on an ungraded road to the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 10½ feet east of the north-south road, 52 feet south of the east-west road, and 101.24 feet from station in azimuth 343°46′, and No. 2 is 54 feet north of the east-west road, and 147.24 feet from station in azimuth 92°18′. The azimuth mark is on the south side of the road northeast of a basement dwelling, 30 feet south of the center of the road, 5½ feet west of a fence corner post, and approximately 0.5 mile from station in azimuth 271°14′05″.

Plane coordinates: (E), x=912,071.44 feet; y=1,084,787.37 feet; grid azimuth to azimuth mark=270°28′30″.*

Childress (Bailey County, Tex., W. R. Porter, 1934; 1938).—About 2 miles southwest of Enochs, Tex., which is a small village about 26 miles south-southwest of Muleshoe, in open pasture land on school land owned by Childress County, in the northeast part of league 122, 0.55 mile southwest of a farmhouse, and 0.8 mile south of a graded east-west road. To reach from Enochs,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

go west from the lumber yard on the main, graded road 1.8 miles to a track road on the left, leave main road, turn left, and go south on a track road 0.5 mile to a farmhouse and buildings on the west side of the road. The azimuth mark is in the front yard of the farm. Continue south on the track road 0.4 mile to a crossroad, continue 0.1 mile south, leave road, turn right, and go west across country 0.3 mile to station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 91.64 feet from station in azimuth 6°33′, and No. 2 is 81.22 feet from station in azimuth 103°48′. The azimuth mark is 114 feet southeast of the southeast corner of the above-mentioned farmhouse, 27 feet west of the center line of a north-south track road that passes to the east of the house, and 0.55 mile from station in azimuth 209°03′41″.

Plane coordinates: (E), x=966,822.50 feet; y=1,044,262.03 feet; grid azimuth to azimuth mark=208°12′16″.*

Hansford (Cochran County, Tex., W. R. Porter, 1934; 1938).—About 4 miles air line south-southwest of Goodland, Tex., in the southwest part of league 144, on Hansford County School Land, on the highest point in the vicinity, 0.5 mile west of a graded road, 1.0 mile southwest of a white house and small buildings, and 75 yards west of a wire fence. To reach from Goodland, go east 2.4 miles on a graded road to a graded-road intersection, turn south and go 3.2 miles, pass through a wire gate and continue south 0.5 mile to another, pass through a wire gate and go west on graded road 0.5 mile to a point where a fence crosses the road, turn south and follow fence line 0.3 mile across pasture to top of hill, cross fence and go west 75 yards to the top of hill and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 83.00 feet from station in azimuth 353°55′, and No. 2 is 67.48 feet from station in azimuth 74°59′. The azimuth mark is 30 feet north of the center line of an east-west track road, 30 feet west of the center line of a north-south track road, 1.5 feet south of an east-west wire fence, and 0.5 mile from station in azimuth 242°50′14″.

Plane coordinates: (E), x=922,360.86 feet; y=1,026,426.54 feet; grid azimuth to azimuth mark=242°03′48″.*

Morton (Cochran County, Tex., W. R. Porter, 1934; 1938).—About 4 miles west of Morton, in an uncultivated field in league 126, labor 23 (approximate), 1.25 miles north of the Lehman ranch house and buildings. To reach from the Lehman Ranch, go north on a track road in a field 1.0 mile to the north edge of a cultivated field, continue north across country 0.25 mile to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 106.32 feet from station in azimuth 8°37′, and No. 2 is 79.83 feet from station in azimuth 112°23′. The azimuth mark is in the Lehman ranch yard at a point 10 feet east of the southeast corner of a chicken house, 26 feet due north of the center of the north wall of an earth tank, and 1.25 miles from station in azimuth 358°41′04″.

Plane coordinates: (E), x=954,514.32 feet; y=993,793.79 feet; grid azimuth to azimuth mark=357°51′16″.*

Campbell (Cochran County, Tex., W. R. Porter, 1934; 1938).—About 9 miles south of Goodland, Tex., 6.4 miles north of Bledsoe, Tex., 1.7 miles south-southeast of the buildings of the Campbell Ranch, 0.1 mile southwest of a T-fence intersection, on the north and west edge of two sand blow-outs in section 8, block U. To reach the station go from railroad crossing one block west of depot in Bledsoe 8.0 miles on graded road to cattle guard, turn right off graded road and go 0.15 mile to Campbell ranch house, follow track road east 0.2 mile, then go south on the track road 1.7 miles to a small sand hill and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 138.25 feet (slope distance) from station in azimuth 208°46′, and No. 2 is 111.81 feet (slope distance) from station in azimuth 126°49′. The azimuth mark is 3 feet northeast of a southwest corral fence corner, 103.5 feet southeast of the southeast corner of the yard fence around the Campbell ranch house, and 1.7 miles from station in azimuth 150°31′52″.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=904,347.15 feet; y=993,603.33 feet; grid azimuth to azimuth mark=149°47′34″.*

Armstrong (Cochran County, Tex., W. R. Porter, 1934; 1938).—About 6.5 miles air line east-northeast of Bledsoe, Tex., in League 136, in pasture land ¾ mile east-northeast of an oil rig, ⅕ mile north of highway and railroad tracks, and 0.4 mile east of a windmill and tanks. To reach from Bledsoe Post Office, go east on the main road 0.9 mile, turn north and follow main road across railroad tracks and then go east on the main road 5.0 miles, pass through cattle guard on the north side of the road, and follow track road east-northeast toward windmill, leaving an oil rig to the left. At the windmill turn east and go 0.4 mile across country to high ground and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 69.96 feet from station in azimuth 211°13′, and No. 2 is 95.37 feet from station in azimuth 331°28′. The azimuth mark is 70 feet west of a fence corner, 30 feet north of the center line of road, 1-foot north of a fence, and 0.6 mile from station in azimuth 55°53′28″.

Plane coordinates: (E), x=934,664.72 feet; y=959,023.04 feet; grid azimuth to azimuth mark=55°06′00″.*

Bledsoe (Cochran County, Tex., W. R. Porter, 1934; 1938).—About 2 miles northwest of Bledsoe, Tex., in a small group of sand hills, 1.0 mile north of the railroad tracks, 0.2 mile east of the New Mexico-Texas boundary line, in an unfenced area in section 1, block Y, 0.4 mile south of an east-west fence. To reach from Bledsoe, go north from the railroad crossing 1 block west of the depot on the graded road 1.2 miles, leave the main road and go west on a track road 1.0 mile, continue straight ahead (west) along the south side of the fence 0.1 mile, leave the fence and go southwest across country 0.6 mile to some small sand hills and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is on the south slope of the same knoll, and is 138.41 feet (slope distance) from station in azimuth 1°36′, and No. 2 is 112.85 feet from station in azimuth 68°56′. The azimuth mark is on the New Mexico-Texas boundary line, 1 foot east of the fence line, 0.4 mile south of a fence intersection, and 0.2 mile from station in azimuth 88°52′48″.

Plane coordinates: (E), x=891,221.52 feet; y=961,237.99 feet; grid azimuth to azimuth mark=88°10′04″.*

Callis (Cochran County, Tex., W. R. Porter, 1934; 1938).—About 7 miles southeast of Bledsoe, in league 151, in pasture land, and about 0.4 mile northeast of the Callis Ranch. To reach from Bledsoe, go east on the main road 9.4 miles, turn off the main road to the south, pass through two gates, cross railroad tracks and take right fork 0.5 mile, pass two windmills and continue on the only trail southwesterly 1.8 miles to a gate, pass through gate and continue on trail 5.3 miles to the Callis ranch house, from the gate at the east of the ranch house follow a trail northeasterly 0.5 mile to station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 86.71 feet from station in azimuth 293°49′, and No. 2 is 157.44 feet from station in azimuth 15°16′. The azimuth mark is about 0.1 mile east of the Callis ranch house, 6½ feet north of a fence, 17 feet east of a gate post, and approximately 0.3 mile from station in azimuth 49°23′38″.

Plane coordinates: (E), x=929,581.75 feet; y=923,426.74 feet; grid azimuth to azimuth mark=48°36′54″.*

Supplementary points

Bledsoe High School, stack (Cochran County, Tex., W. R. Porter, 1934).—Plane coordinates: (E), x=899,351.00 feet; y=954,425.99 feet.

Texas-New Mexico, Clark boundary monument No. 99 eccentric (Lea County, W. R. Porter, 1934).—About 13 miles south of Bledsoe, 0.4 mile west of the Texas-New Mexico State line, on top of a small rise, 35 yards north of a wire fence, and ¾ mile north of Al Grice's house and grove of trees. To reach from Bledsoe, Tex., Post Office to west on graded road 1.8 miles to an intersection of the graded road and the Texas-New Mexico State line road, turn south on the State line road and go 12.5 miles, leave main road and go west

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

0.4 mile to the top of a small hill and station. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1 foot north of an east-west fence and 211.82 feet (slope distance) from station in azimuth 356°42′, and No. 2 is 81.07 feet (slope distance) from station in azimuth 83°45′. *Texas-New Mexico, Clark boundary monument No. 99* is on the west side of the State line road, and 556.121 meters (1,824.54 feet) from station in azimuth 271°20′10″.

Plane coordinates: (E), x=888,125.70 feet; y=888,816.99 feet; grid azimuth to *Texas-New Mexico, Clark boundary monument No. 99*=270°38′06″.**

Texas-New Mexico, Clark boundary monument No. 99 (Cochran County, Tex.-Lea County, N. Mex., W. R. Porter, 1934).—The mile corner is about 13 miles south of Bledsoe, Tex., on the west side of the State line road, and 556.121 meters (1,824.54 feet) from *Texas-New Mexico, Clark boundary monument No. 99 eccentric* (see description thereof) in azimuth 271°20′10″. Marked by an iron pipe and cap, and stamped "Clark Boundary 1859 Mile Corner No. 99 New Mexico-Texas General Land Office Reestablishment 1911 United States Boundary Commission."

Plane coordinates:[1] (E), x=889,950 feet; y=888,797 feet.

VEGA, TEX., TO ODESSA, TEX., ARC (SOUTHERN SECTION)

Principal Points

Roach (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 13 miles southeast of Hobbs, N. Mex., in section 479, block G, 2 miles south of Seminole, in sandy pasture land, 0.2 mile north of a graded road which runs easterly and intersects Texas State Highway 51, and 74 feet east of a fence. To reach fromthe main intersection in Hobbs, go south 0.5 mile, turn east and go 0.5 mile, turn south on the highway and go 4.5 miles, turn off the highway, cross cattle guard and go east on a trail which becomes a graded road after crossing the state boundary 9.2 miles, cross a cattle guard, turn north off the road and follow along the east side of fence 0.2 mile to the top of a sand hill and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 2 feet east of a fence, and 144.44 feet from station in azimuth 30°37′, and No. 2 is 2 feet east of a fence, and 121.02 feet from station in azimuth 143°37′. The azimuth mark is 0.25 mile south of the graded road, 2 feet east of a north-south fence, and approximately 0.45 mile from station in azimuth 2°09′16″.

Plane coordinates: (E), x=922,347.86 feet; y=594,519.19 feet; grid azimuth to azimuth mark=1°24′53″.*

Rachel (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 12 miles air line west-northwest of Seminole, in section 369, block G, on the highest ground in a pasture, about 50 yards southwest of a deserted farm house and windmill. To reach from Seminole, go northwesterly 11.0 miles on Texas State Highway 15, pass through a gate on the north side of the road, and follow a sand trail northwesterly 0.3 mile to a deserted shack and windmill tower; continue northerly on only trail 1.8 miles, pass through a wire gate and continue 0.3 mile to a deserted house, thence 50 yards southwest to station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 118.70 feet from station in azimuth 28°01′, and No. 2 is 126.66 feet from station in azimuth 125°44′. The azimuth mark is 0.4 mile west of the gate entering pasture, 50 feet north of the center line of the highway, and 1.8 miles from station in azimuth 347°19′47″.

Plane coordinates: (E), x=958,588.94 feet; y=643,100.56 feet; grid azimuth to azimuth mark=346°31′21″.*

Bettie (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 7 miles east-northeast of Hobbs, N. Mex., in section 23, block A9, in a sandy pasture land, about 0.6 mile north of State Highway 15, and about 3.0 miles east of the Texas-New Mexico boundary line. To reach from Hobbs, go east 0.8 mile, turn northeast on a good graded road and go 1.9 miles to State Highway 83, which becomes Texas State Highway 15, go 5.0 miles. At this point two prominent groups of heavy brush can be seen north of highway. The station is northeast of the western

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

group. Let down the fence on the north side of the highway and go across country 0.65 mile northerly to the highest point and station. The station is marked with a standard disk set in concrete in an iron pipe. The reference marks are standard disks set in concrete according to note 11a. No. 1 is 105.78 feet (slope distance) from station in azimuth 220°06′, and No. 2 is 111.25 feet from station in azimuth 118°05′. The azimuth mark, a standard disk set in concrete in an iron pipe, is 56 feet north of the center of State Highway 15, 16 feet north of a fence on the north side of the highway, and approximately 0.6 mile from station in azimuth 15°33′02″. Azimuth from station to Hobbs, water tank, is 74°44′28″.

Plane coordinates: (E), x=905,095.66 feet; y=633,822.91 feet; grid azimuth to azimuth mark=14°50′17″.*

Belcher (Gaines County, Tex., W. R. Porter, 1935).—About 15 miles northwest of Seminole, Tex., in section 386, block G, on the highest ground in the vicinity in pasture land belonging to the J Ranch, 4 miles southeast of the main ranch house, and 0.25 mile south-southeast of a windmill, 2.3 miles south of the graded highway leading to Seminole. To reach from the intersection of Texas State Highways 51 and 15 at Seminole, Tex., go northwesterly 1.0 mile on State Highway 15 to a fork, leave highway and go northwesterly on graded road 13.2 miles to an intersection with a graded road from the north and a trail leading south through a cattle guard, go northwest and west on the main graded road, 3.9 miles, leave main road, turn left through wire gate and go southerly on a trail 0.4 mile to a windmill and tank, continue southerly on the trail 1.7 miles to another windmill where the trail ends, continue south-southeast across country 0.25 mile to the highest ground and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 84.96 feet from station in azimuth 250°01′, and No. 2 (not numbered) is 99.77 feet from station in azimuth 348°32′. The azimuth mark is 2.1 miles south of the graded highway leading to Seminole, 68.7 feet west-northwest of a wall, and 0.25 mile from station in azimuth 149°56′55″. In 1938 it was reported that station could not be located.

Plane coordinates: (E), x=952,579.08 feet; y=671,887.89 feet; grid azimuth to azimuth mark=149°08′58″.*

Texpac (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 23½ miles northwest of Seminole, in section 23, block A 7, on the highest ground in a pasture owned by the J Ranch, 0.6 mile northwest of a lone windmill, and 1.5 miles south of a graded road. To reach from the intersection of Texas State Highways 51 and 15 in Seminole, go northwest 1.0 mile on State Highway 15, leave State Highway 15 continuing northwest on graded road and go 13.2 miles to a cross road and trail, go northwest on main graded road 2.0 miles, go west on main road 4.0 miles, go northwest 2.8 miles to gate leading to residence of B. B. Curry who is manager of J. Ranch, go west on the main road 4.5 miles to a windmill on the north side of the road and a gate on the south, pass through gate and go southwest and south on a trail 1.6 miles, leave the trail, turn right and go 0.4 mile west across pasture land to the highest ground and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 106.45 feet from station in azimuth 329°04′, and No. 2 is 89.67 feet from station in azimuth 57°12′. The azimuth mark is 2½ feet south of the south right-of-way fence along a graded highway, 17 feet west of the west gate post which is across the road south from a windmill and tank, and 1.8 miles from station in azimuth 202°29′46″.

Plane coordinates: (E), x=902,913.99 feet; y=685,414.73 feet; grid azimuth to azimuth mark=201°47′01″.*

Gilly (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 16½ miles northwest of Seminole, 1.6 miles north of a graded road, 4 miles east of the main ranch house of the J Ranch, in a sandy pasture, on the highest ground in the vicinity, and in section 379 or 380, block G. To reach from the intersection of Texas State Highways 51 and 15, go northwest 1.0 mile on State Highway 15, leave highway and go northwest on a graded road 13.2 miles to a cross road and trail, continue on main road 1.0 mile to a gate in the right-of-way fence on the right side of the road, leave the road, pass through gate, and go northwest along the northeast side of the fence 1.0 mile to a point where the fence jogs to the left or due west. The azimuth mark is at this point. Here leave the fence, turn half right and go north across country 1.6 miles to a group

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

of heavy brush on high ground, go west 150 yards to the highest ground and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 94.05 feet from station in azimuth 298°28′, and No. 2 is 90.91 feet from station in azimuth 21°32′. The azimuth mark is in the right-of-way fence on the north side of road, 11 feet west of a fence corner and 1.6 miles from station in azimuth 350°39′33″.

Plane coordinates: (E), x=960,377.46 feet; y=692,527.92 feet; grid azimuth to azimuth mark=349°50′40″.*

Pensive (Yoakum County, Tex., W. R. Porter, 1935; 1938).—In the new town of Allred, Tex., which is about 15 miles south-southwest of Plains, Tex., in an open, sandy pasture on the highest ground in the immediate vicinity, in section 862, block D (John H. Gibson), on land which in 1935 was leased by Mr. Payne who lives in a ranch house about ½ mile north-northwest of the station, 1.4 miles north of a graded east-west road along the county line, and 0.3 mile east of a north-south track road. To reach from Plains, go west from the post office 0.3 mile on a graded road, turn left and go south on a graded road 1.5 miles to a point where the road turns right (west), follow graded road west 4.0 miles to a point where the road turns left (south), go south on a graded road 7.0 miles to a white schoolhouse on the west side of the road, continue south 5.6 miles on the main road. This point is 0.4 mile north of the azimuth mark which is on the east side of the road. At this point leave the road, turn left and go east across country 0.3 mile to the highest point and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 98.75 feet from station in azimuth 178°15′, and No. 2 is 101.18 feet from station in azimuth 89°16′. The azimuth mark is 27 feet east of the center line of the north-south track road, at a point 1.0 mile north of the road along the county line, and 0.5 mile from station in azimuth 40°10′24″.

Plane coordinates: (E), x=945,038.27 feet; y=724,971.42 feet; grid azimuth to azimuth mark=39°22′59″.*

Jones (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 21 miles southwest of Plains, in section 7, block A 6, in a sandy pasture belonging to the J Ranch, and about 0.3 mile south of the county line. To reach from Plains, go west on a graded road 0.3 mile, turn south and go 1.5 miles, turn west and go 4.0 miles, turn south and go 7.0 miles to a white schoolhouse on the west side of the road, go south from school 7.0 miles, turn west on the county line road and go 6.0 miles to a cattle guard, continue west 2.2 miles, let down fence on the south side of the road and go 0.3 mile to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 127.68 feet from station in azimuth 197°35′, and No. 2 is 103.31 feet from station in azimuth 96°23′. The azimuth mark is 1½ feet south of the fence on the south side of the road at a point 0.4 mile east of the station, and 0.5 mile from the station in azimuth 236°09′29″.

Plane coordinates: (E), x=900,112.48 feet; y=715,225.13 feet; grid azimuth to azimuth mark=235°26′54″.*

Hudson (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 22 miles air line northeast of Seminole, Tex., in section 65, block AX, in a group of sand rises 100 yards east of trees and a windmill, and 1.5 miles north of the residence of B. B. Curry, who is manager of the J Ranch. To reach the station from Seminole, proceed as directed in the description of station Texpac to the board gate leading to Mr. Curry's residence, go to a board gate 0.2 mile east of the gate to Mr. Curry's place, pass through gate and go northerly toward a group of trees and a windmill. A gate in an east-west fence will be found after going north 1.0 mile, pass through gate and follow sand trail northeasterly 0.8 mile to the trees, windmill, and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 80.75 feet (slope distance) from station in azimuth 22°03′, and No. 2 is 111.68 feet (slope distance) from station in azimuth 101°35′. The azimuth mark is 0.1 mile northwest of a gate in an east-west fence, 10 feet south of a fence corner, 2 feet east of a north-south fence, and 0.8 mile from station in azimuth 26°22′08″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=931,523.31 feet; y=702,961.98 feet; grid azimuth to azimuth mark=25°36′16″.*

Fillingim (Yoakum County, Tex., W. R. Porter, 1934; 1938).—About 16 miles south of Bronco, Tex., Post Office, in section 789, block D, on the highest point of a sandy hill in pasture land, about 3.0 miles south of the Fillingim Ranch, about 3.7 miles north of the county line, and about 1.3 miles east of the Texas-New Mexico boundary. To reach from Bronco Post Office, go south 1.0 mile on U. S. Highway 62, leave highway and continue south on State-line road 10.4 miles, from point where main road turns west continue 0.2 mile south on a trail, go southeast on a trail 1.0 mile, cross cattle guard and go east 0.2 mile, go south 0.1 mile to ranch buildings of T. F. Fillingim, go south across country 1.0 mile, cross wire fence and continue 2.0 miles to the top of the highest sand hill and station. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 92.64 feet from station in azimuth 254°32′, and No. 2 is 128.71 feet from station in azimuth 358°36′. Station *Creak* may be used as an azimuth mark.

Plane coordinates: (E), x=897,808.27 feet; y=738,198.77 feet; grid azimuth to station *Creak*=152°26′31.1″.

Gibson (Yoakum County, Tex., W. R. Porter, 1934; 1938).—About 11 miles, air line, south-southwest of Plains, in section 705, block D of the John H. Gibson Survey, 1.5 miles west of a white schoolhouse, 0.8 mile southeast of a large, brown ranch house, several buildings and a windmill, and in pasture land on the highest ground in the vicinity. To reach from Plains, go west on graded road 0.3 mile, turn south on graded road and go 0.5 mile, turn west on graded road and follow west 3.0 miles to a point where the road turns south, turn south and go 7.0 miles to a white schoolhouse, leave road and go west at the south side of the schoolhouse 1.5 miles to the highest point and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 110.65 feet from station in azimuth 269°10′, and No. 2 is 119.55 feet from station in azimuth 0°30′. The azimuth mark is 400 feet west of the white schoolhouse, 80 feet north of the southwest fence corner, 1.5 feet east of a north-south wire fence, and 1.3 miles from station in azimuth 261°14′06″.

Plane coordinates: (E), x=936,583.31 feet; y=753,720.82 feet; grid azimuth to azimuth mark=260°27′27″.*

Plains (Yoakum County, Tex., W. R. Porter, 1934; 1938).—About 10 miles southeast of Bronco, Tex., 6 miles west-southwest of Plains, Tex., in a sandy pasture on the highest ground in the immediate vicinity, in section 473, block D, 0.8 mile north of a deserted ranch house, 200 yards north of an east-west fence, on land owned by a Methodist minister who lives in El Paso, Tex. As viewed from the east the station appears to be on a high ridge. To reach from the W. T. Arnett Ranch (see description of station *Read*), take the left fork at the southeast corner of the yard and follow a plain trail southeasterly 0.6 mile to a fence corner, continue southerly 1.9 miles, take left fork and continue south 100 yards, pass through a gate and continue south 0.4 mile, pass through a gate and continue south 0.6 mile to a point where a trail comes in from the east and the north-south trail bears slightly to the south-west towards a ranch about 0.2 mile distant, turn left and follow east-west trail easterly 1.2 miles to an old reservoir, windmill, and trees, continue easterly on the main trail 1.0 mile pass through a gate and continue east on the main trail 1.6 miles to a southwest fence corner. The azimuth mark is 100 feet east of this corner, and a deserted ranch house is about 120 yards to the east. From this point turn left (north) and go 0.7 mile along the west side of a north-south fence to a fence corner, go northeast across country 0.1 mile to the highest point and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 84.49 feet from station in azimuth 225°24′, and No. 2 is 73.55 feet from station in azimuth 114°50.′ The azimuth mark is 4 feet north of an east-west fence, and 0.7 mile from station in azimuth 3°26′06″.

Plane coordinates: (E), x=929,699.39 feet; y=786,664.04 feet; grid azimuth to azimuth mark=2°40′02″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Creak (Lea County, W. R. Porter, 1934; 1938).—About 9 miles south-southwest of Bronco, Tex., Post Office, in open pasture land on the highest ground in the immediate vicinity, 0.4 mile north-northeast of some ranch buildings, 0.05 mile east of a north-south fence, and 3.0 miles south of some red sand dunes. To reach from Bronco Post Office, go south 1.0 mile on U. S. Highway 62 to where the highway turns east, continue straight ahead on the Texas-New Mexico boundary road 7.0 miles to a southeast fence corner, leave the road, turn right and go west on a well-traveled track road along the south side of a fence 1.8 miles, at a rocky place in the road, leave the road and go south on a well-worn trail 0.7 mile, leave the trail and go west 0.25 mile across country to the highest ground and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 121.24 feet from station in azimuth 332°57′, and No. 2 is 106.21 feet from station in azimuth 91°57′. The azimuth mark is 1-foot east of a north-south fence, and 0.4 mile from station in azimuth 173°53′25″.

Plane coordinates: (E), x=877,387.19 feet; y=777,330.50 feet; grid azimuth to azimuth mark=173°12′59″.*

Read (Yoakum County, Tex., W. R. Porter, 1934; 1938).—About 7 miles air line south-southeast of Bronco, Tex., in section 452, block D, on the top of a sand rise 0.3 mile east of the W. T. Arnett Ranch, ¾ mile south of the main road, and 150 yards north of a sand trail. To reach from Bronco Post Office, go south on the main road 1.0 mile to a point where the road turns east, continue straight ahead (south) on the State-line road 4.0 miles to a T-intersection of the roads, turn east on a graded road and go 3.6 miles, pass through a cattle guard on the south side of the road and go south on a track road 0.7 mile to a cattle guard at the entrance to the W. T. Arnett Ranch, pass through guard, turn east on a sand trail and go east 0.3 mile to the top of a sand hill, leave the sand trail and go north 0.1 mile to the station. The station and reference marks are standard disks set in tile according to notes 6a and 13a. Reference mark No. 1 is 82.97 feet from station in azimuth 292°13′, and No. 2 is 84.72 feet from station in azimuth 347°26′. The azimuth mark, a standard disk set in concrete according to note 11a, is 70 feet east of the northeast corner of W. T. Arnett's corral, 1.5 feet south of a wire fence, and 0.3 mile from station in azimuth 122°12′23″. This mark is not visible from the ground at the station.

Plane coordinates: (E), x=908,979.76 feet; y=792,279.23 feet; grid azimuth to azimuth mark=121°28′30″.*

Bronco (Lea County, W. R. Porter, 1934; 1938).—About 4½ miles southwest of Bronco, Tex., in a group of sand rises visible from U. S. Highway 62, on the highest ground in the immediate vicinity, 3.0 miles west of the Texas-New Mexico boundary, 120 feet east of a north-south fence, and 3 miles north of a group of red-sand dunes. To reach from Bronco Post Office, go west 3.0 miles on U. S. Highway 62. At a point 0.1 mile east of a white school, leave the highway, turn south through a wire gate and go south on a well-traveled track road 1.0 mile to a crossroad. Cross road, take the right fork and continue south 1.8 miles to the top of a sand rise visible from the highway and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 87.87 feet from the station in azimuth 260°57′, and No. 2 is 90.72 feet from station in azimuth 353°07′. The azimuth mark is 2 feet south of an east-west fence, 1 foot east of a north-south fence, 0.1 mile north of an east-west fence with a wire gate between two T-fence intersections, and 0.5 mile from station in azimuth 178°48′21″.

Plane coordinates: (E), x=874,175.60 feet; y=808,101.65 feet; grid azimuth to azimuth mark=178°08′09″.*

School (Lea County, W. R. Porter, 1934; 1938).—About 4 miles west-northwest of Bronco, Tex., 0.7 mile north of U. S. Highway 62, about 1.0 mile north-northwest of a school on the highway, in flat pasture land. To reach from Bronco Post Office, go west 3.0 miles on U. S. Highway 62, leave highway just east of a school building and go north on a trail after crossing a cattle guard, go north 0.7 mile, turn off trail and go west across country, 0.5 mile to station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

110.12 feet from station in azimuth 177°46′, and No. 2 is 107.51 feet from station in azimuth 269°24′. The azimuth mark is on the north side of the highway, about 0.2 mile west of the school, 42 feet north of the center of the highway, 2½ feet north of the fence line, and 0.7 mile from station in azimuth 349°17′30″.

Plane coordinates: (E), x=871,566.76 feet; y=827,436.98 feet; grid azimuth to azimuth mark=348°37′29.*

Echol (Lea County, W. R. Porter, 1934).—About 8 miles northwest of Bronco, Tex., in a group of sand hills about 4½ miles west of the Texas-New Mexico boundary, about 75 yards north of an east-west fence, and 100 yards west of a north-south fence. To reach from Bronco post office, go north 6.0 miles on the State-line road, leave the road about 0.3 mile south of a windmill on the west side of the road and go westerly on a dim road and sandy trail 1.5 miles, pass through wire gate at abandoned earth tank, and follow trail southwest to an east-west fence, go through gate and go westerly on south side of fence to ranch house and windmill, and continue along north side of fence, turn north at fence corner and follow along the east side of the fence 1.5 miles to a T-fence corner. This T-fence corner was reported in 1938 to have been removed. From this point go up the sand hills to the west-northwest about 100 yards to the station. The station and reference marks are standard disks set in concrete in the top of iron pipes. Reference mark No. 1 is 223.96 feet (slope distance) from the station in azimuth 224°55′, and No. 2 is 142.48 feet (slope distance) from the station in azimuth 165°13′. The azimuth mark, a standard disk set in concrete according to note 11a, is 1½ feet west of a north-south fence, 12 feet north of a gate post, and 1.0 mile from station in azimuth 356°18′52″.

Plane coordinates: (E), x=867,867.06 feet; y=857,498.49 feet; grid azimuth to azimuth mark=355°39′08″.*

Supplementary point

Bench mark R 182 (Gaines County, Tex., W. R. Porter, 1935; 1938).—About 14 miles air line west of Seminole, Texas, in section 31, Block G, 55 feet south of the center line of Texas State Highway 15, 5 yards north of a wire fence, and south of trees, earth tank, and windmill on the north side of the highway. To reach from Seminole from the interesection of the highway and Main Street, go west 14.4 miles on State Highway 15 to the group of trees, windmill and earth tank. The mark is a standard bench mark disk set in concrete. The reference and azimuth marks are standard disks set in concrete according to note 11a. Reference mark No. 1 is 55 feet north of the center line of the highway and 141.65 feet (slope distance) from the station in azimuth 210°46′, and No. 2 is 50 feet south of the center line of the highway and 124.60 feet (slope distance) from station in azimuth 92°44′. The azimuth mark is 30 feet north of the center line of the highway and 0.4 mile from station in azimuth 267°14′17″.

Plane coordinates: (E), x=944,683.38 feet; y=630,619.32 feet; grid azimuth to azimuth mark=266°27′22″.*

LAS CRUCES TO BELEN ARC

Principal points

Aden (Dona Ana County, L. C. Johnson, 1934).—The station is about 29 miles southwest of Las Cruces, 7 miles S. 30° W., of Aden railroad station in the northwest corner of T. 26 S., R. 3 W., and on the highest point of a rounded and rather pointed hill which is the highest in the vicinity. A fence line runs over the east side of the top of the hill. To reach from the Johnson Ranch, which is 4½ miles by road from Aden, pass through corrals, take right fork on dim road and go 1.9 miles to a creek wash on the left. At this point the station is straight ahead on a line parallel with the wash. Follow the road 0.2 mile to a point where it crosses wash, leave the road before it crosses wash and pick way about 2.0 miles towards the station to the end of truck travel, continue up a draw and over malpais flats about 2.0 miles to the foot of the hill on which the station is located. The station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

No. 1 is 21.208 meters (69.58 feet) from the station in azimuth 123°17′, and No. 2 is 7.378 meters (24.21 feet) from the station in azimuth 343°26′.

Plane coordinates: (C), x=211,403.72 feet; y=390,018.31 feet. (W), x=701,867.84 feet; y=389,388.46 feet.

Flat Top (Dona Ana County, L. C. Johnson, 1934; 1936).—The station is about 26 miles northwest of Las Cruces, 11.5 miles south of Hatch, on a flat-topped peak, the highest of a group, locally known as Cerro Magdalena. The peak slopes off to the north, east, and west, dropping off abruptly to the south, and the mark is 54 feet north of the south edge, 47 feet east of the west edge, and about 40 feet northwest of the southeast edge. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 21 feet north of the south edge of the peak and 10.070 meters (33.04 feet) from the station in azimuth 357°28′, and No. 2 is 10 feet east of the west edge of the peak, 13.388 meters (43.92 feet) from the station in azimuth 87°51′. The azimuth mark is 42 feet west of a track road, 8 feet east of a bottom of a wash, and approximately 2 miles from the station in azimuth 47°00′06″.

Plane coordinates: (C), x=217,502.73 feet; y=543,696.58 feet; the grid azimuth to the azimuth mark=47°29′38″.* (W), x=705,716.02 feet; y=543,135.79 feet; the grid azimuth to the azimuth mark=46°38′36″.*

Table (Dona Ana County, L. C. Johnson, 1934; 1936).—The station is about 14 miles west-southwest of Las Cruces, on a brush-covered flat, 40 feet north of the center line of U. S. Highways 70 and 80, and about 250 yards northeast of a ranch house on the south side of the highway. To reach from the junction of U. S. Highways 85, 70, and 80, which is 0.4 mile west of the overpass in the west side of Las Cruces, go west 15.0 miles on U. S. Highways 70 and 80 to the station site on the north side of the road. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 40 feet north of the center line of the highway, 14.500 meters (47.57 feet) from the station in azimuth 264°25′, No. 2 is 43 feet south of the center line of the highway, 25.568 meters (83.88 feet) from the station in azimuth 349°48′, and No. 3 (azimuth mark) is 39 feet south of the highway, 1.8 miles from the station in azimuth 262°47′27″ and 9.454 meters (31.02 feet from station *Tab* (see geographical position and description thereof) in azimuth 81°28′.

Plane coordinates: (C), x=256,788.55 feet; y=458,931.23 feet; the grid azimuth to reference mark No. 3=263°12′39″.*

Tortugas (N. Mex. Geodetic Survey) (Dona Ana County, L. C. Johnson, 1934; 1936).—The station is about 5 miles southeast of Las Cruces, about 2 miles east of the New Mexico State College, and on Tortugas Mountain. On the western slope near top of the mountain is a large whitewashed "A" maintained as a tradition by the students of the college. The letter can be seen miles away and makes the mountain easily distinguishable. To reach from the New Mexico State College campus, go east about 3 miles on winding roads to the northwest base of the mountain from which it is a 30-minute pack to the summit and station site. The station is marked by a U. S. Coast and Geodetic Survey and State Survey disk set in 3-foot concrete post which rests on bedrock and protrudes about 18 inches above the ground. The reference marks are standard disks set in bedrock according to note 12c. Reference mark No. 1 is 20.380 meters (66.86 feet) from the station in azimuth 1°15′, and No. 2 is 7.185 meters (23.57 feet) from the station in azimuth 134°48′. The azimuth mark, a standard disk set in concrete according to note 11a, is 10.8 meters (35 feet) south of the center line of a road, and 2 miles from the station in azimuth 94°33′25″. The following azimuths are from the station: Airway beacon, 8°14′26″; San Augustin Peak 218°03′; and round topped peak in the Organ Mountains, 245°30′.

Plane coordinates: (C), x=361,768.84 feet; y=470,525.76 feet; the grid azimuth to the azimuth mark=94°47′45″.*

Rincon (Sierra County, L. C. Johnson, 1934; 1936).—The station is about 12 miles N. 15° W. of Rincon, 12 miles N. 9° E. of Hatch, on the crest of a long, low ridge running north and south and about 1.0 mile south of the north end. A higher range of hills lies about 3 miles westward. The station and reference

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 15.142 meters (49.68 feet) from the station in azimuth 331°34′, and No. 2 is 11.342 meters (37.21 feet) from the station in azimuth 86°30′. In 1936 the station was recovered and an azimuth mark, a standard disk set in bedrock according to note 12a, was set 10 feet west of the center line of a dim track road and 1.25 miles from station in azimuth 216°43′53.″

Plane coordinates: (C), x=234,684.23 feet; y=659,430.32 feet; the grid azimuth to the azimuth mark=217°11′57″.* (W), x=721,151.83 feet; y=659,110.60 feet; the grid azimuth to the azimuth mark=216°20′29″.*

Gardner (Dona Ana County, L. C. Johnson, 1934).—The station is about 32 *miles northeast of Rincon*, on a high and rather inaccessible peak of the San Andreas Mountains in the vicinity of the southwestern corner of sec. 17, T. 17 S., R. 4 E. This peak is locally known as Gardner Peak, lies about 10 miles north of the higher summit which is known as Andreas Peak, and is just south of Deadman Canyon which opens out toward the east. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 10.610 meters (34.81 feet) (slope distance) from the station in azimuth 243°54′, and No. 2 is 10.468 meters (34.34 feet) (slope distance) from the station in azimuth 161°11′.

Plane coordinates: (C), x=404,277.95 feet; y=663,606.35 feet.

Mesa (Dona Ana County, L. C. Johnson, 1934).—The station is about 25 miles north-northwest of Las Cruces, 7 miles north of Radium Springs, on the west side of the Detroit Ranch-Radium Springs road, 100 yards south of a fence corner, and 75 feet west of a telephone line. To reach from Radium Springs, go through underpass and follow the road toward Rincon and the Detroit Ranch 7.8 miles to the station site. The station is marked by a standard disk set in a boulder according to note 4. The reference marks Nos. 1 and 2 are standard disks set in boulders according to note 12c. Reference mark No. 1 is 16.270 meters (53.38 feet) from the station in azimuth 330°06′, and No. 2 is 17.262 meters (56.63 feet) from the station in azimuth 73°03′. Reference mark No. 3 (azimuth mark) (probably a standard reference disk) is about 100 feet west of the telephone line, on the west side of the road, and 0.8 mile from the station in azimuth 154°49′04″.

Plane coordinates: (C), x=285,203.32 feet; y=584,221.57 feet; the grid azimuth to reference mark No. 3=155°11′37″.*

Engle (Sierra County, L. C. Johnson, 1934).—The station is about 15 miles northeast of Hot Springs, 10 miles north-northwest of Engle, and on the more southern one of the two highest peaks of the southern, semidetached section of the Fra Cristobal Mountain Range. The station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 9.372 meters (30.75 feet) from the station in azimuth 218°32′, and No. 2 is 12.290 meters (40.32 feet) from the station in azimuth 109°05′. The distance between reference marks is 17.630 meters (57.84 feet). The south windmill on Deep Wells Ranch is 5 miles from the station in azimuth 292°31′42″.

Plane coordinates: (C), x=244,008.77 feet; y=841,362.07 feet. (W), x=727,732.67 feet; y=841,161.60 feet.

Gyp (Socorro County, L. C. Johnson, 1934).—The station is about 30 miles air line east of Hot Springs, 18 miles east of Engle, about 2 miles south of the Hot Springs, Tularosa Road (State Highway 52), in T. 13 S., R. 2 E., on the highest point of a mountain which is locally known as Gyp Mountain. The mountain drops off abruptly toward the east, and a long ridge with scattering timber extends northwestward. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 18.82 meters (61.7 feet) (slope distance) from the station in azimuth 72°26′, and No. 2 is 7.23 meters (23.7 feet) from the station in azimuth 4°54′.

Plane coordinates: (C), x=355,587.96 feet; y=793,127.92 feet.

Jawibi (Sierra County, L. C. Johnson, 1934).—The station is about 10 miles south of Engle, on the railroad right-of-way, 25.89 meters (84.9 feet) east of the east rail, and 2 meters (7 feet) west of a fence line. To reach from Engle, go south on the dirt road on the east side of the railroad tracks 10.2 miles, or 2.2 miles beyond Cutler Grocery. The station and reference marks are standard disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is 18.570 meters (60.93 feet) from the station in azimuth 349°04′, No. 2 is 15.527 meters (50.94 feet) from the station in azimuth 71°12′ and No.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

3 (azimuth mark) is on the railroad right-of-way, about 18.00 meters (59.1 feet) east of east rail, 35 feet west of a fence line, and 1.5 miles from the station in azimuth 168°40′10″.

Plane coordinates: (C), x=265,820.07 feet; y=737,884.07 feet; and grid azimuth to reference mark No. 3=169°05′10″.* (W), x=751,106.24 feet; y=738,023.82 feet; the grid azimuth to reference mark No. 3=168°13′23″.*

Little Burro (Socorro County, L. C. Johnson, 1934).—The station is about 31.5 miles east-southeast of San Marcial, just south of the road which goes through Mocking Bird Pass on the west edge of T. 9 S., R. 5 E., and on a prominent peak about ½ mile north of the largest peak on Little Burro Mountain. A long ridge runs up to the peak from the northwest. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 16.65 meters (54.6 feet) (slope distance) from the station in azimuth 112°07′, and No. 2 is 9.585 meters (31.45 feet) (slope distance) from the station in azimuth 195°54′.

Plane coordinates: (C), x = 433,251.96 feet; y = 918,824.32 feet. (W), x = 915,794.77 feet; y = 921,503.84 feet.

Jornada (Socorro County, L. C. Johnson, 1934).—The station is about 14 miles south of San Marcial, 2½ miles northeast of Lava railroad station on the Atchison, Topeka & Santa Fe Railway, on a low, flat, malpais ridge on the west edge of the Jornada del Muerto. To reach the station, follow the main road northward from Lava railroad station about 3.5 miles to an east-west road crossing the railroad. From this point the ridge on which the station is located is 0.2 mile toward the south. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 17.320 meters (56.82 feet) from the station in azimuth 347°56′ and No. 2 is 17.510 meters (57.45 feet) from the station in azimuth 67°13′.

Plane coordinates: (C), x = 274,118.59 feet; y = 917,525.58 feet. (W), x = 756,680.40 feet; y = 917.775.88 feet.

Exter (Socorro County, L. C. Johnson, 1934).—The station is about 25 miles air line north of Hot Springs, about 245 feet southeast of U. S. Highway 85 and approximately abreast of a highway marker. To reach from Hot Springs, follow U. S. Highway 85 north 31.0 miles to the Socorro-Sierra county line marker and continue 2.1 miles to the station site. The station, azimuth and reference marks are standard disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is 15.898 meters (52.16 feet) from the station in azimuth 206°28′, No. 2 is 14.83 meters (48.7 feet) from the station in azimuth 128°12′, and No. 3 (azimuth mark) is 60 feet northeast of the highway, and about 1.4 miles from the station in azimuth 198°19′07″.

Plane coordinates: (C), x=198,915.00 feet; y=910,797.46 feet; the grid azimuth to reference mark No. 3=198°51′49″.* (W), x=681,588.81 feet; y=909,901.19 feet; the grid azimuth to reference mark No. 3=197°59′23″.*

Bursum (Socorro County, L. C. Johnson, 1934).—The station is about 26 miles south of east of San Antonio, 4 miles south of Bursum's ranch, near the west side of T. 6 S., R. 5 E., and on the highest peak of a reddish, rocky range of low mountains lying west of the Oscuro Range. Bursum's ranch may be reached by turning off U. S. Highway 380 at a point 22 miles east of San Antonio and following an ungraded road southward 4.5 miles. To reach the station from here, follow a trail, which leads southward and then bears westward, 4.15 miles to a dirt tank and an old rock house. From here the station is about a 20-minute pack beyond a small ridge toward the east. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 6.50 meters (21.3 feet) (slope distance) from the station in azimuth 272°18′, and No. 2 is 14.61 meters (47.9 feet) (slope distance) from the station in azimuth 99°14′.

Plane coordinates: (C), x=433,244.44 feet; y=1,024,076.36 feet.

Chupedera (U. S. G. S.) (Socorro County, L. C. Johnson, 1934).—The station is about 6 miles southwest of San Antonio and on the highest point of the highest peak of the northeastern group of mountains. There is a higher peak toward the southwest. To reach the station from San Antonio, go southward 4.3 miles on U. S. Highway 85, turn right off the road and go one mile across country to a dry wash, follow the main part of the wash around to a point north of the most eastern peak, go southward to the saddle, go southward

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

across another wash or swale to the ridge, follow the ridge to the highest point and the station. The station is marked with a U. S. Geological Survey bench mark set in a drill hole in a boulder. The reference marks are standard disks set in rock according to note 12c. Reference mark No. 1 is 5.857 meters (19.22 feet) from the station in azimuth 166°41′, and No. 2 is 5.386 meters (17.67 feet) from the station in azimuth 47°42′.

Plane coordinates: (C), x=287,692.79 feet; y=1,036,377.33 feet.

Slash (Socorro County, L. C. Johnson, 1934).—The station is about 10 miles east-southeast of San Marcial, on property of the "Slash Bar" Ranch, and about 30 feet southeast of the center of a road. To reach from San Marcial, cross the river to Val Verde and go east 4.0 miles to a gate, continue 0.6 mile, take right fork (main road) and go 0.35 mile, take right fork and go 0.05 mile, take right fork and go 1.0 mile to a gate, and continue 1.8 miles to the station site. The station and reference marks are standard disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is 18.09 meters (59.4 feet) from the station in azimuth 278°39′, No. 2 is 16.88 meters (55.4 feet) from the station in azimuth 11°52′, and No. 3 (azimuth mark) is about 70 feet northeast of the main-traveled road, between the main road and a dim road which forms an east-and-west tangent, and 3.5 miles from the station in azimuth 141°28′04″.

Plane coordinates: (C), x=327,011.20 feet; y=957,529.17 feet; the grid azimuth to reference mark No. 3=141°46′58″.*

Holcomb (Socorro County, L. C. Johnson, 1934).—The station is about 35 miles southwest of Mountainair, 20 miles east of Socorro, 3 miles west of J. E. Holcomb's ranch, in the NW¼ sec. 5, T. 3 S., R. 4 E., and at the southeastern end of a ridge, or mesa, known as Sierrita, or the Black Mountain. J. E. Holcomb's ranch may be reached by going from a point which is 18 miles east of San Antonio on U. S. Highway 380 northward on an ungraded road 13½ miles. To reach the station from here, follow a trail westward 1.6 miles to a fork, leave the road and head straight for the peak. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 9.20 meters (30.2 feet) from the station in azimuth 209°26′, and No. 2 is 8.818 meters (28.93 feet) from the station in azimuth 329°43′.

Plane coordinates: (C), x=406,524.94 feet; y=1,120,611.30 feet.

Socorro (U. S. G. S.). (Socorro County, L. C. Johnson, 1934).—The station is about 4.5 miles northwest of Socorro, in the NE¼ sec. 8, T. 3 S., R. 1 W., and on the second highest of three peaks. The highest peak is about 50 feet higher than the station and about ½ mile northwestward. The peak slightly lower than the station and about ¼ mile east is distinguished by a large "M" on the east side which is visible from Socorro. The station is marked with U. S. Geological Survey bronze tablet which is set in a boulder and stamped "7,226". The reference marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is 8.970 meters (29.43 feet) from the station in azimuth 174°44′, and No. 2 is 5.488 meters (18.01 feet) from the station in azimuth 245°12′. The azimuth from the station to the apex of the most northerly college building, distant 3 miles, is 274°12′28″.

Plane coordinates: (C), x=284,269.73 feet; y=1,118,170.19 feet; the grid azimuth to the apex of the most northerly college building=274°36′25″.*

Storm (Socorro County, L. C. Johnson, 1934).—The station is about 14 miles east of San Antonio, 30 feet south of the center line of U. S. Highway 380, 90 yards northeast of an old windmill and well, and 85 yards east of a road leading to a farmhouse to the north. To reach from the junction of U. S. Highways 85 and 380 in San Antonio, go east on U. S. Highway 380, 14.3 miles directly to the station site. The station, underground, azimuth and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is on the north side of the road, and 18.310 meters (60.07 feet) from the station in azimuth 172°06′, No. 2 is south of the road, and 16.960 meters (55.64 feet) from the station in azimuth 258°58′, and No. 3 (azimuth mark) is about 80 feet north of the center line of the road, and 4.0 miles from the station in azimuth 82°29′39″.

Plane coordinates: (C), x = 386,715.05 feet; y = 1,053,111.79 feet; the grid azimuth to reference mark no. 3 = 82°42′08″.*

Puerco (Socorro County, L. C. Johnson, 1934).—The station is about 30 miles north of Socorro, 15 miles south of Belen, about 0.1 mile south of the junction

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

of U. S. Highways 60 and 85, and 65 feet east of the center line of the road. To reach from the southern city limits of Belen, go south 15.6 miles on U. S. Highway 85, or 8.6 miles south of the Valencia-Socorro county line, directly to the station site. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 24.393 meters (80.03 feet) from the station in azimuth 236°17′, No. 2 is across the highway and 28.575 meters (93.75 feet) from the station in azimuth 130°38′, and No. 3 (azimuth mark) is on the south side of the road, about 100 feet from the center line and 2.4 miles from the station in azimuth 52°42′23″.

Plane coordinates: (C), $x = 322,177.49$ feet; $y = 1,244,036.20$ feet; the grid azimuth to reference mark No. 3 = 53°02′23″.* (W), $x = 799,694.58$ feet; $y = 1,245,008.83$ feet; the grid azimuth to reference mark No. 3 = 52°08′41″.*

Supplementary points

Bishop's Cap Mountain (Dona Ana County, L. C. Johnson, 1934.—This mountain is called "Pyramid Peak" by the U. S. Geological Survey.

Plane coordinates:[1] (C), x=390,929 feet; y=432,823 feet.

Organ Mountain (Dona Ana County, L. C. Johnson, 1934).—Plane coordinates:[1] (C), x=398,317 feet; y=510.229 feet.

San Andreas Peak (Dona Ana County, L. C. Johnson, 1934).—Plane coordinates: (C), x=411,925.34 feet; y=609,655.01 feet.

Salinas Peak (Socorro County, L. C. Johnson, 1934).—Plane coordinates: (C), x=414,170.52 feet; y=836,066.70 feet.

LORDSBURG, N. MEX., TO GRAND JUNCTION, COLO., ARC

Principal points

Secho (Hidalgo County, L. C. Johnson, 1934).—About 8 miles northwest of Lordsburg, on northerly of three low hills. To reach from underpass in Lordsburg, go northwest 8.4 miles on U. S. Highway 70, to a cattle guard, continue 0.1 mile, turn right, leaving highway, and follow trail road northeast along east base of hills 0.55 mile, turn left towards hill and go 0.2 mile to base of hill about 100 yards from station site. Surface and reference marks are standard disks set in bedrock according to notes 2a and 12a. Reference Mark No. 1 is 13.098 meters (42.97 feet) from station in azimuth 148°52′, and No. 2 is 26.865 meters (88.14 feet) from station in azimuth 337°06′. *Lordsburg, water tower* may be used as an azimuth mark.

Plane coordinates: (W), x=207,152.55 feet; y=529,361.07 feet; and grid azimuth to *Lordsburg, water tank*=329°23′20″.**

Burro (U. S. G. S.) (Grant County, L. C. Johnson, 1934).—About 15 miles air line southwest by west of Silver City, 24 miles air line northeast of Lordsburg, 5½ miles air line southwest from Tyrone, on the northeast and highest point of Big Burro Mountains, near station *Burro*. Station is marked according to note 4 with a standard disk set in a drill hole in a boulder which formerly held a U. S. Geological Survey disk. The disk is erroneously stamped "Burro—1910–1934." Reference marks are standard disks set in boulders according to note 12c. No. 1 is 5.265 meters (17.27 feet) from station in azimuth 165°35′, and No. 2 is 12.263 meters (40.23 feet) from station in azimuth 83°32′. The azimuth mark, a standard disk set in a boulder according to note 12c, is on the summit of the timbered mountain northwest of the station, at a point 50 feet west of the highest point of the hill, 50 feet south of the east-west fence, 10 feet southeast of a 12-inch pine tree, and 0.5 mile from station in azimuth 137°40′51″. A drill hole in a boulder about 1½ feet lower than the station and 3.156 meters (10.35 feet) distant, is in azimuth 106°52′.

Plane coordinates: (W), x=315,586.89 feet; y=579,107.40 feet; the grid azimuth to the azimuth mark=138°00′12″.*

Lordsburg (Hidalgo County, L. C. Johnson, 1934).—On northwest corner of Lordsburg High School grounds, in sec. 36, T. 22 S., R. 18 W., about 12 feet south of north fence, and 7.6 feet from west fence. Surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 2 is 18.953 meters (62.18 feet) from station in

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

azimuth 275°52′, No. 3 is 5.662 meters (18.58 feet) from station in azimuth 40°13′, and No. 1 (azimuth mark) is about 1.3 miles north of point where U. S. Highway 80 passes through underpass, 50 feet west of center line of road, 6 feet west of fence, in fence corner on west side of road, and approximately 1½ miles from station in azimuth 189°11′59″. Azimuth from station to water tank, ½ mile distant, is 355°49′32″.

Plane coordinates: (W), x=228,759.48 feet; y=492,206.84 feet; the grid azimuth to reference mark No. 1=189°40′11″.*

Guthrie (U. S. G. S.) (Greenlee County, Ariz., L. C. Johnson, 1934).—About 20 miles east of Safford, about 14 miles northwest of Duncan, in sec. 25, T. 6 S., R. 30 E. and on pointed hill which is highest in vicinity. To reach from Duncan, go north and west 27 miles on U. S. Highway 70 (or go east 16 miles from Safford on U. S. Highway 70) to junction of U. S. Highway 70 and State Highway 81, go northeast 13.8 miles on State Highway 81 to canyon where road turns left and dim road goes up canyon, follow road up canyon about 0.3 mile to its end. Station is on pointed peak to southeast. Best ascent is by going up canyon, taking right fork to saddle, then following ridge to south and station. Station was remarked (in 1934) with standard disk set in boulder according to note 4. Reference marks are standard disks set in boulders according to note 12c, No. 1 is 8.610 meters (28.25 feet) from station in azimuth 217°08′, and No. 2 is 18.212 meters (59.75 feet) from station in azimuth 159°07′.

Sunset (U. S. G. S.) (Greenlee County, Ariz., L. C. Johnson, 1934).—About 6 miles northeast of Clifton, in sec. 32, T. 3 S., R. 30 E., on Sunset Peak. To reach from post office, in Clifton, cross railroad tracks to right, turn left and follow road up southwest side of San Francisco River 0.6 mile, cross bridge and follow main road 5.1 miles, take right fork where main road crosses river and go 0.5 mile to Wm. McBride's place, follow trail which is about 100 yards east of farmhouse to top of ridge, and then go up ridge in northeasterly direction to peak and station site. Marked with standard U. S. Geological Survey tablet in drill hole in boulder, stamped as being 5,900 feet above sea level. Reference marks are standard disks set in boulders according to note 12c, No. 1 is 16.650 meters (54.63 feet) from station in azimuth 213°36′, and No. 2 is 8.113 meters (26.62 feet) from station in azimuth 346°25′. *Rose Peak Lookout* may be used as an azimuth mark.

Plane coordinates: (W), x=73,391.26 feet; y=774,903.02 feet; the grid azimuth to *Rose Peak Lookout*=159°58′42″.*

Bryce (U. S. G. S.) (Graham County, Ariz., L. C. Johnson, 1934).—About 12 miles air line north of Safford, and on sharp, prominent peak in Gila Mountain Range. To reach from Safford, go northwest on U. S. Highway 70 to Pima, thence north 2.5 miles on Indian Hop Springs road to Bryce School, take right fork and go 11.5 miles to water tank, follow dim rocky trail up south canyon to saddle, then go almost due east to base of sharp peak or cliff, and climb through broken spot in rock wall to top and station site. Climb to station takes 2½ to 3 hours. Marked with standard U. S. Geological Survey tablet set in drill hole in rock. Reference marks are standard disks set in bedrock according to note 12a, No. 1 is 14.50 meters (47.6 feet) from station in azimuth 147°28′, and No. 2 is 7.55 meters (24.8 feet) from station in azimuth 220°58′.

Arimex (Arizona-New Mexico Boundary, L. C. Johnson, 1934).—About 4.0 miles northeast of Duncan, Arizona, on Arizona-New Mexico Boundary. To reach from post office in Duncan, go east across Gila River Bridge, turn left (north) and go 0.7 mile (from post office), turn right (east) and go 0.4 mile, turn left (north) and go 3.9 miles to station site about 13 feet east of center of road. Station marked with a standard disk set in concrete, according to note 1a. There may be an underground mark, a standard disk set in concrete, note 7a. Reference marks are standard disks set in concrete according to note 11a, No. 1 is 9.938 meters (32.60 feet) from station in azimuth 286°57′, No. 2 is on west side of road, and 20.250 meters (66.44 feet) from station in azimuth 75°01′ and No. 3 (azimuth mark) is about 75 feet northwest of road at point where road makes turn to south and goes down into valley to west, and 0.35 mile from station in azimuth 72°39′35″.

Plane coordinates: (W), x=126,857.39 feet; y=644,999.00 feet; the grid azimuth to reference mark No. 3=73°19′00″.*

Telephone (Grant County, L. C. Johnson, 1934).—About 8 miles east of the Gila post office, in sec. 25, T. 15 S., R. 16 W., and on northern peak of what is

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

locally known as Telephone Ridge. To reach from Gila Post Office, go north 0.2 mile, turn right (east) onto graded road and go 3.0 miles, turn right onto farm road and go 0.8 mile to farmhouse, pass to north of house and go east 0.1 mile, turn right and go 1.8 miles through wash (arroyo), turn left out of wash and go 0.25 mile along fence, turn left and go 1.0 mile on road up wash, go up point of ridge in easterly direction 0.7 mile, go east 0.7 mile on trail leading up hill to ridge running south from station, and follow ridge north to summit and station site. Station and reference marks are standard disks set in bedrock according to notes 2a and 12a. Reference mark No. 1 is 20.441 meters (67.06 feet) from station in azimuth 162°54′, and No. 2 is 9.390 meters (30.81 feet) from station in azimuth 283°26′.

Plane coordinates: (W), x=293,062.19 feet; y=710,675.57 feet.

Mogollon (Catron County, L. C. Johnson, 1934).—About 25 miles north of the town of Cliff, in Mogollon Mountain Range, on prominent peak known locally as Old Baldy, and 36.90 feet due south of Forest Service lookout tower which is known as *Mogollon-Baldy Lookout*. To reach from the Gila Post Office, go 0.6 mile on road toward Cliff to bridge across Gila River, continue straight ahead 0.7 mile to T-fork, turn right and go 2.1 miles to red ranch house on right side of road, turn left, cross cattle guard, and go 7.3 miles, take right fork and go 3.5 miles to Shelly Ranch (916 ranch), from here proceed north 25 miles on horseback by trail to station site. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 19.238 meters (63.12 feet) from station in azimuth 195°22′, and No. 2 is 23.92 meters (78.48 feet) from station in azimuth 253°46′.

Plane coordinates: (W), x=267,566.56 feet; y=827,095.60 feet.

Tularosa (Catron County, L. C. Johnson, 1934).—About 10 miles east-southeast of Reserve, on Eagle Peak in Tularosa Mountain Range, and close to Eagle Peak lookout tower. To reach from Reserve post office, follow Magdalena road 2.3 miles, turn right onto Polk Mesa road and go 0.7 mile, take right fork and follow road to end which is 12.8 miles from last fork. From end of truck travel continue up canyon on blazed trail about 1½ miles to fork, take right fork and go ½ mile to saddle, take left fork of trail through gate in fence and continue ½ mile to lookout tower and station. It is an easy pack of about 1¾ hours. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 7.10 meters (23.3 feet) from station in azimuth 304°26′, and No. 2 is 5.70 meters (18.7 feet) from station in azimuth 261°45′. Following azimuths are from station: Tularosa (U. S. G. S.) 4.565 meters (14.98 feet), 150°06′; *Tularosa Lookout* (Eagle Peak lookout tower), distant 8.350 meters (27.39 feet), 159°57′.

Plane coordinates: (W), x=273,958.07 feet; y=974,554.27 feet.

Cliff (Grant County, L. C. Johnson, 1934).—About 30 miles northwest of Silver City, on mesa ½ mile east of Cliff post office. To reach from Cliff post office which is on U. S. Highway 260, take right fork leading past schoolhouse and follow main-traveled road 0.8 mile to top of mesa where fence runs north and south and road makes left curve. Station is 30 paces south-southeast of fence corner. Surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 11.220 meters (36.81 feet) from station in azimuth 227°03′. No. 2 is 11.810 meters (38.75 feet) from station in azimuth 317°52′, and No. 3 (azimuth mark) is in azimuth 49°57′05″.

Plane coordinates: (W), x=264,056.13 feet; y=716,015.43 feet; the grid azimuth to reference mark No. 3=50°22′12″.*

Whiterocks (U. S. G. S.) (Catron County, L. C. Johnson, 1934).—About 15 miles northwest of Glenwood post office, on Whiterocks Mountain, on the southernment of three peaks in sec. 30, T. 9 S., R. 21 W. To reach from Glenwood post office, follow U. S. Highway 260 north 10.9 miles, turn west onto road to S. F. Spurgeon's farm, continue past house, turn left down river and cross river, turn right through gate at 0.8 mile from highway and follow road 3.7 miles, take right fork and go 1.4 miles, pass through fence, turn right and go 0.25 mile to flat. From this point truck can be driven 2.3 miles in direction of mountain. Go west up ridge to junction with other ridge, then northwest to station. Mark is standard U. S. Geological Survey tablet set in boulder. Reference marks (1934) are standard disks set in bedrock according to note 12a, No. 1 is 4.490 meters (14.73

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

feet) from station in azimuth 231°55′ and No. 2 is 10.550 meters (34.61 feet) from station in azimuth 132°08′. *Rose Peak Lookout* may be used as an azimuth mark.

Plane coordinates: (W), x=131,236.62 feet; y=912,735.24 feet; the grid azimuth to *Rose Peak Lookout*=77°46′07″.*

Rose (Greenlee County, Ariz., L. C. Johnson, 1934).—About 25 miles north of Clifton, in sec. 8, T. 1 N., R. 29 E., on Rose Peak, and 150 yards south of *Rose Peak Lookout.* To reach from Clifton post office, follow State Highway 81 (Coronado Trail) north toward Springerville 43.7 miles to sign on north side of Rose Peak (sign points to *Rose Peak Lookout*), follow this road about 100 yards to end of truck travel, then take trail to summit and station. Station and reference marks are standard disks set in rock according to notes 4 and 12a. Reference mark No. 1 is 11.255 meters (36.93 feet) from station in azimuth 169°05′, and No. 2 is 9.690 meters (31.79 feet) from station in azimuth 24°35′.

Escadilla (U. S. G. S.) (Apache County, Ariz., L. C. Johnson, 1934).—About 7 miles north of Alpine, in sec. 6, T. 6 N., R. 31 E., and directly under center of lookout tower of Escudilla Mountain. To reach from store in Alpine, go 5.8 miles toward Springerville, turn right onto side road and follow about 4 miles to end of truck travel, and follow trail to lookout tower and station. Marked by standard U. S. Geological Survey tablet set in boulder. Reference marks are standard disks set in boulders, note 12c, No. 1 is 21.590 meters (70.83 feet) from station in azimuth 261°23′, and No. 2 is 10.304 meters (33.81 feet) from station in azimuth 326°19′.

Plane coordinates: (W), x=109,460.43 feet; y=1,074,634.87 feet.

Blue (U. S. G. S.) (Greenlee County, Ariz., L. C. Johnson, 1934).—About 18 miles southwest of Alpine, about 10 miles west-southwest of town of Blue, about 5 miles southeast of Hannagan Medows, on same mountain as Blue Lookout. The mountain is situated on what is known as Mogollon Rim, and is on boundary of Crook and Apache National Forests. To reach from Alpine, go southwest 25.0 miles on State Highway 81 (Coronado Trail) to store at Hannagan Medows, continue 7.1 miles to cattle guard across road at boundary of Crook and Apache National Forests, turn left and go about 100 feet, turn right onto old wagon road and follow it east 3.4 miles to end of road at base of peak, go 1.0 mile almost due east along blazed trail to lookout tower and station. Do not take trail to ranger's cabin. Station is directly under lookout tower and is marked with standard U. S. Geological Survey tablet in drill hole in rock. Reference marks are standard U. S. Geological Survey tablets in drill holes in rock. No. 1 is 10.480 meters (34.38 feet) from station in azimuth 204°52′, and No. 2 is 16.840 meters (55.25 feet) from station in azimuth 323°28′. *Rose Peak Lookout* and *Bear Mountain Lookout* may be used as azimuth marks.

Chusca (McKinley County, E. B. Latham, 1934).—About 25 miles north of Gallup, about 4½ miles northwest of Tohatchi, on Navajo Indian Reservation, and on a sharp peak which lies west of Tohatchi Mountains. To reach from railroad in Gallup, go north 22.8 miles on U. S. Highway 666, turn left and go 0.7 mile, turn right and go 0.4 mile, turn left and follow road up canyon 8.3 miles, take left fork and go 0.6 mile, leave main road and go 0.7 mile, turn left and go 1.1 miles, pass through gate and go 0.5 mile along west side of fence line to end of truck travel, follow old fence road about ¼ mile, go east to top of ridge, then south along ridge to station. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 3.752 meters (12.31 feet) from station in azimuth 280°09′, and No. 2 is 6.911 meters (22.67 feet) from station in azimuth 162°21′.

Plane coordinates: (W), x=202,655.87 feet; y=1,778,900.23 feet.

Tohatchi (McKinley County, E. B. Latham, 1934).—About 26 miles north of Gallup, about 15 miles east of Arizona-New Mexico State line, about 3 miles north by west of Tohatchi (an Indian school and trading post), on southern Navajo Indian Reservation, and on extreme eastern point of summit of Chuska Peak. Inquire at trading post for directions to station. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 12.030 meters (39.47 feet) from station in azimuth 187°45′, and No. 2 is 10.160 meters (33.33 feet) from station in azimuth 125°52′. Azimuth from station to Tohatchi, standpipe, is 351°47′48″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Plane coordinates: (W), x=221,842.86 feet; y=1,787,159.03 feet; the grid azimuth to Tohatchi, standpipe=352°20′51″.*

Hosta (McKinley County, E. B. Latham, 1934).—About 13 miles north by east of Thoreau, about 6 miles south-southwest of Crown Point, about 6 miles southeast by south of the southeast corner of Navajo Indian Reservation, in the southeast part of T. 16 N., R. 13 W., and on west end of prominent butte locally known as Hosta Butte. To reach from Thoreau post office, go east 0.3 mile on U. S. Highway 66, turn left onto Crown Point Road and proceed north 15.3 miles to point where road goes into canyon, turn back sharply to left and go 0.2 mile to fork, take left fork and go 0.2 mile on road down left side of canyon to dam, follow road over dam 0.8 mile to point where road turns sharply to left and goes to top of ridge, follow this road 0.7 mile, take left fork and go 0.7 mile, take left fork and go 0.3 mile, turn right up draw and go straight (west) toward butte 0.6 mile to its foot. From here it is about a 30-minute pack climb to top and then to west or northwest end of butte and station. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 10.315 meters (33.84 feet) from station in azimuth 238°13′, and No. 2 is 12.710 meters (41.70 feet) from station in azimuth 164°30′. *Shiprock, highest point* may be used as an azimuth mark.

Plane coordinates: (W), x=392,707.01 feet; y=1,669,119.48 feet; the grid azimuth to *Shiprock, highest point*=154°52′57″.2.

Ebon (McKinley County, E. B. Latham, 1934; 1936).—About 6 miles northeast of Gallup, on southwest end and highest point of a long ridge that runs southwest and northeast, about 500 feet from south edge of cliff. South side of ridge consists of sheer cliffs and top is wooded. To reach from All States Auto Camp at east end of Gallup, follow U. S. Highway 66 east 2.6 miles to dim road to left under railroad trestle (Grand Canyon line), follow dim road 0.3 mile, take right fork and go 1.0 mile, take right fork and go 0.1 mile, take left fork and go 0.4 mile, take left fork and go 1.3 miles, take right fork and go 0.9 mile, just beyond a bridge, take left fork and go 1.1 miles to sharp turn back to left, take this turn and go up grassy canyon that parallels long ridge to right, follow this road about 0.7 mile to end of truck travel. From here station appears to northwest and on highest point of ridge. There are only two places that one can climb up from south side; the going is steep and treacherous and requires about 1½ hours pack. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 13.76 meters (45.14 feet) from station in azimuth 16°41′ and No. 2 is 14.38 meters (47.18 feet) from station in azimuth 80°18′. Station *Knoll* may be used as an azimuth mark.

Plane coordinates: (W), x=248,248.24 feet; y=1,676,439.67 feet; the grid azimuth to *Knoll*= 49°16′49″.7.

Knoll (McKinley County, E. B. Latham, 1934; 1936).—About 5 miles west-southwest of Gallup, on western and highest of two buttes locally known as Twin Buttes and about ¾ mile south of U. S. Highway 66. To reach from west city limits of Gallup, go west 5 miles on U. S. Highway 66 to road going south just east of the buttes which are seen to south, go south on this road 0.8 mile, then up north side of butte to highest point and station site. Station, azimuth and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 8.161 meters (26.77 feet) from station in azimuth 330°00′, and No. 2 is 13.357 meters (43.82 feet) from station in azimuth 124°05′. In 1934 the azimuth mark used was reference mark No. 3 of station *Gallup* and is about 5 miles from station in azimuth 241°40′37″. In 1936 a new azimuth mark, a standard disk set in bedrock according to note 12a, was established 35 feet west of the center line of road, 15 feet west of right-of-way fence at top of knoll, 15 feet south of a lone 10-inch pinon tree, 50 yards south of a telephone line, and 0.5 mile from station in azimuth 200°01′30″. The following distances and azimuths are from station: Stack at coal mine west of Gallup, 6 miles, 217°54′06″; Atchison, Topeka & Santa Fe Railway tank, Gallup, 5 miles 245°54′39″; and Saint Mary's Catholic Hospital, cupola, Gallup, 5 miles, 248°06′17″.

Plane coordinates: (W), x=202,007.73 feet; y=1,636,639.13 feet; the grid azimuth to the 1936 azimuth mark=200°36′23″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Gallup (McKinley County, E. B. Latham, 1934).—In Gallup, on Saint Mary's Hospital grounds, south of main hospital building, at intersection of Woodrow Street and Mesa Avenue, 70 feet west of southwest corner of stone building, and 67 feet east of east curb of Woodrow Street. Surface, underground and reference marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 22.558 meters (74.01 feet) from station in azimuth 43°59′, and No. 2 is 25.132 meters (82.45 feet) from station in azimuth 105°38′. Reference mark No. 3 (azimuth mark) is a standard disk set in bedrock according to note 12a, 75 yards east of a house, 25 yards west of highest point of bluff, 6 feet north of south rim, and about 1 mile from station in azimuth 154°27′08″. To reach reference mark No. 3 from intersection of railroad tracks and Second Street, go north 0.2 mile on Second Street, turn right and go 1 block to First Street, turn left onto First Street and go 0.2 mile, turn right (northeast) onto road between buildings and go 0.2 mile, toward top of bluff.

Plane coordinates: (W), x=231,502.29 feet; y=1,647,916.37 feet; the grid azimuth to reference mark No. 3=154°58′36″.*

G. L. O. Station 7 (San Juan-McKinley Counties, E. B. Latham, 1934).—About 35 miles north of Gallup, on the Navajo Indian Reservation, on fifth standard parallel north. It is the standard ¼ section corner of sec. 33, T. 21 N., R. 17 W. of the New Mexico principal meridian. To reach from intersection of railroad tracks and U. S. Highway 666 in Gallup, go north 36.2 miles on U. S. Highway 666 to highway bridge No. 78, continue north 0.4 mile to point about 100 yards past concrete "Dip", then go east 125 yards to station site in sandy flat. Station and reference marks are General Land Office tablets set in concrete posts. All marks stamped "U. S. C. & G. S." Reference mark No. 1 is 21.730 meters (71.29 feet) from station in azimuth 221°46′. Reference mark No. 2 was not found in 1934.

Plain coordinates: (W), x=256,433.24 feet; y=1,821,265.43 feet.

Stony Butte (San Juan County, E. B. Latham, 1934).—About 25 miles east of Drolet's Trading Post, about 4 miles south of Chaco River, about 2½ miles north of Stony Butte oil camp, 2 miles north of southwest corner of T. 22 N., R. 13 W., ½ mile west of east boundary of the Navajo Indian Reservation, and on southern end of small north-and-south ridge which is most easterly of three or four small ridges on big butte that is largest and highest of all buttes in Stony Butte vicinity. To reach from Crownpoint post office, go north 2.4 miles on main road to well traveled road leading off to left, follow this road 3.0 miles, take right fork and go 25.7 miles on main road to old Indian trading post, continue on same road 0.8 mile to large stone house (Indian council house), continue north 0.5 mile, take left fork and go 0.7 mile, take left fork and go 0.1 mile, take left fork and go 0.2 mile to foot of Stony Butte, and climb up butte to station site. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 42.042 meters (137.93 feet) from station in azimuth 311°29′, and No. 2 is 34.410 meters (112.89 feet) from station in azimuth 236°11′. *Shiprock, highest point*, may be used as an azimuth mark. Azimuth from station to tank, easterly of two, distant 1½ miles is 10°03′19″.

Plane coordinates: (W), x=371,574.45 feet; y=1,862,505.86 feet; the grid azimuth to *Shiprock, highest point*,=141°34′0.1″.6.

Bennett (San Juan County, E. B. Latham, 1934).—About 28 miles south of the town of Shiprock, on the Navajo Indian Reservation, on what is locally known as Bennett Rock. The station is on the southern part of the rock. To reach from the junction of U. S. Highways 666 and 550 in Shiprock, go south 27.8 miles on U. S. Highway 666, turn right off road and go across country about 0.8 mile to the east base of the rock, climb up draw to the ridge then go south up ridge to station site which is on a spur that runs southeast and is about 50 yards northeast of the highest southern part of the rock. The station and reference marks are standard disks set in bedrock, according to notes 2 and 12a. Reference mark No. 1 is 14.892 meters (48.86 feet) from station in azimuth 60°17″, and No. 2 is 20.081 meters (65.88 feet) from station in azimuth 155°41′.

Plane coordinates: (W), x=233,609.22 feet; y=1,957,585.22 feet.

Simpson (U. S. G. S.) (San Juan County, E. B. Latham, 1934).—About 17½ miles south of Farmington, about 1½ miles east of east boundary of the Navajo

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Indian Reservation, in west central part of T. 26 N., R. 13 W., on summit of a long, ridge-like mesa. To reach from Farmington, turn south off Main Street at Avery Hotel and go to railroad station, cross tracks west of station and go south one block, west one block, south one block, then turn right and follow main road westward 0.9 mile to forks reached just after crossing San Juan River, take left fork and go 4.9 miles to forks near top of mesa, take left fork and go 0.1 mile, take right fork and follow main-traveled road southward towards high ground about 12 miles air-line distance, passing old store on right, go 0.4 mile to forks, take center road and go 6.9 miles, take right fork and go 3.6 miles, take left fork and go 1.9 miles, take left fork and go 0.3 mile, leave road and follow along top of mesa to east about 0.5 mile to station which is about 10 feet west of east side of bluff. Station mark is standard U. S. Geological Survey tablet in large pipe extending about 2½ feet above ground. Reference marks (1934) are standard disks set in concrete according to note 11a, No. 1 is 24.560 meters (80.58 feet) from station in azimuth 321°02′, and No. 2 is 19.645 meters (64.45 feet) from station in azimuth 380°51′. Azimuth mark is bench mark E 17 (1927), a standard bench mark disk in concrete post about 5.2 miles by road north of the station, 3.86 meters (12.7 feet) east of road, and in azimuth from station 186°10′44″. *Shiprock, highest point* may also be used as an azimuth mark.

Plane coordinates: (W), x=378,871.93 feet; y=1,993,090.17 feet; the grid azimuth to bench mark E 17=186°25′26.″*

Dike (San Juan County, E. B. Latham, 1934).—About 11 miles southwest of town of Shiprock, on Navajo Indian Reservation, in west central part of T. 11 N., R. 3 W., (Navajo Base Line and Meridian) on ridge running south from the rock (Shiprock) about 1 mile. Station is on rounded knoll which is not as rocky as main ridge and seems set apart from it. To reach from junction of U. S. Highways 666 and 550 in Shiprock, go south 6.7 miles on U. S. Highway 666, turn right onto graded road and go 7.6 miles to point just east of ridge, turn right and go north 1.5 miles along east side of ridge, and proceed west about 200 yards to ridge and station site. Station and reference marks are standard disks set in bedrock according to notes 2a and 12a. Reference mark No. 1 is 6.06 meters (19.9 feet) from station in azimuth 210°19′, and No. 2 is 27.52 meters (90.3 feet) from station in azimuth 16°44′.

Plane coordinates: (W), x=207,141.90 feet; y=2,060,945.45 feet.

Dune (U. S. G. S.) (San Juan County, E. B. Latham, 1934).—About 4 miles south-southeast of Farmington, about 4 miles south of San Juan River, about 1 mile east of southwest corner of T. 29 N., R. 13 W., on top of flat-topped sandy mesa, and 75 feet south of old Simpson-Farmington road. To reach from Avery hotel in Farmington, turn south off main street and go to railroad station, cross tracks west of station and go south 1 block, west 1 block, south 1 block, turn right and follow main road to westward 0.9 mile to fork, reached just after crossing the bridge over San Juan River, take left fork and go 4.7 miles, take right fork and go 0.4 mile, take right fork and go 0.3 mile, take right fork and go 0.4 mile, turn left off road and go about 75 feet to station. Station mark is capped iron pipe (U. S. Geological Survey bench mark) projecting about 1 foot above ground. Reference marks are standard disks set in concrete according to note 11a, No. 1 is 27.830 meters (91.30 feet) from station in azimuth 260°43′ and No. 2 is 30.078 meters (98.68 feet) from station in azimuth 157°42′.

Plane coordinates: (W), x=381,147.68 feet; y=2,063,187.61 feet.

Ute (Montezuma County, Colo., E. B. Latham, 1934; 1936).—About 12 miles west-southwest of town of Cortez, on northern boundary of Southern Ute Indian Reservation, in sec. 13, T. 35 N., R. 18 W., and at middle of sharp hogback, on summit of high, prominent point known as "Ute Peak," highest mountain in immediate vicinity. To reach from Cortez: Follow U. S. Highway 666 southwest towards Shiprock 3.1 miles to schoolhouse on left reached just after crossing river; turn right (west) off U. S. Highway 666 and go 1.0 mile; turn left (south) and go 0.05 mile; take little-used road leading towards mountain and go 0.3 mile; take right fork and follow old road (keeping to main road) towards mountain 4.5 miles to wire fence and gate; continue 0.1 mile to wire corral. From here head northwest towards main ridge leading off mountain and go to top of ridge, then west and southwest up ridge to highest point and station. Three-hour pack. Top of peak is timbered. Marked by standard disk set in boulder according to note 5. Reference marks are standard disks set in

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

bedrock according to note 12a, No. 1 is 12.770 meters (41.90 feet) from station in azimuth 221°55′, and No. 2 is 9.280 meters (30.45 feet) in azimuth 333°30′. Azimuth from station to *Shiprock, highest point* is 4°27′29″ and to rock pinnacle is 346°53′52″.

Plane coordinates: (W), x=225,166.95 feet; y=2,288,069.65 feet; the grid azimuth to *Shiprock, highest point*=5°01′34″.8.

Madden (La Plata-Montezuma Counties, Colo., E. B. Latham, 1934; 1936.)—About 15 miles northwest of Durango, 9 miles north-of-east of Mancos, 7 miles north-northwest of Hesperus, on divide between La Plata and Mancos Rivers, which divide forms county boundary line and also boundary between San Juan and Montezuma National Forests, in sec. 18, T. 36 N., R. 11 W., on high barren peak, known locally as "Madden Peak," second highest barren peak from south in La Plata Range. To reach from Durango, follow U. S. Highway 160 west about 12 miles to small settlement of Hesperus; from Hesperus post office continue west 0.4 mile to side road on right, reached just after crossing bridge; cross railroad tracks, and Madden Peak can be seen directly down road. Follow road northward 4.8 miles to ranch home of Mrs. Little and small schoolhouse on left, and just south of road forks. From ranch house trail goes northwest up left side of ridge, swinging to north up to end of trail and cabin at timber line. From cabin go north and east, and over shale rock, to highest point and station. Forty-minute pack from cabin. Station and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 was 10.168 meters (33.36 feet) from station in azimuth 67°12′ and No. 2, 11.398 meters (37.39 feet) in azimuth 131°56′. In 1936 reference mark reported 10.200 meters (33.46 feet) from station in azimuth 67°12′ was named R. M. No. 1 (1936), and one called R. M. No. 1 (1934) was reported 4.582 meters (15.03 feet) from station in azimuth 259°43′. Azimuth from station to Hesperus Peak, central one of three cairns, is 192°14′37″.

Huerfanita (U. S. G. S.) (San Juan County, E. B. Latham, 1934).—About 16 miles southeast of Bloomfield, 5 miles east-southeast of Angels Rock (very prominent rock in this vicinity), 4½ miles west of Canyon Blanco, in south central part of T. 27 N., R. 9 W., about 8 miles north by east of large mesa which has small buttes on top (known locally as Huerfane Butte), on south end of small flat-topped mesa that rises about 75 feet above top of larger flat-topped mesa, near south end of and about 50 feet east of west rim of mesa. To reach from Bloomfield, go south 0.8 mile on State Highway 55 to south end of bridge across San Juan River, continue on same road 16.5 miles to wagon road that crosses highway, turn left and go 0.5 mile, take left fork and go 7.9 miles to forks of two large washes, leave road and bear right about 100 feet, bear more to right and go about 75 feet along bank of wash to old road leading out of wash to left, follow this road 0.9 mile to point of rocks on left side of road, turn left (leaving road) and go 0.3 mile to end of truck travel. From here go up dry arroya on right toward south end of butte keeping to all right-hand branches of arroya and go to head of branch, turn onto ridge to right, continue climbing to right to highest part of butte and station. There are a few places where one can go up over the rocks. It is about a one-hour pack. Marked by standard U. S. Geological Survey tablet set in drill hole in rock outcrop. Reference marks are standard disks set in bedrock according to note 12a, No. 1 is 27.320 meters (89.63 feet) from station in azimuth 255°00′, and No. 2 is 17.485 meters (57.37 feet) from station in azimuth 146°39′.

Plane coordinates: (C), x=49,675.35 feet; y=2,018,077.14 feet. (W), x=514,832.37 feet; y=2,014,527.57 feet.

Piedra (U. S. G. S.) (Archuleta County, Colo., E. B. Latham, 1934; 1936).—About 26 miles southeast of Durango, 11 miles east-southeast of Ignatio, 5 miles north-northeast of Allison, 3 miles west of the Piedra River, on the north end of a high point shown on the maps as Piedra Peak but known locally as Mt. Allison, in T. 33 N., R. 6 W. To reach from Allison go east 2.5 miles, turn left (north) off highway and go 1.0 mile, turn right (east) and go 200 yards to home of Richard Swanemyo, continue by horseback north on the lane west of his place to the end of the road, continue north up ridge, then east by first peak after getting up on bench land. From here climb to the high point to the north, go over its summit and swing to the west, cross saddle and climb peak west, to the highest point and station site. Station mark is 6 meters southeast of edge of bluff. Station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 13.24 meters (43.4 feet) from station in azimuth 258°52′, and No. 2 is 29.00 meters (95.1 feet) from

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station in azimuth 358°59′. Azimuth from station to Chimney Rock, 10 miles distant is 229°07′.

Plane coordinates: (C), x=148,368.75 feet; y=2,217,915.23 feet. (W), x=610,187.46 feet; y=2,215,940.00 feet.

Supplementary points

Lordsburg, water tank (Hidalgo County, L. C. Johnson, 1934).—Plane coordinates:[1] (W), x=229,374 feet; y=491,802 feet.

Mulligan Peak (Greenlee County, Ariz., L. C. Johnson, 1934).—Plane coordinates:[1] (W), x=83,330 feet; y=789,928 feet.

Mogollon-Baldy Lookout (Catron County, L. C. Johnson, 1934).—Plane coordinates:[1] (W), x=267,584 feet; y=287,128 feet.

Rose Peak Lookout (Greenlee County, Ariz., L. C. Johnson, 1934).—No description of this station available.

Bear Mountain Lookout (Greenlee County, Ariz., L. C. Johnson, 1934).—Plane coordinates:[1] (W), x=100,702 feet; y=924,057 feet.

Tularosa Lookout (Catron County, L. C. Johnson, 1934).—Plane coordinates:[1] (W), x=273,949 feet; y=974,580 feet.

G. L. O. Station 9 eccentric (McKinley County, E. B. Latham, 1934).—About 25 miles southeast of Gallup, about 10 miles southeast of McGaffey, on wooded ridge running east and west, on saddle separating two small peaks of this ridge. To reach from Gallup, follow Highway 66 east about 12 miles to Wingate railroad station, turn south through stone gate and go 2.8 miles to old Fort Wingate; at trading post take right fork and follow main road 8.2 miles to forks at far end of town of McGaffey, take left fork and follow main road 6.8 miles to cross road at schoolhouse, turn left and go 2.2 miles to where road turns south, go through gate east 1.1 miles, go through gate at entrance to ranch, continue on about 200 feet, turn left and follow road northeast 0.4 mile, take right fork and go 1.0 mile; from here station is best reached by a ten-minute walk to top of ridge (south), turn east and go about ⅛ mile. Station is marked with a standard General Land Office tablet in sandstone outcrop. G. L. O. Station 9 is similarly marked and is 69.175 meters (226.95 feet) (slope distance) from station in azimuth 312°49′. Reference mark No. 1 is also similarly marked, and is 66.375 meters (217.77 feet) from station in azimuth 323°56′.

Plane coordinates: (W), x=339,851.77 feet; y=1,572,703.32 feet.

G. L. O. Station 8 eccentric (San Juan County, E. B. Latham, 1934).—About 10 miles north of Gallup, near *G. L. O. Station 8* and identical with reference mark No. 2 of that station. To reach from Gallup, follow U. S. Highway 666 north 9.0 miles from railroad, turn left off highway, then sharply to right and follow road 0.4 mile, turn right and go 0.2 mile to top of mesa and station. Station marked with a standard General Land Office tablet in concrete block. Reference mark No. 1 is standard General Land Office tablet in concrete block, 26.933 meters (88.36 feet), from station in azimuth 274°48′. *G. L. O. Station 8*, marked with a General Land Office tablet in concrete block, is 20.304 meters (66.61 feet) from station in azimuth 337°04′. All marks are stamped "USC&GS".

Plane coordinates:[1] (W), x=220,627 feet; y=1,694,579 feet.

G. L. O. Station 8 (McKinley County, E. B. Latham, 1934).—About 10 miles north of Gallup, at the standard quarter-section corner of sec. 32, T. 17 N., R. 18 W., marked with a standard General Land Office tablet stamped "USC&GS" and set in concrete block. Station is 20.304 meters (66.61 feet) in azimuth 337°04′ from *G. L. O. Station 8, eccentric.*

Plane coordinates:[1] (W), x=220,653 feet; y=1,694,517 feet.

G. L. O. Station 6 eccentric (San Juan County, E. B. Latham, 1934).—Just south of Pueblo Bonito, near McKinley County line, and close to standard corner of secs. 35 and 36, T. 21 N., R. 11 W. which is named *G. L. O. Station 6.* To reach station from Main Street in Farmington, follow Miller Street south 0.6 mile across Animas River bridge, turn left and go 12.6 miles to Bloomfield, follow State Highway 55 south and southeast 29.2 miles to Otis's store, turn right and follow main road and signs to "Chaco Canyon National Monument, Pueblo Bonito" 22.2 miles, cross Chaco Canyon arroya and follow main road toward Crown Point 4.2 miles to cattle guard. Station marked by standard General Land Office tablet in concrete, 410.47 feet from station in azimuth 273°46′48″. *G. L. O. Station 6* is marked with a standard General Land Office

[1] No check on this position.

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disk in concrete, and is in north-south fence line, 0.1 mile from cattle guard mentioned above, and 393.65 feet from station in azimuth 283°56′04″. Distance between reference mark No. 1 and *G. L. O. Station 6* is 73.13 feet. All marks are stamped "USC&GS 1934".

Plane coordinates: (W), x=460,264.22 feet; y=1,820,115.97 feet; the grid azimuth to reference mark No. 1=273°51′32″.*

G. L. O. Station 6 (San Juan-McKinley County Line, E. B. Latham, 1934).—The station is the standard corner of secs. 35 and 36, T. 21 N., R. 11 W. Marked by standard General Land Office tablet, stamped "USC&GS 1934." For directions to reach station see description of *G. L. O. Station 6 eccentric* which is similarly marked.

Plane coordinates:[1] (W), x=460,646 feet; y=1,820,021 feet.

Carson (San Juan County, E. B. Latham, 1934).—About 25 miles southeast of Farmington, about 0.8 mile west of the standard corner of secs. 31 and 36, T. 25 N., Rs. 10 and 11 W. To reach from Avery Hotel in Farmington, go southwest across San Juan River bridge, go south 4.7 miles to top of mesa, take left fork and go 0.3 mile, take left fork and go southeast 7.9 miles along telephone line, take right fork and go 1.2 miles, take left fork and go 10.1 miles to Carson's store, from here go south 0.1 mile into Gallegos Arroyo, go up arroyo 0.2 mile, turn right out of arroyo and go 0.8 mile passing to right of shearing pens, take right fork and go 1.3 miles, take right fork and go 3.0 miles, take right fork and go 0.5 mile, turn left and go east 1.9 miles to top of mesa, take left fork and go 0.8 mile to where road comes up over ridge, take right fork (dim road) and go 0.1 mile to station site. Station is on the highest point, 35 yards south of road, and 25 yards east and north of where ridge breaks off to the west and south. Station was marked in 1931 by General Land Office, and is probably standard disk of that organization set in concrete. Reference marks (1934) are standard disks set in concrete according to note 11a, No. 1 is 20.112 meters (65.98 feet) from station in azimuth 17°21′, and No. 2 is 23.557 meters (77.29 feet) from station in azimuth 104°30′.

Plane coordinates: (W), x=463,224.90 feet; y=1,947,726.45 feet.

G. L. O. Station 5 (San Juan County, E. B. Latham, 1934).—The station is the standard corner of secs. 31 and 36, T. 25 N., Rs. 10 and 11 W. To reach the station from the top of mesa mentioned in description of station *Carson* proceed as follows: Take left fork and go 0.8 mile, take left fork and go 0.15 mile, take left fork (straight ahead) and go 0.35 mile, take right fork and go 0.1 mile, turn left (before road starts down hill to southeast) and go 0.2 mile to station site, about 10 feet south of where ground slopes off to the south, and a few feet lower than edge of ridge. Station and reference marks are standard General Land Office tablets set in concrete posts. Reference mark No. 1 is 21.375 meters (70.13 feet) from station in azimuth 222°39′ and No. 2 is 21.318 meters (69.94 feet) from station in azimuth 133°19′.

Plane coordinates: (W), x=466,796.35 feet; y=1,946,809.79 feet.

G. L. O. Station 4 (San Juan County, E. B. Latham, 1934).—About 10 miles southwest of the Town of Shiprock in the Navajo Indian Reservation. It is the standard corner of secs. 31 and 36, T. 29 N., Rs., 18 and 19 W. To reach from junction of U. S. Highways 666 and 550 in Shiprock, go south 6.7 miles on U. S. Highway 666, turn right onto graded road, and go 6.6 miles, turn right off main road and go 0.4 mile on old road, turn right onto old dim road running north-northeast and go 2.2 miles, turn right and go 0.35 mile straight toward clay butte about 2.5 miles to east. Station and reference marks are General Land Office tablets set in concrete posts. Reference mark No. 1 is 22.243 meters (72.98 feet) from station in azimuth 225°19′, and No. 2 is 22.792 meters (74.78 feet) from station in azimuth 135°54′. All marks are stamped "U.S.C.&G.S. 1934."

Plane coordinates: (W), x=219,422.24 feet; y=2,066,771.19 feet.

G. L. O. Station 3 (San Juan County, E. B. Latham, 1934).—The station is the standard corner of secs. 31 and 36, T. 29 N., Rs. 13 and 14 W., located about 5 miles southwest of Farmington, on east boundary of Northern Navajo Indian Reservation. To reach from Avery Hotel in Farmington, go south to depot, follow main-traveled road southwest to San Juan River bridge, proceed south 4.7 miles to top of mesa, take right fork leaving main road and go 0.25

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

mile, continue straight ahead 0.15 mile, take right fork and go 0.25 mile, take left fork and go 0.1 mile, take left fork and go about 100 yards, take right fork and go 0.15 mile, continue straight ahead 50 yards, take right fork and go 0.5 mile, take right fork and go 0.15 mile, take right fork and go 0.4 mile, and follow dim left fork 0.05 mile to station site which is 14 yards south of old road. Station and reference marks are General Land Office tablets set in concrete posts. Reference mark No. 1 is 20.260 meters (66.47 feet) from station in azimuth 232°47′ and No. 2 is 21.900 meters (71.85 feet) from station in azimuth 146°37′. All marks are stamped "USC&GS 1934." Azimuth from station to *Shiprock, highest point* is 91°36′18″.

Plane coordinates: (W), x=377,174.37 feet; y=2,065,541.97 feet; the grid azimuth to *Shiprock, highest point*=91°51′22″.7.

Shiprock, highest point (San Juan County, E. B. Latham, 1934).—A masterpiece of nature near Shiprock, that rises from the desert to an elevation of several hundred feet. Two sharp tips at the top give it the appearance from a distance of a two-mast sailing vessel. This rock has never been climbed. It is a natural azimuth point from all stations seeing it.

Plane coordinates: (W), x=206,082.94 feet; y=2,071,087.04 feet.

New Mexico-Colorado boundary milepost No. 247 (G. L. O. Station 2) (Archuleta County, Colo., Rio Arriba County, N. Mex., E. B. Latham, 1934).—About 3 miles southwest of Allison, Colo., slightly more than 1 mile east of west boundary of R. 6 W., on low, wooded mesa. To reach from Allison post office go west 2.5 miles to point where main road turns north, here turn south and go 1.8 miles to turn in road and triangle-blazed cedar tree, from this tree follow blazed trail to southeast over rocks about 500 yards to station which is about 75 yards beyond rim of hill. Station and reference marks are standard General Land Office tablets set in large concrete posts. Reference mark No. 1 is 18.890 meters (61.97 feet) from station in azimuth 221°21′, and No. 2 is 21.625 meters (70.95 feet) from station in azimuth 131°13′.

Plane coordinates: (C), x=126,367.28 feet; y=2,185,757.41 feet. (W), x=588,727.04 feet; y=2,183,424.30 feet.

Four Corners (G. L. O. Station 1) eccentric (San Juan County, Utah, E. B. Latham, 1934).—Identical with reference mark No. 3 of station *Four Corners (G. L. O. Station 1)* which is marked by standard General Land Office tablet in concrete monument, 279,798 meters (917.97 feet) from station in azimuth 350°15′50″. Station is marked by standard General Land Office tablet in concrete post.

Plane coordinates: (W), x=146,161.47 feet; y=2,186,052.11 feet.

Four Corners (G. L. O. Station 1) (New Mexico, Arizona, Colorado, and Utah boundary lines, E. B. Latham, 1934).—About 36.6 miles (road distance) west of Shiprock, N. Mex., and about 75 yards west of an old abandoned stone building. To reach from junction of U. S. Highways 666 and 550 in Shiprock, go south 0.6 mile on U. S. Highway 666 turn right (west) and go 6.0 miles, take right fork and go 15.3 miles to trading post, continue west 7.4 miles on main road to a well-traveled Indian road, turn right and go 0.45 mile, take right fork and go 6.85 miles on main road to station site. Originally marked by stone post 7 feet by 12 inches by 6 inches set 3 feet in ground, and marked on northeast face "Colo. 37° N. L."; on southeast face "N. Mex. 32° W. L."; on the southwest face "Arizona"; and on northwest face "Utah 1875." In 1931, station was re-marked by standard General Land Office tablet in concrete monument, projecting 2 feet above ground. Originally stamped "G. L. O. #1," and "Four Corners" added in 1934. Reference marks are standard General Land Office tablets in concrete posts, No. 1 is 22.870 meters (75.03 feet) from station in easterly direction, No. 2 is 22.860 meters (75.00 feet) from station in westerly direction, and No. 3, identical with station *Four Corners (G. L. O. Station 1) eccentric*, is 279,798 meters (917.97 feet) from station in azimuth 170°15′51″.

Plane coordinates:[1] (W), x=146,306 feet; y=2,185,146 feet.

G. L. O. Station 15 eccentric (La Plata County, Colo., E. B. Latham, 1934).—Identical with reference mark No. 1 of *G. L. O. Station 15*. To reach from Farmington, go west on main highway 3.0 miles to road leading right just after crossing bridge, follow this road 14.4 miles to La Plata, N. Mex., continue on same road 6.2 miles to road leading right, turn right and go 0.7 mile, take left fork and go 0.8 mile. From here station is on low ridge to left (north). Turn off road and go 0.1 mile to top of ridge and station. Marked by standard General Land Office tablet in concrete post. *G. L. O. Station 15* is 1075.40 feet

[1] No check on this position.

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from station in azimuth 277°43′07″. G. L. O. Station 15, reference mark No. 2 is 809.60 feet from station in azimuth 307°35′02″.

Plane coordinates: (W), x=407,748.67 feet; y=2,203,216.68 feet; the grid azimuth to reference mark No. 2=307°46′28″.*

G. L. O. Station 15 (La Plata County, Colo., E. B. Latham, 1934).—About 30 miles north-northeast of Farmington, N. Mex., 21 miles south-southwest of Hesprus, Colo., 5 miles north of Colorado-New Mexico State line, and is the standard corner of secs. 33 and 34, T. 33 N., R. 12 W. of the New Mexico principal meridian. To reach the station, follow directions in description of *G. L. O. Station, eccentric*, but instead of turning off the road to go to top of ridge, continue 0.1 mile to station on right side of road, 10 feet off road and near large tree. Station and reference marks are standard General Land Office tablets in concrete posts. Reference mark No. 1 identical with *G. L. O. Station 15 eccentric*, is 1075.40 feet from station in azimuth 97°43′15″, and No. 2 is 549 feet from station in azimuth 47°12′01″.

Plane coordinates: [1] *(W), x=408,814 feet; y=2,203,069 feet.*

LOWER RIO GRANDE AREA

Principal points

Reeves (El Paso County, Tex., W. R. Porter, 1934; 1936).—About 14.7 miles north-by-east of El Paso, 4.3 miles west by south of Newman, 0.7 mile south of the state line, on a slight rise on an open mesa covered with cactus and low brush. To reach from Newman schoolhouse, take road passing on the south side of the school and go 3.6 miles, at this point turn left, passing through a wire fence, and go south approximately 0.9 mile to the station. The station, underground, and reference marks are standard disks set according to notes, 1a, 7a, and 11a. Reference mark No. 1 is 23.561 meters (77.30 feet) from station in azimuth 242°56′, and No. 2 is 17.978 meters (58.98 feet) from the station in azimuth 332°57′. *Texas-New Mexico boundary monument No. 195* may be used as an azimuth mark. The following distances and azimuths are from station: Point on road perpendicular to station, approximately 0.8 mile, 175°27′; and highest peak in the Organ Range of Mountains, 158°00′.

Plane coordinates: (C), x=457,501.84 feet; y=360,577.57 feet; the grid azimuth to *Texas-New Mexico boundary monument No. 195*=183°32′59″.**

Bishop (*Dona Ana County*, W. R. Porter, 1936).—About 5.5 miles east of Mesquite, on a very prominent and sharp peak, locally known as Bishop's Cap and shown as Pyramid Peak on the United States Geological Survey topographical map, 50 feet from the north edge, 40 feet from the south edge, and about 10 feet from the east and west edges. The peak is bare of vegetation. The station mark is a standard disk set in a depression in rock according to note 3. The azimuth and reference marks are standard disks set according to notes 13a and 12a. Reference mark No. 1 is 4.749 meters (15.58 feet) from the station in azimuth 228°55′, and No. 2 is 2.962 meters (9.72 feet) from the station in azimuth 355°39′. The azimuth mark is 20 feet east of a road, and approximately 2.0 miles from the station in azimuth 24°51′00″.

Plane coordinates: (C), x=390,644.77 feet; y=433,182.90 feet; the grid azimuth to the azimuth mark=25°02′18″.*

New (Otero County, W. R. Porter, 1936).—About 18.6 miles air line and 21.2 miles by road northeast of El Paso 3.8 miles east of Newman railroad station, 0.15 mile north of the state line, probably in sec. 31, T. 26 S., R. 7 E., in open range land covered with cactus and low brush, 125 feet south of the southwest corner of an old ranch building, 15 feet west of the road leading to a ranch, 28.6 feet north of a fence line, and 0.2 mile north of a point where the road to the ranch and the station makes a T-intersection with the main east-and-west road. To reach from Newman railroad station, turn right through gates south of the railroad station, take the right fork and continue 3.8 miles on main traveled road to a side road to the left, turn left and go 0.2 mile to the ranch and the station. The station, underground, azimuth and reference marks are standard disks set according to notes 1a, 7a, and 11a. Reference mark No. 1 is in an east-and-west fence line, 28.676 meters (94.08 feet) from the station

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] No check on this position.

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in azimuth 8°48′, and No. 2 is 29.169 meters (95.70 feet) from the station in azimuth 100°31′. The azimuth mark is 12 feet north of the east-and-west road, and approximately 0.8 mile from the station in azimuth 75°51′37″. A U. S. General Land Office Mark set in a 4-inch pipe and reported to be stamped "Tps. 26 S., R. 6 E, R. 7 E., S 3, S 31, C C," is 50 feet south of the east-and-west road, and 0.9 mile from the station in azimuth 76°24′38″. The following distances and azimuths are from station: Southwest corner of a house, 125 feet, 194°16′; and T-road intersection, 0.2 mile, 7°43′.

Plane coordinates: (C), x=497,387.86 feet; y=365,575.88 feet; the grid azimuth to the azimuth mark=75°51′53″.*

United States and Mexico boundary monument No. 2 eccentric (Chihuahua, Mexico, J. S. Hill, 1909; 1936).—About 3 miles west of El Paso on top of the first high ridge west of the Rio Grande, and approximately 1 mile west of the boundary line corner between Mexico, New Mexico, and Texas. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 14.282 meters (46.86 feet) from the station in azimuth 234°59′, and No. 2 is 7.890 meters (25.89 feet) from the station in azimuth 148°35′. The azimuth mark is a standard disk set in the southeast corner of the southeast one of four concrete bases supporting a steel pier (most easterly one on the west side of the river) under the Southern Pacific Railroad bridge over the Rio Grande, and is approximately 1 mile from station in azimuth 244°06′16″. *United States and Mexico boundary monument No. 2* is 9.75 meters (32.0 feet) from the station in azimuth 149°58′. The following distance and azimuths are from station: Large smelter stack, 1 mile, 294°08′42″; airway beacon on Beacon Hill, 265°12′16″; and weather vane on the stack of the A. S. & R. Co., 278°31′32″.

Plane coordinates: (C), x=410,929.52 feet; y=285,166.16 feet; the grid azimuth to the azimuth mark=244°15′19″.*

Mastodon (Dona Ana County, W. R. Porter, 1936).—About 15 miles north-northwest of El Paso, Tex., 4 miles southwest of the Strauss railroad station, 3 miles south-of-west of the abandoned railroad station at Mastodon, about 2½ miles north of the Mexican border, on sand flats alongside the southern branch of the Southern Pacific Railroad, opposite semaphore No. 13060, 101 feet north of the north rail of the railroad, 4 feet north of the north right-of-way fence, and about 15 feet south of the center line of a sand-track road. To reach from Strauss post office go southeast on a track road 0.8 mile to three forks and a cattleguard, continue straight ahead through a gate, turn sharp right on right fork (south) and go south on track road 2.35 miles, take right fork and go 0.2 mile to a T-road near deserted buildings at Mastodon station, turn right, parallel to the railroad, and go 2.85 miles to the station. The station mark is a standard disk in tile, projecting 18 inches above the ground, according to note 6a. The azimuth and reference marks are standard disks in tile, according to note 13a. Reference mark No. 1 projects 10 inches, is 50 feet north of the north right-of-way fence, and 14.675 meters (48.15 feet) from the station in azimuth 190°17′. Reference mark No. 2 projects 24 inches, is about one foot north of the right-of-way fence, and 13.240 meters (43.44 feet) from the station in azimuth 79°19′. The azimuth mark projects 10 inches, is on the north side of the railroad and the sand-track road, 14 feet north of the north right-of-way fence, about 7 feet north of the track road, and 0.5 mile from the station in azimuth 262°38′24″. The following distances and azimuths are from station: Railroad semaphore No. 13067, ¾ mile, 264°28′22″; and Strauss Pump House, taller of two black stacks, 4½ miles, 218°08′26″.

Plane coordinates: (C), x=346,810.74 feet; y=297,663.40 feet; the grid azimuth to the azimuth mark=262°54′00″.*

North Anthonys Nose (New Mexico Geodetic Survey) (Dona Ana County, W. R. Porter, 1936).—The station is 13 miles air line southeast of Mesquite, 10 miles air line northeast of Canutilla, 5 miles air line east-northeast of Anthony, on the highest peak of the mountain range north of Anthonys Pass. The station is in rock outcrop 9 feet west of the edge of a small cliff in the peak which is characterized by numerous outcropping strata of rock that give the mountain a banded appearance. The station and reference marks are standard U.S.C.&G.S. and State survey disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 7.286 meters (23.90 feet) from the station in azimuth 156°34′ and No. 2 is 6 feet west of the edge of a perpendicular cliff, 3.47 meters (11.4 feet) from the station in azimuth 319°33′. The azimuth mark, a standard disk set in concrete

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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in the top of a 4-inch cast-iron pipe according to note 13a, is 65 feet west of a 45° angle road fork, 20 feet south of the center line of a track road, and 3 miles from the station in azimuth 74°38′33″. The azimuth from the station to an airway beacon is 294°50′26″.

Plane coordinates: (C), x=412,304.18 feet; y=378,074.39 feet; the grid azimuth to the azimuth mark=74°47′33″.*

Crater (U. S. G. S.) (Dona Ana County, W. R. Porter, 1936).—The station is 3.2 miles air line and 6.5 miles by road south-by-west of Afton, on the extreme southern edge of an extinct volcano. Viewed from the Braidfoot ranch it is the most western of three knobs. The station mark is a standard U. S. Geological Survey disk set flush in a lava outcrop. The reference marks are standard disks set in rock according to note 12a. Reference mark No. 1 is 16.978 meters (57.02 feet) from the station in azimuth 65°23′, and No. 2 is on the north wall of crater, about 5 feet down from the rim, 48.097 meters (157.80 feet) from the station in azimuth 188°35′. Station *Afton* may be used as an azimuth mark.

Plane coordinates: (C), x=285,208.01 feet; y=370,506.15 feet; the grid azimuth to *Afton*=51°46′08″.9.

Afton (Dona Ana County, W. R. Porter, 1936).—The station is 34 miles north of El Paso, Tex., 25 miles southwest of Las Cruces, about 5 miles south-southwest of Afton, on a slight swell in the flat, sand-and-lava country southwest of a prominent extinct volcanic cone, and about 0.4 mile north of track road which runs in a northeast and southwest direction. To reach from the Braidfoot ranch which is about 4 miles by road southeast of Afton, go through the ranch yard, pass by a windmill, turn right on a trail west along a fence line for 0.5 mile, swing left away from the fence on a track road and go 0.6 mile, take right fork and go 4.0 miles, leave the road and go right (north) across country 0.4 mile to the highest point in the immediate vicinity and the station. The station, underground, and reference marks are standard disks set according to notes 1a, 7a, and 11a. Reference mark No. 1 is 17.085 meters (56.05 feet) from the station in azimuth 302°00′, and No. 2 is 17.401 meters (57.09 feet) from the station in azimuth 36°32′. Station *Crater* (*U. S. G. S.*) may be used as an azimuth mark.

Plane coordinates: (C), x=276,782.75 feet; y=363,868.77 feet.

Lava (Dona Ana County, W. R. Porter, 1936).—About 7.7 miles by road and 5.6 miles air line west of Chamberino post office, on top of a small, lava knoll on flat, open, blow-sand-and-lava mesa. A point of lava stone is 4 inches higher and 6 inches south of the station disk. To reach from Chamberino post office, go south 0.3 mile on State Highway 28, turn right (west) and go 0.8 mile to a point where road turns sharp left (south) (there is a grocery store in the southwest corner of the intersection), continue straight ahead (west) past buildings and follow the main-traveled, heady-sand, track road 2.2 miles, take right fork and go 4.1 miles on a dim track road to station *Lava Azimuth* which is 44 steps to the south of the center line of the road. The station is 0.3 mile south-southwest of the azimuth mark. The station, azimuth and reference marks are standard disks set in rock according to notes 2, and 12a. Reference mark No. 1 is 1 foot north of a point where the lava rock breaks off to the south, 5.340 meters (17.52 feet) from the station in azimuth 332°11′, and No. 2 is 6.380 meters (20.93 feet) from the station in azimuth 82°10′. The following distance and azimuths are from station: Windmill on a wooden tower, 1 mile, 1°39′32″; and El Paso beacon, 315°01′35″.

Plane coordinates: (C), x=338,473.60 feet; y=377,710.89 feet; the grid azimuth to *Lava Azimuth mark*=163°12′06″.**

Strauss (Dona Ana County, W. R. Porter, 1936).—The station is 2.8 miles air line northwest of the Strauss post office, on a slight knoll on a large mesa, 26.5 feet east of the center line of a track road and 133 feet west of railroad signal pole No. 12766. To reach from Strauss post office, go northwest on a track road for 3.0 miles to a slight rise and the station site on the right. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1*a*, 7*a*, and 11*a*. Reference mark No. 1 is 4 feet west of the west right-of-way fence, and 18.760 meters (61.55 feet) from the station in azimuth 173°45′, and No. 2, is 2.5 feet west of the west right-of-way fence, and 19.410 meters (63.68 feet) from the station in azimuth 278°18′.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

For notes in regard to marking of stations see p. 90.

The azimuth mark is 48 feet west of the west right-of-way fence, 11 feet east of the center line of the north-south track road, and 0.3 mile from the station in azimuth 317°11′25″. The railroad signal pole No. 12766 is 133.0 feet from the station in azimuth 235°09′.

Plane coordinates: (C), x=349,355.76 feet; y=326,246.62 feet; the grid azimuth to the azimuth mark=317°26′48″.*

Target (Dona Ana County, W. R. Porter, 1936).—About 30 miles north of El Paso, 2 miles northeast of the Dona Ana target range, on a low knoll in the southern foothills of the Organ Mountains, 50 yards north of a track road leading from the Dona Ana target range, and about 2¼ miles north of the boundary line of the military reservation. To reach from El Paso city limits go north 4.0 miles on U. S. Highway 54 to a stone house on the left side of the road, turn left on the target-range road and go 18 miles to a track road leading past a large, steel water tank, turn right 0.3 mile past water tank and go 0.3 mile, take the left fork (northeast) and go 1.5 miles (azimuth mark is 0.6 mile ahead on the main-traveled road at the boundary post on the left side of the road), turn left at a dim fork and follow a track road north 1.9 miles, take left fork and go 2.25 miles to the low knoll and the station. The station and reference marks are standard disks set in rock according to notes 2 and 12*a*. Reference mark No. 1 is 28.170 meters (92.42 feet) from the station in azimuth 316°38′, and No. 2 is 20.354 meters (66.78 feet) from the station in azimuth 48°29′. The azimuth mark, a standard disk set in a tile according to note 13*a*, is 35 feet north of a track road, 3 feet northwest of a boundary post for the military reservation, and 2 miles from the station in azimuth 338°01′14″.

Plane coordinates: (C), x=424,265.61 feet; y=444,115.18 feet; the grid azimuth to the azimuth mark=338°09′04″.*

Cox (Dona Ana County, W. R. Porter, 1936).—About 8.7 miles by road southeast of Organ, 1.3 miles southeast of Cox's ranch, on open range land at the foot of the Organ Mountains, on the east side of the San Augustin Pass, 47 feet southwest of the center line of a road running southeast and northwest. To reach from Organ, go east 2.9 miles on U. S. Highway 70, or about 1.0 mile east of the San Augustin Pass, turn right onto a side road and go 0.6 mile, take the left fork, downhill, and go 3.6 miles, take the right fork leading to Cox's ranch, then take the left fork for 1.5 miles to the station site on the right. The station, underground, and reference marks are standard disks set in concrete according to notes 1*a*, 7*a*, and 11*a*. The station mark projects 4 inches. Reference mark No. 1, projects 8 inches, and is 90 feet southwest of the road, and 30.196 meters (99.07 feet) from the station in azimuth 333°24′, and No. 2, projects 10 inches, and is 27.648 meters (90.71 feet) from the station in azimuth 58°35′. The azimuth mark is a standard disk set in tile, according to note 13*a*, projects 8 inches, is approximately 200 yards north of Cox's ranch, about 50 yards east of the road to ranch, on a slight, bare, sandy rise, and approximately 1.3 miles from the station in azimuth 112°31′54″. The following distances and azimuths are from the station: Windmill at ranch, 1.3 miles, 108°04′; and point on the road perpendicular to the station, 47 feet, 214°42′.

Plane coordinates: (C), x=424,409.22 feet; y=500,650.13 feet; the grid azimuth to the azimuth mark=112°39′47″.*

Kent Azimuth (Dona Ana County, W. R. Porter, 1936).—About 22 miles air line northeast of Las Cruces, 9 miles northeast of Organ, on the west end of a small knoll on the west end of a ridge running down toward the west from the most northern and highest one of three peaks which are close together on Black Mountain. Black Mountain is a spur running east from the San Andreas Range just north of Organ Pass. To reach from Organ go eastward 8.5 miles on State Highway 3 to a ranch track road forking left to the north at a 10-inch iron pipe projecting 2 feet with a sign on side "Salley Mine 3 Mi". Bear left on ranch road and go 1.2 miles to ranch buildings, continue on the main-traveled road 2.6 miles to the Salley Mine buildings. From the Salley Mine follow dim road bearing north and toward mountain 1.8 miles to end of truck travel at foot of mountain. Pack up mountain over first peak to second and highest peak, then down ridge westward 0.5 mile to the station. The station is marked with a standard azimuth disk in a drill hole in outcropping bedrock. Stations *Kent* and *Cox* may be used as azimuth marks.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (C), x=426,509.89 feet; y=548,169.55 feet; the grid azimuth to station *Kent*=261°23′30″.**

Pipe (Dona Ana County, W. R. Porter, 1936).—About 17.5 miles southwest of Las Cruces, 5.3 miles, north-northwest of Afton, on an open, flat mesa, just east of a slight dip, 33 feet south-southwest of the center line of an east-southeast and west-northwest road, 23.5 feet south-southwest of a pipe line which is parallel to the road, and approximately 0.5 mile southeast of a deserted ranch with a windmill. To reach the station from Afton, go north-northwest on the main-traveled road 5.5 miles, turn right on a road which is on the north side of and parallel to the pipe line and go 0.1 mile to a slight rise and the station site on the right. The station and underground marks are standard disks in concrete, according to notes 1a and 7a, and the reference and azimuth marks are set in tile according to note 13a. Reference mark No. 1 is 15 feet south-southwest of the center line of the road, and 18.504 meters (60.71 feet) from the station in azimuth 287°28′, and No. 2 is 16.415 meters (53.85 feet) from the station in azimuth 19°52′. The azimuth mark is 9 feet north-northeast of the center line of the road, 16 feet north-northeast of the pipe line, and approximately 0.4 mile from the station in azimuth 284°41′25″. The following distances and azimuths are from station: Afton, railroad depot, tank, 5.3 miles, 336°44′31″; and windmill at ranch, approximately 0.5 mile, 144°32′.

Plane coordinates: (C), x=273,075.74 feet; y=416,834.55 feet; the grid azimuth to the azimuth mark=285°04′49″.*

San Miguel Lava Cone (New Mexico Geodetic Survey) (Dona Ana County, W. R. Porter, 1936).—The station is 18.4 miles by road south of Las Cruces, 4.7 miles by road northwest of San Miguel, on a lava-shaped cone, and is on the highest point in the vicinity. To reach from the San Miguel schoolhouse, go north 0.4 mile to a dirt T-road crossing a canal, turn west and go 0.3 mile, turn north with the road and go 0.8 mile to a T-road across a canal bridge, turn right after crossing bridge and follow the main-traveled road 0.6 mile, take the middle fork and go 0.8 mile up a wash, take the right fork, leave the wash, and follow a ridge road 1.3 miles, pack east up the cone 100 yards to the highest point and the station. The station mark is a standard State survey disk set in a concrete post. The reference marks are standard disks set in rock according to note 12c. Reference mark No. 1 is 8.079 meters (26.51 feet) from the station in azimuth 257°36′, and No. 2 is 23.140 meters (75.92 feet) from the station in azimuth 356°21′. The azimuth mark is a standard disk set in the northeast corner of a concrete abutment of an irrigation-canal bridge, 15 feet west-northwest of a T-road intersection, and is 1.75 miles from the station in azimuth 292°59′47″.

Plane coordinates: (C), x=335,896.69 feet; y=426,280.36 feet; the grid azimuth to the azimuth mark=293°16′44″.*

Las Cruces Magnetic (Dona Ana County, W. R. Porter, 1936).—The station is the magnetic station "State College." It is on the eastern part of the campus of the New Mexico State Agriculture College in Las Cruces, 130 yards southeast of the east gate post of the gate in the east-west fence which is a few feet south of the swimming pool, and 10 yards west of a small dry arroyo running about 200 yards east of the pump house, and east of and nearly in line with the south side of Hodley Hall. It is marked with a brass magnetic station disk set in a concrete post, 6 by 8 by 30 inches, projecting about 3 inches above the ground, and protected by a heap of sand and gravel. The reference marks are standard disks set according to note 11a. Reference mark No. 1 is 13.911 meters (45.64 feet) from the station in azimuth 93°22′, and No. 2 is 20.878 meters (68.50 feet) from the station in azimuth 174°50′. The azimuth mark, similar to the station mark, is at the north end of the meridian line from the station, 85 feet south of an east-west power line, and 864.65 feet from the station in azimuth 179° 59′32″.

Plane coordinates: (C), x=345,943.53 feet; y=466,732.48 feet; the grid azimuth to the azimuth mark=180°15′30″.*

N.M. D.A. 97 (New Mexico Geodetic Survey) (Dona Ana County, W. R. Porter, 1936).—A station of the Dona Ana County Survey, located on the eastern outskirts of Las Cruces, 175 feet north of the north edge of the city reservoir, and on a sand ridge covered with low brush. The station mark is a State Survey traverse disk set in concrete according to note 1a. The reference marks are

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

For notes in regard to marking of stations see p. 90.

standard reference disks set in concrete according to note 11a. Reference mark No. 1 is 14,980 meters (49.15 feet) from the station in azimuth 336°10′, and No. 2 is 21.174 meters (69.47 feet) from the station in azimuth 72°28′. The following distance and azimuths are from station: Las Cruces water works, center of reservoir, 265 feet, 21°51′; Church spire, 79°58′07″; Men's dormitory, dome, 355°39′56″; and Engineering Building, stucco tower, dome, 358°07′32″.

Plane coordinates: (C), x=343,990.95 feet; y=478,930.41 feet; the grid azimuth to a church spire=80°14′19″.*

Dona Ana (New Mexico Geodetic Survey) (Dona Ana County, W. R. Porter, 1936).—The station is 9.5 miles air line north of Las Cruces on one of the highest and most westerly summits of the Dona Ana Mountains. To reach from the intersection of U. S. Highway 85 and State Highway 3 in the northern outskirts of Las Cruces, go north 4.75 miles on State Highway 3, turn left on a gravel road and go 6.6 miles, turn left (west) along south side of a reserve fence and go 1.0 mile to a fence corner, turn right with the road and go 0.1 mile and then go left on road leading up a draw for 2.1 miles, turn left (south) and go up a canyon 1.3 miles to the end of truck travel, pack south up the face of the mountain to the station. The station is marked by an unstamped state survey disk. Reference mark No. 1 is a standard disk set flush in a rock outcrop according to note 12a, 18.663 meters (61.23 feet) from the station in azimuth 16°04′, No. 2 is a standard disk in a boulder according to note 12c, 15.819 meters (51.90 feet) from the station in azimuth 147°23′. The azimuth mark, a standard disk set in an iron pipe which projects 6 inches above ground, is 0.75 mile from station in azimuth 190°01′02″.

Plane coordinates: (C), x=333,999.80 feet; y=529,319.63 feet; the grid azimuth to the azimuth mark =190°18′22″.*

Jornada (Dona Ana County, W. R. Porter, 1936).—The station is 15.3 miles by road northwest of Organ, 12.7 miles by road north-by-east of Las Cruces, on open range land, 30 meters (98 feet) east of a gravel road leading to the Jornada Experimental Range Headquarters. To reach from Las Cruces, go north on State Highway 3 for 5.8 miles, turn left (north) onto a gravel road and go 6.9 miles to the station site on the east of the road. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 21.309 meters (69.91 feet) from the station in azimuth 300°18′, and No. 2 is 20.850 meters (68.41 feet) from the station in azimuth 34°40′. The azimuth mark is 30 feet west of the center line of the road, and 0.4 mile from the station in azimuth 355°07′06″. Station *Dona Ana* may also be used as an azimuth mark.

Plane coordinates: (C), x=350,168.08 feet; y=538,035.29 feet; the grid azimuth to the azimuth mark=355°22′45″.*

Tonuco (New Mexico Geodetic Survey) (Dona Ana County, W. R. Porter, 1936).—About 26 miles north-northwest of Las Cruces, 9 miles south-southeast of Hatch, 2 miles east of U. S. Highway 85, on the southern part of the top of a very black, flat-topped peak known as Tonuco Mountain. To reach from the post office in Hatch, go east and south 9.2 miles on U. S. Highway 85, turn left on a gravel road and go 1.2 miles, cross a drainage ditch, turn right (south) and go 0.6 mile, turn left around an old river bed and go 0.6 mile, take right fork and go 0.1 mile, cross railroad track and go through a gate, 25 yards beyond the gate take the left fork for 0.1 mile, take the right fork past old adobe remains and continue 0.25 mile to an old building site and end of truck travel from where it is a 1-hour pack straight to the top. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 11.711 meters (38.42 feet) from the station in azimuth 242°05′, and No. 2 is 19.872 meters (65.20 feet) from the station in azimuth 340°02′. The azimuth mark, a standard disk set in concrete according to note 11a, is 40 feet east of the center line of U. S. Highway 85, five feet east of the right-of-way fence, 85 feet southeast of culvert No. 1504, and 2 miles from the station in azimuth 69°53′43″.

Plane coordinates: (C), x=273,078.30 feet; y=583,697.41 feet; the grid azimuth to the azimuth mark=70°17′32″.* (W), x=760,673.00 feet; y=583,958.41 feet; the grid azimuth to the azimuth mark=69°26′21″.*

Fort (Dona Ana County, W. R. Porter, 1936).—About 15 miles southeast of Hatch, about 5 miles west of Old Fort Sleden, on a flat mesa about 2 miles

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

west of U. S. Highway 85. To reach from Hatch post office, go south 17.0 miles on U. S. Highway 85, just north of where the road bends to the southeast between high bluffs and river, here turn right up a wash which runs under a concrete highway bridge, follow the left side of a dirt levee 0.35 miles, bear to the left up a sandy wash 1.85 miles, bear to the left up on the mesa 0.15 mile to the highest point and the station. The station, underground, azimuth, and reference marks are standard disks set in concrete and tile according to notes 6a, 7a, and 13a. Reference mark No. 1 is 22.146 meters (72.66 feet) from the station in azimuth 237°39′, and No. 2 is 16.248 meters (53.31 feet) from the station in azimuth 302°24′. The azimuth mark is on a small knoll and is approximately 0.25 mile from the station in azimuth 74°36′57″.

Plane coordinates: (C), x=268,743.28 feet; y=546,606.43 feet; the grid azimuth to the azimuth mark=75°01′08″.*

Hawk (Dona Ana County, W. R. Porter, 1936).—About 14.5 miles west-northwest of Las Cruces, on a conical shaped hill which is covered with rocks and grass and on the eastern edge of a range of hills running northeast and southwest. To reach the station, go west 7.65 miles on U. S. Highway 80 from the junction of U. S. Highways 80 and 85 at the west edge of Las Cruces, turn right and go 6 miles to Corrolitas ranch, and follow a track road northward 5.4 miles to the Hawkens ranch from which the station can be seen 1.5 miles toward the northwest at a magnetic bearing of 296°. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 6.222 meters (20.41 feet) from the station in azimuth 333°17′ and No. 2 is 6.507 meters (21.35 feet) from the station in azimuth 120°44′. The azimuth mark, a standard disk set in concrete according to note 11a, is about 200 feet west of the ranch house, 12 feet north of a track road, 2 feet west of a fench line which is at the west edge of the Hawkens ranch yard, and approximately 1.0 mile from the station in azimuth 306°41′21″. The following distances and azimuths are from the station: Hawkens ranch, windmill, approximately 1.0 mile, 305°07′47″; Corrolitas ranch, windmill, approximately 4.5 miles, 358°08′07″.

Plane coordinates: (C), x=266,608.30 feet; y=505,849.17 feet; the grid azimuth to the azimuth mark=307°05′39″.*

Tab (Dona Ana County, W. R. Porter, 1936).—About 14 miles west-southwest of Las Cruces, on a slight rise on an open mesa covered with small brush, 50 feet south of the center line of U. S. Highways 70 and 80. To reach from the over-pass in Las Cruces, go west 13.8 miles on U. S. Highways 70 and 80 to station site on the left. The station, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 90 feet south of the center line of the highway, and 11.127 meters (36.51 feet) from the station in azimuth 355°07′. Reference mark No. 3 of station *Table* is 50 feet south of the center line of the highway, and 9.454 meters (31.02 feet) from the station in azimuth 81°28′. Stations *Table* and *NM DA 55* (*N. Mex. Geodetic Survey*) may be used as azimuth marks.

Plane coordinates: (C), x=266,083.82 feet; y=460,038.56 feet; the grid azimuth to station *Table*=83°12′23″.3.

Range (Dona Ana County, W. R. Porter, 1936).—About 23.5 miles by road north of Las Cruces, 0.9 mile west-by-north of the Jornada Experimental Range Headquarters buildings (see description of station *Blow*), 0.5 mile northwest of a C. C. C. barracks, on the highest point of a slight rise on the open range land. The station, underground, azimuth and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 21.693 meters (71.17 feet) from the station in azimuth 20°09′, and No. 2 is 23.815 meters (78.13 feet) from the station in azimuth 102°30′. The azimuth mark is 36 feet west of the center of a cattle guard, 7 feet east of a telephone pole, 6 feet south of a fence, and 0.7 mile from the station in azimuth 261°52′09″.

Plane coordinates: (C), x=345,010.44 feet; y=589,714.80 feet; the grid azimuth to the azimuth mark=262°08′26″.* (W), x=832,512.97 feet; y=591,047.04 feet; the grid azimuth to the azimuth mark=261°17′13″.*

Blow (Dona Ana County, W. R. Porter, 1936).—The station is 45.4 miles by road north of Las Cruces, 22.8 miles north of the Jornada Experimental Range Headquarters, 22 miles air line northeast of Rincon, at the highest point of a

*This azimuth has been computed by the first formula (p. 95), neglecting the second term

range of shifting sand hills, 0.2 mile north of a deserted ranch house, on the west side of an old ranch road, and 165 feet west of a fence line. To reach the station from Las Cruces, go north 5.8 miles on State Highway 3, turn north and go 10.6 miles on a gravel road, take the right fork and go 5.9 miles, take the right fork and go 0.2 mile to the Jornada Experimental Range Headquarters office, go east 0.1 mile to a T-intersection, turn left (north) and go 0.4 mile to crossroads, turn left (north) along the east side of a fence and go 10.9 miles to a cattle guard at the northern boundary of the experimental range, continue north on ranch road 2.4 miles, pass through a cattle guard west of a ranch house, turn east and follow a ranch road east and north 8.8 miles to a deserted ranch house, continue north on a very dim road along the west side of a fence 0.2 mile to the station site, 150 feet west of the track road. The station, underground, and reference marks are standard disks set in concrete and tile according to notes 6a, 7a, and 13a. Reference mark No. 1 is 21.035 meters (69.01 feet) from the station in azimuth 225°17′, and No. 2 is 31.420 meters (103.08 feet) from the station in azimuth 286°44′. The azimuth mark, a standard disk set in concrete according to note 11a, is 240 feet west-southwest of a deserted ranch house, 2 feet west of a fence line, 0.2 mile from the station in azimuth 354°00′48″. Azimuth from station to the peak of a gabled roof 0.2 mile away is 346°05′.

Plane coordinates: (C), x=335,691.71 feet; y=668,809.50 feet; the grid azimuth to the azimuth mark=354°18′13″.* (W), x=822,012.36 feet; y=670,002.37 feet; the grid azimuth to the azimuth mark=353°26′41″.*

Upham (Sierra County, W. R. Porter, 1936).—About 5 miles southeast of Upham, 1.7 miles west of a ranch road, and about 15 feet northwest of a shallow hole about 10 feet in diameter. To reach from Old Fort Seldon, go northeastward on a gravel road 1.4 miles to Radium Hot Springs Pavilion, turn right under the railroad pass and go 10.5 miles, crossing four cattle guards, to the road forks at the Old Detroit Ranch (remains of adobe buildings and wooden windmill tower) on the left, bear right on a ranch road and go 0.1 mile, take the left fork, main road, and go 4.5 miles, take the right fork straight ahead and go 6.5 miles to a ranch on the right, continue north, bearing left up hill from ranch house, on a dim road 2.2 miles, take the right fork and go 3.5 miles, leave the road, turn left (west) toward the highest one of the hills and drive across country 1.0 mile to the southeast base of the hill on which the station is located. The station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 11.838 meters (38.84 feet) from the station in azimuth 209°10′, and No. 2 is 10.882 meters (35.70 feet) from the station in azimuth 297°39′. The azimuth mark is on the north point of a low ridge that runs into the station hill, and 0.3 mile from station in azimuth 351°43′25″.

Plane coordinates: (C), x=294,094.38 feet; y=668,414.94 feet; the grid azimuth to the azimuth mark=352°05′13″.* (W), x=780,422.21 feet; y=668,984.40 feet; the grid azimuth to the azimuth mark=351°13′42″.*

Dry (Dona Ana County, W. R. Porter, 1936).—The station is 18 miles air line, east-northeast of Rincon, 9.0 miles by road north of Jornada Experimental Range Headquarters in open range land. To reach from the range office of the Jornada Experimental Range Headquarters (see description of station *Blow*), go east 0.1 mile to a T-intersection, turn left (north) and go 0.4 mile to crossroads, turn left along east side of fence and go 5.7 miles to a windmill and a reservoir known as Middle Well (the azimuth mark is at this well), leave the road and bear northeastward 3.8 miles across country to the station. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 25.620 meters (84.05 feet) from the station in azimuth 276°52′, and No. 2 is 25.835 meters (84.76 feet) from the station in azimuth 26°01′. The azimuth mark is near a fenced windmill at the southwest side of a track road, 3.8 miles from the station in azimuth 54°07′14″. Station *Upham* may also be used as an azimuth mark.

Plane coordinates: (C), x=348,038.49 feet; y=624,799.15 feet; the grid azimuth to the azimuth mark=54°23′15″.* (W), x=835,017.63 feet; y=626,176.77 feet; the grid azimuth to the azimuth mark=53°31′55″.*

Aleman (Sierra County, W. R. Porter, 1936).—The station is 32 miles by road north-by-east from Hatch, 8.2 miles north-by-east from the Upham Railroad

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

depot, 0.1 mile east of the Rincon-Cutter track road, 0.5 mile north of a ranch house, on the highest point of a slight rise, and 18 feet west of a dim track road. To reach from the Upham Railroad depot, go north on the Rincon-Cutter track road along the east side of the railroad tracks 7.8 miles to a ranch house, continue north through cattle guard to the east side of house and then go 0.4 mile, take the right, dim fork and go 0.1 mile to the station. The station, underground, azimuth, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 36 feet west-northwest of a dim track road, 20.932 meters (68.67 feet) from the station in azimuth 175°06′, and No. 2 is 20.038 meters (65.74 feet) from the station in azimuth 267°12′. The azimuth mark is 100 yards north of a windmill and earth tank, 30 feet west of a track road, and 0.25 mile from the station in azimuth 335°13′25″.

Plane coordinates: (C), x=269,159.68 feet; y=728,159.49 feet; the grid azimuth to the azimuth mark=335°38′01″.* (W), x=754,591.99 feet; y=728,350.35 feet; the grid azimuth to the azimuth mark=334°46′16″.*

Anders (Socorro County, W. R. Porter, 1936).—The station is 28 miles air line northeast of Rincon, 28 miles air line east of Caballo Dam, 3.4 miles air line northeast of a dirt reservoir, in open range land at the highest point of a sandy ridge. To reach the station from Rincon, go east on the main-traveled road about 8 miles to the old Detroit ranch (remains of adobe buildings and wooden windmill tower), turn sharp left on a ranch road and go 0.1 mile, take the left fork and go 4.5 miles, take the right fork and go 6.5 miles, pass through cattle guard with ranch house on the right, go north 2.7 miles, take the right fork and go 12.2 miles, turn sharp right at crossroads and go 1.6 miles, leave the road at the northeast side of long, low hill and go across country, bearing 54° magnetic, 5.5 miles to a fence corner, go east along the south side of a fence 0.9 mile to an old road, cross the old road and continue across country on the above bearing 3.4 miles to the station. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 20.930 meters (68.67 feet) from the station in azimuth 244°17′, and No. 2 is 18.360 meters (60.24 feet) from the station in azimuth 342°26′. Station *Aleman* may be used as an azimuth mark. The following distances and azimuths are from station: Peak, 6 miles, 250°03′; peak, 7 miles, 277°49′; and peak, 7½ miles, 291°56′.

Plane coordinates: (C), x=336,726.46 feet; y=719,655.95 feet; the grid azimuth to Station *Aleman*=97°10′23″.4. (W), x=822,283.63 feet; y=720,863.95 feet; the grid azimuth to station *Aleman*=96°18′39″.7.

Cutter (Sierra County, W. R. Porter, 1936).—About 20.9 miles by road south-southwest of Engle Railroad station, 12.9 miles by road west-southwest of Cutter Railroad station, on the northwest end of a gravel ridge, which slopes up from the southern, eastern, and western sides and drops off sharply toward the north. The ridge is very rocky and is sparsely covered with grass and mesquite. To reach the station from Cutter Railroad station and water tank, cross the tracks from east to west, take the left fork and go 0.1 mile, take the right fork and go 0.5 mile, take the right fork and go 0.4 mile, pass over a cattle guard, turn sharp right along a fence line and go 3.1 miles passing through two gates to two ranch houses and a windmill, continue along the fence line for 1.2 miles to a windmill and cattle pens, bear to the left around pens and follow the main-traveled road 1.2 miles to a T-road, turn right and go 2.6 miles to the edge of an arroyo and the azimuth mark, continue 0.6 mile to a T-road, turn right and go 0.2 mile, take the right fork and go 1.3 miles, take right fork and go 0.6 mile, go left across country, towards the highest peak. It is a 30-minute pack up to highest point and station. The station, azimuth and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 9.937 meters (32.60 feet) from the station in azimuth 5°06′, and No. 2 is 19.992 meters (65.59 feet) from the station in azimuth 101°56′. The azimuth mark is set in a large area of outcropping bedrock which is several feet above the surrounding ground, on the north edge of the arroyo, 35 feet west of the main-traveled road, and 2.3 miles from the station in azimuth 245°42′50″.

Plane coordinates: (W), x=706,914.79 feet; y=723,214.38 feet; the grid azimuth to the azimuth mark=245°20′47″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Trujillo (U. S. G. S.) (Sierra County, W. R. Porter, 1936).—About 20 yards from the west end of the crest on a lone, sharp hill, about 3 miles southeast of Hillsboro, and 1 mile east of State Highway 26. The station mark is a standard U. S. Geological Survey disk in outcropping bedrock stamped "Trujillo, 1934." The reference marks are standard disks set in rock according to note 12a. Reference mark No. 1 is 12.023 meters (39.45 feet) from the station in azimuth 215°45′, and No. 2 is 7.867 meters (25.81 feet) from the station in azimuth 296°11′. The azimuth mark, a standard disk set in concrete according to note 11a, is 3.2 miles from the intersection of U. S. Highway 180 and State Highway 26 in Hillsboro, on a small knoll, 27 feet east of State Highway 26, 100 feet northwest of a telephone pole, and 2¼ miles from station in azimuth 95°32′11″.

Plane coordinates: (W), x=597,171.35 feet; y=684,673.94 feet; the grid azimuth to the azimuth mark=95°21′52″.*

Nutt (Sierra County, W. R. Porter, 1936).—On highest point of a round-top peak locally known as Nutt Peak, about 4.0 miles by road north of Nutt, and 50 feet east of a small crater. The station, azimuth, and reference marks are standard disks set in bedrock according to notes 2 and 12a. Reference mark No. 1 is 6.828 meters (22.40 feet) from the station in azimuth 335°48′, and No. 2 is 13.655 meters (44.80 feet) from the station in azimuth 80°02′. The azimuth mark is on the north slope of a long ridge, about 100 yards south of a track road, and ¾ mile from the station in azimuth 21°57′19″.

Plane coordinates: (C), x=131,193.97 feet; y=591,770.29 feet; the grid azimuth to the azimuth mark=22°36′04″.* (W), x=618,690.37 feet; y=589,916.82 feet; the grid azimuth to the azimuth mark=21°44′51″.*

Paint (Sierra County, W. R. Porter, 1936).—About 16.7 miles by road north-northwest of Hatch, 4.7 miles by road northeast of Dry, a small settlement on U.S. Highway 85, 3.9 miles northeast of U.S. Highway 85, on the highest point of a lone peak of the Sierra de Los Caballos. This peak is at the west side of the mountains, characterized by a group of mines near its top on the west side. These mines are visible from the highway. There are higher peaks toward the northeast and southeast. To reach from Hatch, go northward 13.0 miles on U.S. Highway 85, turn right (east) on a dirt T-road and go 0.2 mile, take the right fork and follow a little-used road for 1.5 miles to forks in the wash, take the right fork in the wash and go 0.2 mile, turn left and leave the wash, continue on a track road for 1.0 mile, take the right fork and go 1.0 mile to a mine on the side of the peak. From here it is a 20-minute pack northeastward to crest of ridge. Turn right along the top of the ridge to the station. The station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 4.460 meters (14.63 feet) from the station in azimuth 231°37′, and No. 2 is 18.235 meters (59.83 feet) from the station in azimuth 321°04′. The azimuth mark is about 30 feet northwest of a track road at the end of truck travel at this point, 0.1 mile southwest of a mine-loading chute, and ½ mile from the station in azimuth 43°39′24″.

Plane coordinates: (C), x=195,814.37 feet; y=664,732.48 feet; the grid azimuth to the azimuth mark=44°11′36″.* (W), x=682,208.08 feet; y=663,829.80 feet; the grid azimuth to the azimuth mark=43°20′07″.*

Sibley (U. S. G. S.) (Sierra County, W. R. Porter, 1936).—The station is 9.5 miles south-southeast of Hillsboro, 1.0 mile east of State Highway 26, on the northeastern and highest peak of a prominent mountain. To reach from the junction of State Highway 26 and U.S. Highway 180 in Hillsboro, go south 9.5 miles on State Highway 26 to a ranch house on the west (right), leave the highway, turn left (east) across country and go up a ridge 0.6 mile to the end of truck travel. From here it is a 1-hour pack eastward across a canyon and up a narrow ravine to the top of the highest peak and the station. The station mark is a standard U.S. Geological Survey disk set flush in bedrock and stamped "Sibley 1934" and "El. 6,111 feet". The reference marks are standard U.S. Geological Survey disks set in bedrock, and stamped "Tyble 1934". Reference mark No. 1 is 10.991 meters (36.06 feet) from the station in azimuth 7°00′, and No. 2 is 14.640 meters (48.03 feet) from the station in azimuth 68°44′. The azimuth mark, a standard disk set in concrete according to note 11a, is 50.0 feet east of the center line of State Highway 26, 9 feet southwest of a telephone pole, and 1.75 miles from the station in azimuth 121°49′49″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Plane coordinates: (C), x=111,069.01 feet; y=656,880.20 feet; the grid azimuth to the azimuth mark=122°30′57″.* (W), x=597,598.11 feet; y=654,710.20 feet; the grid azimuth to the azimuth mark=121°39′29″.*

Benson (Sierra County, W. R. Porter, 1936).—The station is 8.1 miles air line north of the new Caballo Dam, 0.3 mile air line east of the Rio Grande, and on the highest point of a gravel foothill 300 yards east of Mr. Benson's ranch. To reach from the Caballo Dam, go northward on a road east of the Rio Grande 1.3 miles to a pipe line and construction camp, cross the pipe line and go 0.6 mile, take the left fork and go 1.5 miles, keep straight ahead (left) and go 4.5 miles to Benson's ranch and end of truck travel, pack eastward 300 yards to the station. The station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 51.915 meters (170.32 feet) from the station in azimuth 308°03′, and No. 2 is 5.401 meters (17.72 feet) from the station in azimuth 176°24′. The azimuth mark is ¼ mile from station in azimuth 36°31′57″. The following distances and azimuths are from station: Peak, 3 miles, 278°20′; and another peak, 3 miles, 312°19′.

Plane coordinates: (W), x=672,867.21 feet; y=725,518.61 feet; the grid azimuth to the azimuth mark=36°13′32″.*

Sign (Sierra County, W. R. Porter, 1936).—The station is 10.5 miles by road east-northeast of Hillsboro, 7 miles air line west of Caballo Dam, and 20.2 meters (66 feet) north of the center line of U.S. Highway 180. To reach the station from the junction of U.S. Highway 85 and U.S. Highway 180, which is 25.0 miles north of Hatch, go west 6.5 miles on U.S. Highway 180 to a curve to left and the station. The station, underground, and reference marks are standard disks in concrete set according to notes 1a, 7a, and 11a. Reference mark No. 1 is 19.842 meters (65.10 feet) from the station in azimuth 177°34′ and No. 2 is 23.630 meters (77.53 feet) from the station in azimuth 277°38′. The azimuth mark is a standard U.S. Geological Survey disk which is set in a concrete post and stamped "66–C–1934", is 20 feet north of the center line of U.S. Highway 180, and 2.6 miles from the station in azimuth 78°44′53″.

Plane coordinates: (W), x=629,458.99 feet; y=718,728.23 feet; the grid azimuth to the azimuth mark=78°31′06″.*

Alka (Dona Ana County, W. R. Porter, 1936).—About 6.5 miles southeast of Nutt, in open range land, on the highest point of a prairie ridge, and about 1 mile north of a ranch with two windmills. To reach the station from a T-road which is 2.6 miles east of Nutt, or 17.7 miles west of Hatch on State Highway 27, turn south on the ranch road and go 1.0 mile to railroad tracks and gates on either side, pass through the gates, and turn left at forks and go 1.4 miles, pass through a gate and go about 50 yards straight ahead, take the right fork and go 1.8 miles, take left, dim fork at a fence corner and go 0.75 mile to the highest point of a ridge, turn left off the road and go along the ridge 0.1 mile to the highest point and the station. The station, underground, azimuth and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 20,000 meters (65.62 feet) from the station in azimuth 285°19′, and No. 2 is 18.935 meters (62.12 feet) from the station in azimuth 21°33′. The azimuth mark is about 10 feet west of the track road to the station, 6 feet west of the fence corner, 1 foot south of the fence line, and approximately 0.7 mile from the station in azimuth 167°05′57″. The following distances and azimuths are from station: Windmill at a ranch, approximately 1 mile, 9°35′25″; and another windmill at a ranch, approximately 1 mile, 9°56′17″.

Plane coordinates: (C), x=151,474.40 feet; y=549,596.16 feet; the grid azimuth to the azimuth mark=167°42′24″.* (W), x=639,593.56 feet; y=548,053.72 feet; the grid azimuth to the azimuth mark=166°51′21″.*

Prairie (Sierra County, W. R. Porter, 1936).—About 10.1 miles by road southwest of Nutt, 1.5 miles northwest of State Highway 26, 93 feet east of the center line of a graded dirt road leading north from the highway, in open prairie land. To reach from Nutt, go southwest 8.6 miles to a T-road, turn right (north) and go 1.5 miles on a graded road to the station. The station, underground, azimuth and reference marks are standard disks in concrete or tile set according to notes 1a, 7a, 11a, and 6a. Reference mark No. 1 is 26.940 meters (88.39 feet) from the station in azimuth 308°09′, and No. 2 is

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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22.036 meters (72.30 feet) from the station in azimuth 43°39′. The azimuth mark is 30 feet west of the center line of the road, and approximately 1 mile from the station in azimuth 315°52′48″.

Plane coordinates: (C), x=101,748.20 feet; y=548,037.46 feet; the grid azimuth to the azimuth mark=316°34′27″.* (W), x=589,902.32 feet; y=545,757.00 feet; the grid azimuth to the azimuth mark=315°43′24″.*

Black (U. S. G. S.) (Grant County, W. R. Porter, 1936).—The station is 4.0 miles northeast of Pinos Altos, on the highest point of the highest peak of a mountain range. The peak is known locally as Black Mountain. The station mark is a standard U. S. Geological Survey triangulation disk cemented in a drill hole in a rock outcrop. Reference mark No. 1 is a standard U. S. Geological Survey bench mark disk stamped "el. 9,022 ft.", cemented in a drill hole in a rock outcrop, and is 4.273 meters (14.02 feet) from the station in azimuth 52°53′, and No. 2, a standard reference mark disk set in rock according to note 12a, is 4.283 meters (14.05 feet) from the station in azimuth 135°31′. Station *Signal* may be used as an azimuth mark.

Plane coordinates: (W), x=339,226.74 feet; y=694,739.95 feet; the grid azimuth to station *Signal*=135°28′29″.3.

Caballo (Grant County, W. R. Porter, 1936).—About 11 miles air line east of Hurley, on the central one and highest of three peaks which form the station ridge, on Mimbres Peak, a lone mountain which is known locally as Caballo Blanco (White Horse). The station, azimuth and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 8.706 meters (28.56 feet) from the station in azimuth 150°18′, and No. 2 is 7.110 meters (23.33 feet) from the station in azimuth 359°25′. The azimuth mark is on a lower, but prominent, peak of the same ridge, and 0.25 mile from the station in azimuth 47°34′30″.

Plane coordinates: (W), x=467,673.81 feet; y=619,979.39 feet; the grid azimuth to the azimuth mark=47°37′55″.*

Sawyer (Sierra and Grant Counties, W. R. Porter, 1936).—About 20 miles by road and trail west-by-south of Hillsboro, about 3 miles by foot-trail south of U. S. Highway 180, in a small clearing where a fire tower once stood, at the highest point of Sawyers Peak, which is a very prominent peak of the Mimbres Mountains. To reach the station from the junction of State Highway 26 and U. S. Highway 180 in Hillsboro, go westward 17.4 miles on U. S. Highway 180 to the top of the divide which is the line between Sierra and Grant Counties, and end of truck travel. Follow a foot trail southward and up hill along the left side of a fence to forks, keep straight ahead on the left fork to dim forks, take the dim, right fork and bear around in a half circle to the right (northwest), go up the rise to the highest point and the station. The trail is well blazed from the road to the station. The station and reference marks are standard disks set in rock according to notes 2 and 12c. Reference mark No. 1 is 17.666 meters (57.96 feet) from the station in azimuth 23°57′, and No. 2 is 13.657 meters (44.81 feet) from the station in azimuth 122°52′. *Signal Peak Lookout* may be used as an azimuth mark.

Plane coordinates: (W), x=516,842.44 feet; y=682,224.62 feet; the grid azimuth to *Signal Park Lookout*=98°19′23″.2.

Hillsboro (Sierra County, W. R. Porter, 1936).—About 6 miles north of Hillsboro, on the highest point of a grassy and rocky hill. There is a higher range of hills about ¾ mile toward the south and southeast. To reach from the junction of State Highway 26 and U. S. Highway 180 in Hillsboro, go east 1.1 miles on U. S. Highway 180 to a point where the highway curves to the left. About 40 yards west of this point leave highway, turn left and go north on a plane track road 1.2 miles, take the right fork, entering a wash, and go 0.1 mile, take the left fork, keeping to the wash, and go 0.4 mile, take the left fork, and go 0.5 mile, take the left fork and go 1.2 miles, take the left fork and go north 1.4 miles to the azimuth mark on the east side of the road, continue north on the main-traveled road 0.3 mile, then leave road, turn right, and go across country 0.15 mile. From this point it is a 20-minute climb with a heavy load northeastward up the left-hand hill to its summit and the station. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 9.830 meters (32.25 feet) from the station in azimuth 269°40′, and No. 2 is 9.611 meters (31.53 feet) from the station in azimuth 13°25′. The azimuth mark, a standard disk set in

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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concrete according to note 11a, is 33 feet east of the center line of the above-mentioned north-and-south track road, and 0.3 mile from the station in azimuth 66°25′56″. The azimuth from the station to a U. S. Forest Service tower is 81°01′28″.

Plane coordinates: (W), x=580,497.45 feet; y=720,429.96 feet; the grid azimuth to the azimuth mark=66°17′21″.*

Granite (U. S. G. S.) (Sierra County, W. R. Porter, 1936).—Located on Granite Peak, a bare granite knob which slopes off to a wood-covered ridge on the north and drops off abruptly to the south. To reach the station from Hillsboro post office, go westward 6.8 miles on U. S. Highway 180, turn right (north) and go 7.0 miles to the B. Reid Ranch, continue up a canyon 2.0 miles to the Moffat Mine Camp, continue 0.2 mile to the end of truck travel. From here pack up canyon for about 30 minutes following a trail, continue up the canyon on a blazed trail for about an hour and a half in a northerly direction to the point where the trail turns due east around the north side of a hill with a rocky knob on top, turn east with the trail for about 30 minutes to the top of the ridge. The station is in sight off to the right at this point. Bear right around the southerly edge of the ridge to a granite knob on the southernmost point and the station. The station and reference marks are standard U. S. Geological Survey disks set in outcropping bedrock. Reference mark No. 1 is 4.775 meters (15.67 feet) from the station in azimuth 306°13′, and No. 2 is 8.579 meters (28.15 feet) from the station in azimuth 146°13′. *Signal Peak Lookout* may be used as an azimuth mark.

Plane coordinates: (W), x=522,591.28 feet; y=728,126.51 feet; the grid azimuth to *Signal Peak Lookout*=77°46′19″.8.

Hendricks (Grant County, W. R. Porter, 1936).—About 6 miles north of San Lorenzo, on Hendricks Peak, a prominent round knob about 8 miles west of the Black Range Mountains. The station is 19 feet northeast of a rock cairn marking *Hendricks Peak, cairn (U. S. F. S.)*. The station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is at point where knob breaks off on the south side, 9.622 meters (31.57 feet) from the station in azimuth 20°20′, and No. 2 is on the northwest edge of the knob, 8.599 meters (28.21 feet) from the station in azimuth 72°37′. The azimuth mark is 1.1 miles by road from Gila National Forest boundary, 55 feet north of a track road, 50 feet south of the north edge of a canyon, and approximately 2.0 miles form the station in azimuth 21°50′53″.

Plane coordinates: (W), x=475,751.16 feet; y=689,311.90 feet; the grid azimuth to the azimuth mark=21°53′28″.*

Powder (Grant County, W. R. Porter, 1936).—The station is 10 miles air line, or 12.2 miles by road, north of Mimbres post office on a high, timbered ridge known as Powder Horn Ridge, and 145 feet west of the Powder Horn Ridge Road. To reach from Mimbres post office go north 5.9 miles to ranger cabins on left, continue straight ahead on the main-traveled road 1.0 mile, turn right on T-road and go 0.2 mile, take the left fork and go 0.1 mile, take left fork at sign on tree "Powder Horn Ridge Road" and go 5.0 miles to the station on the left side of road. The station and underground marks are standard disks set in concrete according to notes 1a and 7a, and the reference and azimuth marks are standard disks set in rock according to note 12a. Reference mark No. 1 is 23.310 meters (76.48 feet) from the station in azimuth 35°32′, and No. 2 is 27.239 meters (89.37 feet) from the station in azimuth 114°35′. The azimuth mark is 0.2 mile west of the road on the next ridge to the southwest, and ½ mile from the station in azimuth 29°13′58″. Station *Hendricks* also may be used as an azimuth mark.

Plane coordinates: (W), x=459,523.67 feet; y=725,409.20 feet; the grid azimuth to the azimuth mark=29°18′17″.*

North Star (Grant County, W. R. Porter, 1936).—About 10 miles north-by-west of Mimbres post office, in the Gila National Forest, on the North Star Mesa of the Continental Divide, on a knoll covered with scrub cedar and pine, and 86 feet west of the center line of a road. To reach from Mimbres post office, go north on a gravel road for 4.8 miles to the entrance into the Gila National Forest, continue 2.4 miles, take the right fork and go 2.4 miles, take the right fork onto North Star Road and up onto a ridge and go 1.2 miles to a cairn on right of the road with a sign on the top reading "Continental Divide-North Star Mesa," continue 1.4 miles to the station site on the left as the road tops

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

a slight rise. The station, underground, and reference marks are standard disks set in concrete and tile according to notes 6a, 7a and 13a. Reference mark No. 1 is 18.217 meters (59.77 feet) from the station in azimuth 171°39′, and No. 2 is 21 feet west of the centerline of the road, and 18.799 meters (61.68 feet) from the station in azimuth 257°50′. There is no azimuth mark.

Plane coordinates :(W), x=437,733.16 feet; y=729,775.88 feet.

Signal (Grant County, W. R. Porter, 1936).—About 13 miles air line north-northeast of Silver City, 1½ miles southeast of the graded road in Cherry Creek, 1½ miles northwest of station *Black (U. S. G. S.)*, on a high wooded peak in the Gila National Forest, and locally known as "Signal Peak." There is a 30-foot Forest Service lookout tower on this peak and the station mark is 4.9 feet southwest of the inner corner of the concrete footing of the northeast leg of the tower, 11.8 feet southeast of the inner corner of the northwest footing, 15.1 feet northeast of the inner corner of the southwest footing, and 10.6 feet northwest of the inner corner of the southeast footing. The station and reference marks are standard disks set in rock according to notes 4 and 12a. Reference mark No. 1 is 46 feet north-northeast of the northwest corner of the log cabin which is southeast of the tower, and 8.371 meters (27.46 feet) from the station in azimuth 281°51′, and No. 2 is 40 feet west of the northwest corner of the cabin, and 18.070 meters (59.28 feet) from the station in azimuth 22°32′. Station *Black (U. S. G. S.)* may be used as an azimuth mark.

Plane coordinates: (W), x=393,832.06 feet; y=700,224.79 feet.

Meadow (Grant County, W. R. Porter, 1936).—The station is 10.4 miles air line, or 15.3 miles by road, north of Pinos Altos, on a timbered, north-south ridge over which there is a well-traveled road, which passes about 25 feet west of station. There are higher ridges toward the southeast and the southwest. To reach from the schoolhouse at Pinos Altos, take the right fork and go 8.0 miles to ranger cabins on the left, take the left fork and go 3.0 miles, take the main-traveled, graded road (right fork) and go 0.2 mile, take the right fork and go 4.0 miles on a graded road to the station site on the right side of the road. The station and underground marks are standard disks in concrete and tile according to notes 1a and 7a. The reference marks are standard disks set in boulders according to note 12c. Reference mark No. 1 is flush with the surface of the ground, 45 feet east of the centerline of a north-south road, and 16.765 meters (55.00 feet) from the station in azimuth 197°40′, and No. 2 is flush with the ground, 42 feet east of the center line of a north-south road, and 10.693 meters (35.08 feet) from the station in azimuth 289°16′. The azimuth mark is station *Meadow Azimuth.*

Plane coordinates: (W), x=380,557.93 feet; y=732,511.76 feet; the grid azimuth to *Meadow Azimuth*=36°49′29″.**

Meadow Azimuth (Grant County, W. R. Porter, 1936).—The station, a standard disk set in rock according to note 2, is approximately 0.9 mile from station *Meadow*, on a timbered, north-south ridge, about 20 feet west of the east edge, about 10 feet east of the west edge, and in a boulder outcrop 10 meters (33 feet) southwest of a break at edge of ridge. The reference marks are standard disks in rock outcrops according to note 12a. Reference mark No. 1 is 7.580 meters (24.87 feet) from the station in azimuth 338°14′, and No. 2 is 5.440 meters (17.85 feet) from the station in azimuth 123°47′. The azimuth mark is station *Meadow.*

Plane coordinates: (W), x=377,650.49 feet; y=728,628.80 feet.

Lone (Grant County, W. R. Porter, 1936).—About 6 miles air line southeast of Silver City, on the highest peak of what is known locally as "Lone Mountain." The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 7.745 meters (25.41 feet) from the station in azimuth 352°43′, and No. 2 is 5.294 meters (17.37 feet) from the station in azimuth 71°34′. The azimuth mark is about ¼ mile west of a galvanized sheet-iron building, on the north bank of a wash, about 50 feet above the bed of the wash, 30 yards north of the point where a track road leaves the wash and goes up over the south bank, and approximately 1 mile from station in azimuth 157°40′53″.

Plane coordinates: (W), x=388,190.29 feet; y=624,170.83 feet; the grid azimuth to the azimuth mark=157°52′41″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

For notes in regard to marking of stations see p. 90.

Pinos (Grant County, W. R. Porter, 1936).—About 7 miles north-northwest of Silver City, about 1 mile west of Pinos Altos Mountain, about 15 feet south of and 2 feet lower than the highest point of the mountain. The station, azimuth, and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is 9.712 meters (31.86 feet) from the station in azimuth 60°38′, and No. 2 is 11.822 meters (38.79 feet) from the station in azimuth 121°36′. The azimuth mark is 0.4 mile south of the schoolhouse in Pinos Altos, 50 feet northwest of the center line of the graded road from Pinos Altos to Silver City, 12 feet northeast of a track road, and 1.5 miles from the station in azimuth 283°30′07″. The azimuth from the station to Pinos Altos Catholic Church, cross, is 256°48′44″.

Plane coordinates: (W), x=374,807.09 feet; y=677,511.91 feet; the grid azimuth to the azimuth mark=283°43′23″.*

Hodges (Grant County, W. R. Porter, 1936).—The station is 3.3 miles air line southeast of Silver City, 0.5 mile east of the Silver City stockyards in open range land, on west side of a small canyon, on east edge of a ridge, 100 yards north of H. Hodges Diamond Bar ranch house, and 10 feet west of an unstable iron pipe marking the ½ section corner. The station, underground, azimuth and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 24.312 meters (79.76 feet) from the station in azimuth 47°27′, and No. 2 is 24.523 meters (80.46 feet) from the station in azimuth 126°11′. The azimuth mark is on top of a knoll which drops off sharply to the west, 75 feet north of an east-west fence line, and 0.3 mile from the station in azimuth 93°51′52″.

Plane coordinates: (W), x=373,857.23 feet; y=631,594.55 feet; the grid azimuth to the azimuth mark=94°05′11″.*

Station 10 (New Mexico Geodetic Survey) (Grant County, W. R. Porter, 1936).—Located on the highest point of a hill on the southern edge of Silver City, 100 yards east of U. S. Highway 180 (Cooper Street) at a point which is at the top of the grade and 0.4 mile south of the Grant County Courthouse. The station and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is on the northeast slope of the hill, 19.760 meters (64.83 feet) from the station in azimuth 214°20′, and No. 2 is 12.069 meters (39.60 feet) from the station in azimuth 267°46′. The azimuth mark is a standard U.S.C.&G.S. bench mark disk set in a concrete block and stamped "J 126–1934," and is 6 feet south of the east-west fence on the south side of the cemetery which is east of U. S. Highway 180, 4 feet east of the north-south right-of-way on the east side of the highway, and 0.5 mile from the station in azimuth 7°31′06″. There are two State Survey reference marks consisting of galvanized bolts leaded into boulders, one is 6.580 meters (21.59 feet) from the station in azimuth 213°02′; and the other is 4.524 meters (14.84 feet) from the station in azimuth 108°24′.

Plane coordinates: (W), x=363,051.25 feet; y=642,034.56 feet; the grid azimuth to bench mark J 126, the azimuth mark,=7°45′34″.*

Spence (Grant County, W. R. Porter, 1936).—About 18 miles north-by-west of Deming, about 7 miles south of Dwyer, about 1.5 miles west of the Irwin ranch, on a slight knoll about 0.15 mile east of the graded road between Dwyer and Deming. To reach from Deming, go northwestward on U. S. Highway 260 for 13.0 miles, turn right on a graded road and go 7.5 miles to a cattle guard with sign on gate "Spence ranch," pass through cattle guard and continue for 0.45 mile to top of slight rise, turn sharp right (east), in line to Cooks Peak, over open range land for 0.15 mile to station site on highest point. The station, underground, azimuth, and reference marks are standard disks in concrete set according to notes 1a, 7a, and 11a. Reference mark No. 1 is 27.258 meters (89.43 feet) from the station in azimuth 343°07′, and No. 2 is 27.876 meters (91.46 feet) from the station in azimuth 72°07′. Azimuth mark is 30 feet east of the center line of the road, and 0.9 mile from the station in azimuth 16°27′39″. The following distance and azimuths are from station: Irwin ranch, chimney, 1.5 miles, 264°17′07″; and oil derrick, 10°50′50″.

Plane coordinates: (W), x=484,992.40 feet; y=554,056.49 feet; the grid azimuth to the azimuth mark=16°29′13″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Hiway (Luna County, W. R. Porter, 1936; 1938).—Located 21.6 miles by road northwest of the underpass in Deming, 15.7 miles air line and 16.1 miles by road southeast of Hurley railroad station, 72 feet southwest of the center line of U. S. Highway 260, and 10 feet southwest of the southwest right-of-way fence. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 69 feet northeast of the center of the highway, in the line of the fence on the northeast side of and parallel to the highway and 141.00 feet from the station in azimuth 229°03′. Reference mark No. 2 is 62 feet southwest of the center of the highway, in the southwest, right-of-way fence line, and 115.30 feet from the station in azimuth 314°03′. The azimuth mark is set in the headwall at the southwest end of a box culvert about 0.4 mile from the station in azimuth 139°51′54″.

Plane coordinates: (W), x=449,728.86 feet; y=550,480.09 feet; grid azimuth to azimuth mark=139°57′09″.*

Dog (Luna County, W. R. Porter, 1936; 1938).—About 19 miles air line south of Silver City, 7.5 miles air line southwest of Whitewater railroad station, and on a low, sotol-covered hill which is 0.5 mile east of a north-south fence and road. To reach from Whitewater railroad station, go 6.5 miles southwest and west on the White-Signal, graded dirt road to a cattle guard, go through gate south of cattle guard, turn left (south) and go along west side of fence 0.85 mile, turn left (east) around fence corner, follow track road east a short way, then south 0.65 mile, take left fork straight ahead 0.9 mile, turn right at corrals and windmill and go west 0.9 mile, keep straight ahead on left fork for 1.2 miles, pass through gate and go south 1.1 miles, pass through gate and continue south 0.15 mile to the azimuth mark on the left side of the road, drive east across country 0.5 mile to the station. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 9.972 meters (32.72 feet) from the station in azimuth 193°47′, and No. 2 is 7.611 meters (24.97 feet) from the station in azimuth 106°29′. The azimuth mark, a standard disk set in concrete according to note 11a, is 5 feet east of a north-south fence and 0.5 mile from the station in azimuth 106°21′34″.

Plane coordinates: (W), x=375,655.00 feet; y=544,442.04 feet; grid azimuth to azimuth mark=106°34′34″.*

White (Grant County, W. R. Porter, 1936).—The station is 6.0 miles by road west-southwest of Whitewater railroad station, on a low ridge, 10.15 meters (33.3 feet) south of the center line of an east-west dirt road. The station, underground, azimuth and reference marks are standard disks set according to notes 1a, 7a, and 11a. Reference mark No. 1 is 23.449 meters (76.93 feet) from the station in azimuth 94° 10′, and No. 2 is 20.346 meters (66.75 feet) from the station in azimuth 10°00′. The azimuth mark is 9.45 meters (31.0 feet) north of the center line of the dirt road, and approximately 0.5 mile from the station in azimuth 258°46′27″. The following distances and azimuths are from station: Windmill, ¼ mile, 77°23′; and another windmill, ½ mile, 218°32′.

Plane coordinates: (W), x=378,975.71 feet; y=566,136.37 feet; the grid azimuth to the azimuth mark=258°59′08″.*

Supplementary points

United States and Mexico boundary monument No. 2 (United States and Mexico, United States and Mexico Boundary Commission, 1855 and 1893; J. S. Hill, 1909, 1936).—On boundary line between the United States and Mexico, on top of the first high ridge west of the Rio Grande. Mark is an obelisk of concrete 4 feet square at base and 12 feet high. *United States and Mexico boundary monument No. 2 eccentric* is 9.75 meters (32.0 feet) from the station in azimuth 329°58′.

Plane coordinates: [1] (C), x=410,914 feet; y=285,193 feet.

United States and Mexico boundary monument No. 3 (United States and Mexico, United States and Mexico Boundary Commission, 1855 and 1893; J. S. Hill, 1909).—On boundary line between United States and Mexico, about 5 miles west of El Paso, and about 0.5 mile south-southwest of Anapra siding on east rim of mesa. Mark is concrete obelisk 12 feet high on base 4 feet square. Elevation of top of masonry base 1,258 meters (4,127 feet).

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (C), x=396,929.55 feet; y=285,234.05 feet.

El Paso, cross on mountain (Dona Ana County, W. R. Porter, 1936).—Plane coordinates:[1] (C), x=408,219 feet; y=286,417 feet.

Phoenix-El Paso Airway, beacon No. 39 (Dona Ana County, W. R. Porter, 1936).—About 18 miles air line west of El Paso and 6 miles air line west-southwest of Strauss.

Plane coordinates: (C), x=336,228.23 feet; y=299,182.56 feet.

Dona Ana, target range, water tank (Dona Ana County, W. R. Porter, 1936).—Plane coordinates:[1] (C), x=422,101 feet; y=418,461 feet.

United States Detention Farm, northwest water tank (El Paso County, Tex., W. R. Porter, 1936).—About 16 miles air line north-northwest of El Paso.

Plane coordinates: (C), x=394,793.20 feet; y=357,401.25 feet.

United States Detention Farm, southwest water tank (El Paso County, Tex., W. R. Porter, 1936).—About 16 miles air line north-northwest of El Paso.

Plane coordinates: (C), x=394,850.53 feet; y=356,404.58 feet.

United States Detention Farm, dome (El Paso County, Tex., W. R. Porter, 1936).—About 16 miles air line north-northwest of El Paso.

Plane coordinates: (C), x=394,309.14 feet; y=357,311.43 feet.

Newman, water tank (Otero County, W. R. Porter, 1936).—Plane coordinates: (C), x=477,860.25 feet; y=365,228.03 feet.

Texas-New Mexico boundary monument No. 195 (El Paso County, Tex., Dona Ana County, N. Mex., W. R. Porter, 1934).—On the Texas-New Mexico boundary line, about 4 miles west of Newman, 0.5 mile from station *Reeves*, 48 feet south of an east-west fence, on a flat mesa used as pasture land. The station is marked with an iron pipe with a bronze tablet cemented in the top.

Plane coordinates:[1] (C), x=457,728 feet; y=364,223 feet.

Lava, azimuth mark (Dona Ana County, W. R. Porter, 1936).—About 7.7 miles by road west of Chamberino post office, on a small lava knoll on a flat, open, blow-sand-and-lava mesa. The station is marked by a standard disk set in rock according to note 12a. Station *Lava* is 0.3 mile south-southwest.

Plane coordinates:[1] (C), x=337,960 feet; y=379,411 feet.

N.M. D.A. 55 (New Mexico Geodetic Survey) (Dona Ana County, W. R. Porter, 1936).—A station of the Dona Ana County Survey, marked by a standard U. S. C. & G. S. disk set in concrete, 31 feet south of the center line of U. S. Highways 70 and 80, and 80.176 meters (263.04 feet) from station *Tab*.

Plane coordinates:[1] (C), x=266,345 feet; y=460,074 feet.

Hendricks Peak, cairn (U. S. F. S.) (Grant County, W. R. Porter, 1936).—The cairn is about 6 miles north of San Lorenzo, on Hendricks Peak, a prominent round knob about 8 miles west of the Black Range Mountains. The cairn is 19 feet southwest of station *Hendricks*.

Plane coordinates:[1] (W), x=475,736 feet; y=689,301 feet.

Hurley, tall, black stack (Grant County, W. R. Porter, 1936).—Plane coordinates:[1] (W), x=411,000 feet; y=616,935 feet.

Signal Peak Lookout (Grant County, W. R. Porter, 1936).—About 13 miles north-northeast of Silver City, 1½ miles southeast of the graded road in Cherry Creek, on a high, wooded peak in the Gila National Forest, and locally known as "Signal Peak." The lookout is over triangulation station *Signal*.

Plane coordinates: (W), x=393,827.36 feet; y=700,221.27 feet.

Fort Bayard, Veterans Hospital, water tank (Grant County, W. R. Porter, 1936).—Plane coordinates: (W), x=402,701.89 feet; y=654,957.09 feet.

"T" on hill (Grant County, W. R. Porter, 1936).—Located on mountain north of Silver City. Plane coordinates: (W), x=372,533.60 feet; y=664,966.82 feet.

Silver City, Presbyterian Church, spire (Grant County, W. R. Porter, 1936).—Plane coordinates:[1] (W), x=363,615 feet; y=645,214 feet.

Silver City, Catholic Church, east spire (Grant County, W. R. Porter, 1936).—Plane coordinates:[1] (W), x=363,183 feet; y=644,656 feet.

Silver City, Catholic Church, west spire (Grant County, W. R. Porter, 1936).—Plane coordinates:[1] (W), x=363,143 feet; y=644,660 feet.

Silver City, public school, chimney (Grant County, W. R. Porter, 1936).—Plane coordinates:[1] (W), x=363,428 feet; y=644,889 feet.

Phoenix-El Paso Airway, beacon No. 33 (Luna County, W. R. Porter, 1936).—About 10 miles air line west of Columbus.

Plane coordinates:[1] (W), x=511,974 feet; y=303,189 feet.

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[1] No check on this position.

For notes in regard to marking of stations see p. 90.

LITTLE COLORADO RIVER AREA

Principal points

Green eccentric (Apache County, Ariz., J. D. Thurmond, 1936).—About 16½ miles west of Springerville, on the highest point of Green Peak, about 14 feet north of the northwest corner of the ranger's cabin, 12 feet south of the southeast corner of the lookout tower, and 8 paces south of station *Green* (see description thereof). Surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 80.58 feet from the station in azimuth 355°43′, and No. 2 is 67.60 feet from the station in azimuth 100°43′. Reference mark No. 1 of station *Green* is 22.83 feet from the station in azimuth 342°16′. The azimuth mark is on the highest point of ridge just before it drops off to the southwest, 130 feet west-southwest of a five-wire fence, 30 feet east of a north-and-south fence and approximately 0.15 mile from station in azimuth 5°20′41″. Azimuth from station to McKay Lookout, about 15 miles distant, is 54°00′52″.

Reese (Apache County, Ariz., J. Bowie, Jr., 1936).—About 11½ miles southeast of Navajo and 16½ miles south-southwest of Sanders. On the high, broad mesa between the Rio Puerco and Little Colorado drainages, on the north rim of the mesa, about 15 paces south of the north rim of the mesa and 15 paces west of the rim on the east. To reach station from the post office at Navajo, drive south across the tracks and cross the Rio Puerco and go 0.2 mile to a cattle guard and Y, take the left fork and go 0.4 mile, bear right and go 0.4 mile, keep straight ahead and go along an improved dirt road (the old St. Johns road) for 5.1 miles, turn right (southeast) toward a north-south fence just before reaching ponds and windmill, follow south along the west side of the north-south fence for 1.8 miles to an opening in an east-west fence, go 0.4 mile to a dim cross road, go straight ahead 1.9 miles, go straight ahead on the left fork 0.1 mile to a telephone line crossing, continue on winding trail for 3.0 miles to the top, from where the station site can be seen on the second and highest point on the rim of the mesa to the southeast, continue 0.4 mile to a triangle blaze on a piñon on the left, turn left (east) 30 yards past the blaze and go across country generally parallel to the rim for 1.3 miles to the highest ground on the projecting point of the rim and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 20.678 meters (67.84 feet) from the station in azimuth 9°12′, and No. 2 is 21.086 meters (69.18 feet) from the station in azimuth 84°35′. The azimuth mark is approximately 0.6 mile from the station in azimuth 112°09′ 34″.

Los Angeles-Albuquerque Airway, beacon No. 54 B eccentric (Apache County, Ariz., J. Bowie, Jr., 1936).—Located 14.1 miles south-southeast of Sanders along Arizona State Highway 81, on the top of the bluff at the edge of the mesa north of Los Angeles-Albuquerque Airway beacon 54 B, about 300 yards north of Arizona State Highway 81, and on top of a small sandy knoll. The surface, underground, azimuth, and reference mark No. 1 are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 2 is set in the center of the concrete base under the airway beacon. Reference mark No. 1 is 8.003 meters (26.26 feet) from the station in azimuth 235°08′, and No. 2 is 113.395 meters (372.03 feet) from the station in azimuth 4°15′. The azimuth mark is 25 feet east of the center line of the highway, on a small knoll and approximately 0.6 mile from the station in azimuth 130°17′54″.

Plane coordinates: (W), x=72,925.84 feet; y=1,471,354.93 feet; the grid azimuth to the azimuth mark=131°07′03″.*

St. Johns (Apache County, Ariz., J. D. Thurmond, 1936).—About 10 miles (air line) east-southeast of St. Johns, in sec. 8, T. 12 N., R. 30 E., about 2 miles east of the west end of a prominent, partly timbered mesa and on the highest point of that mesa, which is the highest point in the vicinity. There is a large clearing to the south and west of the station, with a scattering of scrub cedars to the north and east. The station, reference, and azimuth marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 49.69 feet from the station in azimuth 294°38′, and No. 2 is 37.58 feet from the station in azimuth 37°57′. The azimuth mark is 65 feet north of

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

track road to station, 0.05 mile east of point where the road turns north to the station, and about 0.3 mile from station in azimuth 322°55′06″.

Plane coordinates: (W), x=90,042.18 feet; y=1,261,425.50 feet; the grid azimuth to the azimuth mark=323°41′18″.*

Hinkson (Apache County, Ariz., J. D. Thurmond, 1936).—Station is about ½ mile west of New Mexico-Arizona State Line in sec. 28, T. 15 N., R. 31 E., and about 21.5 miles northeast from St. Johns, Ariz., about 20 miles west and 3 miles south of Atarque, N. Mex., and near the west end of a prominent, heavily timbered ridge which is the divide between the Little Colorado and Zuni Rivers. To reach the station from St. Johns, Ariz., go north on Arizona State Highway 81 for 11.2 miles to dim road on right, turn right and follow this road east for 8.5 miles passing through 3 gates, take right fork and continue 3.2 miles passing through 2 gates, take left fork and continue 0.2 mile, take right fork and continue 4.35 miles and turn left (north) after passing through second gate, continue north for 1.3 miles, pass through a gate, turn west and follow along fence for 1.2 miles until a General Land Office mark is reached, here take down fence and go about 0.7 mile south and west along winding tracks to highest point of ridge and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 29.68 feet from the station in azimuth 252°02′, and No. 2 is 31.40 feet from the station in azimuth 329°24′. The azimuth mark is in a clear spot in the cedar, a little east of a line from the station to two buttes seen in the distance, 20 feet north of a lone, large cedar tree, and approximately 0.6 mile from the station in azimuth 195°17′03″.

Plane coordinates: (W), x=133,074.31 feet; y=1,345,884.55 feet; the grid azimuth to the azimuth mark=195°58′44″.*

Witch (Apache County, Ariz., J. D. Thurmond, 1936).—In sec. 30, T. 16 N., R. 29 E., about 4 miles northwest of the Zuni River and the St. Johns-Zuni Highway, and is at the southwest end of a low, timbered ridge. To reach the station from the junction of U. S. Highway 260 and Arizona State Highway 81 at St. Johns, go east and north on State Highway 81 for 16.2 miles to steel bridge over Zuni River, continue 0.55 mile to side road to the left, turn left and follow unimproved road north and west 1.55 miles, go straight ahead on right fork 1.35 miles, go through gate in east-west fence and go north for 1.05 miles to a fork, thence left for 0.05 mile and join a road coming in on the right, continue north 0.5 mile to an open and clear space, turn left (south) and go 0.05 mile to small sand mound and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 11.126 meters (36.50 feet) from the station in azimuth 346°00′, and No. 2 is 10.981 meters (36.03 feet) from the station in azimuth 67°24′. The azimuth mark is 150 yards north of road, at south base of low sand ridge at north edge of open space, and approximately 0.15 mile from the station in azimuth 183°10′56″.

Plane coordinates: (W), x=58,766.12 feet; y=1,372,493.80 feet; the grid azimuth to the azimuth mark=184°01′12″.*

Loco (Apache County, Ariz., J. D. Thurmond, 1936).—The station is located on summit of wooded knob known as Loco Knoll in NW¼, sec. 17, T. 7 N., R. 31 E., in area of Apache National Forest. From the junction of U. S. Highway 60 and State Highway 81 at 0.7 mile east of Springerville, go south on graveled State Highway 81 for 12.0 miles, turn left (east) on dirt road which leads between two cattle guards and go 1.3 miles to summit of grade and Y, bear right and go 1.2 miles to a Y in road, bear right and go 0.2 mile to Y, bear left and go 0.3 mile to Y, bear right and go 0.5 mile, pass through a wire gate near a ranch house and continue east and south 0.75 mile to a Y, bear left along E L C Ranch road for 1.5 miles to a wash, continue up wash 1.7 miles to a saddle and small clearing on left, turn left leaving road and drive north as far as possible, pack north 0.5 mile through woods. Station and reference marks are standard disks set in rock according to notes 4 and 12a. Reference mark No. 1 is 6.204 meters (20.35 feet) from the station in azimuth 292°53′ and No. 2 is 10.404 meters (34.13 feet) from the station in azimuth 57°57′. The azimuth mark, a standard disk set in concrete, note 11a, is about 100 feet southwest of road where it turns northeastward, on the northwest edge of timber line and southeast edge of opening, and approximately 0.4 mile from the station in azimuth 350°49′43″.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (W), x=115,597.86 feet; y=1,096,566.07 feet; the grid azimuth to the azimuth mark=351°32′17″.*

State (Apache County, Ariz., L. C. Johnson, 1934; 1936).—Station is about 4½ miles northeast of Springerville, Ariz., in sec. 14, T. 9 N., R. 29 E., on a prominent butte cupped with malpais, which is the highest and most northern one of a small group of hills visible from Springerville. To reach the station from Springerville, Ariz., Post Office, go east on U. S. Highway 60 for 4.3 miles to the southeast corner of a fence, turn left through a gate and head northeast toward the highest point of hill for about 1.5 miles to within 600 yards of the station. The station and reference marks are standard disks set in drill holes in boulders. Station was stamped "1931" by the General Land Office. Reference mark No. 1 (1931) is in a boulder at the foot of the rock knoll and 67.69 feet from the station in azimuth 262°07′, and reference mark No. 2 is 27.70 feet from the station in azimuth 27°36′. *Bench mark Z 66* (see description and geographic position thereof) can be used for the azimuth mark.

Plane coordinates: (W), x=75,662.97 feet; y=1,156,603.96 feet; the grid azimuth to *bench mark Z 66*=306°29′53.8″.

Wahl (Apache County, Ariz., J. D. Thurmond, 1936).—About 11.0 miles south of Springerville on the summit of a high, prominent peak known as Wahl Knoll in sec. 22, T. 7 N., R. 28 E, on land of the Apache National Forest. This peak is wooded on its northern slope and bare on its southern slope. The station, reference, and azimuth marks are standard disks set in outcropping rock according to notes 3 and 12a. The station is 18 feet north-northeast of a rock cairn. Reference mark No. 1 is 64.75 feet from the station in azimuth 241°36′, and reference mark No. 2 is 40.95 feet from the station in azimuth 131°36′. The azimuth mark is 25 feet north of the road and approximately 1.5 miles from the station in azimuth 302°12′58″.

Pole (Apache County, Ariz., J. D. Thurmond, 1936).—Station is located on a prominent smooth knoll known as Pole Knoll, in sec. 32, T. 8 N., R. 27 E., on lands of Apache National Forest, and about 50 feet south of the edge of the timber. To reach station from Springerville, go 2.1 miles south on the McNary road through Eagar and thence 16.2 miles west and southwest to a dirt road leading left (south), follow dirt road south for 1.3 miles, turn northeast and go up bare slope. It is about a 30-minute pack to the highest point and station. The station and reference marks are standard disks set in rock according to notes 3 and 12a. Reference mark No. 1 is 10.316 meters (33.85 feet) from the station in azimuth 342°18′, and reference mark No. 2 is 12.172 meters (39.93 feet) from the station in azimuth 102°03′. The azimuth mark, a standard disk set in concrete in a depression in a boulder according to note 12d, is 15 feet east of the road on the first hill which is southwest of the station and which is readily distinguishable by the road winding around its western slope, on the western slope of the hill, and approximately 1.1 miles from the station in azimuth 11°42′30″. Azimuth from station to McKay Lookout, about 16 miles distant, is 78°28′24″.

Saffell (Apache County, Ariz., J. D. Thurmond, 1936).—Station is located approximately 7 miles south of Springerville, on a prominent, partly wooded knob known as Saffell Knoll, in sec. 34, T. 8 N., R. 29 E., within the boundaries of the Apache National Forest. To reach station from Eagar Post Office, go south 6.5 miles on Water Canyon road, turn left (east) on dirt road and go 0.8 mile, turn left up side of hill and drive as close to top as possible with truck, pack up to top of hill to flat top, bear northeast across flat land to top of prominent knoll and station. The station, reference, and azimuth marks are standard disks set in rock according to notes 3 and 12a. Reference mark No. 1 is in a large rock outcrop and 45.20 feet from the station in azimuth 241°49′, and No. 2 is 33.36 feet from the station in azimuth 124°48′. The azimuth mark is 4 feet north of a small pine tree, on the southeastern slope, near the top, and approximately 0.25 mile from the station in azimuth 108°22′48″.

Plane coordinates: (W), x=62,368.19 feet; y=1,108,955.23 feet; the grid azimuth to the azimuth mark=109°11′19″.*

Bench mark Z 66 (Apache County, Ariz., J. D. Thurmond, 1936).—Station is located in sec. 24, T. 9 N., R. 29 E., on right-of-way of U. S. Highway 60, 45 feet south of the center line of the highway, 3 feet north of the right-

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

of-way fence, and at the east end of a low area. To reach station from Springerville, go east on U. S. Highway 60 for 5.1 miles to east end of low area. The station is a standard bench mark disk set in malpais outcrop and stamped "Z 66 1934." The reference marks are standard disks set in outcropping rock according to note 12a. Reference mark No. 1 is about 4 feet north of the right-of-way fence and 9.839 meters (32.28 feet) from the station in azimuth 253°10′, and No. 2 is 35 feet south of the right-of-way fence and 11.528 meters (37.82 feet) from station in azimuth 359°00′. Station *State* may be used for an azimuth mark.

Plane coordinates: (W), x=82,739.06 feet; y=1,151,368.26 feet.

Springerville (U. S. G. S.) (Apache County, Ariz., J. D. Thurmond, 1936).—About ½ mile southeast of the town of Springerville in sec. 33, T. 9 N., R. 29 E., on the most prominent ground in the Springerville graveyard; and about 225 feet east of a north-and-south fence. The station and reference marks are U. S. Geological Survey standard disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is 73.65 feet from the station in azimuth 161° 40′, and reference mark No. 2 is 72.00 feet from the station in azimuth 252°21′. The azimuth mark is 0.5 mile east of Gude's Cash Store, in the north headwall of a culvert at the top of a small hill, and approximately 0.5 mile from the station in azimuth 220°41′10″.

Plane coordinates: (W), x=62,114.12 feet; y=1,140,454.79 feet; the grid azimuth to the azimuth mark=221°29′53″.*

Bare (Apache County, Ariz., J. D. Thurmond, 1936).—The station is about 14 miles air line west-northwest of Springerville, about 1 mile south of new U. S. Highway 60, ½ mile south of a gravel pit in section 32, T. 10 N., R. 27 E. To reach the station from Springerville go north on U. S. Highway 260 for 5 miles to its junction with U. S. Highway 60, turn northwest on new U. S. Highway 60 and go approximately 10 miles to a point where a very prominent, round-topped, bare hill is visible about 1 mile south, turn south toward this hill and go 0.5 mile, continue south along east side of gravel pit about 0.2 mile to base of steep slope, pack to top of hill and station. The surface and reference marks are standard disks set in concrete at the top of cast-iron pipes. Underground mark is a standard disk set in concrete according to note 7a. Reference mark No. 1 is 30.45 feet from the station in azimuth 264°53′, and reference mark No. 2 is 38.44 feet from the station in azimuth 0°47′. The azimuth mark, an Arizona Highway Department bronze disk set in the middle of a concrete wall on south side of bridge, is approximately 2 miles from the station in azimuth 281°17′47″.

Bench mark K 47 (Apache County, Ariz., J. D. Thurmond, 1936).—The station is about 10 miles northwest of Springerville on west side of U. S. Highway 260, reported to be in section 30, but probably in section 20, T. 10 N., R. 28 E., about 1.5 miles north of a cinder cone, 60.7 feet southwest of U. S. Highway 260, and 5.38 feet northeast of fence line. Station is a standard bench-mark disk set in top of a 6-inch square concrete post. Reference mark No. 1 is a standard disk set in concrete according to note 11a. Reference mark No. 2 and the azimuth mark are standard disks set in rock according to note 12a. Reference mark No. 1 is 34.36 feet from the station in azimuth 55°37′, and No. 2 is 5 feet northeast of a fence and 71.45 feet from the station in azimuth 146°59′. The azimuth mark is 25 paces east of the center of U. S. Highway 260, 200 feet north of a cattle guard, in a large rock outcrop which projects about 2 feet, and approximately 1 mile from the station in azimuth 323°19′51″.

Red Cone (Catron County, J. D. Thurmond, 1936).—The station is located in sec. 23, T. 1 N., R. 20 W., on the highest point of a small cinder knoll covered with small, scattered piñons and cedars, which knoll is the highest and most prominent one in the vicinity and which is easily recognized by its reddish color. To reach the station from Springerville, Ariz., go east 26.5 miles on Highway No. 60, or 0.5 mile east of the Red Hill Post Office, go north on a dirt road east of a fence 1.1 miles, pass through a gate, take the right fork of the first Y road and the left fork of the second Y road and go 0.25 mile, take the right fork and go 0.7 mile directly toward the station, take the left fork and go straight ahead along the main road 2.4 miles (at this point you will have passed through two more wire gates and will have passed the azimuth mark which is 0.25 mile north of the third gate), turn off the road into prairie and

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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go about 0.8 mile north to a point west of the station knoll. It is best reached by climbing and is about a 30-minute pack up the west side to the top. The surface and reference marks are standard disks set in the tops of 4-inch pipes filled with concrete, and sunk in the ground. The underground mark is a standard disk set in concrete according to note 7a. Reference mark No. 1 is 24.66 feet from the station in azimuth 187°04′, and No. 2, a standard bronze reference disk is 29.57 feet from the station in azimuth 289°31′. The azimuth mark, a standard disk set in rock according to note 12c, is about 300 feet east of the road, on the smallest of two boulders about 88 feet west of the rocky bluff of a low, flat-topped hill, and 1¼ miles from the station in azimuth 351°58′47″.

Plane coordinates: (W), x=180,500.85 feet; y=1,200,235.82 feet; the grid azimuth to the azimuth mark=352°34′33″.*

Fox (Catron County, J. D. Thurmond, 1936).—About 22 miles southwest of Quemado, on the summit of a high, prominent peak known as Fox Mountain, about 85 feet northeast of the northeast corner of the lookout station and about 4 feet east of a pole supporting a lightning rod. The station mark is a standard disk set in the top of a 4-inch pipe filled with concrete and sunk in the ground. Reference mark No. 1 and the azimuth mark are standard disks set in rock according to note 12c. Reference mark No. 2 is a standard disk set in the concrete steps of the lookout station. Reference mark No. 1 is 32.52 feet from the station in azimuth 291°30′, and No. 2 is 82.05 feet from the station in azimuth 70°35′. The azimuth mark is about 80 yards along the left fork of a Y-road, on the west edge of a bluff, about 3.0 miles by road and 1¼ miles air line from the station in azimuth 297°36′04″.

Plane coordinates: (W), x=236,289.13 feet; y=1,120,813.51 feet; the grid azimuth to the azimuth mark=298°05′20″.*

Holder (Catron County, J. D. Thurmond, 1936).—About 8 miles north and 1 mile west of Quemado, on the highest point of a lone, prominent butte which is the highest in the immediate vicinity, in sec. 28, T. 3 N., R. 16 W., near the center of the east rim on the butte, and 40 feet west of east rim. The station and reference marks are standard disks set in rock according to notes 5 and 12d. Reference mark No. 1 is 6 paces west and north of the rim and 28.57 feet from the station in azimuth 326°51′ and No. 2 is 34.57 feet from the station in azimuth 108°39′. The azimuth mark, a standard disk set in concrete according to note 11a, is 0.45 mile north of a windmill and an adobe house, 42 feet southwest of a road fork, 18 feet southwest of juniper bushes and approximately 0.2 mile from the station in azimuth 338°29′30″.

Plane coordinates: (W), x=294,449.96 feet; y=1,258,679.59 feet; the grid azimuth to the azimuth mark=338°52′39″.*

Quemado (Catron County, J. D. Thurmond, 1936).—Station is located about 3½ miles south of Quemado in the SW¼ sec. 15, T. 1 N., R. 16 W. on west edge of prominent mesa. To reach the station from Quemado, go east 2.8 miles on U. S. Highway 60 to log constructed gasoline station south of highway, turn right on dirt road a few yards east of station and go south 0.8 mile, take right fork up valley and go south for 0.3 mile to ranch house on right, continue straight ahead up the valley 1.65 miles, pass through gate and continue south 0.3 mile to a dim track turning right, follow this track west and north 0.9 mile to gate at T-fence corner, pass through north gate and follow trail west and northwest 0.65 mile, bear left along edge of bluff to a gate in a north-south fence on edge of bluff, pass through the gate and follow tracks northwest 0.95 mile to edge of bluff and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 8.720 meters (28.61 feet) from the station in azimuth 322°25′ and No. 2 is 11.511 meters (37.77 feet) from the station in azimuth 45°43′. The azimuth mark is 75 feet north of a gate, in line with a north-south fence, about 100 feet north of the edge of a bluff, and 1.0 mile from the station in azimuth 315°19′20″.

Plane coordinates: (W), x=298,089.23 feet; y=1,203,046.06 feet; the grid azimuth to the azimuth mark=315°41′57″.*

G. L. O. Station 10 (Catron County, L. C. Johnson, 1934; 1936).—The station is 0.4 mile south of U. S. Highway 60 and on a rolling mesa on which there is a scattering of trees. The point on the highway north of the station is 13.1 miles west of Quemado. The station is the ¼-section corner of sec. 35, T. 1 N.,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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R. 18 W., on the New Mexico Base Line. It is a bronze disk which is set in a concrete post and inscribed "U. S. G. L. O. 192, ¼ sec. 35, T. 1 N., R. 18 W., 1931." Over this inscription there has been stamped "U. S. C. & G. S. 1934." The two reference marks are bronze disks set in concrete posts and stamped "U. S. G. L. O. No. 1, 1931" and "U. S. G. L. O. No. 2, 1931" respectively and "U. S. C. & G. S. 1934" was stamped on both. Reference mark No. 1 is 24.59 meters (80.7 feet) from the station in azimuth 134°11′, and No. 2 is 21.63 meters (71.0 feet) from the station in azimuth 223°29′. In 1936, bench mark 64 (probably bench mark M 64) was made the azimuth mark for this station. It is 27 feet south of the center line of U. S. Highway 60, 3 feet north of a fence line and 0.9 mile from the station in azimuth 250°08′57″.

Plane coordinates: (W), x=240,098.47 feet; y=1,186,911.80 feet; the grid azimuth to the azimuth mark=250°38′01″.*

Sanchez (Catron County, J. D. Thurmond, 1936).—About 16 miles southwest of Quemado and on a prominent, bare, volcanic, boulder-covered hill. To reach the station from a point on U. S. Highway 60 which is 31.3 miles east of Springerville, Ariz., or 4.1 miles east of Red Hill Post Office, follow the road south 1.3 miles to crossroads, turn left (east) and go 1.8 miles, go southeast on road between ranch houses and follow main trail southeast 0.5 mile, pass through wire gate, and go east and southeast along the main trail 2.0 miles. At this point the azimuth mark is on the right (south) of the road and the station is 0.5 mile northeast. It is about a 10-minute pack to the hilltop and the station. The station, reference, and azimuth marks are standard disks set in rock according to notes 4 and 12a. Reference mark No. 1 is on the edge of bluff and 9.040 meters (29.66 feet) from the station in azimuth 314°33′ and No. 2 is 8.89 meters (29.16 feet) from the station in azimuth 191°27′. The azimuth mark is on a low, boulder-covered hill which is sparsely covered with piñon trees, about 120 feet south of the road, and 0.5 mile from the station in azimuth 76°30′55″.

Plane coordinates: (W), x=225,337.88 feet; y=1,169,853.78 feet; the grid azimuth to the azimuth mark=77°01′34″.*

Hardcastle (Catron County, J. D. Thurmond, 1936).—On top of a rocky peak, about 20 yards southeast of rim rock, 22 feet west of a 2½-foot pine, and near the northeastern part of the hill. To reach the station, go to a road junction 4.0 miles east of Red Hill Post Office, or 30 miles east of Springerville, Ariz., on U. S. Highway 60, go south on the road joining the highway 4.7 miles, take the left fork and go 3.1 miles, pass through a gate in an east-west fence in front of a ranch house, go 1.4 miles to an adobe house on the right, continue south 6.0 miles on the main road, take the left fork and go 0.8 mile to the top of the ridge and Hardcastle Gap, turn left into woods and follow high ground east-northeast 1.7 miles to a point opposite the second one of two peaks. The station is on the second one from the west of two peaks. This peak is the highest one in the vicinity and is the one with the rocky cliff on the north and northeast sides. Climb by foot up the ravine to the east of the station to the top of the ridge, turn right and follow ridge to the peak and the station. The station, reference, and azimuth marks are standard disks set in rock according to notes 3 and 12a. Reference mark No. 1 is 18.57 feet from the station in azimuth 217°36′, and No. 2 is 33.45 feet from the station in azimuth 315°20′. The azimuth mark is on the first small hill 1.6 miles north of Hardcastle Gap, about 20 yards east of the center line of a road and about 2.0 miles from the station in azimuth 121°30′36″.

Plane coordinates: (W), x=223,328.46 feet; y=1,107,471.00 feet; the grid azimuth to the azimuth mark=122°01′16″.*

Bench mark F 64 *(Catron County, J. D. Thurmond, 1936).*—Located 27.7 miles by U. S. Highway 60 east of Springerville, Ariz., 24.8 miles by U. S. Highway 60 west of Quemado, across the road from Red Hill Post Office, 52 feet south of the center line of the highway, 297.15 feet southwest of the southwestern corner of the post-office building, and about 650 feet southeast of the southeastern corner of a ranch house. The station is a standard bench mark disk, stamped "F 64 1934," set in a precast concrete post. The reference marks are standard disks set in concrete according to note 11a. Reference mark No. 1 is 46.65 feet from the station in azimuth 274°58′, and No. 2 is 41.95 feet from the station in azimuth 20°59′. The azimuth mark is bench mark G 64 (1934) which is a standard bench mark disk cemented in

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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a precast concrete post and which is located due south of a prominent bluff, or butte, about ½ mile northeast of a ranch house, about 300 feet west of the private road leading to the ranch house, 30 feet south of the center line of the highway, and about 2.0 miles from the station in azimuth 253°16′55″.

Plane coordinates: (W), x=182,985.49 feet; y=1,174,571.54 feet; the grid azimuth to the azimuth mark=253°52′18″.*

Beard (Catron County, J. D. Thurmond, 1936).—Station is about 21 miles east-southeast of Springerville, and 15 miles north of Luna, on a small bare hill in SW¼, sec. 16, T. 3 S., R. 20 W. Station is within the Apache National Forest. To reach station from Springerville, go east on U. S. Highway 60 11.85 miles, go through gate in south fence and follow road east and south 1.5 miles keeping right fork, pass through gate and follow main-traveled road 7.0 miles to the H–V Ranch, continue south through lane between buildings, bear left (southeast) up hill 0.5 mile to gate, continue east 0.4 mile, take left fork across draw near reservoir dam and go 0.15 mile, take right fork and go 4.65 miles to wire gate, continue east on main road 3.6 miles. Station is on small hill north of road. Turn left (north) and go across country about 1.0 mile to top of small hill and station at the approximate center of the hill. Station, reference, and azimuth marks are standard disks set in rock according to notes 3 and 12a. Reference mark No. 1 is 50.63 feet from the station in azimuth 267°27′, and reference mark No. 2 is 24.67 feet from the station in azimuth 169°43′. The azimuth mark is 0.3 mile north of road, 4 feet east of rock cairn, and approximately 0.3 mile from the station in azimuth 16°34′43″.

Plane coordinates: (W), x=165,789.65 feet; y=1,107,443.18 feet; the grid azimuth to the azimuth mark=17°11′47″.*

Martin (Valencia County, J. D. Thurmond, 1936).—The station is about 9 miles air line south-southwest of Atarque, about 6 miles air line southwest of Fence Lake, about 11 miles air line north of Salt Lake and about 2½ miles north of Valencia-Catron county line, on the high part of a prominent, timbered ridge which is known locally as "The Mesa," in the south edge of sec. 31, T. 5 N., R. 18 W. To reach the station from Atarque Post Office go south on main-traveled road 6.5 miles to Fence Lake Store and Service Station, continue south on main-traveled road 1.0 mile to cross road at section corner, turn right and go west 0.05 mile, take left fork and go 1.15 miles, take right fork and go 0.1 mile, take right fork and go west 1.1 miles, pass through a gate at entrance to farmyard and continue west keeping to the left of the house and right of barn, continue west for 1.1 miles to gate in north-south fence line, go straight ahead on left fork 0.6 mile to dim fork to right, leave main traveled road and take right, dim fork west 0.35 mile to dim cross road, continue ahead and up hill on dim road 1.35 miles to triangle blazes on piñon trees on both sides of road, leave road here, turn south, and follow blazes south 0.15 mile to station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 46.83 feet from the station in azimuth 352°32′, and No. 2 is 67.11 feet from the station in azimuth 107°34′. The azimuth mark is 15 feet north of track road, 75 feet east of triangle blaze on piñon tree, and approximately 0.15 mile from the station in azimuth 173°22′01″.

Plane coordinates: (W), x=220,022.45 feet; y=1,316,502.12 feet; the grid azimuth to the azimuth mark=173°53′44″.*

Tingle (Valencia County, J. D. Thurmond, 1936).—About 8 miles south and 12 miles east of Atarque, about 3 miles north of the Catron County Line in sec. 35, T. 5 N., R. 16 W., and on the top of a prominent lone butte with a bench on its western end. To reach the station from Atarque, go south on the main road toward Fence Lake 5.45 miles to crossroads at a section corner, go east on section line road 8.85 miles to a point where road turns south, continue east and south on graded road 1.1 miles, go left on main-traveled road 2.6 miles to fence corner, turn left and go east on graded road 1.0 mile to fence corner, leave road, make U turn to the right and drive across country 1.6 miles down an open valley to the northeast base of the butte, and pack southwest up butte to the highest point and the station site. Station and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is 37.28 feet from the station in azimuth 304°00′ and reference mark No. 2 is 32.94 feet from the station in azimuth 38°08′. The

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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azimuth mark is a standard General Land Office mark, a cap on a galvanized iron pipe marking the corner of sections 19 and 30, T. 5 N., R. 15 W., and sections 24 and 25, T. 5 N., R. 16 W. It is 3 paces south of the center of the road from Atarque via Techado Post Office to Quemado, 1 foot south of a large fence post, directly across the road from fence corner, and approximately 1.5 miles from the station in azimuth 222°49′02″.

Plane coordinates: (W), x=303,198.35 feet; y=1,317,678.46 feet; the grid azimuth to the azimuth mark=223°11′20″.*

Terreo (Valencia County, J. Bowie, Jr., 1936).—About 25½ miles southwest of Zuni, in sec. 33, T. 7 N., R. 16 W., on the Terreo ranch, about 1¼ miles northeast of the ranch house, on the high point at the west end of a small, timbered mesa, 65 feet north of the south edge of the point, 60 feet southeast of a large, weathered shale boulder, 47 feet east of the west edge of the highest level of the summit. To reach the station from the store and post office at Atarque, go east and northeast on the main-traveled road 0.5 mile, turn right through the gate at the top of the grade, go east on track road 0.5 mile, pass through gate, go east and northeast along north side of fence 0.5 mile, take left fork, go up the valley 0.7 mile, pass through corral, go straight ahead up the valley about 100 yards, bear left up the mesa for 0.4 mile, pass through gate, go north for 0.2 mile, take right fork, go east 0.2 mile, pass through two gates, go east 0.05 mile, cross arroyo, go east 1.8 miles, pass through gate in an east-west fence, go northeast and east 0.65 mile, pass through the gate in north-south fence, go east 0.5 mile, pass an old stone house, go east on the main-traveled road 2.0 miles, bear left at reverse Y, go 0.05 mile, take dim right fork, go east 0.6 mile, pass through gate, go east 1.2 miles, pass through gate, go east and southeast up the valley 1.3 miles to a small stone house and windmill, go east 0.15 mile, pass through gate, go east 0.65 mile to the Terreo ranch house, go north on dim road up hill 0.5 mile, turn right just after crossing the crest of the ridge, go east across country 0.3 mile to the south end of the lowest bench of the mesa, go up the slope to the top of the bench, turn left and go north and east along the mesa about 0.5 mile to the base of the highest point. The station is on the summit of the point, about 50 yards east. The station and azimuth marks and reference mark No. 2 are standard bronze disks, set in rock, as described in notes 4 and 12a. Reference mark No. 1, a standard bronze reference mark, set in top of a buried boulder according to note 12c, is towards the south edge of the summit, and 13.427 meters (44.05 feet) south of the station in azimuth 349°19′. Reference mark No. 2 is at the west edge of the highest level of the summit and 14.510 meters (47.60 feet) from the station in azimuth 92°22′. The azimuth mark is 0.45 mile north of the Terreo ranch house, 90 yards west of a track road, at the east end of the summit of a low, rocky hill, set in a flat ledge, and approximately 0.6 mile from station in azimuth 54°28′37″.

Plane coordinates: (W), x=295,982.20 feet; y=1,379,205.35 feet; the grid azimuth to the azimuth mark=54°51′52″.*

Crockett (Valencia County, John Bowie, Jr., 1936).—About 11 miles north and 3½ miles east of Atarque, near the west edge of sec. 28, T. 8 N., R. 17 W., and about ¾ mile south of the Zuni Indian Reservation fence line, and on the southwesternmost point of a prominent, timbered mesa on land owned by Mr. Crockett who lives about 1 mile east of the station. The station and reference marks are standard bronze disks set in rock, as described in notes 2 and 12a. Reference mark No. 1 is 4.310 meters (14.14 feet) from the station in azimuth 335°49′ and No. 2 is 8.150 meters (26.74 feet) from the station in azimuth 110°18′. The azimuth mark, a standard disk set in a boulder according to note 12c, is on a small hill which lies just off the main-traveled road from Crockett Ranch, and about 0.3 mile from station in azimuth 319°03′51″.

Plane coordinates: (W), x=258,107.05 feet; y=1,417,018.60 feet; the grid azimuth to the azimuth mark=319°31′32″.*

Colorado (Valencia County, J. Bowie, Jr., 1936).—The station is about 10 miles south and 4 miles east of Zuni, about 12½ miles north and 4½ miles west of Atarque, in the northwest corner of sec. 19, T. 8 N., R. 18 W., about 3 miles east of the Zuni-Atarque road, at a jog in the south boundary fence of the Zuni Indian Reservation, 165 feet south and 254 feet east of the fence lines, and on the highest point near the west end of one of the ridges of Mesa Colorada. To reach from the Trading Post at Zuni go west on St.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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Johns Road about ¼ mile, go south on graded road 7.2 miles to top of rise, turn right, go south on main-traveled track road 6.6 miles to cattle guard, continue south 0.8 mile to cross road with triangle blaze on cedar tree east of road and north of southerly of two crossings, turn left, go east 0.05 mile to cross road, continue straight ahead east 2.9 miles, thence take left fork, cross wash, go 0.05 mile to a road coming in from left, continue east 0.35 mile, thence left fork on main-traveled road 0.05 mile to top of mesa, continue east 0.1 mile, take left fork, follow dim road northeast and north 0.45 mile to Indian Reservation fence line, take down fence, pass through fence, turn left, pick up dim road and follow it west along north side of fence line 1.0 mile to fence corner and station. Station mark and reference mark No. 1 are standard disks set in rock according to notes 4 and 12c. Reference mark No. 2 and azimuth mark are standard disks set in bedrock, note 12a. Reference mark No. 1 is 20.583 meters (67.53 feet) from the station in azimuth 288°38′, and No. 2 is 19.044 meters (62.48 feet) from the station in azimuth 15°10′. The azimuth mark is on top of the bluff at the edge of the mesa, about 50 yards south and 50 feet above an old wood road, 6 feet south and 6 feet east of the edge of the rock ledge, and approximately ¼ mile from the station in azimuth 1°03′51″.

Plane coordinates: (W), x=215,687.80 feet; y=1,425,617.22 feet; the grid azimuth to the azimuth mark=1°36′25″.*

Porter (Apache County, Ariz., J. D. Thurmond, 1936).—About 18 miles southeast of Sanders, Ariz., 12½ miles west of Zuni, N. Mex., about 1½ miles west of the Arizona-New Mexico State line on property owned, or controlled, by Mr. Burr Porter, on the highest point of a long divide between the drainage basins of the Zuni River and Rio Puerco, on a long, narrow, sandy spur running north from the main divide. The ridge drops off abruptly to the east and gently to the west. To reach the station, go south 14.1 miles on Arizona State Highway 81, from its junction with U. S. Highway 66 in Sanders, Ariz., to *Los Angeles-Albuquerque Airway, beacon No. 54B* on the east, continue southward 1.3 miles, turn left (east) and go 0.2 mile to a house on a hill, continue 2.1 miles, take the left fork and go 1.7 miles, take the right fork and continue straight ahead 4.7 miles, take the left fork and go 0.6 mile, take the right fork and go 0.3 mile to the cross roads, turn right and go 1.3 miles, take the left fork and go 0.05 mile, leave the road and follow the crest of the spur 0.7 mile to the highest point and the station. The station, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 41.15 feet from the station in azimuth 0°37′, and No. 2 is 32.43 feet from the station in azimuth 81°04′. The azimuth mark is in a natural clearing in lowlands, 60 feet northwest of a lone piñon tree, and about 0.5 mile from station in azimuth 317°51′53″.

Plane coordinates: (W), x=130,296.23 feet; y=1,484,263.09 feet; the grid azimuth to the azimuth mark=318°34′29″.*

Zuni (McKinley County, C. L. Garner, 1920; 1936).—Station is located on the highest point and south end of the southern one of the Zuni Twin Buttes, 5 miles northwest of Zuni, 30 miles south-southwest of Gallup and about 8 miles east of the state line. The station mark is a standard disk set in rock according to note 4. The station mark is stamped "1919," but was not occupied until 1920. *Zuni* (*U. S. G. S.*), marked with a stone monument, is 8.448 meters (27.72 feet) from the station in azimuth 163°26′. A standard reference mark set in rock according to note 12c is 5.262 meters (17.26 feet) from the station in azimuth 196°51′. A rock cairn, built by Indians on religious pilgrimages, is 9.5 meters (31.2 feet) from the station in azimuth 169°05′. The azimuth mark is 25 feet north of the bare and prominent point which projects southeastward, on the east edge of the rim of the butte, and 175 yards from station in azimuth 210°01′50″.

Plane coordinates: (W), x=177,731.78 feet; y=1,501,979.61 feet; the grid azimuth to the azimuth mark=210°39′03″.*

Los Angeles-Albuquerque Airway, beacon No. 56 eccentric (Apache County, Ariz., J. D. Thurmond, 1936).—About ¼ mile west of the intersection of the northern diagonal boundary line of the Zuni Indian Reservation and the Arizona-New Mexico boundary line. To reach the station from Zuni, go 12 miles southwest on State Highway 36 to the Arizona-New Mexico boundary line, turn

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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right onto side road and go 1.0 mile to the airway beacon. The station is 25 feet north of the northeastern corner of the fence enclosing the beacon and 16.755 meters (54.97 feet) from *Los Angeles-Albuquerque Airway, beacon No. 56* in azimuth 202°10′. The surface, underground, and azimuth marks and reference mark No. 2 are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is a standard disk set in the concrete base support for the tower, and is 3.7 feet northeast of the southwestern leg and 17.543 meters (57.56 feet) from the station in azimuth 23°01′. Reference mark No. 2 is on a hillside and 12.830 meters (42.09 feet) from the station in azimuth 100°58′. The azimuth mark is 65 yards west of the State line, 25 feet north of the highway, and 0.8 mile from the station in azimuth 338°51′02″.

Plane coordinates: (W), x=135,238.81 feet; y=1,469,100.85 feet; the grid azimuth to the azimuth mark=339°33′00″.*

Scrub (Apache County, Ariz., J. D. Thurmond, 1936).—The station is about 18½ miles southwest of Zuni and about 23½ miles southeast of Sanders, Ariz., on the top of a sandy ridge, south of a low, sandy mesa between the Zuni-St. Johns road and the Arizona-New Mexico State line. To reach the station from Sanders go southeast on the St. Johns road 23.8 miles to Witch Wells and a road to the left, take this left-hand road toward Zuni 8.2 miles to a very dim cross road, go southeast on this dim road 0.9 mile to a lake on the left and a corral on the right, pass through a wire fence and go south along the east side of the fence 0.3 mile, bear left and go southeast 1.8 miles keeping to the left of all drains to the west, to the top of sandy ridge and the station. The station mark is a standard disk welded to the top of a steel rod which was sunk into the ground and around which concrete was poured. The underground, reference, and azimuth marks are standard disks set in concrete according to notes 7a and 11a. Reference mark No. 1 is 67.12 feet from the station in azimuth 234°43′, and No. 2 is 64.12 feet from the station in azimuth 355°43′. The azimuth mark is in the northwest corner of a small clearing and approximately 0.3 mile from the station in azimuth 154°19′06″.

Plane coordinates: (W), x=117,223.45 feet; y=1,437,848.70 feet; the grid azimuth to the azimuth mark=155°03′00″.*

Ojo (Valencia County, J. D. Thurmond, 1936).—Station is near the north edge of sec. 32, T. 8 N., R. 20 W., about 0.35 mile south of the Zuni Reservation fence line about 2.25 miles south of Ojo Caliente and about 13 miles south and 8 miles west of Zuni on top of the west end of a low, timbered ridge. To reach the station from Zuni, go southwest about 13 miles to the village of Ojo Caliente, from the creek crossing at the southeast edge of town follow the road with telephone poles southeast and south 1.2 miles to Indian houses, turn right (west) and follow main-traveled road 1.4 miles to north-and-south fence coming up to road from south, turn sharp left and follow road south 1.5 miles to gate, pass through gate in reservation fence, leave road, bear left onto a dim road along top of ridge for 0.35 mile to top of ridge and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 30.29 feet from the station in azimuth 214°21′, and No. 2 is 31.39 feet from the station in azimuth 297°46′. The azimuth mark is 41 paces east of center line of north-south road, about 75 yards northeast of three rock cairns and 0.7 mile south of the reservation fence line and approximately 0.5 mile from the station in azimuth 33°46′20″.

Plane coordinates: (W), x=160,008.12 feet; y=1,414,833.72 feet; the grid azimuth to the azimuth mark= 34°25′15″.*

Cousins (McKinley County, J. D. Thurmond, 1936).—Station is located about 21 miles south-southwest of Gallup, 12 miles north of Zuni, 11 miles east of the Arizona-New Mexico line in sec. 28, T. 12 N., R. 19 W., and on a large, flat, sandy, wooded ridge between White Water Creek and Zuni River. To reach station from the intersection of U. S. Highway 66 and State Highway 32 in Gallup, go south 21.4 miles, go west on improved dirt road 4.9 miles to a farm road leading southwest up hill, follow this road 0.3 mile to "Y," bear right and follow dim tracks west along top of ridge 0.2 mile to highest point and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 38.20 feet from the station in azimuth 237°59′ and No. 2 is 38.86 feet from the station in azimuth 353°59′. The azimuth mark is 5.1 miles west of State

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Highway 32, 7 paces south of the center line of an east-west road, 11 paces west of a telephone pole, and approximately 0.3 mile from the station in azimuth 311°13′32″.

Plane coordinates: (W), x=194,746.66 feet; y=1,545,994.92 feet; the grid azimuth to the azimuth mark=311°48′56″.*

Lupton (McKinley County, J. D. Thurmond, 1936).—About 21 miles southwest of Gallup, about 2 miles air line southeast of Lupton, Ariz., and 1½ miles east of the Arizona-New Mexico State line, on the highest point of a large mesa which is heavily wooded with piñon, on the east side of a very flat knoll, and 15 feet southeast of a 5-inch piñon tree with triangle blaze. The surface, underground, reference, and azimuth marks are standard disks set in concrete as described in notes 1, 7a, and 11a. Reference mark No. 1 is 60.81 feet from the station in azimuth 221°11′, and No. 2 is 60.44 feet from the station in azimuth 305°53′. The azimuth mark is 15 feet northeast of the trail to the station, across the trail from, and 22 feet northwest from an 8-inch piñon with a triangle blaze, and approximately 0.4 mile from the station in azimuth 207°31′28″.

Plane coordinates: (W), x=142,729.76 feet; y=1,578,526.49 feet; the grid azimuth to the azimuth mark=208°13′02″.*

Whitewater (Apache County, Ariz., or McKinley County, N. Mex., J. D. Thurmond, 1936).—The station is about 8 miles south of U. S. Highway 66 on the north edge of the prominent mesa just south of Whitewater canyon, 0.15 mile west of the road and about 25 feet south of the north edge of the mesa. To reach the station from Gallup, go west on U. S. Highway 66 21.9 miles to a point 0.3 mile east of Lupton where a dirt road runs along the south side of highway for a short distance, take this dirt road and go 0.25 mile across the Atchison, Topeka and Santa Fe Railroad and through a gate, take the right (main) fork and go 1.6 miles, crossing a deep wide wash, a hogan on the left and going around a knoll to the left, take the left fork and go 1.7 miles, take the right fork and go 2.1 miles to a Y-road just before reaching a hogan on the right, take the left fork and go 3.1 miles to a left-hand curve and a hogan on the right, go to the left, cross a small ditch, keep the main (right) fork, and go 1.25 miles to the top of ridge and a left-hand curve, leave the road and go 0.15 mile west along the north edge of mesa to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 50.62 feet from the station in azimuth 257°20′, and No. 2 is 61.54 feet from the station in azimuth 2°28′. The azimuth mark is about 0.1 mile east of the last of the above-mentioned hogans, 66 feet south of a cedar tree in a fence corner, 1 foot east of the fence, and approximately 1.0 mile from the station in azimuth 180°25′18″.

Plane coordinates: (W), x=137,294.57 feet; y=1,546,494.56 feet; the grid azimuth to the azimuth mark=181°07′22″.*

Pond (McKinley County, J. D. Thurmond, 1936).—Station is about 13 miles southwest of Gallup and 11 miles east of the Arizona-New Mexico State line near the section line between sections 15 and 16, T. 13 N., R. 19 W., about ¼ mile northeast of the western end of a pond made by a low earthen dam in a wide valley, on the highest point of a prominent, sandy knoll which is covered with stunted piñons and junipers, 8 paces northwest of a blaze on a 10-inch piñon, 3 paces west of a blaze on a 4-inch piñon and 5 paces northeast of a blaze on a 24-inch juniper. To reach the station from Gallup go south 15.0 miles on State Highway 32, turn right (west) on dirt road and go 1.6 miles, bear right and go 2.3 miles to curve and intersection, bear right, then bear right again on dim road and go 0.5 mile, bear right and go 0.6 mile, bear right and go 0.7 mile to wash with fence on left, cross wash and go 1.5 mile, bear right and keep straight ahead at intersection just past Y, go 0.5 mile, cross wash, turn sharp right and go 0.3 mile, bear left and go 0.4 mile, bear right and go 0.1 mile, bear right and go 0.1 mile to reversed Y, half way up hill, continue 0.2 mile to a hogan and cornfield on right, continue 1.2 miles to 2 hogans on right, bear left and go 1.2 miles to fence corner on left where fence goes south across east end of pond, continue around pond, go 0.2 mile to house, turn right, go north 0.2 mile up draw past barn to edge of brush, and go about 200 yards up hill to highest point and station. Station, reference, and azimuth marks are standard disks welded into the tops of 4-inch pipes.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Reference mark No. 1 is 1 yard east of western slope, 4 feet southeast of a large piñon, and 55.37 feet from the station in azimuth 210°08′ and No. 2 is 10 feet east of western edge of rim and 56.97 feet from the station in azimuth 313°49′. The azimuth mark is 15 feet south of center line of road, 0.2 mile east of the above-mentioned two hogans, and approximately 1.5 miles from the station in azimuth 231°09′27″.

Plane coordinates: (W), x=194,168.66 feet; y=1,588,496.82 feet; the grid azimuth to the azimuth mark=231°45′04″.*

Supplementary points

G. L. O. Station 2 eccentric (Apache County, Ariz., L. C. Johnson, 1934; 1936).—The station is reference mark No. 2 for *G. L. O., Station 2.* It is a General Land Office reference tablet set in a concrete post. To reach the station from the intersection of U. S. Highway 260 and Arizona State Highway 61 in St. Johns, Ariz., go west 9.6 miles on U. S. Highway 260, turn left off the highway, circle to the right of a low hill, and go southeast about 0.5 mile to the top of the hill and the station. *G. L. O. Station 2* is in a north-south fence line and 390.938 meters (1,282.60 feet) from the station in azimuth 93°11′55″. G. L. O. reference mark No. 1, a tablet set in a concrete post, is 0.1 mile north of *G. L. O. Station 2,* 15 steps east of fence line and 114°45′33″ in azimuth from the eccentric station.

G. L. O. Station 2 (Apache County, Ariz., L. C. Johnson, 1934; 1936).—The station marks the standard corner of T. 13 N., Rs. 26, 27 E. It is a General Land Office tablet set in a concrete post, and is 390.938 meters (1,282.60 feet) from *Gl. L. O. Station 2 eccentric* (see description thereof) in azimuth 93°11′55″.

Arizona-New Mexico boundary milepost No. 197 eccentric (Apache County, Ariz., L. C. Johnson, 1934).—About 13 miles air line east of Springerville, Ariz., about 1 mile south of U. S. Highway 60, at the Arizona-New Mexico boundary line, and on a small knoll of an open ridge of a broad mesa, bearing east and northwest. The General Land Office reference mark No. 3 was used as the station. To reach the station from Springerville, Ariz., go east 15.4 miles on U. S. Highway 60 to the State line, continue east 0.3 mile, turn off the highway onto a road leading to the right, go southeast about 0.3 mile to a windmill south of ranch house, go through the gate just north of the windmill and follow the old road east and south 1.15 miles to top of mesa and edge of timber, continue about 100 yards, turn right and go along the open top of the ridge 0.5 mile, swing to the right and drive nearly due west 0.8 mile to a fence line, turn right and follow the fence line about 0.2 mile, walk almost due west about 0.15 mile to the top of a little knoll and the station. The station is marked by standard General Land Office tablets set in concrete posts. Reference mark No. 1, a standard General Land Office tablet, is 1,104.00 feet (slope distance) from the station in azimuth 323°25′17″. Reference mark No. 2, a standard General Land Office tablet, is 1,029.00 feet (slope distance) from the station in azimuth 331°45′03″. Arizona-New Mexico boundary milepost No. 197, marked with a General Land Office tablet, is 1,053.03 feet (slope distance) from the station in azimuth 327°24′17″.

Plane coordinates: (W), x=132,470.55 feet; y=1,147,908.85 feet; the grid azimuth to Arizona-New Mexico boundary milepost No. 197=328°05′12″.*

Green Peak Lookout (Apache County, Ariz., L. C. Johnson, 1934).—No description for this station available.

Mt. Baldy, cabin (Apache County, Ariz., L. C. Johnson, 1934).—No description for this station available.

Springerville, grammar school, cupola (Apache County, Ariz., J. D. Thurmond, 1936).—The point observed upon was the base of the flag pole on top of the cupola of the Springerville grammar school, which is located in the eastern part of the town of Springerville and is the most prominent building in the town.

Plane coordinates:[1] (W), x=61,893 feet; y=1,142,633 feet.

Fox Mountain Lookout (Catron County, J. D. Thurmond, 1936).—Plane coordinates: (W), x=236,202.14 feet; y=1,120,783.51 feet.

Zuni (U. S. G. S.) (McKinley County, C. L. Garner, 1919; 1936).—See description of *Zuni.* Plane coordinates;[1] (W), x=177,724 feet; y=1,502,006 feet.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Boundary (Apache County, Ariz., McKinley County, N. Mex., C. L. Garner, 1920).—Station is on a low hill which is about 12 miles by road west of Zuni, 4 miles west of Louis Chaves' ranch house and 1 mile south of road leading west from the ranch house. The station was stamped "1919" but was not occupied until 1920. The station surface mark is a standard disk set in concrete according to note 1a. The underground mark is a bottle in upright position, note 10a. Arizona-New Mexico boundary milepost No. 137 is 2,562 feet north of the station.

Plane coordinates:[1] (W), x=137,021 feet; y=1,460,977 feet.

Line (Apache County, Ariz.; McKinley County, N. Mex., C. L. Garner, 1920).—Plane coordinates:[1] (W), x=137,039 feet; y=1,462,566 feet.

Arizona-New Mexico boundary milepost No. 137 (Apache County, Ariz., McKinley County, N. Mex., C. L. Garner, 1920).—Plane coordinates:[1] (W), x=137,054 feet; y=1,463,639 feet.

Los Angeles-Albuquerque Airway, beacon No. 54A (Apache County, Ariz., J. D. Thurmond, 1936).—Plane coordinates: (W), x=59,657.28 feet; y=1,473,001.82 feet.

Los Angeles-Albuquerque Airway, beacon No. 54B (Apache County, Ariz., J. D. Thurmond, 1936).—See description of *Beacon 54, eccentric.*

Plane coordinates: (W), x=72,892.91 feet; y=1,470,984.27 feet.

Los Angeles-Albuquerque Airway, beacon No. 56 (Apache County, Ariz., J. D. Thurmond, 1936).—See description of *Beacon 56, eccentric.*

Plane coordinates: (W), x=135,217.60 feet; y=1,469,050.09 feet.

Los Angeles-Albuquerque Airway, beacon No. 57 (McKinley County, J. D. Thurmond, 1936).—Plane coordinates: (W), x=212,565.61 feet; y=1,477,710.04 feet.

MESCALERO INDIAN RESERVATION AREA

Principal points

Pajarita (U. S. G. S.) (Otero County, J. Bowie, Jr., 1936).—The station is 20½ miles east-northeast of Mescalero, 16 miles southeast of Ruidoso, about 2 miles air line east-by-north of the Indian Village of White Tail, on the highest point of the summit of Pajarita Mountain, on its longitudinal center, about 80 yards north of a large, dead tree, 60 feet west of the east edge of the summit, in range with the dead tree and the highest peak on the horizon toward the north. The station mark is a standard U. S. Geological Survey aluminum disk cemented in a drill hole in bedrock, and stamped "8014." The azimuth and reference marks are standard disks set in rock according to note 12a. Reference mark No. 1 is midway between the center and the east edge of the summit, 6.895 meters (22.62 feet) from the station in azimuth 244°07′; and No. 2 is along the center of the summit, 5.950 meters (19.52 feet) from the station in azimuth 354°29′. The azimuth mark is across a grassy park, on the east side of a low, rocky ridge, about 50 yards west of the west edge of the eastern one of two seasonal ponds, about 100 yards southward along the ridge from the grassy saddle separating the two ponds, 17 feet northeast of a 3-foot pine tree with a surface root pointing in the direction of the mark, in the top of a large, rough, outcropping ledge about 10 feet below the summit of the ridge, and approximately 1.5 miles from the station in azimuth 96°50′52″.

Plane coordinates: (E), x=164,664.52 feet; y=815,448.88 feet; grid azimuth to azimuth mark=97°26′57″.* (C), x=750,716.74 feet; y=814,665.60 feet; grid azimuth to azimuth mark=96°23′54″.*

Wofford (N. Mex. Geodetic Survey) (Otero County, W. R. Porter, 1934; 1936).—The station is 11½ miles south-southeast of Mescalero, 3 miles northeast of Cloudcroft, about ½ mile south of the south boundary of the Mescalero Indian Reservation, on the crest of the divide between Silver Springs Canyon and La Luz Canyon drainage, under the center of the Wofford lookout tower of the U. S. Forest Service. To reach from Cloudcroft, go down the James Canyon Road 1.5 miles and take left-hand road, follow this road about 5 miles to where it joins Silver Springs Canyon, take left-hand road and follow 1 mile to right-hand road, take right-hand road and follow to station site. The station mark is a U. S. C. & G. S. and State Survey disk set in a concrete post in the center of the base of the tower and at the northwest corner of the

[1] No check on this position.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

stair landing of the 80-foot fire tower. The azimuth and reference marks are standard disks set according to note 11a. Reference mark No. 1 is in the foundation for the northeast tower leg, 3.793 meters (12.44 feet) from the station in azimuth 225°08′; No. 2 is at point where the east-west fence crosses road about 50 yards south of the tower, 30 feet north of the road, 27 feet northwest of a jog in the fence line north of the road, and about 200 yards from the station in azimuth 341°08′26″; and No. 3 is in the foundation of the northwest tower leg, 3.796 meters (12.45 feet) from the station in azimuth 135°06′. The azimuth mark is 175 yards south of a road at a fence corner, 11 yards south of the southwest corner of a field, and approximately 1 mile from the station in azimuth 35°35′04″. This azimuth mark is not visible from the ground at the station.

Plane coordinates: (C), x=665,421.74 feet; y=726,676.51 feet; grid azimuth to azimuth mark=35°17′27″.*

Sierra Blanca (Otero County, J. Bowie, Jr., 1936).—The station is about 24 miles north-northeast of Tularosa, 15 miles north of Mescalero, about 8 miles west-northwest of Ruidoso, on the summit of the highest mountain in this part of New Mexico, which is known locally as White Mountain. The station may be reached by horse trail from the ranger station west of Ruidoso. A U. S. Geological Survey bench mark is 1.420 meters (4.66 feet) from the station in azimuth 11°57′ and a lead pipe is 2.643 meters (8.67 feet) from the station in azimuth 210°36′. The station, azimuth, and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is 9.080 meters (29.79 feet) from the station in azimuth 231°45′, and No. 2 is 5.970 meters (19.59 feet) from the station in azimuth 326°01′. The azimuth mark is on the crest of the same ridge as the station, 0.25 mile from the station in azimuth 273°40′41″.

Plane coordinates: (C), x=634,881.00 feet; y=863,948.40 feet; grid azimuth to azimuth mark=273°26′06″.*

Nogal (U. S. G. S.) (Lincoln County, J. Bowie, Jr., 1936).—The station is about 16 miles air line northwest of Ruidoso, 5 miles northwest of the Bonito Dam on the Rio Bonito, on top of Nogal Peak, an isolated, sharp, brusy peak in the Lincoln National Forest, lying at the heads of Tortolita, Nogal, Water, and Skull Canyons. To reach from Stern's two-story house which is on the west side of the road, about 5 miles by road from the Bonito Dam, and from which the peak is plainly visible as a high, sharp peak 2 miles toward the northwest, go ½ mile further up Skull Canyon towards Nogal Peak to another farm house and end of truck travel. From here go north-northwestward up good trail along the canyon to a prominent saddle at the west-southwest side of the peak, bear right and go up steep slope for 1½ miles to the summit and station site. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 11.150 meters (36.58 feet) from the station in azimuth 262°12′, and No. 2 is 6.698 meters (21.98 feet) from the station in azimuth 58°31′. The azimuth mark, a standard disk set in concrete according to note 11a, is 100 feet northwest of Stern's house, and 2 miles from the station in azimuth 322°23′40″.

Plane coordinates: (C), x=636,279.49 feet; y=908,742.27 feet; grid azimuth to azimuth mark=322°08′52″.*

Analla (Lincoln County, J. Bowie, Jr., 1936).—The station is about 9 miles (6 miles air line) northwest of Tinnie, about 8 miles east-southeast of Lincoln, about 5 miles north of Hondo, 3¼ miles south and 1 mile west of Escondido Spring, on the Escondido ranch, on the highest point of a nearly bare knoll, about 40 feet southwest of a small, bushy cedar tree. The station knoll is on a north-south spur ridge with deep canyons on both east and west sides, all drainage is to the south and southeast. A still larger canyon lies about 1 mile to the southwest, running down southeasterly to the Rio Hondo and the canyons east and west of the station drain into this large canyon. There is a higher north-south ridge about 1 mile east of the station. To reach from the Escondido Ranch which is about 9½ miles by road from Tinnie, take the road passing on the left side of ranch house and go 0.2 mile to a red-roofed cabin, take the left fork just beyond cabin and continue on main road 1.5 miles up draw to south to a low, red, tin-roofed barn, continue on track road 1.1 miles to a low saddle,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

take the left fork (straight ahead) and follow dim track for 0.25 mile to a higher saddle and an arrow on a pine tree, turn right and follow the top of the spur west and then south 1.4 miles to a low knoll with a blazed tree on it and station site. There is no road from the high saddle to the station knoll but the spur ridge is bounded on both sides by deep canyons and there is no way to get off the right ridge. The station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 11.280 meters (37.01 feet) from the station in azimuth 195°02′, and No. 2 is 8.031 meters (26.35 feet) from the station in azimuth 279°17′. The azimuth mark is on a high point of the same ridge as the station, where it turns from south to west around a canyon and where a short spur continues to the south, approximately ¾ mile from the station in azimuth 195°50′16″.

Plane coordinates: (C), x=802,164.86 feet; y=889,413.32 feet; grid azimuth to azimuth mark=195°17′30″.*

Monjeau (Lincoln County, J. Bowie, Jr., 1936).—The station is 7.5 miles air line north-northwest of Ruidoso, on Monjeau Peak, just south of the U. S. Forest Service's *Monjeau Lookout*. To reach from Alto, turn left off the main road, cross cattle guard and go 0.9 mile to a fork and sign "Monjeau Lookout 5½ mi.", take right fork and follow the road 5.6 miles to the station site. The station and reference marks are standard disks set in rock according to notes 2, 11a, and 12a. Reference mark No. 1 is 13.780 meters (45.21 feet) (slope distance) from the station in azimuth 47°57′, and No. 2 is 9.560 meters (31.36 feet) from the station in azimuth 149°45′. The azimuth mark, a standard disk set in concrete according to note 11a, is on the left side of the road going up, at a point where road tops out of high ridge, and 1¼ miles from the station in azimuth 6°12′22″. Azimuth from the station to the White Mountain Lookout is 59°24′55″.

Plane coordinates: (C), x=658,334.12 feet; y=884,611.55 feet; grid azimuth to azimuth mark=5°55′13″.*

Westbox (Lincoln County, J. Bowie, Jr., 1936).—The station is 21 miles north-northeast of Mescalero, 7½ miles air line north-northeast of Ruidoso, on a high grassy ridge on pasture land of the West & Box Ranch 0.75 mile east of the stucco ranch house on the first ridge ½ mile north of the Little Creek, and ½ mile south of the graded road from Alto to Fort Stanton. To reach the station take the right fork at Alto post office and follow the graded road for 0.5 mile, turn right on the road on top of hill and go 0.1 mile, take left fork and go 4.3 miles to the West & Box ranch house, continue 1.0 mile straight ahead, go southeastward on track road 0.1 mile, turn right and go southwestward across the open pasture about ½ mile to the highest point and the station site. The station, underground, azimuth and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 11.237 meters (36.87 feet) from the station in azimuth 240°36′, and No. 2 is 12.523 meters (41.09 feet) from the station in azimuth 343°18′. The azimuth mark is on the north side of a wooded knoll just south of a footpath that passes around the north side of the knoll, approximately 0.3 mile from the station in azimuth 232°02′58″. A triangle blazed on a 15-inch cedar tree is 168.5 feet from the station in azimuth 338°40′.

Plane coordinates: (C), x=697,681.26 feet; y=884,472.50 feet; grid azimuth to azimuth mark—231°41′33″.*

West Spur (Lincoln County, J. Bowie, Jr., 1936).—The station is 4½ miles west of Fort Stanton, 4⅛ miles south-by-west of Capitan, ¾ mile south of the northern boundary of the Mescalero Indian Reservation, 50 feet east of the western extremity of a narrow spur ridge, 0.5 mile west of the main grassy ridge along the east side of the basin extending south from the town of Capitan, and in range with Sierra Blanca and a shallow gap in the high range on the horizon to the northeast. The station, azimuth, and reference marks are standard disks set in rock according to notes 2, 12a, and 12c. Reference mark No. 1 is at the north edge of the spur, 7.522 meters (24.68 feet) from the station in azimuth 196°28′, and No. 2 is along the longitudinal center of the spur, 7.333 meters (24.06 feet) from the station in azimuth 272°25′. Station *West Spur Azimuth* may be used as an azimuth mark. The following distances and azimuths are from station: Buena Vista (U.S.G.S.), 4.0 miles, 247°17′42″; Windmill, about ½ mile, 191°38′23″; and Capitan, church belfry, 199°05′40″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (C), x=699,876.03 feet; y=907,407.27 feet; grid azimuth to *West Spur Azimuth*=109°49′18″.**

West Spur Azimuth (Lincoln County, J. Bowie, Jr., 1936).—The station is about 5 miles west of Fort Stanton, 4½ miles south-southwest of Capitan, and approximately 0.6 mile from station *West Spur*, on the summit of the first ridge across the basin from the main ridge along the east side of the basin which extends south from the town of Capitan, on the longitudinal center of the ridge, and 20 feet south of its northern extremity. It is marked by a standard azimuth disk set in the top of a small, outcropping ledge according to note 12a. Station *West Spur* may be used as an azimuth mark.

Plane coordinates: (C), x=697,342.85 feet; y=908,320.44 feet.

Lincoln (Lincoln County, J. Bowie, Jr., 936).—The station is 1¼ miles west-southwest of Lincoln, on the extreme northwest end of a high wooded mesa, on the southwest side of the Rio Bonito Canyon, and on the highest ground in the vicinity. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 13.670 meters (44.85 feet) from the station in azimuth 220°38′, and No. 2 is 16.225 meters (53.23 feet) from the station in azimuth 341°06′. Station *Lincoln Azimuth* may be used as an azimuth mark.

Plane coordinates: (C), x=757,924.78 feet; y=906,855.63 feet; grid azimuth to *Lincoln Azimuth*=213°16′36″.**

Lincoln Azimuth (Lincoln County, J. Bowie, Jr., 1936).—The station is west-southwest of Lincoln, on a high wooded mesa, 487 meters (1,600 feet) north-east-by-north of station *Lincoln* on the summit of the first ridge to the north-east-by-north, about 50 feet south of the brink of the rocky bluff at the north end of the ridge, in top of a small outcrop of ledge rock. The station mark is a standard azimuth disk set in rock according to note 12a. Stations *Lincoln* and *Nogal* (*U. S. G. S.*) may be used as azimuth marks.

Plane coordinates: (C), x=758,802.66 feet; y=908,193.28 feet.

Coe (Lincoln County, J. Bowie, Jr., 1936).—The station is about 25 miles air line northeast of Mescalero. To reach from Glencoe post office go eastward 0.8 mile to a point 100 yards beyond the grocery store of Geo. W. Coe (partner of Billy, the Kid), turn right on dirt road and go south 0.2 mile to two cattle guards about 150 yards apart, take left fork and go on main traveled road southeasterly and southerly up canyon 2.2 miles to top of grade, continue 0.4 mile to forks, take right fork straight ahead and continue 1.3 miles to summit then continue, 0.3 mile to point where main traveled road curves to the right and a dim trail goes straight ahead and curving slightly to the left, and drive in here about 50 yards to end of truck travel. A trail is blazed through the pine trees to the station site. The station, azimuth and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 4.720 meters (15.49 feet) from the station in azimuth 256°50′ and No. 2 is 10.405 meters (34.14 feet) from the station in azimuth 323°36′. A witness mark, a triangle blazed in the north side of a 12-inch pine tree, is 9.20 meters (30.2 feet) from the station in azimuth 97°10′. The azimuth mark is ¾ mile from the station in azimuth 55°45′36″. To reach azimuth mark from the end of truck travel to station, continue on main traveled road 0.8 mile to an 8-inch pine tree with 3 blazes on it, on the left side of road, go northwest about 40 feet to the mark.

Plane coordinates: (C), x=749,991.48 feet; y=859,373.13 feet; grid azimuth to azimuth mark=55°18′35″.*

Rain (Lincoln County, J. Bowie, Jr., 1936).—The station is about 5 miles south of Tinnie, on the northern slope of a rocky ridge on the west side of a deep canyon which extends northward to Rio Hondo, at a point about ½ mile north of the high point of the ridge, ¼ mile south of an east-west fence, 80 yards east of a north-south fence, 14 yards northeast of a 6-inch alligator juniper tree which is marked with a 6-inch triangular blaze on its northeast side. The station mark is a standard disk set in rock according to note 2. Reference mark No. 1, a standard disk set in rock according to note 12c, is 6.845 meters (22.46 feet) from the station in azimuth 61°45′; and No. 2, a standard disk set in rock according to note 12a, is 8.600 meters (28.22 feet) from the station in azimuth 155°44′. The azimuth mark, a standard disk set in rock according to note 12a, is in a saddle on the east side of the same canyon which passes

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

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on the east side of the station, 14 yards north of an east-west fence, 13 yards east of a small juniper tree, and ⅜ mile from the station in azimuth 264°18′04″.

Plane coordinates: (C), x=806,936.88 feet; y=832,422.16 feet; grid azimuth to azimuth mark=263°45′00″.*

Turkey (Otero County, J. Bowie, Jr., 1936).—The station is about 20 miles east by south of Mescalero, about 20 miles northeast of Cloudcroft, on a partially bare hill on the ridge south of Turkey Canyon. To reach from Turkey Well, which is about 26 miles by road from Mescalero, pass around north side of the pump and continue 2.2 miles, turn right, cross country toward the hills and go 0.3 mile to base of hill and end of truck travel. From here it is a 30 minute pack southeastward up hill to the top and the station site. The station and reference marks are standard disks set in concrete according to notes 2 and 12a. Reference mark No. 1 is 16.540 meters (54.26 feet) from the station in azimuth 218°36′, and No. 2 is 9.923 meters (32.56 feet) from the station in azimuth 324°04′. The azimuth mark, a standard disk set in concrete according to note 11a, is at the south edge of the ridge at the north edge of the valley, 0.5 mile from the station in azimuth 163°10′54″. To reach the azimuth mark go 2.8 miles from Turkey Well, turn left off road and go across country west-northwest 0.3 mile to the base of the hill and the mark.

Plane coordinates: (E), x=159,232.66 feet; y=766,085.22 feet; grid azimuth to azimuth mark=163°47′22″.* (C), x=746,189.57 feet; y=765,214.22 feet; grid azimuth to azimuth mark=162°44′33″.*

Tuton (Otero County, J. Bowie, Jr., 1936).—The station is about 25 miles east-southeast of Mescalero, 21 miles east by north of Cloudcroft, on the divide between Elk Canyon and Little Felix Canyon, about ½ mile north of the southern boundary of the Mescalero Indian Reservation, 2 miles east of the point where the Elk Canyon Road passes through the Reservation fence, about 2½ miles northeast of Pat Tuton's ranch in Elk Canyon and on the northeast end and the highest point of a high timbered ridge. The station and reference marks are standard disks set in boulders according to notes 4 and 12c. Reference mark No. 1 is 17.860 meters (58.60 feet) from the station in azimuth 221°32′, and No. 2 is 12.280 meters (40.29 feet) from the station in azimuth 148°08′. *Tuton Azimuth* may be used as an azimuth mark.

Plane coordinates: (E), x=174,138.62 feet; y=731,998.04 feet; grid azimuth to *Tuton Azimuth*=34°40′01″.** (C), x=761,714.04 feet; y=731,406.84 feet; grid azimuth to *Tuton Azimuth*=33°37′23″.**

Tuton Azimuth (Otero County, J. Bowie, Jr., 1936).—The station is 25 miles east-southeast of Mescalero, 21 miles east by north of Cloudcroft, on the divide between Elk Canyon and Little Felix Canyon, approximately ½ mile southwest of station *Tuton* on the highest point of the timbered hill on the southwest end of ridge, and about 100 yards north of the Reservation fence. The station is marked by a standard disk set in a boulder, according to note 12c.

Plane coordinates: (E), x=173,079.08 feet; y=730,465.93 feet. (C), x=760,682.66 feet; y=729,855.75 feet.

Silver (Otero County, J. Bowie, Jr., 1936).—The station is 17 miles southeast of Mescalero, 10 miles east-northeast of Cloudcroft, on the summit of the divide between Silver Springs Canyon and Sixteen Springs Canyon, near the head of the latter and at the head of a side canyon which runs into Silver Springs Canyon, along the southern boundary of the Mescalero Indian Reservation, about ¾ mile east of a road through the reservation fence line, on the highest point near the fence line, 8½ feet north of the fence line, and 13½ feet northeast of a 24-inch pine tree which has a triangular blaze on its northwest side and which is in the fence line. The station and underground marks are standard disks set in concrete according to notes 1a and 7a. Reference mark No. 1, a standard disk set in a small boulder according to note 12c, is 4 feet south of the fence line, 11.503 meters (37.74 feet) from the station in azimuth 287°57′; and No. 2, a standard disk set in concrete according to note 11a, is 35½ feet south of the fence line, 13.201 meters (43.31 feet) from the station in azimuth 12°53′. The azimuth mark, a standard disk set in rock according to note 12c, is south of three small blazed pine trees, 27 feet south of the fence line, and about 350 yards from station in azimuth 272°27′24″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

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Plane coordinates: (C), x=700,595.96 feet; y=729,879.85 feet; grid azimuth to azimuth mark=272°06′01″.*

Harley (Otero County, J. Bowie, Jr., 1936).—The station is about 9 miles east of Mescalero, 50.7 meters (166 feet) north of *Harley Lookout*, on a high hogback between the Whitetail Canyon and Elk Canyon drainage. The station and reference marks are standard disks set in concrete according to notes 1a and 11a. Reference mark No. 1 is 8.000 meters (26.25 feet) from the station in azimuth 172°20′, and No. 2 is 6.630 meters (21.75 feet) from the station in azimuth 247°40′. The azimuth mark, a standard disk set in rock according to note 12a, is on the southeastern slope of a brushy ridge, 0.25 mile from the station in azimuth 170°32′54″.

Plane coordinates: (C), x=691,762.40 feet; y=786,549.09 feet; grid azimuth to azimuth mark=170°12′20″.*

Whitetail (Otero County, J. Bowie, Jr., 1936).—The station is about 16 miles east-northeast of Mescalero, 2½ miles northeast of the Indian Village of White Tail, about ½ mile north of the main road summit on the road from White Tail to Well No. 5, on a small, sharply pointed knoll which rises abruptly about 40 feet above the divide and which is thickly covered with small pines. There are higher points on the divide toward the northeast. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 8.564 meters (28.10 feet) from the station in azimuth 277°01′, and No. 2 is 7.339 meters (24.08 feet) from the station in azimuth 179°42′. The azimuth mark, a standard disk set in outcropping limestone bed rock according to note 12a, is about 30 feet south of the road from White Tail to the station, about 0.2 mile west of the main summit on this road, on grassy pasture land, 0.3 mile from the station in azimuth 12°05′34″.

Plane coordinates: (C), x=721,356.93 feet; y=822,091.04 feet; grid azimuth to azimuth mark=11°41′44″.*

Carrizo (Otero County, J. Bowie, Jr., 1936).—The station is about 10 miles air line north and east of Mescalero, about 4 miles south and 2 miles west of Ruidoso, ⅓ mile northeast of the main road leading northwesterly over the divide from U. S. Highway 70, ¼ mile west of the highway, on the highest point of a lightly timbered knoll on the divide between the Carrizo and Mescalero Creeks, and in a rock outcrop between two 6-inch pine trees with triangular blazes. To reach from Mescalero go northeastward 11.0 miles on U. S. Highway 70, go 0.8 mile on the road leading to the left to the top of the divide and an open park, then go northeastward across country ¼ mile to the side of the knoll and the end of truck travel. From here the station site is a 10-minute pack northeastward to the top of the knoll. The station, azimuth, and reference marks are standard disks set in rock according to notes 4, 12a, and 12c. Reference mark No. 1 is on top of ridge, 3 feet east of a 12-inch pine tree, and 8.072 meters (26.48 feet) from the station in azimuth 354°58′, and No. 2 is 6 feet west of a 9-inch pine tree, and 11.944 meters (39.19 feet) from the station in azimuth 131°13′. The azimuth mark is 1 foot east of a rock cairn, and ½ mile from the station in azimuth 131°45′28″. The azimuth mark is 0.6 mile northerly on the road from the turn-off to the station to a log cabin on the west side of the road, thence 0.15 mile northwestward to the southern brow of an east-west ridge.

Plane coordinates: (C), x=667,672.98 feet; y=827,984.98 feet; grid azimuth to azimuth mark=131°27′24″.*

Mescalero (Otero County, J. Bowie, Jr., 1936).—The station is about 3 miles south of Mescalero, on a hill known locally as Sim's Cave Hill, on the northeast end of a spur of a ridge, about 10 yards east of a cave entrance, just above another cave entrance, and 20 yards west of a piñon tree with a triangle blazed on its west side. The hill is visible from the hospital in Mescalero at magnetic azimuth 203°. There is a bare scar near the top which is an entrance to a cave. The hill breaks off steeply toward the north, but toward the southwest it slopes down to a saddle, then up to the highest point of the hill which appears to be about 100 feet higher than the station. The station is marked with a standard disk set in a cubical limestone boulder which is about 2 feet on each side. The reference marks are standard disks set in rock according to note 12a. Reference mark No. 1 is 7.526 meters (24.69 feet) from the station in azimuth 207°01′, and No. 2 is 9.140 meters (29.99 feet) from the station in

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

azimuth 128° 48′. The azimuth mark, a standard disk set in concrete according to note 11c, is about 50 feet south of the hospital in Mescalero, in a concrete retaining wall about 20 feet west of the concrete steps leading down from the hospital, and approximately 3 miles from the station in azimuth 217°33′12″.

Plane coordinates: (C), x=639,923.80 feet; y=776,985.77 feet; grid azimuth to azimuth mark=217°18′12″.*

Cloud (Otero County, J. Bowie, Jr., 1936).—The station is about 13½ miles south of Mescalero, 2¼ miles south of the south boundary of the Mescalero Indian Reservation, 1½ miles west-northwest of Cloudcroft, on the highest summit of a prominent, brush-covered hill which is timbered on the lower slopes, lying just north of the Cloudcroft-Alamogordo Highway, about 200 yards east of a shallow saddle, on the center of the summit, 17 feet northwest of the southeast edge, 18 feet south of a small white pine tree, 18 feet north-northwest of a topped white pine tree at the southeast edge of the summit, and in the north end of the top of a narrow outcrop of limestone. The station, azimuth, and reference marks are standard disks set in rock according to notes 2, 12a, and 12c. Reference mark No. 1 is 10 feet southeast of a small white pine tree, along the ridge line, and 4.063 meters (13.33 feet) from the station in azimuth 224°37′, and No. 2 is at the southeast edge of the summit, 5.262 meters (17.26 feet) from the station in azimuth 336°01′. The azimuth mark is at Cloudcroft, about 0.1 mile north of the brick schoolhouse, 25 yards east of the center of a lane, 15 yards northeast of the gate at the hillside patch, 10 paces east-southeast of the trail leading northeastward up the hillside, in the top of a low, flat boulder, 1.5 miles from the station in azimuth 285°49′39″. Station *Cloudcroft (U. S. G. S.)* is about on the center of the summit, 3.535 meters (11.60 feet) from the station in azimuth 69°07′. The azimuth from the station to the cupola of the Cloudcroft Lodge is 306°21′53″.

Plane coordinates: (C), x=648,868.10 feet; y=715,481.67 feet; grid azimuth to azimuth mark=285°33′48″.*

Domingo (U. S. G. S.) (Otero County, J. Bowie, Jr., 1936).—The station is 9 miles east of Tularosa, on Domingo Peak, an inconspicuous peak on the west edge of the mountains where they break off abruptly into low foothills and plains. There are much higher hills to the east, but none to the south for about 10 miles. To reach from Tularosa, go east 2.6 miles on U. S. Highway 70, turn right through a cattle guard and follow a gravel road east and parallel to U. S. Highway 70 for 1.05 miles, turn right on a road to the right at the C. C. C. dumping grounds and follow for 1.15 miles to a fork just beyond a large wash, take the right fork and follow the main traveled road 3.65 miles to a wire gate, pass through gate and continue 0.65 mile to a shack and corrals on the left, continue 0.05 mile to a dim road to the right beyond a small wash. At this point the station can be seen on the skyline at a magnetic bearing of 106° about 2½ miles distant, appearing as a high point on the south end of a ridge. The station mark is a standard U. S. Geological Survey disk set in a boulder on the highest point of the hill, about 25 paces east of a north-south fence line. The reference marks are standard disks set in rock according to note 12a. Reference mark No. 1 is 19.597 meters (64.29 feet) from the station in azimuth 356°11′, and No. 2 is 15.731 meters (51.61 feet) from the station in azimuth 82°05′. The azimuth mark, a standard disk set in a boulder according to note 12c, is on a higher hill on the skyline, on the west slope of this hill, about 25 yards west of the ridge line, about 100 yards northwest of the highest point on the south end of the ridge, and approximately 0.8 mile from station in azimuth 227°06′14″.

Plane coordinates: (C), x=616,982.26 feet; y=747,556.49 feet; grid azimuth to azimuth mark=226°53′45″.*

Coy (Otero County, J. Bowie, Jr., 1936).—The station is about 7 miles north and 2 miles east of Tularosa, about 4 miles east of Temporal station on the Southern Pacific Railway, on the highest point of a high ridge, which has a very steep slope along the south side, at the southwest end of the barren Coyote Range of hills. Station Coyote (U. S. G. S.) is located about ¾ mile east-northeast on a sharp knoll of a slightly higher hill. To reach from the old Maxwell place, which is on the main wash of the Rinconado Creek and about 7 miles by road from Temporal, go 100 yards up wash, turn right out of wash and pass large cottonwood tree and boxed well, continue southeast

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

up a side wash 75 yards to ruins of an old stone house, continue on old road up a side wash 0.2 mile, cross wash and take a poor road up a steep hill along the southeasterly left side of draw, continue 0.75 mile to top of ridge, and take right fork southerly. The station is on the high skyline southwest of this point. Take left fork at 0.2 mile, go southerly 0.3 mile and take right fork on the least traveled road southerly and southwesterly across draws of the north slope of Coyote Range, go 0.7 mile to forks, turn left (southerly) up ridge and go 0.1 mile to end of truck travel. The station lies about 1 mile southwestward and may be reached by following up ridge to the crest of the divide thence west to the station. It is a 40-minute pack from end of truck travel. The station and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 2.689 meters (8.82 feet) from the station in azimuth 194°49′, and No. 2 is 3.052 meters (10.01 feet) from the station in azimuth 281°33′. Station *Black Ledge* may be used as an azimuth mark.

Plane coordinates: (C), x=584,561.28 feet; y=791,089.52 feet; grid azimuth to *Black Ledge*=102°40′33″.3.

Black Ledge (Otero County, J. Bowie, Jr., 1936).—The station is 3 miles due east of Temporal station on the Southern Pacific Railway, 1 mile south of Rinconado Creek on a barren spur ridge which is the highest in the vicinity, and which runs east-southeast and west-northwest, in the western foothills of the Coyote Mountains. The ridge is conspicuous due to a 20-foot black ledge along the south crest. The station, azimuth, and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is 12.120 meters (39.76 feet) from the station in azimuth 229°43′, and No. 2 is 8.704 meters (28.56 feet) from the station in azimuth 309°05′. The azimuth mark is on top of a small, rocky hill approximately 0.3 mile from the station in azimuth 113°05′08″.

Plane coordinates: (C), x=576,187.52 feet; y=792,972.93 feet; grid azimuth to azimuth mark=112°56′57″.*

Reservoir (Otero County, J. Bowie, Jr., 1936).—The station is about 2 miles east-northeast of Tularosa, about 0.2 mile south of U. S. Highway 70, at a point near the Tularosa Irrigation Reservoir, about 0.1 mile east of a north-south, graded road about 40 yards west of the highest point on the east end of a low hill which is the second hill south of U. S. Highway 70. There are higher hills toward the east. The station and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is 16.656 meters (54.65 feet) from the station in azimuth 272°58′, and No. 2 is 6.013 meters (19.73 feet) from the station in azimuth 22°30′. The azimuth mark, a standard disk set in concrete according to note 11a, is 0.4 mile west of the intersection of the graded road with U. S. Highway 70, on the south side of the road, about 3 feet north of the right-of-way fence, and approximately 0.6 mile from the station in azimuth 103°13′10″. The azimuth of the center of the more northern one of twin tanks at the C. C. C. camp, 2 miles distant, is 229°44′26″.

Plane coordinates: (C), x=580,329.38 feet; y=756,313.04 feet; grid azimuth to azimuth mark=103°04′34″.*

Laborcita (Otero County, J. Bowie, Jr., 1936).—The station is 9 miles southeast of Tularosa, 8½ miles northeast of Alamogordo, 4 miles northeast of La Luz, about ¾ mile north of the southern boundary of the Mescalero Indian Reservation, in the foothills of the Sacramento Mountains, on the high point at the east end of the red sandstone and gravel ridge lying along the north side of Laborcita Canyon, about ¼ mile east-by-north of a slightly higher summit, on the longitudinal center of the ridge, 65 feet east-by-north of a small, bushy juniper tree, in top of a small, rectangular boulder, projecting about 5 inches above the ground. To reach from La Luz, go 2.9 miles on the Cloudcroft road, take the left fork, leave the highway and go 2.3 miles, take the left fork and go 1.05 miles and pass the azimuth mark on the right, continue 0.55 mile, turn left (northwest) on dim road just after crossing a wash and go 0.9 mile to the top of a low ridge, turn left and go westerly across country along the summit of the ridge 0.5 mile to the end of truck travel at the east base of hill, go westerly up hill to summit and station site. The station and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is down the north slope of the ridge, about 8 feet below the crest,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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and 8.316 meters (27.28 feet) from the station in azimuth 175°43′, and No. 2 is along the ridge line, 12.546 meters (41.16 feet) from the station in azimuth 98°01′. The azimuth mark, a standard U. S. Geological Survey disk, set in top of a small boulder, is stamped "5790", is about 50 yards south of a cattle guard, 50 feet northeast of the center of the road, 15 feet northwest of the southwest fence corner, and about 0.8 mile from the station in azimuth 303°28′48″.

Plane coordinates: (C), x=613,445.16 feet; y=731,236.45 feet; grid azimuth to azimuth mark=303°16′42″.*

Rinconado (Otero County, J. Bowie, Jr., 1936).—The station is 6 miles air line northwest of Mescalero. To reach the station from Mescalero go northeast 4.4 miles on U. S. Highway 70 to an arrow sign "Rinconado", turn left and follow graded road up draw 2.6 miles, take left fork and go 0.5 mile, take the left fork and follow the main traveled road along side of a hill for 6.6 miles to the summit of a ridge opposite a red fire box, turn right off road and go up ridge ¼ mile to the station site on a knob on the ridge. The station, azimuth, and reference marks are standard disks set in rock according to notes 2 and 12a. Reference mark No. 1 is 18.508 meters (60.72 feet) from the station in azimuth 300°49′, and No. 2 is 15.490 meters (50.82 feet) from the station in azimuth 16°27′. The azimuth mark is on the south side of the ridge at an elevation a few feet lower than the top, ½ mile from the station in azimuth 85°42′49″. To reach the azimuth mark from the red fire box, go westward up ridge ¼ mile to the top.

Plane coordinates: (C), x=623,578.88 feet; y=809,754.73 feet; grid azimuth to azimuth mark=85°29′31″.*

Rose (Lincoln County, J. Bowie, Jr., 1936).—About 8½ miles northeast-by-north of Three Rivers, 5 miles southeast of Oscuro, ¾ mile east of the west boundary of the Mescalero Indian Reservation, at the south end of a high point of the summit of a high, bare peak, locally known as Rose Peak, which is at the south end of the main ridge of the Godfrey Hills (a barren, rocky range lying about 4 miles east of U.S. Highway 54 and the Southern Pacific Railway), about 6 feet east of the longitudinal center of the summit, and 5 feet southeast of a rock cairn which marks station *Rose* (*U. S. G. S.*). The station, azimuth, and reference marks are standard disks set in rock according to notes 4, 12a, and 12c. Reference mark No. 1 is along the ridge line, 6.953 meters (22.81 feet) from the station in azimuth 19°35′, and No. 2 is on the west edge of the summit, in a slanting outcrop of ledge rock, 6.585 meters (21.60 feet) from the station in azimuth 108°34′. The azimuth mark is in the top of a large, flat-topped boulder, between the rocky point of the east end of the main shoulder of the station peak and a shallow wash, 10 feet north of a strand wire fence, and in range with the rocky point and grassy knoll to the north, and approximately 1 mile from station in azimuth 285°02′16″.

Plane coordinates: (C), x=579,855.72 feet; y=883,811.43 feet; grid azimuth to azimuth mark=284°53′37″.*

McCray (Otero County, J. Bowie, Jr., 1936).—The station is about 19 miles north-northeast of Tularosa, 12 miles northwest of Mescalero, on a sharp, brushy peak on a hogback ridge that leads down from Sierra Blanca to Black Mountain, about 2 miles south of a saddle in this ridge, and about 2 miles north of the highest point at the south end of the ridge. This peak is used as a lookout by the Forest Service. To reach from the Indian Agency at Mescalero, go northeast 4.4 miles on U.S. Highway 70 to a graded road, turn left off highway and go north on this road up a draw 2.6 miles, take left fork and go 0.5 mile, take left fork and follow the main, graded road westerly 7.6 miles, take left fork and go 4.7 miles, continue on a dugway, graded road. which is narrow and crooked, 5.1 miles to a road summit in a saddle on a hogback ridge which is the location of a cabin and the azimuth mark, turn left off the road and follow the ridge south for about 2 miles to a high point and the station site. The station, azimuth, and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is 8.528 meters (27.98 feet) from the station in azimuth 237°23′, and No. 2 is 6.097 meters (20.00 feet) from the station in azimuth 346°42′. The azimuth mark is set in a boulder about 25 yards north of a cabin, 10 yards west of the road, and 2 miles from the station in azimuth 204°50′28″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (C), x=613,047.88 feet; y=838,865.09 feet; grid azimuth to azimuth mark=204°38′16″.*

Fall (Otero County, J. Bowie, Jr., 1936).—The station is about 4 miles east and ½ mile north of Three Rivers, on the old Albert E. Fall ranch, in Three Rivers Valley, about 2 miles east of the ranch house, about ¾ mile south of Three Rivers Wash, on the highest point of a high, brushy ridge. This ridge is the first one south of the wash, is the highest ridge in the vicinity, and the highest point is about 50 feet above the valley floor. Anderson's farm house, about 1 mile distant, bears 351° magnetic south. The station and reference marks are standard disks set in rock according to notes 4 and 12c. Reference mark No. 1 is 5.833 meters (19.14 feet) from the station in azimuth 199°42′, and No. 2 is 22.195 meters (72.82 feet) from the station in azimuth 305°49′. The azimuth mark, a standard disk set in concrete according to note 11a, is about 150 yards west of an adobe farm house, 34 yards west of a cattle guard, 9 yards south of the center line of a road, and approximately 1 mile from the station in azimuth 178°03′06″.

Plane coordinates: (C), x=576,343.55 feet; y=848,680.13 feet; grid azimuth to azimuth mark=177°54′51″.*

Supplementary points

Capitan, large brick building, principal gable (Lincoln County, J. Bowie, Jr., 1936).—Plane coordinates:[1] (C), x=706,474 feet; y=925,102 feet.

Wooden windmill north of station West Spur (Lincoln County, J. Bowie, Jr., 1936).—Plane coordinates:[1] (C), x=701,555 feet; y=912,170 feet.

Monjeau Lookout (Lincoln County, J. Bowie, Jr., 1936).—This is a U. S. Forest Service fire lookout house which is 7.5 miles air line north-northwest of Ruidoso, on Monjeau Peak, 5.50 meters (18.0 feet) from station *Monjeau* in azimuth 194°31′.

Plane coordinates:[1] (C), x=658,338 feet; y=884,629 feet.

U. S. G. S. bench mark near station Sierra Blanca (Otero County, J. Bowie, Jr., 1936).—The mark is 1.420 meters (4.66 feet) from station *Sierra Blanca* in azimuth 11°57′. The mark is a standard U. S. Geological Survey bench mark stamped with the elevation 12,003 feet.

Plane coordinates:[1] (C), x=634,885 feet; y=863,956 feet.

Lead pipe near station Sierra Blanca (Otero County, J. Bowie, Jr., 1936).—The pipe (or plug) is 2.643 meters (8.67 feet) from station *Sierra Blanca* in azimuth 210°36′.

Plane coordinates:[1] (C), x=634,885 feet; y=863,956 feet.

Rose (U. S. G. S.), cairn (Lincoln County, J. Bowie, Jr., 1936).—The station is 5 feet northwest of station *Rose*. The station, an intersection point of the U. S. Geological Survey, is marked with a rock cairn about 3 feet high on the summit of the peak.

Plane coordinates:[1] (C), x=579,853 feet; y=883,816 feet.

Harley Lookout (Otero County, J. Bowie, Jr., 1936).—This is a fire lookout tower about 9 miles east of Mescalero, on a high hogback between Whitetail Canyon and Elk Canyon drainage, and just south of station *Harley*.

Plane coordinates: (C), x=691,762.47 feet; y=786,382.73 feet.

Cloudcroft (U. S. G. S.) (Otero County, J. Bowie, Jr., 1936).—The station is 3.535 meters (11.60 feet) from station *Cloud* in azimuth 69°07′. The station mark is a standard U.S. Geological Survey disk cemented in a drill hole in bedrock, and stamped "8640".

Plane coordinates:[1] (C), x=648,857 feet; y=715,478 feet.

CLAYTON TO TUCUMCARI ARC

Principal points

Grimes (Union County, W. R. Porter, 1935).—About 5.0 miles southwest of Clayton, in the SW ¼, sec. 12, T. 25 N., R. 34 E., on the top of a prominent ridge overlooking a valley to the north and east, and higher rolling country to the south and west, on a small knoll approximately 20 feet in diameter and 4 feet high, 0.3 mile west of a wire gate in an east-west section-line fence, 92 yards

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

south of the north rim of the ridge, 34 feet north of the east-west section line fence, and 52 feet north of the center line of an east-west track road south of the fence. To reach from the west corner of the Union County Courthouse square in Clayton drive 1 block northwest on Second Avenue, turn left on Monroe Street and drive west and south on State Highway 58 for 5.3 miles, leave the highway at this point where the highway turns west, pass through a wire gate in a short span of a north-south fence, drive south on a dim track road 0.2 mile, take the left fork around the heavy sand and go 0.8 mile on the main track road to a wire gate in an east-west section-line fence, turn right (west) along the north side of the fence and drive 0.3 mile up the ridge to a small, prominent knoll and the station. The surface, underground, reference, and azimuth marks are standard bronze disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 2 feet north of the east-west fence, 16 feet north of the center line of the track road and 67.66 feet from the station in azimuth 298°28′. Reference mark No. 2 is 2 feet north of the section-line fence, 16 feet north of the track road south of the fence and 51.76 feet from the station in azimuth 52°29′. The azimuth mark is 1.0 mile north of the station, 2 feet south of an east-west right-of-way fence at a point where the highway turns west, 45 feet south of the center line of State Highway 58, 87 feet west of the southeast fence corner south of a gate in the 20-yard north-south section of the fence, 107 feet west-southwest of the northwest fence corner north of the gate, and about 1.0 mile from station in azimuth 198°08′08″.

Plane coordinates: (E), x=814,955.73 feet; y=1,969,925.89 feet; the grid azimuth to the azimuth mark=197°30′00″.*

Comyford (Union County, W. R. Porter, 1935).—Located 16 miles air line west-southwest of Clayton, about 9 miles air line south of Dora, on pasture land, 0.3 mile east of two shallow lakes, 0.4 mile northwest of a long, shallow lake, 0.2 mile west of "Old Comyford Place" now occupied by H. D. Ames, 0.2 mile east of the southern end of the section-line road running north, 54 feet south of the center of the section-line track road, and 29 feet, south of a fence. To reach from the Courthouse in Clayton drive west and south on State Highway 58 for 19 miles to point where the road veers diagonally to the left or southwest, leave the highway and continue straight ahead (west) on graded road 0.4 mile, go right (north) 0.1 mile on a track road, at Dugan mail box bear left (northwest) on the track road 0.7 mile, at 50 yards north of a mail box and 100 yards northeast of a farmhouse go left (west) 0.6 mile; pass through wire gate and go on main track road northwesterly 0.8 mile; at a fence corner just northeast of "Old Comyford Place" go left (west) 0.3 mile along track section-line road to the station. To reach from Dora, go on poor, section-line roads south 6 miles, east ½ mile, south 3½ miles and east 0.2 mile. The surface, underground, reference, and azimuth marks are standard disks set in concrete as described in notes 1a, 7a, and 11a. Reference mark No. 1 is 24 feet south of the center of section-line road, 1 foot south of a fence and 134.80 feet from station in azimuth 258°28′, No. 2 is 24 feet south of center of section-line road, 1 foot south of a fence and 115.14 feet from station in azimuth 103°42′. The azimuth mark is 24 feet east of section-line road, 1 foot west of a fence and 0.3 mile from station in azimuth 136°56′36″.

Plane coordinates: (E), x=755,485.55 feet; y=1,964,083.51 feet; the grid azimuth to the azimuth mark=136°25′42″.*

Cook (Union County, W. R. Porter, 1935).—About 18 miles air line southwest of Clayton, on the property of Mr. Cook of Thomas, N. Mex., on top of the highest hill in the vicinity, 185 feet southeast of a lone, southeast fence corner and about 25 yards east of the projection of a north-south fence. To reach the station from crossroads about 100 yards west of Thomas Post Office drive west 1.0 mile to the crossroads, turn north and go 2.0 miles to crossroads, turn left (west) and go 2.8 miles, take left or main-traveled fork and go west-northwesterly 1.0 mile to the farmhouse of J. L. Atwood, pass between windmill and house and continue west-northwesterly on a track road 0.5 mile, turn right and go north 0.4 mile, pass through gate, turn left (west) and go 1.0 mile to crossroads, pass through the gate on south side of road and go south 0.5 mile to an old fence corner. The azimuth mark is at this point. Turn right (west), pass between the fence corner and an old boiler and go across the country 0.5 mile to the highest point and station. The surface,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

underground, reference, and azimuth marks are standard disks set in concrete described in notes 1a, 7a, and 11a. Reference mark No. 1 is 25.315 meters (83.05 feet) from station in azimuth 266°38′, and No. 2 is 26.834 meters (88.04 feet) from station in azimuth 358°59′. The azimuth mark is 0.1 mile north-northeast of an old steel boiler, 40 feet west of an old fence corner, 52 feet west of the center line of a north-south track road, and about 0.5 mile from station in azimuth 250°45′35″.

Plane coordinates: (E), x=772,550.99 feet; y=1,923,136.50 feet; the grid azimuth to the azimuth mark=250°12′45″.*

Rardin (Union County, W. R. Porter, 1935).—About 10 miles south of Clayton and 2 miles west of State Highway 18, in the NW. ¼, sec. 16, T. 24 N., R. 35 E, on top of the hill which is about 300 yards west-southwest of the home of Mr. W. A. Rardin, 25 feet east of the east right-of-way fence and 58 feet east of the center of the section-line road. To reach from Clayton go south 10.5 miles on State Highway 18, to the Massacre School, turn right off the highway and go west 2 miles, turn north and go 0.9 mile to the station on the east side of the road. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 35 feet west of the center of the road, 1½ feet west of the fence, and 163.98 feet from station in azimuth 34°41′, and No. 2 is 35 feet west of the center of the road, 1½ feet west of the fence and 115.45 feet from station in azimuth 126°18′. The azimuth mark is about 60 yards northeast of a stone house, 1½ feet east of the fence west of the road and approximately 0.5 mile from the station in azimuth 1°48′46″.

Plane coordinates: (E), x=827,909.97 feet; y=1,936,590.96 feet; the grid azimuth to the azimuth mark=1°09′13″.*

Hopson (Union County, W. R. Porter, 1935).—Located 19 miles air line south of Clayton, on top of the eastern slope of a smooth, grassy hill, about one mile west-southwest of the residence of Mr. Jim Hopson, 25 yards north of an old, dim, track road and 150 yards west of a few remaining posts of an old fence line. To reach from Clayton go south 18.5 miles on State Highway 18, or 8.0 miles south of Massacre School, turn right (west) and go 1.0 mile, cross cattle guard, turn left and go south on dim track road 0.6 mile, or 0.1 mile past cross tracks, turn right (west) and go 0.1 mile to the top of the hill and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 34.998 meters (114.83 feet) from station in azimuth 318°10′, and No. 2, is 34.628 meters (113.61 feet) from station in azimuth 45°20′. The azimuth mark is 33 feet south of the center line of a cattle guard, 1 foot south of an east-west fence, and 1.10 miles from the station in azimuth 241°07′24″.

Plane coordinates: (E), x=832,884.34 feet; y=1,886,586.17 feet; the grid azimuth to the azimuth mark=240°27′26″.*

Thomas (Union County, W. R. Porter, 1935).—Located 16 miles air line south-southwest of Clayton, 150 yards northeast of a vacant stone house, on land belonging to a woman in California and managed by H. H. Errett, of Clayton, 29.5 feet east of a north-south fence line, 45.5 feet south-southeast of a fence T-intersection, 31 feet south of an east-west fence, and 58 feet south of the center line of an east-west section-line road. The station may be reached from the cross roads about 100 yards west of Thomas Post Office by going west on a section-line road for 0.5 mile. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 26 feet south of the center line of a section-line road, 1 foot south of an east-west fence and 34.408 meters (112.89 feet) from station in azimuth 253°57′, and No. 2 is 1 foot east of a north-south fence and 37.112 meters (121.76 feet) from station in azimuth 12°47′. The azimuth mark is 26 feet south of the center line of a section-line road, 1 foot south of an east-west fence and 0.25 mile from station in azimuth 268°47′29″.

Plane coordinates: (E), x=804,167.38 feet; y=1,910,187.64 feet; the grid azimuth to the azimuth mark=268°10′53″.*

Howard (Union County, W. R. Porter, 1935).—Located 25 miles air line south-southwest of Clayton, in the SW¼, sec. 9, T. 22 N., R. 33 E., and on the top

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

of a smooth, grassy hill on land owned in 1935 by Mr. St. Clair Hammond and leased by Mr. W. G. Howard whose house is about 1.0 mile north-northeast. To reach the station from the Clapham post office drive west 0.1 mile, thence south 0.2 mile, take the right fork, main road, and go west 1.6 miles, pass through a cattle guard, turn north and go 0.1 mile, thence west 1.0 mile to T intersection of the roads at the ranch house of W. G. Howard, turn left and go south 0.1 mile to a fence corner and gate. The azimuth mark is at this point. Drive south along the west side of the fence 1.0 mile to a fence corner, turn west and go 0.4 mile along the north side of the fence to the crest of the ridge, turn north and go 0.1 mile to top of hill and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 150.85 feet from station in azimuth 260°59′, and No. 2 is 144.45 feet from station in azimuth 345°23′. The azimuth mark is near the home of W. G. Howard, 0.1 mile south of an east-west section-line road, 6 feet south of a northwest fence corner, 1 foot west of a north-south fence and 1.0 mile from station in azimuth 210°57′58″.

Plane coordinates: (E), x=767,624.26 feet; y=1,873,485.60 feet; the grid azimuth to the azimuth mark=210°25′54″.*

Clapham (Union County, W. R. Porter, 1935).—Located 26 miles air line south-southwest of Clayton, 3 miles south of Clapham post office and 0.5 mile south-southeast of an old, deserted, red, stone house, 0.4 mile southeast from a lone southwest fence corner, and 0.35 mile due south of an east-west fence running east from the lone, southwest fence corner, on the highest hill in the immediate vicinity. There are some large trees in a coulee at the western foot of the hill. To reach the station from Clapham post office, drive west on the main road 0.1 mile, turn south and follow main road south for 0.3 mile. take the left fork (track road) straight ahead (south) and drive 0.3 mile alongside fence, take the right fork (due south) and go 0.1 mile, take the right fork straight ahead on the main track road and drive 1.0 mile, pass through a wire gate, continue south on the main track road 0.5 mile to a fence T intersection with the stem south, pass through the westernmost of the wire gates and drive south 0.2 mile to a point west of an old, deserted, red, stone house (the azimuth mark is located 0.05 mile south of this point) go south 0.1 mile to a lone, southwest fence corner, drive southeast 0.5 mile to the top of the hill and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 139.03 feet from station in azimuth 202°26′, and No. 2 is 149.40 feet from station in azimuth 99°57′. The azimuth mark is located 249 feet southwest of the southwest corner and 264 feet southwest of the southeast corner of the old, deserted, red, stone house, 43 feet east of an old north-south fence line (wire down), 185 feet east of the center line of a dim north-south track road and 0.45 mile from station in azimuth 155°03′20″.

Plane coordinates: (E), x=787,220.89 feet; y=1,867,473.18 feet; the grid azimuth to the azimuth mark=154°28′56″.*

Zurick (Union County, W. R. Porter, 1935).—About 11 miles northwest of Amistad, about 6 miles southwest of the Stead post office, near the northern and highest part of a long north-and-south ridge which extends about 3 miles west of State Highway 18. To reach the station from Amistad, go west and north 9.0 miles on State Highway 18, turn left and go west on a section-line road 1.8 miles to some ranch buildings, pass through a gate and go west along the south side of the fence 0.5 mile, turn north through a gate and go west along the north side of a fence 0.4 mile, pass through a gate and drive west-northwest across country 0.3 mile to the highest part of the ridge and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 120.63 feet from station in azimuth 179°46′ and No. 2 is 164.28 feet from station in azimuth 261°10′. The azimuth mark is 1 foot north of a fence line and about 0.65 mile from the station in azimuth 30°26′12″.

Plane coordinates: (E), x=816,373.70 feet; y=1,837,051.73 feet; the grid azimuth to the azimuth mark=29°48′25″.*

Swoyer (Harding County, W. R. Porter, 1935).—About 8 miles (air line) west-northwest of Hayden, 90 feet north of the rim of a sharp bluff to a deep draw, 200 yards west-southwest from a deserted, white, ranch house and windmill,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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243 feet south of the center line of a graded, east-west, section-line road, 274½ feet south of an east-west, section-line fence, and on a high, sandy, pasture ridge. The station ridge slopes off sharply to the south and gently to the north, west, and east. The location is approximately 1 mile north-northeast from Lawrence Swoyer's ranch buildings. To reach the station from the post office and store in Hayden, drive north on the main, graded road 0.3 mile to a graded road junction, turn left and drive west 4.7 miles to a slight detour north around a lake, continue west 2.3 miles to a cross road with a windmill in the southwest angle, turn right and go north on a graded, section-line road, drive 0.7 mile to an old concrete culvert, pass through a wire gate just beyond and drive north 0.5 mile, pass through a wire gate and continue west 0.8 mile to a road junction, turn west onto graded, section-line road and drive 1.3 miles to a deserted, white, ranch house on the north side of the road, leave the road and drive 200 yards southwest to the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 158 feet south of the center line of the graded, east-west, section-line road, 190 feet south of the east-west, section-line fence, and 95.27 feet from station in azimuth 208°22′, and No. 2 is 159 feet south of the center line of section-line road, 190 feet south of the section-line fence and 123.01 feet from station in azimuth 133°42′. The azimuth mark is 1 foot south of the east-west section-line road and 0.35 mile from station in azimuth 98°25′56″.

Plane coordinates: (E), x=771,273.66 feet; y=1,819,843.69 feet; the grid azimuth to the azimuth mark=97°53′35″.*

Bell (Harding County, W. R. Porter, 1935).—About 4½ miles north-northeast of Rosebud, about 2 miles north-northwest of the ranch house of J. W. Hillis and located on the highest part of a high, smooth, north-and-south ridge which is the highest point in the vicinity. The station is 12 feet south of an east-west fence. To reach from Amistad go south 4.4 miles on State Highway 18, turn right and drive west on a graded road 11.0 miles, turn off the road to the right and go north along the west side of a fence 0.3 mile, take the left fork and go northwesterly 1.5 miles to the ranch buildings of Mr. Hillis, drive north along the east side of the fence 1.2 miles to a lone, northeast fence corner. The azimuth mark is located at this point. Drive northwest across country 0.7 mile to the station. The surface, underground, reference and azimuth marks are standard disks set in concrete as described in notes 1a, 7a, and 11a. Reference mark No. 1 is 1½ feet north of the fence and 76.85 feet from station in azimuth 257°41′, and No. 2 is 2 feet south of the fence and 74.34 feet from station in azimuth 96°04′. The azimuth mark is 1½ feet north and 6 feet west of the lone, northeast fence corner and approximately 0.7 mile from station in azimuth 327°48′15″.

Plane coordinates: (E), x=782,295.58 feet; y=1,784,005.81 feet; the grid azimuth to the azimuth mark=327°14′43″.*

Amistad (Union County, W. R. Porter, 1935).—About 3 miles northwest of Amistad, 0.6 mile north of a group of abandoned farm buildings, 0.1 mile south of a dim trail running east from the highway, 1.8 miles north of an east-west section line along which State Highway 18 jogs for 2 miles, and 47 feet east of State Highway 18, on a low, rounded, east-west ridge of sandy ground. To reach the station from Amistad Garage at the intersection of State Highway 18 with the main east-west street of Amistad, drive north 0.6 mile on State Highway 18, turn left and go west 2.0 miles, turn right and go north 1.8 miles to the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in a fence line 42 feet east of the center of the highway, and 143.95 feet from the station in azimuth 345°18′, and No. 2 is in a fence line, 42 feet east of the center of the highway and 174.93 feet from the station in azimuth 178°33′. The azimuth mark is in a fence line, 33 feet west of the center of the highway and is 0.4 mile north of the station in azimuth 177°59′19″.

Plane coordinates: (E), x=836,778.73 feet; y=1,804,907.03 feet; the grid azimuth to the azimuth mark=177°19′13″.*

Whaley (Union County, W. R. Porter, 1935).—Located 5 miles by road south of Amistad, 0.6 mile south of the Rosebud Highway, 200 yards south of the frame ranch buildings of S. C. Whaley, 28 feet west of the center line of State Highway 18, and 4 feet east of the west right-of-way fence. The surface,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

underground, and reference marks were standard disks set in concrete according to notes 1a and 7a. Reference mark No. 1 was 1 foot west of the east right-of-way fence, 30 feet east of the center line of the highway, and 20.685 meters (67.86 feet) from the station in azimuth 303°47′, and No. 2 was 1 foot east of the west right-of-way fence, 28 feet west of the center line of the highway, and 27.120 meters (88.98 feet) from the station in azimuth 2°16′. The azimuth mark is 62 feet west of the center line of State Highway 18, 165 feet north-northwest of a lone, northeast fence corner, 354 feet northeast of a windmill west of the highway, and in the right-of-way intersection of the Rosebud Highway and State Highway 18. It is a standard bench mark, set in a circular mass of concrete stamped "S 107, 1934" and is 0.6 mile from station in azimuth 179°39′25″. In 1936, due to widening of the highway, a new station *Whaley 2* was established 8.995 meters (29.51 feet) from this station in azimuth 123°47′. The station and reference marks were destroyed. New reference marks were established for *Whaley 2*. The new disks were stamped "Whaley 1935–1936."

Plane coordinates: (E), x=847,547.60 feet; y=1,765,716.60 feet; the grid azimuth to bench mark S 107=178°58′12″.*

Mitchil (Union County, W. R. Porter, 1935).—About 5 miles air line east of Rosebud, 1.1 miles northeast of T. S. Mitchel's ranch house, ¾ mile east of a point where the highway to Rosebud turns from south to west, ¾ mile southeast of a tall, deserted building and several shacks and trees, 100 yards south of a small saddle, 35 yards south of an east-west section-line fence and on the highest point of a pasture ridge which is a north-south divide and drops off gradually to the south and more sharply to the north. To reach the station from Robert's Garage which is 0.5 mile west of the town of Amistad, go south 4.4 miles on State Highway 18, go 11.0 miles due west on a graded, section-line road, turn south and go 1.0 mile to where the main road turns west, continue south 0.1 mile to a point 50 yards beyond a concrete cattle guard, turn left and go 0.5 mile east along the south side of a fence to the top of the hill and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 27.911 meters (91.57 feet) (slope distance) from the station in azimuth 258° 39′, and No. 2 is 1½ feet south of a section-line fence and 36.147 meters (118.59 feet) (slope distance) from the station in azimuth 156°35′. The azimuth mark is 0.1 mile west of concrete cattle guard in east-west fence, 60 feet south of center line of highway to Rosebud, 2 feet north of east-west fence, and 0.60 mile from station in azimuth 92°12′17″. It is bench mark Y 107.

Plane coordinates: (E), x=793,063.36 feet; y=1,762,782.82 feet; the grid azimuth to bench mark Y 107=91°37′33″.*

Centerville (Quay County, W. R. Porter, 1935).—About 10 miles air line north-northwest of Nara Visa, 5 miles south-southwest of Centerville post office, 3⅓ miles west of State Highway 18, 0.4 mile north of a main section-line road and wire fence and on the highest point of a smooth, pasture hill, on a high, dividing ridge between two, east-west drainages. To reach the station from Nara Visa go north from the bank, 9.1 miles on State Highway 18 to a square, white, sod house with a peaked roof east of the road. Turn left off the main highway, and go due west across cattle guard on a section-line road for 3.6 miles or 0.5 mile beyond a wooden cattle guard, turn right off the section-line road and go north across country 0.4 mile to the top of the hill and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 27.530 meters (90.32 feet) from the station in azimuth 265°06′ and No. 2 is 35,793 meters (117.43 feet) from the station in azimuth 349°54′. The azimuth mark is 49 feet south-southwest of the center line of a cattle guard, 22 feet west of the center line of a wire gate in an east-west fence, 1½ feet north of the fence and 0.60 mile from the station in azimuth 309°22′58″.

Plane coordinates: (E), x=840,580.64 feet; y=1,723,032.38 feet; the grid azimuth to the azimuth mark=308°42′45″.*

Reed (Harding County, W. R. Porter, 1935).—About 18 miles air line west-northwest of Nara Visa, 4 miles northwest of the H. L. Kauffman ranch, 1 mile north of a windmill known as the "Willow Mill", on a high, pasture hill of a divide and on land belonging to Mr. Jim Reed. To reach the station from the post office in Nara Visa, go north and northwest 3.5 miles on State Highway 18,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

turn west on the graded road and go 11.8 miles to a lone windmill that has no wheel, take the lesser-traveled right fork and go northwest 0.9 mile to a lone, southeast fence corner, crossroads and a gate, pass through the gate and continue northwest 1.2 miles to the ranch buildings of H. L. Kauffman, pass east of the house, then go northeast and north around a cultivated field for 0.5 mile to the northeast corner of the field and 3 forks, take the center fork and go northwest 1.0 mile to a north-south fence and gate, pass through the gate and go north 0.2 mile to an east-west fence and gate, pass through this gate and drive west and northwest 1.2 miles on a track road to a lone, northeast fence corner and cross road, go due north 0.4 mile to a windmill and group of willows, known as "Willow Mill", pass east of the mill and follow a dim, sandy, track road due north 1.0 mile to the top of the ridge, turn west off the road and go 0.1 mile to the highest point and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 169.65 feet from the station in azimuth 14°17′, and No. 2 is 118.41 feet from the station in azimuth 102°20′. The azimuth mark is 0.1 mile south of a windmill and black, steel tank, 15 feet west of a sandy, track road and 1.0 mile from the station in azimuth 182°46′43″.

Plane coordinates: (E), x=783,959.47 feet; y=1,722,142.05 feet; the grid azimuth to the azimuth mark=182°13′12″.*

Kerlin (Quay County, W. R. Porter, 1935).—About 6 miles air line northwest of Nara Visa, 347 feet north of a fence, about 250 yards north of section line, and on a flat-topped pasture hill 200 yards north of ranch buildings of R. L. Kerlin. The station hill is quite visible from all directions except east. To reach the station from the Nara Visa post office drive east ½ block, turn left and go north 3.9 miles on State Highway 18, turn left and go west 3.5 miles on a graded, section road, turn right at a ranch house in the northwest corner of road intersection and go north along the section-line road 1.0 mile; turn right and go east 0.3 mile to Kerlin ranch buildings, turn left and go north 0.2 mile to the top of a hill and station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 390 feet north of a fence and 94.25 feet from the station in azimuth 235°44′, and No. 2 is 257 feet north of a fence, and 97.20 feet from the station in azimuth 339°50′. The azimuth mark is 36 feet west of center line of road, 26 feet south of fence corner, 1 foot east of fence and 0.4 mile from station in azimuth 57°25′40″.

Plane coordinates: (E), x=844,262.17 feet; y=1,700,779.41 feet; the grid azimuth to the azimuth mark=56°45′06″.*

Shed (Quay County, W. R. Porter, 1935).—The station is 11½ miles, air line, west-northwest of Nara Visa, 4 miles north and 1 mile east of the Lockney schoolhouse (no school held at Lockney school in 1935), 1.0 mile southwest of the L. J. Blank ranch building, 0.15 mile south-southwest of a small, shed-roofed shack, on top of a large pasture hill, the station hill is the highest point in the immediate vicinity and the above-mentioned shack is on the northeast side. To reach from the post office in Nara Visa, drive north and northwest 3.5 miles on State Highway 18, turn left and go west 8.2 miles on the section-line road; drive to an old cattle guard and wire gate, pass through the wire gate and go 0.1 mile west, pass over cattle guard, go west on the main road 0.7 mile to a steep, shingle-roofed ranch house south of the road. The azimuth mark is near the ranch-yard fence, south of this house. Turn left and go south through ranch lots and take the left fork of a plain, track road, drive southeasterly 0.5 mile to a T-fence intersection which is 0.2 mile west-southwest of the L. J. Blank ranch building, pass through the wire gate in the west bar of the T and drive 1.0 mile southwesterly up the rise to a small, shed-roofed shack south of the track road, leave the track road and continue southwesterly 0.1 mile to the top of a rise and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 130.45 feet from station in azimuth 313°57′, and No. 2 is 126.00 feet from the station in azimuth 45°39′. The azimuth mark is 168 feet south of the northwest fence corner of the ranch yard (this ranch is 0.5 mile north-northwest of the L. J. Blank ranch), 92 feet west-southwest of windmill, 1.4 feet west of the west fence of the ranch yard, and about 1.4 miles from station in azimuth 190°38′07″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=802,506.47 feet; y=1,687,621.05 feet; the grid azimuth to the azimuth mark=190°02′32″.*

McCarty (Harding County, W. R. Porter, 1935).—About 17 miles north of Logan, about 1 mile southwest of the McCarty ranch, and on the top of a prominent sand hill which is highest point in several miles. To reach the station from Logan go north 0.8 mile on State Highway 39, leave the highway and go north on a graded road which later becomes a trail 12.3 miles to the Brown ranch, continue northwest on the main trail 5.9 miles to the McCarty ranch, pass through the ranch lot and go west on a trail 1.1 miles to a fence corner, turn left and go south along the west side of the fence 0.6 mile to another fence corner, pass through a gate and drive across country east-southeast 0.4 mile to the station on the highest point. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 143.96 feet (slope distance) from the station in azimuth 194°19′, and No. 2 is 134.64 feet (slope distance) from the station in azimuth 259°05′. The azimuth mark is in the northeast corner of the ranch-house yard, 2 feet south of the east-west fence, 3½ feet west of the north-south fence, 49 feet north of the northeast corner of the house, and about 1.0 mile from the station in azimuth 219°27′26″.

Plane coordinates: (E), x=764,944.83 feet; y=1,673,346.04 feet; the grid azimuth to the azimuth mark=218°56′18″.*

Clampit (Quay County, W. R. Porter, 1935).—The station is 9 miles air line southwest of Nara Visa and 3 miles west-northwest of Obar, on a high, broad pasture ridge which is the highest in the vicinity, and 271 feet west of a north-south fence. To reach the station from Obar, drive due west across the railroad tracks and thence west on the main-traveled road for 2.2 miles, take the right fork on a straight, northwest, track road and go 1.0 mile to a T-fence intersection and the intersection of several roads, leave the road and drive due north across country 0.5 mile to a lone, southwest, fence corner, go north on the west side of the north-south fence 0.3 mile to the top of a hill, thence west 90 yards to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 196 feet west of a north-south fence and 135.68 feet from the station in azimuth 213°47′, and No. 2 is 127.50 feet from the station in azimuth 107°00′. The azimuth mark is set in an east-west fence line, 0.3 mile east of a lone, southwest, fence corner and approximately 0.5 mile from the station in azimuth 298°44′56″.

Plane coordinates: (E). x=822,891.06 feet; y=1,660,445.76 feet; the grid azimuth to the azimuth mark=298°07′03″.*

Sand Springs Quay County, W. R. Porter, 1935).—About 7 miles northeast of Logan, 1.8 miles northeast of the Canode siding, in the right-of-way between U. S. Highway 54 and the Chicago, Rock Island and Pacific Railroad, 11 feet northwest of the fence, on the highest point between the Canode siding and the Sand Springs siding, and 83 feet southeast of the southeast rail of the railroad. To reach the station from Logan go northeast 5.1 miles on U. S. Highway 54, to the Canode siding, continue northeast 1.8 miles on No. 54 to the station on the northwest side of the highway. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 90 feet southeast of the southeast rail of the railroad, 1½ feet northwest of the fence and 81.54 feet (slope distance) from the station in azimuth 234°01′, and No. 2 is 99 feet southeast of the center of the highway, 1½ feet northwest of the fence and 181.95 feet (slope distance) from the station in azimuth 344°25′. The azimuth mark is 36 feet northwest of the southeast right-of-way fence, 64 feet southeast of U. S. Highway 54 and approximately 0.85 mile from the station in azimuth 45°04′18″.

Plane coordinates: (E). x=799,969.10 feet; y=1,616,401.54 feet; the grid azimuth to the azimuth mark=44°29′15″.*

McCullough (Harding County, W. R. Porter, 1935).—About 8 miles air line north-northwest of Logan, about 2 miles northeast of Ute Creek, 150 yards west-southwest of the ranch house of Mr. Dan McCullough, on a township-line road right-of-way, on the highest ground in the vicinity, 22½ feet west of the center line of the township-line road, 50 yards north of a section-line road, and 6 feet east of a north-and-south fence. To reach station from the post office in Logan

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

drive north and west on State Highway 39 for 7.7 miles to a prominent sign on the west side of the highway that says "Dan Trigg Seven D ranch, 20.9 miles." There is also a road going west here. Continue north on State Highway 39 for 0.9 mile to where the highway turns west, keep straight ahead, north, on a plain section-line road for 3.7 miles to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 26 feet west of the center line of the road, 1 foot west of a north-south fence and 24.265 meters (79.61 feet) from station in azimuth 218°39′, and No. 2 is 29 feet west of the center line of the road, 3 feet east of a north-south fence and 34.562 meters (113.39 feet) (slope distance) from station in azimuth 1°41′. The azimuth mark is 25¼ feet west of the center line of gate and north-south township line, 2½ feet east of north-south fence, 2½ feet south of east-west fence, and 0.90 mile from station in azimuth 179°51′48″.

Plane coordinates: (E), x=752,510.52 feet; y=1,624,690.21 feet; the grid azimuth to the azimuth mark=179°22′17″.*

Brown (Harding County, W. R. Porter, 1935).—Located 12 miles air line north of Logan, 0.9 mile southwest of the ranch house of Mr. Brown, 0.7 mile south of a well-traveled ranch road, 229 feet east of a fence, ½ mile southwest of a draw, on a prominent sand hill, which is the highest point in the vicinity. To reach the station from Logan post office drive ½ block east, turn left go north 0.6 mile and then left (west) 0.2 mile on State Highway 39, turn right off the highway and go north 6.9 miles on a fair, section-line road, pass adobe ranch buildings and continue north on poor section-line road 1.7 miles, take left fork northwest to gate and abandoned cattle guard, pass through gate and take right fork north and then northwest 0.8 mile, take the main right fork ¼ mile east of the windmill, take right fork and go 2.2 miles, at cattle guard leading into the Brown ranch yard take the left fork on a well-traveled trail and go 0.2 mile, take the right fork and go 0.4 mile, leave trail here and drive south 0.7 mile across the country up the side of a sand hill to the highest point and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1 foot east of fence and 249.60 feet (slope distance) from station in azimuth 66°42′, and No. 2 is 1 foot east of fence and 254.38 feet (slope distance) from station in azimuth 116°22′. The azimuth mark is 1 foot south of fence, 7 feet east of the cattle guard, 16 feet east of fence corner, about 200 yards south of Brown's ranch house, and 0.9 mile from station in azimuth 250°49′28″.

Plane coordinates: (E), x=768,330.26 feet; y=1,649,710.29 feet; the grid azimuth to the azimuth mark=250°18′01″.*

Woods (Quay County, W. R. Porter, 1935).—About 3 miles east of Logan, about 1 mile east-southeast (94° magnetic) from the ranch buildings of Guy Woods, 0.6 mile north-northeast of an old windmill derrick and four trees, and 51 feet south of the center line of a track road, located on school land, on the highest point in the immediate vicinity, on the first high ridge south of the Canadian River. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 52 feet northeast of the center line of a track road and 104.22 feet from station in azimuth 229°08′, and No. 2 is 38½ feet southwest of the center line of a track road and 113.17 feet from station in azimuth 315°36′. The azimuth mark is 0.1 mile east of a windmill, 6 feet south-southeast of the northeast corner of the fence around Guy Woods' ranch buildings, ½ foot east of a fence and 1.0 mile from station in azimuth 123°03′28″.

Plane coordinates: (E), x=795,871.03 feet; y=1,586,295.07 feet; the grid azimuth to the azimuth mark=122°29′01″.*

Supplementary points

Pits (Union County, W. R. Porter, 1935).—Located 15.4 miles west of Clayton viaduct, 2.7 miles east of the town of Mt. Dora, 91 feet south of the south rail of the railroad tracks, about 56 feet north of the center of the U. S. Highway 87, directly across the pavement from the gravel pits, and on a low rise. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 102 feet

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

north of center of highway, 47 feet south of south rail of railroad and 131.10 feet from station in azimuth 258°28′, and No. 2 is 99 feet north of center of highway, 49 feet south of south rail of railroad and 148.26 feet from station in azimuth 115°58′. The azimuth mark is 54 feet south of center of highway, ½ foot south of fence and 0.4 mile from station in azimuth 283°14′50″.

Plane coordinates: (E), x=761,380.20 feet; y=2,005,095.31 feet; the grid azimuth to the azimuth mark=282°43′05″.*

Ears (Union County, W. R. Porter, 1935).—About 4½ miles west-northwest of Clayton, 4 miles south of a butte known as Rabbit Ears Butte, and 60.8 feet north of the center line of U. S. Highway 87, 130.00 feet north of *Highway marker No. 590+00* which is an iron rail. To reach the station from the railroad overpass in Clayton, drive west 4.60 miles on U. S. Highway 87. The station is north of the highway at this point. The surface, underground, reference, and azimuth marks are set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 lies 108 feet north of the center line of the highway, 41.24 feet south of the south rail of the Chicago, Burlington and Quincy Railroad and 92.93 feet from the station in azimuth 252°48′, and No. 2 is located 108 feet north of the center line of the highway, 40.39 feet south of the south rail of the railroad and 80.11 feet from the station in azimuth 137°45′. The azimuth mark is 406.7 feet west-southwest of the white, concrete, Federal-aid-project marker No. 1570 which is also highway station 608+00.00 and which is on the south side of the highway 0.25 mile east of the station mark, 71 feet south of the center line of the highway, 1 foot north of the right-of-way fence, and 0.25 mile from the station in azimuth 287°36′46″. The finial of the water tank in Clayton is 295°47′52″ in azimuth from the station.

Plane coordinates: (E), x=814,572.34 feet; y=1,994,960.98 feet; the grid azimuth to the azimuth mark=286°58′36″.*

Highway marker No. 590+00 (Union County, W. R. Porter, 1935).—See description of station *Ears*.

Plane coordinates:[1] (E), x=814,550 feet; y=1,994,833 feet.

Court magnetic station (Union County, W. R. Porter, 1935).—On land owned by the City of Clayton, just north of the northwest corner of the fenced enclosure containing the racetrack and grandstand, 0.3 mile south-southwest of the Fourth Ward Grade School, 0.5 mile southwest of the Union County Courthouse, 0.2 mile southwest of the intersection of Adams Street and Third Avenue, 121 feet east of a north-south wire fence, 90 feet north of a 6-foot board fence, 190 feet northeast of a fence T-intersection and near the center of a small, triangular orchard. To reach the station from the southwest of the Union County Courthouse drive west one block, pass to the left of a small, stucco house and drive southwest 0.2 mile to the edge of a small orchard and station. The station is marked with a standard U. S. C. & G. S. Magnetic Station mark set in a 6-inch square of concrete. The reference and azimuth marks are standard disks set in concrete, note 11a. Reference mark No. 1 is 181 feet east-northeast of a fence T-intersection, 1 foot north of a board fence, and 26,035 meters (85.42 feet) from station in azimuth 327°23′, and No. 2 is 124 feet north of a fence T-intersection, 1 foot east of a north-south fence and 121.54 feet from station in azimuth 78°12′. The azimuth mark is 44 feet south of center line of State Highway 58, 3 feet south of an east-west fence and 0.5 mile from station in azimuth 110°01′28″.

Plane coordinates: (E), x=836,351.07 feet; y=1,983,622.09 feet; the grid azimuth to the azimuth mark=109°20′42″.*

Bench mark N 106 (Union County, W. R. Porter, 1935).—About 16 miles air line south of Clayton, 1.1 miles south of a wooden bridge over a small draw, 5.2 miles south of Massacre school and store, in the northwest corner of a field, 54 feet southeast of the intersection of State Highway 18, with a graded east-west section line road, and 12 feet east of a fence corner. To reach the station from Clayton post office drive south 0.7 mile on a paved street, turn right and go west 0.2 mile across the tracks, turn left onto State Highway 18 and go south 15.2 miles to the station. The station is marked with a standard disk stamped "BENCH MARK N-106 1934," set in concrete in a stovepipe 12 inches in diameter. Reference and azimuth marks are standard disks set in concrete, note 11a. Reference mark No. 1 is in a fence line, 27 feet south of the center

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

of the highway and 121.88 feet from station in azimuth 268°56′, and No. 2 is 1 foot east of a fence, 27 feet east of the center of the highway, 144 feet south of a fence corner and 143.40 feet from station in azimuth 5°00′. The azimuth mark is in a fence line, 24 feet west of the center of State Highway 18, on the north slope of a draw and 1.4 miles from station in azimuth 179°37′39″.

Plane coordinates: (E), x=838,656.61 feet; y=1,905,467.76 feet; the grid azimuth to the azimuth mark=178°56′56″.*

Whaley 2 (Union County, Eli B. Packer, 1936).—Located 5 miles by road south of Amistad, 0.6 mile south of the Rosebud Highway, 200 yards south of the frame buildings of S. C. Whaley, 54 feet west of the center line of the highway and inside or west of the right-of-way fence on State Highway No. 18. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in the east right-of-way fence line, 50 feet east of the center line of the highway and 36.828 meters (120.83 feet) from station in azimuth 303°47′, and No. 2 is 54 feet west of the center line of the highway and 31.792 meters (104.30 feet) from station in azimuth 0°30″. Bench mark S 107, the azimuth mark for station *Whaley*, is in the intersection of the Rosebud Highway and State Highway 18, about 0.6 mile north of the station, and was recovered but not connected to the new station.

Plane coordinates: (E), x=847,523 feet; y=1,765,733 feet.

Obar (Quay County, W. R. Porter, 1935).—In the road right-of-way ¼ mile northeast of the post office in the village of Obar, 42 feet northwest of the center line of State Highway 18 (U. S. Highway 54), 7.8 feet southeast of the south right-of-way fence of the Chicago, Rock Island and Pacific Railroad, and 105½ feet southeast of the southeast rail of the main-line track. The station may be reached from Obar post office and store by driving 0.25 mile, northeast on State Highway 18 to a sign on the northwest side of the highway. The station is located about 15 feet north-northeast of this sign. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 158.95 feet southeast of the station, 116 feet southeast of the center line of the highway, 264½ feet southeast of the southeast rail of the main-line railroad track and 158.95 feet from station in azimuth 316°32′, and No. 2 is 1 foot southeast of the south railroad right-of-way fence, 47 feet northwest of the center line of the highway, 98½ feet southeast of the southeast rail of the main-line railroad track and 106.58 feet from station in azimuth 51°59′. The azimuth mark is 42 feet southeast of the center line of the highway, 91 feet southeast of the south right-of-way fence, 189.6 feet southeast of the southeast rail of the main-line track, 753.08 feet northwest of the west-northwest corner of the Obar schoolhouse and about 0.5 mile from the station in azimuth 46°39′22″.

Plane coordinates: (E), x=837,412.83 feet; y=1,652,598.11 feet; the grid azimuth to the azimuth mark=45°59′49″.*

Mater (Quay County, W. R. Porter, 1935).—The station is 4.5 miles air line southwest of Logan, 1¾ miles north-northeast of Mater siding on the Chicago, Rock Island and Pacific Railroad; ⅓ mile northwest of U. S. Highway 54; ⅓ mile southwest of a ranch, 100 yards south of a fence line, 75 yards east of a fence line and on a round hill in the forks between the Canadian River and Tucumcari Creek. To reach from Logan, drive south and southwest on U. S. Highway 54 for 5 miles to the yard-limit sign on the railroad tracks, and leave the main road, pass through the wire gate on the west side of the road (the west gatepost is a large tree trunk) and take the right fork northeasterly parallel to the highway for 0.3 mile, continue on the road northerly upgrade for 0.2 mile, leave the track road and drive westerly across the country, passing south of a lone southeast fence corner, for 0.3 mile to the top of the hill and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 98.89 feet from the station in azimuth 73°06′, and No. 2 is 97.00 feet from the station in azimuth 171°37′. The azimuth mark is 46 feet west of the center line of the highway, 1 foot west of a north-south fence line and about 0.5 mile from station in azimuth 332°51′05″.

Plane coordinates: (E), x=765,154.27 feet; y=1,568,803.84 feet; the grid azimuth to the azimuth mark=332°20′15″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Tucum (Quay County, W. R. Porter, 1935).—In the southwest corner of the Tucumcari High School ground, 190 feet southwest of the southwest corner of the high school, 266 feet southwest of the northwest corner of the high school, 31 feet north of the center of an east-west street, and 31 feet east of the center of a north-south street. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 36 feet west of the center of the street and 96.47 feet from station in azimuth 44°43′, and No. 2 is 36 feet west of the center of the street and 98.40 feet from station in azimuth 137°30′. The azimuth mark (Tucumcari magnetic station) is 38 feet east of the center of Fifth Street, 30 feet north of the center of McGee Street, 1½ inches below the surface of the ground and 1,083.82 feet from station in azimuth 180°25′20″.

Plane coordinates: (E), x=680,511.56 feet; y=1,517,630.01 feet; the grid azimuth to *Tucumcari magnetic station*=180°04′27″.**

Tucumcari magnetic station (Quay County, W. R. Porter, 1935).—In the town of Tucumcari about ¼ mile southwest of the courthouse, at the northeast corner of the intersection of Fifth and McGee Streets, at the southwest corner of block 30, McGee addition, 38 feet east of the center of Fifth Street, 30 feet north of the center of McGee Street, and 330.349 meters (1,083.82 feet) from station *Tucum* in azimuth 180°25′20″.

Plane coordinates:[1] (E), x=680,513 feet; y=1,518,714 feet.

Los Angeles-Amarillo Airway, beacon No. 85 (Quay County, W. R. Porter, 1935).—Airway beacon on a 51-foot tower, on the summit of Tucumcari Mountain, in sec. 36, T. 11 N., R. 31 E.

Plane coordinates: (E) x=689,838.66 feet; y=1,504,733.44 feet.

Los Angeles-Amarillo Airway, beacon No. 86 (Quay County, W. R. Porter, 1935).—Airway beacon on a 51-foot tower, 7 miles airline and 8½ miles by road east of Tucumcari, in sec. 13, T. 11 N., R. 31 E.

Plane coordinates: (E) x=715,912.04 feet; y=1,519,346.52 feet.

Los Angeles-Amarillo Airway, beacon No. 87 (Quay County, W. R. Porter, 1935).—Airway beacon on a 51-foot tower, 7 miles airline and 12 miles by road northwest of San Jon, in sec. 14, T. 11 N., R. 33 E.

Plane coordinates: (E), x=776,046.59 feet; y=1,524,313.35 feet.

Los Angeles-Amarillo Airway, beacon No. 88 (Quay County, W. R. Porter, 1935).—Airway beacon on a 51-foot tower, 8 miles airline and 9½ miles by road northeast of Bard, in sec. 12, T. 11 N., R. 35 E.

Plane coordinates: (E), x=844,825.70 feet; y=1,529,872.89 feet.

Los Angeles-Amarillo Airway, beacon No. 89 (Oldham County, Tex., W. R. Porter, 1935).—Airway beacon on a 62-foot tower, 4 miles air line and 8½ miles by road east of Glenrio, New Mexico.

Plane coordinates: (E), x=902,554.69 feet; y=1,529,155.20 feet.

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (NORTHERN SECTION)

Principal points

Lobo (Quay County, W. R. Porter, 1935).—About 15 miles south-southeast of Tucumcari, 13 miles south of the Tucumcari Airport and U. S. Highway 66, 1½ miles west of a north-south section-line road, in NE ¼ sec. 34, T. 9 S., R. 31 E., on the most easterly spur of Redondo Mesa, on land owned by H. E. Wright who lives in a cabin about ¾ mile northwest of the east toe of the mesa, 132 yards south of the north end of the most easterly point of the mesa, and 16 yards west of the east edge. A 30-minute pack, rough and steep, is required to reach this station. The station mark is a standard disk set in a boulder according to note 4. The reference marks are standard disks set in bedrock according to note 12a. Reference mark No. 1 is in the rim rock on the east edge of the mesa, 63.88 feet from station in azimuth 233°19′, and No. 2 is in the rim rock on the east edge of the mesa, 90.64 feet from station in azimuth 341°55′. The azimuth mark, a standard disk set in concrete according to note 11a, is in the right-of-way fence on the west side of the section-line road, at a point 96 feet northeast of the northeast corner of an abandoned adobe ranch house, and 1.5 miles from station in azimuth 286°25′30″.

Plane coordinates: (E), x=709,006.09 feet; y=1,444,415.30 feet; the grid azimuth to the azimuth mark=286°01′31″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Gregory (Quay County, W. R. Porter, 1935).—About 8 miles northwest of the Grady post office, on high, smooth ground about ⅓ mile southwest of the farmhouse of Mr. Forstoffer, on land owned by Mr. Gregory and in 1935 leased by Mr. Duke, 0.2 mile west of a section-line road and 3 feet south of a half-section-line fence. To reach from Grady post office, go west 4.0 miles, north 3.0 miles, west 1.0 mile and north 5.6 miles to the half section south of the house of Mr. Forstoffer, turn left off road and go west along the south side of the fence 0.2 mile to station site. Station, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is about 1 foot south of the fence and 123.78 feet from station in azimuth 270°21′, and No. 2 is about ½ foot south of the fence and 155.87 feet from station in azimuth 92°02′. The azimuth mark is 26 feet west of the center line of the road, in the fence line, and approximately 0.35 mile from station in azimuth 303°45′24″.

Plane coordinates (E), x=776,643.19 feet; y=1,436,595.12 feet; the grid azimuth to the azimuth mark=303°13′40″.*

Frio (Quay County, W. R. Porter, 1935).—About 4 miles northwest of the Forrest post office, on the edge of the breaks overlooking the Tucumcari Valley, on the highest point in the vicinity, about ¼ mile southeast of the cliffs which drop several hundred feet into the valley, and 0.2 mile north of a section-line fence. The slopes of the breaks are covered with scrub pine and cedar. To reach from Forrest post office, go north 2.0 miles to State Highway 18; turn west and go 3.0 miles, turn off highway and go north on section-line road 1.0 mile, where the graded road turns east; continue straight ahead (north) on a trail 1.1 miles along the west side of a fence, leave the fence and continue north-northwesterly on trail down the slope 0.2 mile, pass through a gate just north of the cliffs, turn right along the north side of the fence, and follow trail 0.2 mile to top of hill, leave trail and go north across country along the top of ridge 0.2 mile to station site. The station, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 65.14 feet from station in azimuth 255°46′, and No. 2 is 49.77 feet from station in azimuth 344°02′. The azimuth mark is 5½ feet north of a half-section-line fence corner post, 1½ feet west of a section-line fence, and approximately 1.2 miles from station in azimuth 5°37′35″.

Plane coordinates: (E), x=704,486.16 feet; y=1,404,093.05 feet; the grid azimuth to the azimuth mark=5°14′13″.*

Watts (Curry County, W. R. Porter, 1935).—The station is 30 miles air line north-northwest of Clovis, in sec. 9, T. 6 N., R. 33 E., on a high, dividing ridge about 4 miles north of the Blanco Creek, in the southwest corner of a field owned by J. M. Watts and 9 feet northeast of a southwest fence corner. To reach from Clovis Hotel in Clovis, drive north 24.7 miles on State Highway 18, go west on plain, section-line road 13.0 miles, go north on section-line road 1 mile to Mr. Watts' ranch, go south 1.0 mile, then west on a plain road 0.5 mile, cross a cattleguard, leave road, turn left (south) and go along the west side of fence 0.5 mile to fence corner and station site. The station, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 116 feet north of the fence corner, 1 foot east of a north-south fence and 111.35 feet from station in azimuth 175°49′, and No. 2 is 111 feet east of the fence corner, 1 foot north of an east-west fence and 103.88 feet from station in azimuth 272°50′. The azimuth mark is 30 feet west of the center line of a north-south track road and 0.6 mile from station in azimuth 226°09′01″.

Plane coordinates: (E), x=765,000.75 feet; y=1,367,862.78 feet; the grid azimuth to the azimuth mark=225°38′50″.*

Forest (Quay County, W. R. Porter, 1935).—About 25½ miles north of Melrose, 7.1 miles north of the Quay-Curry County line, 2 miles west of Forest, in sec. 27, T. 7 N., R. 31 E., on the highest point of a high east-west ridge covered with wheat fields, and in the right-of-way fence on the west side of State Highway 88. The station, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in the right-of-way fence east of the highway and 78.33 feet from station in azimuth 280°13′, and No. 2 is in the right-of-way fence, west of the highway and 98.95 feet from station in azimuth 0°02′. Bench mark

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

G 110 (azimuth mark), a standard bench mark disk set in concrete stamped "G–110–1934," is in the southwest corner of the intersection of the state highway and a graded crossroad (there is a sign "Tucumcari 35 miles" in the northeast corner), 2 feet south of and 25 feet west of the fence corner in the southwest angle of the intersection, and 1.1 miles from station in azimuth 0°15′20″.

Plane coordinates: (E), x=709,369.89 feet; y=1,381,752.15 feet; the grid azimuth to bench mark G 110=359°51′28″.*

Phone (Quay County, W. R. Porter, 1935).—About 18 miles north of Melrose, 0.3 mile north of the Quay-Curry County line, in sec. 35, T. 6 N., R. 31 E., on the first ridge south of a large draw which is about a mile wide, and 42 feet east of the center line of State Highway 88. The station, underground and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 105.73 feet (slope distance) from station in azimuth 273°32′, and No. 2 is 47 feet east of the center line of the highway and 121.75 feet from station in azimuth 356°47′. There are sand drifts between the station and reference mark No. 1. Bench mark K–110 (azimuth mark), a standard bench mark disk set in concrete, is 1½ feet west of the east right-of-way fence of State Highway 88, 7.6 feet east-northeast of sign marking the Quay-Curry County line, 40 feet east of the center line of the highway, and 0.3 mile from station in azimuth 359°14′53″.

Plane coordinates: (E), x=709,993.14 feet; y=1,345,644.52 feet; the grid azimuth to bench mark K–110=358°51′01″.*

Hammond (Curry County, W. R. Porter, 1935).—About 23 miles air line northwest of Clovis, in the SE¼ sec. 9, T. 5 N., R. 33 E., on the highest part of a high divide, 2¾ miles south of Blanco Creek, 1½ miles due west of Mr. Hammond's ranch house, 200 yards east of a large, lone, red barn, 21 feet north of a graded section-line road and in an east-west fence line. To reach from Clovis, go north 19.1 miles on State Highway 18, to a point where the highway curves slightly to the east and a graded road turns to the west, leave highway and go west on graded road 13.4 miles to the highest point of the ridge and station site. The station, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 37 feet south of the center line of the graded road, 2 feet north of an east-west fence, and 110.18 feet from the station in azimuth 302°09′, and No. 2 is 37 feet south of the center line of the graded road, 2 feet north of an east-west fence, and 91.55 feet from station in azimuth 50°47′. The azimuth mark is 35 feet south of the center line of the graded road and 0.6 mile from station in azimuth 271°06′38″.

Plane coordinates: (E) x=765,931.88 feet; y=1,333,546.87 feet; the grid azimuth to the azimuth mark=270°36′27″.*

Lummis (Curry County ,W. R. Porter, 1935).—About 13 miles air line north of Melrose, on the highest point of a sandy pasture ridge, which is the highest point for several miles on the property of V. L. Lummis, 0.5 mile east of State Highway 88 and 0.9 mile southeast of the ranch buildings of H. H. Hudspeth. To reach from Melrose, go north 13.2 miles on State Highway 88 to a lone plaster building on the west side of the road, turn short right and go 0.6 mile east-southeast across country to the top of the hill and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 106.12 feet from station in azimuth 292°38′, and No. 2 is 114.81 feet from station in azimuth 25°47′. The azimuth mark is on a small, red sand dune, 150 feet east of the center of State Highway 88 and 0.4 mile from station in azimuth 58°58′39″.

Plane coordinates: (E) x=712,401.21 feet; y=1,313,918.67 feet; the grid azimuth to the azimuth mark=58°34′36″.*

Melrose (Curry County, W. R. Porter, 1935).—About 5½ miles northeast of Melrose, 5 miles north of U. S. Highway 60, on a broad ridge on the highest ground in the vicinity, 1.0 mile west of a jog in a graded road, 22.5 feet east of a north-south fence, and 10 feet north of an east-west fence. To reach from St. Vrain, go west 3.2 miles on U. S. Highway 60, turn north and go 5.0 miles on graded road, leave the road at a northwest jog and take trail west along the north side of fence 1.0 mile to station site on the south side

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

of the trail and the north side of a fence. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 2½ feet north of the east-west fence and 95.23 feet from station in azimuth 274°17′, and No. 2 is 1 foot east of the north-south fence, 90 feet south of the fence corner, and 126.32 feet from station in azimuth 9°04′. The azimuth mark is about 0.5 mile west of graded road, 1½ feet north of the east-west fence, and 0.5 mile from station in azimuth 270°06′21″.

Plane coordinates: (E) x=731,817.65 feet; y=1,271,667.28 feet; the grid azimuth to the azimuth mark=269°40′13″.*

Gordon (Curry County, W. R. Porter, 1935).—About 12 miles northwest of Clovis, 3 miles west-northwest of the Ranchvale School, in the northwest corner of sec. 10., T. 3 N., R. 34 E., in the southeast angle of the intersection of an east-west and a north-south section-line road, in the right-of-way fence on the south side of the east-west road at a point 26.3 feet east of a telephone pole which is at the fence corner in the southeast angle of the intersection, 147 feet southeast of the southeast corner of the house of B. R. Patton which is in the northwest angle of the intersection, and on land owned by J. F. Gordon. To reach from the Ranchvale School which is about 12.5 miles by road from Clovis, go north on main road 1.0 mile to a crossroad, turn left and go west on graded road 3.0 miles to a crossroad and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in the south right-of-way fence of the east-west road and 290.52 feet from station in azimuth 269°55′, and No. 2 is in the east right-of-way fence of the north-south road and 243.03 feet from station in azimuth 6°11′. The azimuth mark is in the east right-of-way fence of the north-south road and 0.3 mile from station in azimuth 178°52′13″.

Plane coordinates: (E), x=789,911.49 feet; y=1,277,192.79 feet; the grid azimuth to the azimuth mark=178°19′30″.*

Raybourn (Curry County, W. R. Porter, 1935).—About 3½ miles south of St. Vrain, on the highest point of a brushy sand hill, in pasture land leased by Mr. Raybourn, ¾ mile southwest of Mr. M. W. Brandon's brown stucco house, 150 feet north of an east-west fence and 100 yards northeast of a T-fence intersection (stem south). To reach from St. Vrain go east 0.8 mile on U. S. Highway 60, turn right (south), cross railroad tracks and continue south on a section-line road 3.2 miles, at the end of a lane which is about 40 yards west of Mr. Brandon's house, leave section-line road and follow a dim track road west along the south side of a fence 0.2 mile to the azimuth mark, and go south-southwest across country 0.6 mile to the highest point and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 174.92 feet from station in azimuth 192°49′, and No. 2 is 107.81 feet from station in azimuth 98°58′. The azimuth mark is 1 foot south of an east-west fence, 0.2 mile west of Mr. Brandon's house and 0.6 mile from station in azimuth 213°45′08″.

Plane coordinates: (E), x=756,145.52 feet; y=1,224,321.30 feet; the grid azimuth to the azimuth mark=213°16′23″.*

Portair (Curry County, W. R. Porter, 1935).—The station is 6 miles along U. S. Highway 60 west of Clovis, near the Clovis Airport, known as Portair, about 125 yards northwest of the corner of the T. A. T. Airport Hangar, 81 feet north of the north rail of the main line of the railroad and 16 feet south of the right-of-way fence north of the railroad. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 96 feet north of the north rail of the main line of the railroad, 62½ feet east of a fence corner post, 1½ feet south of the right-of-way fence and 162.24 feet from station in azimuth 269°12′, and No. 2 is on the top of a small ridge of earth, 69 feet south of the south rail of the main line of the railroad, and 165.39 feet from station in azimuth 24°32′. The azimuth mark is 43 feet south of the center of the highway, 94 feet north of the north rail of the railroad, 2 feet southwest of a fence corner post, east of a crossroad which crosses the railroad tracks, and 1.5 miles from station in azimuth 94°23′53″.

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Plane coordinates: (E), x=808,821.47 feet; y=1,239,978.80 feet; the grid azimuth to the azimuth mark=93°49′10″.*

Hardwick (Curry County, W. R. Porter, 1935).—About 8 miles southwest of Clovis, 6 miles south of the Clovis Airport, on the top of a short, brush-covered ridge which runs east and west, 30 yards west of a section-line fence, and ¾ mile northeast of the C. P. Hileman Ranch buildings. To reach from Clovis, go west 6.5 miles on U. S. Highway 60, go south 6.9 miles to C. P. Hileman's ranch, go through two gates east of windmill, thence northeasterly on an old track road 0.7 mile; leave track road at crest of hill and go southeast 50 yards to top of hill and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1 foot west of a section-line fence and 161.55 feet (slope distance) from station in azimuth 260°15′, and No. 2 is 1 foot southwest of a section-line fence and 272.08 feet (slope distance) from station in azimuth 325°07′. The azimuth mark is 12 feet south of a track road and 0.6 mile from station in azimuth 59°54′22″.

Plane coordinates: (E), x=811,342.05 feet; y=1,207,201.19 feet; the grid azimuth to the azimuth mark=59°19′29″.*

Floyd (Roosevelt County, W. R. Porter, 1935).—About 8 miles west of Portales, 0.9 mile north of the South Floyd Highway, in the NW. ¼ sec. 28, T. 1 S., R. 33 E., 500 feet west of a north-south quarter section-line fence, 0.25 mile south-southwest of Mr. Watt Williams' ranch houses and on highest point of pasture ridge. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in the north-south quarter-section-line fence, 200 feet south of the junction of that fence and an east-west fence, and 811.58 feet from station in azimuth 225°52′, and No. 2 is in the quarter-section-line fence and 592.80 feet from station in azimuth 280°04′. The azimuth mark is 20 feet west of the center of section 28 which is the intersection of north-south and east-west fences, 2 feet north of the east-west fence and 0.3 mile from station in azimuth 341°42′39″.

Plane coordinates: (E), x=756,302.68 feet; y=1,164,333.24 feet; the grid azimuth to the azimuth mark=341°14′04″.*

Portales (Roosevelt County, W. R. Porter, 1935).—The station is 4 miles air line northeast of Portales, in sec. 16, T. 1 S., R. 35 E., about ¼ mile southeast of U. S. Highway 70 at a point where the highway passes over the top of a high sand ridge, 0.3 mile east of a windmill, on a high firm sand dune, the highest in the vicinity, and 20 feet southeast of its end. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 148.98 feet from station in azimuth 253°23′, and No. 2 is 110.11 feet from station in azimuth 3°45′. The azimuth mark is 51 feet southeast of the center line of U. S. Highway 70, 1 foot southeast of a wire fence, and 0.5 mile from station in azimuth 73°18′00″.

Plane coordinates: (E), x=816,809.59 feet; y=1,173,684.05 feet; the grid azimuth to the azimuth mark=72°42′38″.*

Boyd (Roosevelt County, W. R. Porter, 1935).—About 8 miles south-southeast of Portales, in sec. 6, T. 3 S., R. 35 E., about 1.8 miles east of State Highway 18, on pasture land owned by W. W. Boyd, about 0.2 mile west-southwest of the white house of Mr. Boyd, 28½ feet north of the fence, north of the road and 13 feet east of a north-south fence. To reach from Portales, go south 8.0 miles on State Highway 18, turn off highway and go east on a section line road 1.8 miles to the station site on the north side of the road. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to note 1a, 7a, and 11a. Reference mark No. 1 is 90 feet north of a fence corner post, 1 foot east of fence, and 62.43 feet from station in azimuth 168°09′, and No. 2 is 78½ feet east of a fence, corner post, 1 foot north of fence, and 72.39 feet from station in azimuth 292°42′. The azimuth mark is 100 feet north of the fence corner northwest of the road intersection, 21 feet west of the center of the road, 1½ feet east of the fence on the west side of the road, and 0.2 mile from station in azimuth 265°21′31″.

Plane coordinates: (E), x=811,784.93 feet; y=1,118,257.26 feet; the grid azimuth to the azimuth mark=264°46′55″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Delphos (Roosevelt County, W. R. Porter, 1935).—About 11 miles southwest of Portales, 0.3 mile west of Delphos post office, in sec. 4, T. 3 S., R. 33 E., on the highest point of a sand dune in the center of an orchard and 0.2 mile north-northeast of the MacDonald's ranch house. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is on the eastern slope of the same sand dune as the station and 118.61 feet (slope distance) from station in azimuth 256°26′, and No. 2 is 140.79 feet (slope distance) from station in azimuth 354°37′. The azimuth mark is 1 foot west of the east right-of-way fence of a track road, 14 feet north of a southwest fence corner, 27 feet east of the center line of a track road, 53 feet northwest of the center line of U. S. Highway 70 and 0.3 mile from station in azimuth 263°33′14″.

Plane coordinates: (E), x=754,834.71 feet; y=1,120,671.06 feet; the grid azimuth to the azimuth mark=263°04′57″.*

Red Lake (Roosevelt County, W. R. Porter, 1935).—About 11½ miles west of Dora, 1.2 miles south of the Dora-Elida graded road, on the northwest end of a ridge and the highest point in this region, in sec. 36, T. 4 S., R. 32 E., 150 yards south of an east-west fence, 0.2 mile west of a north-south road, in a pasture on school land which in 1935 was leased by Jack Killgore who lives 3 miles to the west of the station. To reach from Dora, go west on the graded Dora-Elida road 11.2 miles to a track section-line crossroad. The azimuth mark is in the southeast corner of this intersection. Turn left and go south on a plain section-line road 0.7 mile, pass through gate and continue south 0.3 mile, to a gate, pass through gate in east-west fence, turn right and go west along the south side of an east-west fence 0.2 mile, and go south across country 150 yards to high point of the ridge and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 151.94 feet from station in azimuth 282°16′, and No. 2 is 139.74 feet from station in azimuth 16°44′. The azimuth mark is 1 foot west of the northwest fence corner of the right-of-way fence south side of the Dora-Elida road 0.5 mile west of a two-story, white-plastered house north of the road, and 5,890 feet from station in azimuth 192°05′57″.

Plane coordinates: (E), x=743,304.45 feet; y=1,063,780.64 feet; the grid azimuth to the azimuth mark=191°39′05″.*

Burkett (Roosevelt County, W. R. Porter, 1935).—About 2 miles south of Dora, on level ground 0.2 mile east of State Highway 18, in an east-west fence line, ¼ mile northeast of the ranch buildings of A. J. Burkett. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. *Bench mark H-50* (*U. S. G. S.*) (reference mark No. 1), a standard U. S. Geological Survey bench-mark disk set in concrete, is 18 feet north of an east-west trail, 51 feet west of the center of the highway, 11½ feet east of a corner post and 1,037.74 feet from station in azimuth 91°46′59″. Reference mark No. 2 is 1 foot west of a fence, 40 feet east of the center of the highway and 1,304.55 feet from station in azimuth 126°25′27″. The azimuth mark is 42 feet east of the center of the highway, 1½ feet east of the fence on the east of the highway and 0.6 mile from station in azimuth 19°45′30″.

Plane coordinates: (E), x=803,720.64 feet; y=1,059,860.96 feet; the grid azimuth to the azimuth mark=19°12′00″.*

Tanneyhill (Roosevelt County, W. R. Porter, 1935).—About 16.5 miles air line northwest of Milnesand post office, in sec. 36, T. 5 S., R. 32 E., on high pasture ground belonging to Mr. Tanneyhill, ¾ mile north of the ranch buildings of Nels Rose, and 20 yards north of the intersection of two track roads. To reach from Milnesand, go on the main-traveled track road (graded in places) west and north 8.9 miles, north 4.0 miles, west 1.8 miles, north 2.0 miles, then west 1.0 mile to a cattle guard and mail box of J. R. Lee. Leave main road before crossing cattle guard and go north on plain section-line road 5.3 miles, passing to the west of several ranch houses to the intersection of ranch roads and the station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 78.20 feet from station in azimuth 227°43′, and No. 2 is 85.24 feet from station in azimuth 121°14′. The azimuth mark is 38 feet west of a

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

north-south track road, 3 feet north of an east-west fence and 0.3 mile from station in azimuth 0°01′45″.

Plane coordinates: (E), x=745,362.39 feet; y=1,027,120.02 feet; the grid azimuth to the azimuth mark=359°34′46″.*

Dean (Roosevelt County, W. R. Porter, 1935).—About 30 miles south of Portales, 7.4 miles north of Milnesand post office, in sec. 35, T. 6 S., R. 35 E., 150 yards northeast of Jess Dean's house, and 48 feet east of the center line of State Highway 18. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1 foot northeast of a fence T-intersection, 54 feet west of the center line of the highway and 158.94 feet from station in azimuth 40°14′, and No. 2 is 1 foot east of the west right-of-way fence line, 51 feet west of the center line of the highway and 168.74 feet from station in azimuth 143°15′. The azimuth mark is 1 foot east of the east right-of-way fence, 41 feet east of the center line of the highway and 0.6 mile from station in azimuth 0°11′35″.

Plane coordinates: (E), x=802,136.20 feet; y=1,002,138.91 feet; the grid azimuth to the azimuth mark=359°38′27″.*

Twin (Roosevelt County, W. R. Porter, 1935).—About 8 miles air line west of Milnesand post office, on a prominent hill in a pasture, 75 yards northwest of twin windmills and tanks, ½ mile north-northwest of a white house and farm buildings, and 76 feet north of an east-west wire fence. To reach from Milnesand, go west on the graded road toward Elida 4.9 miles, turn north with road and follow main-traveled road north 1.0 mile and west 3.0 miles to a point where the main road turns north. The General Land Office marker used for the azimuth mark is at this intersection. Leave the main road here and pass through a gate just west of the intersection, and go west along a track road 0.5 mile to the highest point and station site. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 3.5 feet north of an east-west fence and 98.45 feet from station in azimuth 302°48′, and No. 2 is 3.5 feet north of an east-west wire fence and 95.18 feet from station in azimuth 35°20′. G. L. O. mark (azimuth mark), a General Land Office standard brass cap on a 3-inch pipe at the corner common to sections 32, 33, 4 and 5, Tps. 7 and 8 S., R. 34 E., and stamped with these data, is 36 feet east-northeast of a cattle guard, 14 feet south-southwest of a fence corner, 14 feet southwest of the road intersection, and 0.5 mile from station in azimuth 271°27′08″.

Plane coordinates: (E), x=757,589.70 feet; y=967,793.85 feet; the grid azimuth to G. L. O. mark=270°58′59″.*

Milne-Sand (Roosevelt County, W. R. Porter, 1935).—About ¾ mile northeast of Milnesand, on the highest point in a pasture which is school land, in the E. ½ sec. 2, T. 8 S., R. 35 E., 0.4 mile east of State Highway 18, 0.6 mile north of the Milnesand-Bledsoe graded road, 0.6 mile north-northwest of the N. W. Blackwell ranch, 0.6 mile east of the Flying M ranch, and 50 yards north of a track road. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 132.12 feet from station in azimuth 94°12′, and No. 2 is 183.95 feet from the station in azimuth 354°52′. The azimuth mark is in the right-of-way fence on the north side of the Milnesand-Bledsoe graded road, 0.8 mile east of Milnesand, 0.2 mile west of a cattle guard at the Blackwell ranch and 0.6 mile from station in azimuth 334°09′46″.

Plane coordinates: (E), x=805,957.55 feet; y=965.498.44 feet; the grid azimuth to the azimuth mark=333°36′20″.*

Supplementary points

Cari (Quay County, W. R. Porter, 1935).—About 6½ miles east of Tucumcari, at the southeast corner of the main lot to the Tucumcari Airport, 125 yards east of the main building, 68 feet north of the center of U. S. Highway 66, 8 feet northwest of a corner post, and 150 yards south of the southeast corner of the lighted landing field. The surface, underground, and reference marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 185 feet north of the center of the highway, in fence line, and 116.95 feet from station in azimuth 182°34′, and No. 2 is 63 feet north of the center of the highway, in fence line, and 114.17 feet from station in azimuth

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

86°44′. Bench mark B 112 (azimuth mark), a standard bench-mark disk set in concrete, is 16 yards north of the railroad track, 16 yards west of the center of a graded road, 12 feet northeast of a fence corner and 680 yards from station in azimuth 47°15′19″.

Plane coordinates: (E), x=716,559.22 feet; y=1,518,793.84 feet; the grid azimuth to bench mark B 112=46°50′16″.*

Los Angeles-Amarillo Airway, beacon No. 83 (Quay County, W. R. Porter, 1935).—Airway beacon on a 51-foot tower, 5 miles air line north-northwest of Montoya, 20 miles air line and 32 miles by road west of Tucumcari, in sec. 21, T. 11 N., R. 27 E.

Plane coordinates: (E), x=576,009.36 feet; y=1,513,048.22 feet.

Los Angeles-Amarillo Airway, beacon No. 84 (Quay County, W. R. Porter, 1935).—Airway beacon on a 75-foot tower, 8 miles air line and 9 miles by road west of Tucumcari, in sec. 22, T. 11 N., R. 29 E.

Plane coordinates: (E), x=643,106.96 feet; y=1,516,120.00 feet.

San Jon (Quay County, W. R. Porter, 1935).—In the southwest part of the town of San Jon, 150 yards west of State Highway 39, 96 feet south of the south rail of the Chicago, Rock Island & Pacific Railway main line, in an abandoned right-of-way fence line, and 0.2 mile south of U. S. Highway 66. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1 foot north of the abandoned fence line, 95 feet south of the south rail of the main-line tracks and 117.73 feet from station in azimuth 276°05′, and No. 2 is 96 feet south of the south rail of the main-line tracks and 108.88 feet from station in azimuth 96°11′. The azimuth mark is in fence line, 21 feet west of the center of State Highway 39 and 0.35 mile from station in azimuth 344°08′00″.

Plane coordinates: (E), x=799,517.20 feet; y=1,494,798.65 feet; the grid azimuth to the azimuth mark=343°33′26″.*

Vrain (Curry County, W. R. Porter, 1935).—About 12½ miles west of Clovis, 3.3 miles east of St. Vrain, on the Atchison, Topeka & Santa Fe Railway right-of-way south of U. S. Highway 60, 95 feet north of railway semaphore signal No. 6692, 82 feet north of the north rail of the tracks, and 16 feet south of the fence on the south side of the highway. Surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 2½ feet south of the fence on the south side of the highway and 111.83 feet from station in azimuth 268°17′, and No. 2 is 1½ feet south of the fence on the north side of the highway and 115.06 feet from station in azimuth 172°56′. The azimuth mark is 43 feet south of the center of the highway, 1½ feet south of the fence, 2½ feet south of a highway right-of-way marker, 94 feet north-northeast of railway semaphore signal No. 6701 and approximately 1.0 mile from station in azimuth 94°22′52″.

Plane coordinates: (E), x=771,841.26 feet; y=1,242,395.02 feet; the grid azimuth to the azimuth mark=93°52′19″.*

Clovis Roof (Curry County, W. R. Porter, 1935).—The station is in the town of Clovis, in the west coping of the Clovis Hotel roof, near the southwest corner. Station and reference marks are standard disks. Reference mark No. 1 is in the north coping, near the northwest corner of the hotel roof and 13.465 meters (44.18 feet) from station in azimuth 181°42′, and No. 2 is in the south coping of the roof and 5.972 meters (19.59 feet) from station in azimuth 279°43′. The azimuth mark, a standard disk set in concrete according to note 11a, is 33 feet south of the center line of Second Street, 53 feet west of the center line of Merriwether Street, 109 feet northeast of a wooden frame building, 4 inches north of a concrete sidewalk, and 501.259 meters (1,644.55 feet) from station in azimuth 87°15′16″. *Clovis Ground* is 1.596 meters (5.24 feet) from the station in azimuth 1°45′.

Plane coordinates: (E), x=840,473.30 feet; y=1,238,702.93 feet; the grid azimuth to the azimuth mark=86°37′00″.*

Clovis Ground (Curry County, W. R. Porter, 1935).—The station is in the town of Clovis, 5.61 feet west-northwest of the southwest corner of the Clovis Hotel, 10.02 feet east of the west edge of the sidewalk, 7.2 feet east of the center of a fireplug, and 31.03 feet south-southwest of the west entrance to the hotel lobby. The station and reference marks are standard disks set in the concrete sidewalk. Reference mark No. 1 is 13.9 feet west of the center of a

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

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lamp post, 15.06 feet from the southeast sidewalk corner, 1.4 feet southwest of the southeast corner of a brick building, and 96.39 feet west of the station; and No. 2 is 65.94 feet north-northwest of the northwest corner of Bay's Automotive Association building, 3.6 feet east of the west edge of the sidewalk, 2.2 feet east of the center of a lamp post and 93.57 feet south of the station. A note in the records states that the reference marks are numbered wrong.

Plane coordinates:[1] (E), x=840,473 feet; y=1,238,697 feet.

Clovis, water tank (Curry County, W. R. Porter, 1935).—Plane coordinates: (E), x=841,688.94 feet; y=1,238,027.17 feet.

Portales, water tank (Roosevelt County, W. R. Porter, 1935).—Plane coordinates: (E), x=801,582.65 feet; y=1,161,451.00 feet.

Bench mark H 50 (U. S. G. S.) (Roosevelt County, W. R. Porter, 1935).—About 2 miles south of Dora. The mark (used as reference mark No. 1 for station *Burkett*) is a standard U. S. Geological Survey bench-mark disk set in concrete, and is 18 feet north of an east-west trail, 51 feet west of the center of State Highway 18, 11½ feet east of a corner post, and 1,037.74 feet from station *Burkett* in azimuth 91°46′59″.

Plane coordinates:[1] (E), x=802,683 feet; y=1,059,883 feet.

TUCUMCARI, N. MEX., TO MONAHANS, TEX., ARC (SOUTHERN SECTION)

Principal points

Gulf (Winkler County, Tex., W. R. Porter, 1935; 1938).—About 9 miles north of Wink, Tex., 0.8 mile north of a red board gate, and 75 yards east of a pipe line on a low, east-west, red sand ridge in section 15, School Block 26. To reach from Palmer and Sons' grocery store in Wink, go northeast, north, and east on Texas State Highway 115 for 6.2 miles, turn north on oiled road and go 3.0 miles, pass through a red board gate and continue north on track road along a pipe line 0.8 mile to top of ridge and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 111.91 feet (slope distance) from station in azimuth 16°34′, and No. 2 is 196.14 feet (slope distance) from station in azimuth 69°43′. The azimuth mark is 0.45 mile north-northwest of the red board gate, 9 feet east of the center line of a track road, and 0.25 mile from station in azimuth 354°33′52″. In 1938 it was reported that the station had been disturbed, the bronze disk was missing, the reference marks were in good condition and that the board gate had been replaced by a cattle guard.

Plane coordinates: (E), x=861,335.86 feet; y=322,796.62 feet; grid azimuth to azimuth mark=353°56′58″*

Scarborough (Winkler County, Tex., W. R. Porter, 1935).—About 12 miles northwest of Wink, 2½ miles west-northwest of the Scarborough ranch, on the highest point of a north-south ridge that is sparsely covered with brush (there is higher ground to the north and south at a distance of approximately 4 miles), in pasture land owned by the Scarborough ranch, in section 4, School Block 27, 230 yards south of an east-west fence, and 400 yards west of a north-south fence. To reach the station from Conoco Service Station in Wink, go north and northeast 5.2 miles on Texas State Highway 115, leave highway and continue north on track road 1.1 miles, take left fork and go northwest on main-bladed road 5.2 miles, pass over cattleguard on left of road and go generally southwest on main road 1.7 miles, take right fork and go 0.6 mile to Scarborough ranch yard, take left fork pass over cattleguard, go generally northwest on plain road 1.6 miles to crossroads, turn sharp left and go south 0.7 mile to dim crossroads, turn right and go west and northwest on dim road 1.3 miles to a gate with tall iron posts in an east-west fence, go west 100 feet to north-south fence, and go southeast across country 0.25 mile to highest point and the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 128.70 feet from station in azimuth 249°36′, and No. 2 is 105.47 feet from station in azimuth 347°41′. The azimuth mark is in the southwest angle of the T-intersection of a north-south fence and an east-west fence, 100 feet west of

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

the gate with tall iron posts, and 0.25 mile from station in azimuth 224°00′10″.

Plane coordinates: (E), x=821,034.11 feet; y=321,053.99 feet; grid azimuth to azimuth mark=223°27′24″.*

New Mexico-Texas boundary (Clark) mile corner No. 8 (Lea County, N. Mex.-Winkler County, Tex., W. R. Porter, 1935; 1938).—About 17 miles north-northwest of Wink, on top of a sand dune on the New Mexico-Texas boundary line, 2½ feet south of a fence. To reach the station from Wink, Tex., go northerly 5.2 miles on Texas State Highway 115, leave highway and go straight ahead (north) 1.1 miles, take left fork and go 5.2 miles on main-bladed road, take right fork and go northerly 2.3 miles, take left fork (straight ahead) and go 4.5 miles to cattleguard about 0.1 mile west of C. C. Cowden's ranch buildings, continue northwesterly 1.0 mile, cross cattleguard and follow trail along north side of fence easterly 1.6 miles, pass through wire gate and continue east 1.6 miles to fence corner, continue east on dim track to a gate, continue east on south side of fence 0.3 mile to station site. The mile corner is marked by an iron pipe and cap stamped "Clark Boundary 1859—Mile Corner No. 8—New Mexico-Texas—General Land Office—Reestablishment 1911—U. S. Boundary Commission." The reference marks are standard disks set in concrete according to note 11a. Reference mark No. 1 is 103.08 feet (slope distance) from station in azimuth 318°52′, and No. 2 is 104.89 feet (slope distance) from station in azimuth 39°08′. Station *Clarence* may be used as an azimuth mark.

Plane coordinates: (E), x=851,176.23 feet; y=365,644.19 feet; grid azimuth to station *Clarence*=81°39′52″.6.

Clarence (Loving County, Tex., W. R. Porter, 1935).—About 20 miles air line north-northwest of Wink, in section 13, block 24, about 6 miles west of C. C. Cowden's ranch, 1¼ miles south of the New Mexico-Texas boundary line, ¼ mile northwest of a clay pit, on an east spur of a high ridge which rises very gradually to the west, 30 feet south of the rim, and 40 feet west of the edge of a deep draw. There is a prominent, nearly bare cliff rising 100 feet directly over the clay pit. The station is on the next point north, and a few feet higher than this cliff. To reach the station, go to the cattleguard which is 0.1 mile west of C. C. Cowden's ranch buildings as given in the description of *New Mexico-Texas boundary (Clark) mile corner No. 8*, drive 100 yards north, turn onto dim track road westward 2.4 miles, pass through wire gate with iron pipe posts and continue westward 1.4 miles, pass south of a windmill and follow dim remains of road from southwest corner of corral westward 3.3 miles to clay pit at foot of cliff; pack ¼ mile up northern spur to top of ridge and station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 30 feet north of the edge of a deep draw, and 74.29 feet from station in azimuth 7°35′, and No. 2 is 77.90 feet from station in azimuth 93°40′. The azimuth mark is 10 feet south of the center line of the dim track road leading to the clay pit, and 0.4 mile from station in azimuth 270°52′48″.

Plane coordinates: (E), x=798,124.13 feet; y=357,871.26 feet; grid azimuth to azimuth mark=270°22′15″.*

Winters (Lea County, W. R. Porter, 1935).—About 2 miles northwest of Jal, 1.4 miles west of the Jal-Eunice Highway, on the south end of a high ridge that extends in a general north-and-south direction, in NE ¼ sec. 13, T. 25 S., R. 36 E., 50 yards north of the south edge of the ridge, 0.1 mile north of an east-west fence, 200 yards east of a row of oil tanks and on land leased in 1935 by the Continental Oil Co., owned by W. H. Winters, who lives about 1.2 miles east of the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 130.83 feet from station in azimuth 255°56′, and No. 2 is 198.43 feet from station in azimuth 4°10′. The azimuth mark is in the northeast angle of a bend in the road where the road turns from east-west to north-south, 22 feet north of the center line of the east-west road, 63 feet east of the center line of the north-south road, and 0.6 mile from station in azimuth 96°38′09″.

Plane coordinates: (E), x=846,630.69 feet; y=413,755.68 feet; grid azimuth to azimuth mark=96°02′25″.*

Beard (Lea County, W. R. Porter, 1935).—About 12 miles air line west of Jal, approximately in the center of sec. 17, T. 25 S., R. 35 E., on the east end of a high, sandy spur ridge of waste land which projects easterly and is covered with greasewood and mesquite, on the property of Mr. Beard, 1½ miles west-

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

northwest from Mandlin's ranch buildings, about ½ mile east from two windmills which are plainly visible on the skyline from several miles to the east and are known as "Willie Henry's Water," 150 yards northeast of a plain track road, 40 yards northwest of a lone fence post. To reach the station from Jal Hotel in Jal, go north on main street 0.7 mile, go west on graded road 1.5 miles and north 0.8 mile, go west with grade 0.5 mile and north 0.3 mile, turn west on grade and go 3.8 miles, take left fork and follow main road westerly, 2.2 miles, take left fork westerly, and go 0.9 mile, take left fork, pass through gate, go 1.8 miles on main road, take right fork westerly and go 0.4 mile to crossroads, continue straight ahead 0.2 mile to a gate, go west and northwest on main road 0.8 mile, turn right off the road and go 0.1 mile northeast to highest point of sand dunes and the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 104.45 feet from station in azimuth 234°12′, and No. 2 is 89.46 feet from station in azimuth 328°46′. The azimuth mark is on a sandy hump 300 yards south of the twin windmills and tanks, and 0.5 mile from station in azimuth 71°03′02″.

Plane coordinates: (E), x=791,071.92 feet; y=412,479.54 feet; grid azimuth to azimuth mark=70°33′02″.*

Hooper (Lea County, W. R. Porter, 1935).—About 10 miles north-northeast of Jal, 14 miles south-southwest of Eunice, on a large and broad sand dune, the highest point in the vicinity, approximately in SE¼ sec. 32, T. 23 S., R. 36 E., 0.3 mile east of a north-south fence. To reach the station from Eunice post office go south on Jal road 11.3 miles to railroad crossing and 3 section houses, go east 0.8 mile and generally south 1.2 miles on main road to crossroad of which a ranch is about 1 mile east-northeast, turn right off main road and go southwest on track road 0.3 mile to railroad, cross tracks continue west 0.3 mile, pass through gate, continue west 1.0 mile to north-south pipe line, continue west 1.3 miles, pass through gate in east-west fence, take left fork, go west 0.1 mile to ranch, go west 0.4 mile on main road, take left fork, go 0.1 mile to crossroads 150 yards south of ranch, go straight ahead (west) 0.8 mile to pipe line, continue west 0.2 mile, pass through gate, continue west 1.0 mile, turn left and go south across country along east side of fence 0.5 mile, turn left and go east across country 0.3 mile to top of hill and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 45.76 feet from station in azimuth 272°46′, and No. 2 is 45.59 feet from station in azimuth 18°11′. The azimuth mark is in an east-west fence at a point 130 yards east of a northwest fence corner, 0.25 mile from station in azimuth 298°44′33″.

Plane coordinates: (E), x=827,644.04 feet; y=458,436.14 feet; grid azimuth to azimuth mark=298°10′37″.*

Page (Lea County, W. R. Porter, 1935).—About 18 miles west-northwest of Jal, about 5 miles northwest of Ochoa on property of Mr. Luther Page of Lamesa, Tex., 150 yards north of a ranch house occupied by Mr. Leo Cook, 134 feet northeast of a southwest fence corner, at a jog in the fence line, 82½ feet east of a north-south fence line, and in the SW¼ sec. 4, T. 24 S., R. 34 E. To reach from Ochoa, pass between the post office and a white house to the northeast, go generally northwest 4.8 miles, drive around the east side of Mr. Leo Cook's residence and garden plot and go north 0.1 mile to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 220 feet northeast of the northeast corner of a yard fence and 167.72 feet from station in azimuth 236°00′, and No. 2 is 5.8 feet west-northwest of the northeast corner of a yard fence, 126.2 feet east of a north-south fence line at a jog in the fence, and 114.11 feet from station in azimuth 337°00′. The azimuth mark is 10 feet east of a fence line, and 0.6 mile from station in azimuth 178°42′02″. *T. 24 S., R. 34 E., sec. 4, southwest corner*, marked by pipe with a standard General Land Office bronze cap stamped with the township, range, section data, is 5½ feet north of a T-fence intersection, 35 feet east of a cattle guard, 48 feet west-southwest of the southwest corner of Mr. Leo Cook's house, in the west yard fence line, and 463.15 feet from station in azimuth 8°46′.

Plane coordinates: (E), x=762,988.74 feet; y=452,244.69 feet; grid azimuth to azimuth mark=178°14′48″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Merchant (Lea County, W. R. Porter, 1935).—About 12 miles west-southwest of Eunice, 5 miles east-southeast of the headquarters of the Merchant Cattle Co., on land owned by this company, on the highest ground in the vicinity, and about 1 mile north of East Lake. To reach the station from Eunice, go south 2.7 miles on State Highway 18, turn west off highway and go 1.6 miles on the trail southwesterly, pass east of house, windmill, and trees, turn westerly on main trail and go 2.5 miles, turn right at T-intersection and follow the main trail 0.6 mile to the headquarters of King ranch, go westerly on main trail 6.8 miles, take right fork and go west 1.5 miles, take dim right fork and go around east and north sides of East Lake 0.3 mile, take right fork and go northerly 0.7 mile, turn off the trail to the left and go west across country 0.3 mile to station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 75.18 feet from station in azimuth 48°49′, and No. 2 is 89.26 feet from station in azimuth 155°38′. The azimuth mark is 22 feet west of the center of the trail and about 0.4 mile from station in azimuth 212°55′34″.

Plane coordinates: (E), x=806,331.53 feet; y=499,765.34 feet; grid azimuth to azimuth mark=212°23′41″.*

Brinninstool (Lea County, W. R. Porter, 1935).—About 23 miles west-northwest of Jal, 8 miles northwest of Ochoa Post Office on land owned by Mr. C. S. Brinninstool, 69½ feet west-southwest of the center line of a track road, and in sec. 23, T. 23 S., R. 33 E. To reach from Ochoa, proceed to Mr. Leo Cook's house as in the description of station *Page*, pass through a cattle guard 85 feet west-southwest of the house, and go northerly on main road 1.0 mile, pass around a house to the left or west and follow the main track road in a generally northwest direction 1.5 miles; at a road junction turn left (west) and go 1.0 mile or 0.4 mile beyond a cattle guard at a General Land Office pipe, take right fork and go 0.55 mile, passing two windmills and a house; turn left (west) and go 0.3 mile, pass north of windmill and some buildings and continue west 0.1 mile; take right fork and go west 0.25 mile; take right fork and go north 1.1 miles to station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 32 feet east-northeast of the center line of a track road and 101.59 feet from station in azimuth 245°11′, and No. 2 is 126.18 feet from station in azimuth 140°03′. The azimuth mark is 8 feet east of the center line of a track road and 0.25 mile from station in azimuth 315°55′04″.

Plane coordinates: (E), x=742,583.99 feet; y=470,161.20 feet; grid azimuth to azimuth mark=315°29′54″.*

Berry (Lea County, W. R. Porter, 1935).—About 22 miles west of Eunice, 1 mile south of the Berry ranch house, on the eastern end of a hilltop, about 0.3 mile west of a fence corner and a trail and 1.0 mile north of a fence. To reach from the headquarters of the Merchant Cattle Co., which is about 30 miles northwest of Jal, go north on graded road 0.2 mile, take the north one of two left forks and go northwest 2.9 miles, pass north of two windmills and continue on the trail 0.5 mile, take the right fork and go 0.2 mile, take the right fork uphill and go 0.6 mile, take main right fork and go northwest 2.7 miles to crossroads, turn right (north) and go 1.0 mile, take left fork and go west 0.2 mile to a fence corner; go west along the south side of the fence 0.3 mile, pass through fence and go north 0.15 mile to the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 110.36 feet from station in azimuth 312°45′, and No. 2 is 159.52 feet from station in azimuth 68°13′. The azimuth mark is about 100 yards west of a fence corner, 1 foot north of a fence, and approximately 0.3 mile from station in azimuth 292°48′30″.

Plane coordinates: (E), x=747,550.79 feet; y=544,621.10 feet; grid azimuth to azimuth mark=292°22′38″.*

Conoco (Lea County, W. R. Porter, 1935; 1936).—About 8 miles west-northwest of Eunice, on the A. E. Meyer lease of the Continental Oil Co., in the SW¼ sec. 17, T. 21 S., R. 36 E., 126 feet east of No. 1014 oil separator, 151 feet northwest of the northwest corner of the middle one of 3 houses which are inhabited by employes of the oil company, and 120 yards south of well "A. E. Meyer No. 1." The surface, underground, reference, and azimuth marks are

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in a north-south fence on the west side of the yard surrounding the 3 dwelling houses, 3 feet north of the north post of a cattle guard, 72 feet northwest of the same house corner to which the station is referenced, and 89.62 feet from station in azimuth 282°58′, and No. 2 is 126.51 feet from station in azimuth 176°19′. The azimuth mark is on a high ridge that extends generally east and west, 200 yards northeast of an oil well on the ridge and 1.1 miles from station in azimuth 3°52′45″. In 1936 it was reported that reference mark No. 1 had been destroyed.

Plane coordinates: (E), x=820,990.17 feet; y=537,454.43 feet; grid azimuth to azimuth mark=3°19′13″.*

King (Lea County, W. R. Porter, 1935).—About 7 miles air line, southwest of Eunice, in sec. 35, T. 22 S., R. 36 E., on a sandy pasture ridge belonging to Mr. W. H. King, about ¼ mile north of a windmill and earth tank, about 1½ miles westerly from the ranch buildings of Mr. King, 70 feet south of an angle-iron post at angle in fence alignment, and 34 feet east of a wire fence. To reach the station, go to the King ranch as in the description of station *Merchant*, pass through four wooden gates along the south side of cattle shelter and go west and southwest on main-track road 1.3 miles to a Y, leave track road here, turn right (west) and go 0.3 mile to highest ground and station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 58.62 feet from station in azimuth 159°52′, and No. 2 is 51.60 feet from station in azimuth 263°13′. The azimuth mark is 1 foot east of a north-south fence line, 20 feet north of north gatepost in fence, and 0.5 mile from station in azimuth 148°35′01″.

Plane coordinates: (E), x=837,391.13 feet; y=493,289.14 feet; grid azimuth to azimuth mark=147°59′56″.*

Weir (Lea County, W. R. Porter, 1935).—About 21½ miles south-southeast of Lovington, 13 miles west-southwest of Hobbs, 1½ miles west of Mr. W. Weir's ranch house, about 150 yards north-northeast of a point that drops off to the southwest, 0.7 mile east of a north-south fence, in sec 27, T. 24 S., R. 36 E. To reach from the intersection of U. S. Highway 62 and State Highway 16 which is 17.3 miles south of courthouse in Lovington and 13 miles west of Hobbs, go south on a track road 3.1 miles, cross a cattle guard and continue south along the east side of a north-south fence 1.0 mile, turn left about 150 yards north of a jog in the fence and follow a dim trail eastward 0.7 mile, at a point about 50 yards north of a conspicuous boulder, leave trail and go south across pasture land 0.3 mile to station site. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 8b, and 11a. Reference mark No. 1 is 94.22 feet from station in azimuth 297°37′, and No. 2 is 100.28 feet from station in azimuth 21°38′. The azimuth mark is 3 feet east of a north-south fence and 0.7 mile from station in azimuth 110°05′51″.

Plane coordinates: (E), x=806,248.47 feet; y=596,421.12 feet; grid azimuth to azimuth mark=109°33′40″.*

Scharb (Lea County, W. R. Porter, 1935).—About 23 miles air line south-southwest of Lovington, in the SE¼ sec. 10, T. 19 S., R. 34 E., on top of the edge of Mescalero Ridge, about 100 yards south of U. S. Highway 62 where it begins its descent from the ridge, about 40 yards south of a surveyed relocation of this highway, on land owned by the State and leased by the Scharbauer Cattle Co. The surface, underground, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. The azimuth mark is 50 feet north of the center line of the highway, by a telephone post, and 1.3 miles from station in azimuth 69°51′44″. *Bench mark H-36 (U. S. G. S.)*, a standard U. S. Geological Survey bench mark disk set in concrete, is 30 feet east of the center line of the highway, and 182.214 meters (597.81 feet) from station in azimuth 168°08′01″. *T. 19 S., R. 34 E., sec. 10, southeast corner*, a standard General Land Office cap, on an iron pipe set in a round mass of concrete, is in a wire fence, and 131.027 meters (429.88 feet) from the station in azimuth 277°13′01″″.

Plane coordinates: (E), x=743,996.68 feet; y=607,494.13 feet; grid azimuth to azimuth mark 69°26′04″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Alzugary (Lea County, W. R. Porter, 1935).—About 14 miles south of Lovington, 2.2 miles west of U. S. Highway 62, in pasture land owned by Joyce Alzugary whose house is 3 miles east of the station, 1.2 miles west of a north-south fence, 308.5 feet north of a windmill, and in T. 18 S., R. 36 E. To reach from the Lea County Courthouse in Lovington, follow U. S. Highway 62 south and west 13.6 miles, turn right (west) and go 1.0 mile on a track road, to a gate in fence, pass through a gate in a north-south fence and continue west on main road 1.2 miles to a large windmill and tank; turn north and go about 100 yards to the station site. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 91.02 feet from station in azimuth 267°35′, and No. 2 is 106.79 feet from station in azimuth 358°50′. The azimuth mark is 0.3 mile east of a north-south fence, 12 feet north of the center line of the track road from the above-mentioned windmill, and 0.8 mile from station in azimuth 128°38′43″.

Plane coordinates: (E), x=790,822.83 feet; y=639,308.67 feet; grid azimuth to azimuth mark=128°08′01″.*

Lee (Lea County, W. R. Porter, 1935).—About 21 miles southwest of Lovington, 28 miles west-northwest of Hobbs, about 1.0 mile north of a ranch house at the foot of the breaks, near the west edge of the breaks, 95 feet east of a fence T-intersection, 17.8 feet north of a fence line, in sec. 19, T. 18 S., R. 34 E. To reach from the intersection of U. S. Highway 62 and State Highway 16, go west 10.2 miles on U. S. Highway 62 to a point where the highway turns left (south-southwest); leave highway 50 feet west of a cattle guard and go north on track road 0.3 mile, pass through a wire gate and go northwest on the main track road 1.0 mile, pass through a wooden gate and keep straight ahead on the left fork 0.3 mile to a crossroad; continue northwest 1.4 miles, pass through a wire gate and continue straight ahead 1.4 miles, pass through a wire gate and continue on the main tracks 0.6 mile, take right fork and go 0.4 mile to the ruins of an old house where bench mark H 38 (U. S. G. S.) and a General Land Office station are located, turn left and go west on a dim track road 0.5 mile to the west edge of the breaks, a fence T-intersection, and the station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1½ feet east of a fence line, 206 feet north of a fence line, and 207.64 feet from station in azimuth 165°51′, and No. 2 is 1½ feet north of a fence line, 263 feet east-southeast of a fence T-intersection, and 171.98 feet from station in azimuth 291°45′. A note in the records states that the reference marks are numbered wrong. The azimuth mark, bench mark H 38 (U. S. G. S.,), a standard U. S. Geological Survey disk with a triangle in the center, set in concrete, is 10½ feet south of the center line of the track road, 47½ feet east of a track road intersection, and 0.5 mile from station in azimuth 260°40′04″. The General Land Office mark, the corner common to sections 17, 18, 19, and 20, T. 18 S., R. 34 E., a General Land Office iron pipe with a bronze cap, is at the ruins of the old house on the route to the station, 60 feet east of the center line of the track road, 102.63 feet north of bench mark H–38 (U. S. G. S.), and 0.5 mile from station in azimuth 258°28′11″.

Plane coordinates: (E), x=725,780.52 feet; y=633,309.36 feet; grid azimuth to bench mark H 38 (U. S. G. S.)=260°16′14″.*

Eidson (Lea County, W. R. Porter, 1935).—About 7 miles southwest of Lovington, 1½ miles south-southwest of the ranch occupied by Oscar Wood, on the highest point of a small hill, on pasture land which is partly owned by Millard Eidson of Lovington, in the NW¼ sec. 36, T. 16 S., R. 35 E. To reach the station from Fairweather hotel in Lovington, go west 2.2 miles on State Highway 83, turn left and go south 1.0 mile on graded road to crossroads, turn right, cross cattle guard, go west on track road on north side of fence 1.0 mile, turn left, cross cattle guard, go south on track road on east side of fence 1.5 miles, take right fork (main road) and go 0.8 mile, enter gate, turn right and go to house occupied by Oscar Wood, pass through gate in a north-south fence at a point 40 yards south of the house, go south along the west side of a fence 0.35 mile, turn right and go west along north side of east-west fence 0.4 mile; the azimuth mark is 10 feet west of the

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

gate. Pass through gate and go southwest across country 0.8 mile to top of hill and station site. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a. 7a, and 11a. Reference mark No. 1 is 156.38 feet from the station in azimuth 191°54′, and No. 2 is 166.99 feet from station in azimuth 298°08′. The azimuth mark is 0.7 mile from station in azimuth 221°50′38″.

Plane coordinates: (E), x=782,788.08 feet; y=686,236.53 feet; grid azimuth to azimuth mark=221°20′38″.*

Williams (Lea County, W. R. Porter, 1935).—About 17 miles west of Lovington, on a small knoll 0.2 mile south of State Highway 83, just east of a dry lake bed, in sec. 23, T. 16 S., R. 33 E. The surface, underground and reference marks are standard disks set in concrete according to notes 1a, 7a and 11a. Reference mark No. 1 is 95.29 feet from station in azimuth 260°18′, and No. 2 is 105.69 feet from station in azimuth 353°22′. The azimuth mark (bench mark U 34), a standard bench mark disk set in concrete, is 0.5 mile west of a cattle guard on the highway, 35 feet south of the center of the highway, and 1.3 miles from the station in azimuth 73°36′52″.

Plane coordinates: (E), x=715,812.17 feet; y=694,491.16 feet; grid azimuth to bench mark U 34=73°13′57″.*

Rycade (Lea County, W. R. Porter, 1935).—About 13 miles southwest of Lovington, in sec. 13, T. 17 S., R. 34 E., on land owned by the State, about 0.7 mile east of the Rycade-Magdum Joint New Mexico State No. 1 oil well. about 0.1 mile south of an oblique fence corner, and 74 feet west of a north-south fence. To reach from Lovington, go south 0.3 mile from the courthouse, turn right (west) on State Highway 83 and go 7.2 miles, turn off the highway to the left and go southwest on a trail 0.6 mile, take left fork and go 0.9 mile, cross cattle guard, take right fork and go southwest 2.7 miles, cross cattle guard and keep the main left fork 1.5 miles, cross cattle guard, turn south and go 0.2 mile, then go south-southwest 2.7 miles to the oil well on the right, turn left and go across country 0.7 mile to the station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1½ feet west of a fence, and 107.49 feet from station in azimuth 221°56′, and No. 2 is 2 feet west of a fence, and 97.79 feet from station in azimuth 313°22′. The azimuth mark is 44 feet east of the center of a trail, and approximately 0.7 mile from station in azimuth 141°23′36″.

Plane coordinates: (E), x=754,360.23 feet; y=668,068.86 feet; grid azimuth to azimuth mark=140°56′39″.*

Graham (Lea County, W. R. Porter, 1935).—About 21 miles air line southwest of Lovington, in the NW¼ sec. 34, T. 17 S., R. 33 E., about 50 yards north of the top edge of the "Breaks," 1½ miles from a visible ranch house in the valley, and 40 feet east of a north-south fence. To reach the station proceed as in description of station *Lee* to the ruins of an old house where bench mark H 38 (U. S. G. S.) and General Land Office station are located, follow main track road northwest 5.6 miles, go west along south side of fence 0.4 mile to a fence corner and the General Land Office mark for sections 27, 28, 33 and 34, T. 17 S., R. 33 E., go south 0.2 mile on east side of north-south fence to station. The surface, underground, reference and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 105.68 feet from station in azimuth 245°59′, and No. 2 is 1½ feet east of a north-south fence line, and 123.17 feet from station in azimuth 162°09′. The azimuth mark is 150 feet south of the intersection of track roads, 50 yards east of the top edge of the "Breaks," and 0.5 mile from station in azimuth 294°38′34″. The General Land Office mark, the corner common to sections 27, 28, 33, and 34, T. 17 S., R. 33 E., is a standard General Land Office iron pipe with a cap, and is in the corner of the intersection of a north-south and an east-west fence, 0.2 mile from station in azimuth 177°46′37″. The mark is set at an angle and the direction is measured to the top of cap.

Plane coordinates: (E), x=707,252.28 feet; y=653,766.54 feet; grid azimuth to azimuth mark=294°16′39″.*

Pello (Lea County, W. R. Porter, 1935).—About 15½ miles air line west-northwest of Lovington, in sec. 13, T. 15 S., R. 33 E., on rocky pasture land owned by E. Pello, 25 yards east of an old mill, 0.6 mile west-southwest of a mill, shack,

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

and earth shack. To reach the station from Fairweather hotel in Lovington, go west 11.2 miles on State Highway 83, leave the highway, pass through gate, drive northwest on a dim road 1.5 miles to an old stucco house, follow the only track road 0.6 mile, cross cattle guard, follow main track road east and then north 2.1 miles, cross cattle guard, follow only track road 1.0 mile, go through gate, go north 0.5 mile to fence corner south of E. Pello's ranch, go west 1.0 mile on track road along south side of fence, pass through gate, go north along west side of fence to General Land Office mark, go west-southwest across country 0.8 mile to a lone windmill and the station. The surface, underground and reference marks are standard disks set in concrete, according to notes 1a, 7a, and 11a. Reference mark No. 1 is 126.59 feet from station in azimuth 203°57′. and No. 2 is 131.47 feet from station in azimuth 314°33′. The General Land Office mark (used as an azimuth mark), the corner common to sections 12 and 13, T. 15 S., R. 33 E., and sections 7 and 18, T. 15 S., R 34 E., is a standard General Land Office iron pipe and cap, and is in a north-south fence line, 6 inches north of a south gate post, and 0.8 mile from station in azimuth 252°57′19″.

Plane coordinates: (E), x=733,506.69 feet; y=735,869.75 feet; grid azimuth to the General Land Office mark=252°32′25″.*

Lea (Lea County, W. R. Porter, 1935).—About 4 miles north-northwest of Lovington, 0.2 mile northwest of a lone windmill, 0.5 mile south of a section-line road, and in sec. 22, T. 15 S., R. 35 E. To reach from Lovington, go north from the courthouse 1.0 mile on U. S. Highway 62; where highway turns east, keep straight ahead on a graded road for 0.3 mile to a T-intersection; go west on a graded road 0.2 mile (this is a jog in the township line), then north 3.0 miles; leave the graded road, turn left, and go west on a section-line road 2.5 miles; turn left through a wire gate and go south-southwest 0.5 mile across pasture land to station site. The surface, underground, reference and azimuth marks are standard disks set in concrete, according to notes 1a, 7a, and 11a. Reference mark No. 1 is 137.90 feet from station in azimuth 356°48′, and No. 2 is 136.81 feet from station in azimuth 97°50′. The azimuth mark is 2 feet south of the south right-of-way fence of a section-line road, 46 feet west of the west gate post of a wire gate, and 0.5 mile from station in azimuth 202°26′20″.

Plane coordinates: (E), x=786,796.93 feet; y=30,290.06 feet; grid azimuth to azimuth mark=201°55′46″.*

Baum (Lea County, W. R. Porter, 1935).—This station is 19 miles air line northwest of Lovington, in sec. 1, T. 14 S., R. 33 E., in a pasture on land owned by Bob Baum and leased by Pete Etchenorry, 0.3 mile southwest of a tall mill and several old shacks, about ¼ mile south of a lone fence post, 50 feet west of a north-south wire fence which is the west edge of a cultivated field, and 171 feet southwest of a fence corner. To reach the station proceed to the fence corner south of Mr. E. Pello's ranch buildings as in the description of station *Pello*, go north 0.1 mile to cattle guard entering ranch yard, pass through gate, go east 0.1 mile on track road, follow main trail curving north 0.4 mile, cross cattle guard, go northwest along main trail, cross cattle guard, follow main trail 1.8 miles, enter gate, follow main trail north 2.0 miles to fence south of Pete Etchenorry's place, go west along south side of fence 0.8 mile to wire gate, enter gate, go north along west side of fence 0.9 mile to mill, tank, and trees, follow well-worn trail 0.9 mile, enter gate, follow trail north 0.5 mile to a gate in a north-south fence. The azimuth mark is 15 feet south of this gate. The surface, underground, reference and azimuth marks are standard disks set in concrete, according to notes 1a, 7a, and 11a. Reference mark No. 1 is 2 feet west of a north-south wire fence, 67 feet south of a fence corner, and 110.59 feet from station in azimuth 216°01′, and No. 2 is 2 feet west of a north-south wire fence, and 75.98 feet from station in azimuth 305°29′. The azimuth mark is 3 feet east of a north-south woven wire fence and 0.8 mile from station in azimuth 73°24′46″.

Plane coordinates: (E), x=735,833.79 feet; y=778,025.96 feet; grid azimuth to azimuth mark=72°59′30″.*

Austin (Lea County, W. R. Porter, 1935).—About 11 miles north-northwest of Lovington, 0.7 mile west of a north-south section-line road, in rocky pasture land, ¾ mile northeast of a lone windmill and group of trees, 1 mile east-northeast of a ranch, and in NW¼ sec. 13, T. 14 S., R. 35 E. To reach from the Lea County Courthouse in Lovington, go north 1.0 mile on the main street (U. S.

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Highway 62) to a point where highway bears to the northeast; continue straight ahead on graded road 0.3 mile to an east-west graded road, turn left and go west 0.2 mile, turn right and go north on a section-line road 9.0 miles to a gate across the road. The azimuth mark is 0.7 mile north of this point and is on the west side of the road. Pass through gate and continue north 1.0 mile, turn left and go west on track road 0.7 mile, turn left and go south across country 0.3 mile to the highest point of pasture and station site. The surface, underground, reference and azimuth marks are standard disks set in concrete, according to notes 1a, 7a, and 11a. Reference mark No. 1 is 156.58 feet from station in azimuth 215°58′, and No. 2 is 185.49 feet from station in azimuth 299°11′. The azimuth mark is 20 feet west of the center line of north-south section-line road, 0.7 mile north of an east-west fence, and 0.7 mile from station in azimuth 266°22′44″.

Plane coordinates: (E), x=796,918.56 feet; y=768,221.97 feet; grid azimuth to azimuth mark=265°50′57″.*

Jones (Lea County, W. R. Porter, 1935).—About 12½ miles west of Tatum, in a rocky pasture ½ mile southwest of a windmill, 4 miles west-southwest of the A. D. Jones ranch house, 210 feet west of the center line of a track road. To reach the station from the junction of U. S. Highways 62 and 380 and State Highway 18 at Tatum, go west 13.8 miles on U. S. Highway 380, turn left off the highway through a gate with large posts, go southeast along a fence 0.1 mile, go south-southwest on a well-worn trail 0.6 mile, pass through a board gate, continue on the only trail 1.0 mile, pass to left of a windmill and earth tank, go south-southwest on track road 1.0 mile, pass through a gate, continue on track road 0.6 mile, pass to right of a windmill and earth tank, continue south-southwest 1.4 miles, pass through a gate, continue straight ahead 1.1 miles, pass to right of a windmill and earth tank, continue south-southwest 0.4 mile; leave the track road and go west 210 feet across country to station site. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 103.93 feet from station in azimuth 236°10′, and No. 2 is 128.84 feet from station in azimuth 154°32′. The azimuth mark is 0.25 mile east of a windmill, 14 feet south of the center line of a track road, and 0.65 mile from station in azimuth 232°21′20″.

Plane coordinates: (E), x=739,732.80 feet; y=814,016.95 feet; grid azimuth to azimuth mark=231°55′33″.*

Callaghan (Lea County, W. R. Porter, 1935).—About 4 miles southwest of Tatum, in the NE¼ sec. 12, T. 13 S., R. 35 E., on flat pasture land owned by Miles Callaghan, about 0.1 mile west of a section corner, 66½ feet south of the fence on the south side of a lane running along the section line. To reach from Tatum go south 2.0 miles on U. S. Highway 62, turn off highway and go west 2.0 miles, turn south and go 1.0 mile, pass through cattle guard about 50 yards south of the section corner and go 0.1 mile west to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 149.18 feet from station in azimuth 3°38′, and No. 2 is 55 feet south of the fence and 179.58 feet from station in azimuth 93°23′. The azimuth mark is about 80 yards north of the half-section line, 27½ feet west of the center of the road, 1½ feet west of the fence, and 0.5 mile from station in azimuth 187°14′38″.

Plane coordinates: (E), x=799,841.07 feet; y=806,449.80 feet; grid azimuth to azimuth mark=186°42′25″.*

Tatum (Lea County, W. R. Porter, 1935).—About 4 miles northwest of Tatum, on a small rise in a pasture, and about 0.25 mile west of a windmill and dirt surface tank. To reach from Tatum go west 1 mile, north 2 miles, and west 0.3 mile to a ranch house; pass through a wire gate south of the house, turn north along fence and go on a trail 0.8 mile; turn west-northwest and go 1.1 miles to the windmill and surface tank, continue west across country 0.25 mile to the station. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 199.88 feet from station in azimuth 5°57′, and No. 2 is 163.36 feet from station in azimuth 83°26′. The azimuth mark is 1½ feet north of the fence enclosing the surface tank, 5½ feet east of the northwest corner of the enclosure, and 0.25 mile from station in azimuth 280°44′11″.

Plane coordinates: (E), x=797,020.83 feet; y=840,179.56 feet; grid azimuth to azimuth mark=280°12′09″.*

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*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

For notes in regard to marking of stations see p. 90.

Ranger (*Lea County, W. R. Porter, 1935*).—About 4½ miles air line west-northwest of Tatum, in T. 12 S., R. 35 E., about 50 yards west of a small gravel pit, 51 feet northeast of the center line of U. S. Highway 380, 15 feet northeast of the northeast right-of-way fence of the highway, and 35 feet west-southwest of the more eastern one of two 12 by 12 gateposts. To reach from the junction of U. S. Highway 380 and State Highway 18 in Tatum, go west 5.5 miles on U. S. Highway 380 to a small gravel pit and a gate with large gateposts northeast of the road. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is 1 foot northeast of the northeast right-of-way fence, 35 feet northeast of the center line of the highway, 74 feet from the more eastern one of the two gateposts, and 106.68 feet from station in azimuth 306°22′, and No. 2 is 1 foot southwest of the southwest right-of-way fence, 40 feet southwest of the center line of the highway, and 91.50 feet from station in azimuth 32°23′. The azimuth mark is 1 foot northeast of the northeast right-of-way fence, 40 feet northeast of the center line of the highway, and 0.5 mile from station in azimuth 299°22′13″. Bench mark X 94, a standard bench mark disk set in concrete, is 35 feet northeast of the center line of the highway, 3 feet southwest of the northeast right-of-way fence, and 1.9 miles from station in azimuth 118°49′37″.

Plane coordinates: (E), x=786,008.42 feet; y=826,344.90 feet; grid azimuth to azimuth mark=298°51′25″.*

Supplementary points

New Mexico-Texas boundary (Clark) mile corner No. 12 (Lea County, N. Mex.-Winkler County, Tex., W. R. Porter, 1935; 1938).—About 19 miles north-northwest of Wink, on the New Mexico-Texas boundary, about 425 feet west of a bladed road, and 2 feet south of a fence. To reach the station, proceed to the cattle guard 0.1 mile west of C. C. Cowden's ranch buildings as in description of *New Mexico-Texas boundary (Clark) mile corner No. 8*, go northwest 1.0 mile, turn left off the road and go along the south side of a fence about 425 feet to station site. The mile corner is marked with an iron pipe and cap stamped "Clark Boundary 1859 Mile Corner No. 12 New Mexico-Texas General Land Office Reestablishment 1911 U. S. Boundary Commission." Reference mark No. 2, a standard disk set in concrete according to note 11a, is 78.62 feet from station in azimuth 2°58′: *Bench mark H-105 (U. S. G. S.)* can be used as the azimuth mark.

Plane coordinates: (E), x=830,042.67 feet; y=365,420.69 feet; grid azimuth to *H 105 (U. S. G. S.)*=268°40′51″.**

Bench mark H 105 (U. S. G. S.) (Lea County, W. R. Porter, 1935; 1938).—This is a U. S. Geological Survey standard disk set in concrete. It is 4 feet northwest of the fence corner post west of the road. *New Mexico-Texas boundary (Clark) mile corner No. 12* is 406.22 feet from station in azimuth 89°14′44″.

Plane coordinates:[1] (E), x=830,449 feet; y=365,430 feet.

T. 24 S., R. 34 E., sec. 4, southwest corner (*Lea County, W. R. Porter, 1935*).—About 18 miles west-northwest of Jal and 5 miles air line northwest of Ochoa. The mark is a pipe with a standard General Land Office bronze cap stamped with the township, range, and section data, and is 5½ feet north of a T-fence intersection, 35 feet east of a cattle guard, 48 feet west-southwest of the southwest corner of Mr. Leo Cooks' house, in the west yard fence line, and 463.15 feet from station *Page* in azimuth 8°46′.

Plane coordinates:[1] (E), x=762,922 feet; y=451,786 feet.

Sims (*Lea County, W. R. Porter, 1935*).—About 7 miles south of Eunice, 1½ miles west-northwest of the ranch owned by O. H. Sims, on land owned by Mr. Sims, in the SE¼ sec. 33, T. 22 S., R. 37 E., 19 feet west of the right-of-way fence on the west side of the Jal-Eunice Road, 138 feet northwest of a railway warning sign on the east side of The Texas & Pacific Railway Co. tracks at a grade crossing, 87.6 feet north of the north post of a gate in fence, and 200 yards south of a sign "Maypens P. S. 1 Mile" on the railway right-of-way. To reach from the post office in Eunice, go south 6.9 miles on the Jal-Eunice Road to a gate in the fence on the west side of the road (there is a grade crossing and two cattle guards opposite this gate). The station is 30

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

**This azimuth has been computed by the first formula (p. 95), using both terms.

[1] *No check on this position.*

For notes in regard to marking of stations see p. 90.

yards north of the gate. The surface, underground, reference, and azimuth marks are standard disks set in concrete according to notes 1a, 7a, and 11a. Reference mark No. 1 is in the railway right-of-way fence and 72.80 feet from station in azimuth 228°47′, and No. 2 is in the railway right-of-way fence and 51.19 feet from station in azimuth 13°56′. The azimuth mark is 25 feet east of the center line of the Jal-Eunice Road, 52 feet west of the center line of the railway, and 0.3 mile from station in azimuth 218°19′13″. *Bench mark A 96*, a standard bench mark disk set in concrete, is in the right-of-way fence on the east side of the road and 134.93 feet from station in azimuth 2°02′54″.

Plane coordinates: (E), x=861,335.35 feet; y=489,842.52 feet; grid azimuth to azimuth mark=217°41′40″.*

Bench mark A 96 (Lea County, W. R. Porter, 1935).—About 7 miles south of Eunice, in the right-of-way fence on the east side of the Jal-Eunice Road. The mark is a standard bench mark disk set in concrete, and is 134.93 feet from station *Sims* in azimuth 2°02′54″.

Plane coordinates:[1] (E), x=861,332 feet; y=489,708 feet.

T. 19 S., R. 34 E., sec. 10, southeast corner (Lea County, W. R. Porter, 1935).—About 23 miles air line south-southwest of Lovington, on the edge of the Mescalero ridge. The mark is the corner common to sections 10, 11, 14, and 15, T. 19 S., R. 34 E., and is an iron pipe with a standard General Land Office cap, and is 131.027 meters (429.88 feet) from station *Scharb* in azimuth 277°13′01″.

Plane coordinates:[1] (E), x=744,423 feet; y=607,443 feet.

Bench mark H 36 (U. S. G. S.) (Lea County, W. R. Porter, 1935).—About 23 miles south-southwest of Lovington, on the edge of the Mescalero ridge. The mark, a standard U. S. Geological Survey bench mark disk set in concrete, is 30 feet east of the center line of U. S. Highway 62, and is 182.214 meters (597.81 feet) from station *Scharb* (see description thereof) in azimuth 168° 08′01″.

Plane coordinates:[1] (E), x=743,870 feet; y=608,079 feet.

Hobbs, municipal water tank (Lea County, W. R. Porter, 1935).—Plane coordinates: (E), x=868,072.66 feet; y=623,214.83 feet.

APACHE NATIONAL FOREST AREA

Principal points

Red Hill (U. S. F. S.) (Greenlee County, Ariz., L. B. Marr, 1935).—On the highest and most northwesterly point of hill known as Red Hill, about 4 miles west of Blue Ranger Station. To reach from Blue Ranger Station take Blue-Hannegan road northwest 4.9 miles to a fence; thence, by trail approximately 1 mile to a U. S. Forest Service trail; thence, by trail along the fence approximately ¾ mile to the southwestern slope of the peak and station. It is approximately a 1½-hour climb from the end of the road. The station is marked with a standard U. S. Forest Service tablet, set in rock and stamped "Red Hill 1935." Reference mark No. 1 is 34.1 feet northwest of the station. Reference mark No. 2 is 13.5 feet south of the station.

Plane coordinates: (W), x=100,063.06 feet; y=975,828.55 feet.

Saddle Mountain (U. S. F. S.) (Catron County, L. B. Marr, 1935).—On the highest peak of Saddle Mountain, 15 miles southwest of Reserve, under the U. S. Forest Service steel lookout tower. To reach the station from Blue Ranger Station, go south and then east 6.3 miles to Arizona-New Mexico State boundary line; thence, ⅓ mile east along the same road; thence, take the road to the north two miles; thence, southeast 2 miles to the station and lookout tower. The station is marked by a standard U. S. Forest Service tablet set in ledge rock and stamped "Saddle Mountain 1935." Reference mark No. 1, a U. S. Forest Service standard tablet set in rock is 41 feet from the station. Reference mark No. 2, a standard U. S. Forest Service tablet set in rock, is 16.5 feet from the station.

Plane coordinates: (W), x=144,700.22 feet; y=953,470.28 feet.

Tularosa (U. S. G. S.) (Catron County, U. S. Geological Survey, 1913; r. 1934).—On the highest peak of the Tularosa Mountains, locally known as Eagle

*This azimuth has been computed by the first formula (p. 95), neglecting the second term.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

Peak, under which name it was occupied by the Wheeler Survey. It is in T. 7 S., R. 17 W., section 22, approximately, and is at the head of Long Canyon on the north and Cox Canyon on the south. They both head in a saddle about ¼ mile west of the station. The Forest Service trail from Tularosa Ranger Station across the mountains to the Nigrito Ranger Station crosses through the saddle. There is a ranger cabin in the saddle from which a trail and a telephone line lead east up hill to the station. The station is about 11 miles east of Reserve and 15 miles south and 4 miles west of Aragon on the Magdalena public road. The station is marked by a standard U. S. Geological Survey, bronze, triangulation station tablet set in a 6 by 8 by 24-inch stone set in the ground over which is erected a rock cairn 5 feet high.

Plane coordinates: (W), x=273,951 feet; y=974,567 feet.

Box (U. S. G. S.) (Catron County, U. S. Geological Survey, 1913; 1915).—On the east end of the San Francisco Range, locally known as the South Mountain, about 8 miles north and 3 miles west of Reserve. It is in the northwest part of T. 6 S., R. 19 W., about 3 miles southeast of the junction of Rio San Francisco and the S. A. Creek, and 1 mile northeast along the ridge from a point where the trail from the S. A. ranch to Reserve crosses the summit. The station is about 2 miles southwest of a point where the Rio San Francisco goes into a canyon locally known as "The Box" from which the station derives its name. The station is marked with a U. S. Geological Survey standard bronze triangulation tablet set in solid rock.

Plane coordinates: (W), x=201,570 feet; y=1,017,819 feet.

Fox (U. S. G. S.) (Catron County, U. S. Geological Survey, 1913; 1915).—In section 4 (approximately), T. 3 S., R. 18 W., on the highest point of the "Fox" Mountain, a high, round, bare peak overlooking the country for miles in every direction. Several canyons head against the peak: Perry Lawson on the southeast, American on the northwest, and Des Meter on the northeast. It is about 3 miles west of the Jewett Gap and 10 miles northwest of the Jewett Ranger Station and N. H. Ranch. It is an excellent natural triangulation station, as it overlooks the American, Salt Lake, and Aqua Frio valleys and the Johnson Basin. It is easily ascended by following the Forest Service trail from Jewett Gap. The station is marked with a U. S. Geological Survey standard bronze triangulation tablet in a 6- by 8- by 24-inch stone buried in the ground over which was built a rock cairn 4 feet high.

Plane coordinates: (W), x=236,208 feet; y=1,120,792 feet.

Apache (U. S. G. S.) (Catron County, U. S. Geological Survey, 1913; 1915).—In T. 4 S., R. 17 W., near the corner of sections 21, 22, 27, and 28, approximately, on the west end of the Apache Mountain, about 3 miles southeast of the Jewett Ranger Station, and 7 miles northwest of the village of Aragon. The station can be easily reached from the Jewett Ranger Station. The station mark is an oak tree 15 feet high carrying a flag. Around the base of the tree a quadripod of poles was built.

Plane coordinates: (W), x=261,238 feet; y=1,073,612 feet.

Apache Mountain, south end (U. S. F. S.) (Catron County, L. B. Marr, 1935).—On the southeast end of Apache Mountain, 4½ miles air-line southeast of Jewett Ranger Station, in sec. 34, T. 4 S., R. 17 W., and 4½ miles northwest of the village of Aragon. To reach the station from Apache Creek Post Office, take the road northward 5.7 miles to an abandoned schoolhouse, thence take the trail approximately 2 miles east to the top of the mountain and the station. The station is marked with a standard U. S. Forest Service tablet set in ledge rock and stamped "Apache Mountain South End, 1935." Reference mark No. 1 is 31.4 feet from the station. Reference mark No. 2 is 32.7 feet from the station.

Plane coordinates: (W), x=265,966 feet; y=1,061,000 feet.

John Kerr (U. S. F. S.) (Catron County, L. B. Marr, 1935).—Center of U. S. Forest Service steel lookout tower, on the southeast point of the mountain in T. 6 S., R. 16 W. To reach the station from Apache Creek Post Office, take the road eastward 13.8 miles to the station and lookout tower. The station is marked with a standard U. S. Forest Service tablet set in a large boulder and stamped "John Kerr, 1935." Reference mark No. 1 is 24.6 feet from the station. Reference mark No. 2 is 20.62 feet from the station.

Plane coordinates: (W), x=305,500 feet; y=1,020,177 feet.

T. 5 S., R. 17 W., southeast corner (U. S. F. S.) (Catron County, U. S. Forest Service, 1935).—Plane coordinates: (W), x=280,618 feet; y=1,027,834 feet.

T. 5 S., R. 17 W., section 32, southeast corner (U. S. F. S.) (Catron County,

For notes in regard to marking of stations see p. 90.

U. S. Forest Service, 1935).—Plane coordinates: (W), $x=259,729$ feet; $y=1,027,921$ feet.

Mangus (U. S. F. S.) (Catron County, L. B. Marr, 1935).—Center of U. S. Forest Service steel lookout tower on the highest point on Mangus Mountain in the central portion of T. 3 S., R. 14 W., approximately 8 miles air line south to the village of Mangus. The station may be reached from Mangus, as follows: take the road southward approximately 5.4 miles to the Mangus Ranger Station, thence 4.1 miles south to an intersection with a road to the Mangus Lookout Tower, thence northeasterly 3.7 miles to lookout tower and station. The station is marked with a standard U. S. Forest Service tablet set in a boulder and stamped "Mangus 1935." Reference mark No. 1 is 19.2 feet from the station. Reference mark No. 2 is 14.4 feet from the station.

Plane coordinates: (W), $x=356,680.88$ feet; $y=1,110,589.11$ feet.

El Caso (U. S. F. S.) (Catron County, L. B. Marr, 1935).—Under the center of U. S. Forest Service Steel lookout tower on top of a flat ridge, in Section 27, T. 2 S., R. 16 W. To reach the station from Jewett Ranger Station, take the road northeasterly approximately 13 miles to telephone line, thence take road northwest approximately 3 miles to the tower and the station. The station is marked with standard U. S. Forest Service tablet set in a large boulder and stamped "El Caso 1935." Reference mark No. 1 is 46.25 feet from the station. Reference mark No. 2 is 56.6 feet from the station.

Plane coordinates: (W), $x=299,770.86$ feet; $y=1,129,530.87$ feet.

ADDENDA

THIRTY-FIFTH PARALLEL

Supplementary points

Oil Derrick (Deaf Smith County, Tex., E. O. Heaton, 1921).—Plane coordinates:[1] (E), $x=905,121$ feet; $y=1,522,199$ feet.

Glenrio, water tank (Deaf Smith County, Tex., E. O. Heaton, 1921).—Plane coordinates:[1] (E), $x=886,191$ feet; $y=1,522,774$ feet.

Springerville, red roof church, brown steeple (Apache County, Ariz., C. L. Garner, 1920).—This station is incorrectly shown on sketches 18 and 19 as Egar, red roof church, brown steeple.

Plane coordinates:[1] (W), $x=61,883$ feet; $y=1,142,626$ feet.

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC

Supplementary point

Conical peak (Hudspeth County, Tex., W. R. Porter, 1934).—Plane coordinates: (C), $x=717,520.82$ feet; $y=362,574.86$ feet.

[1] No check on this position.

For notes in regard to marking of stations see p. 90.

ADDENDA—Continued

THIRTY-FIFTH PARALLEL ARC

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points	° ′ ″	° ′ ″	° ′ ″				
Oil derrick (Tex.), 1921 (n. d.) [1]	35 10 34.81	110 09 19	289 59 35	Canadian	4.435624	27,266.2	89,456
	102 58 39.78	267 43 58	87 47 53	Harwell	4.014156	10,331.3	33,895
Glenrio, water tank (Tex.), 1921 (n. d.) [1]	35 10 42.99	114 42 43	394 35 10	Canadian	4.339162	21,835.4	71,638
	103 02 27.68	269 24 44	89 30 51	Harwell	4.206569	16,090.5	52,790
Springerville, red roof church, brown steeple (Ariz.), 1920 (n. d.).[1]	34 07 56.40	54 12 12	234 01 21	Ords	4.566358	36,843.3	120,877
	109 16 51.86	85 16 37	265 06 46	Green	4.432986	27,101.0	88,914

HOT WELLS, TEX., TO SANTA ROSA, N. MEX., ARC

Supplementary point							
Conical peak (Tex.), 1934 (n. d.)	31 59 41.642	302 01 32.8	122 07 49.6	Powell	4.343957	22,077.9	72,434
	105 32 54.053	314 18 19.9	134 27 44.3	Quail	4.594614	39,320.0	129,002
		327 28 24.6	147 36 21.8	Antelope	4.646766	44,337.0	145,462

[1] No check on this position.

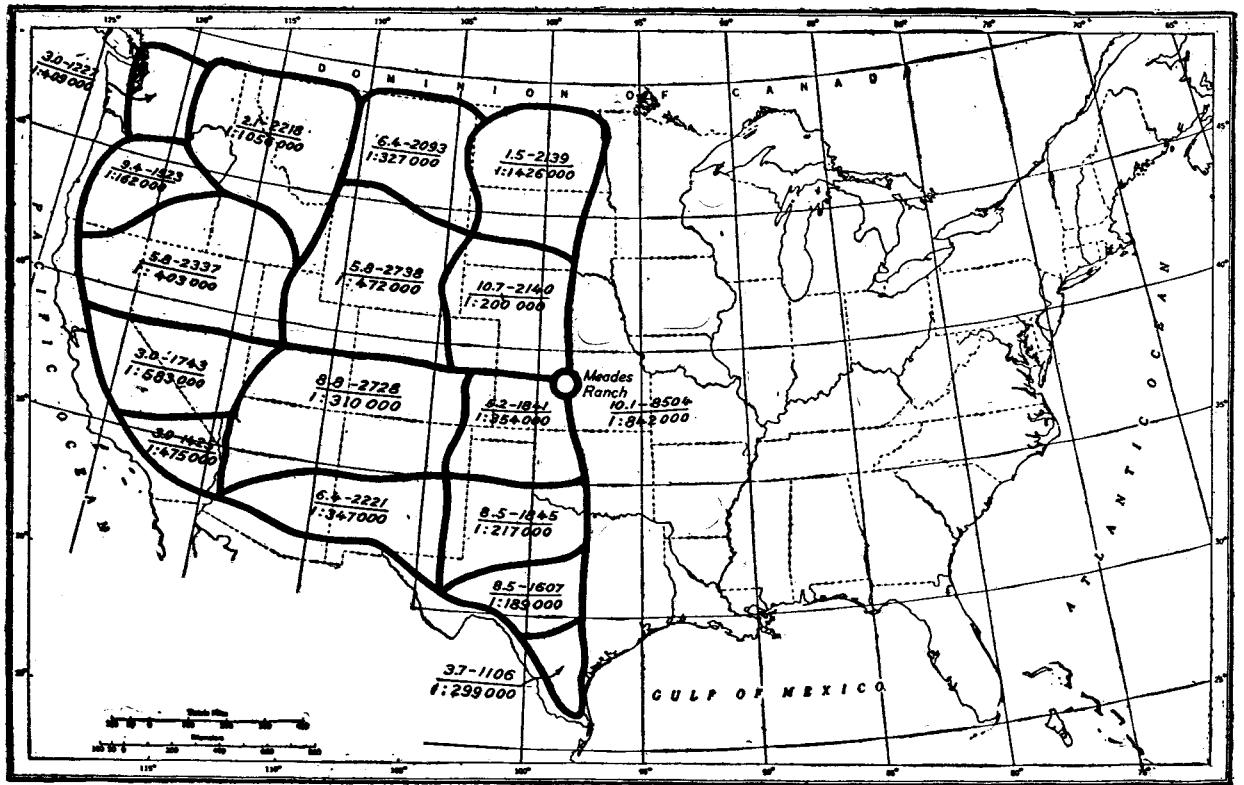

FIGURE 5.—Arcs included in western adjustment and loop closures.

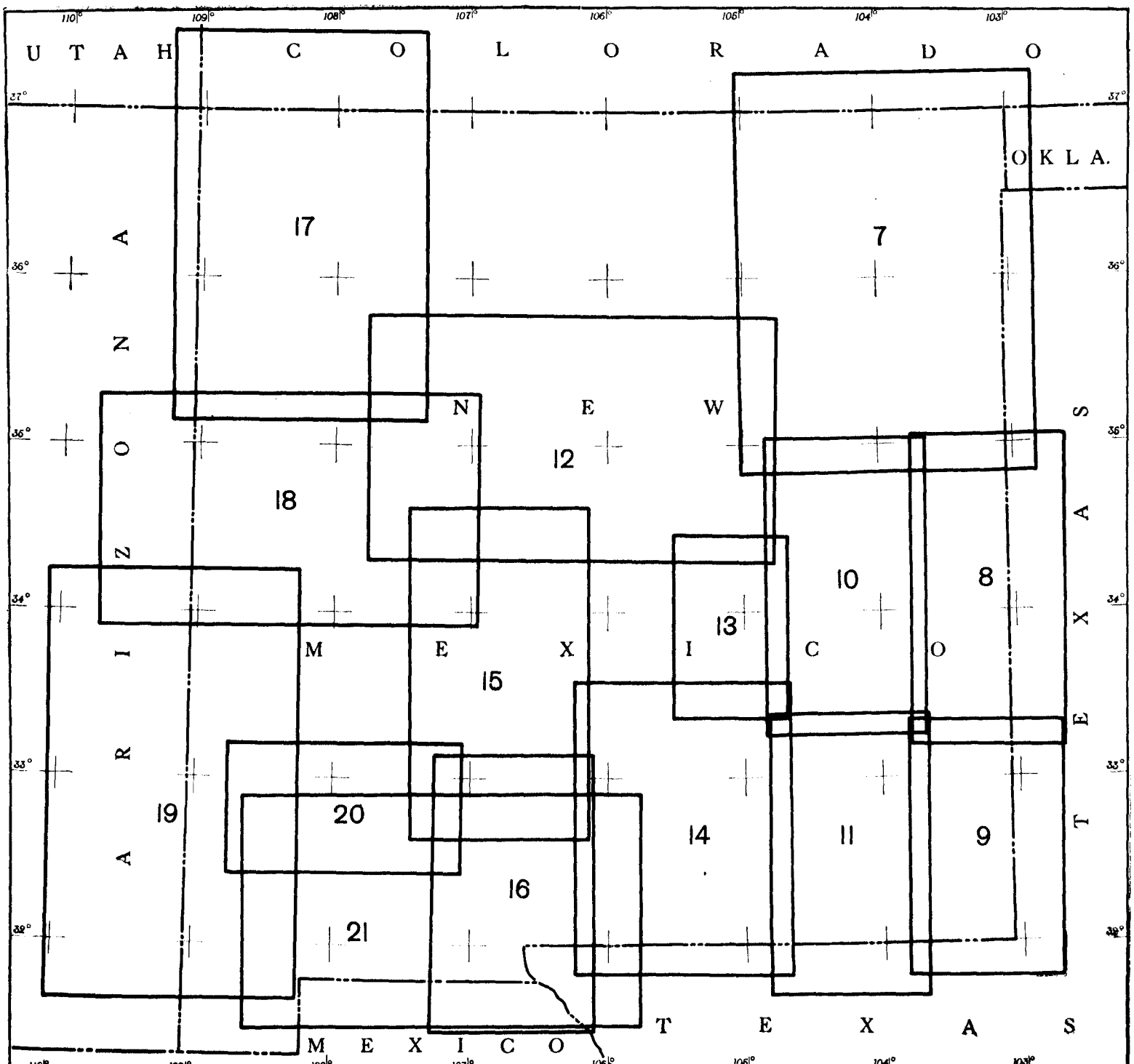

FIGURE 6.—Index map of New Mexico showing areas covered by the following sketches, figures 7 to 21.

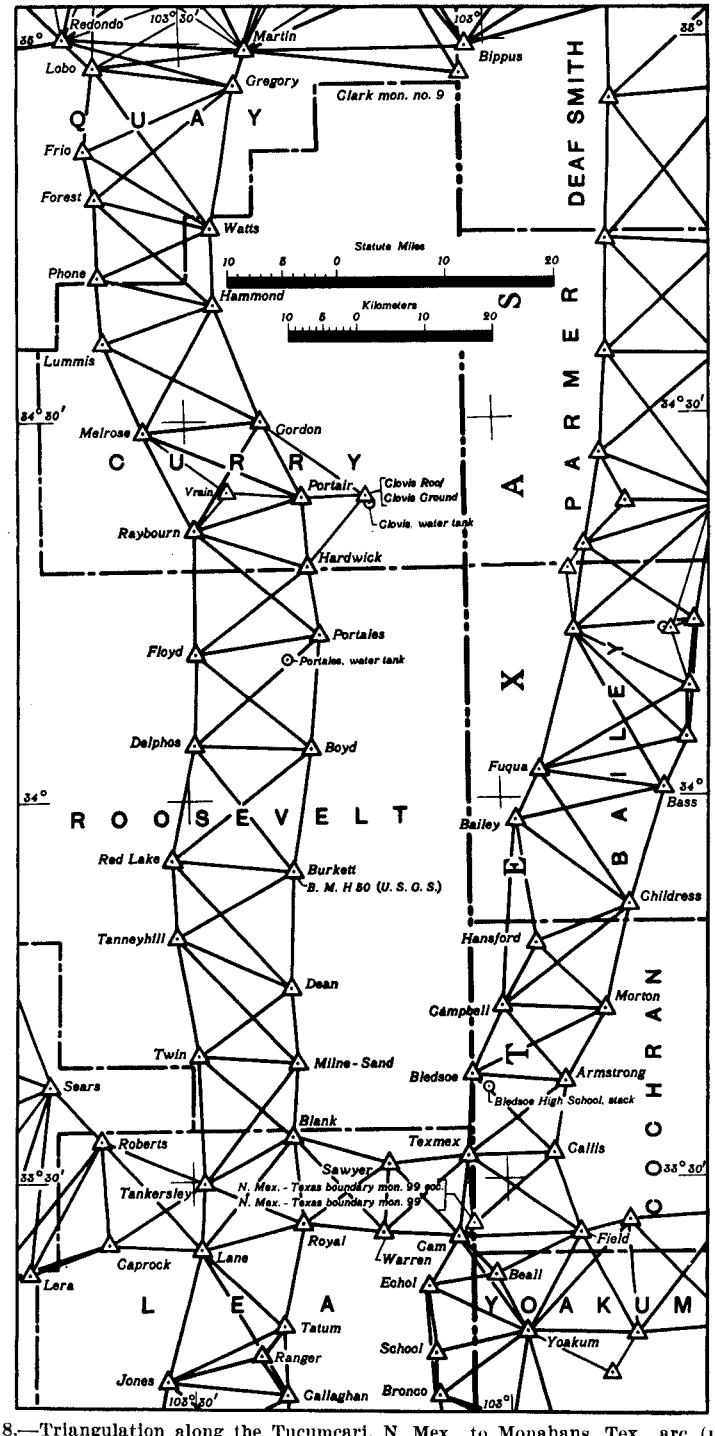

FIGURE 8.—Triangulation along the Tucumcari, N. Mex., to Monahans, Tex., arc (northern and southern sections); Vega, Tex., to Odessa, Tex., arc (northern and southern sections); and the Picacho, N. Mex., to Slaton, Tex., arc.

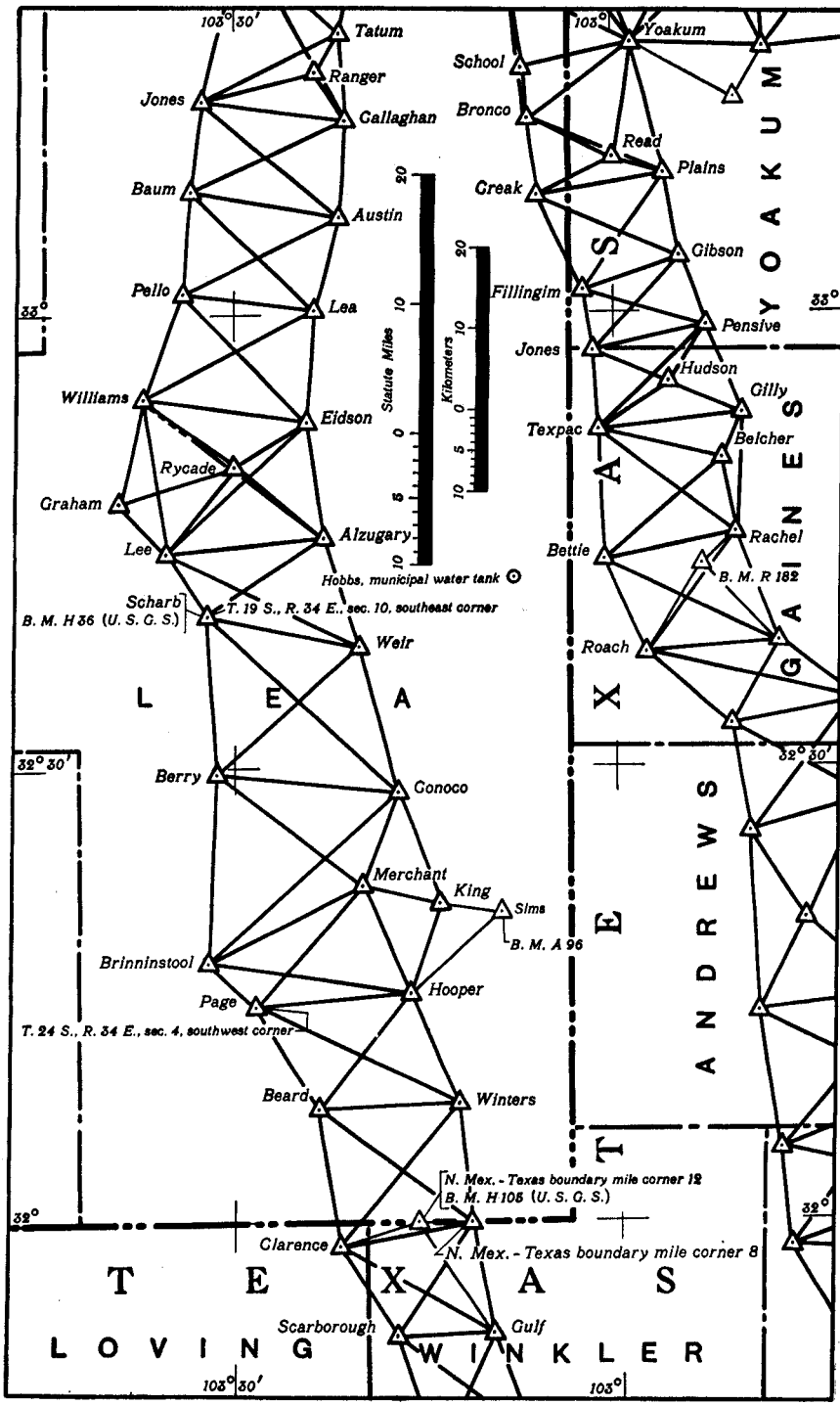

FIGURE 9.—Triangulation along the Tucumcari, N. Mex., to Monahans, Tex., arc (southern section) and the Vega, Tex., to Odessa, Tex., arc (southern section).

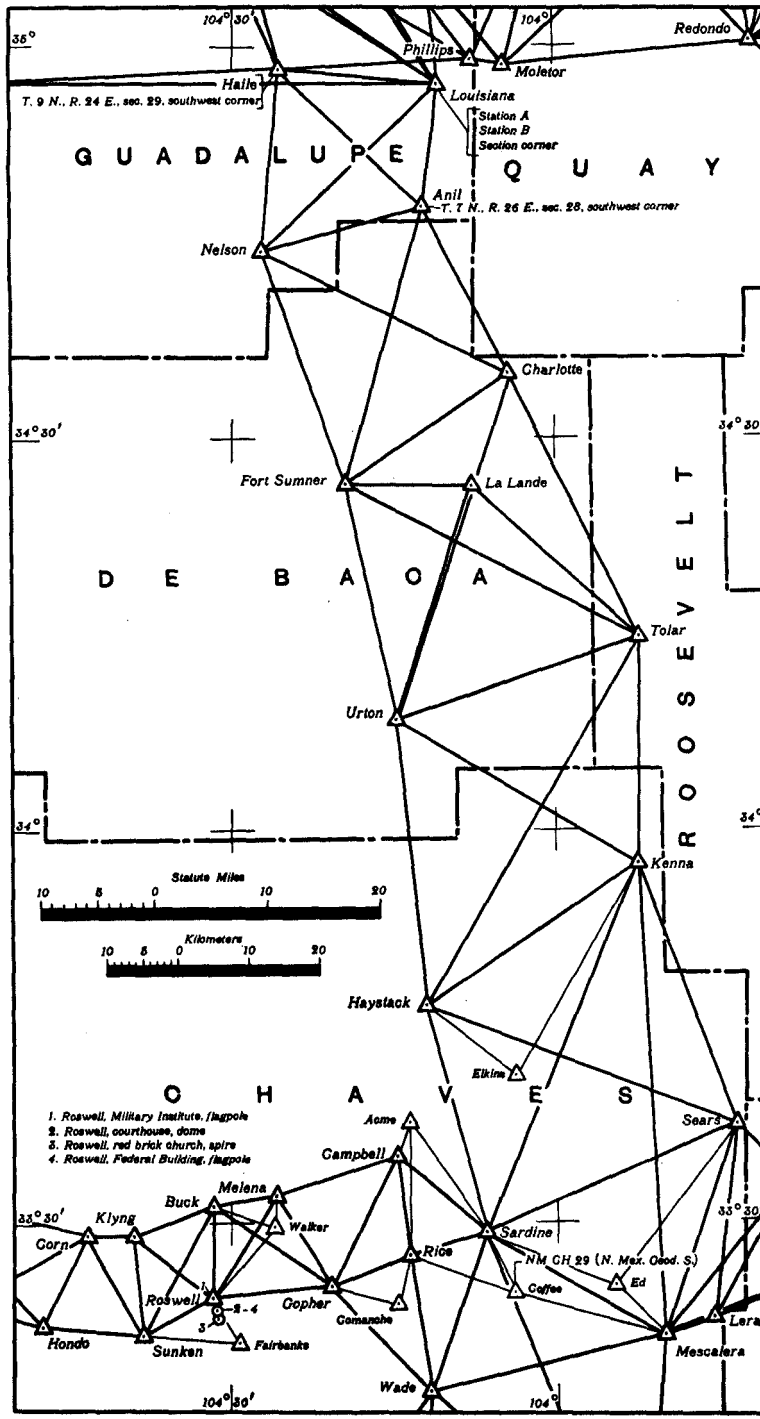

FIGURE 10.—Triangulation along the thirty-fifth parallel arc; one-hundred-and-fourth meridian arc; and the Picacho, N. Mex., to Slaton, Tex., arc.

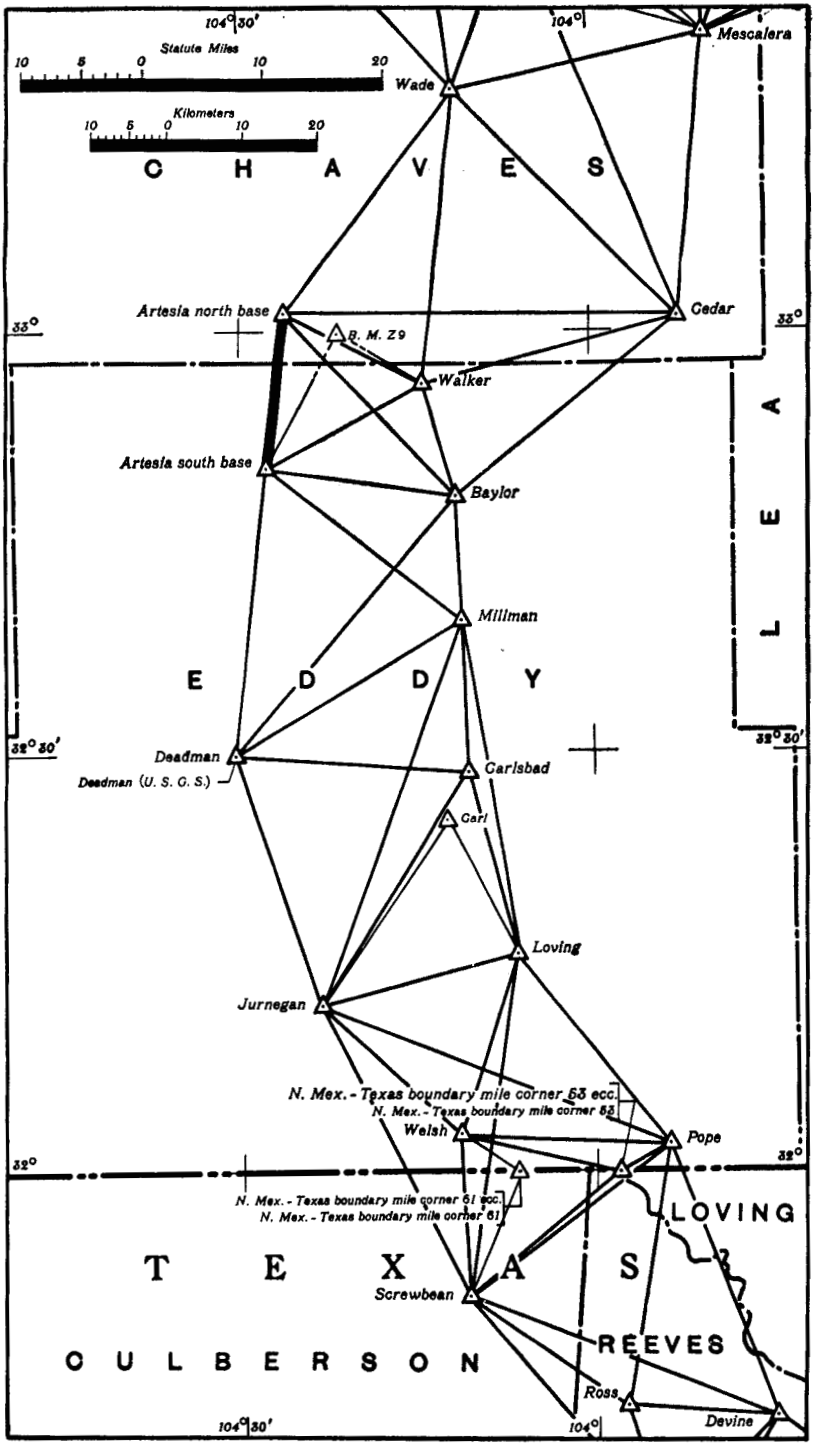

FIGURE 11.—Triangulation along the one-hundred-and-fourth meridian arc.

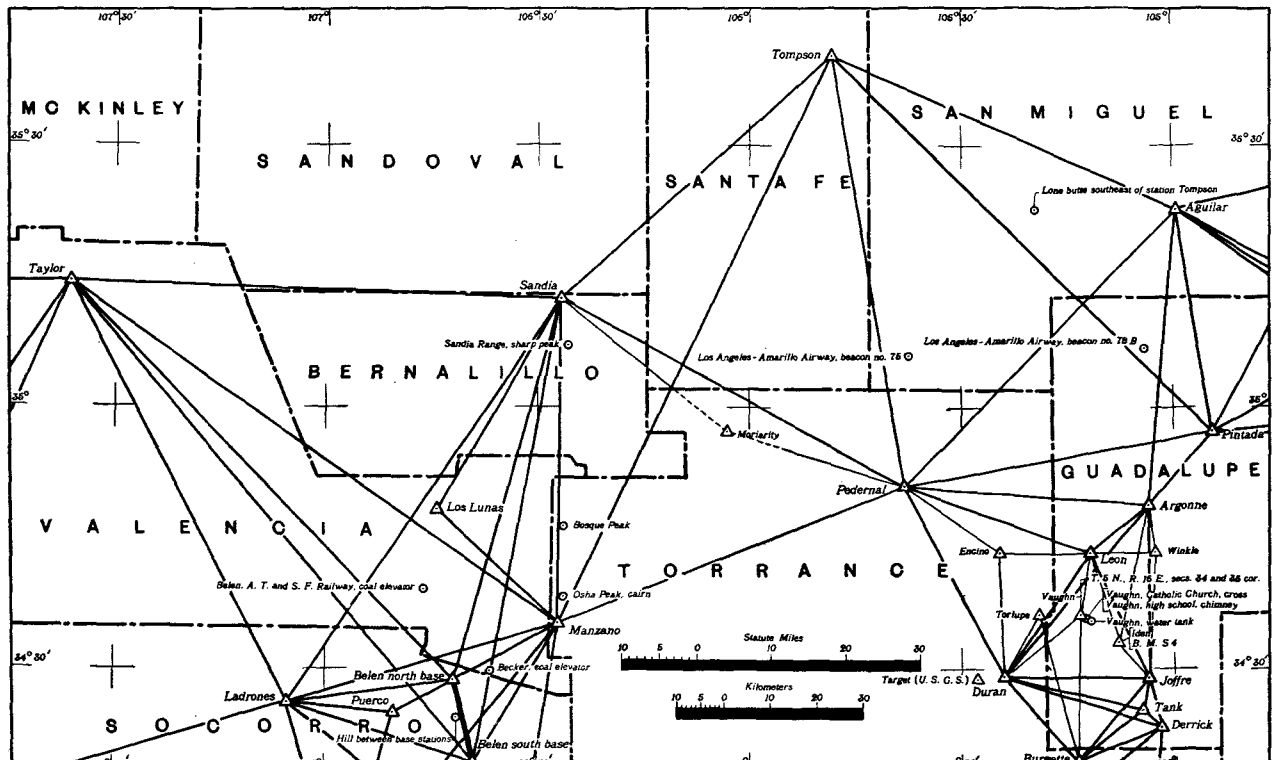

FIGURE 12.—Triangulation along the thirty-fifth parallel arc; Hot Wells, Tex., to Santa Rosa, N. Mex., arc; and the Las Cruces to Belen arc.

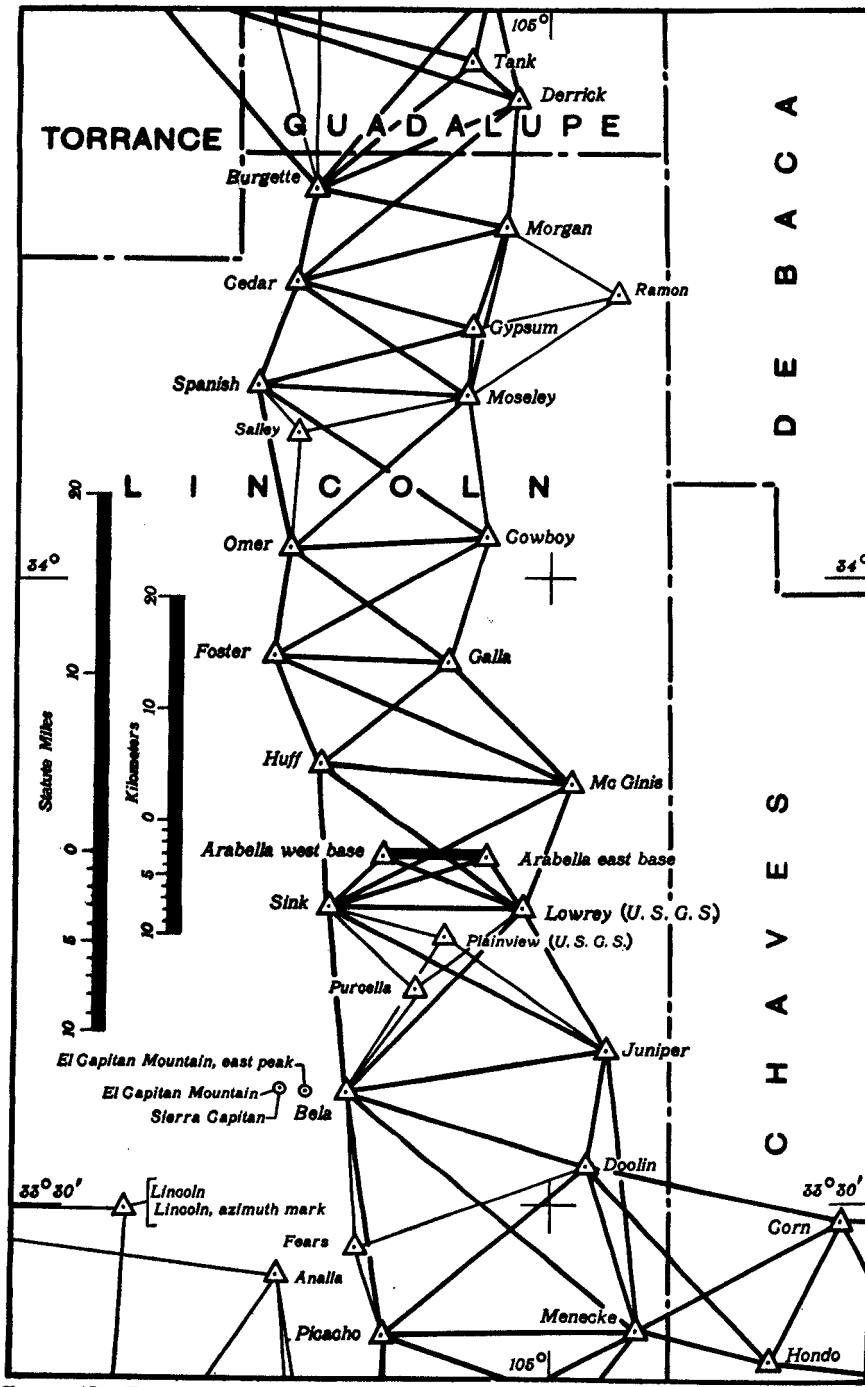

FIGURE 13.—Triangulation along the Hot Wells, Tex., to Santa Rosa, N. Mex., arc; and the Picacho, N. Mex., to Slaton, Tex., arc.

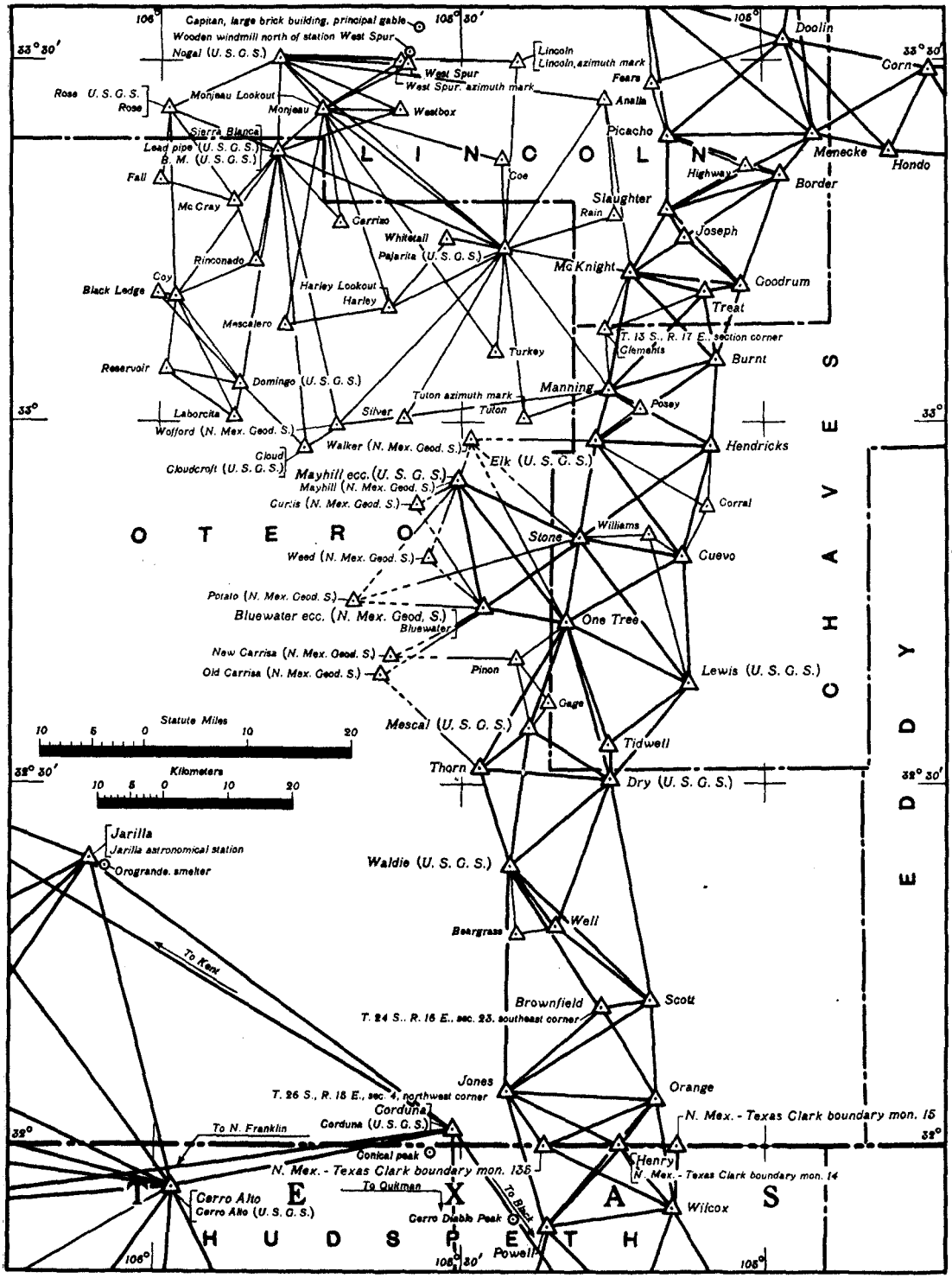

FIGURE 14.—Triangulation along the Texas-California arc; Hot Wells, Tex., to Santa Rosa, N. Mex., arc; Picacho, N. Mex., to Slaton, Tex., arc; and in the Mescalero Indian Reservation area.

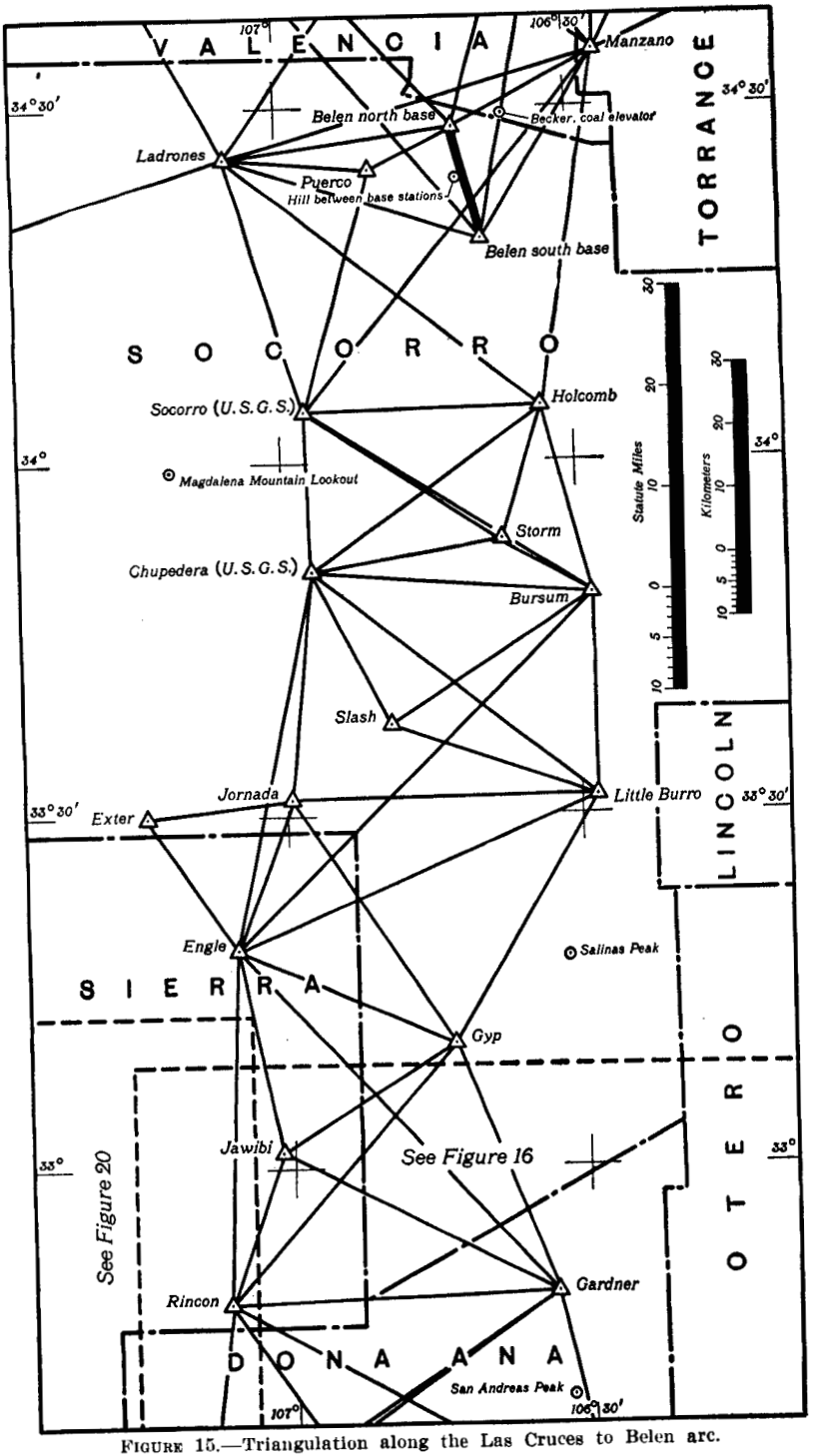

FIGURE 15.—Triangulation along the Las Cruces to Belen arc.

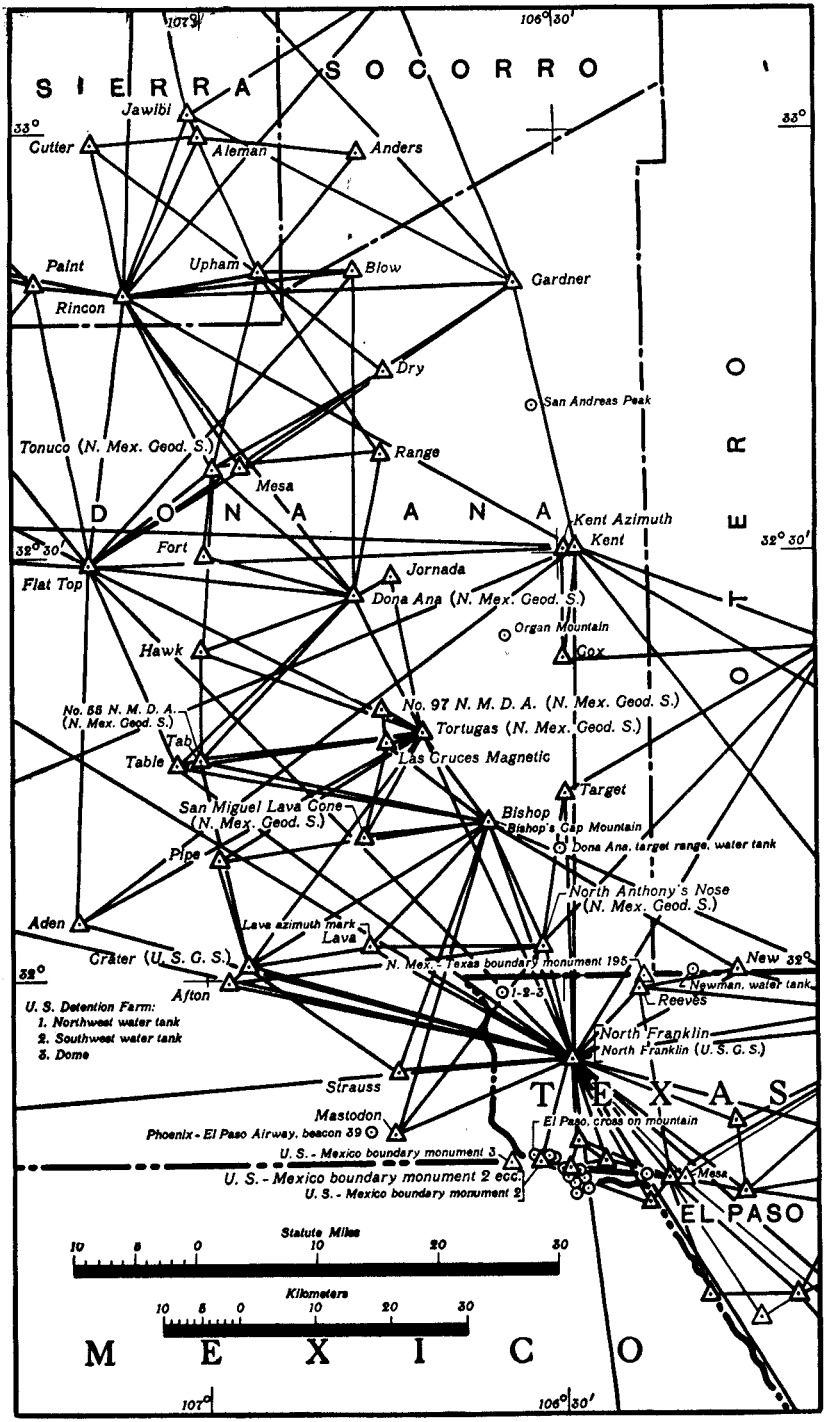

FIGURE 16.—Triangulation along the Texas-California arc; Las Cruces to Belen arc; and in the Lower Rio Grande area.

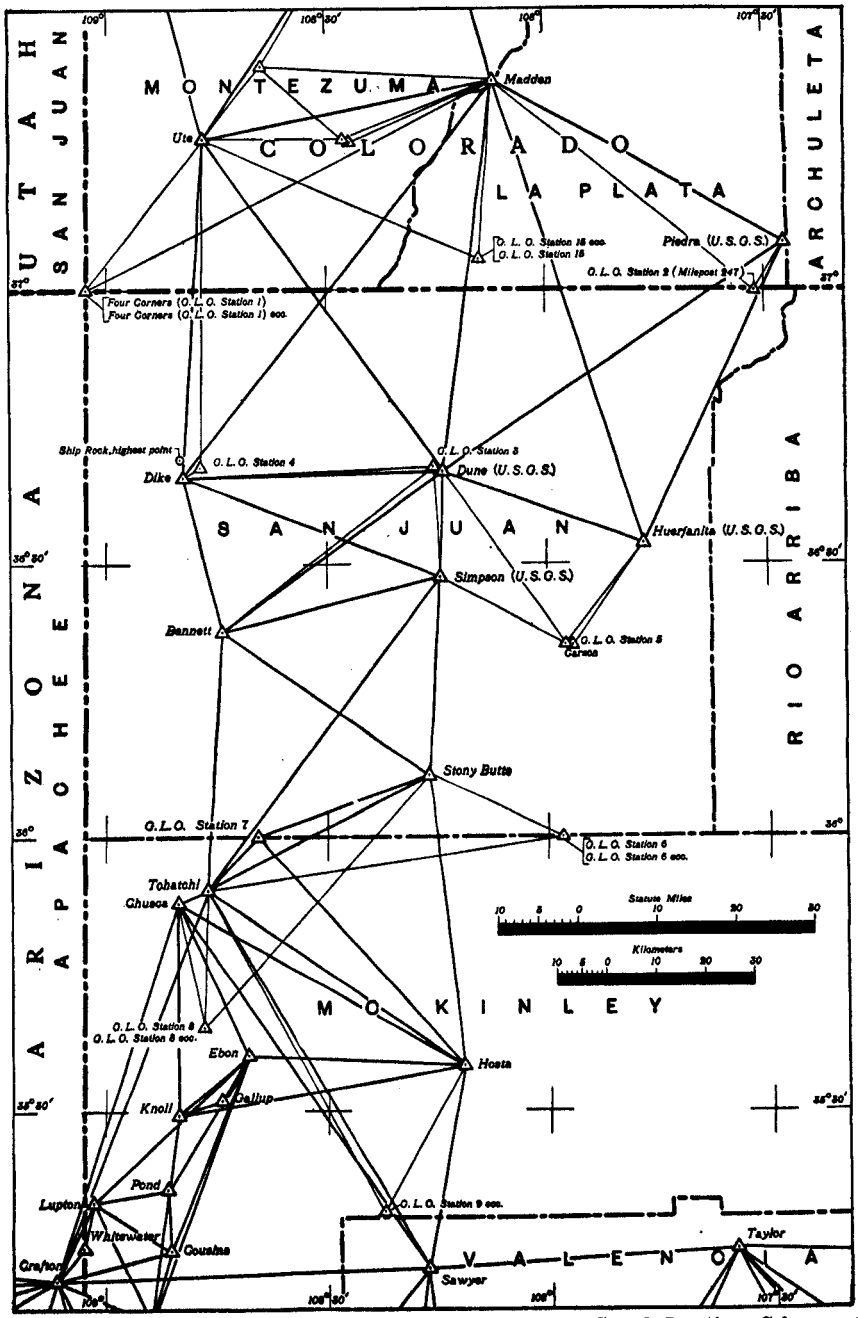

FIGURE 17.—Triangulation along the Lordsburg, N. Mex., to Grand Junction, Colo., arc; and the thirty-fifth parallel arc.

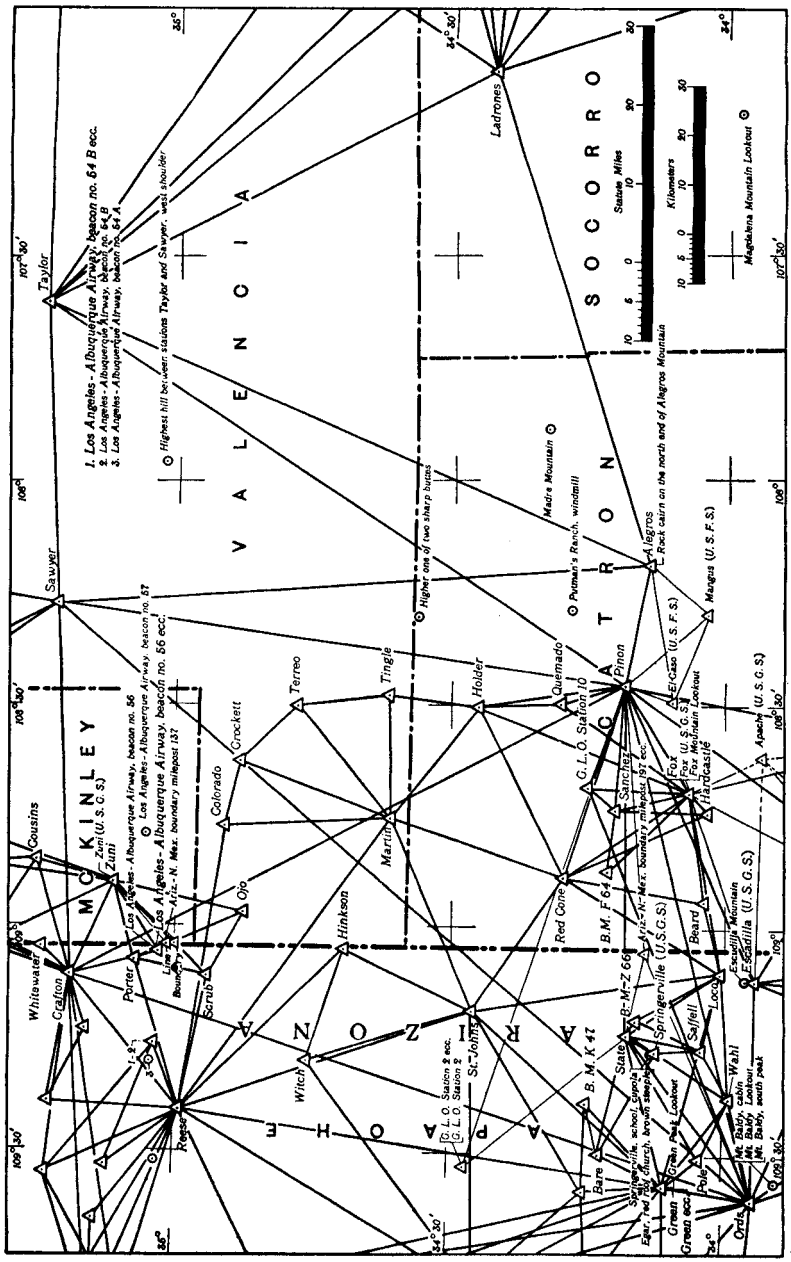

FIGURE 18.—Trianglation along the thirty-fifth parallel arc; Lordsburg, N. Mex., to Grand Junction, Colo., arc; and in the Little Colorado River area; and Apache National Forest area.

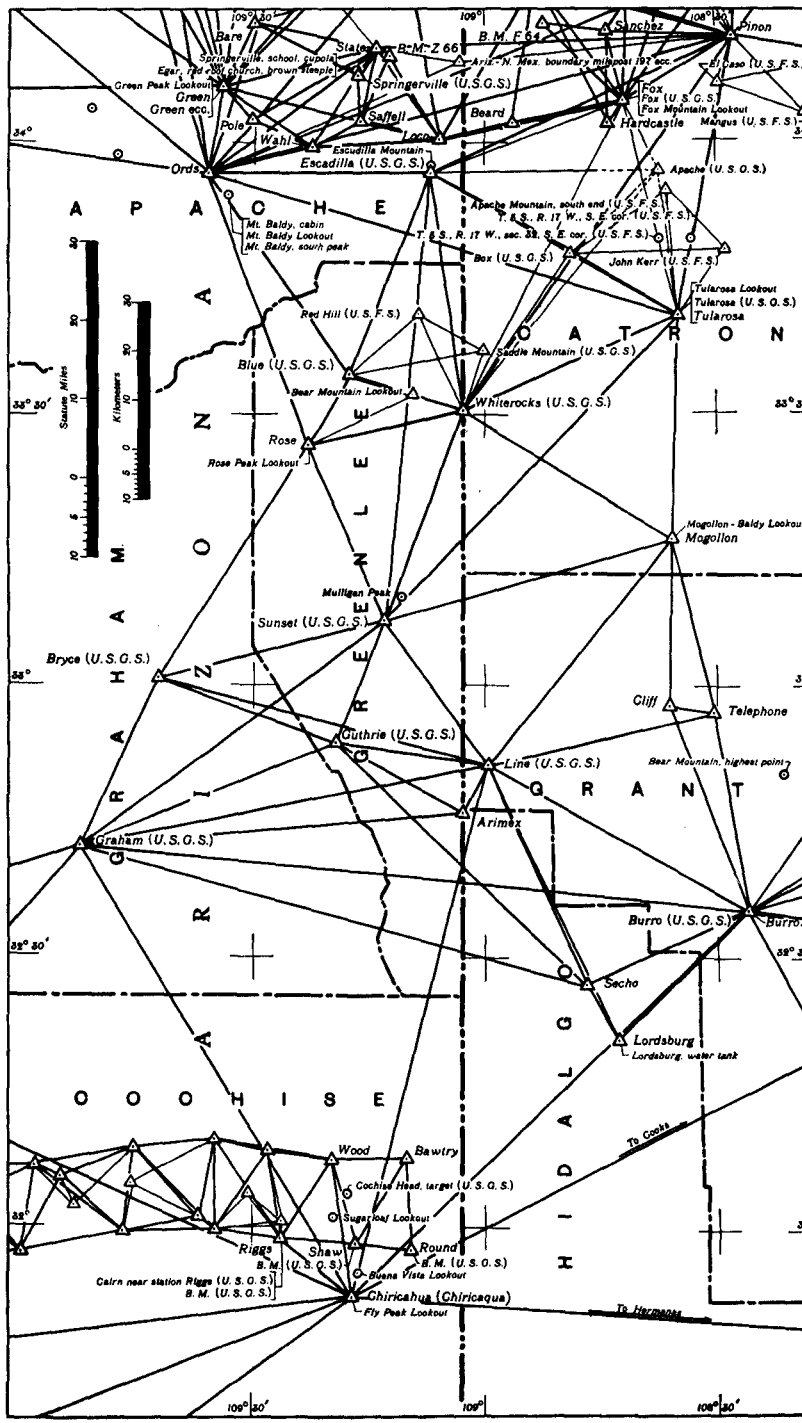

FIGURE 19.—Triangulation along the Texas-California arc; Lordsburg, N. Mex., to Grand Junction, Colo., arc; thirty-fifth parallel arc; and in the Little Colorado River area; and Apache National Forest area.

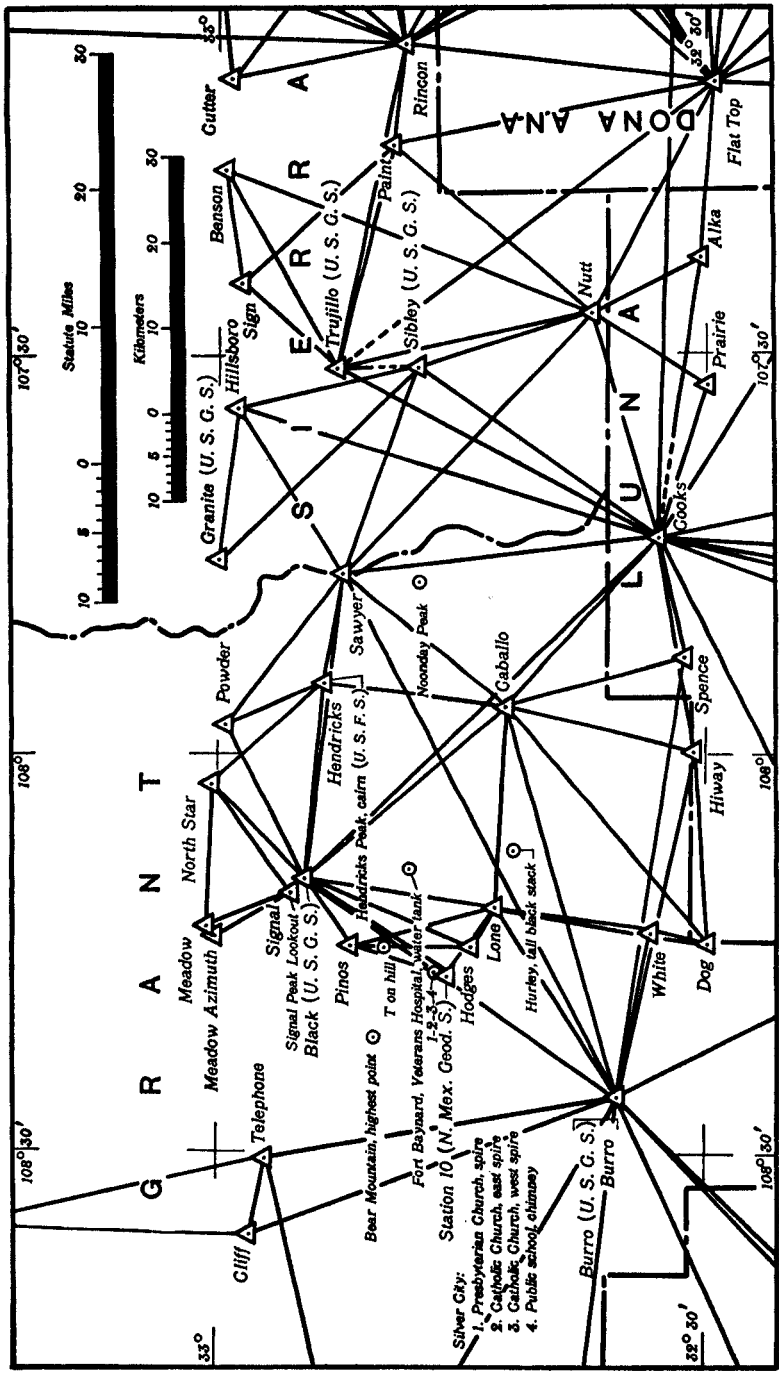

FIGURE 20.—Triangulation along the Texas-California arc; and in the Lower Rio Grande area.

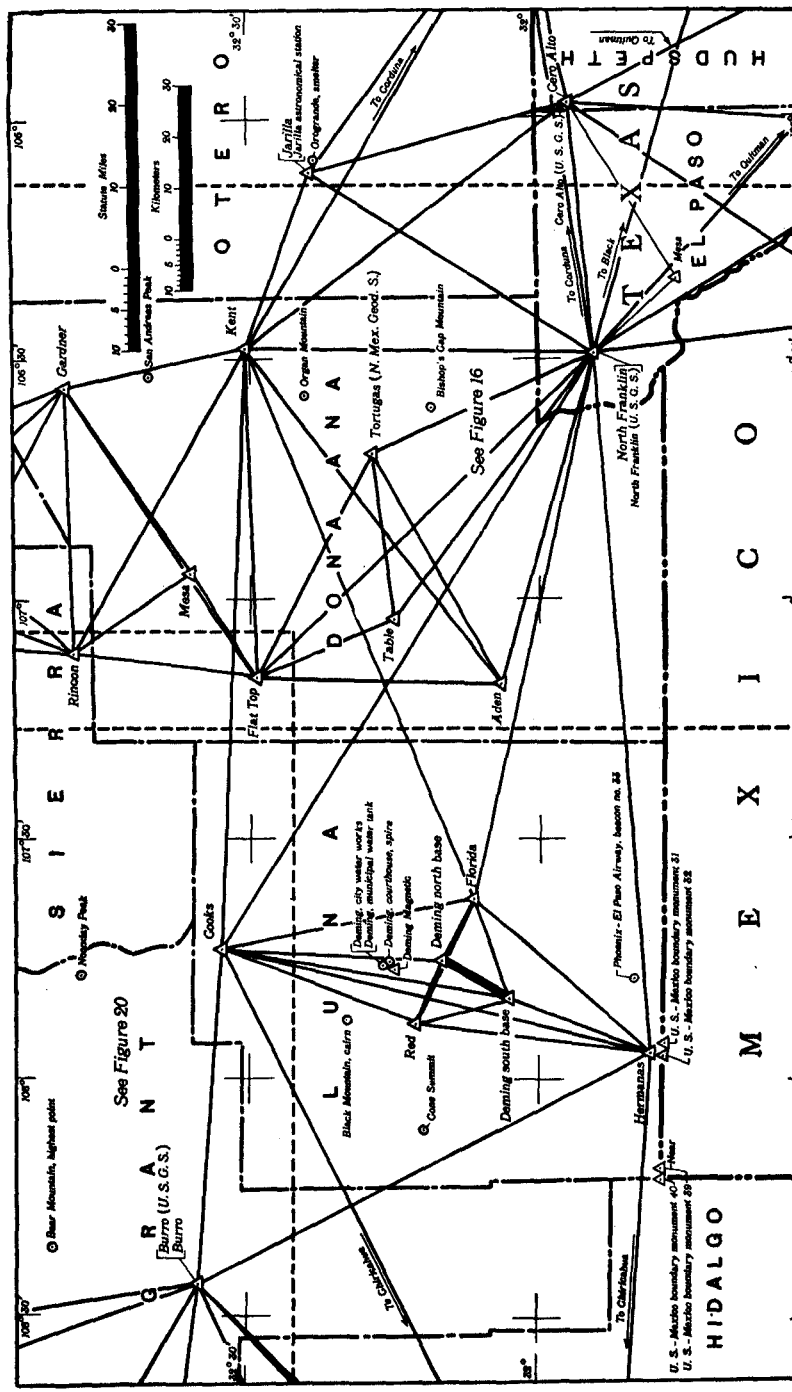

FIGURE 21.—Triangulation along the Texas-California arc; and the Las Cruces to Belen arc.

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Station	Geographic position	Description and/or plane coordinates	Elevation	Sketch
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Afton	59	209		16
Aguilar	23	129	129	7, 12
Alegros	23	131	131	18
Alegros Mountain, rock cairn on north end of	25	134		18
Aleman	61	214		16
Alka	62	217		20
Alzugary	84	269		9
Amistad	76	249		7
Analla	72	237		13, 14
Anders	61	215		16
Anil	27	137	137	10
Apache (U. S. G. S.)	87	275		18, 19
Apache Mountain, south end (U. S. F. S.)	87	275		19
Arabella east base	37	159		13
Arabella west base	37	159		13
Argonne	39	165		12
Arimex (Ariz.-N. Mex.)	54	197		19
Arizona—New Mexico boundary milepost:				
No. 137	71	236		18
No. 197 eccentric (Ariz.)	70	235		18, 19
Armstrong (Tex.)	48	185		8
Artesia north base	28	140	140	11
Artesia south base	28	140	140	11
Astronomical station:				
Jarilla	20	124		14, 21
Kidder	32	146		7
Atchison, Topeka & Santa Fe Railway, Belen, coal elevator	25	134		12
Austin	85	271		9
Azimuth mark, Lava	65	223		16
Bailey (Tex.)	47	183		8
Baldy-Mogollon Lookout	57	204		19
Bare (Ariz.)	67	227		18, 19
Bass (Tex.)	47	183		8
Baum	85	271		9
Bawtry (Ariz.) [1]				19
Baylor	28	140	140	11
Beacon No.:				
33, Phoenix-El Paso Airway	66	223		21
39, Phoenix-El Paso Airway	64	223		16
54A, Los Angeles-Albuquerque Airway (Ariz.)	71	236		18
54B, eccentric, Los Angeles-Albuquerque Airway (Ariz.)	66	224		18
54B, Los Angeles-Albuquerque Airway (Ariz.)	71	236		18
56 eccentric, Los Angeles-Albuquerque Airway (Ariz.)	69	232		18
56, Los Angeles-Albuquerque Airway (Ariz.)	71	236		18
57, Los Angeles-Albuquerque Airway	71	236		18
75, Los Angeles-Amarillo Airway	43	173		12
78B, Los Angeles-Amarillo Airway	43	173		12
81A, Los Angeles-Amarillo Airway	43	173		7
81B, Los Angeles-Amarillo Airway	43	173		7
82, Los Angeles-Amarillo Airway	43	173		7
83, Los Angeles-Amarillo Airway	82	263		7
84, Los Angeles-Amarillo Airway	82	263		7
85, Los Angeles-Amarillo Airway	79	256		7
86, Los Angeles-Amarillo Airway	79	256		7
87, Los Angeles-Amarillo Airway	79	256		7
88, Los Angeles-Amarillo Airway	79	256		7
89, Los Angeles-Amarillo Airway (Tex.)	79	256		7
Beall (Tex.)	46	181		8
Bear Mountain, highest point	21	125	125	19, 20, 21
Bear Mountain Lookout (Ariz.)	57	204		19
Beard (Catron County)	68	230		18, 19
Beard (Lea County)	83	265		9
Beargrass	40	166		14
Becker, coal elevator	25	133		12, 51

[1] The east-west arc in Cochise County, Ariz., is not included in this publication.

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Belcher	49	187		9
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Belen base stations, hill between	25	133		12, 15
Belen north base	23	131	131	12, 15
Belen south base	23	131	131	12, 15
Bell	76	249		7
Bench mark:				
A 96	86	274		9
F 64	68	229		18, 19
H 36 (U. S. G. S.)	86	274		9
H 50 (U. S. G. S.)	82	264		8
H 105 (U. S. G. S.)	86	273		9
K 47 (Ariz.)	67	227		18
N 106	78	254		7
R 182 (Tex.)	51	191		9
S 4	42	171	171	12
U. S. G. S., near station Riggs (Ariz.)[1]				19
U. S. G. S., near station Round (Ariz.)[1]				19
U. S. G. S., near station Shaw (Ariz.)[1]				19
U. S. G. S., near station Sierra Blanca	75	245	245	14
Z 9	31	144	144	11
Z 66 (Ariz.)	67	226		18, 19
Bennett	56	201		17
Benson	62	217		20
Berry	83	267		9
Bettie (Tex.)	49	186		9
Bippus (Tex.)	21	125	125	7, 8
Bishop	58	207		16
Bishop's Cap Mountain	53	196		16, 21
Black (Tex.)	18	118	118	
Black (U. S. G. S.)	62	218		20
Black Ledge	73	243		14
Black Mountain, cairn	20	124	124	21
Blank	45	178		8
Bledsoe (Tex.)	48	185		8
Bledsoe High School, stack (Tex.)	48	185		8
Blow	61	213		16
Blue (U. S. G. S.) (Ariz.)	55	199		19
Bluewater (N. Mex. Geodetic Survey)	40	167		14
Bluewater eccentric (N. Mex. Geodetic Survey)	35	153		14
B. M. (*see* bench mark)				
Booster Station:				
Black water tank, finial	33	147		7
Galvanized tank on red platform, center	33	147		7
Border	36	156		14
Bosque Peak	24	133		12
Boundary (N. Mex.-Ariz.)	71	236		18
Boundary mile corner:				
53 eccentric, New Mexico-Texas (Tex.)	29	142	142	11
53, New Mexico-Texas	31	145		11
61 eccentric, New Mexico-Texas (Tex.)	31	145	145	11
61, New Mexico-Texas	31	145		11
306, New Mexico-Texas	33	147		7
No. 8 (Clark), New Mexico-Texas	83	265		9
No. 12 (Clark), New Mexico-Texas	86	273		9
Boundary milepost No.:				
1, New Mexico-Texas	33	147		7
4 eccentric, New Mexico-Texas	32	146		7
4, New Mexico-Texas	33	147		7
137, Arizona-New Mexico	71	236		18
197 eccentric, Arizona-New Mexico (Ariz.)	70	235		18, 19
247, New Mexico-Colorado (G. L. O. Station 2)	58	206		17
313, Colorado-New Mexico	29	143		7
328 eccentric, New Mexico-Colorado	26	135	135	7
328 (old), New Mexico-Colorado	30	143		7
Boundary Monument (1900) (Colo.-N. Mex.-Okla.)	30	143	143	7
Boundary Monument No.:				
2 eccentric, United States and Mexico (Mexico)	59	208		16
2, United States and Mexico	64	222		16
3, United States and Mexico	64	222	222	16
9, Clark, New Mexico-Texas	21	126		7, 8
14, Clark, New Mexico-Texas	39	166		14
15, Clark, New Mexico-Texas	34	149		14
31, United States and Mexico	21	125	125	21
32, United States and Mexico	21	125	125	21

[1] The east-west arc in Cochise County, Ariz., is not included in this publication.

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40, United States and Mexico	21	125	125	21
99, Clark, Texas-New Mexico	49	186		8
99 eccentric, Clark, Texas-New Mexico	49	185		8
135, Clark, New Mexico-Texas	34	148		14
195, Texas-New Mexico	65	223		16
Boundary (old) (M. C. 1881), New Mexico-Colorado	30	143		7
Boyd	81	260		8
Box (U. S. G. S.)	87	275		19
Brinninstool	83	267		9
Bronco	50	190		8, 9
Brown	77	253		7
Brownfield	34	149		14
Bryce (U. S. G. S.) (Ariz.)	54	197		19
Buck	44	175		10
Buena Vista Lookout (Ariz.) [1]				19
Burgette	39	163		12, 13
Burkett	81	261		8
Burnt	36	154		14
Burro	19	122	122	19, 20, 21
Burro (U. S. G. S.)	53	196		19, 20, 21
Bursum	52	194		15
Caballo	62	218		20
Cabin, Mt. Baldy (Ariz.)	70	235		18, 19
Cairn:				
Alegros Mountain, rock on north end of	25	134		18
Black Mountain	20	124	124	21
Corduna (U. S. G. S.)	19	123		14
Hendricks Peak (U. S. F. S.)	65	223		20
Laughlin (U. S. G. S.)	30	144		7
North Franklin (U. S. G. S.) (Tex.)	20	124		16, 21
Osha Peak	25	133		12
Quitman (U. S. G. S.) (Tex.)	19	123		
Rose (U. S. G. S.), cairn	75	245		14
U. S. G. S., near station Riggs (Ariz.) [1]				19
Callaghan	85	272		8, 9
Callis (Tex.)	48	185		8
Cam	46	179		8
Campbell	45	176		10
Campbell (Tex.)	48	184		8
Canadian	21	126	126	7
Capitan, large brick building, principal gable	74	245		14
Caprock	45	177		8
Carl	81	262		7
Carl	31	144	144	11
Carlsbad	29	141	141	11
Carriso	26	136	136	7
Carrizo	73	241		14
Carson	57	205		17
Catholic Church:				
Silver City, east spire	66	223		20
Silver City, west spire	66	223		20
Vaughn, cross	43	172		12
Cedar (Chaves County)	28	140	140	11
Cedar (Lincoln County)	38	163		13
Centerville	77	250		7
Cerro Alto (Tex.)	18	120	120	14, 21
Cerro Alto (U. S. G. S.) (Tex.)	19	123		14, 21
Cerro Diablo Peak (Tex.)	39	166		14
Charlotte	27	137	137	10
Childress (Tex.)	47	183		8
Chimney:				
Silver City, public school	66	223		20
Vaughn, high school	42	172		12
Chiricahua (Chiricaqua) (Ariz.)	19	122	122	19
Chiricaqua (*see* Chiricahua).				
Chupedera (U. S. G. S.)	52	194		15
Church:				
Roswell, red brick, spire	46	181		10
Silver City, Catholic, east spire	66	223		20
Silver City, Catholic, west spire	66	223		20
Silver City, Presbyterian, spire	66	223		20
Chusca	55	199		17
City water tank, Tucumcari	24	133	133	7

[1] The east-west arc in Cochise County, Ariz., is not included in this publication.

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City waterworks, Deming	20	124	124	21
Clampit	77	252		7
Clapham	76	248		7
Clarence (Tex.)	83	265		9
Clark, boundary mile corner No.:				
8, New Mexico-Texas	83	265		9
12, New Mexico-Texas	86	273		9
Clark boundary monument No.:				
14, New Mexico-Texas	39	166		14
15, New Mexico-Texas	34	149		14
99, Texas-New Mexico	49	186		8
99 eccentric, Texas-New Mexico	49	185		8
135, New Mexico-Texas	34	148		14
Clark Monument No. 9 (Tex.-N. Mex.)	21	126		7, 8
Clark's monument—northwest corner of Texas (N. Mex.-Tex.)	32	146		7
Clay	32	145	145	7
Clayton east base	26	134	134	7
Clayton, municipal water tank (silver), finial	33	147		7
Clayton west base	26	135	135	7
Clements	41	169		14
Cliff	55	198		19, 20
Cloud	73	242		14
Cloudcroft (U. S. G. S.)	75	245		14
Clovis Ground	82	263		8
Clovis Roof	82	263		8
Clovis, water tank	82	264		8
Coal elevator:				
Becker	25	133		12, 15
Belen, Atchison, Topeka & Santa Fe Railway	25	134		12
Cochise Head, target (U. S. G. S.) (Ariz.)[1]				19
Coe	73	239		14
Coffee	47	182		10
Collins (Colo.)	29	143	143	7
Colorado	69	231		18
Colorado-New Mexico boundary milepost No.:				
247 (G. L. O. Station 2)	58	206		17
313	29	143		7
328 eccentric	26	135	135	7
Colorado-New Mexico boundary (old) (M. C. 1881)	30	143		7
Colorado-New Mexico-Oklahoma boundary monument (1900)	30	143	143	7
Colorado-New Mexico old boundary milepost No. 328	30	143		7
Comanche	47	181		10
Comyford	75	246		7
Cone Summit	21	125		21
Conical peak (Tex.)	277	276		14
Conoco	84	267		9
Cook	75	246		7
Cooks	18	120	120	20, 21
Corazon	22	128	128	7
Corduna	18	118	118	14
Corduna (U. S. G. S.), cairn	19	123		14
Corn	44	173		10, 13, 14
Corral	41	168		14
Court magnetic station	78	254		7
Courthouse:				
Roswell, dome	46	181		10
Deming, Luna County, spire	20	124		21
Cousins	69	233		17, 18
Cowboy	38	161		13
Cox	59	210		16
Coy	73	242		14
Crafton (Ariz.)	24	132	132	17, 18
Crater (U. S. G. S.)	59	209		16
Creak	50	190		9
Crockett	69	231		18
Cross on mountain, El Paso	64	223		16
Cross, Vaughn, Catholic Church	43	172		12
Cuevo	35	152		14
Cupola, Springerville, grammar school (Ariz.)	71	235		18, 19
Curtis (N. Mex. Geodetic Survey)	41	168		14
Cutter	61	215		16, 20
De Maya	29	143	143	7
Deadman	29	141	141	11
Deadman (U. S. G. S.)	31	144		11
Dean	81	262		8
Delphos	81	261		8

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Magnetic station	20	124		21
Municipal water tank	20	124		21
North base	19	121	121	21
South base	19	122	122	21
Derrick	39	164		12, 13
Des Moines	26	135	135	7
Des Moines townsite, T. 29 N., R. 29 E., sec. 10, southeast corner	30	143		7
Devine (Tex.)	29	142	142	11
Dike	56	202		17
Dog	64	222		20
Dome:				
Roswell, courthouse	46	181		10
United States Detention Farm (Tex.)	65	223		16
Domingo (U. S. G. S.)	73	242		14
Dona Ana (N. Mex. Geodetic Survey)	60	212		16
Dona Ana, target range, water tank	64	223		16
Doolin	37	157		13, 14
Dora	26	135	135	7
Dripping	22	127	127	7
Dry	61	214		16
Dry (U. S. G. S.)	34	150		14
Dune (U. S. G. S.)	56	202		17
Duran	39	164		12
Ears	78	254		7
East base:				
Arabella	37	159		13
Clayton	26	134	134	7
Ebon	55	200		17
Echol	50	191		8
Ed	47	182		10
Egar (should be Springerville), red roof church, brown steeple (Ariz.)	277	276		18, 19
Eidson	84	269		9
Eklund	32	145	145	7
El Capitan Mountain	42	170		13
El Capitan Mountain, east peak	42	170		13
El Caso (U. S. F. S.)	87	276		18, 19
Elk (U. S. G. S.)	35	154		14
El Paso, cross on mountain	64	223		16
Elkins	31	144	144	10
Encino	43	172		12
Engle	51	193		15
Escadilla (U. S. G. S.) (Ariz.)	55	199		18, 19
Escudilla Mountain (Ariz.)	25	134		18, 19
Exter	52	194		15
Fairbanks	46	181		10
Fall	74	245		14
Fears	41	169		13, 14
Federal Building, Roswell, flagpole	47	181		10
Field (Tex.)	46	180		8
Fillingim (Tex.)	49	189		9
Flagpole:				
Roswell, Federal Building	47	181		10
Roswell, Military Institute	46	181		10
Flat Top	51	192		16, 20, 21
Florida	19	121	121	21
Floyd	80	260		8
Fly Peak Lookout (Ariz.) [1]				19
Forest	79	257		8
Fort	60	212		16
Fort Bayard, Veterans' Hospital, water tank	65	223		20
Fort Sumner	27	137	137	10
Foster	38	161		13
Four Corners (G. L. O. Station 1) (Utah-Colo.-Ariz.-N. Mex.)	58	206		17
Four Corners (G. L. O. Station 1) eccentric (Utah)	58	206		17
Fox	68	228		18, 19
Fox (U. S. G. S.)	87	275		18, 19
Fox Mountain Lookout	71	235		18, 19
Frio	79	257		7, 8
Fuqua (Tex.)	47	183		8

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Galla	37	160		13
Gallup	55	201		17
Gardner	51	193		15, 16, 21
General Land Office (*see* G. L. O.).				
Gibson (Tex.)	50	189		9
Gilly (Tex.)	49	187		9
Glenrio (Tex.-N. Mex.)	21	126	126	7
Glenrio, water tank (Tex.)	277	276		7
G.L.O. Station:				
1 (Four Corners) (Utah-Colo.-Ariz.-N. Mex.)	58	206		17
1 (Four Corners) eccentric (Utah)	58	206		17
2 (Ariz.)	70	235		18
2 (New Mexico-Colorado boundary milepost no. 247)	58	206		17
2 eccentric (Ariz.)	70	235		18
3	57	205		17
4	57	205		17
5	57	205		17
6	57	205		17
6 eccentric	57	204		17
7	55	201		17
8	57	204		17
8 eccentric	57	204		17
9 eccentric	57	204		17
10	68	228		18
15 (Colo.)	58	207		17
15 eccentric (Colo.)	58	206		17
Goodrum	36	156		14
Gopher	44	175		10
Gordon	80	259		8
Graham	85	270		9
Graham (U. S. G. S.) (Ariz.)	19	123	123	19
Grammar school, Springerville, cupola (Ariz.)	71	235		18, 19
Grande	26	135	135	7
Granite (U. S. G. S.)	63	219		20
Green (Ariz.)	24	133	133	18, 19
Green eccentric (Ariz.)	66	224		18, 19
Green Peak Lookout (Ariz.)	70	235		18, 19
Gregory	79	257		7, 8
Grimes	75	245		7
Gulf (Tex.)	83	264		9
Guthrie (U. S. G. S.) (Ariz.)	54	197		19
Gyp	51	193		15
Gypsum	38	162		13
Haile	22	129	129	7, 10
Hammond	80	258		8
Hansford (Tex.)	48	184		8
Hardcastle	68	229		18, 19
Hardwick	80	260		8
Harley	73	241		14
Harley Lookout	75	245		14
Harwell (Tex.)	21	125	125	7
Hawk	60	213		16
Haystack	27	138	138	10
Hendricks (Chaves County)	35	153		14
Hendricks (Grant County)	63	219		20
Hendricks Peak, cairn (U. S. F. S.)	65	223		20
Henry	34	148		14
Hermanas	18	120	120	21
High School:				
Bledsoe, stack (Tex.)	48	185		8
Vaughn, chimney	42	172		12
Higher one of two sharp buttes	25	134		18
Highest hill between stations Taylor and Sawyer, west shoulder	25	134		18
Highway	41	169		14
Highway marker No. 590+00	78	254		7
Hill	22	128	128	7
Hill between Belen base stations	25	133		12, 15
Hill, small butte northwest of station	24	133		7
Hillsboro	63	218		20
Hinkson (Ariz.)	66	225		18
Hiway	64	222		20
Hobbs, municipal water tank	86	274		9
Hodges	63	221		20
Holcomb	52	195		15
Holder	68	228		18

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Hooper	83	266		9
Hoover	32	145	145	7
Hopson	75	247		7
Hosta	55	200		17
Howard	76	247		7
Hudson (Tex.)	49	188		9
Huerf	23	129	129	7
Huerfanita (U. S. G. S.)	56	203		17
Huff	37	160		13
Hurley, tall black stack	65	223		20
Iden	42	171		12
Jarilla	18	119	119	14, 21
Jarilla astronomical station	20	124		14, 21
Jawibi	52	193		15, 16
Joffre	39	165		12
John Kerr (U. S. F. S.)	87	275		19
Jones (Lea County)	85	272		8, 9
Jones (Otero County)	34	148		14
Jones (Tex.)	49	188		9
Jornada (Dona Ana County)	60	212		16
Jornada (Socorro County)	52	194		15
Joseph	36	156		14
Juniper	37	158		13
Jurnegan	29	141	141	11
Kenna	27	138	138	10
Kent	18	119	119	16, 21
Kent Azimuth	59	210		16
Kerlin	77	251		7
Kidder astronomical station	32	146		7
King	84	268		9
Klyng	44	174		10
Knoll	55	200		17
La Lande	27	138	138	10
Laborcita	74	243		14
Ladrones	23	130	130	12, 15, 18
Lane	45	178		8
Las Cruces Magnetic	60	211		16
Laughlin	27	136	136	7
Laughlin (U. S. G. S.), cairn	30	144		7
Lava	59	209		16
Lava, azimuth mark	65	223		16
Lea	85	271		9
Lead pipe near station Sierra Blanca	75	245		14
Lee	84	269		9
Leon	39	165		12
Lera	45	176		8, 10
Lewis (U. S. G. S.)	35	152		14
Lincoln	72	239		13, 14
Lincoln Azimuth	72	239		13, 14
Line (N. Mex.-Ariz.)	71	236		18
Line (U. S. G. S.)	19	123	123	19
Little Burro	52	194		15
Lobo	79	256		7, 8
Loco (Ariz.)	67	225		18, 19
Lone	63	220		20
Lone butte southeast of station Tompson	24	133		12
Lookout:				
Baldy-Mogollon	57	204		19
Bear Mountain (Ariz.)	57	204		19
Buena Vista (Ariz.)[1]				19
Fly Peak (Ariz.)[1]				19
Fox Mountain	71	235		18, 19
Green Peak (Ariz.)	70	235		18, 19
Harley	75	245		14
Magdalena Mountain	25	134		15, 18
Mogollon-Baldy	57	204		19
Monjeau	74	245		14
Mt. Baldy (Ariz.)	25	134		18, 19
Rose Peak (Ariz.)	57	204		19
Signal Peak	65	223		20
Sugarloaf (Ariz.)[1]				19
Tularosa	57	204		19

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Los Angeles-Albuquerque Airway, beacon No.:				
54A (Ariz.)	71	236		18
54B (Ariz.)	71	236		18
54B eccentric (Ariz.)	66	224		18
56 (Ariz.)	71	236		18
56 eccentric (Ariz.)	69	232		18
57	71	236		18
Los Angeles-Amarillo Airway, beacon No.:				
75	43	173		12
78B	43	173		12
81A	43	173		7
81B	43	173		7
82	43	173		7
83	82	263		7
84	82	263		7
85	79	256		7
86	79	256		7
87	79	256		7
88	79	256		7
89 (Tex.)	79	256		7
Los Lunas	23	130	130	17
Louisiana	22	128	128	7, 12
Louisiana, section corner near station	31	144	144	7, 10
Loving	29	141	141	10
Lowrey (U. S. G. S.)	37	158		11
Lummis	80	258		3
Luna County Courthouse, Deming, spire	20	124		28
Lupton	70	234		11
McCarty	77	252		7
McCray	74	244		14
McCullough	77	252		7
McGinis	37	160		13
McKnight	36	155		14
Madden (Colo.)	56	203		17
Madre Mountain	25	134		18
Magdalena Mountain Lookout	25	134		15, 18
Magnetic station:				
Court	78	254		7
Deming	20	124		21
Tucumcari	79	256		7
Mangus (U. S. F. S.)	87	276		18, 19
Manning	36	154		14
Manzano	23	130	130	12, 15
Martin (Quay County)	21	126	126	7, 8
Martin (Valencia County)	69	230		18
Mastodon	59	208		16
Mater	78	255		7
Mayhill (N. Mex. Geodetic Survey)	41	168		14
Mayhill eccentric (U. S. G. S.)	35	153		14
Meadow	63	220		20
Meadow Azimuth	63	220		20
Melena	44	175		10
Melrose	80	258		8
Menecke	37	157		13, 14
Merchant	83	267		9
Mesa	51	193		16, 21
Mesa (Tex.)	19	123	123	16, 21
Mescal (U. S. G. S.)	35	151		14
Mescalera	28	139	139	10, 11
Mescalero	73	241		14
Mexico and United States boundary monument No.:				
2	64	222		16
2 eccentric (Mexico)	59	208		16
3	64	222	222	16
31	21	125	125	21
32	21	125	125	21
39	20	125	125	21
40	21	125	125	21
Military Institute, Roswell, flagpole	46	181		10
Millman	29	141	141	11
Milne-Sand	81	262		8
Mitchil	76	250		7
Mogollon	54	198		19
Mogollon-Baldy Lookout	57	204		19
Moletor	22	127	127	7, 10

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Monjeau Lookout	74	245		14
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Morgan	38	163		13
Moriarity	24	133		12
Morton (Tex.)	48	184		8
Moseley	38	162		13
Mount Baldy, cabin (Ariz.)	70	235		18, 19
Mount Baldy Lookout (Ariz.)	25	134		18, 19
Mount Baldy, south peak (Ariz.)	25	134		18, 19
Mulligan Peak (Ariz.)	57	204		19
Municipal water tank:				
Clayton, silver, finial	33	147		7
Deming	20	124		21
Hobbs	86	274		9
Near	20	124	124	21
Nelson	27	137	137	10
New	58	207		16
New Carrisa (N. Mex. Geodetic Survey)	40	167		14
New Mexico-Arizona boundary milepost No.:				
137	71	236		18
197 eccentric (Ariz.)	70	235		18, 19
New Mexico-Colorado boundary milepost No.:				
247 (G. L. O. Station 2)	58	206		17
313	29	143		7
328 eccentric	26	135	135	7
New Mexico-Colorado boundary (old) (M. C. 1881)	30	143		7
New Mexico-Colorado-Oklahoma boundary monument (1900)	30	143	143	7
New Mexico-Colorado old boundary milepost No. 328	30	143		7
New Mexico-Texas boundary mile corner:				
53	31	145		11
53 eccentric (Tex.)	29	142	142	11
61	31	145		11
61 eccentric (Tex.)	31	145	145	11
306	33	147		7
No. 8, (Clark)	83	265		9
No. 12, (Clark)	86	273		9
New Mexico-Texas boundary milepost No.:				
1	33	147		7
4	33	147		7
4 eccentric	32	146		7
New Mexico-Texas boundary monument No. 195	65	223		16
New Mexico-Texas, Clark boundary monument No.:				
9	21	126		7, 8
14	39	166		14
15	34	149		14
99	49	186		8
99 eccentric	49	185		8
135	34	148		14
Newman, water tank	65	223		16
N. M. CH 29 (N. Mex. Geodetic Survey)	47	182		10
N. M. D. A. 55 (N. Mex. Geodetic Survey)	65	223		16
N. M. D. A. 97 (N. Mex. Geodetic Survey)	60	211		16
Nogal	72	237		14
Noonday Peak	20	124		20, 21
North Anthonys Nose (N. Mex. Geodetic Survey)	59	208		16
North base:				
Artesia	28	140	140	11
Belen	23	131	131	12, 15
Deming	19	121	121	21
North Franklin (Tex.)	18	119	119	16, 21
North Franklin (U. S. G. S.), cairn (Tex.)	20	124		16, 21
North Star	63	219		20
Northwest corner of Texas—Clark's Monument (N. Mex.-Tex.)	32	146		7
Nutt	61	216		20
Obar	78	255		7
Oil derrick (Tex.)	277	276		7
Ojo	69	233		18
Oklahoma-Colorado-New Mexico boundary monument (1900)	30	143	143	7
Old boundary milepost no. 328, New Mexico-Colorado	30	143		7
Old Carrisa (N. Mex. Geodetic Survey)	40	167		14
Omer	38	161		13
One Tree	35	151		14
Orange	33	148		14
Ords (Ariz.)	24	132	132	18, 19

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Osha Peak, cairn	25	133		12
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Paint	61	216		16, 20
Pajarita (U. S. G. S.)	71	236		14
Pedernal	23	129	129	12
Pello	85	270		9
Pensive (Tex.)	49	188		9
Phillips	22	128	128	7, 10
Phoenix-El Paso Airway beacon No.:				
33	66	223		21
39	64	223		16
Phone	80	258		8
Picacho	37	157		13, 14
Piedra (U. S. G. S.) (Colo.)	56	203		17
Pinon (Catron County)	24	132	132	18, 19
Pinon (Otero County)	40	166		14
Pinos	63	221		12
Pintada	22	128	128	7, 12
Pipe	59	211		16
Pits	78	253		7
Plains (Tex.)	50	189		9
Plainview (U. S. G. S.)	41	170		13
Pole (Ariz.)	67	226		18, 19
Pond	70	234		17
Pope	29	142	142	11
Portair	80	259		8
Portales	81	260		8
Portales, water tank	82	264		8
Porter (Ariz.)	69	232		18
Posey	41	169		14
Potato (Colo.)	25	134	134	7
Potato (N. Mex. Geodetic Survey)	40	167		14
Powder	63	219		20
Powell (Tex.)	33	147		14
Prairie	62	217		20
Presbyterian Church, Silver City, spire	66	223		20
Public school, Silver City, chimney	66	223		20
Puerco	53	195		12, 15
Purcella	41	170		13
Putnam's Ranch, windmill	25	134		18
Quemado	68	228		18
Quitman (Tex.)	18	118	118	
Quitman (U. S. G. S.), cairn (Tex.)	19	123		
Rabbit	26	136	136	7
Rabbit Ear Butte, northernmost peak, tip	33	147		7
Rachel (Tex.)	49	186		9
Rain	73	239		14
Ramon	42	171		13
Range	61	213		16
Ranger	85	273		8, 9
Rardin	75	247		7
Raybourn	80	259		8
Read (Tex.)	50	190		9
Red	19	121	121	21
Red Cone	67	227		18
Red Hill (U. S. F. S.) (Ariz.)	86	274		19
Red Lake	81	261		8
Redondo	22	127	127	7, 8, 10
Reed	77	250		7
Reese (Ariz.)	66	224		18
Reeves (Tex.)	58	207		16
Reservoir	74	243		14
Rica	23	129	129	7
Rice	45	176		10
Riggs (Ariz.) [1]				19
Riggs, U. S. G. S. bench mark near station (Ariz.) [1]				19
Riggs, U. S. G. S. cairn near station (Ariz.) [1]				19
Rincon	51	192		15, 16, 20, 21

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Roach (Tex.)	49	186		9
Roberts	45	177		8
Rock cairn on north end of Alegros Mountain	25	134		18
Rose	74	244		14
Rose (Ariz.)	55	199		19
Rose (U. S. G. S.), cairn	75	245		14
Rose Peak Lookout (Ariz.)	57	204		19
Ross (Tex.)	29	142	142	11
Roswell	44	174		10
Roswell:				
Courthouse, dome	46	181		10
Federal Building, flagpole	47	181		10
Military Institute, flagpole	46	181		10
Red brick church, spire	46	181		10
Round (Ariz.) [1]				19
Round, U. S. G. S. benchmark near station (Ariz.) [1]				19
Royal	45	178		8
Rycade	85	270		9
Saddle Mountain (U. S. F. S.)	87	274		19
Saffell (Ariz.)	67	226		18, 19
St. Johns (Ariz.)	66	224		18
Salinas Peak	53	196		15
Salley	42	170		13
San Andreas Peak	53	196		15, 16, 21
San Jon	82	263		7
San Miguel Lava Cone (N. Mex. Geodetic Survey)	60	211		16
Sanchez	68	229		18, 19
Sand Springs	77	252		7
Sandia	23	130	130	12
Sandia Range, sharp peak	24	133		12
Sardine	28	138	138	10
Sawyer (Lea County)	45	178		8
Sawyer (Sierra and Grant Counties)	62	218		20
Sawyer (Valencia County)	24	132	132	17, 18
Sawyer and Taylor, *highest hill between stations, west shoulder*	25	134		18
Scarborough (Tex.)	83	264		9
Scharb	84	268		9
School	50	190		8, 9
School (Okla.)	32	145	145	7
School:				
Bledsoe High, stack	48	185		8
Silver City, public, chimney	66	223		20
Springerville, grammar, cupola	71	235		18, 19
Scott	34	149		14
Screwbean (Tex.)	29	142	142	11
Scrub (Ariz.)	69	233		18
Sears	28	139	139	8, 10
Secho	53	196		19
Section corner (*see* T.)				
Section corner near station Louisiana	31	144	144	7, 10
Seneca	26	136	136	7
Seven L (Colo.)	25	134	134	7
Shaw (Ariz.) [1]				19
Shaw, U. S. G. S. bench mark near station (Ariz.) [1]				19
Shed	77	251		7
Shiprock, highest point	57	206		17
Sibley (U. S. G. S.)	62	216		20
Sierra Blanca	72	237		14
Sierra Blanca, lead pipe near station	75	245		14
Sierra Blanca, U. S. G. S. bench mark near station	75	245	245	14
Sierra Capitan	31	144		13
Sign	62	217		20
Signal	63	220		20
Signal Peak Lookout	65	223		20
Silver	73	240		14
Silver City:				
Catholic Church, east spire	66	223		20
Catholic Church, west spire	66	223		20
Presbyterian Church, spire	66	223		20
Public school, chimney	66	223		20
Simpson (U. S. G. S.)	56	201		17
Sims	86	273		9

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Slash	52	195		15
Slaughter	36	156		14
Small butte northwest of station Hill	24	133		7
Smelter, Orogrande	20	124		14, 21
Socorro (U. S. G. S.)	53	195		15
Solana	27	137	137	7
Solana townsite, northeast corner	31	144		7
South base:				
Artesia	28	140	140	11
Belen	23	131	131	12, 15
Deming	19	122	122	21
Spanish	38	162		13
Spence	63	221		20
Spire:				
Deming, Luna County Courthouse	20	124		21
Roswell, red brick church	46	181		10
Silver City, Catholic Church, east	66	223		20
Silver City, Catholic Church, west	66	223		20
Silver City, Presbyterian Church	66	223		20
Springerville (U. S. G. S.) (Ariz.)	67	227		18, 19
Springerville:				
Grammar school, cupola (Ariz.)	71	235		18, 19
Red roof church, brown steeple (Ariz.)	277	276		18, 19
Stack:				
Bledsoe High School (Tex.)	48	185		8
Hurley, tall black	65	223		20
State (Ariz.)	67	226		18, 19
Station 10 (N. Mex. Geodetic Survey)	63	221		20
Station A	31	144	144	7, 10
Station B	31	144	144	7, 10
Stone	35	153		14
Stony Butte	56	201		17
Storm	53	195		15
Strauss	59	209		16
Sugarloaf Lookout (Ariz.) [1]				19
Sunken	44	174		10
Sunset (U. S. G. S.) (Ariz.)	54	197		19
Swoyer	76	248		7
"T" on Hill	65	223		20
Tab	61	213		16
Table	51	192		16, 21
Tank	39	164		12, 13
Tank. (*See* water tank.)				
Tank, Booster Station, galvanized, on red platform, center	33	147		7
Tankersley	45	177		8
Tanneyhill	81	261		8
Target	59	210		16
Target range, Dona Ana, water tank	64	223		16
Target, U. S. G. S.	43	172		12
Tatum	85	272		8, 9
Taylor	23	131	131	12, 17, 18
Taylor and Sawyer, highest hill between stations, west shoulder	25	134		18
Telephone	54	197		19, 20
Terreo	69	231		18
Texas-New Mexico boundary (Clark) mile corner No.:				
8	83	265		9
12	86	273		9
Texas-New Mexico boundary mile corner:				
53	31	145		11
53 eccentric (Tex.)	29	142	142	11
61	31	145		11
61 eccentric (Tex.)	31	145	145	11
306	33	147		7
Texas-New Mexico boundary milepost No.:				
1	33	147		7
4	33	147		7
4 eccentric	32	146		7
Texas-New Mexico boundary monument No. 195	65	223		16
Texas-New Mexico, Clark boundary monument No.:				
9	21	126		7, 8
14	39	166		14
15	34	149		14
99	49	186		8
99 eccentric	49	185		8
135	34	148		14

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Texline, West Texas Utilities Co., water tank, finial (Tex.)	33	147		7
Texmex	46	179		8
Texpac (Tex.)	49	187		9
Thomas	75	247		7
Thorn	35	151		14
Tidwell	35	152		14
Tingle	69	230		18
Tohatchi	55	199		17
Tolar	27	138	138	10
Tompson	23	130	130	12
Tompson, lone butte southeast of station	24	133		12
Tonuco	60	212		16
Torlupe	43	172		12
Tortugas (N. Mex. Geodetic Survey)	51	192		16, 21
Township (*see* T.)				
T. 5 N., R. 16 E., sections 34 and 35 corner	42	172		12
T. 5 S., R. 17 W., section 32, southeast corner (U. S. F. S.)	87	275		19
T. 5 S., R. 17 W., southeast corner (U. S. F. S.)	87	275		19
T. 7 N., R. 26 E., sec. 28, southwest corner	31	144	144	10
T. 9 N., R. 24 E., sec. 29, southwest corner	31	144		7, 10
T. 12 N., R. 26 E., sections 30 and 31, ¼ sec. corner	31	144		7
T. 13 S., R. 17 E., section corner	41	169		14
T. 19 N., R. 27 E., sec. 28, northeast 1/16 corner	31	144		7
T. 19 S., R. 34 E., sec. 10, southeast corner	86	274		9
T. 20 N., R. 22 E., sec. 2, southwest corner	31	144		7
T. 22 N., R. 28 E., sec. 4, southwest corner	30	144	144	7
T. 24 S., R. 16 E., sec. 23, southeast corner	40	166		14
T. 24 S., R. 34 E., sec. 4, southwest corner	86	273		9
T. 26 N., R. 34 E., sec. 1, northeast corner	30	144	144	7
T. 26 S., R. 15 E., sec. 4, northwest corner	39	166		14
T. 27 N., R. 33 E., sec. 17, southwest corner	30	144		7
T. 28 N., R. 26 E., sec. 28, southwest corner	30	144		7
T. 28 N., R. 35 E., sec. 23, southeast corner	30	144		7
T. 29 N., R. 29 E., sec. 10, southeast corner, Des Moines townsite	30	143		7
T. 29 N., R. 34 E., sec. 3, southwest corner	30	143		7
T. 30 N., R. 35 E., sec. 33, southeast corner	30	143	143	7
Townsite, Des Moines, T. 29 N., R. 29 E., sec. 10, southeast corner	30	143		7
Townsite, Solana, northeast corner	31	144		7
Treat	36	155		14
Trujillo	61	216		20
Tucum	78	256		7
Tucumcari	24	133	133	7
Tucumcari, city water tank	24	133	133	7
Tucumcari magnetic station	79	256		7
Tularosa	54	198		19
Tularosa (U. S. G. S.)	87	274		19
Tularosa Lookout	57	204		19
Turkey	73	240		14
Tuton	73	240		14
Tuton Azimuth	73	240		14
Twin	81	262		8
United States and Mexico boundary monument No.:				
2	64	222		16
2 eccentric (Mexico)	59	208		16
3	64	222	222	16
31	21	125	125	21
32	21	125	125	21
39	20	125	125	21
40	21	125	125	21
United States Detention Farm:				
Dome (Tex.)	65	223		16
Northwest water tank (Tex.)	65	223		16
Southwest water tank (Tex.)	65	223		16
Upham	61	214		16
Urton	27	138	138	10
U. S. G. S. bench mark near station Riggs (Ariz.) [1]				19
U. S. G. S. bench mark near station Round (Ariz.) [1]				19
U. S. G. S. bench mark near station Shaw (Ariz.) [1]				19
U. S. G. S. bench mark near station Sierra Blanca	75	245		14
U. S. G. S. target	43	172		12
Ute (Colo.)	56	202		17

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Vaughn:				
Catholic Church, cross	43	172		12
High school, chimney	42	172		12
Water tank	43	172		12
Veterans Hospital, Fort Bayard, water tank	65	223		20
Vrain	82	263		8
Wade	28	139	139	10, 11
Wagon	27	136	136	7
Wahl (Ariz.)	67	226		18, 19
Waldie (U. S. G. S.)	34	150		14
Walker (Chaves County)	47	181		10
Walker (Eddy County)	28	140	140	11
Walker (N. Mex. Geodetic Survey)	41	168		14
Warmuth	21	126	126	7
Warren	45	179		8
Water tank:				
Booster Station, black, finial	33	147		7
Clayton, municipal (silver), finial	33	147		7
Clovis	82	264		8
Deming, municipal	20	124		21
Dona Ana, target range	64	223		16
Fort Bayard, Veterans' Hospital	65	223		20
Glenrio (Tex.)	277	276		7
Hobbs, municipal	86	274		9
Lordsburg	56	204		19
Newman	65	223		16
Portales	82	264		8
Texline, West Texas Utilities Co., finial (Tex.)	33	147		7
Tucumcari, city	24	133	133	7
United States Detention Farm, northwest (Tex.)	65	223		16
United States Detention Farm, southwest (Tex.)	65	223		16
Vaughn	43	172		12
Waterworks, Deming, city	20	124	124	21
Watts	79	257		8
Weed (N. Mex. Geodetic Survey)	40	167		14
Weir	84	268		9
Welch	29	142	142	11
Well	35	150		14
West base:				
Arabella	37	159		13
Clayton	26	135	135	7
West Spur	72	238		14
West Spur Azimuth	72	239		14
West Spur, wooden windmill north of station	74	245		14
West Texas Utilities Co., Texline, water tank, finial (Tex.)	33	147		7
Westbox	72	238		14
Whaley	76	249		7
Whaley 2	78	255		7
White	64	222		20
Whiterocks (U. S. G. S.)	55	198		19
Whitetail	73	241		14
Whitewater	70	234		17, 18
Wilcox (Tex.)	33	147		14
Williams (Chaves County)	41	168		14
Williams (Lea County)	84	270		9
Windmill:				
Putnam's Ranch	25	134		18
Wooden, north of station West Spur	74	245		14
Winkle	43	172		12
Winters	83	265		9
Witch (Ariz.)	67	225		18
Wofford (N. Mex. Geodetic Survey)	71	236		14
Wood (Ariz.)[1]				19
Wooden windmill north of station West Spur	74	245		14
Woods	77	253		7
Worsham (Tex.)	32	146	146	7
Yoakum (Tex.)	46	180		8, 9
Zuni	69	232		18
Zuni (U. S. G. S.)	71	235		18
Zurick	76	248		7

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